ILLINOIS STATE WATER SURVEY

No. 40

STATE OF ILLINOIS
OTTO KERNER, *Governor*

DEPARTMENT OF REGISTRATION AND EDUCATION
WILLIAM SYLVESTER WHITE, *Director*

SUPPLEMENT H
TO
BULLETIN 40

ADDITIONS TO PUBLIC GROUND-WATER SUPPLIES IN ILLINOIS

by

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URBANA

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SUPPLEMENT *U*

TO

BULLETIN 40

SUMMARY

Supplement II to Bulletin 40 contains 299 descriptive articles on public ground-water supplies in Illinois, as shown in the following table:

Incorporated municipalities	212
Subdivisions, public water districts, sanitary districts, and unincorporated places	80
State parks	7
Total	299

Of the 212 incorporated municipalities included herein, 178 were described in Bulletin 40 and are brought up to date in this Supplement. They are not counted again in the State totals (Table C). The remaining 34 are new supplies and are counted in the State totals. The subdivisions, public water districts, sanitary districts, and unincorporated places are additional to those of the same categories shown in Bulletin 40 and Supplement I, as also are the seven State parks.

There are 473 wells in service for the 299 public water systems described in Supplement II. These wells are currently producing 44.14 mgd. from three sources. The sources of water, number of wells, and amount of water pumped are shown in Table A.

Table B shows the sources of water, total number of wells in service, and total pumpage for all public supplies shown in Bulletin 40 and Supplements I and II.

Table C shows the total number of public ground-water supplies within the State, on which there are adequate, well-confirmed data in the Survey's records.

TABLE A

Source of Water	Wells no.	Pumpage mgd.
Unconsolidated	183	18.04
Limestone	193	10.82
Sandstone	97	15.28
Total	473	44.14

TABLE B

Source of Water	Total Wells no.	Total Pumpage mgd.
Unconsolidated	935	83.27
Limestone	419	38.71
Sandstone	482	45.94
Total	1836	167.92

TABLE C

TOTAL PUBLIC GROUND-WATER SUPPLIES IN ILLINOIS

	Bulletin 40	Supplement I	Supplement II	Total
Incorporated municipalities	501	105	34	638
Subdivisions, public water districts, sanitary districts, unincorporated places	18	3	80	103
State parks	6	4	7	17
State institutions	10	3		13
Total	535	115	121	771

INTRODUCTION

Supplement II to Bulletin 40 completes the inventory of the State Water Survey's records of all public ground-water supplies in the State as of December 31, 1960. Included herein are:

(1) all supplies which have been installed since Bulletin 40 (1950) and Supplement I (1958);

(2) those supplies which may have been installed before the publication of Bulletin 40, but because of scanty information in the Survey's files or in some cases a complete lackof information, were omitted from Bulletin 40;

(3) some supplies described in Bulletin 40 which have expanded their operation by finding new sources of water, or otherwise brought about significant changes in well and water characteristics.

A number of towns have drilled new wells in the same field as the old well or wells and of similar construction, with no significant change in water quality. In the interest of economy these are not included herein, but the data are available upon request.

Also omitted are a number of subdivisions and unincorporated areas (possibly 150 or 175 over the State) for which there is a considerable lack of basic data. Continuing field work by the staff will fill in the missing data which then will be made available upon request to the Survey.

FORMAT

Supplement II has been organized and assembled in a form similar to that of Bulletin 40, with pages punched for use in either a 2 or 3-ring binder. The last date on which authoritative information was received by the Survey is shown in the upper right hand corner under the subject name.

The U. S. census population for 1960 is shown following the first mention of the name of incorporated places. For unincorporated places the population is estimated, based on the number of services or residential units.

All elevations are in feet above mean sea level datum, unless stated otherwise.

The subdivisions and unincorporatedplaces to be found herein are listed by county on pages immediately following.

As in Bulletin 40, the public supplies are described for those State parks which have overnight lodging accommodations.

ACKNOWLEDGMENTS

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H. F. Smith, Head of the Engineering Section, supervised the field work and the preparation of the manuscript.

T. E. Larson, Head of the Chemistry Section, directed, the chemical analyses and Laurel M. Henley supervised the laboratory work.

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SUBDIVISIONS, PUBLIC WATER DISTRICTS, AND UNINCORPORATED PLACES

COOK COUNTY

Location			Name
Twp.	R.	Sec.	
36N	12E	22	Fernway
36N	12E	25	Southlands
36N	13E	9	El Vista
36N	13E	22	Willowick Estates
37N	12E	35	Palos Highlands
37N	13E	19	Ridgewood Homes
37N	13E	28	Blue Crest
38N	12E	8	Country Club Heights
38N	12E	17	Dise
38N	12E	18	Ridgewood
38N	12E	32	Edgewood Acres
41N	11E	10	Hatlen Heights
41N	11E	24	Waycinden Park
41N	12E	12	Eugenia
41N	12E	14	Golf-Greenwood
42N	10E	3	Barrington Woods
42N	10E	11	Northern Aire Estates
42N	11E	26	Brickman Manor
42N	11E	27	Prospect Meadows
42N	11E	34	Citizens Bluett Company
42N	12E	5	Lonetree
42N	12E	17	Northbrook West
42N	12E	30	Northfield Woods
42N	12E	33	Glenview Countryside

DU PAGE COUNTY

38N	9E	9	Scots Plains
38N	10E	11	Oakview
38N	10E	12	Belmont-Highwood P. W. D.
38N	10E	13	Maple Hill Improvement Assn.
38N	11E	4	Liberty Park
38N	11E	10	Black Hawk Heights
38N	11E	16	Austin Acres
38N	11E	27	Brookhaven Manor
38N	11E	35	Tri-State Village (uninc.)
39N	9E	13	Wheaton Pk. Manor (Winfield)
39N	9E	35	Warrenville (uninc.)
39N	10E	2	Glen Ellyn Heights
39N	10E	5	Gary Avenue Gardens
39N	10E	10	Wheaton Farms (uninc.)
39N	10E	35	Valley View
39N	11E	5	Lombard Heights
39N	11E	20	York Center
39N	11E	20	Highland Hills (Midwest York Water Co.)
40N	10E	15	Suncrest Highlands
40N	11E	25	Country Club Highlands
40N	11E	36	Emroy-Howard

KANE COUNTY

42N	8E	13	Meadowdale

LAKE COUNTY

43N	10E	10	Forest Lake Addition
43N	10E	18	Zurich Heights Sanitary District
43N	11E	6	Towner
45N	11E	2	Harvest Homes-Waukegan Countryside
45N	11E	29	Wildwood
46N	12E	26	Lake County P. W. D.

MADISON COUNTY

5N	9W	2	Forest Homes-Maple Park P. W. D.

MC HENRY COUNTY

45N	7E	14	Highland Shores
45N	8E	18	Oakwood Shores
45N	8E	18	Wooded Shores
45N	8E	25	Eastwood Manor
45N	8E	27	Lakeland Park
45N	9E	5	Pistakee Highlands

ROCK ISLAND COUNTY

17N	1E	5	Fair Acres Estates
17N	1E	6	Oneida Heights
17N	1E	7	Glendale Addition
18N	1E	31	Silvis Heights

ST. CLAIR COUNTY

2N	9W	1	Mound P.W.D.

TAZEWELL COUNTY

26N	4W	24	North Tazewell P.W.D.

WILL COUNTY

32N	9E	1	Lakewood Shores
34N	9E	5	Adams Heights
34N	14E	20	Balmoral Heights
35N	10E	11	Ridgewood Water Assn.
35N	10E	27	Preston Heights
35N	12E	10	Arbury Hills
36N	9E	25	Sunnyland
36N	10E	3	Oakview Avenue
36N	10E	31	Richland
36N	10E	31	Sycamore-Greengold
36N	10E	35	May Street
36N	11E	7	Lockport Heights
37N	10E	33	Hampton Park (Romeoville Well No. 2)

WINNEBAGO COUNTY

44N	2E	34	Mulfords

WOODFORD COUNTY

27N	3W	29	Caterpillar Trails P.W.D.

ABBREVIATIONS AND SYMBOLS

B. H. P.	brake horse power
ci.	cast iron
cu. yd.	cubic yard (s)
°C.	degree Centigrade
°F.	degree Fahrenheit
epm.	equivalents per million
ft.	foot (feet)
gal.	gallon (s)
gal. per hr.	gallons per hour
gi.	galvanized iron
gpd.	gallons per day
gpm.	gallons per minute
gps.	gallons per second
gr. per gal.	grains per gallon
gwi.	genuine wrought iron
HC.	high capacity
HC1.	hydrochloric acid
HTH.	high test hypochlorite
hp.	horsepower
hr.	hour (s)
id.	inside diameter
in.	inch (es)
Lab.	laboratory
L. S. D.	land surface datum
lb.	pound (s)
LC.	low capacity
MC.	medium capacity
mg.	million gallons
mgd.	million gallons per day
min.	minute (s)
M. S. L.	mean sea level
mo.	month (s)
No.	number
od.	outside diameter
O. W.	observation well
ppm.	parts per million
psi.	pounds per square inch
qt.	quart (s)
R.	range
rpm.	revolutions per minute
T.	township
T.D.H.	total dynamic head
wk.	week (s)
wi.	wrought iron
%	per cent

ADAMS HEIGHTS
SUBDIVISION
Will County
November 28, 1958

A public water supply was installed in 1952 for Adams Heights Subdivision (est. 450). Two wells are in service. The system is owned by the Adams Heights Improvement Association.

WELL NO. 1 was completed in Aug. 1952 to a depth of 204 ft. by Dreher and Schorie, Joliet, and located on Lot 18 of the subdivision, or approximately 2200 ft. S. and 150 ft. W. of the N. E. corner of Section 6, T34N, R14E. The ground surface elevation at the well is 735. The well was cased with 6-in. pipe to 125 ft.

The pumping equipment consists of 100 ft. of 1 l/2-in. drop pipe; Reda submersible pump, No. 41150, rated at 35 gpm.; 1 l/2-hp. electric motor.

WELL NO. 2 was completed in 1954 to a depth of 194 ft. and located on Lot 63, about 500 ft. northeast of Well No. 1, or approximately 925 ft. S. and 200 ft. E. of the N. W. corner of Section 5. The ground surface elevation at the well is 725. The well was cased with 124 ft. of 6-in. pipe.

The pumping equipment consists of 105 ft. of 2-in. drop pipe; Reda submersible pump, No. 413001, rated at 45 gpm.; 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 148256) collected Nov. 20, 1958 showed the water to have a hardness of 29 gr. per gal., total dissolved minerals of 489 ppm., and an iron content of 1.6 ppm.

There are 160 services, all metered, and all of the subdivision is served. Pumpage is estimated to average 25, 000 gpd.

LABORATORY NO. 148256

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.6		Silica	SiO_2	13.1	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	98.3	4.92	Boron	B	0.1	
Magnesium	Mg	47.9	3.94	Chloride	Cl	4.	.11
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	0.5	.01
Sodium	Na	13.	.56	Sulfate	SO_4	64.4	1.34
				Alkalinity (as	$CaCO_3$)	400.	8.00
Turbidity		5		Hardness (as	$CaCO_3$)	443.	8.86
Color		0					
Odor		0					
Temp. (reported)		52.0°F		Total Dissolved Minerals		489.	

ADDISON
DuPage County
October 21, 1960

The village of Addison (6741) has four wells in service.

WELL NO. 1 was reportedly drilled in 1924 to a depth of 155 ft. and cased with 10-in. pipe from the surface to rock at 90 ft.

In July 1949 it was reported that the Keystone piston pump had been replaced with a Cook turbine pump, Serial No. 10957, directly connected to a 15-hp. U S electric motor. In June 1951 a new shaft was reportedly installed in the well. In June 1956 Well No. 1 was reported to be the sole source of supply for the village with 463 services, all metered. The pumping equipment included a Byron Jackson oil lubricated turbine pump set at 90 ft. The pump, rated at 600 gpm. at 160 ft. T.D.H., was directly connected to a 40-hp. General Electric motor. The static water level was reported to be 25 ft. below the top of the casing and during pumping, the drawdown was 6 ft. There was no air line in the well.

WELL NO. 2, drilled in 1908 to a depth of 115 ft., was originally constructed for fire protection. It was located on the village hall lot, about 70 ft. south of Well No. 1, or approximately 1420 ft. S. and 2010 ft. W. of the N. E. corner of Section 28, T40N, R11E.

In Sept. 1950 a brief production test was made by State Water Survey personnel, at the request of Village officials, to determine the value of the well as a stand-by unit. The well had, at one time, been equipped with a 30-gpm. capacity cylinder pump. The S. B. Geiger & Co., Chicago, removed the pump and found the well to be cased with 6-in. pipe to rock at a depth of 70 ft. and the hole to be 4 l/2 in. in diameter from the bottom of the casing to the bottom of the well at 91 ft. For the test a Pomona turbine pump was installed with the bottom of the bowls set at 70 ft. and an air line of 70 ft. length. The power was furnished by a 7 1/2-hp. electric motor.

Water was pumped for 2 hr. at rates accelerated from 75 to 98 gpm. with a maximum drawdown of 7 ft. from a nonpumping water level of 41 ft. below the top of the casing. During this test the pump in Well No. 1, about 50 ft. distant, was operating at a rate of 160 gpm. Since the test pump was too small to develop the full capacity of the well, the test was discontinued. In June 1956 Well No. 2 was reportedly used only during periods of peak demand. The pumping equipment included a Fairbanks-Morse turbine pump, Serial No. AM2979, rated at 200 gpm. atl60ft. T.D.H., directly connected to a 10-hp. U S electric motor.

In Aug. 1957 Well No. 2 was reported to be in use daily.

WELL NO. 3 was completed by J. P. Miller Artesian WellCo., Brookfield, toadepthof 221 ft. in the spring of 1956 and located on the east side of Michigan St., north of Fullerton St., or approximately 160 ft. N. and 1540 ft. W. of the S. E. corner of Section 28. The well was cased from the surface to 78 ft. with 14-in. od. gwi. pipe and with 10-in. id. gwi. pipe from 18 in. above to 110 ft, below the ground surface. The annulus between the casings was filled with cement grout. Below the casings the hole was finished 13 l/4.in. in diameter to the bottom. Well No. 3 was placed in service in 1957 and was equipped with a Model 10 RM Layne and Bowler pump rated at 600 gpm. at 300 ft. T.D.

H., directly connected to a 60-hp. Louis Allis electric motor.

In a production test on July 24, 1956 water was pumped for 8 hr, at a rate of 500 gpm. with a drawdown of 104 ft. from a static water level of 14 ft. below the ground surface (elev. 665).

Analysis of a sample (Lab. No. 146504) collected Apr. 28, 1958, after 5min. pumping, showed the water in Well No. 3 to have a hardness of 24. 9 gr. per gal., total dissolved minerals of 525 ppm., and an iron content of 1.1 ppm.

Late in 1955 or early in 1956 the Pleasant View Acres Subdivision water system facilities was purchased by the village of Addison. The system included 713 services, 100% metered. The subdivision well, now designatedas village WELL NO. 4, was drilled in 1954 to a depth of 250 ft. by a Mr. Bilskey of Hinsdale. The well is located south of Addison on the north side of Winthrop, west of Westgate, or approximately 1350 ft. S. and 1050 ft. E. of the N. W. corner of Section 33. The well was cased with 10-in. id. pipe, penetrating rock at 81 ft. The pumping equipment included a Sta-Rite turbine pump, Serial No. OI3860, rated at90'gpm. against 220 ft. T.D.H., and attached to 60 ft. of 3-in. column pipe and powered by a 7 1/2-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146505) collected Apr. 28, 1958, after 5 min. pumping, showed the water in Well No. 4 to have a hardness of 24. 5 gr. per gal., total dissolved minerals of 495 ppm., and an iron content of 1.1 ppm.

In Oct. 1960 new pumping equipment was installed consisting of 165 ft. of 5-in. column pipe; 8-in., 13-stage Layne turbine pump, No. 40426, and rated at 375 gpm. at 300 ft. T.D.H.; 10 ft. of 6-in. suction pipe with strainer; 165 ft. of air line; 40-hp. Westinghouse electric motor.

Pumpage for Addison is reported to average 375,000 gpd.

Correlated driller's log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	74	74
SILURIAN SYSTEM		
Limestone	176	250
Shale	-	250

LABORATORY NO. 146505

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1. 1		Silica	SiO_2	18. 0	
Manganese	Mn	Tr.		Fluoride	F	0. 3	
Calcium	Ca	94. 4	4. 72	Boron	B	0. 2	
Magnesium	Mg	44. 9	3. 69	Chloride	Cl	3.	. 08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 5	. 01
Sodium	Na	12.	. 54	Sulfate	SO_4	106. 6	2. 22
				Alkalinity (as	$CaCO_3$)	332.	6. 64
Turbidity		5		Hardness (as	$CaCO_3$)	421.	8. 41
Color		0					
Odor		0					
Temp. (reported)		51. 2°F		Total Dissolved Minerals		495.	

ALPHA
Henry County
January 22, 1957

Water for the public water supply of the village of Alpha (637) is obtained from one well.

WELL NO. 1, described in Bulletin 40 as being leased from the C. B. & Q. Railroad, has not been used since about 1950 or 1951.

WELL NO. 2 was completed at the site of Test Well No. 1-50 in Jan. 1950 by Peerless Service Co., Orion. It was drilled to a depth of 1209 ft. and located near the corner of "E" and Second St. about 1 block northeast of Well No. 1, or approximately 1750 ft. S. and 650 ft. W. of the N. E. corner of Section 21, T14N, R1E. The ground elevation at the well is 800. The hole and casing record is shown in Table A.

TABLE A

Hole Record

1 6-in. from surface to 240 ft.
12-in. from 240 ft. to 433 ft.
10-in. from 433 ft. to 551 ft.
8-in. from 551 ft. to 1209 ft.

Casing Record

12-in. id. from surface to 240 ft.
10-in. id. from 240 ft. to 433 ft.
8-in. id. from surface to 551 ft.

A production test was conducted on Test Well No. 1-50 on Jan. 16, 1950 by representatives of the Driller, the State Water Survey, and the Austin Engineering Co., Consulting Engineers. For test purposes the well was equipped with an electrically driven Peerless turbine pump, rated at 100 gpm. against 400ft. T.D.H. The assembly included 350 ft. of 4-in. column pipe; 12 ft. of pump bowls in 28 stages; 20 ft. of tail pipe. The pump assembly was to be retained as the permanent equipment. A 350-ft. air line was in place for determining water levels.

After 4 1/2 hr. pumping at a rate of 112 gpm., the drawdown was 49 ft. from a nonpumping water level of 256 ft. Ten min. after pumping was stopped, the water level had recovered to 260 ft.

A mineral analysis of a sample (Lab. No. 120516) collected Jan. 16, 1950, after 4 1/2 hr. pumping at 112 gpm., showed the water in Test Well No. 1-50 to have a hardness of 14. 7 gr. per gal., total dissolved minerals of 754 ppm., and an iron content of 2. 7 ppm.

Test Well No. 1-50 was then accepted by the village and designated as Well No. 2.

There are 240 services, all metered and serving 100% of the population.

Pumpage for 1956 averaged about 35, 000 gpd.

Correlated driller's log of Alpha Test Well No. 1-50, now WELL NO. 2, furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Clay	75	75
Sand, coarse	3	78
PENNSYLVANIAN SYSTEM		
Shale	149	227
Sandstone	14	241
Shale	5	246
Sandstone	14	260
Shale	95	355
DEVONIAN & SILURIAN SYSTEMS		
Limestones, gray	205	560
SILURIAN SYSTEM		
Limestone, white	110	670
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, blue	85	755
Rock, gray	80	835
Shale, gray	43	878
Galena-Platteville Formations		
Limestone, brown	317	1195
St. Peter Formation	14	1209
		T. D.

2 - Alpha

LABORATORY NO. 120516

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.7		Silica	SiO_2	15.7	
Manganese	Mn	0.1		Fluoride	F	0.9	
Calcium	Ca	62.3	3.12	Chloride	Cl	36.	1.02
Magnesium	Mg	22.9	1.89	Nitrate	NO_3	6.5	.10
Ammonium	NH_4	0.5	.03	Sulfate	SO_4	155.1	3.23
Sodium	Na	183.	7.95	Alkalinity (as	$CaCO_3$)	432.	8.64
Turbidity		80		Hardness (as	$CaCO_3$)	251.	5.01
Color		0					
Odor		Tr.		Total Dissolved Minerals		754.	

AMBOY
Lee County
November 17, 1960

Two wells are available for use by the city of Amboy (2067).

WELL NO. 1, described in Bulletin 40, is not in service and may be retired.

WELL NO. 2, described in Bulletin 40, is available for service, but has been used only occasionally since Well No. 3 was constructed.

WELL NO.. 3 was completed in Mar. 1958 to a depth of 1105 ft. by Layne-Western Co., Aurora, and located about 60 ft. east of Well No. 2, about 80 ft. north of the treatment plant, or approximately 779 ft. S. and 1315 ft. W. of the N. E. corner of Section 22, T20N, R10E. The ground surface elevation at the well is 750. The well is cased with 20-in. steel pipe from the surface to 29 l/2 ft. and with 16-in. steel pipe from the surface to 235 ft. (cemented in), below which the hole was finished 15 l/4 in. in diameter to the bottom.

A production test was conducted on Jan. 24, 1958 by representatives of the Driller, the State Water Survey, and C. K. Willett Co., Consulting Engineers. After 16 hr. pumping at a rate of 644 gpm., the drawdown was 150 ft. from a non-pumping water level of 44 ft. Eight hr. after the test was stopped, the water level had returned to 44 ft.

The pumping equipment includes a Byron Jackson turbine pump, No. 351463, rated at 500 gpm. at 286 ft. T.D.H. or 350 gpm. at 140 ft. Power for pumping is from a 50 and 22-hp. variable speed U S electric motor.

A mineral analysis of a sample (Lab. No. 153626) collected Nov. 16, 1960 showed the water in Well No. 3 to have a hardness of 21. 6 gr. per gal., total dissolved minerals of 389 ppm., and an iron content of 2. 8 ppm.

There are approximately 540 services, 60% of whichare metered. Pumpage is reported to average 104, 177 gpd.

LABORATORY NO. 153 626

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 8		Silica	SiO_2	16. 3	
Manganese	Mn	0. 0		Fluoride	F	0. 2	
Calcium	Ca	85. 5	4. 28	Boron	B	0. 0	
Magnesium	Mg	37. 5	3. 08	Chloride	Cl	0.	. 00
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	7. 6	. 12
Sodium	Na	6.	. 26	Sulfate	SO_4	10. 5	. 22
				Alkalinity (as	$CaCO_3$)	364.	7. 28
Turbidity		18		Hardness (as	$CaCO_3$)	368.	7. 36
Color		0					
Odor		0					
Temp. (reported)		53. 0°F		Total Dissolved Minerals		389.	

ANTIOCH
Lake County
July 21, 1958

The village of Antioch (2268) has three wells in service.

The pump in WELL NO. 1 was removed in 1952 and 20 ft. of column pipe was added.

WELL NO. 2 was repaired in Nov. 1949 by C. L. Wertz, Antioch. The well was cased with 220 1/2 ft. of 10-in. pipe and 11 ft. of 6-in. Johnson Everdur screen (No. 160 slot openings) to a total depth of 231 1/2 ft. to the bottom of the screen. A leaded wooden plug was installed in the bottom of the screen. Upon completion of the repairs, water was pumped at a rate of 200 gpm. with a drawdown of 70 ft. from a nonpumping water level of 45 ft. below the surface.

In Dec. 1949 a new Peerless turbine pump rated at 250 gpm., was installed in Well No. 2 and directly connected to a 20-hp. General Electric motor. New column pipe was also installed.

WELL NO. 3 was completed in 1953 to a depth of 149 ft. by Layne-Western Co., Aurora, and located 500 ft. south of Ada St. and 88 ft. east of the Soo Line right-of-way, or approximately 600 ft. N. and 2360 ft. W. of the S. E. corner of Section 8, T46N, R10E. The completed well was located at the site of a 6-in. test well which had been drilled to a depth of 149 ft. in Dec. 1952. The static water level in the test well was 12 ft. 8 in. below the ground surface. Well No. 3 was cased with 12-in. pipe from 10 in. above the pump house floor to 122 ft. and cement grouted from the surface to 40 ft. The well was of 28 by 12-in. gravel pack construction from the surface to 142 ft. with a 12-in. id. black steel casing from 2 ft. above the surface to 122 ft. and a 12-in. id. Layne shutter screen from 122 to 142 ft. When completed water was reportedly pumped at a rate of 800 gpm. with a drawdown of 12 ft. from a nonpumping water level of 41 ft. below the surface.

The permanent pump assembly consists of 70 ft. of 6-in. column pipe; 10-in., 7-stage Layne turbine pump, No. 26899, rated at 400 gpm. against 235 ft. T.D.H. and having an over-all length of 6 ft. 1 in.; 10 ft. of 6-in. suction pipe; 70 ft. of air line; 40-hp. U S electric motor.

On May 29, 1958 water was being pumped at a rate of 415 gpm. with a drawdown of 7 ft. from a nonpumping water level of 45 ft. below the pump base.

Analysis of a sample (Lab. No. 146791) collected May 29, 1958 showed the water in Well No. 3 to have a hardness of 12 gr. per gal., total dissolved minerals of 350 ppm., and an iron content of 0. 6 ppm.

Pumpage from May 1, 1957 to Apr. 30, 1958 averaged 177,000 gpd.

Sample study summary log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Silt, buff, yellow	50	50
Clay, gray, laminated	20	70
Till, buff, gray, very silty	20	90
Sand, very fine to fine, well sorted, clean	5	95
Gravel, coarse, poorly sorted; till, brownish gray, sandy	5	100
Sand, fine well sorted, clean	5	105
Till gray, very silty	10	115
Gravel, granular to coarse, clean; sand medium to very coarse	15	130
Sand, very fine to very coarse, well sorted, clean; little till brownish gray	15	145
Silt, brownish gray, clayey	5	150

2 - Antioch

LABORATORY NO. 146791

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	19.0	
Manganese	Mn	Tr.		Fluoride	F	0.8	
Calcium	Ca	39.5	1.98	Boron	B	0.3	
Magnesium	Mg	26.0	2.14	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.2	.05
Sodium	Na	52.	2.25	Sulfate	SO_4	64.0	1.33
				Alkalinity (as	$CaCO_3$)	244.	4.88
Turbidity		2		Hardness (as	$CaCO_3$)	206.	4.12
Color		0					
Odor		0					
Temp. (reported)		51.4°F		Total Dissolved Minerals		350.	

Illinois State Water Survey
Bulletin 40 - Supplement II

ARBURY HILLS
SUBDIVISION
Will County
March 25, 1960

A public water supply was installed in 1960 for the Arbury Hills Subdivision (Futuristic Homes Inc.), located about 2 miles east of Mokena.

WELL NO. 1 was completed to a depth of 457 ft. in Mar. 1960 by Wehling Well Works, Beecher, and located approximately 1380 ft. S. and 1306 ft. E. of the N. W. corner of Section 10, T35N, RUE. The ground surface elevation at the well is 735. The well is cased with 20-in. od. pipe from the surface to 121 ft., below which the hole was finished in limestone and shale at 19 l/4 in. in diameter to the bottom at 457 ft.

A production test was conducted on Mar. 23-25, 1960 by representatives of the Driller and the State Water Survey. After development of the well on Mar. 23-24, pumping was started on Mar. 25 and after 4 hr. pumping at 253 gpm., the drawdown was 164 ft. from a nonpumping water level of 56 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 152064) showed the water to have a hardness of 66 gr. per gal., total dissolved minerals of 1581 ppm., and an iron content of 0.9 ppm.

The permanent pump has not been installed.

LABORATORY NO. 152064

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Fluoride	F	0.4	
Manganese	Mn	Tr.		Chloride	Cl	2.	.06
				Nitrate	NO_3	0.0	.00
				Alkalinity (as	$CaCO_3$)	308.	6.16
Turbidity		5		Hardness (as	$CaCO_3$)	1130.	22.60
Color		0					
Odor		0		Total Dissolved Minerals		1581.	

ARCOLA
Douglas County
January 19, 1960

Three wells are in service for the public water supply of the city of Arcola (2273).

WELLS NO. 1 and 2, described in Bulletin 40, have been disconnected from the system.

WELLS NO. 3 and 4, described in Bulletin 40, are not in service but have not been disconnected from the system.

WELL NO. 1-A was disconnected from the system in 1952 and is used for water table observations by the Illinois State Water Survey.

WELL NO. 2-A, described in Bulletin 40, was equipped in 1955 witha newFairbanks-Morse submersible pump, rated at 170 gpm. and connected to a 10-hp. U S electric motor.

Well No. 2-A is in service about one week of each month and furnishes about 25% of the city demand.

WELL NO. 5 was completed in May 1955 to a depth of 106 ft. by Layne-Western Co., Kirkwood, Mo. A number of test holes had been drilled in 1954 and Well No. 5 was constructed at the site of Test Hole No. 6-54, about 1 mile northeast of Well No. 2-A, or approximately 50 ft. N. and 2500 ft. E. of the S. W. corner of Section 34, T15N, R8E. The ground surface elevation at the well is 660.

A 30-in. hole was drilled from the surface to 106 ft. and a 12-in. casing was set from 1 1/2 ft. above the surface to 81 ft. followed by an 8-in. screen from 81 to 106 ft. Gravel was packed in the annulus between the casing and screen and the wall of the hole from 106 ft. up to 31 ft. A clay fill was placed in the annulus from 31 to 3 ft. and concrete in the upper 3 ft. to the surface.

The permanent pumping equipment was installed in Aug. 1955 consisting of 70 ft. of 5-in. column pipe; 5 3/4-in., 9-stage Deming turbine pump, No. 22957, rated at 175 gpm. at 125 ft. T.D.H.; the over-all length of column pipe and pump is 76 ft. 11 1/2 in.; 7 l/2-hp. U S electric motor. A Johnston gear drive is installed for auxiliary power.

A production test was conducted onAug. 11, 1955 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Consulting Engineers. After 2 hr. pumping at rates of 230 to 250 gpm., the drawdown was 10. 6 ft. from a nonpumping water level of 32. 2 ft.

A partial chemical analysis of a sample (Lab. No. 138429) collected Aug. 11, 1955, after 2 hr. pumping at 245 gpm., showed the water to have a hardness of 15.1 gr. per gal., total dissolved minerals of 425 ppm., and an iron content of 4. 2 ppm.

WELL NO. 6 was completed in Dec. 1955 to a depth of 118 ft. 9 in. by Layne-Western Co. and located at the site of Test Hole No. 7-54, about 1/2 mile northeas t of town, or approximately 850 ft. S. and 50 ft. E. of the N. W. corner of Section 3, T14N, R8E. The ground surface elevation at the well is 668. A 30-in. hole was drilled from the surface to the bottom. A 12-in. casing and 25 ft. of 8-in. Layne No. 7 wrought steel screen were set in the hole and gravel packed similar to Well No. 5.

The pumping equipment consists of 80 ft. of 5-in. column pipe; 5 3/4-in., 9-stage Deming turbine pump, Serial No. 22957, rated at 175 gpm. against 125 ft. T.D.H.; 80 ft. of air line; 7 l/2-hp. U S electric motor.

On Dec. 30, 1955, after 5 1/4 hr. pumping at 125 gpm., the drawdown was 16.1 ft. from a nonpumping water level of 47. 8 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 139371) collected Dec. 30, 1955, after 5 1/4 hr. pumping, showed the water to have a hardness of 13. 6 gr. per gal., total dissolved minerals of 390 ppm., and an iron content of 4.1 ppm.

Wells No. 5 and 6 furnish about 75% of the city demand.

Pumpage for the city in 1959 averaged 145,000 gpd.

LABORATORY NO. 139371

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4.1		Fluoride	F	0.2	
				Chloride	Cl	21.	.59
				Nitrate	NO_3	4.8	.08
				Alkalinity (as	$CaCO_3$)	356.	7.12
Turbidity		24		Hardness (as	$CaCO_3$)	232.	4.64
Color		0					
Odor		0					
Temp. (reported)		55.0°F		Total Dissolved Minerals		390.	

ARLINGTON
Bureau County
January 26, 1957

The village of Arlington (254) has two wells in service.

WELL NO. 1 (West) was abandoned about 1951 and filled in reportedly with puddled clay. The pit, surrounding Wells No. 1 and 2 (East), has been filled in and a concrete floor laid over the fill.

WELL NO. 2 is in service, with no change in pumping equipment reported since Bulletin 40.

WELL NO. 3 was drilled to a depth of 81 ft. in 1954 by Daniel Schmidt, Mendota, and located 100 ft. N. and 150 ft. E. of the S. W. corner of the N. E. 1/4 of Section 8, T17N, RUE. The ground elevation at the well is 752. The well was originally drilled to a depth of 100 ft. and backfilled with pea gravel to 81 ft.

A 10-in. steel casing was set to a depth of 73 ft. with 10 ft. of 10-in. No. 60 slot Johnson Everdur screen (8 ft. exposed) set with the bottom at 83 ft. The elevation of the top of the casing at the pump base was 753. 2. A production test was made on Jan. 20, 1955 and observed by representatives of the Driller, the State Water Survey, and Wallace Engineering Co., Peoria, Consulting Engineers. For the test, power was furnished from the drill rig. After 3 1/4 hr. pumping at a final rate of 100 gpm., the drawdown was 3. 6 ft. from a nonpumping water level of 29. 3 ft. below the top of the casing. Seven min. after pumping was stopped, the water level had recovered to 29. 6 ft. For 1 hr. during the test, Well No. 2 was pumped with no decrease in the rate (115 gpm.) in Well No. 3.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Fill	5	5
Yellow clay	5	10
Hard pan	5	15
Blue clay	30	45
Light blue clay	10	55
Blue clay and gravel	15	70
Gravel	8	78
Sand	2	80
Light blue clay	20	100

Analysis of a sample (Lab. No. 136762) collected Jan. 20, 1955, after 1 1/2 hr. pumping, showed the water in Well No. 3 to have a hardness of 20. 3 gr. per gal., total dissolved minerals of 372 ppm., and an iron content of 1 ppm.

The permanent pump assembly consists of 60 ft. of 3-in. column pipe; 5 2/16-in. od., 7-stage Jacuzzi water lubricated turbine pump, No. SL6-6, rated at 90 gpm. at 40 lb. head; 60 ft. of 1/4-in. plastic air line; 5-hp. electric motor.

Pumpage is reported to average 9950 gpd.

LABORATORY NO. 136762

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.0		Fluoride	F	0. 1	
				Chloride	Cl	9.	.25
				Nitrate	NO_3	0. 5	.01
				Alkalinity (as	$CaCO_3$)	312.	6. 24
Turbidity		14		Hardness (as	$CaCO_3$)	348.	6. 96
Color		0					
Odor		0					
Temp. (reported)		51. 4°F		Total Dissolved Minerals		372.	

The village of Arlington Heights (2,7,878) has four wells in service.

WELL NO. 1 was abandoned and reportedly-filled with sand and concrete in July 1956.

WELL NO. 2, located at the corner of Chestnut and Hawthorne St., was rehabilitated in June 1956 by L. Cliff Neely, Batavia. A total of 810 qt. of nitrogel was exploded between 1220 and 1310 ft. depth. A cement grout had been placed, prior to 1955, in the annulus outside the 10-in. casing to the bottom of the 10-in. casing at 455 ft. The casing and hole record is shown in Table A.

TABLE A

Hole Record

12-in. from surface to 455 ft.
10-in. from 455 ft. to 1345 ft. (bottom)

Casing Record

12-in. from surface to 1 6 1 ft.
10-in. from surface to 455 ft.
8-in. liner (479 ft.) from 571 to 1050 ft.

The pumping equipment includes 550 ft. 7-in. column pipe; 7-in., 14-stage Peerless turbine pump, 14 ft. long and rated at 700 gpm.; 20 ft. of 6-in. suction pipe with strainer; 550 ft. of air line; 100-hp. U S electric motor.

In Mar. 1958 a State Department of Public Health report stated that Well No. 2 was "on stand-by status at present."

WELL NO. 3 was abandoned in July 1945.

WELL NO. 4, located at Wing and Kennicott St., has been cleaned out and reworked. The well was rehabilitated in the fall of 1955 by L. Cliff Neely, and is reportedly cased with 16-in. od. grouted pipe to 142. 5 ft.; 14-in. od. pipe from the surface to 162. 5 ft.; the old liner was removed and replaced with a new 10-in. liner to 350 ft. depth.

After the well was reworked the following pumping equipment was installed: 505 ft. of column pipe; 10-in., 22-stage Peerless turbine pump rated at 780 gpm.; 200-hp. Westinghouse electric motor.

The nonpumping water level was reported to be 350 ft. with a drawdown of 110 ft.

Well No. 4 is in service.

WELL NO. 5, located at Douglas St. and Foundry Road, was rehabilitated in the. spring of 1956 by L. Cliff Neely. The well is reportedly cased with 24-in. od. cement grouted pipe to 108 ft.; 422 ft. of 14-in. od. cement grouted liner pipe from the surface; from 422 to 900 ft. is a 13 1/4-in. hole; from 900 to 1000 ft. is a new 10-in. liner which was pulled and replaced at time of rehabilitation. From 1000 ft. to 1525 ft. the hole is 2 in. in diameter.

After the rehabilitation work the following pumping equipment was installed: 550 ft. of 10-in. column pipe; 12-in., 9-stage Byron Jackson turbine pump rated at 1050 gpm.; 20 ft. of 8-in. suction pipe with strainer; 550 ft. of 1/4-in. stainless steel air line; 250-hp. U S electric motor. An Aurora centrifugal booster pump is directly connected to the discharge line. It has a capacity of 800 gpm. against 150 ft. T.D.H. and is directly connected to a 40-hp. U S electric motor.

A production test was conducted on Apr. 24, 1956 by representatives of the Drilling Contractor, Consoer and Townsend, Consulting Engineers, and the State Water Survey. After 10 1/2 hr. pumping at 1056 gpm., the drawdown was 74 ft. from a nonpumping water level of 334 ft. below the ground level. Ten min. after pumping was stopped, the water level had recovered to 361 ft.

Well No. 5 is in service.

WELL NO. 6 was drilled to a depth of 1553 ft. in 1952 by R. E. Milaeger Well Drilling Co., Milwaukee, Wis. The well is located near the corner of Wing and Ridge St., or approximately 1087 ft. N. and 1532 ft, W. of the S. E. corner of Section 30, T42N, R11E. The ground elevation at this location is 707.

The well was cased from the surface to 435 ft. with 18-in. od. pipe which was grouted in. The hole was 15 1/4 in. in diameter from top to bottom. A 12-in. od. liner was placed from 922 to 1140 ft. The well was reportedly shot with 400 lb. of 100% nitroglycerine atfour locations with the bottom of the shots at 1490, 1280, 1230 and 1180 ft.

depths. A large amount of sand was removedfrom the well after shooting.

On Jan. 20-21, 1953 a production test was conducted by representatives of the Drilling Contractor, Consoer and Townsend, Consulting Engineers, and the State Water Survey. After 5 hr. pumping at a rate of 1100 gpm., the drawdown was 131 ft. from a nonpumping water level of 278 ft. below the ground level. One hr. after pumping was stopped, the water level had recovered to 312 ft.

On Jan. 23, 1953, after the pump was removed, the well was sounded and found to have filled with sand to a depth of 1155 ft. The static water level was found to be 300 ft. below the surface.

After about one month spent in removing the sand, a second production test was conducted on Feb. 25-26, 1953. After about 14 l/2 hr. pumping at a rate of 1120 gpm., the drawdown was 98 ft. from a nonpumping water level of 227 ft. But after the pump was removed, sand was found to have filled in again to a depth of 1155 ft. The sand was once more removed, but this time it was found that a section of about 180 ft. of the lower wall hole was not filled with sand. By May 1 the sand was cleaned out to 1530 ft.

On May 4-5, 1953 a third production test was conducted. After 15 1/2 hr. pumping at a rate of 1200 gpm., the drawdown was 97 ft. from a nonpumping water level of 290 ft. On removal of the pump, the sand was found to have filled in to 1475 ft. depth. The pumping equipment installed about May 1953 included a 10-in., 9-stage Layne and Bowler turbine pump set at 520 ft. and rated at 1000 gpm. against a T.D.H. of 575 ft.; 250-hp. U S electric motor.

Analysis of a sample (Lab. No. 146375) collected Apr. 17, 1958, after 6 hr. pumping at 1250 gpm., showed the water in "Well No. 6 to have a hardness of 15.6 gr. per gal., total dissolved minerals of 385 ppm., and an iron content of 0. 2 ppm.

Well No. 6 is in service.

WELL NO. 7 was completed to a depth of 1553 ft. in May 1958 by L. Cliff Neely and located on Frederick St., 300 ft. east of Hickory St., or approximately 600 ft. S. and 2050 ft. W. of the N. E. corner of Section 29. The ground elevation is 692. 5. The well hole and casing record is shown in Table B.

TABLE B

Hole Record

25 1/4-in. from 0 to 433. 5 ft.
1 9 1/4-in. from 433. 5 to 1112. 5 ft.
1 5 1/4-in. from 1112.5 to bottom

Casing Record

26-in. od. steel pipe from 0 to 147. 5 ft.
20-in. od. steel pipe from 0 to 433. 5 ft.
The 20-in. casing was cemented in by Holland Well Service, using 175barrels.

A production test was conducted on Apr. 17-18, 1958. For test purposes the well was equipped with a 12-in., 8-stage pump set at 555 ft. An air line, 555 ft. long, was installed. After 21 hr. pumping at a rate of 1114 gpm., the discharge rate suddenly dropped to 617 gpm. While pumping at 1114 gpm., the drawdown was 173 ft. from a nonpumping water level of 300 ft. (255 ft. above the bowls) below the top of the casing. Due to the pump trouble the test was terminated. Following the production test "the well was shot with 44251b. of Nitro(Jell Form) requiring 2684 hours of clean-out time and recovering a tremendous amount of sand. "

On June 9-10, 1958 a second production test was conducted. After 20 hr. pumping at a rate of 1534 gpm., the drawdown was 130 ft. from a nonpumping water level of 365 ft. below the pump base (at the end of 100 hr. quiet period).

The permanent pumping equipment is on order and is presently being manufactured. The installation will include 600 ft. of 13 3/8-in. column pipe; Byron Jackson submersible pump rated at 1200 gpm. against 600 ft. T.D.H. at 1750 rpm.; 600 ft. of air line; 250-hp. Byron Jackson electric motor.

It is expected that the well will be in service Oct. 31, 1958.

Pumpage for Arlington Heights is reported to average 1 mgd.

ASHMORE
Coles County
November 25, 1960

A public water supply was installed in 1955 for the village of Ashmore (447).

WELL NO. 1 was completed in May 1955 to a depth of 42 ft. by Henry Holkenbrink, Effingham, and located at the south end of town on Third St., or approximately 350 ft. S. and 700 ft. E. of the N. W. corner of Section 6, T12N, R11E. The ground surface elevation at the well is 685. A 24-in. hole was drilled from the surface to the bottom of the well and cased with 24-in. pipe from 1 ft. above to 25.7 ft. below the ground surface and with 10-in. pipe from 2 ft. above to 31.5 ft. below the surface, followed by 10 ft. of 10-in. screen, having No. 80 slot openings. The well was gravel packed, outside the screen and 10-in. casing, from the bottom up to 5 ft. below the surface.

A production test was conducted on May 23-24, 1955 by representatives of the Driller, the State Water Survey, and Marbry and Johnson, Consulting Engineers. After 23 1/2 hr. pumping at 50 gpm., the drawdown was 2. 7 ft. from a nonpumping water level of 21.95 ft. below the top of the casing. Two hr. after pumping had been stopped, the water level had recovered to 22.28 ft.

The pumping equipment includes a Jacuzzi water lubricated turbine pump, rated at 75 gpm., connected to a 5-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 153661) collected Nov. 22, 1960 showed the water from Well No. 1 to have a hardness of 24.2 gr. per gal., total dissolved minerals of 478 ppm., and an iron content of 2 ppm.

There are 147 services, 100% metered, and 97% of the population is served. Pumpage is estimated to average 22, 000 gpd.

LABORATORY NO. 153661

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.0		Silica	SiO_2	15.6	
Manganese	Mn	0. 1		Fluoride	F	0.2	
Calcium	Ca	93.4	4.67	Boron	B	0. 1	
Magnesium	Mg	43.8	3.60	Chloride	Cl	16.	.45
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.5	.06
Sodium	Na	10.	.42	Sulfate	SO_4	70. 1	1.46
				Alkalinity (as	$CaCO_3$)	336.	6.72
Turbidity		13		Hardness (as	$CaCO_3$)	414.	8.27
Color		0					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		478.	

AURORA
Kane County
April 29, 1959

Water for the public supply of Aurora (63, 715) is obtained, either wholly or in part, from 13 drilled wells. Some of the wells discharge directly into the distribution system and others discharge into collecting reservoirs. Wells No. 5, 11, 12, 12-A and 17 are located at the main pumping station, known locally as the Aurora Avenue Pumping Station at the north city limits.

Water from Wells No. 6, 14 and 16, located on the east side of the Fox River, is discharged directly from each well into the distribution system. Water from Well No. 9 is discharged into the iron removal plant.

Water from Wells No. 7 and 15, located on the west side of the river, is discharged directly from each well into the distribution system. Water from Well No. 10 is discharged into the iron removal plant.

Well No. 8 is located in the downtown area and its water is discharged directly into the distribution system.

The location of WELL NO. 5, described in Bulletin 40, has been corrected to 925 ft. S. and 2300 ft. W. of the N. E. corner of Section 15, T38N, R8E. The well was out of service from Sept. 1950 to Sept. 1951 because of pump repairs. The well is now equipped with 350 ft. of 8-in. column pipe; 10-in., 9-stage Aurora turbine pump, ratedat 600 gpm. at 370 ft. T.D.H.; 75-hp. Westinghouse electric motor. Well No. 5 is only about 20 ft. from Well No. 12 and is operated irregularly or when No. 12 is not in use.

A mineral analysis of a sample (Lab. No. 149493) collected Apr. 28, 1959, while pumping at a rate of 550 gpm., showed the water in Well No. 5 to have a hardness of 24. 5 gr. per gal., total dissolved minerals of 854 ppm., and an iron content of 0. 9 ppm.

WELL NO. 6, described in Bulletin 40, was logged by Schlumberger on Jan. 26, 1952 and later the well was "shot" at 13 levels from 2060 ft. depth to 1170 ft. Before the shooting, the static water level was 30 ft. below the surface; and after shooting, it was 60 ft. below. The well was cleaned out to 2100 ft., and a 16-in. casing was pressure grouted inside the 18-in. casing to a depth of 400 ft.

On June 21, 1952 the well had been equipped with a 12-in., 13-stage Aurora turbine pump rated at 950 gpm. and set on 370 ft. of 8-in. column pipe and connected to a 150-hp. General Electric motor. A 350-ft. air line was installed. The production test showed a drawdown of 120 ft. from a static water level of 207 ft. below the pump base (elev. 662.12).

A mineral analysis of a sample (Lab. No. 149497) collected Apr. 28, 1959, when pumping at a rate of 700 gpm., showed the water in Well No. 6 to have a hardness of 15 gr. per gal., total dissolved minerals of 365 ppm., and an iron content of 0. 5 ppm.

In June 1957 Well No. 6 was being maintained for emergency service.

WELL NO. 7, described in Bulletin 40, is now equipped with 270 ft. of 10-in. column pipe; 12-in., 10-stage Aurora turbine pump; 75-hp. U S electric motor. This equipment was reportedly moved from Well No. 6.

A mineral analysis of a sample (Lab. No. 149492) collected Apr. 28, 1959, while pumping at a rate of 395 gpm., showed the water in Well No. 7 to have a hardness of 22.8 gr. per gal., total dissolved minerals of 926 ppm., and an iron content of 1. 6 ppm.

Well No. 7 is maintained for stand-by use. In Jan., Feb., and Mar. 1957 it was producing only a negligible part of the municipal supply.

The location of WELL NO. 8, described in Bulletin 40, has been corrected to 1300 ft. N. and 1000 ft. E. of the S. W. corner of Section 22, T38N, R8E. The well was rehabilitated in Nov. 1949 by Layne-Western Co., Aurora. Due to high chloride content the well was cleaned out and then plugged at about 1420 ft. depth, presumably at the bottom of the Galesville sandstone. The well was shot with 50 qt. of nitrogengel at each of 5 elevations between 1410 ft. and 1324 ft. depths. Broken casing and liner were cleaned out of the well and a production test made in Jan. 1950. After 5 1/4 hr. pumping at a rate of 805 gpm., the drawdown was 143 ft. from a static water level of 154 ft. below the ground level (elev. 629.42).

In May 1950 it was found that sand had filled the well from 1400 to 1360 ft. The pump was in

bad condition because of pumping sand. Repairs were made.

In Apr. 1952 Well No. 8 was operated only 7 days producing 3 mg. for the month. In Mar. 1954 the well was cleaned out by L. Cliff Neely, Batavia, and a new liner was set at the base of the St. Peter sandstone. At the time a 20-ft. section of 9-in, pipe was fished out. It was not known how or when this pipe had been lost in the well. In May 1954 the well was recased with 26-in. od. pipe from the surface to 25 ft. A 20-in. od. pipe was set and cemented in from the surface to 310 ft. The hole was reamed out to 19 in. from 310 ft. to 1000 ft. depth. The well was sounded and found to be 1440 ft. deep. On July 19, 1954 a production test was conducted by the Contractor, and after 24 hr. pumping at a rate of 810 gpm., the drawdown was 152 ft. from a static water level of 166 ft. below the surface. A 350-ft. air line was in place.

The pumping equipment now installed includes 400 ft. of 10-in. column pipe; 12-in., 17-stage Aurora turbine pump, rated at 1000 gpm.; 200-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 149498) collected Apr. 28, 1959, while pumping at a rate of 925 gpm., showed the water in Well No. 8 to have a hardness of 14. 5 gr. per gal., total dissolved minerals of 341 ppm., and an iron content of 0. 5 ppm.

In Jan., Feb., and Mar. 1957 Well No. 8 was producing about one fifth of the total municipal supply, or about 850, 000 gpd.

WELL NO. 9, described in Bulletin 40, is now equipped with a 1200-gpm. Aurora turbine pump connected to a 150-hp. General Electric motor.

In Jan., Feb., and Mar. 1957 Well No. 9 furnished about one eighth of the total municipal supply or about 500, 000 gpd.

WELL NO. 10, described in Bulletin 40, is maintained for emergency use. The yield rate of the well is about 400 gpm.

WELL NO. 11, described in Bulletin 40, is now equipped with a 1400-gpm. Aurora turbine pump connected to a 200-hp. Westinghouse electric motor.

In Jan., Feb., and Mar. 1957 Well No. 11 was producing a very small part of the municipal supply, about 45, 000 gpd.

WELL NO. 12, described in Bulletin 40, is unchanged. In Jan., Feb., and Mar. 1957 this well furnished less than one tenth of the total municipal supply.

WELL NO. 12-A, described in Bulletin 40, is unchanged. No recent report has been made on the production from this well. It is maintained for emergency use.

There is no WELL NO. 13.

WELL NO. 14, formerly called Phillips Park Well and described in Bulletin 40, is maintained for emergency use only. This well is reportedly equipped with a 375-gpm. Aurora turbine pump connected to a 30-hp. electric motor.

WELL NO. 15 was completed in 1951 to a depth of 2150 ft. by Layne-Western Co. and located at Prairie Ave. and Hartford St., or approximately 164 ft. S. and 175 ft. W. of the N. E. corner of Section 29, T38N, R8E. The elevation of the ground surface at the well is 700. The hole and casing record is shown in Table A.

TABLE A

Hole Record

25-in.	from	the surface	to	632 ft.
19-in.	from	632 ft.	to	898 ft.
15-in.	from	898 ft.	to	2 150 ft.

Casing Record

26-in. od.	from	+2 ft.	to	49 ft.
20-in. id.	from	+2 ft.	to	632 ft.
16-in. od. liner	from	818 ft.	to	898 ft.
12-in. id. liner	from	1420 ft.	to	1790 ft.

The 20-in. casing was cemented in.
The 1 6-in. liner was perforated.

A production test was conducted on Mar. 13-15, 1951 by representatives of the Driller and City officials. After 21 1/2 hr. pumping at 1115 gpm., the drawdown was 181 ft. from a static water level of 155 ft. below the surface.

The pumping equipment in Well No. 15 consists of 420 ft. of 10-in. column pipe; 12-in., 19-stage Aurora turbine pump rated at 1200 gpm. against 118 ft. T.D.H.; and powered by a 200-hp. General Electric motor.

In Jan., Feb., and Mar. 1957 this well produced more than one fourth of the total municipal supply, about 1 mgd.

WELL NO. 16 was completed in 1952 to a depth of 2139 ft. by Layne-Western Co. and located about 2 1/2 miles southeast of Well No. 15 at Lafayette and Parker St., or approximately 1100 ft. S. and 600 ft. E. of the N. W. corner of Section 34. The ground surface elevation at the well is 660. The well is reportedly cased identical to Well No. 15.

The pumping equipment is also identical to that in Well No. 15.

A mineral analysis of a sample (Lab. No. 149496) collected Apr. 29, 1959, while pumping at a rate of 1100 gpm., showed the water in Well No. 16 to have a hardness of 13.6 gr. per gal., total dissolved minerals of 386 ppm., and an iron content of 0.7 ppm.

In Jan., Feb., and Mar. 1957 Well No. 16 was producing about one fourth of the total municipal pumpage or about 1 mgd.

WELL NO. 17 was completed in 1958 to a depth of 2152 ft. by Layne-Western Co. and located about 1 1/4 miles west of Well No. 5 and about 1 mile northwest of Well No. 8, or approximately 2100 ft. N. and 2350 ft. W. of the S. E. corner of Section 16, T38N, R8E. The ground surface elevation at the well is 685. During the drilling of the well, shots were placed as follows: six of 150 lb. each between depths of 2140 ft. and 1880 ft.; also three 200-lb. shots between 1350 and 1300 ft. The hole and casing record is shown in Table B.

On Nov. 12, 1958, after the well had been shot and cleaned out, a production test was conducted by the Driller. For test purposes the well was equipped with a 15-in., 5-stage Layne turbine pump set at 415 ft. and powered by a LeRoi gas engine. A 415-ft. air line was in place. After 21 hr. pumping at a rate of 1016 gpm., the drawdown was 157 ft. from a static water level of 274 ft.

TABLE B

Hole Record

25-in.	from	0	to 660 ft.	
19-in.	from	660 ft.	to 962 ft.	
15-in.	from	962 ft.	to 1233 ft.	
12-in.	from	1233 ft.	to 1538 ft.	
10-in.	from	1538 ft.	to 1758 ft.	
8-in.	from	1758 ft.	to 2152 ft.	(bottom)

Casing Record

26-in.	steel pipe	from surface	to 56 ft.	10 in.
20-in.	steel pipe	from surface	to 660 ft.	7 in.
16-in.	steel liner	from 887 ft.	to 962 ft.	
12-in.	steel liner	from 1164 ft. 6 in.	to 1233 ft.	
10-in.	steel liner	from 1428 ft.	to 1538 ft.	
8-in.	steel liner	from 1677 ft.	to 1758 ft.	

The 20-in. casing was cemented in.

A partial chemical analysis of a sample (Lab. No. 148168) collected Nov. 14, 1958, after 21 hr. pumping at a rate of 1016 gpm., showed the water in Well No. 17 to have a hardness of 13.6 gr. per gal., total dissolved minerals of 327 ppm., and an iron content of 0.8 ppm.

For the months of Jan., Feb., and Mar. 1957 Wells No. 5, 7, 8, 9, 11, 12, 15 and 16 produced 392.5 mg., an average pumpage of 4.36 mgd.

LABORATORY NO. 149496

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Silica	SiO_2	8.6	
Manganese	Mn	Tr.		Fluoride	F	1.1	
Calcium	Ca	59.9	3.00	Boron	B	0.3	
Magnesium	Mg	20.4	1.68	Chloride	Cl	46.	1.30
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.6	.04
Sodium	Na	59.	2.55	Sulfate	SO_4	29.2	.61
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		2		Hardness (as	$CaCO_3$)	234.	4.68
Color		0					
Odor		0					
Temp. (reported)		64.4°F		Total Dissolved Minerals		386.	

AUSTIN ACRES
DuPage County
September 14, 1959

A public water supply was installed in 1946 for Austin Acres (est. 40), a subdivision located on the south of Westmont.

WELL NO. 1 was completed in 1946 to a depth of 300 ft. by Harry Austin and located on the south side of 57th St. just west of Cass Ave., or approximately 1400 ft. S. and 250 ft. W. of the N. E. corner of Section 16, T38N, RUE. The elevation of the ground surface at the well is 765. The hole was drilled 6 in. in diameter to the bottom at 300 ft. and a 6-in. casing was set from the surface to limestone at about 100 ft.

Water is pumped by a Reda submersible pump, installed in Aug. 1959 and set at 150 ft. The pump is rated at 1260 gal. per hr. at 40 psi. A 3-hp. Robbin and Meyer electric motor furnishes power for pumping.

The static water level at the time was 126 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 150612) collected Sept. 14, 1959 showed the water in Well No. 1 to have a hardness of 27. 2 gr. per gal., total dissolved minerals of 579 ppm., and an iron content of 2. 9 ppm.

Pumpage is estimated to average 3000 gpd.

LABORATORY NO. 150612

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.9		Silica	SiO_2	16.3	
Manganese	Mn	Tr.		Fluoride	F	0.4	
Calcium	Ca	118.3	5.91	Boron	B	0.1	
Magnesium	Mg	40.7	3.35	Chloride	Cl	8.	.23
Ammonium	NH_4	0.0	.00	Nitrate	NO_3	1.5	.02
Sodium	Na	24.	1.03	Sulfate	SO_4	155.9	3.24
				Alkalinity (as	$CaCO_3$)	340.	6.80
Turbidity		19		Hardness (as	$CaCO_3$)	463.	9.26
Color		0					
Odor		0					
Temp. (reported)		53.8°F		Total Dissolved Minerals		579.	

BALMORAL HEIGHTS
Will County
July 11, 1958

Balmoral Heights, a subdivision located near Crete, installed a public water supply in 1956. At present there are 100 services and a maximum of 135 services is expected. Water is obtained from two wells.

WELL NO. 1 was drilled in 1956 to a depth of 240 ft. by Dreher and Schorie, Joliet, and located 2350 ft. N. and 250 ft. W. of the S. E. corner of Section 20, T34N, R14E. The ground elevation at the well is 760. The well was cased with 6-in. pipe to an unreported depth. When completed, water was pumped for 8 hr. at a rate of 60 gpm. with a drawdown of 40 ft. from a nonpumping water level of 60 ft. below the surface.

The pumping equipment consists of a Clayton-Mark submersible pump, No. C-8203, attached to a 2-in. drop pipe with power from a 3-hp. electric motor.

Analysis of a sample (Lab. No. 146506) collected Apr. 29, 1958 showed the water to have a hardness of 21. 3 gr. per gal., total dissolved minerals of 424 ppm., and an iron content of 0. 4 ppm.

WELL NO. 2 was drilled in 1957 to a depth of 273 ft. by Dreher and Schorie and located 2250 ft. N. and 400 ft. W. of the S. E. corner of Section 20. The well was cased with 6-in. pipe to an unreported depth. When completed, water was pumped for 8 hr. at a rate of 80 gpm. with a drawdown of 50 ft. from a nonpumping water level of 70 ft. below the surface.

The pumping equipment consists of a Red Jacket submersible pump, No. 18E, rated at 72 gpm. at 20 psi. discharge pressure. Power is furnished from a 7 1/2-hp. electric motor.

Pumpage is estimated to average 18, 000 gpd.

LABORATORY NO. 146506

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	11.5	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	82.8	4.14	Boron	B	0.2	
Magnesium	Mg	38.7	3.18	Chloride	Cl	1.	.03
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	19.	.82	Sulfate	SO_4	19.1	.40
				Alkalinity (as	$CaCO_3$)	384.	7.68
Turbidity		2		Hardness (as	$CaCO_3$)	366.	7.32
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		424.	

Illinois State Water Survey
Bulletin 40 - Supplement II

BARRINGTON WOODS
SUBDIVISION
Cook County
November 4, 1958

A public water supply was installed for the Barrington Woods Subdivision (est. 280) in 1953.

WELL NO. 1 was completed in Aug. 1953 to a depth of 250 ft. by Layne-Western Co., Aurora, for the Maxon Construction Co., and located about 3 miles east of Barrington, approximately 500 ft. S. and 1500 ft. E. of the N. W. corner of Section 3, T42N, R10E. The ground surface elevation at the well is 785.

The well was cased with 8-in. pipe to 193 ft., below which the 8-in. hole was finished in limestone. The top of the casing was set 1. 5 ft. above the ground level.

A production test, conducted by the Drilling Contractor when the well was finished, resulted in a reported pumping rate of approximately 16 gpm. Subsequent to that test, the well was acidized by the Layne-Western Co.

A production test was conducted after acidizing on Oct. 14, 1953 by representatives of the Drilling Contractor, the State Water Survey, and the Owner. The well was equipped with a Pomona vertical turbine pump set at 208 ft. Power was furnished by a LeRoi gas engine through a right angle drive head. An air line, 208 ft. long, was installed for measuring water levels. After 5 hr. pumping at a rate of 16. 4 gpm., the drawdown was 48 ft. from an assumed nonpumping water level of 44 ft. below the top of the casing. Forty-five min. after pumping was stopped, the water level had recovered to 44 ft.

A partial chemical analysis of a sample (Lab. No. 133506) collected about Dec. 10, 1953, after 148 hr. pumping, showed the water to have a hardness of 24. 7 gr. per gal., total dissolved minerals of 659 ppm., and an iron content of 0. 7 ppm.

Subsequently, the permanent pump assembly was installed and included a Reda submersible pump, No. 4-4720, set at 225 (?) ft. and powered by a 7 1/2-hp. electric motor.

There are 69 services and pumpage is estimated to average 14,000 gpd.

LABORATORY NO. 133506

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 7		Fluoride	F	0. 7	
				Chloride	Cl	45.	1. 27
				Nitrate	NO_3	0. 3	. 01
				Alkalinity (as	$CaCO_3$)	168.	3. 36
Turbidity		3		Hardness (as	$CaCO_3$)	424.	8. 48
Color		0					
Odor		0		Total Dissolved Minerals		659.	

BARRY
Pike County
March 13, 1959

Two wells are in service for the public water supply of the city of Barry (1422).

The SPRING NO. 1, described in Bulletin 40, was abandoned in 1956.

SPRING NO. 2 or Hart Spring, an emergency s upply brought into service in 1953, was located about 1200 ft. south-southeast of the pumping station. Use of this spring was discontinued about 1956.

Dug WELL NO. 1, described in Bulletin 40, was abandoned in 1956.

WELL NO. 2, described in Bulletin 40 as three 2-in. sand points jetted-in in 1948, was discontinued in 1956.

WELL NO. 3 was completed in May 1951 to a depth of 30 ft. by Calhoun Drilling Co., Batchtown, and located about 75 ft. southeast of the sand points Well No. 2 on the west bank of Hadley Creek about 125 ft. north of the reservoir. The well was cased with 10-in. pipe from 4 ft. above the surface to 30 ft. below L.S.D. In 1954 the yield of this well had declined to 12 gpm. and about 1955 the well was abandoned.

The emergency well with sand points drilled in 1953 was abandoned in 1954.

WELL NO. 4 was completed to a depth of 325 ft. in 1954 by J. P. Miller Artesian Well Co., Brookfield, and located east of the public road and north of the creek, or approximately 400 ft. S. and 1850 ft. E. of the N. W. corner of Section 26, T4S, R6W. The well was cased with 6-in. pipe to 154 ft. penetrating limestone.

On July 8, 1954, after 4 hr. pumping at a rate of 16 gpm., the drawdown was 88 ft. from a static water level of 54 ft.

A partial chemical analysis of a sample (Lab. No. 135259) collected July 8, 1954 showed the water in Well No. 4 to have a hardness of 5. 5 gr. per gal., total dissolved minerals of 1214 ppm., and an iron content of 0. 3 ppm.

When the Grubb Hollow wells were put into service in 1956, all wells previously in use for the Barry public supply were either retired or abandoned and a new well numbering system established.

WELL NO. 1 (Grubb Hollow) was completed in July 1956 to a depth of 72 ft. by Layne-Western Co., St. Louis, and located at the site of Test Hole 56-2 in the Mississippi River bottomlands about 4 miles west of Barry and 2 miles south of Kinderhook, or approximately 2500 ft. N. and 4080 ft. W. of the S. E. corner of Section 31, T4S, R6W. The ground surface elevation at the well is 500. The well was cased with 61 ft. of 8-in. pipe from 4 ft. above the ground followed by 15 ft. of Layne shutter screen exposed to the formation. The hole was bored 30 in. in diameter and the annulus outside the screen was filled with coarse sand and pea gravel from the bottom to 10 ft. below the surface.

A production testwas conducted on July 2-3, 1956 by representatives of the Driller, the State Water Survey, and Casler and Stapleton, Consulting Engineers. For the test a turbine test pump was set at 59. 5 ft. with power from a gasoline engine. An air line, 55. 5 ft. long, was installed for measuring water levels. Two wells at 50 and 150 ft. west of the pumped well were used for observing water levels during the test. After 22 hr. pumping at a rate of 207 gpm., the drawdown in Well No. 1 was 5. 5 ft. from a static water level of 24 ft. below the top of the casing. Five min. after the pump was stopped, the water level had returned to 25. 5 ft.

A partial analysis of a sample (Lab. No. 140915) collected July 3, 1956, after 25 hr. pumping, showed the water in Well No. 1 to have a hardness of 18.7 gr. per gal., total dissolved minerals of 345 ppm., and an iron content of 0. 1 ppm.

The pumping equipment includes a 190 gpm. capacity turbine pump connected to a 30-hp. U S electric motor.

WELL NO. 2 (Grubb Hollow) was completed in July 1956 to a depth of 71. 5 ft. by Layne-Western Co. and located 100 ft. west of Well No. 1. The well was constructed similar to Well No. 1. The gravel pack was placed up to 37 ft. below the ground surface.

A production test was conducted on July 18-19, 1956 by the same representatives who conducted the test on Well No. 1. After 24 hr. pumping at 204 gpm., the drawdown was 4 ft. from a static water level of 23. 5 ft. below the top of the casing (4 ft. above L.S. D.). During the test water

levels were observed in O. W. No. 1, 50 ft. east of Well No. 2, and in Well No. 1, 100 ft. east of Well No. 2. The water level in the O. W. lowered 1 ft. 4 1/2 in. and in the Well No. 1 the water level lowered 1 ft. 3 in.

A partial analysis of a sample (Lab, No. 141043) collected July 19, 1956, after 23 1/2 hr. pumping, showed the water in Well No. 2 to have a hardness of 17. 5 gr. per gal., total dissolved minerals of 363 ppm., and an iron content of 0. 3 ppm.

There are 575 services, all metered, and including 10 farm homes tapped in on the main between the well and Barry. Pumpage is reported to average 85, 000 gpd.

Correlateddriller's log of GRUBB HOLLOW WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Red clay	30	30
Blue sandy clay	6	36
Medium sand	8	44
Coarse sand and gravel	17	61
Medium fine sand	11	72
Clay balls	1	73

LABORATORY NO. 141043

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 3		Fluoride	F	0. 1	
				Chloride	Cl	9.	.25
				Nitrate	NO_3	0. 2	Tr.
				Alkalinity (as	$CaCO_3$)	340.	6. 80
Turbidity		2		Hardness (as	$CaCO_3$)	348.	6. 96
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		363.	

Two wells are in service for the public water supply of the village of Bartlett (1540).

WELL NO. 1 was overhauled in 1954. At the time the static water level was reportedly 34. 9 ft: below the pump base.

WELL NO. 2 was completed in Nov. 1945 to a depth of 200 ft. by Henry Boysen, Libertyville, and located on Main St. 40 ft. east of Well No. 1, or approximately 1100 ft. N. and 360 ft. W. of the S. E. corner of Section 34, T41N, R9E. The elevation of the top of the well is 805. 29. The well was cased with 8-in. pipe to limestone at 151 ft. below which the hole was finished 8 in. in diameter.

On Feb. 18, 1948 the nonpumping water level was reportedly 36 ft. below the pump base (1 1/2 ft. above floor level). On Oct. 31, 1957 the nonpumping water level was 57 ft. below the pump base. On Feb. 19, 1959, after 1 1/2 hr. pumping at a rate of 349 gpm. (No. 1 pump off), the drawdown in Well No. 2 was 7 ft. from a nonpumping water level of 60 ft. below the pump base. With continued pumping in Well No. 2 and with No. 1 pumping at more than 320 gpm., the drawdown in Well No. 2 was 14 ft.

The pumping equipment in Well No. 2 consists of 120 ft. of 6-in. column pipe; 8-in., 9-stage American Well Works turbine pump, rated at 200 gpm.; 10 ft. of 5-in. suction pipe; 120 ft. of air line; 15-hp. U S electric motor.

A log of Well No. 2 and Laboratory Analysis No. 106281 for Well No. 1 are shown in Bulletin 40.

There are 400 services, all metered, and 100% of the population is served. Pumpage is estimated to average 75, 000 gpd.

BATAVIA
Kane County
November 14, 1958

Three wells provide the municipal supply for the city of Batavia (7496).

WELL NO. 1, described in Bulletin 40, was abandoned and filled in about Sept. 1948.

WELL NO. 2 is described in Bulletin 40. In Jan. 1948 the static water level was 128 ft. below the pump base. In July 1948, after 2 hr. pumping at 1600 gpm., the water level was 191 ft. below the pump base (elev. 670). In Jan. 1952 the static water level was 200 ft., and during pumping, the drawdown was 20 ft.

From Oct. 1, 1955 to Oct. 1, 1956, this well produced 112.15 mg., an average of 320, 000 gpd.

WELL NO. 3 is described in Bulletin 40. On July 9, 1948, after 20 min. pumping, the drawdown was 53 ft. from a static water level of 124 ft. below the pump base (elev. 666.8). Well No. 2 was shut down during the time of pumping.

From Oct. 1, 1955 to Oct. 1, 1956 Well No. 3 produced 112 mg., an average of 320, 000 gpd.

New pumping equipment was installed in Well No. 3 on Mar. 10, 1958 consisting of 350 ft. of 10-in. column pipe; 14-in., 4-stage Aurora turbine pump, No. 114417, rated at 1200 gpm. against 340 ft. T.D.H.; 20 ft. of 10-in. suction pipe; 350 ft. of air line; 150-hp. Westinghouse electric motor.

WELL NO. 4 was completed in Mar. 1953 to a depth of 1357 ft. by L. Cliff Neely, Batavia, and located on the eastern side of the Fox River, approximately 1650 ft. S. and 425 ft. E. of the N. W. corner of Section 22, T39N, R8E. The elevation of the top of the pump base is 721.11. The hole and casing record is shown in Table A.

A production test was conducted by the Driller on Apr. 20-21, 1953. After 10 hr. pumping at a rate of 552 gpm., the drawdown was 110 ft. from a static water level of 210 ft. below the surface.

The Driller had reported that the top and bottom of the Galesville sandstone were encountered at 1180 ft. and 1320 ft., respectively. The well was shot with 300 qt. of nitroglycerine between depths of 1227 and 1321 ft.

TABLE A

Hole Record

26-in.	from	surface	to	60 ft.
25-in.	from	60	to	270 ft.
19 1/4-in.	from	270	to	955 ft.
16-in.	from	955	to	1357 ft.

Casing Record

26-in.	from	surface	to 60 ft.	
19-in.	from	surface	to 270 ft.	(cemented)
16-in.	from	840	to 955 ft.	(cemented)

A second production test was conducted on May 27-28, 1953 by representatives of the Driller, the State Water Survey, and Wells Engineering Co. For test purposes the well was equipped with a 7-stage turbine pump with the top of the bowl section set at a depth of 120 ft. After 24 hr. pumping at a rate of 668 gpm., the drawdown was 53 ft. from a static water level of 240 ft. below the pump base. One hr. after the pump was stopped, the water level had recovered to 246. 5 ft.

In Sept. 1958, after 24 hr. pumping at 600 gpm., the drawdown was 20 ft. from a nonpumping water level of 250 ft.

A mineral analysis of a sample (Lab. No. 132088) collected on May 28, 1953, after 13 hr. pumping at 674 gpm., showed the water in Well No. 4 to have a hardness of 15 gr. per gal., total dissolved minerals of 380 ppm., and an iron content of 1.1 ppm.

Well No. 4 is equipped with 350 ft. of 8-in. column pipe; 12-in., 12-stage Aurora turbine pump, No. 468970, rated at 600 gpm. against 320 ft. T.D.H.; 350 ft. of air line; 75-hp. Westinghouse electric motor.

Pumpage from Wells 2, 3 and 4 from Oct. 1, 1956 to May 1, 1957 averaged 857, 000 gpd.

2 - Batavia

LABORATORY NO. 132088

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	9.7	
Manganese	Mn	Tr.		Fluoride	F	1.0	
Calcium	Ca	61.7	3.09	Chloride	Cl	7.	.20
Magnesium	Mg	24.8	2.04	Nitrate	NO_3	0.5	.01
Ammonium	NH_4	0.9	.05	Sulfate	SO_4	47.3	.98
Sodium	Na	44.	1.89	Alkalinity (as	$CaCO_3$)	294.	5.88
Turbidity		15		Hardness (as	$CaCO_3$)	257.	
Color		0					
Odor		0					
Temp. (reported)		53.5°F		Total Dissolved Minerals		380.	

BAYLIS
Pike County
December 31, 1958

Two wells are in service for the village of Baylis (284).

WELL NO. 1 is described in Supplement I, Bulletin 40.

WELL NO. 2 was completed in Nov. 1958 to a depth of 453 ft. by Mike Callahan, Pittsfield, and located about 760 ft. northeast of Well No. 1, or approximately 700 ft. N. and 2440 ft. W. of the S. E. corner of Section 7, T4S, R4W. The ground surface elevation at the well is 869. 3. The well was cased with 10-in. pipe from the surface to 103 ft. and with 8-in. pipe from the surface to 263 ft. 10 in., below which the hole was finished 8 in. in diameter.

A production testwas conducted on Dec. 30, 1958 by representatives of the Driller, the State Water Survey, and William H. Klingner and Associates. For the test the permanent pump was installed consisting of a Reda submersible pump set at 435 ft. with power from a 7 1/2-hp. motor. An air line, 435 ft. long, was in place. After 2 hr. pumping at a rate of 25 gpm. the drawdown was 106 ft. from a nonpumping water level of 217 ft. below the top of the casing (4. 05 ft. above L. S. D.).

A mineral analysis of a sample (Lab. No. 148580) collected Dec. 31, 1958, after 2 hr. pumping at 25 gpm., showed the water in Well No. 2 to have a hardness of 1. 2 gr. per gal., total dissolved minerals of 360 ppm., and an iron content of 0. 1 ppm.

Pumpage is estimated to average 20, 000 gpd.

LABORATORY NO. 148580

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	9. 8	
Manganese	Mn	Tr.		Fluoride	F	1. 6	
Calcium	Ca	5. 6	. 28	Boron	B	0. 8	
Magnesium	Mg	1. 5	. 12	Chloride	Cl	51.	1. 44
Ammonium	NH_4	0. 3	. 02	Nitrate	NO_3	1. 9	. 03
Sodium	Na	136.	5. 93	Sulfate	SO_4	1. 4	. 03
				Alkalinity (as	$CaCO_3$)	242.	4. 84
Turbidity		Tr.		Hardness (as	$CaCO_3$)	20.	. 40
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		59°F		Total Dissolved Minerals		360.	

Five wells are in service for the public water supply of the city of Beardstown (6294).

Two wells, COOK WELL NO. 2 and KELLY WELL NO. 1, described in Bulletin 40 as being in service, were abandoned in 1958 and 1957, respectively.

COOK WELL NO. 1 and KELLY WELL NO. 2, described in Bulletin 40, are in service.

VARNER WELL NO. 1 was completed in May 1956 to a depth of 86 ft. by J. P. Miller Artesian Well Co., Brookfield (successors to Varner Well and Pump Co., Dubuque, Iowa). The well was located at Fifth and Clay St., about l/4 mile west of the water works property and about 500 ft. northeast of Kelly Well No. 2, or approximately 3715 ft. N. and 725 ft. W. of the S. E. corner of Section 15, T18N, R12W. The elevation of the ground surface at the well is 445.

A 42-in. hole was drilled from the surface to the bottom at 86 ft. A 48-in. drive pipe was set from the surface to 4 ft. and a 16-in. casing was set from 1. 9 ft. above the surface to 61 ft. followed by 25 ft. of 16-in. Cater stainless steel screen having No. 110 slot openings. From the bottom of the hole up to 52 ft. the annulus between the screen and the wall of the hole was packed with gravel graded from 1/16 to l/4 in. From 52 ft. to the top of the casing the annulus was filled with bentonite and torpedo sand.

A production test was conducted on May 29, 1956 by representatives of the Driller, the State Water Survey, Village officials, and Casler and Stapleton, Consulting Engineers. After 8 hr. pumping at 800 gpm., the drawdown was 5. 5 ft. from a nonpumping water level of 16 ft. below the top of the 16-in. casing. Thirty min. after the pump was stopped, the water level hadrecovered to 17 ft.

The well was shut down in Nov. 1957. The 16-in. casing and screen were pulled and reinstalled in Apr. 1958. A finer gravel pack was placed in the well.

The pumping equipment includes a Fairbanks-Morse turbine pump, rated at 750 gpm., connected to a 50-hp. Fairbanks-Morse electric motor.

A partial analysis of a sample (Lab. No. 140690) collected May 29, 1956, after 8 hr. pumping, showed the water in this well to have a hardness of 29. 7 gr. per gal., total dissolvedminerals of 732 ppm., and an iron content of 2. 7 ppm.

This well is in service.

INDUSTRIAL WELL or WELL NO. 1-57 was completed in Apr. 1957 to a depth of 90 ft. by Luhr Bros., Columbia, and located about 1/2 mile south of the water works plant between U. S. Highway 67 and the river levee, or approximately 200 ft. S. and 1000 ft. E. of the N. W. corner of Section 24, T18N, R12W. The elevation of the ground surface at the well is 440.

The hole was cased with 42-in. pipe from the surface to the bottom at 90 ft. A 12-in. casing was set from the surface to 75 ft. followed by 15 ft. of stainless steel screen with No. 180 slot openings. The annulus between the 12-in. screen and casing and the 42-in. casing was packed uniformly with gravel up to 60 ft., above which fine gravel was packed up to within 10 ft. of the surface and the top 10 ft. was filled with concrete.

Correlated driller's log of WELL NO. 1-57 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Sand	32. 5	32. 5
Coarse sand	15. 5	48.
Sand and gravel, scattered boulders	10. 5	58. 5
Sand boulders at 63 ft.	16.	74. 5
Sand and gravel	15. 5	90.

When the well was completed, the Driller reported pumping for 11 hr. at a rate of 620 gpm, A partial chemical analysis (Lab. No. 143255) collected May 1, 1957 showed the water to have a hardness of 19 gr. per gal., total dissolved minerals of 345 ppm., and an iron content of 1. 3 ppm.

The pumping equipment includes a Layne turbine pump rated at 500 gpm. directly connected to a Fairbanks-Morse electric motor.

This well is in service.

VARNER WELL NO. 2 was completed in May 1959 to a depth of 89 ft. by Varner Well and

Pump Co. (now J. P. Miller Artesian Well Co.), and located about l/4 mile northeast of Varner Well No. 1, or approximately 500 ft. S. and 50 ft. E. of the N. W. corner of Section 14. The ground surface elevation at the well is 440. A 36-in. hole was drilled from the surface to 89 ft. and a 16-in. inner casing was set from the surface to 69 ft. followed by 20 ft. of 16-in. Johnson stainless steel screen with No. 80 slot openings. The annulus between the 16-in. casing and screen and the wall of the hole was filled with gravel from the bottom of the hole up to 49 ft.

A production test was conducted on May 20, 1959 by representatives of the Driller, the State Water Survey, and Casler and Stapleton, Consulting Engineers. After 4 3/4 hr. pumping at a rate of 1000 gpm., the drawdown was 16. 5 ft. from a static water level of 19 ft. below the top of the casing (2. 5 ft. above ground level). Five min. after the pump was stopped, the water level had recovered to 19 ft. Pumping was then resumed at 400 gpm., and after 1 hr. 20 min. pumping at rates increased to 800 gpm., the drawdown was 12. 5 ft.

The pumping equipment consists of 60 ft. of 8-in. column pipe; 11 3/4-in., 4-stage Peerless turbine pump, No. 131962, rated at 924 gpm. against 180 ft. T.D.H.; 8-in. galvanized strainer; 60 ft. of air line; 60-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152606) collected June 29, 1960 showed the water in the well to have a hardness of 22. 6 gr. per gal., total dissolved minerals of 512 ppm., and an iron content of 0. 6 ppm.

Pumpage in July 1958 was reported to average 1. 5 mgd.

LABORATORY NO. 152606

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	16.3	
Manganese	Mn	0.3		Fluoride	F	0.2	
Calcium	Ca	97.4	4.87	Boron	B	0.3	
Magnesium	Mg	35.0	2.88	Chloride	Cl	39.	1.10
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.2	.02
Sodium	Na	26.	1.14	Sulfate	SO_4	123.6	2.57
				Alkalinity (as	$CaCO_3$)	260.	5.20
Turbidity		2		Hardness (as	$CaCO_3$)	388.	7.75
Color		0					
Odor		0		Total Dissolved Minerals		512.	

A public water supply was installed for the village of Beecher City (452) in 1952.

Preliminary work on the installation was initiated in Dec. 1941 when an electrical earth resistivity survey was made by the State Geological Survey. In 1950-1951 a number of test holes were drilled by E. C. Baker & Sons, Sigel, and located in a thin shallow stratum of sand and gravel in the flat of Wolfe Creek about 3/4 mile south of the corporation limit of Beecher City. The elevation of the ground surface at the wells is 600.

On Jan. 16-18, 1951 production tests were conducted by the Driller on Test Wells 2 and 13. On Feb. 5-6, 1951 production tests were conducted on Test Wells 14 and 15. These four wells were selected to furnish the village supply.

TEST WELL NO. 2 was drilled to a depth of 24. 5 ft. at a location approximately 1100 ft. S. and 60 ft. E. of the N. W. corner of Section 5, T8N, R4E. The well was cased with 7-in. pipe from 2. 5 ft. above ground level to 18 ft. below and followed by a 10 ft. length of 6-in. Cook screen with No. 25 slot openings. The bottom of the screen penetrated 3 ft. of shale and the screen, from 18 to 21 ft. depth, was exposed to the formation.

TEST WELL NO. 13 was drilled to a depth of 23 ft. and located 25 ft. south of Test Well No. 2. The well was cased with 8-in. pipe to 19 ft. below the surface followed by a 6-ft. section of 7-in. pipe. The lower 3 ft. was slotted.

After 4 hr. pumping on Jan. 16 from Well No. 2 at a rate of 20 gprn., the drawdown was 12. 3 ft. from a static water level of 4.1 ft. below the top of the casing. Pumping was then started in Wells 2 and 13 and after 20 hr. pumping at rates of 19. 5 and 10 gpm., the drawdown in Well No. 2 was 14. 7 and in No. 13 the drawdown was 5.9 ft. from a static water level of 6.1 ft. below the surface.

A mineral analysis of a sample (Lab. No. 124146) collected Jan. 17, 1951, after 24 hr. pumping, showed the water in Well No. 2 to have a hardness of 16. 6 gr. per gal., total dissolved minerals of 338 ppm., and an iron content of 3. 7 ppm.

WELL NO. 14 was drilled to a depth of 23 ft. and located 120 ft. northeast of Well No. 2. The well was cased with 8-in. pipe to 20 ft. followed by 3 ft. of Houston screen with No. 40 slot openings exposed to the aquifer.

WELL NO. 15 was drilled to a depth of 22 ft. and located 52 ft. northeast of Well No. 14. The well was cased with 8-in. pipe to 19 ft. followed by 3 ft. of Houston screen with No. 40 slot openings exposed to the aquifer.

An analysis of the pumping tests indicated that if Wells 2 and 14 were operated in tandem and alternately from Wells 13 and 15 with all wells pumping for 12 hours, the pumping water levels would approximate those shown in Table A.

In Mar. 1953 a check of an observation well located about 15 ft. west of Well No. 13, showed a lowering of water levels since Feb. 1951 of 6.9 ft., indicating that the water level had lowered to the top of the formation. Significantly, the ground-water supply was not equal to the withdrawal and it became necessary to stop the distribution system for several hours each day.

A check of the meter readings for the past month showed an average pumpage of 13,000 gpd., an average of 9 gpm. for the four pumps operating 24 hr. daily. On Dec. 4, 1953 the four wells were pumping continuously at an average rate of 6 2/3 gpm. The water level in the observation well just west of Well No. 1 measured 19. 5 ft. below the top of the casing.

In Dec. 1953 a supplemental supply was being pumped into Well No. 13 from a small pool in Wolfe Creek at the rate of 1000 gal. per hr., every other day for 3 hr.

Subsequently, two dug wells, 10 by 10 ft. and 10 by 6 ft. in plan and each 26 ft. deep, were constructed adjacent to the drilled wells. Water was pumped by a Red Jacket jet pump and a Fairbanks-Morse submersible pump installed by Holkenbrink, Well Drilling Co., Effingham.

In Jan. 1958 a Jacuzzi turbine, rated at 25 gpm. was being rented from the Holkenbrink Co.

A mineral analysis of a sample (Lab. No. 145465) collected on Jan. 10, 1958, after 2 hr. pumping, showed the water from the pit to have a hardness of 18.1 gr. per gal., total dissolved minerals of 412 ppm., and an iron content of 2. 5

ppm.

In Mar. 1959 the State Department of Public Health suggested to Mr. Ed Anderson, Water Superintendent, that the well numbering be as follows: The four original wells even though not used be designated as Nos. 1, 2, 3 and 4; the pit or dug well should be No. 5, even though it was to be abandoned and filled in; the well that was constructed near the water plant should be No. 6.

Pumpage is estimated to average 20, 000 gpd.

TABLE A

Well No.	Pumping Rate gpm.	Pumping Level ft.	Inter-ference ft.	Pumping Level (actual)ft.	Top of Well Screen ft.
2	20	14.2	2.6	16.8	18.
14	15	16.6	3.1	19.7	20.
13	20	14.2	1.7	15.9	19.
15	15	16.6	2.2	18.8	20.

LABORATORY NO. 124146

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.7		Silica	SiO_2	19.2	
Manganese	Mn	0.2		Fluoride	F	0.3	
Calcium	Ca	75.1	3.76	Chloride	Cl	6.	.17
Magnesium	Mg	23.1	1.90	Nitrate	NO_3	10.6	.17
Ammonium	NH_4	Tr.	Tr.	Sulfate	SO_4	50.2	1.04
Sodium	Na	18.	.76	Alkalinity (as	$CaCO_3$)	252.	5.04
Turbidity		14		Hardness (as	$CaCO_3$)	283.	5.66
Color		0					
Odor		0					
Temp. (reported)		55.2°F		Total Dissolved Minerals		338.	

LABORATORY NO. 145465

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.5		Silica	SiO_2	16.0	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	78.9	3.95	Boron	B	0.0	
Magnesium	Mg	27.3	2.25	Chloride	Cl	26.	.73
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	32.	1.41	Sulfate	SO_4	71.8	1.49
				Alkalinity (as	$CaCO_3$)	268.	5.36
Turbidity		16		Hardness (as	$CaCO_3$)	310.	6.20
Color		0					
Odor		0					
Temp. (reported)		50.5°F		Total Dissolved Minerals		412.	

BELMONT-HIGHWOOD
PUBLIC WATER DISTRICT
DuPage County
June 16, 1958

Belmont-Highwood Water District (est. 500) was described in Bulletin 40 under the name Belmont. The Water District is located just west of Downers Grove. Two wells are now in service.

WELL NO. 1, described in Bulletin 40, was cleanedout inl954 and deepened tol48 ft. by J. P. Miller Artesian Well Co., Brookfield. Following the repair work the pumping equipment consisted of 100 ft. of 3-in. column pipe; new 4-in., 5-stage Peerless bowls, rated at 115 gpm. at 150 ft. T.D.H.; 10 ft. of 3-in. suction pipe; 100 ft. of air line; 7 1/2-hp. Westinghouse electric motor.

After the pump installation, the static water level was reportedly 45 ft. and, during pumping, the drawdown was 5 ft.

Well No. 1 is in service.

WELL NO. 2 was completed in Sept. 1954 to a depth of 295 ft. by Layne-Western Co., Aurora, and located near the southeast intersection of Belmont Ave. and Ellmore St., or approximately 780 ft. N. and 950 ft. W. of the S. E. corner of Section 12, T38N, R10E. The elevation of the ground surface at the well is 740. The well was cased with 10-in. black iron pipe to 92 ft., below which the hole was finished 10 in. in diameter to the bottom.

A production test was conducted on Sept. 28, 1954 by representatives of the Driller and the State Water Survey. For test purposes the well was equipped with 135 ft. of 6-in. column pipe; Layne turbine test pump, 8 ft. long; 10 ft. of suction pipe; 135 ft. of air line; gasoline engine. After 4 hr. pumping at a rate of 340 gpm., the drawdown was 4 ft. from a static water level of 84 ft. below the top of the casing (1 ft. above ground level).

A partial chemical analysis (Lab. No. 135848) collected Sept. 28, 1954, after 3 hr. pumping, showed the water in Well No. 2 to have a hardness of 26.2 gr. per gal., total dissolved minerals of 497 ppm., and an iron content of 0. 2 ppm.

The permanent pumping equipment includes 110 ft. of 6-in. column pipe; 10-in., 5-stage Layne turbine pump, No. 29631, rated at 400 gpm. at 205 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 110 ft. of air line; U S electric motor.

Well No. 2 is in service.

There are 140 services.

Pumpage in 1958 was reported to average 30, 000 gpd.

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown, dark grayish brown, brown	45	45
Gravel and sand, gray, brown	45	90
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, silty, cherty, gray to light gray, little slightly porous, slightly argillaceous, little yellow, pink lower 15 feet, very fine	150	240
Alexandrian Series		
Dolomite, slightly silty, light gray, greenish gray to light brown, very fine	50	290
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, maroon, green, weak; dolomite, very argillaceous, green, purple, yellow, very fine	5	295
		T. D.

LABORATORY NO. 135848

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Fluoride	F	0.4	
				Chloride	Cl	15.	.42
				Nitrate	NO_3	6.1	.10
				Alkalinity (as	$CaCO_3$)	304.	6.08
Turbidity		2		Hardness (as	$CaCO_3$)	448.	8.96
Color		0					
Odor		0					
Temp. (reported)		50.6°F		Total Dissolved Minerals		497.	

Five wells are in service for the city of Belvidere (11,223).

WELL NO. 1, described in Bulletin 40, was abandoned sometime between 1952 and 1955.

WELL NO. 2, described in Bulletin 40, was reamed out in 1951 from 8 to 10 in. in diameter between 100 and 600 ft. depths. Below 600 ft. the bore hole was leftlO in. in diameter. Following the rehabilitation work, the well produced 615 gpm. over a 4 hr. pumping period with a drawdown of 56 ft. from a nonpumping water level of 13 ft. below the pump base (3 ft. above ground level elevation of 763).

In 1955 the entire water works and distribution system of Belvidere was rehabilitated at an expense of more than $400,000.

Well No. 2 was equipped in 1955 with 85 ft. of 6-in. column pipe; 10-in., 3-stage Byron Jackson submersible pump rated at 500 gpm. at 110 ft. T.D.H., and driven by a 25-hp. electric motor.

WELL NO. 3, described in Bulletin 40, was rehabilitated in 1951. The bore hole, from 90 to 640 ft., was reamed out from 8 to 10 in. in diameter. Following this work the well produced 500 gpm. with a drawdown of 53 ft. from a nonpumping water level of 26. 5 ft.

Well No. 3 was equipped in 195 5 with a new Byron Jackson submersible pump set at 110 ft. and rated at 550 gpm. at 83 ft. T.D.H.

WELL NO. 4, described in Bulletin 40, was equipped in 1955 with a new 4-stage Byron Jackson submersible pump, rated at 1000 gpm. at 220 ft. T. D.H. and driven by a 75-hp. electric motor.

WELL NO. 5, described in Bulletin 40, was equipped in 1955 with a new Byron Jackson submersible pump, Model 11 STO-10 KH, set at 140 ft. and rated at 600 gpm. at 342 ft. T.D.H. The pump is driven by a 75-hp. Byron Jackson electric motor.

In Feb. 1956 whenpumping at 600 gpm., the drawdown was 75 ft. from a nonpumping water level of 57 ft.

WELL NO. 6 was completed in Aug. 1955 to a depth of 868 ft. (after deepening from 560 ft.) by Layne-Western Co., Aurora, and located on McHenry Ave. near the elevated water tank in the northeast part of town, or approximately 440 ft. N. and 66 ft. E. of the S. W. corner of Section 24, T44N, R3E. The ground surface elevation at the well is 784. The well is cased with 30-in. od. pipe from the surface to 10 ft. and with 26-in. od. pipe from the surface to 27.5 ft. followed by 20-in. od. pipe to 110 ft., below which the hole was finished 19 1/4 in. in diameter to the bottom.

On June 15, 1955, when the drilling was 560 ft. deep, a production test was conducted by the Driller, the State Water Survey, and C. K. Willett, Consulting Engineers. After 6 hr. pumping at 713 gpm., the drawdown was 142 ft. from a static water level of 34 ft. below the top of the casing. Seven min. after the pump was stopped, the water level had recovered to 56 ft.

On Aug. 2, following the deepening of the well from 560 to 868 ft., a second production test was conducted. In June the 15-in., 2-stage test turbine had been set on 8-in. column pipe at 200 ft. On this test the pump was set at 210 ft. After 2 1/2 hr. pumping at 734 gpm., the drawdown was 61 ft. from a nonpumping water level of 33 ft. One and one-half hr. after the pump was stopped, the water level had recovered to 46 ft. Pumping was again started and after several starts and stops pumping was maintained at a steady rate of 1212 gpm. for 3 1/2 hr; with a drawdown of 91. 5 ft. Forty-five min. later the water level had recovered to 55 ft.

The permanent pump assembly consists of 150 ft. of 8-in. column pipe; 12-in., 5-stage Byron Jackson submersible pump, No. 313756, rated at 1000 gpm. at 310 ft. T.D.H.; 150 ft. of air line; 125-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153623) collected Nov. 16, 1960 showed the water in Well No. 6 to have a hardness of 20 gr. per gal., total dissolved minerals of 354 ppm., and an iron content of 0. 3 ppm.

Pumpage for the year 1959 averaged 1.224 mgd.

LABORATORY NO. 153623

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	10.9	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	78.0	3.90	Boron	B	0.1	
Magnesium	Mg	36.0	2.96	Chloride	Cl	3.	.08
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	2.4	.04
Sodium	Na	4.	.19	Sulfate	SO_4	30.4	.63
				Alkalinity (as	$CaCO_3$)	316.	6.32
Turbidity		0		Hardness (as	$CaCO_3$)	343.	6.86
Color		0					
Odor		0					
Temp. (reported)		53.0°F		Total Dissolved Minerals		354.	

Sample study summary log of WELL NO. 6 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, yellowish brown	5	5
Sand, gravelly, fine to very coarse, clean in upper 10 ft.	20	25
ORDOVICIAN SYSTEM		
Mohawkian Series		
Galena Formation		
Dolomite, yellowish to buff, extra fine to medium, crystalline	165	190
Decorah Formation		
Dolomite, buff to gray, extra fine to fine, crystalline	28	218
Platteville Formation		
Dolomite, buff to gray, extra fine to fine, crystalline	107	325
Glenwood Formation		
Sandstone, gray to buff, very coarse to fine, incoherent to compact; dolomite, silty, sandy, light-greenish gray	55	380
Chazy Series		
St. Peter Formation		
Sandstone, white to light gray, very fine to coarse, rounded, incoherent	115	495
Sandstone, light buff, very fine to medium, little coarse, rounded, incoherent, little friable	55	550
Sandstone, light gray to light buff, very fine to coarse, incoherent, little shale at base	38	588
CAMBRIAN SYSTEM		
St. Croixan Series		
Trempealeau Formation		
Dolomite, pinkish buff to buff, extra fine to fine, crystalline	72	660
Franconia Formation		
Sandstone, reddish brown to buff, very fine to medium, incoherent to compact; little dolomite at top	57	717
Ironton Formation		
Sandstone, white to light gray, very fine to coarse, incoherent, little compact	83	800
Galesville Formation		
Sandstone, white to light gray, very fine to medium, little coarse, rounded, incoherent	65	865
"Shale red"	3	868

BENSENVILLE
DuPage County
May 1, 1958

Three wells are in service for the public water supply of the village of Bensenville (9141).

WELL NO. 1 was described in Bulletin 40. In Dec. 1957 the nonpumping water level was reported to be 439 ft. In Dec. 1958 it was necessary to reset the pump to 585 ft. because the pumping water level had dropped below the old setting.

WELL NO. 2 was described in Bulletin 40. In Dec. 1957 the nonpumping water level was reported to be 439 ft. In Sept. 1958 the bowls were reset at 600 ft. In Nov. 1958, during pumping at 625 gpm., the drawdown was reportedly 68 ft. from a nonpumping water level of 457 ft.

WELL NO. 3 was completed in Aug. 1954 to a depth of 1445 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at the northeast corner of Main and Church Roads, about 1/2 mile west of Well No. 2, or approximately 2200 ft. S. and 2500 ft. W. of the N. E. corner of Section 14, T40N, R11E. The elevation of the top of the well is 670.4.

The well was cased with 20-in. pipe cemented in a 25-in. hole from the surface to 476 ft. A 16-in. liner was set from 1085 ft. to 1210 ft. The bore hole was finished 19 1/4 in. in diameter from 476 to 1210 ft. and 15 in. from 1210 to 1445 ft.

When the well was completed, the Driller reported pumping for 24 hr. at rates of 1000 to 1100 gpm. with a drawdown of 79 ft. from a nonpumping water level of 370 ft. below the top of the casing.

In Sept. 1957 the nonpumping level was 416 1/2 ft.

The pumping equipment includes 550 ft. of 10-in. column pipe; 14-in., 8-stage Peerless turbine pump (No. 110311); 10 ft. of 10-in. suction pipe; 550 ft. of l/4-in. air line; 250-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146498) collected May 1, 1958 showed the water in Well No. 3 to have a hardness of 13. 7 gr. per gal., total dissolved minerals of 367 ppm., and an iron content of 0.1 ppm.

For Aug. 1957 the pumpage from the three wells was:

Well No. 1	1.14 mg.
Well No. 2	9. 58 mg.
Well No. 3	12. 06 mg.
Total	22. 78 mg. = 738, 000 gpd.

In July 1958 pumpage for the previous six months averaged 731, 000 gpd.

LABORATORY NO. 146498

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	18. 4	
Manganese	Mn	0. 1		Fluoride	F	0. 9	
Calcium	Ca	56. 6	2. 83	Boron	B	0. 3	
Magnesium	Mg	22. 7	1. 87	Chloride	Cl	28.	.79
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2. 0	.03
Sodium	Na	38.	1. 64	Sulfate	SO_4	73. 0	1. 52
				Alkalinity (as	$CaCO_3$)	200.	4. 00
Turbidity		0		Hardness (as	$CaCO_3$)	235.	4. 70
Color		0					
Odor		0					
Temp. (reported)		59. 5°F		Total Dissolved Minerals		367.	

BENSON
Woodford County
March 14, 1957

Two wells are in service for the village of Benson (427).

WELLS NO. 1 and 2, described in Bulletin 40, were abandoned when Well No. 3 was put into service.

WELL NO. 3, described in Bulletin 40, is now equipped with a Fairbanks-Morse submersible pump, rated at 25 gpm.

WELL NO. 4 was completed in 1956 to a depth of 73 ft. by Layne-Western Co., Aurora, and located about 500 ft. north of Well No. 3, or approximately 1270 ft. S. and 1330 ft. E. of the N. W. corner of Section 33, T28N, R1E. The ground surface elevation at the well is 760. The well was drilled to a total depth of 88 ft. but ran out of the formation at 73 ft.

A 10-in. standard casing was set inside a hole of unreported diameter from 12 in. above the surface to 58 ft. followed by 15 ft. of Layne bronze shutter screen with No. 8 slot openings. The annulus between the screen and the wall of the hole was packed with 29 ton of buckshot gravel from 74 to 50 ft. depth.

The pumping equipment includes a Red Jacket submersible pump rated at 30 gpm. with power from a 2-hp. electric motor.

A partial chemical analysis of a sample (Lab. No. 141577) collected in Oct. 1956, after 24 hr. pumping at 30 gpm., showed the water to have a hardness of 24.1 gr. per gal., total dissolved minerals of 467 ppm., and an iron content of 1. 9 ppm.

There are 160 services but no master meter. Pumpage is estimated to average 19,000 gpd.

Summary sample study log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, brown, gray	53	53
Gravel, sandy, granular to medium	15	68
Sand, medium to coarse	5	73
Till, gravelly, sandy, silty, gray to brown	16	89

LABORATORY NO. 141577

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Fluoride	F	0.4	
				Chloride	Cl	9.	.25
				Nitrate	NO_3	0.2	Tr.
				Alkalinity (as	$CaCO_3$)	432.	8.64
Turbidity		6		Hardness (as	$CaCO_3$)	412.	8.24
Color		0					
Odor		0		Total Dissolved Minerals		467.	

Four wells are available for service for the village of Bethalto (3235).

WELL NO. 1, described in Bulletin 40, is reportedly maintained for stand-by use.

WELL NO. 2, described in Bulletin 40, was equipped inl954 with anew Fairbanks-Morse (Pomona) turbine pump, Serial No. AS-4062, rated at 360 gpm. against 380 ft. T.D.H. The length from the discharge to the bottom of the suction strainer was 88 ft. When the pump was set, the static water level was 54 ft. below the top of the well.

Well No. 2 was abandoned, but not filled as of Oct. 1959.

WELL NO. 3 was constructed in Mar. 1951 to a depth of 95 ft. by Thorpe Concrete Well Co., Alton, and located about 100 ft. north of Well No. 2, or approximately 1820 ft. N. and 1227 ft. W. of the S. E. corner of Section 22, T5N, R9W. The elevation of the top of the well is 440. 71 ft.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil	7	7
Dry fine, yellow sand	33	40
Medium fine sand	18	58
Medium coarse sand	7	65
Fine sand	11	76
Medium fine sand	6	82
Blue clay	4	86
Coarse sand and some gravel	9	95

The well was cased with 12 sections (each 4 ft. in length) of 30-in. id. by 40-in. od. blank concrete pipe and 12 sections (each 4 ft. in length) of 30-in. id. by 40-in. od. porous concrete pipe. A concrete plug, about 1 ft. thick, was placed at the bottom of the pipe. The depth from the pump base to the top of the plug is reportedly 96 ft.

The pumping equipment includes an American Well Works turbine pump, rated at 300 gpm. against 300 ft. T.D.H. Power is furnished from a 30-hp. General Electric motor. An air line is installed at a reported length of 90 ft.

On June 7, 1958, during pumping to the system, the drawdown was 8 ft. from a nonpumping water level of 56 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 146819) collected June 7, 1958 showed the water in Well No. 3 to have a hardness of 24 gr. per gal., total dissolved minerals of 497 ppm., and an iron content of 0.4 ppm.

Well No. 3 is maintained for stand-by use.

WELL NO. 4 was completed in 1958 to a depth of 92 ft. by Luhr Bros., Columbia, and located about 100 ft. east of Well No. 3. The elevation of the ground surface at the well is 440. A 34-in. hole was drilled from the surface to the bottom at 92 ft., and a 16-in. inner casing was set from 2 1/2 ft. above ground level to 76 l/2 ft. followedby a 16-in. Johnson stainless steel screen having No. 150 slot openings. The annulus between the inner and outer casings was packed with gravel up to 10 ft. below the surface.

The pumping equipment consists of a Worthington turbine pump, rated at 400 gpm. connected to a 50-hp. U S electric motor.

WELL NO. 5 was completed in Aug. 1959 to a depth of 92 ft. and located about 100 ft. north and 10 ft. west of Well No. 4, or approximately 1665 ft. N. and 1137 ft. W. of the S. E. corner of Section 22. The ground surface elevation at the well is 440. A 34-in. hole was drilled from the surface to the bottom at 92 ft. A 16-in. inner casing was set from 2 1/2 ft. above ground level to the top of a 15 1/2 ft. length of 16-in. Johnson stainless steel screen having No. 150 slot openings. The annulus between the inner and outer casings was filled with gravel up to 10 ft. below the surface.

When the well was completed, a production test was conducted Aug. 12, 1959 by representatives of the Driller and the State Water Survey. After 3 hr. pumping at a rate of 464 gpm., the drawdown was 57 ft. from a static water level of 574 ft. below the top of the 2-in. pipe in the side

of the casing 1 ft. above ground level. Thirty min. after the pump was stopped, the water level had recovered to 58 ft.

The pumping equipment consists of 70 ft. of 8-in. column pipe; Fairbanks-Morse turbine pump, 9 ft. 7 in. long and rated at 375 gpm. against 300 ft. T. D. H. ; 10 ft. of 5-in. suction pipe; 50-hp. Fairbanks-Morse electric motor.

A partial chemical analysis (Lab. No. 150348) collected Aug. 12, 1959, after 3 hr. pumping, showed the water in Well No. 5 to have a hardness of 26.4 gr. per gal., total dissolved minerals of 524 ppm., and an iron content of 0. 6 ppm.

According to a State Department of Public Health report, water is pumped through the Bethalto system to the following:

Bethalto	**952 services**
Rosewood Heights	**1240 services**
Cottage Hills	**823 services**
Total	**3015 services**

Approximately 1500 services are metered.

Pumpage to all the communities is estimated to average 530,000 gpd.

LABORATORY NO. 146819

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	31.3	
Manganese	Mn	0.3		Fluoride	F	0.1	
Calcium	Ca	104.0	5.20	Boron	B	0.1	
Magnesium	Mg	36.9	3.05	Chloride	Cl	11.	.31
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.2	.02
Sodium	Na	16.	.69	Sulfate	SO_4	117.6	2.45
				Alkalinity (as	$CaCO_3$)	308.	6.16
Turbidity		5		Hardness (as	$CaCO_3$)	413.	8.25
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		497.	

Black Hawk Heights, a subdivision located between Clarendon Hills and Westmont, purchased water from Westmont until 1953 when a well and treatment plant was constructed. The water works system was purchased in 1955 by the Illinois Municipal Water Co. and operated as the Black Hawk Heights Water Co.

WELL NO. 1 was drilled in 1953 to a depth of 295 ft. by Layne-Western Co., Aurora, and located 2573 ft. S. and 1517 ft. E. of the N. W. corner of Section 10, T38N, R11E. The ground elevation at the well is 760. The well was cased with 12-in. pipe to a depth of 140 ft., below which the hole was finished 12 in. in diameter to the bottom.

A production test was conducted on Apr. 17, 1953 by representatives of the Drilling Contractor and the State Water Survey. For test purposes the well was equipped with 130 ft. of 6-in. column pipe; 3-stage Layne and Bowler turbine pump, 4 ft. long, with a Johnston right angle gear head connected by a drive shaft to a gasoline engine. A plastic air line, 131 ft. long, was installed. After 8 hr. pumping at a rate of 210 gpm., the drawdown was 24 ft. below a nonpumping water level of 102 ft. below the top of the casing. Six min. after pumping was stopped, the water level had recovered to 102 ft.

The permanent pump assembly includes 150 ft. of 5-in. column pipe; Layne and Bowler turbine pump, 5 ft. 8 in. long, and rated at 2 00 gpm. against 295 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 150 ft. of air line; 20-hp. U S electric motor.

Analysis of a sample (Lab. No. 147067) collected June 11, 1958 showed the water in Well No. 1 to have a hardness of 30 gr. per gal., total dissolved minerals of 696 ppm., and an iron content of 2. 7 ppm.

In 1955, when the water works system was completed there were 270 services, all metered.

Metered pumpage from May 1 to Aug. 1, 1957 averaged 49, 000 gpd., and from May 1, 1957 to Apr. 30, 1958 pumpage averaged 45, 000 gpd.

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown, dark gray, sandy, gravelly	45	45
Gravel, buff, gray, granular to fine, dirty, poorly sorted; till, brown	10	55
Till, dark brown, sandy, gravelly	10	65
Gravel, medium, dirty, poorly sorted; till, gray	10	75
Till, brown, gravelly, sandy	15	90
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to buff, fine, crystalline	140	230
Alexandrian Series		
Dolomite, buff, fine to very fine, compact, crystalline	55	285
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, grayish green, weak; dolomite, greenish gray, fine	10	295

LABORATORY NO. 147067

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.7		Silica	SiO_2	20.8	
Manganese	Mn	0.1		Fluoride	F	0.3	
Calcium	Ca	142.4	7.12	Boron	B	0.2	
Magnesium	Mg	39.4	3.24	Chloride	Cl	3.	.08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.6	.04
Sodium	Na	25.	1.10	Sulfate	SO_4	206.5	4.30
				Alkalinity (as	$CaCO_3$)	352.	7.04
Turbidity		5		Hardness (as	$CaCO_3$)	518.	10.36
Color		0					
Odor		0					
Temp. (reported)		53.0°F		Total Dissolved Minerals		696.	

BLUE CREST SUBDIVISION
Cook County
October 6, 1958

A public water supply was installed in 1956 for the Blue Crest Subdivision (est. 220), sometimes called Dowe Subdivision, located about 3/4 mile southwest of Alsip. The water system is owned and operated by the Doweville Water Co. Water is obtained from one well.

WELL NO. 1 was completed in 1956 to a depth of 349 ft. by J. P. Miller Artesian Well Co., Brookfield, and located north and east of Central Ave. at 127th St., or approximately 400 ft. N. and 300 ft. E. of the S. W. corner of Section 28, T37N, R13E. The ground surface elevation at the well is 598. The well was cased with 10-in. pipe, cemented in, from about 18 in. above the pump house floor to 50 ft. The hole was finished 10 in. in diameter to the bottom.

In a production test in Aug. 1956, during pumping at 250 gpm., the drawdown was 36 ft. from a nonpumping water level of 21 ft. below the pump base. Subsequently, the permanent pumping equipment was installed to include 100 ft. of 5-in. column pipe; 8-in., 7-stage Peerless turbine pump, No. 121040; rated at 250 gpm. at 172 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 100 ft. of air line; 15-hp. U S electric motor.

In June 1958, during pumping at 250 gpm., the drawdown was 16 ft. from a nonpumping water level of 13 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 147020) collected June 11, 1958 showed the water in the subdivision well to have a hardness of 27. 6 gr. per gal., total dissolved minerals of 565 ppm., and an iron content of 1. 3 ppm.

There are 55 services installed with a total of 130 expected when construction is completed. Pumpage is estimated to average 11,000 gpd.

LABORATORY NO. 147020

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Silica	SiO_2	10.5	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	106.8	5.34	Boron	B	0.2	
Magnesium	Mg	49.6	4.08	Chloride	Cl	18.	.51
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	15.	.67	Sulfate	SO_4	186.8	3.89
				Alkalinity (as	$CaCO_3$)	284.	5.68
Turbidity		10		Hardness (as	$CaCO_3$)	471.	9.42
Color		0					
Odor		0					
Temp. (reported)		51.4°F		Total Dissolved Minerals		565.	

Two wells are in service for the village of Bluffs (779).

WELL NO. 1, described in Bulletin 40, has been abandoned.

WELL NO. 2, described in Bulletin 40, is in service.

WELL NO. 3 was completed in Oct. 1958 to a depth of 59 ft. 5 in. by Layne-Western Co., St. Louis, Mo., and located about 50 ft. east of the pump station, or approximately 5 ft. S. and 755 ft. W. of the N. E. corner of Section 16, T15N, R13W. The elevation of the ground surface at the well is 460. Well No. 3 was cased with 26-in. pipe from the surface to 25 ft. and cemented in. The hole was drilled 34 in. in diameter from the surface to the bottom at 59 ft. 5 in. An inner casing, 12 in. in diameter, was set from the surface to 49. 5 ft. followed by a 15 ft. length of La.yne No. 5 stainless steel shutter screen, seated on the bedrock. The annulus between the two casings and between the 12-in. casing and screen and the wall of the 34-in. hole, was filled with gravel,

A production test was conducted on Oct. 9, 1958 by representatives of the Driller, the State Water Survey, and Village officials. After 8 hr. pumping at 250 gpm., the drawdown was 12.2 ft. from a nonpumping water level of 19. 4 ft. below the pump base (7 in. above ground level). Forty-five min. after the pump was stopped, the water level had recovered to 22 ft.

During the test, water levels were noted in two observation wells, No. 1 and 2, located respectively 60 and 58 ft. from the pumped well (No. 3). When the pumping was stopped, the water level in O. W. No. 1 had lowered 5.1 ft. from the static level of 24.2 ft. Thirty-four min. later the water level had raised to 26. 8 ft.

In O. W. No. 2 the water level lowered, during the test, 6. 3 ft. from a static level of 22.4 ft. Thirty-four min. later the water level in O. W. No. 2 had raised to 25 ft.

A mineral analysis of a sample (Lab. No. 152613) collected June 29, 1960 showed the water in Well No. 3 to have a hardness of 32. 2 gr. per gal., total dissolved minerals of 679 ppm., and an iron content of 2. 7 ppm.

There are 375 services. Pumpage is estimated to average 40,000 gpd.

LABORATORY NO. 152613

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.7		Silica	SiO_2	13.9	
Manganese	Mn	0.2		Fluoride	F	0.2	
Calcium	Ca	128.0	6.40	Boron	B	0.1	
Magnesium	Mg	55.9	4.60	Chloride	Cl	16.	.45
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.0	.02
Sodium	Na	26.	1.11	Sulfate	SO_4	197.9	4.12
				Alkalinity (as	$CaCO_3$)	376.	7.52
Turbidity		11		Hardness (as	$CaCO_3$)	550.	11.00
Color		0					
Odor		0		Total Dissolved Minerals		679.	

BRICKMAN MANOR SUBDIVISION
Cook County
April **8, 1**960

One well is in service for the Brickman Manor Subdivision (est. 500) located about 1 mile northeast of Mount Prospect and 1/4 mile southeast of Prospect Heights. The system is owned and operated by Chicago Suburban Utilities Co.

WELL NO. 1 was completed in July 1958 to a depth of 213 ft. by Hoover Water Well Service, Zion. The well was drilled reportedly for Brickman Manor Subdivision at a location 37 ft. S. and 50 ft. W. of the N. E. corner of Section 34, T42N, R11E. The well was cased from the surface to 105 ft. (limestone) with 12-in. pipe, below which the hole was finished 12 in. in diameter to the bottom. The ground surface elevation at the well is 691. A production test July 29, 1958 was reported by the Driller. After 24 hr. pumping at a rate of 200 gpm., the drawdown was 62 ft. from a static water level of 38 ft. below the pump base (2 ft. above L. S. D.).

The pumping equipment includes a Universal submersible pump, No. UEKE2597, rated at 150 gpm., connected to a 15-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152022) collected Apr. 8, 1960, after 5min. pumping at 150 gpm., showed the water in this well to have a hardness of 14. 2 gr. per gal., total dissolved minerals of 458 ppm., and an iron content of 0. 3 ppm.

WELL NO. 2 was completed to a depth of 1468 ft. in Aug. 1959 by Milaeger Well and Pump Co., Inc., Milwaukee, Wis., and located on the south side of Euclid Ave. about 1/2 mile east of Elmhurst Road, or approximately 2450 ft. N. and 1400 ft. E. of the S. W. corner of Section 26, T42N, R11E. The ground surface elevation at the well is 661. The well was cased with 20-in. pipe from the surface to 97 ft. and with 16-in. pipe from the surface to 640 ft. (cemented in). A 14-in. liner was set from 1000 to 1200 ft. depth, below which the hole was finished at 12 in. in diameter to the bottom at 1468 ft.

A production test was conducted on Aug. 24, 1959 by representatives of the Driller, the State Water Survey, and Charles W. Greengard Associates, Consulting Engineers. After 12 hr. pumping at a rate of 480 gpm., the drawdown was 68 ft. from a static water level of 360 ft. below the top of the casing (3 ft. above L. S. D.). Considerable sand was pumped from the well and the test was stopped in order to clean out the well.

On Oct. 1-2, 1959 the Driller reported a secondproduction test. For the test the well was equipped with 480 ft. of 6-in. column pipe; 8-in., 5-stage American Well Works test turbine with 20 ft. of bowl section and suction pipe; 480 ft. of air line; 3 diesel engines. After 24 hr. pumping at a rate of 964 gpm., the drawdown was 135 ft. from a static water level of 365 ft. below the top of the casing. Ten min. after the pump was stopped, the water level had recovered to 404 ft.

A partial chemical analysis of a sample (Lab. No. 150735) collected Oct. 2, 1959, after 23 hr. pumping at a rate of 942 gpm., showed the water in Well No. 1 to have a hardness of 18. 9 gr. per gal., total dissolved minerals of 566 ppm., turbidity of 44 ppm., and an iron content of 2. 1 ppm.

There are 125 services. Pumpage is estimated to average 25, 000 gpd.

LABORATORY NO. 150735

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 1		Fluoride	F	1. 0	
				Chloride	Cl	23.	. 65
				Sulfate	SO_4	185. 1	3. 85
				Alkalinity (as	$CaCO_3$)	260.	5. 20
Turbidity		44		Hardness (as	$CaCO_3$)	324.	6. 48
Color		0					
Odor		0					
Temp. (reported)		60. 2°F		Total Dissolved Minerals		566.	

2 - Brickman Manor Subdivision

LABORATORY NO. 152022

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	12.2	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	50.0	2.50	Boron	B	0.4	
Magnesium	Mg	29.7	2.44	Chloride	Cl	7.	.20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.9	.03
Sodium	Na	67.	2.91	Sulfate	SO_4	194.8	4.05
				Alkalinity (as	$CaCO_3$)	176.	3.52
Turbidity		Tr.		Hardness (as	$CaCO_3$)	247.	4.94
Color		0					
Odor		0					
Temp. (reported)		51.3°F		Total Dissolved Minerals		458.	

BRIDGEVIEW
Cook County
June 4, 1959

A public water supply was installed for the village of Bridgeview (7334) about 1953 to 1955. Water is obtained from three wells which serve three separate sections of Bridgeview. Neither the wells nor the distribution systems are interconnected.

Bridgeview WELL NO. 1 (formerly Bridgeview Manor Subdivision Well) was completed in June 1953 to adepth of 340 ft. by Beddecker Water Well Co., Oak Lawn. The well is located at the northeast corner of 78thand Beloit St. in Bridgeview, or approximately 250 ft. N. and 2000 ft. W. of the S. E. corner of Section 25, T38N, R12E. The ground surface elevation at the well is 620.

According to a State Department of Public Health report, the well is cased with 8-in. black gwi. pipe from the ground surface to 85 ft. The top of the casing was left 3 ft. above the floor of the concrete well pit, which was about 10 ft. by 8 ft. by 6 ft. deep. The well is equipped with a Deming turbine pump, No. 15994, rated at 250 gpm. and connected to a 10-hp. Deming electric motor.

Analysis of a sample (Lab, No. 147975) collected Oct. 16, 1958 showed the water in Well No. 1 to have a hardness of 35. 5 gr. per gal., total dissolved minerals of 879 ppm., and an iron content of 0. 9 ppm.

Bedford Park District well furnishes water to a section of Bridgeview, known as Bridgeview Gardens. The well is described in Bulletin 40 under Bedford Park District. It is located in Bedford Park at 66th Place and 78th Ave., or approximately 2550 ft. S. and 1800 ft. E. of the N. W. corner of Section 24.

A partial chemical analysis of a sample (Lab. No. 147978) collected Oct. 16, 1958 showed the water in the Bedford Park well to have a hardness of 33. 3 gr. per gal., total dissolvedminerals of 945 ppm., and an iron content of 0. 7 ppm.

Bridgeview WELL NO. 3 was completed in Nov. 1956 to a depth of 200 ft. by Olden Pump and Supply Co., Justice, and located near Roberts Road (80th Ave.) between 82nd Place and 82nd St., or approximately 2200 ft. S. and 200 ft. E. of the N. W. corner of Section 36. The ground surface elevation at the well is 620.

The well is cased with 6-in. gwi. pipe to 80 ft.

The pumping equipment includes 80 ft. of 3-in. column pipe; 3 5/8-in. Jacuzzi turbine pump, No. 3M4-8, rated at 75 gpm. connected to a 3-hp. Century electric motor.

A partial chemical analysis of a sample (Lab. No. 147981) collected Oct. 16, 1958 showed the water from Well No. 3 to have a hardness of 56 gr. per gal., total dissolved minerals of 1388 ppm., and an iron content of 2. 5 ppm.

The three wells previously described furnish all of the water for Bridgeview. Five other wells have been abandoned. Reportedly there are 390 services in the village. The supply is not metered and only about 50% of the population is served.

Pumpage is estimated to average 100, 000 gpd.

LABORATORY NO. 147975

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	12.7	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	127.2	6.36	Boron	B	0.4	
Magnesium	Mg	70.7	5.81	Chloride	Cl	23.	.65
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	49.	2.13	Sulfate	SO_4	401.9	8.36
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		1		Hardness (as	$CaCO_3$)	608.	12.17
Color		0					
Odor		Cc					
Temp. (reported)		52.0°F		Total Dissolved Minerals		879.	

BROOKHAVEN MANOR
DuPage County
February 18, 1959

Brookhaven Manor, a subdivision located near Clarendon Hills, installed a public water supply in 1957.

WELL NO. 1 was drilled in 1957 to a depth of 310 ft. by James Bilskey, Hinsdale, and located 3100 ft. S. and 350 ft. E. of the N. W. corner of Section 27, T38N, R11E. The ground elevation at the well is 755. The well was cased with 16-in. black iron pipe from the surface to 115 ft., below which the hole was finished 15 1/2 in. in diameter to the bottom.

The pumping equipment includes a Reda submersible pump, No. 65074, rated at 276 gpm. attached to 280 ft. of 3-in. drop pipe. Power is furnished by a 20-hp. electric motor. On May 5, 1958 the nonpumping water level was 114 ft. 3 in. below the pump base and the pumping rate reported to be 400 gpm. The drawdown was reported to be 140 ft.

Analysis of a sample (Lab. No. 146606) collected May 5, 1958, after l/2 hr. pumping at a rate of 400 gpm., showed the water to have a hardness of 33. 7 gr. per gal., total dissolved minerals of 729 ppm., and an iron content of 2. 9 ppm.

The subdivision has 40 services, all metered. When completed, the system is expected to have 300 services. It is planned to drill a second well about March 1959.

Pumpage at the present is estimated to average 7000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil	3 1/2	3 1/2
Yellow clay	20	23 1/2
Blue clay	21 1/2	45
Gravel and blue clay	10	55
Blue clay	53	108
Fine sand	7	115
SILURIAN SYSTEM		
Limestone	195	310

LABORATORY NO. 146606

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.9		Silica	SiO_2	16.3	
Manganese	Mn	Tr.		Fluoride	F	0.1	
Calcium	Ca	143.8	7.19	Boron	B	0.2	
Magnesium	Mg	53.1	4.37	Chloride	Cl	8.	.23
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.9	.01
Sodium	Na	21.	.91	Sulfate	SO_4	207.3	4.31
				Alkalinity (as	$CaCO_3$)	396.	7.92
Turbidity		11		Hardness (as	$CaCO_3$)	578.	11.56
Color		0					
Odor		0					
Temp. (reported)		51.2°F		Total Dissolved Minerals		729.	

BUFFALO GROVE
Cook County
February 9, 1960

A public water supply was installed in 1957 for Buffalo Grove (1492) recently incorporated. The water system is owned and operated by the Buffalo Grove Utility Co.

A 5-in. well was drilled in Mar. 1957 to a depth of 150 ft. by J. P. Miller Artesian Well Co., Brookfield, and located 654 ft. S. and 1226 ft. E. of the N. W. corner of Section 4, T42N, R11E. The ground elevation at the well is 680. The Driller reported a static water level of 40 ft. and water was pumped for 1 hr. at a rate of 50 gpm.

A partial analysis of a sample (Lab. No. 142848) collected Mar. 8, 1957 showed the water to have a hardness of 19. 5 gr. per gal., total dissolved minerals of 712 ppm., and an iron content of 1. 8 ppm.

WELL NO. 1 has been abandoned and filled with concrete.

WELL NO. 2 was completed in Nov. 1957 to a depth of 1340 ft. by J. P. Miller Artesian Well Co. and located about 2000 ft. west of Well No. 1, or approximately 730 ft. S. and 350 ft. W. of the N. E. corner of Section 5, T42N, R11E. The ground elevation at the well is 686. The hole and casing record is shown in Table A.

The permanent pumping equipment includes 450 ft. of 6-in. column pipe; 10-in., 13-stage Peerless turbine pump, No. 30388, rated at 400 gpm.; 450 ft. of air line (defective Nov. 25, 1958); 75-hp. U S electric motor.

TABLE A

Hole Record

18-in. from 0 to 173 ft.
12 1/2-in. from 173 to 1148 ft.
10-in. from 1148 to 1340 ft.

Casing Record

18-in. from 0 to 173 ft.
13 3/8-in. from 0 to 500 ft. (cemented)

On Nov. 24, 1958, after 18 hr. pumping at a rate of 670 gpm., the drawdown was 138 ft. from a nonpumping water level of 292 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 148334) collected Nov. 24, 1958 showed the water in Well No. 2 to have a hardness of 17. 8 gr. per gal., total dissolved minerals of 449 ppm., and an iron content of 0. 3 ppm.

Well No. 2 furnishes the entire municipal supply.

There are now 130 services installed. Pumpage is estimated to average 35, 000 gpd.

LABORATORY NO. 148334

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	7.4	
Manganese	Mn	Tr.		Fluoride	F	0.8	
Calcium	Ca	86.9	4.35	Boron	B	0.3	
Magnesium	Mg	21.5	1.77	Chloride	Cl	18.	.51
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.5	.01
Sodium	Na	46.	2.00	Sulfate	SO_4	118.9	2.47
				Alkalinity (as	$CaCO_3$)	258.	5.16
Turbidity		2		Hardness (as	$CaCO_3$)	306.	6.12
Color		0					
Odor		0					
Temp. (reported)		57.9°F		Total Dissolved Minerals		449.	

2 - Buffalo Grove

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, sand and gravel	171	171
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white, little pink to orange at base, fine to very fine, crystalline	34	205
Alexandrian Series		
Dolomite, little calcareous, slightly cherty, white to buff, very fine, crystalline	62	267
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Dolomite, gray, buff to brown, very fine to fine, crystalline; little shale	68	335
Shale, sandy, dolomitic, slightly micaceous, gray to green, weak, little tough; little dolomite	110	445
Mohawkian Series		
Galena Formation		
Dolomite, light buff to white, fine to medium, crystalline, slightly porous	175	620
Decorah Formation		
Dolomite, slightly silty, slightly calcareous, buff to light gray, black speckled, fine to medium, crystalline	45	665
Platteville Formation		
Dolomite, gray, buff to white, very fine to extra fine, crystalline, sandy at base	100	765
Glenwood Formation		
Sandstone, slightly silty, slightly dolomitic, light gray to white, fine to coarse, incoherent to compact (no samples 795-800, 810-815)	90	855
Chazy Series		
St. Peter Formation		
Sandstone, slightly silty, white, fine to medium, little very fine, rounded, frosted, incoherent, little friable (112' of samples missing)	177	1032
Chert, oolitic, buff to white; sandstone and shale (38' samples missing)	48	1080
CAMBRIAN SYSTEM		
St. Croixan Series		
Franconia Formation		
Sandstone, silty, glauconitic, dolomitic, green to red, very fine to fine, angular to rounded, compact in incoherent; little shale and dolomite (no samples 1085-1090, 1100-1110)	60	1140
Ironton Formation		
Sandstone, very dolomitic, slightly silty, buff to white, little pink, medium to coarse, little fine to very fine, rounded, little angular at top, slightly frosted to frosted, incoherent to compact; little dolomite	95	1235
Galesville Formation		
Sandstone, silty, buff, very fine to fine, rounded to angular, incoherent	70	1305
Eau Claire Formation		
Shale, dolomitic, little glauconite, greenish gray to brown, brittle to weak; little sandstone and dolomite (no sample 1340-1342)	37	1342

BURLINGTON
Kane County
October 21, 1960

Two wells are in service for the public water supply of the village of Burlington (360).

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2 was completed in Jan. 1960 to a depth of 1105 ft. by L. Cliff Neely, Batavia, and located about 15 ft. northeast of Well No. 1, or approximately 985 ft. S. and 40 ft. W. of the N. E. corner of Section 9, T41N, R6E. The ground surface elevation at the well is 920. The well was cased with 12-in. pipe from the surface to 186 ft. and with 10-in. pipe from the surface to 343 ft. 10 in. (cemented in), below which the hole was finished 10 in. in diameter to the bottom at 1105 ft.

A production test was conducted by the Driller on Jan. 26-27, 1960. For the test a Peerless turbine pump was set at 385 ft. and directly connected to a diesel engine. After 23 hr. pumping at rates varying from 99 to 266 gpm., the drawdown was 42 ft. from a static water level of 275 ft. below the pump base, 2 ft. above ground level. Twenty min, after the pump was stopped, the water level had recovered to 280 ft.

A partial chemical analysis of a sample (Lab. No. 151555) collected Jan. 27, 1960, after 23 hr. pumping, showed the water in Well No. 2 to have a hardness of 14.9 gr. per gal., total dissolved minerals of 321 ppm., and an iron content of 3.1 ppm.

The permanent pumping equipment, installed in Oct. 1960, consists of 405 ft. of 4-in. column pipe; 8-in., 12-stage Layne submersible pump, rated at 230 gpm. against 348 ft. T.D.H.; 405 ft, of air line; 30-hp. U S electric motor.

On Oct. 21, 1960, while pumping at 230 gpm. for 2 hr., the drawdown was 36 ft. from a nonpumping water level of 269 ft. below the pump base.

There are 210 services installed, all of which are metered, and about 95% of the population is served. Pumpage for 1959 was estimated to average 10, 000 gpd.

LABORATORY NO. 151555

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.1		Fluoride	F	0.4	
				Chloride	Cl	0.	.00
				Nitrate	NO_3	0.4	.01
				Sulfate	SO_4	3.1	.06
				Alkalinity (as	$CaCO_3$)	316.	6.32
Turbidity		50		Hardness (as	$CaCO_3$)	260.	5.20
Color		0					
Odor		0					
Temp. (reported)		53.2°F		Total Dissolved Minerals		321.	

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, buff to dark brown, slightly sandy, and gravelly	70	70
Sand, slightly gravelly, silty, fine to coarse	25	95
Gravel, slightly sandy, granule to coarse, little clay (till?)	60	155
Till, gray to grayish buff	10	165
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, gray to buff, brittle to weak; little dolomite	20	185
Dolomite, slightly silty, white, buff, brown and gray, fine to medium, little coarse; little shale and siltstone	105	290
Shale, dolomitic, buff to dark gray, weak to tough; little dolomite	20	310
Galena Formation		
Dolomite, buff to white, little gray, fine to medium, crystalline, slightly cherty at base	170	480
Decorah Formation		
Dolomite, slightly cherty, buff, gray to white, speckled red and black, fine to medium	65	545
Platteville Formation		
Dolomite, slightly calcareous toward base, silty, buff, white to gray, mottled, fine to medium, crystalline	95	640
Glenwood Formation		
Sandstone, dolomitic, white, fine to very coarse, some granules	15	655
Dolomite, sandy, greenish white to white, fine, crystalline, compact, little porous; shale, sandy, green, brittle to tough	40	695
Sandstone, white, fine to coarse, incoherent	20	715
St. Peter Formation		
Sandstone, white, fine to medium incoherent, little chert at base	265	980
Siltstone, little slightly glauconitic, red, white, tough; sandstone and shale	125	1105

CABERY
Ford County
June 24, 1960

Two wells are in service for the village of Cabery (293).

WELL NO. 1, described in Bulletin 40 as the Park Well, was abandoned years ago.

WELL NO. 2, described in Bulletin 40 as the well drilled by Lars Jensen, Clifton, to a depth of 233 ft. in 1920, is maintained for standby use.

WELL NO. 3 was completed in Nov. 1956 to a depth of 357 ft. by J. Bolliger and Sons, Fairbury, and located at the south edge of town, about 650 ft. southeast of Well No. 2, or approximately 800 ft. S. and 600 ft. E. of the N. W. corner of Section 16, T29N, R9E. The ground surface elevation at the well is 700. The well was cased with 8-in. pipe from 3 ft. above the surface to 214 ft. 10 in., below which the hole was finished 8 in. in diameter.

When the well was completed, the Driller reported pumping 4 hr. at a rate of 125 gpm. with a drawdown of 34 ft. from a nonpumping water level of 48 ft. below the surface.

The permanent pump installation is a Deming turbine attached to 100 ft. of column pipe and connected to a 7 1/2-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152585) collected June 24, 1960 showed the water to have a hardness of 37.2 gr. per gal., total dissolved minerals of 1619 ppm., and an iron content of 0. 2 ppm.

There are 105 services, none metered, and 100% of the population is served. Pumpage in July 1958 was reported to average 22,000 gpd.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil	2	2
Yellow clay	3	5
Sandy clay	5	10
Blue clay	30	40
Hard pan	84	124
Dirty sand	2	126
Blue clay	44	170
Hard pan	26	196
Sand	2	198
Sandstone	14	212
SILURIAN SYSTEM		
Limestone, dark	8	220
Limestone, gray	20	240
Limestone, light gray	45	285
Limestone, brown	20	305
Limestone, gray	52	357

LABORATORY NO. 152585

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	9.7	
Manganese	Mn	0.0		Fluoride	F	1.0	
Calcium	Ca	150.8	7.54	Boron	B	1.0	
Magnesium	Mg	64.0	5.26	Chloride	Cl	21.	.59
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	9.0	.14
Sodium	Na	254.	11.06	Sulfate	SO_4	923.2	19.21
				Alkalinity (as	$CaCO_3$)	196.	3.92
Turbidity		0		Hardness (as	$CaCO_3$)	640.	12.80
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		1619.	

CAMP POINT
Adams County
June 29, 1960

Three wells are in service for the public water supply of the village of Camp Point (1092).

WELL NO. 1, the dug well described in Bulletin 40, is not in service.

WELL NO. 2, described in Bulletin 40 as the well drilled by Henry Schuster in 1947, was abandoned and disconnected from the system about 1953 and later was filled.

WELL NO. 3, described in Bulletin 40, was equipped in 1955 with a new Burks centrifugal pump, rated at 1000 gal. per hr.

In Mar. 1959 this well was being used 24 hr. daily.

WELL NO. 4 was completed in July 1955 to a depth of 40 ft. by Elmer Franke, Calhoun Drilling Co., Batchtown, and located about 200 ft. northeast of the railroad reservoir, or approximately 400 ft. S. and 75 ft. E. of the N. W. corner of Section 35, T1N, R6W. The ground surface elevation at the well is 680.

The well was cased with 8-in. standard pipe from 2 ft. above to 34 ft. below the ground level, followed by a 6 ft. length of 6-in. Cook well screen, Everdur metal.

After the well was completed, water was pumped for 4 hr. at a rate of 38 gpm. The drawdown was 28 ft. 9 3/4 in. from a static level of 20 ft. below the surface.

The pumping equipment includes a Myers Ejecto pump connected to a 1-hp. General Electric motor. The estimated capacity of the well is 8-10 gpm.

Correlated driller's log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, sand dirty; clay	34	34
Sand, coarse; gravel fine	6	40

A mineral analysis of a sample (Lab. No. 152607) collected June 29, 1960 showed the water to have a hardness of 34.6 gr. per gal., total dissolved minerals of 708 ppm., and an iron content of 0.1 ppm.

Well No. 4 is in service.

WELL NO. 5 was constructed in 1955 to a depth of 36 ft. and reportedly deepened in Sept. 1959 to 56 ft. It is located about 60 ft. east of Well No. 4.

The hole was drilled 10 in. in diameter and a 6-in. casing and screen were set with the bottom of the screen at 44 ft. The annulus between the casing and screen and the wall of the hole was gravel packed.

Pumping equipment is identical with that in Well No. 4 and the well capacity is estimated at 8-10 gpm. Well No. 5 is in service.

There are 400 services, all metered. Pumpage is estimated to average 43,000 gpd.

LABORATORY NO. 152607

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	24.0	
Manganese	Mn	1.7		Fluoride	F	0.1	
Calcium	Ca	146.0	7.30	Boron	B	0.1	
Magnesium	Mg	54.7	4.50	Chloride	Cl	12.	.34
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.0	.05
Sodium	Na	13.	.58	Sulfate	SO_4	184.3	3.83
				Alkalinity (as	$CaCO_3$)	408.	8.16
Turbidity		0		Hardness (as	$CaCO_3$)	590.	11.80
Color		0					
Odor		0					
Temp. (reported)		57.5°F		Total Dissolved Minerals		708.	

CAMPUS
Livingston County
October 20, 1958

Two wells are in service for the public water supply of the village of Campus (165).

WELL NO. 1 was described in Bulletin 40 as a 2-in. well which was abandoned when Well No. 2 was drilled.

WELL NO. 2, described in Bulletin 40, is now equipped with 80 ft. of 4-in. column pipe; 6-in., 13-stage Pomona turbine pump, No. AK6175, rated at 100 gpm. against 165 ft. T.D.H.; 80 ft. of air line; 7 l/2-hp. Fairbanks-Morse electric motor.

On Oct. 20, 1958 the nonpumping water level was 39 ft.

WELL NO. 3 (formerly Wabash Railroad Well) was purchased from the railroad in 1954 and connected to the village system sometime in 1955. The well had been drilled for the railroad in 1925 to a depth of 174 ft. by R. R. Hopper, Wellington, and located about 900 ft. west of village Well No. 2, or approximately 725 ft. N. and 1200 ft. W. of the S. E. corner of Section 33, T29N, R8E. The ground surface elevation at the well is 650. The well was reportedly cased with 24-in. pipe from the surface to 125 ft. and with 18-in. pipe from the surface to 133 ft. followed by 30 ft. of 18-in. screen.

The pumping equipment consists of 120 ft. of 7-in. column pipe; 10-in., 6-stage Layne turbine pump, No. 3718, rated at 350 gpm.; 20-hp. General Electric motor.

There are two storage tanks, one of 100, 000 gal. capacity formerly owned by the Wabash Railroad and purchased by the village with the well, and the village tank of 25,000 gal. capacity.

Pumpage is estimated to average 13,000 gpd.

CAROL STREAM
DuPage County
September 9, 1960

A public water supply was installed in 1958 for Carol Stream Subdivision incorporated in 1959 as village of Carol Stream (836) located about 2 miles northwest of Wheaton. The subdivision is being laid out by the Durable Construction Co.

WELL NO. 1 was completed in Aug. 1958 to a depth of 335 ft. by Layne-Western Co., Aurora, and located 1033 ft. S. and 925 ft. W. of the N. E. corner of Section 31, T40N, R10E. The ground surface elevation at the well is 764. The well is cased with 10-in. steel pipe to 118 ft., below which the hole is 10 in. in diameter to the bottom at 335 ft.

A production test was conducted by the Driller on Aug. 15, 1958 using a 10-in., 6-stage test turbine pump attached to 145 ft. of 6-in. column pipe. After 3 hr. pumping at a rate of 509 gpm., the drawdown was 13 ft. from a non-pumping water level of 40 ft. below the top of the casing (air line readings).

A partial chemical analysis of a sample (Lab. No. 147510) collected Aug. 15, 1958, after 1 1/2 hr. pumping at a rate of 408 gpm., showed the water in Well No. 1 to have a hardness of 17.8 gr. per gal., total dissolved minerals of 366 ppm., and an iron content of 0.9 ppm. The water was turbid at first but cleared after 3 1/2 hr.

The permanent pumping equipment consists of 70 ft. of 6-in. column pipe; 10-in., 4-stage Layne turbine pump, No. 39508, rated at 500 gpm. at 175 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 70 ft. of air line; 30-hp. Westinghouse electric motor. Auxiliary power is available from a Johnston right angle gear drive and a 4-cylinder Continental Red Seal gasoline engine.

Pumpage for the subdivision is estimated to average 20,000 gpd.

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown to dark yellowish brown, gravelly at base	35	35
Gravel and sand, little slightly silty	75	110
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, slightly silty, slightly argillaceous, brown to gray, little pink and green at base, very fine, crystalline to granular	70	180
Alexandrian Series		
Dolomite, little slightly silty, little argillaceous, light brownish gray, very fine, crystalline	55	235
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, red, green, very dark greenish brown, weak; dolomite, green to dark gray, fine, crystalline	100	335 T.D.

LABORATORY NO. 147510

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Fluoride	F	0.5	
Manganese	Mn	Tr.		Boron	B	0.2	
				Chloride	Cl	3.	.06
				Nitrate	NO_3	0.3	Tr.
				Alkalinity (as	$CaCO_3$)	260.	5.20
Turbidity		14		Hardness (as	$CaCO_3$)	304.	6.08
Color		0					
Odor		0					
Temp. (reported)		51.0°F		Total Dissolved Minerals		366.	

CASEY
Clark County
May 6, 1959

Seven wells are in service for the public water supply of the city of Casey (2890).

Two wells have been abandoned and three wells, No. 7, 8 and 9. have beenadded to the public water supply since Bulletin 40 was published.

WELLS NO. 1 and 4 have been abandoned and the suction lines disconnected.

WELLS NO. 2, 3, 5 and 6, described in Bulletin 40, are in service.

WELL NO. 7 was completed early in 1952 to a depth of 65 ft. by Gordon Green, Casey, and located 15 ft. south of Well No. 1, or approximately 2515 ft. S. and 10 ft. E. of the N. W. corner of Section 19, T10N, R13W. The elevation of the ground surface at the well is 580. The well is reportedly cased with 12 1/2-in. id. pipe from approximately 8 ft. below to 65 ft. below the ground surface.' The lower 17 ft. of the casing is perforated with 3/l6-in. slots. The casing top is sealed with a belted flange. The well is connected to the main suction line common to all the other wells in service.

WELL NO. 8 was completed in 1952 to a depth of 131 ft. by Gordon Green and located 15 1/2 ft. east and 95 ft. south of Well No. 7, or approximately 2610 ft. S. and 25 ft. E. of the N. W. corner of Section 19. The well is reportedly cased with 12 l/2-in. id. pipe from approximately 8 ft. below to 131 ft. below the ground surface. The lower 17 ft. of the casing is perforated. The casing top is sealed with a belted flange and the well is connected to the main suction line common to all the other wells in service.

Water is pumped from the suction line connecting Wells 2, 3, 5, 6, 7 and 8 by a Fairbanks-Morse centrifugal pump rated at 300 gpm. against 43 ft. T.D.H. Power is furnished by a 3-hp. Fairbanks-Morse electric motor. The water from these wells is treated prior to discharge to the distribution system.

WELL NO. 9 was completed in Aug. 1954 to a depth of 132 ft. by Gordon Green and located about 100 ft. northwest of Well No. 8. The well is cased with a 20-in. outer pipe from about 4 ft. above to 132 ft. below the ground surface and with a 10-in. inner pipe from 4 ft. above to 132 ft. below ground level. The annulus between the casings is filled with gravel.

The water from Well No. 9 is pumped by a Worthington turbine pump rated at 300 gpm. This well is maintained as a stand-by or emergency unit.

A mineral analysis of a sample (Lab. No. 149501) collected Apr. 30, 1959, after 10 min. pumping at 300 gpm., showed the water in Well No. 9 to have a hardness of 10.1 gr. per gal., total dissolved minerals of 865 ppm., and an iron content of 5.1 ppm.

A mineral analysis of a composite sample (Lab. No. 149499) collected Apr. 30, 1959, after 8 hr. pumping from Wells 2, 3, 5, 6, 7 and 8, showed this water to have a hardness of 16. 6 gr. per gal., total dissolved minerals of 498 ppm., and an iron content of 2. 3 ppm.

Pumpage in May 1959 was reported to average 200, 000 gpd.

LABORATORY NO. 149501

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	5.1		Silica	SiO_2	11.8	
Manganese	Mn	0.0		Fluoride	F	0.5	
Calcium	Ca	38.4	1.92	Boron	B	0.1	
Magnesium	Mg	18.7	1.54	Chloride	Cl	227.	6.40
Ammonium	NH_4	16.4	.90	Nitrate	NO_3	0.3	.01
Sodium	Na	277.	12.06	Sulfate	SO_4	0.6	.01
				Alkalinity (as	$CaCO_3$)	500.	10.00
Turbidity		21		Hardness (as	$CaCO_3$)	173.	3.46
Color		0					
Odor		D					
Temp. (reported)		56°F		Total Dissolved Minerals		865.	

LABORATORY NO. 149499

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.3		Silica	SiO_2	15.6	
Manganese	Mn	0.1		Fluoride	F	0.5	
Calcium	Ca	65.2	3.26	Boron	B	0.1	
Magnesium	Mg	29.7	2.44	Chloride	Cl	48.	1.35
Ammonium	NH_4	5.3	.29	Nitrate	NO_3	0.1	Tr.
Sodium	Na	83.	3.63	Sulfate	SO_4	1.4	.03
				Alkalinity (as	$CaCO_3$)	412.	8.24
Turbidity		12		Hardness (as	$CaCO_3$)	285.	5.70
Color		0					
Odor		D					
Temp. (reported)		55°F		Total Dissolved Minerals		498.	

CATERPILLAR TRAILS PUBLIC WATER DISTRICT

Woodford County
June 10, 1960

A water supply was installed in 1956 for the Caterpillar Trails Public Water District.

WELL NO. 1 was completed to a depth of 358 ft. in 1956 by Layne-Western Co., Aurora, and located near Germantown, approximately 50 ft. N. and 1700 ft. W. of the S. E. corner of Section 29, T27N, R3W. The ground surface elevation at the well is 746.

The well was cased with 10-in. pipe, set in a 15-in. hole, from the surface to 338 ft. followed by 20 ft. of 10-in. bronze screen. Five cu. yd. of gravel were packed in the annulus between the screen and the wall of the 15-in. hole.

A production test was conducted on Nov. 30-Dec. 1, 1956 by representatives of the Driller, the State Water Survey, and Caldwell-Rhoads Co., Consulting Engineers. For test purposes the well was equipped with an 8-in., 9-stage Layne and Bowler test turbine pump; 297 ft. of air line; Chrysler engine. After 24 hr. pumping at a rate of 108 gpm., the drawdown was 4 ft. below a static water level of 297 ft. Within 1 min. after the pump was stopped, the water level had recovered to 297 ft.

A partial chemical analysis of a sample (Lab. No. 142070) collected Dec. 12, 1956 showed the water in Well No. 1 to have a hardness of 17.5 gr. per gal., total dissolved minerals of 336 ppm., and an iron content of 0.9 ppm.

The permanent pumping equipment consists of 339 ft. of 4-in. column pipe; 16-stage Layne turbine pump, rated at 120 gpm., against 400 ft. T.D.H.; 20-hp. Westinghouse electric motor.

The number of services and the pumpage have not been reported.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil and soft red clay, gravel	12	12
Clay, hard, gray; gravel and large stones	11	23
Sand, loose, fine, some medium gravel; streaks of clay	7	30
Clay, gray, sandy, soft; thin streaks of sand, fine	14	44
Sand, fine; loose to gravel medium	3	47
Sand and gravel, hard, little clay	75	122
Clay, sandy, soft, occasionally gravel imbedded	32	154
Sand, hard, clay; gravel	4	158
Sand, fine to gravel, coarse (boulders)	7	165
Clay, sandy, fairly hard	19	184
Sand, fine to gravel coarse	7	191
Clay, sandy, fairly hard	25	216
Clay, gray; sand very hard; gravel, boulders (219-221)	68	284
Clay, gravelly, hard	10	294
Sand, fine to coarse gravel, dirty; clay	33	327
Sand, fine, tight, with gravel streaks at base	15	342
Sand fine to very coarse	16	358

LABORATORY NO. 142070

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Fluoride	F	0.1	
Manganese	Mn	0.1		Chloride	Cl	4.	.11
				Nitrate	NO_3	0.2	Tr.
				Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		1		Hardness (as	$CaCO_3$)	300.	6.00
Color		0					
Odor		0					
Temp. (reported)		54.8°F		Total Dissolved Minerals		336.	

CHAIN-O'-LAKES STATE PARK
Lake County
May 29, 1958

A public water supply was installed at Chain-O'-Lakes State Park in Oct. 1940. The Park is located northwest of Fox Lake village.

WELL NO. 1 was drilled in Oct. 1940 to a depth of 234 ft. by Henry Boysen, Libertyville, and deepened in Dec. 1940 to 270 ft. The well is located approximately 525 ft. S. and 1250 ft. W. of the N. E. corner of Section 28, T46N, R9E. The ground surface elevation at the well is 775. The well was cased with 8-in. pipe from the surface to 218 ft., below which the hole was finished at 8 in. in diameter. Limestone was encountered at 212 ft.

A production test was conducted by representatives of the Driller and the State Water Survey on Oct. 29-30, 1940. After 12 hr. pumping at a rate of 52 gpm., the drawdown was 90 ft. from a static water level of 44 ft. below the top of the casing. Thirty min. after the test was stopped, the water level had recovered to 48 ft.

After the well was deepened to 270 tt., a second production test was conducted. The casing had been driven from 212 to 218 ft. After 9 hr. pumping at a rate of 40 gpm., the drawdown was 47 ft. The yield in the second test was less than in the first test. This reduction was attributed to extending the casing an additional 6 ft. and probably casing out some of the upper limestone water. The well was pumped for several hours after the first test and before the second test but the turbidity increased, contrary to what was expected.

A mineral analysis of a sample (Lab. No. 89174) collected Oct. 30, 1940 (well depth 234 ft.) showed the water to have a hardness of 14. 5 gr. per gal., total dissolved minerals of 316 ppm., turbidity of 105 ppm., and an iron content of 2. 6 ppm.

A partial mineral analysis of a sample (Lab. No. 89492) collected Dec. 5, 1940 (well depth 270 ft.) showed the water to have a hardness of 14. 5 gr. per gal., total dissolved minerals of 305 ppm., turbidity of 200 ppm., and an iron content of 2. 2 ppm.

The pumping equipment includes a 3-in. column pipe (length not reported); Fairbanks-Morse turbine pump (No. 18827); 7 1/2-hp. Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 146793) collected May 29, 1958, after 10 min. pumping, showed the water in the well to have a hardness of 14. 3 gr. per gal., total dissolved minerals of 320 ppm., turbidity of 9 ppm., and an iron content of 1. 6 ppm.

LABORATORY NO. 146793

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.6		Silica	SiO_2	19.6	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	46.0	2.30	Boron	B	0.2	
Magnesium	Mg	31.0	2.55	Chloride	Cl	6.	.17
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	1.7	.03
Sodium	Na	31.	1.36	Sulfate	SO_4	8.8	.18
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		9		Hardness (as	$CaCO_3$)	243.	4.85
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		51.8°F		Total Dissolved Minerals		320.	

Twenty-three wells are in service for Champaign (49,583) and Urbana (27,294). The plant and distribution system are owned and operated by the Northern Illinois Water Corporation.

Champaign-Urbana wells in service:

Wells No. 2, 3, 10, 26, 29, 30, 32, 33, 35, 36, 40, 41, 42, 43, 45, 46, 47, 48, 50, 52, 53, 54, 55. No. 56 is drilled and will be put in service in 1961.

Champaign-Urbana wells abandoned:

Wells No. 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 31, 44, 49.

WELL NO. 49 caved in and was abandoned in 1957. It was replaced by Well No. 55 in 1958.

WELL NO. 50 and all wells constructed prior thereto are described in Bulletin 40.

WELL NO. 51 was constructed in Aug. 1950 to a depth of 296 ft. by Kelly Well Co., Inc., Grand Island, Neb., and located about 1/4 mile west of Well No. 50, or approximately 40 ft. N. and 955 ft. W. of the S. E. corner of Section 32, T20N, R8E. The ground surface elevation at the well is 735. A 38-in. diameter hole was drilled from the surface to 296 ft. and a concrete base plug was set in the bottom on. top of which were placed 76 lineal ft. of concrete screen blocks 22-in. od. by 17-in. id. and each block. 4 ft. in length and having 184 openings of 4 3/4 by 3/16 in. From 192 ft. to the surface, solid concrete blocks (22-in. od. by 17-in. id.) were placed.

From the bottom of the well up to 192 ft. the annulus between the concrete screen and casing and the wall of the 38-in. hole was filled with selected silica sand and gravel, spouted in through a 2-in. pipe. From 192 ft. up to 20 ft. the annulus was filled with material from the mud pit, and from 20 ft. to the surface the annulus was to be filled with concrete.

A production test was conducted on Aug. 14, 1950 by representatives of the Driller, the State Water Survey, and the Owner. After 24 hr. pumping at 965 gpm., the drawdown was 11 ft. from a nonpumping water level of 76.5 ft. below the top of the casing (2 ft. above ground level). One-half hour after the pump was stopped, the water level had recovered to 78.9 ft. and at 24 hr. the water level had recovered to 76.5 ft. The specific capacity of Well No. 51 was 88 gpm. per ft. of drawdown. By 1954 the specific capacity declined to 50, and after a number of treatments, each of which improved the well only temporarily, the well was abandoned.

In Nov. 1956 Well No. 54 replaced Well No. 51.

A mineral analysis of a sample (Lab. No. 130755) collected Dec. 18, 1952 showed the water in Well No. 51 to have a hardness of 14. 3 gr. per gal., total dissolved minerals of 315 ppm., and an iron content of 0. 84 ppm.

WELL NO. 52 was completed in Sept. 1956 to a depth of 313 ft. 2 in. by Thorpe Well Co., DesMoines, Iowa, and located about 3 l/2 miles east of Well No. 50, or approximately 30 ft. N. and 2628 ft. E. of the S. W. corner of Section 36, T20N, R8E. The elevation of the top of the 24-in. casing is 719. 66. A 42-in. hole was drilled from the surface to the bottom. A 36-in. casing was installed from the surface to 220 ft. and a 24-in. casing was set to 238 ft. followed by a 24-in. screen, 75 ft. in length to the bottom of the well. Between the screen and 24-in. casing and the 36-in. casing the annulus was packed with Muscatine gravel up to 10 ft. above the static level of Sept. 9, 1956. Above this point the annulus was filled with cement grout to the surface. The annulus between the 36-in. casing and the wall of the hole was filled with gravel up to 10 ft. above the bottom of the 36-in. casing and above this point the annulus was filled with cement grout.

A production test was conducted on Sept. 20-21, 1956 by representatives of the Driller, the State Water Survey, and the Owner. After 48 hr. pumping at 1092 gpm., the drawdown was 2.7 ft.

A mineral analysis of a sample (Lab. No. 141514) collected Sept. 21, 1956 showed the water in Well No. 52 to have a hardness of 15. 9 gr. per gal., total dissolved minerals of 492 ppm., and an iron content of 0.2 ppm.

Well No. 52 is not equipped for pumping.

WELL NO. 53 was completed in Dec. 1956 to a depth of 289 ft. by Layne-Western Co.,

Aurora, and located about 2 1/2 miles southeast of Well No. 50, or approximately 2690 ft. N. and 57 ft. E. of the S. W. corner of Section 2, T19N, R8E. The elevation of the top of the pump foundation is 758.05. A 42-in. hole was drilled from the surface to the bottom at 289 ft. A 26-in. outer casing and a 16-in. inner casing, followed by a 75 ft. length of stainless steel 16-in. screen, were set and gravel packed as in Well No. 52.

A production test was conducted on Dec. 26-29, 1956 by representatives of the Driller, the State Water Survey, and the Owner. Before the test was started, the well had been developed over a period of several days by alternating the agitation and pumping of the well. Pumping was started on Dec. 26 and after 48 hr. pumping at 1500 gpm., the drawdown was 14. 2 ft. from a nonpumping water level of 117. 8 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 142209) collected Dec. 29, after 48 hr. pumping at 1500 gpm., showed the water in Well No. 53 to have a hardness of 15. 8 gr. per gal., total dissolved minerals of 308 ppm., and an iron content of 0. 6 ppm.

The pumping equipment includes 180 ft. of 10-in. steel column pipe; 13 3/8-in. od., 4-stage water lubricated Peerless turbine pump, all bronze bowls, and connected to a 200-hp. General Electric motor.

Well No. 53 is in regular service.

WELL NO. 54 was completed in 1957 to a depth of 330 ft. by Layne-Western Co. and located at the site of Well No. 51 (abandoned), or approximately 40 ft. N. and 1016 ft. W. of the S. E. corner of Section 32. The elevation of the top of the pump foundation is 727.65. A 48-in. hole was drilled from the surface to 330 ft. The hole was double cased with a 36-in. outer casing from the surface to the top of the screen, and a 24-in. inner casing set from the surface to 255 ft. followed by a 24-in. screen, 75 ft. in length to the bottom of the hole. The annulus between the 24-in. screen and the wall of the 48-in. hole and between the 24-in. and 36-in. casings was packed with gravel up to 10 ft. above the static water level, which was 87.8 ft. below the top of the pump foundation. The annulus between the 36-in. casing and the wall of the hole was packed with gravel up to 10 ft. above the static water level. The hole between the casings and outside the 36-in. casing was filled with material from the mud pit. The remainder of the hole was cement grouted up to the surface.

A production test was conducted on Nov. 26-29, 1956 by representatives of the Driller, the State Water Survey, and the Owner. After 48 hr. pumping at 3000 gpm., the drawdown was 28.3 ft. from a nonpumping water level of 87.8 ft. below the pump foundation. The specific capacity was 118.

A mineral analysis of a sample (Lab, No. 142030) collected in Dec. 1956 showed the water in Well No. 54 to have a hardness of 14.7 gr. per gal., total dissolved minerals of 312 ppm., and an iron content of 0.2 ppm.

In Aug. 1957 the new pumping installation consisted of 160 ft. of 14-in. column pipe; 15-in., 4-stage water lubricated Peerless turbine pump, all bronze bowls, and rated at 3000 gpm. against 250 ft. T.D.H.; 250-hp. General Electric motor.

Well No. 54 is in service.

WELL NO. 55 was completed in 1958 to a depth of 300 ft. by Layne-Western Co. and located about 70 ft. north of Well No. 49 (previously abandoned), or approximately 865 ft. S. and 40 ft. W. of the N. E. corner of Section 5, T19N, R8E. The elevation of the top of the pump foundation is 735.20. A 42-in. hole was drilled from the surface to 300 ft. A 24-in. casing was set from the surface to 250 ft. and a 14-in. casing was set to 250 ft. followed by a 14-in. stainless steel screen, 50 ft. long to the bottom of the hole. The well was gravel packed similar to Well No. 54, the gravel pack extending from the bottom up to 10 ft. above the static water level. Above the gravel pack, the space between the casings and outside the 24-in. casing was cement grouted.

A production test was conducted on May 2, 1958 by representatives of the Driller, the State Water Survey, and the Owner. After 48 hr. pumping at 900 gpm., the drawdown was 9. 24 ft., a specific capacity of 97.25.

The pumping equipment consists of 150 ft. of 8-in. column pipe; 12-in., 5-stage Peerless turbine, oil lubricated, rated at 1000 gpm. against 225 ft. T.D.H.; 75-hp. U S electricmotor.

Well No. 55 is in regular service.

A mineral analysis of a composite sample (Lab. No. 150853) collected Oct. 21, 1959, be-

fore aeration, from Wells No. 35, 41, 42, 54 and 55, showed the water to have a hardness of 15.7 gr. per gal., total dissolved minerals of 347 ppm., and an iron content of 1. 2 ppm.

The potential production of the two well fields (West and Plant) is presently estimated by the Owner to be 18 mgd. and this should be increased in a year or so to 23 mgd.

For the year 1960, pumpage from the West well field averaged 6. 4 mgd. (includes 1. 75 mgd. to the University of Illinois). Pumpage from the Plant well fieldaveraged 1.47 mgd. Totalpumpage for Champaign-Urbana for the year 1960 averaged 7.87 mgd.

LABORATORY NO. 142030

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	14.0	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	54.3	2.71	Boron	B	0.2	
Magnesium	Mg	28.0	2.30	Chloride	Cl	5.	.14
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	1.5	.02
Sodium	Na	31.	1.36	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	312.	6.24
Turbidity		1		Hardness (as	$CaCO_3$)	251.	5.01
Color		0					
Odor		0		Total Dissolved Minerals		312.	

LABORATORY NO. 150853

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	15.4	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	59.8	2.99	Boron	B	0.3	
Magnesium	Mg	28.8	2.37	Chloride	Cl	2.	.06
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	5.3	.09
Sodium	Na	35.	1.50	Sulfate	SO_4	7.0	.15
				Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		5		Hardness (as	$CaCO_3$)	268.	5.36
Color		5					
Odor		0		Total Dissolved Minerals		347.	

Correlated sample study log of WELL NO. 53 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Wisconsinan Stage		
Soil, brown, silty; till, light yellow, sandy	5	5
Till, yellowish gray to gray, sandy	75	80
Gravel, fine to medium, poorly sorted, dirty	5	85
Till, gray to brown, gravelly	20	105
Sand, very fine to medium, dirty, few pebbles	5	110
Till, dark brown, very sandy, gravelly	20	130
Sand, very fine to medium, poorly sorted	5	135
Illinoian Stage		
Till, yellow to brown, very sandy	5	140
Sand, very fine to medium, well sorted, dirty	5	145
Till, very sandy, gravelly	5	150
Sand, fine, rounded, well sorted, dirty	10	160
Sand, silty, very fine to medium, poorly sorted	25	185
Gravel, granular, clean; sand, medium to coarse; little silt	5	190
Gravel, fine to granular, clean sand fine to medium, clean	10	200
Gravel, granular to fine; little silt	10	210
Sand, medium to coarse, dirty; gravel granular, poorly sorted, dirty	10	220
Kansan Stage		
Till, gray, gravelly, sandy	15	235
Sand, silty, fine to medium, poorly sorted; little gravel, granular	35	270
Gravel, granular to medium, dirty; sand, medium to fine, dirty	10	280
Sand, coarse, well sorted; little gravel, granular	10	290

Three wells are in service for the town of Chatsworth (1330). Two more wells have been constructed and will be available for service as soon as pumps are installed.

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2 was completed in May 1949 to a depth of 67 ft. by Hayes and Sims, Champaign, and located about 1100 ft. due west of Well No. 1, or approximately 2500 ft. S. and 170 ft. E. of the N. W. corner of Section 3, T26N, R8E. The land surface elevation at the well is 734.

The well was cased with 12-in. pipe from 1. 5 ft. above to 57. 3 ft. below ground level followed by 10 ft. of 12-in. Johnson Everdur screen, having No. 40 slot openings.

The pumping equipment consists of 50 ft. of 4-in. column pipe; 5 5/8-in., 7-stage Aurora turbine pump rated at 120 gpm.; 3-hp. U S electric motor.

A production test was conducted on May 17, 1949 by representatives of the Driller. After 6 hr. pumping at a rate of 200 gpm., the drawdown was 11 ft.

A mineral analysis of a sample (Lab. No. 119574) collected Oct. 7, 1949, after 1 hr. pumping at 125 gpm,, showed the water to have a hardness of 24 gr. per gal., total dissolved minerals of 531 ppm., and an iron content of 1. 9 ppm.

WELL NO. 3 was completed in May 1958 to a depth of 99 ft. by Sims Drilling Co., Champaign, and located about 1/4 mile northeast of Well No. 2, or approximately 750 ft. S. and 650 ft. E. of the N. W. corner of Section 3. The land surface elevation at the well is 720. The well was cased with 12-in, pipe from 3 ft. above to 91 ft. 8 in. below land surface followed by 12-in. Johnson Everdur screen to 99 ft. 6 in. The screen had No. 35 slot openings.

A production test was conducted on June 6, 1958 by representatives of the Driller, the State Water Survey, and Tracy Pitzen, Consulting Engineer. For test purposes the well was equipped with a Fairbanks-Morse turbine test pump connected to a 110-hp. Ford industrial gas engine. A 90-ft. air line was installed for measuring water levels. After 9 hr. pumping at a rate of 160 gpm., the drawdown was 41. 5 ft. from a static water level of 45 ft. Thirty min. after pumping was stopped, the water level had recovered to 61. 5 ft.

A partial chemical analysis of a sample (Lab. No. 146814) collected June 6, 1958, after 7 hr. pumping at 165 gpm., showed the water in Well No. 3 to have a hardness of 29. 7 gr. per gal., total dissolved minerals of 639 ppm., and an iron content of 1. 5 ppm.

WELL NO. 4 was completed in June 1960 to a depth of 232 ft. by Sims Drilling Co. and located about 3/4 mile northeast of Well No. 3, or approximately 1200 ft. N. and 1400 ft. E. of the S. W. corner of Section 34, T27N, R8E. The well was cased with 206 ft. of 12-in. pipe.

A production test was conducted by the Driller on June 7, 1960. After 6 hr. pumping at a rate of 207 gpm., the drawdown was 73. 6 ft. from a nonpumping water level of 50 ft. below a measuring point 2. 5 ft. above the ground surface.

A partial chemical analysis of a sample (Lab. No. 152594) collected June 21, 1960, after 6 hr. pumping at a rate of 207 gpm., showed the water in Well No. 4 to have a hardness of 29. 3 gr. per gal., total dissolved minerals of 699 ppm., and an iron content of 2. 8 ppm.

The permanent pump has not been installed.

WELL NO. 5 was completed in Sept. 1960 to a depth of 223 ft. by Sims Drilling Co. and located about l/4 mile north of Well No. 4, or approximately 2700 ft. S. and 1600 ft. E. of the N. W. corner of Section 34. The well was cased with 12-in. pipe from 3 ft. above to 203 ft. below the land surface followed by 21 ft. of screen with slot section as follows: 5 ft. of No. 12; 4 ft. of No. 20; 5 ft. of No. 30; 4 ft. of No. 20; 3 ft. of No. 15 at the bottom.

A production test was conducted on Sept. 19, 1960 by representatives of the Driller, the State Water Survey, and Farnsworth and Wylie, Consulting Engineers. For test purposes the

well was equipped with a 6-in., 6-stage Pomona turbine test pump set at 140 ft. and operated from a gas engine. After 4 hr. pumping at 200 gpm., the drawdown was 16. 5 ft. from a non-pumping water level of 39. 5 ft. One hr. after the test was stopped, the water level had recovered to 41. 1 ft.

A partial analysis of a sample (Lab. No. 153257) collected Sept. 19, 1960, after 4 hr. pumping at 200 gpm., showed the water in Well No. 5 to have a hardness of 25. 6 gr. per gal., total dissolved minerals of 636 ppm., and an iron content of 2. 2 ppm.

The permanent pump has not beeninstalled.

There are 445 services, 95% of which are metered, and 100% of the population is served. Pumpage in 1958 average 120,000 gpd.

LABORATORY NO. 153257

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 2		Fluoride	F	0. 6	
Manganese	Mn	0. 0		Chloride	Cl	0.	. 00
				Nitrate	NO_3	9. 7	. 16
				Alkalinity (as	$CaCO_3$)	380.	7. 60
Turbidity		9		Hardness (as	$CaCO_3$)	438.	8. 76
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		636.	

CHEBANSE
Iroquois County
June 24, 1960

Two wells are in service for the village of Chebanse (995).

WELL NO. 1, described in Bulletin 40, is equipped with a Peerless turbine pump, rated at 100 gpm., connected to a 7 l/2-hp. U S electric motor.

WELL NO. 2 was completed in Apr. 1957 to a depth of 150 ft. by Layne-Western Co., Aurora, and located 15 ft. east of Well No. 1, or approximately 400 ft. S. and 2000 ft. W. of the N. E. corner of Section 14, T29N, R14W. The elevation of the ground surface at the well is 660. The well was cased with 10-in. steel pipe to 85 ft. below which the hole was finished 10 in. in diameter.

A production test was conducted by the Driller on Apr. 9, 1957. After 2 1/2 hr. pumping at 323 gpm., the drawdown was 20 ft. from a nonpumping water level of 45 ft. below the surface. In Well No. 1, 15 ft. to the west of No. 2, the drawdown was 14 ft.

The pump in No. 1 was then started and with both pumps operating, the drawdown in Well No. 2, after 1 1/2 hr. pumping at 214 gpm., was 19 ft. During the same period Well No. 1 was pumped at 859 gpm. with a drawdown of 16 ft.

The permanent pump in Well No. 2 is a Westinghouse turbine, rated at 200 gpm. and set at 78 ft., connected to a 15-hp. Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 152589) collected June 24, 1960 showed the water in Well No. 2 to have a hardness of 17. 6 gr. per gal., total dissolved minerals of 501 ppm., and an iron content of 0.1 ppm.

There are approximately 216 services, 6 of which are metered, and 100% of the population is served. Pumpage is estimated to average 35,000 gpd.

Sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, silty, dark brown	2	2
Till, very silty, yellowish brown to brown	13	15
Till, sandy, gravelly, gray brown	50	65
Gravel, sandy, fine to medium	20	85
SILURIAN SYSTEM		
Dolomite, light gray, buff, very fine to crystalline	65	150

LABORATORY NO. 152589

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	8.7	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	68.2	3.41	Boron	B	0.8	
Magnesium	Mg	31.5	2.59	Chloride	Cl	6.	.17
Ammonium	NH_4	1.0	.06	Nitrate	NO_3	1.0	.02
Sodium	Na	60.	2.59	Sulfate	SO_4	168.3	3.50
				Alkalinity (as	$CaCO_3$)	248.	4.96
Turbidity		0		Hardness (as	$CaCO_3$)	300.	6.00
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		501.	

CHICAGO HEIGHTS
Cook County
April 12, 1960

Since Bulletin 40 was published, four old wells of the city of Chicago Heights (34, 331) have been rehabilitated and restored to service, and two additional wells have been constructed. Currently there are nine wells in service as follows: Wells No. 12, 14, 15, 16, 17, 18, 21, 22 and 23. Wells No. 24 and 25 were constructed in 1958 but have not been equipped with pumps.

WELL NO. 12, described in Bulletin 40, was rehabilitated in Apr. 1955 by Wehling Well Works, Beecher. The well was redrilled and cleaned out from 157 ft. to its original depth of 201 ft. The redrilling was started with an 11 1/2-in. bit reduced to 10 in. at 172 ft. Due to obstruction of a line shaft, previously dropped in the well, an 8-in. bit was used to the bottom. Reportedly, a suggestion was made by the Contractor to "fish out the obstruction" but, since the bowls could be set at 160 ft., the suggestion was officially rejected.

The pumping equipment installed after the rehabilitation work included 140 ft. of 8-in. column pipe; 10-in., 6-stage Byron Jackson pump, all bronze bowl assembly; 20 ft. of 8-in. suction pipe (reinstalled); 40-hp. nonreversible ratchet electric motor. The Contractor reported that after 1 hr. pumping at a rate of 620 gpm. against a main pressure of 45 lb. the drawdown was 3 ft. In Jan. 1957 the Contractor reported the well was producing at the same rate.

There has been no change in WELL NO. 14 since Bulletin 40. The pumping rate is approximately 800 gpm.

WELL NO. 15, described in Bulletin 40, was reconditioned by Wehling Well Works in Nov. 1956. The pump had reportedly broken suction at 195 ft. during pumping at a rate of 900 gpm. The well was cleaned out to its original depth of 200 ft. and then deepened to a total depth of 428 ft. where a shale formation was encountered. Because the 24-in. casing was in poor condition, a 20-in. casing was set from the surface to 104 ft. and the annular space between the casings was cemented in. The Contractor reported that "the American Well Works pump was reinstalled and a pumping test with same showed 1500 gpm. with open discharge from 134 ft. to 140 ft. and only 6 ft. drawdown."

WELL NO. 16, which had not been in operation for some time, was cleaned out in Dec. 1956 to its original depth of 235 ft. by Wehling Well Works. The well was then deepened to a total depth of 428 ft. "where soft formation was encountered and the drilling terminated." The Contractor reported that a pumping test was not made at the time and that the plans were "to install the old pump and replace all column pipe in the spring of 1957." This well is now in use.

WELL NO. 17 was reportedly returned to service Feb. 11, 1956 on the basis of about 10 hr. daily. In 1956, during pumping at a rate of 950 gpm., the drawdown was 92 ft. from a nonpumping water level of 132 ft. below the pump base.

There has been no change in WELL NO. 18 since Bulletin 40.

WELL NO. 19 has been abandoned since about 1950.

WELL NO. 20 was abandoned about 1946, see Bulletin 40.

WELL NO. 21 was equipped, on Sept. 27, 1948 with 120 ft. of new 8-in. column pipe assembly. Following this installation a few minutes operation showed that during pumping at 1440 gpm., the drawdown was 40 ft. from a static water level of 26 ft. below the pump base.

WELL NO. 22, completed in Oct. 1946 to a depth of 270 ft. by J. P. Miller Artesian Well Co., Brookfield, is equipped with 110 ft. of 10-in. column pipe; 12-in., 6-stage Peerless turbine pump, No. 34378, rated at 1000 gpm. at 270 ft. T.D.H.; 110 ft. of air line; 100-hp. electric motor.

On Sept. 2, 1958, while pumping at a rate of 1350 gpm., the drawdown was 10 ft. from a nonpumping water level of 28 ft. below the pump base.

WELL NO. 23, completed in 1946 to a depth of 260 ft. by J. P. Miller Artesian Well Co. is equipped with 110 ft. of 10-in. column pipe; 12-in., 6-stage Peerless turbine pump (No. 34377); 110 ft. of air line; 110-hp. General Electric motor. Auxiliary power equipment is installed consisting of a Peerless right angle gear drive, J-15895, connected to a 150-hp. Buda gas engine.

A mineral analysis of a sample (Lab. No. 108579) collected Dec. 6, 1946, after 22 hr. pump-

ing at a rate of 1200 gpm., showed the water in Well No. 23 to have a hardness of 29 gr. per gal., total dissolved minerals of 587 ppm., an iron content of 2. 2 ppm., and a turbidity of 100 ppm.

On Oct. 16, 1958, during pumping at a rate of 1300 gpm., the water level was 88 ft. below the pump base.

WELL NO. 24 was completed to a depth of 450 ft. in May 1958 by J. P. Miller Artesian Well Co. The well is located about 3/4 mile east of Well No. 17, or approximately 1160 ft. S. and 100 ft. W. of the N. E. corner of Section 28, T35N, R14E. The ground surface elevation at the well is 670.

The well was cased with 30-in. od. pipe from 0 to 32 ft. and an inner casing of 20-in. od. pipe from 0 to 67 ft. The annulus outside the 20-in. casing was filled with cement. The hole below the 20-in, casing was finished at 20 in. in diameter to the bottom at 450 ft.

The Contractor reported a production test was conducted on May 8, 1958. After 20 hr. pumping at a rate of 435 gpm., the drawdown was 148 ft. from a nonpumping water level of 13 ft. below the top of the well.

A partial chemical analysis of a sample (Lab. No. 146558) collected May 8, 1958, after 20 hr. pumping, showed the water in Well No. 24 to have a hardness of 24.2 gr. per gal., total dissolved minerals of 471 ppm., and an iron content of 1 ppm.

The permanent pumping equipment installed in April 1960 consists of 213 ft. of 8-in. steel column pipe; 10-in., 8-stage Byron Jackson turbine pump (No. 367996), 7 ft. long and rated at 550 gpm. at 300 ft. T.D.H.; 213 ft. of air line.; 75-hp. U S electric motor.

Following installation of the permanent pump, a production test was conducted on Apr. 8, 1960. After 3 hr. pumping at a rate of 500 gpm., the drawdown was 181 ft. from a static water level of 15 ft. below the pump base.

WELL NO. 25 was completed to a depth of 450 ft. in Jan. 1958 by J. P. Miller Artesian Well Co. The well is located about 3/8 mile directly south of Well No. 23 and about 2 1/2 miles northwest of Well No. 24, or approximately 4750 ft. S. and 2775 ft. E. of the N. W. corner of Section 19. The ground surface elevation at the well is 680.

The well was cased with 30-in. od. pipe from 0 to 74 ft. and with a 24-in. od. inner pipe from 0 to 81 ft. The annular space outside the 24-in. casing was filled with cement. The hole below the 24-in. casing was finished at 23 l/2 in. in diameter to the bottom at 450 ft.

The Contractor reported a production test was conducted on Jan. 18, 1958. After 24 hr. pumping at a rate of 1800 gpm., the drawdown was 26 ft. from a nonpumping water level of 52 ft. below the top of the casing.

The following permanent pumping equipment was installed June 29, 1959: 160 ft. of 10-in. column pipe; 14-in., 3-stage Byron Jackson submersible pump, rated at 1500 gpm. against 185 ft. T.D.H.; 160 ft. of air line; 100-hp. U S electric motor; 110-hp. Auxiliary gas engine.

Pumpage in 1958 was reported to have averaged 5. 5 mgd.

LABORATORY NO. 146558

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.0		Fluoride	F	0.2	
Manganese	Mn	0.0		Chloride	Cl	8.	.23
				Nitrate	NO_3	0.5	.01
				Alkalinity (as	$CaCO_3$)	386.	7.72
Turbidity		39		Hardness (as	$CaCO_3$)	416.	8.32
Color		0					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		471.	

CHILLICOTHE
Peoria County
October 29, 1959

Three wells are in service for the public water supply of the city of Chillicothe (3054).

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2 was completed in Nov. 1949 to a depth of 124 ft. 4 in. below ground level, by M. Ebert, Washington, and located on Walnut St. extended, on the west side of Chillicothe, about 1/2 mile west of Well No. 1, or approximately 1400 ft. N. and 2480 ft. E. of the S. W. corner of Section 20, T11N, R9E. The ground elevation at the well is 525. The well was cased with 106 ft. 6 in. of 12-in. id. pipe from 2 ft. 8 in. above ground level, followed by a nominal diameter Johnson Everdur screen, 21 ft. 5 in. over-all length, with 20 ft. of slotted section exposed to the aquifer. The top 3 ft. was No. 30 slot, next 7 ft. has No. 20 slot, and the bottom 10 ft. has No. 16 slot openings.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil	3	3
Sand and gravel	122	125

A production test was conducted on Nov. 2, 1949 by representatives of the Driller, the State Water Survey, City officials, and Austin Engineering Co., Consulting Engineers. After 7 hr. pumping at 355 gpm., the drawdown was 9.1 ft. from a static water level of 77. 5 ft. below the ground surface.

A mineral analysis of a sample (Lab. No. 119774) collected Nov. 2, 1949, after 7 hr. pumping, showed the water in Well No. 2 to have a hardness of 19.1 gr. per gal., total dissolved minerals of 381 ppm., and a trace of iron.

The permanent pumping equipment includes 100 ft. of 6-in. column pipe; 8-in., 7-stage Aurora turbine pump, No. 46928, rated at 350 gpm.; 5-ft. 6-in. strainer; 105 ft. of air line; 25-hp. electric motor.

WELL NO. 3 was completed to a depth of 123 ft. in Feb. 1956 by J. P. Miller Artesian Well Co., Brookfield, and located about 250 ft. west of Well No. 2, or approximately 1000 ft. N. and 2400 ft. E. of the S. W. corner of Section 20. The well was cased with 99 ft. of 12-in. casing followed by 26. 5 ft. over-all length of 12-in. Cook brass screen with 25 ft. length exposed to the aquifer. The top 12 ft. of screen has No. 40 slot openings, the bottom 13 ft. has No. 20 slot openings.

A production test was conducted on Feb. 17, 1956 by representatives of the Driller, the State Water Survey, and Austin Engineering Co. After 4 hr. pumping at a rate of 350 gpm., the drawdown was 6. 7 ft. from a nonpumping water level of 78 ft. below the pump base (2 ft. above ground level).

A partial chemical analysis of a sample (Lab. No. 139862) collected Feb. 21, 1956 showed the water in Well No. 3 to have a hardness of 19. 5 gr. per gal., total dissolved minerals of 366 ppm., and a trace of iron.

The pumping equipment installed in May 1956 includes 100 ft. of 6-in. column pipe; 7 1/2-in., 9-stage Aurora turbine pump, rated at 350 gpm.; 6-in. suction pipe; 97 ft. of air line; 25-hp. U S electric motor.

Pumpage is estimated to average 165, 000 gpd.

LABORATORY NO. 119774

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	20.9	
Calcium	Ca	80.5	4.03	Fluoride	F	0.3	
Magnesium	Mg	30.5	2.51	Chloride	Cl	14.	.39
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	10.8	.17
Sodium	Na	4.	.16	Sulfate	SO_4	95.0	1.98
				Alkalinity (as	$CaCO_3$)	208.	4.16
Turbidity		0		Hardness (as	$CaCO_3$)	327.	6.54
Color		0					
Odor		0					
Temp. (reported)		57.1°F		Total Dissolved Minerals		381.	

CISSNA PARK
Iroquois County
June 24, 1960

Four wells are in service for the village of Cissna Park (803).

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2, described in Bulletin 40 as the well drilled in 1921 to a depth of 239 ft., is in service.

WELL NO. 3, described in Bulletin 40 as the well drilled in 1944 to a depth of 163 ft., is in service. This well was deepened to 200 ft. in 1954 by L. F. Swanson, Gibson City, and cased with 6-in. pipe from 2 ft. above the pump house floor to 184 ft. followed by 16 ft. of screen.

The pumping equipment includes 60 ft. of column pipe; 3-stage Fairbanks-Morse turbine pump, rated at 200 gpm.; 5-hp. Fairbanks-Morse electric motor.

In Dec. 1959 the static water level was reported to be at ground level (674).

WELL NO. 4 was completed to a depth of 200 ft. in 1956 and located about 6 ft. west of collecting reservoir No. 2, or approximately 1000 ft. N. and 700 ft. E. of the S. W. corner of Section 1, T34N, R14W. The ground surface elevation at the well is 674. The well is cased with 4-in. pipe from the surface to the bottom at 200 ft.

Well No. 4 is a flowing well and is in service.

A mineral analysis of a sample (Lab. No. 152586) collected June 24, 1960 showed the water from Well No. 4 to have a hardness of 21.1 gr. per gal., total dissolved minerals of 424 ppm., and an iron content of 0.9 ppm.

The pumping equipment includes a Fairbanks-Morse turbine pump, rated at 200 gpm. connected to a 15-hp. electric motor.

There are 320 services, all metered and 100% of population served. Pumpage is estimated to average 100,000 gpd.

LABORATORY NO. 152586

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	15.3	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	82.8	4.14	Boron	B	0.2	
Magnesium	Mg	37.2	3.06	Chloride	Cl	3.	.08
Ammonium	NH_4	2.1	.12	Nitrate	NO_3	0.8	.01
Sodium	Na	23.	.98	Sulfate	SO_4	25.3	.53
				Alkalinity (as	$CaCO_3$)	384.	7.68
Turbidity		2		Hardness (as	$CaCO_3$)	360.	7.20
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		424.	

Illinois State Water Survey
Bulletin 40 - Supplement II

CITIZENS BLUETT COMPANY SUBDIVISION

Cook County
April 11, 1960

A public water supply was installed in 1953 for the Citizens Bluett Company Subdivision (est. 600) located just north of Mt. Prospect. The system is owned and operated by Citizens Utilities Co. of Illinois.

WELL NO. 1 was completed in 1953 to a depth of 218 ft. by Henry Boysen, Libertyville, and located 2550 ft. N. and 450 ft. W. of the S. E. corner of Section 34, T42N, R11E. The elevation of the ground surface at the well is 660. The well was cased with 12-in. pipe to an unreported depth.

When the well was completed the Driller conducted a production test. After 10 hr. pumping at a rate of 157 gpm., the drawdown was 121 ft. from a static water level of 26 ft. below the pump base. On July 1, 1958 the nonpumping water level was 30 ft.

The pumping equipment consists of 160 ft. of 5-in. column pipe; 10-in., 15-stage Byron Jackson turbine pump, No. 281236, rated at 150 gpm. against 286 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 160 ft. of air line; 20-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152021) collected Apr. 11, 1960 showed the water to have a hardness of 16. 3 gr. per gal., total dissolved minerals of 475 ppm., and an iron content of 0. 4 ppm.

There are 174 services. Pumpage is estimated to average 36, 000 gpd.

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellow-gray, oxidized	5	5
Till, buff	25	30
Till, light brown, sandy, gravelly	55	85
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white, very fine-fine, crystalline	2	87
Alexandrian Series		
Kankakee Formation		
Dolomite, white, little buff, very fine to fine, crystalline	51	138
Edgewood Formation		
Dolomite, silty, white, to gray, black speckled at base	39	177
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Shale, dolomite, gray, weak, little tough; dolomite, silty, gray, very fine, crystalline	40	217
No sample	1	218

LABORATORY NO. 152021

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	13.9	
Manganese	Mn	0.0		Fluoride	F	0.4	
Calcium	Ca	55.0	2.75	Boron	B	0.3	
Magnesium	Mg	33.2	2.73	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.7	.03
Sodium	Na	58.	2.54	Sulfate	SO_4	182.5	3.80
				Alkalinity (as	$CaCO_3$)	204.	4.08
Turbidity		Tr.		Hardness (as	$CaCO_3$)	274.	5.48
Color		0					
Odor		0		Total Dissolved Minerals		475.	

CLARENDON HILLS
DuPage County
November 5, 1958

Since publication of Bulletin 40, one well has been added to the public water supply of the village of Clarendon Hills (5885). Three wells are in service.

WELL NO. 1 was abandoned in 1932.

WELL NO. 2 (Burlington Well) was equipped in 1952 with a new pump assembly consisting of 150 ft. of 6-in. column pipe; 10-in., 4-stage Layne turbine pump, rated at 430 gpm.; 150 ft. of air line; 10 ft. of suction pipe; 20-hp. Fairbanks-Morse electric motor.

In July and Aug. 1957 the nonpumping water level in Well No. 2 was reported to be 110 ft. and the drawdown, while pumping, was 9 ft. Well No. 2 is in active service.

WELL NO. 3 (Sheridan Well) was equipped with a new air line, 160 ft. long, in Oct. 1951; and in Feb. 1954, two stages were added to the pump and a 50-hp. electric motor installed. The pumping rate had been falling off, but after the repairs the rate was maintained at 750 gpm. Before installing the new air line in Oct. 1951, the water level readings had not been accurate. Nonpumping water levels since that date are shown in Table A.

TABLE A

Date	Depth to Water ft.
10-10-1951	98.0
12-11-1952	99.5
2- 8-1954	101.9
4- 1-1958	106.0
6-25-1958	106.3

Well No. 3 is in service.

WELL NO. 4 was completed in 1956 to a depth of 370 ft. by Layne-Western Co., Aurora, and located about 1/4 mile north of Well No. 3, or approximately 2100 ft. N. and 2900 ft. W. of the S. E. corner of Section 11, T38N, R11E. The ground elevation at the well is 780. The well was cased with 12-in. id. 45-lb. steel welded pipe from the surface to 130 ft.

A production test was conducted on Apr. 12, 1956 by representatives of the Drilling Contractor, the State Water Survey, and Wright and Company, Consulting Engineers, Barrington. After 8 hr. pumping at a rate of 1029 gpm., the drawdown was 10 ft. from a static water level of 90 ft. below the top of the casing. A partial chemical analysis of a sample (Lab. No. 140311) collected Apr. 12, 1956, after 8 hr. pumping, showed the water in Well No. 4 to have a hardness of 26.8 gr. per gal., total dissolved minerals of 535 ppm., and an iron content of 1.5 ppm.

The permanent pump installation includes 150 ft. of 8-in. column pipe; 10-in., 5-stage Layne turbine pump (No. 34264), 10 ft. 8 in. long; 150 ft. of air line; 50-hp. U S electric motor.

On June 26, 1958 the nonpumping water level reading on the air line was 88 ft.

Well No. 4 is in service and furnishes approximately one half of the daily demand.

Pumpage for 1957 for the village averaged 422, 500 gpd.

LABORATORY NO. 140311

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.5		Fluoride	F	0.4	
				Chloride	Cl	8.	.23
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		5		Hardness (as	$CaCO_3$)	460.	9.20
Color		0					
Odor		0					
Temp. (reported)		55.1°F		Total Dissolved Minerals		535.	

Four wells are in service for the public water supply of the city of Collinsville (14, 217). Five wells, Nos. 1-5 inclusive, described in Bulletin 40, have been abandoned and filled in.

WELL NO. 6, described in Bulletin 40, was reportedly discontinued about 1955.

WELL NO. 7 was completed to a depth of 102 ft. (from top of base which is 4. 6 ft. above L. S. D.) in Aug. 1950 by Layne-Western Co., Kirkwood, Mo. The well is located in the southeast corner of the water works lot, or approximately 500 ft. N. and 75 ft. W. of the S. E. corner of Section 31, T3N, R8W. The ground surface elevation at the well is 430. The well was cased with 38-in. steel pipe from the surface to 32 ft. and with 18-in. pipe from 4. 6 ft. above the surface to 72 ft. below, followed by 30 ft. of 18-in. Layne and Bowler No. 4 screen with . 080 slot openings exposed to the formation. The annulus between the casings and outside the screen was packed with gravel.

The pump assembly in Well No. 7 consists of 60 ft. of 10-in. column pipe; 10-in., 2-stage Johns ton turbine pump, No. 7875, rated at 2000 gpm. (the Johnston pump was removed from abandoned Well No. 4); total length of column pipe bowls section and suction pipe is 89 ft. 8 in.; 83 ft. of air line; 50-hp. Louis Allis electric motor.

A production test was conducted by the Driller Aug. 8, 1950. After 30 min. pumping at a rate of 627 gpm., the drawdown was 4 ft. from a nonpumping water level of 25 ft. below the pump-base. After 15 min. additional pumping at 765 gpm., the drawdown was 6 ft.

A partial analysis of a sample (Lab. No. 122652) collected Aug. 8, 1950, after 15 min. pumping at 627 gpm., showed the water in Well No. 7 to have a hardness of 28. 5 gr. per gal., total dissolved minerals of 573 ppm., and an iron content of 6. 5 ppm.

WELL NO. 8 was completed to a depth of 99 ft. below ground surface in Oct. 1951 by Layne-Western Co. and located near the south edge of the water works property in Section 31. The ground surface elevation at the well is 425.

The well was cased with 42-in. steel pipe from the surface to 20 ft. and with 26-in. pipe from 4. 5 ft. above the surface to an unreported depth, followed by 20 ft. of 26-in. Layne and Bowler No. 4 bronze shutter screen. The hole was 48 in. in diameter from top to bottom. The space between the casings and outside the screen was packed with gravel.

The pumping equipment includes 60 ft. of 10-in. column pipe; 2-stage Layne turbine pump, 3 ft. 7 in. in length, and rated at 1300 gpm.; 9 ft. of suction pipe; 70 ft. of air line; 30-hp. U S electric motor.

A production test was reported by the Driller. On Jan. 11, 1957, after 8 hr. pumping at a rate of 1000 gpm., the drawdown was 22 ft. from a nonpumping water level of 34 ft. below the pump base (4. 5 ft. above ground level).

A partial analysis of a sample (Lab. No. 130998) collected Jan. 29, 1953, after 10 min. pumping at 618 gpm., showed the water in Well No. 8 to have a hardness of 25.4 gr. per gal., total dissolved minerals of 502 ppm., and an iron content of 1. 3 ppm.

WELL NO. 9 was completed in Aug. 1955 to a depth of 102 ft. below the pump base (4 ft. above ground level) by Layne-Western Co. and located about 650 ft. southwest of the pumping station, or approximately 300 ft. N. and 700 ft. W. of the S. E. corner of Section 31. The elevation of the ground surface at the well is 430. The bore hole was 48 in. in diameter from the surface to 20 ft., below which the hole was 42 in. in diameter to the bottom. The well was cased with 26-in. steel pipe followed by 25 ft. of 26-in. Layne and Bowler No. 5 shutter screen with the bottom of the screen set at 98 ft. below ground level. The annulus between the casing, screen, and the well wall was gravel packed.

The pumping equipment includes 60 ft. of 10-in. column pipe; Pomona turbine pump, 3. 5 ft. in length; 6. 5 ft. of 10-in. suction pipe; air line; 30-hp. U S electric motor.

The Driller reported that during pumping at rates of 1001 to 1089 gpm., the drawdown was 13 ft. from a nonpumping water level of 33 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 138478) collected Aug. 17, 1955, after 6 hr. pumping at rates of 1001 to 1089 gpm. > showed the water in Well No. 1 to have a hardness of 21.4 gr. per gal., total dissolved minerals of 412

ppm., and an iron content of 0. 8 ppm.

WELL NO. 10 was completed in May 1958 to a depth of 103 ft. below the ground surface by Luhr Bros. Inc., Columbia, and located about 280 ft. south of Well No. 9, or approximately 20 ft. N. and 800 ft. W. of the S. E. corner of Section 31. The ground surface elevation at the well is 430. The well was cased with 26-in. steel pipe followed by 30 ft. of 26-in. stainless steel Johnson screen, having No. 80 slot openings. The bore hole was left 42 in. in diameter and the annulus outside the casing and screen was packed with Meramec gravel.

The pumping equipment installed in Aug. 1958 includes 60 ft. of column pipe; 3-stage Layne turbine pump; 10 ft. of suction pipe; 40-hp. Fairbanks-Morse electric motor.

A production testwas conducted on Aug. 12, 1958 by the Driller. After 8 hr. pumping at a rate of 1200 gpm., the drawdown was 17.8 ft. from a nonpumping water level of 21 ft. below the pump base (3 ft. above ground level).

A partial chemical analysis of a sample (Lab. No. 147459) collected Aug. 12, 1958, after 8 hr. pumping at 1200 gpm., showed the water in Well No. 10 to have a hardness of 26. 2 gr. per gal., total dissolved minerals of 465 ppm., and an iron content of 1. 6 ppm.

Pumpage in July 1958 averaged 1. 37 mgd.

LABORATORY NO. 138478

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 8		Silica	SiO_2	35. 0	
Manganese	Mn	0. 4		Fluoride	F	0. 3	
Calcium	Ca	87. 4	4. 37	Boron	B	0. 1	
Magnesium	Mg	35. 9	2. 95	Chloride	Cl	7.	. 20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 7	. 01
Sodium	Na	4.	. 17	Sulfate	SO_4	47. 3	. 98
				Alkalinity (as	$CaCO_3$)	316.	6. 32
Turbidity		2		Hardness (as	$CaCO_3$)	366.	7. 32
Color		0					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		412.	

COMPTON
Lee County
November 16, 1960

Two wells furnish the public water supply for the village of Compton (366).

WELL NO. 1 (East), described in Bulletin 40, was abandoned sometime prior to 1953.

WELL NO. 2 (West), described in Bulletin 40, is reported to be 316 ft. deep and in 1955 was equipped with a new 4-in., 19-stage Reda submersible pump set at 299 ft. and rated at 57 gpm. against 485 ft. T.D.H.; and with 290 ft. of air line. Power is from a 7 1/2-hp. electric motor.

On June 2, 1951 the water level was 235 ft. after 15 min. pumping.

Well No. 2 is in service.

WELL NO. 3 was completed in Oct. 1954 to a depth of 332 ft. by Layne-Western Co., Aurora, and located about 15 ft. southeast of Well No. 2, or approximately 2395 ft. S. and 1315 ft. E. of the N. W. corner of Section 11, T37N, R1E. The ground surface elevation at the well is 982. The well was cased with 322 ft. of 8-in. steel pipe followed by 10 ft. of Layne shutter screen (Monel) with No. 6 slot openings. The Driller reported using 3 cu. yd. of "buckshot" gravel in the well.

On Oct. 4-5, 1954, after 15 hr. pumping at 100 gpm., the drawdown was 18 ft. from a non-pumping water level of 257 ft. below the pump base.

Well No. 3 is equipped with 510 ft. of 5-in. column pipe; 7 3/4-in., 14-stage Aurora turbine pump rated at 100 gpm. and 7 ft. 8 in. long, connected to a 15-hp. electric motor. An air line, 310 ft. long, is installed.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Black soil and fill	1	1
Black soil	2	3
Brown clay	22	25
Brown clay, traces of sand	45	70
Brown clay	22	92
Clay sand, fairly loose	17	109
Gray sand, trace of clay	2	111
Brown clay	29	140
Brown clay, traces of gravel	179	319
Sand, gray, fairly loose; hard to drill, clay showings	5	324
Sand, medium, fairly loose, trace of fine sand	10	334
ORDOVICIAN SYSTEM		
Glenwood-St. Peter Formations		
Shale, light green, hard	11	345

A mineral analysis of a sample (Lab. No. 153621) collected Nov. 16, 1960 showed the water in Well No. 3 to have a hardness of 12. 6 gr. per gal., total dissolved minerals of 309 ppm., and an iron content of 1. 2 ppm.

There are 129 services, all metered, and pumpage is reported to average 35, 000 gpd.

LABORATORY NO. 153621

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	15.7	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	48.2	2.41	Boron	B	0.3	
Magnesium	Mg	21.0	1.73	Chloride	Cl	0.	.00
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	0.9	.01
Sodium	Na	34.	1.48	Sulfate	SO_4	0.8	.02
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		2		Hardness (as	$CaCO_3$)	207.	4.14
Color		45					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		309.	

COUNTRY CLUB HEIGHTS
Cook County
July 23, 1959

A public water supply was installed in 1955 for Country Club Heights (est. 70), a subdivision located south of LaGrange, north of the intersection of 55th St. and Brainard Ave. The system is owned and operated by the Home Owners Association.

WELL NO. 1 was completed in 1955 to a depth of 370 ft. by Frank Krein, Brookfield, and located north of Country Club Drive on Brainard Ave., approximately 575 ft. N. and 30 ft. W. of the S. E. corner of Section 8, T38N, R12E. The elevation of the ground surface at the well is 670. The well was cased with 6-in. pipe to 60 ft. below which the hole was finished 6 in. in diameter to the bottom at 370 ft.

When the well was completed in 1955, the Driller reported pumping at a rate of 70 gpm. with a drawdown of 10 ft. from a nonpumping water level of 110 ft.

The pumping equipment includes a Byron Jackson submersible pump with a 2-in. discharge pipe set to an unreported depth. The pump is rated at 70 gpm. at 265 ft. T.D.H. Power is from an electric motor.

A partial chemical analysis of a sample (Lab. No. 150130) collected July 23, 1959 showed the water to have a hardness of 39 gr. per gal., total dissolved minerals of 847 ppm., and an iron content of 1. 2 ppm.

There are 18 homes, all served but none of them metered. A flat charge of $30 per quarter is made to each. Pumpage is estimated to average 7200 gpd.

LABORATORY NO. 150130

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Fluoride	F	0.1	
				Chloride	Cl	24.	.68
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	380.	7.60
Turbidity		8		Hardness (as	$CaCO_3$)	670.	13.40
Color		0					
Odor		0		Total Dissolved Minerals		847.	

COUNTRY CLUB HIGHLANDS
DuPage County
April 21, 1958

A public water supply was installed in 1956 for Country Club Highlands (est. 150), a subdivision about 1 mile south of Bensenville. Water is obtained from one well with 45 services installed at the time of this report. It is expected that the ultimate capacity of the subdivision will be 211 services and a population of 700.

WELL NO. 1 was completed in July 1956 to a depth of 226 ft. by J. P. Miller Artesian Well Co., Brookfield. The well is located 1720 ft. S. and 2590 ft. E. of the N. W. corner of Section 25, T40N, R11E. The ground surface elevation at the well is 682. The well was cased to rock with 12-in. gwi. pipe from the surface to 89 ft.

When the well was completed, the Driller reported pumping at a rate of 200 gpm. for 3 hr. with a drawdown of 54 ft. from a static water level of 41 ft. The pump broke suction, and after the rate was reduced to 190 gpm., pumping was continued at this rate for 6 hr. The pumping water level at the end was 110 ft.

The permanent pump assembly includes 120 ft. of 5-in. column pipe; 6-stage Peerless turbine pump, No. 12026, rated at 180 gpm. against 127 ft. T.D.H.; 20 ft. of 5-in. suction pipe; 120 ft. of air line; 10-hp. US electric motor.

A mineral analysis of a sample (Lab. No. 146383) collected Apr. 21, 1958, after 10 min. pumping with a drawdown of 16 ft. from a non-pumping water level of 44 ft., showed the water in Well No. 1 to have a hardness of 25. 6 gr. per gal., total dissolved minerals of 678 ppm., and an iron content of 0. 8 ppm.

Pumpage for the subdivision from May 25, 1957 to Apr. 1, 1958 averaged 8500 gpd.

LABORATORY NO. 146383

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.8		Silica	SiO_2	19.6	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	89.4	4.47	Boron	B	0.5	
Magnesium	Mg	52.3	4.30	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.9	.01
Sodium	Na	52.	2.26	Sulfate	SO_4	237.2	4.93
				Alkalinity (as	$CaCO_3$)	296.	5.92
Turbidity		7		Hardness (as	$CaCO_3$)	439.	8.77
Color		0					
Odor		0					
Temp. (reported)		53.5°F		Total Dissolved Minerals		678.	

COUNTRY CLUB HILLS
Cook County
September 9, 1960

A public water supply was installed in 1956 for Country Club Hills Subdivision incorporated in 1958 as city of Country Club Hills (3421). Water is obtained from two wells.

WELL NO. 1 was completed in May 1956 to a depth of 275 ft. by J. P. Miller Artesian Well Co., Brookfield, and located near 183rd and Cicero Ave., 2 miles southeast of Tinley Park, or approximately 664 ft. N. and 1136 ft. E. of the S. W. corner of Section 34, T36N, R13E. The ground elevation at the well is 710. The well was cased with 12-in. pipe to 106 ft., below which the hole was finished 12 in. in diameter.

The pumping equipment includes 220 ft. of 6-in. column pipe; 10-in., 10-stage Peerless turbine pump, No. 2812865, rated at 300 gpm. at 315 ft. T.D.H.; 30 ft. of 6-in. suction pipe; 200 ft. of air line; 25-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 148017) collected Oct. 20, 1958, after 2 hr. pumping at a rate of 370 gpm., showed the water in Well No. 1 to have a hardness of 24.8 gr. per gal., total dissolved minerals of 631 ppm., and an iron content of 0. 6 ppm.

On Sept. 26, 1956 the nonpumping water level was 66 ft. The pump discharges into a 3000 gal. metal storage tank at ground level.

WELL NO. 2 was completed in 1956 to a depth of 387 ft. by Kramer Bros., Homewood, and located 2700 ft. N. and 2500 ft. E. of the S. W. corner of Section 34. The casing in the 12-in. hole was not reported.

The pumping equipment includes 100 ft. of column pipe; Deming turbine pump (No. 31150); 100 ft. of air line; 40-hp. U S electric motor.

On Oct. 20, 1958 the nonpumping water level was 37 ft.

WELL NO. 3 has not been constructed.

WELL NO. 4 (Unit No. 7) was completed in 1959 to a depth of 382 ft. by Kramer Bros. and located about 1 3/8 miles south of Well No. 2, or approximately 1050 ft. N. and 2450 ft. W. of the S. E. corner of Section 3, T35N, R13E. The elevation of the ground surface at the well is 728. The well was cased with 93 ft. of 12-in. pipe, below which the hole was finished 12 in. in diameter to the bottom of the well.

When the well was completed, the Driller reported pumping at 500 gpm. with a drawdown of 32 ft. from a nonpumping water level of 60 ft.

A mineral analysis of a sample (Lab. No. 149638) showed the water in Well No. 4 to have a hardness of 34.2 gr. per gal., total dissolved minerals of 791 ppm., and an iron content of 0. 3 ppm.

At present there are 575 services. About 6000 services will eventually be installed.

Pumpage is estimated to average 60,000 gpd.

LABORATORY NO. 148017

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	18.7	
Manganese	Mn	0.0		Fluoride	F	0.5	
Calcium	Ca	105.2	5.26	Boron	B	0.9	
Magnesium	Mg	39.9	3.28	Chloride	Cl	3.	.08
Ammonium	NH_4	0.0	.00	Nitrate	NO_3	1.8	.03
Sodium	Na	47.	2.03	Sulfate	SO_4	187.4	3.90
				Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		2		Hardness (as	$CaCO_3$)	427.	8.54
Color		0					
Odor		0					
Temp. (reported)		52.2°F		Total Dissolved Minerals		631.	

2 - Country Club Hills

LABORATORY NO. 149638

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	8.4	
Manganese	Mn	Tr.		Fluoride	F	0.1	
Calcium	Ca	117.0	5.85	Boron	B	0.8	
Magnesium	Mg	68.0	5.59	Chloride	Cl	6.	.17
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	0.7	.01
Sodium	Na	48.	2.09	Sulfate	SO_4	308.6	6.42
				Alkalinity (as	$CaCO_3$)	348.	6.96
Turbidity		2		Hardness (as	$CaCO_3$)	572.	11.44
Color		0					
Odor		0		Total Dissolved Minerals		791.	

CRESCENT CITY
Iroquois County
June 24, 1960

Two wells are in service for the village of Crescent City (393), originally called Crescent.

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2 was completed in June 1954 to a depth of 132 ft. by Coy and Sons, Lafayette, Ind., and located about 20 ft. northwest of Well No. 1, or approximately 40 ft. S. and 1480 ft. E. of the N. W. corner of Section 5, T26N, R13W. The land surface elevation at the well is 645. The well was cased with 6-in. ci. pipe from 18 in. above to 125 ft. below the surface followed by 7 ft. of screen to the bottom.

The pumping equipment includes 40 ft. of 4-in. column pipe; 4-in., 9-stage Peerless turbine pump, rated at 150 gpm. Power is furnished from a 7 l/2-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152591) collected June 24, 1960 showed the water to have a hardness of 21.1 gr. per gal., total dissolved minerals of 479 ppm., and an iron content of 0. 9 ppm.

Well No. 2 is in service. There are 150 services all of which are metered. Pumpage is estimated to average 18, 000 gpd.

LABORATORY NO. 152591

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	16.9	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	85.8	4.29	Boron	B	0.3	
Magnesium	Mg	35.6	2.93	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	4.8	.08
Sodium	Na	31.	1.36	Sulfate	SO_4	94.4	1.96
				Alkalinity (as	$CaCO_3$)	320.	6.40
Turbidity		3		Hardness (as	$CaCO_3$)	361.	7.22
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		479.	

CRESTON
Ogle County
March 5, 1959

One well is in service for the public water supply of the village of Creston (454).

WELL NO. 1, described in Bulletin 40, is maintained for stand-by use.

WELL NO. 2 was completed in 1955 to a depth of 732 ft. by J. P. Miller Artesian Well Co., Brookfield, and located 1 block east of Well No. 1, or approximately 1550 ft. S. and 350 ft. W. of the N. E. corner of Section 23, T40N, R2E. The ground surface elevation at the well is 905. The well was cased with 12-in. steel pipe from the surface to 220 ft. and with 10-in. steel pipe from 220 to 435 ft., below which the hole was finished 10 in. in diameter. The bore hole was 48 in. in diameter from the surface to 220 ft.

Water level data, during the drilling, are shown in Table A.

A production test was conducted on Dec. 30, 1955 by representatives of the Driller, the State Water Survey, and C. K. Willett, Consulting Engineers. For the test the following equipment was installed: 7-in. turbine pump set at 220 ft.; 12-in. suction pipe; 220 ft. of air line; 23-hp. motor. After 9 2/3 hr. pumping at rates of 135 to 303 gpm., the drawdown was 38 ft. from a static water level of 124 ft. below the gage (1 ft. above top of casing).

A partial chemical analysis of a sample (Lab. No. 139573) collected in Dec. 1955 showed the water in Well No. 2 to have a hardness of 12. 8 gr. per gal., total dissolved minerals of 295 ppm., and an iron content of 0. 7 ppm.

The pumping equipment consists of 180 ft. of 6-in. column pipe (bitumastic coated); 10-in., 8-stage Layne turbine pump, No. 34219, rated at 250 gpm. against 320 ft. T.D.H.; 10 ft. of 8-in. suction pipe; 180 ft. of air line; 30-hp. U S electric motor.

On Mar. 5, 1959 the nonpumping water level was 128 ft.

Pumpage from Dec. 16, 1956 to Dec. 31, 1958 averaged 24,100 gpd.

TABLE A

From ft.	To ft.	Depth to Water ft.
Surface	220	Rotary drilling
220	497	No water recorded
497	614	123
614	737	121

LABORATORY NO. 139573

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Fluoride	F	0.3	
				Chloride	Cl	4.	.11
				Nitrate	NO_3	2.8	.05
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		2		Hardness (as	$CaCO_3$)	220.	4.40
Color		0					
Odor		0		Total Dissolved Minerals		295.	

CREVE COEUR
Tazewell County
June 8, 1960

Three wells are in service for the public supply of the village of Creve Coeur (6684).

WELL NO. 1, described in Bulletins 33 and 40, is maintained for stand-by use.

WELL NO. 2, described in Bulletin 40, is maintained for stand-by use.

WELL NO. 3 was completed in May 1952 to a depth of 78 ft. by Mike Ebert, Washington, and located about 200 ft. west of Well No. 2, approximately 2500 ft. N. and 2355 ft. E. of the S. W. corner of Section 12, T25N, R5W. The ground surface elevation at the well is 452. The well was cased with 16-in. pipe from 10 ft. 6 in. above to 58 ft. below ground level followed by 20 ft. of 16-in. Johnson Everdur screen.

An earth berm is built up around the well to an elevation 4 ft. higher than the highest known flood level. In May 1952 the static water level was 20. 5 ft. below the top of casing (extended).

The permanent pump installation includes a Fairbanks-Morse Pomona turbine rated at 800 gpm., connected to a 125-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152390) collected June 8, 1960 showed the water in Well No. 3 to have a hardness of 30 gr. per gal., total dissolved minerals of 640 ppm., and an iron content of 0.1 ppm.

There are approximately 2000 services. Pumpage is reported to average 404, 000 gpd.

LABORATORY NO. 152390

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	18. 3	
Manganese	Mn	Tr.		Fluoride	F	0. 2	
Calcium	Ca	121. 8	6. 09	Boron	B	0. 2	
Magnesium	Mg	50. 2	4. 13	Chloride	Cl	22.	. 62
Ammonium	NH_4	0. 1	. 01	Nitrate	NO_3	2. 7	. 04
Sodium	Na	27.	1. 19	Sulfate	SO_4	175. 1	3. 64
				Alkalinity (as	$CaCO_3$)	356.	7. 12
Turbidity		0		Hardness (as	$CaCO_3$)	511.	10. 22
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		640.	

Two wells are in service and three wells are available for service on a stand-by basis for the public supply of the city of Crystal Lake (8314).

WELL NO. 1, (Beardsley St. Well) described in Bulletin 40, is maintained for stand-by use.

WELL NO. 2, (Franklin Ave. Well) described in Bulletin 40, was reconditioned in Oct. -Nov. 1952, after some directional shooting and acid treatment in the shot area. The well was sounded at 1978. 5 ft. depth. On Nov. 13, 1952 water was pumped for 12 hr. at 388 gpm. with a drawdown of 79 ft. from a static water level of 269 ft. The well was sounded 1218 ft. in depth in 1956.

The well is now equipped with 420 ft. of 6-in. column pipe; 10-in., 11-stage Layne bowls (installed in 1956), rated at 400 gpm. against 515 ft. T.D.H.; 420 ft. of air line.

In Apr. 1956, after 4 hr. pumping at 400 gpm., the drawdown was 85 ft. from a nonpumping water level of 295 ft. below the pump base.

Well No. 2 is in service and in May 1959 produced about 58% of the city supply.

WELL NO. 3 (Virginia St. Park Well) was completed as Test Well No. 1-48 in July 1948 to a depth of 44 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located on Florence St. between Pierson and Virginia, or approximately 2325 ft. S. and 570 ft. W. of the N. E. corner of Section 6, T43N, R8E. The ground surface elevation at the well is 900. The well was cased with 10-in. pipe from the surface to 33 ft. and with 8-in. pipe from the surface to 34 ft. followed by 10 ft. of 6-in. slotted pipe and 5 ft. of 6-in. pipe below the slotted pipe.

When the test well was completed, the Driller reported pumping for 8 hr. with a drawdown of 17.5 ft. from a static water level of 16.5 ft. below the drill rig floor (0.4 ft. above ground surface).

A chemical analysis of a sample (Lab. No. 115406) collected July 24, 1948 showed the water in the well (No. 3) to have a hardness of 23.2 gr. per gal., total dissolved minerals of 462 ppm., and an iron content of 1. 2 ppm.

The finished well was to be drilled within 15 ft. of this well. Since 1956 Well No. 3 has been maintained for stand-by use.

WELL NO. 4 (Virginia St. Park Well) was constructed in 1948 toa depth of 57 ft. by Milaeger Well Drilling Co. and located in the City Park, about 170 ft. southeast of Well No. 3, or approximately 2500 ft. S. and 400 ft. W. of the N. E. corner of Section 6. The ground surface elevation at the well is 900. The well was constructed with the top of the casings in the bottom of an 8- . ft. reinforced concrete pit. An 18-in. casing extends from the bottom of the pit to 15 ft. and a 10-in. casing from the bottom of the pit to 39 ft. followed by 8 ft. of 10-in. Johnson screen, having No. 100 slot openings. The bottom of the casing is 57 ft. below ground level. The annulus between the two casings was grouted with cement.

The pumping equipment consists of 46 ft. of column pipe; 3-stage Byron Jackson submersible pump, rated at 250 gpm. against 120 ft. T. D. H.; 15-hp. electric motor.

In July 1955 Wells No. 3 and 4 were pumped after about 3 yr. of idleness due to low yields. Well No. 3 produced at a rate of 162 gpm. and No. 4 at 172 gpm. The static water levels were 10 ft. above the bowls in No. 3 and 15 ft. above the bowls in No. 4.

Since then Well No. 4, as No. 3, has been maintained for stand-by use only.

WELL NO. 5 (Poplar St. Well) was completed in 1952 to a depth of 1355 ft. by Milaeger Well Drilling Co. and located in the northeastern part of the city, about l/2 mile northeast of Well No. 2, or approximately 400 ft. N. and 2100 ft. E. of the S. W. corner of Section 33, T44N, R8E. The ground surface elevation at the well is 930. Well No. 5 was cased with 16-in. pipe from the surface to 20 ft. and with 12-in. pipe from the surface to 304 ft. and a 10-in. liner from 422 to 530 ft.

The permanent pumping equipment consists of 370 ft. of 8-in. column pipe; 10-in., 12-stage Aurora turbine pump, No. 66482, rated at 700 gpm. against 400 ft. T.D.H.; 370 ft. of air line; 100-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 139367) collected Dec. 27, 1955 showed the water in Well No. 5 to have a hardness of 18 gr. per gal., total dissolved minerals of 387 ppm., and an iron content of 0. 3 ppm.

On Oct. 1, 1957, when pumping at capacity, the drawdown was 22 ft. from a nonpumping water level of 274 ft. below the pump base.

2 - Crystal Lake

Well No. 5 is in service and in May 1959 produced about 40% of the city supply.

Pumpage for Crystal Lake, Jan.-May 1959, averaged about 762,000 gpd.

LABORATORY NO. 139367

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	17.8	
Manganese	Mn	Tr.		Fluoride	F	0.4	
Calcium	Ca	66.2	3.31	Boron	B	0.6	
Magnesium	Mg	35.4	2.91	Chloride	Cl	9.	.25
Ammonium	NH_4	0.9	.05	Nitrate	NO_3	0.3	Tr.
Sodium	Na	29.	1.26	Sulfate	SO_4	38.1	.79
				Alkalinity (as	$CaCO_3$)	324.	6.48
Turbidity		1		Hardness (as	$CaCO_3$)	311.	6.22
Color		0					
Odor		0		Total Dissolved Minerals		387.	

One well is in service for the village of Danforth (394).

WELL NO. 4, described in Bulletin 40, was taken out of service in June 1958.

WELL NO. 5 was completed to a depth of 116 ft. in July 1952 by Hayes and Sims, Champaign, and located at the site of Test Well No. 1-52, about 1/2 mile west of town, or approximately 500 ft. S. and 2600 ft. W. of the N. E. corner of Section 18, T27N, R14W. The ground surface elevation at the well is 650. The well was cased with 6-in. pipe from 2 ft. above to 110 ft. below the surface, followed by 7 ft. of Johnson Everdur screen with No. 18 slot openings.

A production test was conducted on July 3, 1952 by representatives of the Driller, the State Water Survey, and Tracy Pitzen, Consulting Engineer. After 4 l/2 hr. pumping at a rate of 22 gpm., the drawdown was 49. 3 ft. from a non-pumping water level of 35. 7 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level had recovered to 45. 2 ft.

A partial chemical analysis of a sample (Lab. No. 129196) collected July 3, 1952 showed the water to have a hardness of 9 gr. per gal., total dissolved minerals of 424 ppm., and an iron content of 4. 3 ppm.

Well No. 5 was equipped with a Goulds 2-pipe jet pump, rated at 30 gpm., connected to a 3-hp. Century electric motor. In Feb. 1956 the pumping equipment was removed to Well No. 6. In 1958, an attempt was made to remove the casing but the well caved in and in June 1958 Well No. 5 had been abandoned.

WELL NO. 6 was completed to a depth of 210 ft. in Jan. 1956 by J. Bolliger and Sons, Fairbury, and located at the site of Test Well No. 6, at the west edge of town, or approximately 1250 ft. S. and 1500 ft. W. of the N. E. corner of Section 18. The ground surface elevation at the well is 645. The well was cased with 8-in. pipe from 1. 5 ft. above to 140 ft. below ground level.

When the well was 160 ft. deep, a production test was made by representatives of the Driller, Village officials, Tracy Pitzen, and the State Water Survey. After 6 hr. pumping at a rate of 12 gpm., the drawdown was 87. 5 ft. from a static water level of 24 ft. below the top of the casing.

The well was then deepened to 210 ft. and a production test was made on Jan. 24, 1956. After 5 hr. pumping at 25. 7 gpm., the drawdown was 55. 9 ft. from a static water level of 20 ft. below the top of the casing. Thirty min, after the pump was stopped, the water level had returned to 35 ft.

A partial chemical analysis of a sample (Lab. No. 139651) collected Jan. 24, 1956 (after deepening) showed the water to have a hardness of 6. 6 gr. per gal., total dissolved minerals of 1164 ppm., and an iron content of 0. 4 ppm.

The pumping equipment from Well No. 5 was placed in Well No. 6 in Feb. 1956. The pump was reportedly throttled to 25 gpm.

In June 1958 Well No. 6 was furnishing the entire supply.

WELL NO. 7 was completed in July 1960 to a depth of 250 ft. by J. Bolliger and Sons and located 1100 ft. S. and 1870 ft. W. of the N. E. corner of Section 18. The well was cased with 8-in. pipe from 1 ft. above ground level to limestone at 142. 7 ft., below which the hole was finished 8 in. in diameter to the bottom of the well.

A production test was conducted on Aug. 1, 1960 by representatives of the Driller, the State Water Survey, and Vail Moore, Consulting Engineer. After 7 hr. pumping at a rate of 40 gpm., the drawdown was 121 ft. from a static water level of 38 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level had recovered to 42.1 ft.

During the test in Well No. 7, water levels were observed in Wells No. 5 and 6, located 751 and 365 ft., respectively, from Well No. 7. Neither well was being pumped while No. 7 was being tested. During the test there was no change in the water level in Well No. 5. It was steady at 29. 3 ft. below the top of the casing.

During the test the water level in Well No. 6 was lowered 6. 6 ft. from 43. 8 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 152858) collected Aug. 1, 1960 showed the water in Well No. 7 to have a hardness of 2. 9 gr. per gal., total dissolved minerals of 969 ppm., and an iron content of 0. 5 ppm.

The permanent pump had not been installed.

There are 216 services. Pumpage is estimated to average 16, 000 gpd.

LABORATORY NO. 152858

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Fluoride	F	1.8	
Manganese	Mn	0.0		Chloride	Cl	290.	8.18
				Nitrate	NO_3	0.8	.01
				Alkalinity (as	$CaCO_3$)	420.	8.40
Turbidity		2		Hardness (as	$CaCO_3$)	48.	.96
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		969.	

The city of DesPlaines (34,886) has four wells in service. In addition the Chicago & Northwestern Railroad's Norma Well is maintained by the city for emergency supply. The Higgins Water Co. also supplies well water to a portion of the city's area.

WELL NO. 1 (Cater) is described in Bulletin 40.

WELL NO. 2, described in Bulletin 40, was equipped in June 1947 with 441 ft. of 8-in. column pipe; 12-in. Sterling turbine pump, 9 ft. long, rated at 1000 gpm.; 30 ft. of 8-in. suction pipe; 187-hp. electric motor.

WELL NO. 3 was completed in 1953 for the city of DesPlaines. The well was drilled by S. B. Geiger & Co., Chicago, to a depth of 1843 ft. and located about 1/2 mile southwest of the Chicago & Northwestern Railroad's Norma Well, or approximately 2000 ft. N. and 1900 ft. E. of the S. W. corner of Section 19, T41N, R12E. The ground elevation at the well is 652. The hole and casing record for Well No. 3 is shown in Table A.

TABLE A

Casing Record

24-in.	from +2 ft.	to 230 ft.	
20-in.	from +2 ft.	to 376 ft.	(cemented)
12-in. liner	from 807 ft. 6 in.	to 898 ft.	
10-in. liner	from 1300 ft.	to 1580 ft.	

Hole Record

20-in.	from 376	to 650 ft.
15 1/4-in.	from 650	to 898 ft.
12-in.	from 898	to 1580 ft.
10-in.	from 1580	to 1843 ft.

A production test was conducted on June 30-July 1, 1953 by representatives of the Driller and the State Water Survey. For test purposes the well was equipped with an electrically driven Sterling turbine pump set at 500 ft. An air line, 500 ft. long, was installed. A Byron Jackson orifice, 6 1/4 in. by 8 in., was used to measure rates of production. Two gages were used to measure water levels. One gage was checked against the other.

After 24 hr. pumping at a rate of 1020 gpm., the drawdown was 83 ft. from a nonpumping water level of 297 ft. below the top of the casing. Fifty min. after pumping was stopped, the water level had recovered to 317 ft.

On June 17, 1958, during pumping at a rate of 1000 gpm., the water level was 454 ft. below the pump base. On the same date the permanent pumping equipment includes 550 ft. of 8-in. column pipe; 12-in. Aurora turbine pump, No. 69264, rated at 1000 gpm. against 575 ft. T.D.H.; 550 ft. of air line; 200-hp. U S electric motor.

Analysis of a sample (Lab. No. 147015) collected June 17, 1958, after 24 hr. pumping at a rate of 1000 gpm., showed the water from Well No. 3 to have a hardness of 16. 8 gr. per gal., total dissolved minerals of 569 ppm., and an iron content of 0. 2 ppm.

WELL NO. 4 was drilled in 1954 to a depth of 1811 ft. by L. Cliff Neely, Batavia. The well is located on Lots 11 and 12, Westfield Gardens, about 3/8 mile north of Well No. 3, or approximately 1200 ft. S. and 1900 ft. E. of the N. W. corner of Section 19. The ground elevation at the well is 654. The casing record is shown in Table B.

TABLE B

Casing Record

26-in. od.	from surface	to 277 ft.	
20-in. od.	from surface	to 400 ft.	(cemented)
16-in. od.	from 715	to 845 ft.	
12-in. id.	from 1264	to 1586 ft.	

The hole is 12 in. in diameter from 1586 ft. to the bottom.

The Driller reported that on Sept. 8, 1955, after 12 hr. pumping from Well No. 4 at a rate of 760 gpm., the drawdown was 151 ft. from a nonpumping water level of 330 ft. below the top of the casing. This followed a 12-hr. stoppage.

Analysis of a sample (Lab. No. 138790) collected Oct. 8, 1955 showed the water from Well No. 4 to have a hardness of 15. 8 gr. per gal., total dissolved minerals of 677 ppm., and an iron content of 0. 2 ppm.

Table C shows some reported water levels

in the DesPlaines wells.

Since 1940 the population of DesPlaines has increased about 200%, and since 1946 the pumpage has increased about 200%.

Pumpage for DesPlaines for the year 1956 was reported to average 2. 9 rngd. For the first four months of 1957, Jan. through Apr., reported average pumpage was nearly equal to this amount, or 2. 4 mgd.

The Higgins Water Co., a private utility, furnishes water to an area known as Orchard Place on the south side of DesPlaines, generally described as being south of Touhy, east of Maple, north of Higgins and Devon, and west of a line drawn south from the intersection of Touhy and River Road.

A well was drilled some years ago by S. B. Geiger fa Co., Chicago, and located 350 ft. N. and 2075 ft. W. of the S. E. corner of Section 33, T41N, R12E, about 2 miles south of the DesPlaines wells. The pumping equipment includes 260 ft. of 4-in. column pipe; 6-in., 29-stage Pomona turbine pump, No. SJ1055, rated at 100 gpm. at 360 ft. T.D.H.; 15-hp. General Electric motor.

Analysis of a sample (Lab. No. 147017) collected June 17, 1958 showed the water from the Higgins Well to have a hardness of 18. 6 gr. per gal., total dissolved minerals of 620 ppm., and an iron content of 0.1 ppm.

In May 1958 the Higgins Water Co. was furnishing water to 690 services, indicating a population served of approximately 2400 and an estimated average pumpage of 120, 000 gpd.

TABLE C

Date	Well	Feet to Water		Water Level MSL elevation	
		Non-pumping	Pumping	Non-pumping	Pumping
Nov. 1913	Norma	7		646	
Nov. 1913	Norma		62		591
Nov. 1942	Norma	133		520	
Nov. 1943	Norma	157		496	
Nov. 1943	Norma		299		354
Jan. 1953	Norma	271		382	
1936	City No. 2	155		497	
Dec. 1943	City No. 2	210		442	
Dec. 1943	City No. 2		395		257
Mar. 1957	City No. 2		452		201
June 1953	City No. 3	297			355
June 1953	City No. 3		380		272
June 1958	City No. 3		454		198
Mar. 1957	City No. 4		512		142
May 1957	City No. 4	390			264

LABORATORY NO. 147017

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	10. 4	
Manganese	Mn	Tr.		Fluoride	F	0. 3	
Calcium	Ca	72. 5	3. 63	Boron	B	0. 4	
Magnesium	Mg	33. 7	2. 76	Chloride	Cl	19.	.54
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 5	.01
Sodium	Na	69.	3. 01	Sulfate	SO_4	282. 8	5. 89
				Alkalinity (as	$CaCO_3$)	148.	2. 96
Turbidity		3		Hardness (as	$CaCO_3$)	319.	6. 39
Color		0					
Odor		0					
Temp. (reported)		52. 1°F		Total Dissolved Minerals		620.	

DIAMOND
Grundy County
December 7, 1960

A public water supply was installed in 1959 for the village of Diamond (250). Water is obtained from one well.

WELL NO. 1 was completed in 1959 to a depth of 723 ft. by Wehling Well Works, Beecher, and located on the State Highway near the center of the village, or approximately 70 ft. N. and 2124 ft. E. of the S. W. corner of Section 36, T33N, R8E. The ground surface elevation at the well is 565. The well was cased with 10-in. pipe from the surface to 40 ft. and with 6-in. pipe from the surface to 219 ft. (penetrating limestone), below which the hole was finished 5 7/8 in. in diameter to the bottom. The 6-in. casing was cemented in.

When the well was completed the Driller reported pumping at a rate of 65 gpm. for 8 hr. with a drawdown of 70 ft. from a nonpumping water level of 130 ft. The Driller reported the main supply of water was from the sandstone between 590 and 723 ft. depths.

A partial analysis of a sample (Lab. No. 150748) showed the water to have a hardness of 22.8 gr. per gal., total dissolved minerals of 1156 ppm., and an iron content of 0. 7 ppm.

The permanent pump is a Johnston submersible, Serial No. JO4897, set at 305 ft. and rated at 100 gpm. at 305 ft. T.D.H. Power for pumping is from a 15-hp. electric motor. A 305-ft. air line is installed.

Pumpage for Oct. 1960 averaged 14, 500 gpd.

LABORATORY NO. 150748

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Fluoride	F	0.9	
Manganese	Mn	0.1		Chloride	Cl	245.	6.91
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		5		Hardness (as	$CaCO_3$)	390.	7.80
Color		0					
Odor		0		Total Dissolved Minerals		1156.	

A public water supply was installed in 1952 for the Dise Subdivision (est. 560). The water system is owned by the Midwest-Dise Water Co. or sometimes called Midwest-Blackstone Water Co.

WELL NO. 1 was completed in 1952 to a depth of 375 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 1/2 mile southwest of LaGrange between Willow Springs and Brainard Roads, or approximately 435 ft. N. and 485 ft. W. of the S. E. corner of Section 17, T38N, R12E. The ground elevation at the well is 690. The well was cased with 8-in. pipe from the surface to 62 ft., below which the hole was finished at 8 in. in diameter.

A production test was conducted in Sept. 1952 by representatives of the Drilling Contractor and the State Water Survey. After 2 hr. pumping at a rate of 110 gpm., the drawdown was 82 ft. from a nonpumping water level of 74 ft. below the top of the casing. Subsequently, the permanent pump assembly was installed as follows: 150 ft. of 4-in. column pipe; 7-in., 17-stage Peerless turbine pump, No. 8396, rated at 110 gpm.; 10 ft. of 4-in. suction pipe; 150 ft. of air line; 10-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 146024) collected Mar. 18, 1958, after 10 min. pumping at a rate of 110 gpm., showed the water to have a hardness of 31.2 gr. per gal., total dissolved minerals of 882 ppm., and an iron content of 0. 9 ppm.

The nonpumping water level on the same date was 75 ft.

Pumpage for the year 1957 averaged 23, 500 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	60	60
SILURIAN SYSTEM		
Limestone	315	375
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale	below	

LABORATORY NO. 146024

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	12.4	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	158.4	7.92	Boron	B	0.2	
Magnesium	Mg	34.0	2.80	Chloride	Cl	20.	.56
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.0	.02
Sodium	Na	99.	4.32	Sulfate	SO_4	326.0	6.78
				Alkalinity (as	$CaCO_3$)	384.	7.68
Turbidity		4		Hardness (as	$CaCO_3$)	536.	10.72
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		882.	

Two. wells have been added to the public water supply of Downers Grove (21,154) since Bulletin 40 was published. The first five wells of the system were abandoned as reported in Bulletin 40. There are now four wells in service.

WELL NO. 6 (Lee Ave.) has been equipped with a new pump, since Bulletin 40, and includes 110 (?) ft. of column pipe; 14-in., 12-stage Aurora turbine pump, No. 77976, rated at 1200 gpm. at 280 ft. T.D.H.; 110 ft. of air line; 1500-hp. U S electric motor. (It is uncertain if the column pipe and air line are 110 ft. or 150 ft.)

Well No. 6 is in service and during July 1957 averaged 363, 000 gpd.

WELL NO. 7, (Park Ave.) described in Bulletin 40, is in service and in July 1957 averaged 843,000 gpd.

WELL NO. 8 (Burlington Ave.) was completed in 1950 to a depth of 262 ft. by Layne-Western Co., Aurora, and located 2550 ft. S. and 750 ft. E. of the N. W. corner of Section 8, T38N, RUE. Well No. 8 is about 1/4 mile north and l/2 mile west of Well No. 7, and is about 7/8 mile east of Well No. 6. The ground surface elevation at Well No. 8 is 720. The well was cased with 30-in. pipe to 85 ft., below which the hole was finished 24 in. in diameter to the bottom at 262 ft.

Before constructing the permanent well, a test well was constructed to a depth of 260 ft. A production test was made, and during pumping at 412 gpm., the drawdown was 5 ft. from a static water level of 64 ft.

The permanent pumping installation consists of 130 ft. of 10-in. column pipe; 14-in., 12-stage Aurora turbine pump, No. 51750, rated at 1500 gpm. at 280 ft. T.D.H.; 130 ft. of air line; 150-hp. U S electric motor.

In Oct. 1958, during pumping at 1425 gpm., the drawdown was 24 ft. from a nonpumping water level of 74 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 142291) collected Jan. 7, 1957 showed the water in Well No. 8 to have a hardness of 29. 2 gr. per gal., total dissolved minerals of 525 ppm., and an iron content of 0. 3 ppm.

Well No. 8 is in service and in July 1957 averaged 440,000 gpd.

WELL NO. 9 (Downer Ave.) was completed in 1956 to a depth of 300 ft. by L. Cliff Neely, Batavia, and located 1940 ft. N. and 2465 ft. E. of the S. W. corner of Section 6. This location is about 7/8 mile north and 5/8 mile west of Well No. 8. The elevation of the pump base at the well is 755. 6. The well is cased with 30-in. pipe to 130 ft., below which the hole was finished 24 in. in diameter to the bottom at 300 ft.

The permanent pumping installation consists of 190 ft. of 10-in. column pipe; 14-in., 10-stage Aurora turbine pump, No. 103044, rated at 1200 gpm. at 300 ft. T.D.H.; 190 ft. of air line; 150-hp. U S electric motor.

On Oct. 31, 1958, after 5 hr., pumping at a rate of 850 gpm., the drawdown was 76 ft. from a nonpumping water level of 109 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 148181) collected Oct. 31, 1958 showed the water in Well No. 9 to have a hardness of 21. 8 gr. per gal., total dissolved minerals of 432 ppm., and an iron content of 0. 8 ppm.

Pumpage from Well No. 9 in July 1957 averaged 440, 000 gpd.

Total pumpage for Downers Grove in 1956 averaged 1. 8 mgd.

2 - Downers Grove

LABORATORY NO. 148181

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.8		Silica	SiO_2	12.9	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	90.7	4.54	Boron	B	0.1	
Magnesium	Mg	35.2	2.90	Chloride	Cl	9.	.25
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.8	.03
Sodium	Na	12.	.51	Sulfate	SO_4	114.8	2.39
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		3		Hardness (as	$CaCO_3$)	372.	7.44
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		51.8°F		Total Dissolved Minerals		432.	

EASTON
Mason County
December 9, 1960

A public water supply was installed in 1960 for the village of Easton (361).

WELL NO. 1 was completed to a depth of 135 ft. in Mar. 1960 by Don Hatfield, Easton, and located on Park St. between Second and Third St., or approximately 15 ft. N. and 800 ft. E. of the S. W. corner of Section 25, T21N, R7W. The ground surface elevation at the well is 510. The well was cased with 8-in. steel pipe to 125 ft. followed by a 10 ft. length of 8-in. screen. An envelope of gravel was placed around the screen from the bottom up to 125 ft.

When the well was completed the Driller reported pumping for 2 1/2 hr. at a rate of 190 gpm. Casler and Stapleton, Consulting Engineers, supervised the production test.

The permanent pump is a Deming turbine, rated at 150 gpm., connected to a 5-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 153764) collected Dec. 9, 1960 showed the water to have a hardness of 16 gr. per gal., total dissolved minerals of 284 ppm., and an iron content of 2.1 ppm.

There are 140 services, all metered. Pumpage is estimated to average 20, 000 gpd.

LABORATORY NO. 153764

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 1		Silica	SiO_2	18.0	
Manganese	Mn	0. 2		Fluoride	F	0. 2	
Calcium	Ca	63. 1	3.16	Boron	B	0. 1	
Magnesium	Mg	28. 2	2. 32	Chloride	Cl	1.	.03
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.0	.02
Sodium	Na	3.	.11	Sulfate	SO_4	24. 1	.50
				Alkalinity (as	$CaCO_3$)	252.	5. 04
Turbidity		5		Hardness (as	$CaCO_3$)	274.	5. 48
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		284.	

There are 22 wells in service for the public supply of the city of East Peoria (12, 310).

In Bulletins 33 and 40, Wells No. 1-19 were described including the 14 wells at the Washington Ave. pumping station, the three Moschel St. Wells, Allison St. No. 1 Well, and one abandoned well which had not been fully developed.

WELL NO. 21 (Allison St. No. 2 Well) was completed in Aug. 1950 to a reported depth of 46 ft. by M. Ebert Co., Washington, and located about 100 ft. southwest of Allison St. No. 1 Well, or approximately 2100 ft. S. and 1850 ft. E. of the N. W. corner of Section 34, T26N, R4W. The ground surface elevation at the well is 480. The well was cased from the ground surface to 26 ft. with 10-in. id. pipe followed by 20 ft. of Johnson Everdur screen with slot sizes in sequence as follows: upper 5 ft. No. 40, next 5 ft. No. 30, next 5 ft. No. 25, and the bottom 5 ft. No. 20.

A production test was conducted on Aug. 2, 1950 by representatives of the Driller, the State Water Survey, and Crenshaw and Jost, Consulting Engineers. After 5 1/2 hr. pumping at 335 gpm., the drawdown was 7. 5 ft. from a static water level of 15 ft. Fifteen min. after the pumping was stopped, the water level had returned to 15.8 ft.

The permanent pump is a Worthington turbine, rated at 250 gpm., connected to a 25-hp, electric motor.

A mineral analysis of a sample (Lab. No. 122549) collected Aug. 2, 1950 showed the water in Well No. 21 (Allison No. 2) to have a hardness of 24.6 gr. per gal., total dissolved minerals of 536 ppm., and an iron content of 0. 3 ppm.

WELL NO. 22 (Meadows Ave. No. 1 Well) was completed in 1954 to a depth of 113 ft. by M. Ebert and Son and located on Meadows Ave. about 1 1/4 miles southeast of Well No. 21, or approximately 1000 ft. N. and 2850 ft. W. of the S. E. corner of Section 35. The ground surface elevation at the well is 530.

The well was cased with 12-in. pipe from the surface to 83 ft. 6 in. followed by 30 ft. of 12-in. screen. When the well was completed the water level was 45 ft. below the top of the casing.

The pumping equipment consists of 90 ft. of 6-in. column pipe; 10-in., 7-stage Peerless turbine rated at 500 gpm. against 225 ft. T.D.H.; 40-hp. electric motor.

WELL NO. 23 (Meadows Ave. Well No. 2) was completed in Aug. 1956 to a depth of 115 ft. by M. Ebert Co. and located about 150 ft. south of Well No. 22, or approximately 850 ft. N. and 2800 ft. W. of the S. E. corner of Section 35. The well was cased with 85 ft. of 12-in. pipe followed by 30 ft. of Johnson Everdur screen. The top 12 ft. had No. 125 slot openings, the next 10 ft. had No. 20 slots, and the bottom 8 ft. had No. 25 slots.

Sample study summary log of WELL NO. 23 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, sandy, dark brown	5	5
Silt, very gravelly, brown	5	10
Sand, fine to coarse, little silt at top	25	35
Gravel, very sandy, granular to coarse	5	40
Gravel, granular to coarse	5	45
Sand, yellowish brown, medium to coarse	10	55
Sand, very gravelly, fine to coarse	5	60
Gravel, very sandy, granular to coarse	35	95
Sand, very coarse to medium, little fine	20	115

When the well was completed the static water level was 45 ft.

The pumping equipment consists of 75 ft. of 10-in. column pipe; 10-in., 6-stage Layne and Bowler turbine, 5 1/2 ft. long and rated at 500 gpm.; 10 ft. of 6-in. suction pipe; 60-hp. General Electric motor. An air line is installed.

There are approximately 4000 services. Pumpage is reported to average 1. 68 mgd.

2 - East Peoria

LABORATORY NO. 122549

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	18.8	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	104.6	5.23	Chloride	Cl	29.	.82
Magnesium	Mg	37.9	3.12	Nitrate	NO_3	17.9	.30
Ammonium	NH_4	Tr.	Tr.	Sulfate	SO_4	129.4	2.69
Sodium	Na	17.	.74	Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		Tr.		Hardness (as	$CaCO_3$)	418.	8.35
Color		0					
Odor		0					
Temp. (reported)		53°F		Total Dissolved Minerals		536.	

EASTWOOD MANOR
SUBDIVISION
McHenry County
November 17, 1958

One well is in service for the public water supply of Eastwood Manor Subdivision (est. 380). The subdivision is operated by Eastwood Manor Water Co. and is located just east of McHenry.

WELL NO. 1 was completed in Aug. 1955 to a depth of 180 ft. penetrating limestone at 168 ft. The well was drilled by Joseph Huemann and Sons, McHenry, and located approximately 250 ft. N. and 900 ft. W. of the S. E. corner of Section 25, T45N, R8E. The ground surface elevation at the well is 770. The well was cased with 8-in. pipe from the surface to limestone at 168 ft., below which the hole was finished at 8 in. in diameter to the bottom at 180 ft.

When the well was completed, the Driller reported pumping for 10 hr. at a rate of 100 gpm. with a drawdown of 40 ft. from a static water level of 42 ft. below the top of the casing.

The pumping equipment consists of 160 ft. of 3-in. column pipe; 4-in. submersible pump, rated at 100 gpm.; 7 1/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 148179) collected Oct. 28, 1958 from storage showed the water in Well No. 1 to have a hardness of 16.9 gr. per gal., total dissolved minerals of 300 ppm., and an iron content of 0.4 ppm.

In Oct. 1958 there were reportedly 108 service connections, and eventually 350 are expected. Pumpage is estimated to average 24,000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Top soil"	8	8
"Stones and gravel (dry)"	36	44
"Clay"	118	162
"Hard pan"	6	168
SILURIAN SYSTEM		
"Limestone"	12	180
		T.D.

LABORATORY NO. 148179

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	20.0	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	60.1	3.01	Boron	B	0.1	
Magnesium	Mg	33.9	2.79	Chloride	Cl	2.	.06
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.4	.02
Sodium	Na	7.	.32	Sulfate	SO_4	9.5	.20
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		3		Hardness (as	$CaCO_3$)	290.	5.80
Color		0					
Odor		0					
Temp. (reported)		51.0°F		Total Dissolved Minerals		300.	

EDGEWOOD ACRES
Cook County
April 18, 1958

A public water supply was installed in 1953 for the Edgewood Acres Subdivision (est. 200). The system is owned by the Midwest-Wolf Water Co. Water is obtained from one well.

The SUBDIVISION WELL was drilled to a depth of 150 ft. in 1953 by J. P. Miller Artesian Well Co., Brookfield, and located on Bielby Ave. between 79th St. and 80th Place about 5 miles south of LaGrange, or approximately 540 ft. S. and 690 ft. E. of the N. W. corner of Section 32, T38N, RUE. The ground elevation at the well is 627. The well is cased with 10-in. gwi. pipe to 48 ft., below which the hole was finished 10 in. in diameter to the bottom.

A production test was conducted on Nov. 16, 1953 by the Drilling Contractor. After 3 hr. pumping at a rate of 210 gpm., the drawdown was 34 ft. from a nonpumping water level of 15 ft. below the ground level. The permanent pumping equipment includes 60 ft. of 5-in. column pipe; 7-in., 8-stage Peerless turbine pump, No. 108473, rated at 125 gpm.; 7 l/2-hp. U S electric motor.

On Mar. 18, 1958, after 4 min. pumping at a rate of 135 gpm., the drawdown was 8 ft. from a nonpumping water level of 20 ft. below the top of the casing (approximately 12 in. above the pump house floor).

A mineral analysis of a sample (Lab. No. 146379) collected Apr. 18, 1958 showed the water to have a hardness of 48. 5 gr. per gal., total dissolved minerals of 1331 ppm., and an iron content of 2. 2 ppm.

Pumpage for 1956 was reported to average 12,180 gpd.

Correlated driller's log of SUBDIVISION WELL furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	47	47
SILURIAN SYSTEM		
Limestone	103	150

LABORATORY NO. 146379

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.2		Silica	SiO_2	16.3	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	177.8	8.89	Boron	B	0.1	
Magnesium	Mg	94.2	7.75	Chloride	Cl	330.	9.31
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.7	.01
Sodium	Na	148.	6.44	Sulfate	SO_4	319.0	6.64
				Alkalinity (as	$CaCO_3$)	356.	7.12
Turbidity		17		Hardness (as	$CaCO_3$)	832.	16.64
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		1331.	

Five drilled wells and one dug well are in service for the public water supply of the village of Edinburg (1003).

WELLS NO. 1 and 2, described in Bulletin 40, were abandoned in 1953.

WELL NO. 3, described in Bulletin 40, is in service with a reported production rate of 20 gpm. It was originally planned to construct a berm around the well but recent reports indicate the well site is subject to floods from the South Fork of the Sangamon River.

A partial chemical analysis of a sample (Lab. No. 115510) collected July 29, 1948 shows the treated water from Well No. 3 to have a hardness of 14.7 gr. per gal., total dissolved minerals of 280 ppm., and an iron content of 0.1 ppm.

A DUG WELL was completed about 1948 to a depth of 50 ft. by Russell Anderson, Washington, and located within the town about 100 ft. west of the water treatment plant. The well reportedly was constructed 9 ft. in diameter and lined with brick and with a 2-in. thickness of concrete mortar on the outside of the brick lining to a depth of 12 ft.

The well is equipped with a Jacuzzi jet pump, located in the treatment plant, connected to a 2-hp. electric motor. The well is currently maintained for stand-by use and reportedly produces about 20 gpm. when in service.

The well site is subject to floods from South Fork.

WELL NO. 4 was completed about 1950 to a depth of 42 ft. and located about 300 ft. west of Well No. 3 in the South Fork flat, or approximately 60 ft. N. and 1500 ft. E. of the S. W. corner of Section 16, T14N, R3W. The natural ground surface elevation at the well is 550. The well was cased with 8-in. pipe from about 4 ft. above the natural ground surface (or 1 ft. above pump house floor) to a depth of 32 ft. followed by 10 ft. of screen to a total depth of 42 ft.

The well site is reported to be subject to floods from the South Fork. The pumping equipment includes a Jacuzzi jet pump rated at 32 gpm., connected to an electric motor.

The well is in service and currently yields about 20 gpm.

WELL NO. 5 was completed to a depth of 52 ft. in 1953 by G. C. Mashburn, Maroa, and located about 100 ft. northeast of Well No. 4. The well was cased with 8-in. pipe from 2 ft. above natural ground level to near the bottom of the well (no screen details were reported).

The pumping equipment includes a Burks jet pump with an estimated rating of 15 gpm., connected to a 1 1/2-hp. electric motor. The pump is located in the Well No. 4 pump house and the two jet lines enter the well casing about 6 or 8 ft. below ground level.

WELL NO. 6 was completed to a depth of 42 ft. in 1953 by G. C. Mashburn and located in the South Fork flat about 200 ft. west of Well No. 4, or approximately 60 ft. N. and 1300 ft. E. of the S. W. corner of Section 16. The well is cased with 6-in. pipe from 5 ft. above natural ground level to 37 ft. below, followed by 5 ft. of 5-in. screen.

The pumping equipment includes a Jacuzzi jet pump, rated at 32 gpm. but currently yielding about 20 gpm., connected to a 2-hp. Century electric motor.

WELL NO. 7 was completed to a depth of 46 ft. in 1956 by G. C. Mashburn and located in the South Fork flat about 200 ft. west of Well No. 6, or approximately 60 ft. N. and 1100 ft. E. of the S. W. corner of Section 16. Construction is similar to that of Well No. 6. The casing top is about 7 ft. above natural ground level and was reportedly about 1 ft. above the June 1957 flood in South Fork.

The pumping equipment includes a Jacuzzi turbine pump rated at 30 gpm., connected to a 2-hp. electric motor.

The pumps of all wells are manual control. There are 400 services, 60% of which are metered.

Pumpage is estimated to average 40,000 gpd.

2 - Edinburg

LABORATORY NO. 115510

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Fluoride	F	0.3	
				Chloride	Cl	5.	.14
				Alkalinity (as	$CaCO_3$)	220.	4.40
Turbidity		0		Hardness (as	$CaCO_3$)	252.	5.04
Color		0		Total Dissolved Minerals		280.	
Odor		0		Free CO_2 (calc.)		59.	
Temp. (reported)		72°F		pH = 6.9			

EDWARDSVILLE
Madison County
May 14, 1958

Three wells are in service for the public supply of the city of Edwardsville (9996).

WELL NO. 1, which is described in Bulletin 40, has been abandoned and filled.

WELL NO. 2 is described in Bulletin 40. In Sept. 1951 it was reported that when this well was pumping, the drawdown in Well No. 1, which was 75 ft. north, was 8 in. and there was no drawdown in Well No. 3, which was 175 ft. west of Well No. 2.

WELL NO. 3, described in Bulletin 40, is in service.

WELL NO. 4 was completed in May 1953 to a depth of 116.5 ft. by Harold Watson, East St. Louis, and located 103 ft. southeast of Well No. 3, or approximately 1975 ft. N. and 575 ft. W. of the S. E. corner of Section 13, T4N, R9W. The ground surface elevation at the well is 438. 8. The well was cased with 76 ft. 4 in. of 16-in. pipe followed by 42 ft. 2 in. of Johnson screen (2 ft. overlap).

The pumping equipment consists of 52 ft. of 9-in. column pipe; Aurora turbine pump, 3 ft. long; air line; 21 ft. of 10-in. suction pipe; electric motor,

A production test was conducted by the Driller on May 14, 1958. After 2 hr. pumping at a rate of 690 gpm., the drawdown was 16 ft. from a nonpumping water level of 26. 5 ft. below the top of the casing (1 ft. above ground level).

A mineral analysis of a sample (Lab. No. 146647) collected May 14, 1958, after 2 hr. pumping, showed the water in Well No. 4 to have a hardness of 14. 5 gr. per gal., total dissolved minerals of 315 ppm., and an iron content of 2.1 ppm.

Pumpage is reported to average 0. 5 mgd.

LABORATORY NO. 146647

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 1		Silica	SiO_2	35. 0	
Manganese	Mn	0. 2		Fluoride	F	0. 1	
Calcium	Ca	63. 8	3.19	Boron	B	0. 0	
Magnesium	Mg	18. 2	1. 50	Chloride	Cl	6.	.17
Ammonium	NH_4	0. 5	.03	Nitrate	NO_3	1. 2	.02
Sodium	Na	7.	.30	Sulfate	SO_4	51. 2	1. 07
				Alkalinity (as	$CaCO_3$)	188.	3. 76
Turbidity		6		Hardness (as	$CaCO_3$)	235.	4. 69
Color		0					
Odor		M					
Temp. (reported)		58. 5°F		Total Dissolved Minerals		315.	

ELGIN
Kane County
July 29, 1960

Eight wells are in service for the city of Elgin (49, 447). Two other wells are available for service. The wells ordinarily in regular service are: Slade Ave. Wells No. 1-6 inclusive, St. Charles St. Well No. 3, and LaVoie Ave. Well. However, due to rehabilitation work, Slade Ave. Wells No. 1 and 3 are currently out of service.

The North State St. Well and Crighton Ave. Well are available for service, but are used only during summer at times of peak demand.

The shallow well formerly known as No. 5 at the Slade Ave. plant is equipped with a pump but the well is not used.

St. Charles St. Well No. 2 and Shuler St. Well are open but not used.

All other wells mentioned in Bulletin 40 have been abandoned.

WELL NO. 1 of the Slade Ave. group, described in Bulletin 40 and located 1250 ft. S. and 1300 ft. W. of the N. E. corner of Section 11, T41N, R8E, is being rehabilitated by S. B. Geiger & Co., Chicago, and when completed will be cased with 20-in. pipe from the surface to 125 ft. and with 16-in. pipe from the surface to 160 ft. (cemented), below which the hole will be finished 16 in. in diameter to 800 ft. and 6 in. in diameter from 800 to 1945 ft.

The elevation of the top of the pump base is 740. 67. Well No. 1 will be in regular service when rehabilitated.

WELL NO. 2 of the Slade Ave. group, described in Bulletin 40, is located 1100 ft. S. and 1200 ft. W. of the N. E. corner of Section 11. The well, drilled in 1904 to a depth of 1965 ft., was rehabilitated by S. B. Geiger & Co. in 1959 and measured 1935 ft. deep. The elevation of the top of the pump base is 743. 33. The well is now reportedly cased with EO-in. pipe from the surface to 125 ft. and with 16-in. pipe from the surface to 160 ft. (cemented), below which the hole is 16 in. in diameter to 800 ft. and 6 in. in diameter from 800 to 1935 ft.

The pumping equipment consists of 500 ft. of 8-in. column pipe; 12-in., 17-stage Aurora turbine pump rated at 1000 gpm. against 390 ft. T.D.H.; 500 ft. of air line; 150-hp. U S electric motor.

On June 19, 1960, when pumping at a rate of 790 gpm., the drawdown was 60 ft. from a nonpumping water level of 328 ft. below the pump base.

Well No. 2 is in regular service.

WELL NO. 3 of the Slade Ave. group, described in Bulletin 40, is located approximately 1000 ft. S. and 1100 ft. W. of the N. E. corner of Section 11. The well was completed in 1904 to a depth of 1880 ft. The elevation of the pump base is 744.88.

The pumping equipment consists of 400 ft. of 8-in. column pipe; 12-in., 17-stage Aurora turbine pump, rated at 1000 gpm. against 390 ft. T.D.H.; 400 ft. of air line; 150-hp. U S electric motor.

On June 19, 1960 the nonpumping water level was 320 ft. below the pump base. Well No. 3 is out of service pending rehabilitation by S. B. Geiger & Co.

WELL NO. 4 of the Slade Ave. group, described in Bulletin 40, was completed in 1904 to a depth of 1880 ft. and located 800 ft. S. and 850 ft. W. of the N. E. corner of Section 11. The elevation of the pump base is 740.11.

The well was rehabilitated in Oct. 1954. The casing and hole sizes are shown in Table A.

TABLE A

Casing Size

30-in.	drive pipe	from surface to 46 ft.
25-in.	casing	from surface to 146 ft. (cemented)
20-in.	casing	from surface to 275 ft. (cemented)

Hole Size

20-in.	from 275 ft. to 501 ft.
1 5-in.	from 501 ft. to 792 ft.
8-in.	from 792 ft. to 1898 ft.

On Jan. 24, 1957, after 18 hr. pumping at a rate of 1000 gpm., the drawdown was 60 ft. from a nonpumping water level of 265 ft.

A partial analysis of a sample (Lab. No.

149552) collected May 6, 1959, after 3 1/2 hr. pumping at 915 gpm., showed the water in Well No. 4 to have a hardness of 15.7 gr. per gal., total dissolved minerals of 335 ppm., and an iron content of 0.1 ppm.

On Apr. 20, 1960 the well was equipped with 500 ft. of 8-in. pipe; 12-in., 17-stage Aurora turbine pump, rated at 100 gpm. against 390 ft. T.D.H.; 500 ft. of air line; 150-hp. U S electric motor.

On June 19, 1960, during pumping at 1038 gpm., the drawdown was 52 ft. from a nonpumping water level of 318 ft. The well is in regular service.

WELL NO. 5 of the Slade Ave. group, was completed in Sept. 1949 to a depth of 1255 ft. by Layne-Western Co., Aurora, and located 1500 ft. S. and 1450 ft. W. of the N. E. corner of Section 11. The elevation of the ground surface at the well is 740. A 28-in. od. drive pipe was set from the surface to 50 ft. A 22-in. od. casing was set from the surface to 125 ft. and the annulus between the two pipes was pressure grouted.

On Sept. 22, 1949, after 5 hr. pumping at a rate of 1300 gpm., the drawdown was 220 ft. from a nonpumping water level of 100 ft. below the pump base.

The pumping equipment includes 450 ft. of column pipe; 14-in. Aurora turbine pump, No. 43748, rated at 1400 gpm. at 400 ft. T.D.H.; an air line 450 ft. long; 200-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 124959) collected from Well No. 5 showed the water to have a hardness of 15.2 gr. per gal., total dissolved minerals of 339 ppm., and an iron content of 0.1 ppm.

Well No. 5 is in regular service.

WELL NO. 6 of the Slade Ave. group, was completed in Mar. 1958 to a depth of 1300 ft. by L. Cliff Neely, Batavia, and located approximately 1700 ft. S. and 1500 ft. W. of the N. E. corner of Section 11. The ground surface elevation at the well is 740. The well was cased with 26-in. drive pipe from the surface to 54 ft. and with 20-in. pipe from the surface to 293. 5 ft. (cemented), below which the hole was finished 19 in. in diameter to the bottom at 1300 ft.

When pumping at a rate of 1503 gpm., the drawdown was 37 ft. from a nonpumping water level of 407 ft. below the pump base.

The pumping equipment includes 500 ft. of 10-in. column pipe; 14-in., 7-stage Byron Jackson submersible pump, rated at 1500 gpm. at 500 ft. T.D.H.; 500 ft. of air line; 250-hp. electric motor.

Well No. 6 is in regular service.

WELL NO. 3, at St. Charles St. station, was completed in 1953 to a depth of 1255 ft. by L. Cliff Neely, and located about 500 ft. west of St. Charles St. Well No. 2, or approximately 750 ft. N. and 1550 ft. W. of the S. E. corner of Section 24, T41N, R8E. The ground surface elevation at the well is 728. The well was cased with 26-in. drive pipe from the surface to an unreported depth and with 20-in. pipe from the surface to 315 ft. (pressure grouted with 375 bags of cement). Below 315 ft. the hole was finished 20 in. in diameter to 1040 ft. and 15 l/4 in. in diameter to the bottom at 1255 ft.

In Nov. 1953 six charges of nitroglycerine were exploded as shown in Table B.

TABLE B

Charge qt.	Depth ft.
420	1225
100	858
120	807
100	747
100	646
100	596

By Feb. 2, 1954 about 300 cu. yd. of sandstone had been removed from the well since the shooting on the previous Nov.-Dec. On Mar. 12, 1954 a production test was conducted by the Driller and City officials. After 48 hr. pumping at a rate of 1438 gpm., the drawdown was 188 ft. from a nonpumping water level of 192 ft.

A mineral analysis of a sample (Lab. No. 134205) collected Mar. 19, 1954 showed the water in St. Charles St. Well No. 3 to have a hardness of 14.9 gr. per gal., total dissolved minerals of 337 ppm., and an iron content of 0. 3 ppm.

The pumping equipment consists of 500 ft. of 10-in. column pipe; Aurora turbine pump, rated at 1000 gpm. against 390 ft. T.D.H.; 150-hp. U S

electric motor.

On May 30, 1960, when pumping at 1100 gpm., the drawdown was 100 ft. from a nonpumping water level of 285 ft. below the pump base.

Well No. 3 at the St. Charles St. station is in regular service.

LA VOIE AVE. WELL, described in Bulletin 40, is equipped with 360 ft. of 8-in. column pipe; 12-in., 6-stage American Well Works turbine pump, rated at 750 gpm. against 360 ft. T.D.H.; 20 ft. of 8-in. suction pipe; 360 ft. of air line; 100-hp. Westinghouse electric motor.

The LaVoie Ave. Well is in regular service.

The NORTH STATE ST. WELL and CRIGHTON AVE. WELL, available for service, are described in Bulletin 40.

The ST. CHARLES ST. WELL NO. 2 and the SHULER ST. WELL, both open but not used, are described in Bulletin 40.

Pumpage for the city of Elgin for the year 1959 averaged 4. 35 mgd.

LABORATORY NO. 134205

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	6.9	
Manganese	Mn	0.2		Fluoride	F	0.5	
Calcium	Ca	60.8	3.04	Boron	B	0.2	
Magnesium	Mg	24.7	2.03	Chloride	Cl	5.	.14
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.2	Tr.
Sodium	Na	26.	1.13	Sulfate	SO_4	7.4	.15
				Alkalinity (as	$CaCO_3$)	300.	6.00
Turbidity		2		Hardness (as	$CaCO_3$)	254.	5.07
Color		0					
Odor		0		Total Dissolved Minerals		337.	

ELK GROVE VILLAGE
Cook County
August 20, 1958

A public water supply was installed for the village of Elk Grove (6608) in 1957 under the name of Elk Grove Water and Sewer Co., Inc. The Centex Construction Co. has a large subdivision planned and construction is underway. About 500 or 600 homes are now completed, and reportedly a population of several thousand people is expected. In addition to the residential development, the plans include "Centex Industrial Park," an industrial area on Busse Road south of Lindmeier Road. A shopping center is being constructed. Water is obtained from two wells.

WELL NO. 1 was completed in 1957 to a depth of 1415 ft. by Layne-Western Co., Aurora, and located in the center of the housing project, or approximately 860 ft. N. and 660 ft. W. of the S. E. corner of Section 21, T41N, R11E. The ground elevation at the well is 710. The well was cased with 20-in. drive pipe from the surface to 119 ft. and with 16-in. pipe from the surface to 495 ft. The bore hole was 19 1/2 in. in diameter to 495 ft. and finished at 15 1/2 in. in diameter from 495 ft. to the bottom. The annulus outside the 16-in. casing was filled with cement from 495 ft. to the surface.

In a production test by the Drilling Contractor, July 19, 1957, the drawdown was 98 ft. from a nonpumping water level of 430 ft. below the top of the casing after 20 hr. pumping at a rate of 1147 gpm.

The permanent pumping equipment ins tailed about Nov. 1957 includes 550 ft. of 8-in. column pipe; 12-in., 11-stage Layne and Bowler turbine pump, 10 ft. 7 in. in length and having a rated capacity of 1000 gpm. at 1770 rpm.; 10 ft. of 8-in. suction pipe; 250-hp. electric motor.

A partial analysis of a sample (Lab. No. 144970) collected in Nov. 1957 showed the water to have a hardness of 19. 2 gr. per gal., total dissolved minerals of 526 ppm., and an iron content of 0. 2 ppm.

WELL NO. 2 was completed in Apr. 1958 to a depth of 1395 ft. by Layne-Western Co. and located on Busse Road near the Industrial Park, or approximately 100 ft. N. and 200 ft. E. of the S. W. corner of Section 26, T41N, RUE. The ground elevation at the well is 682.

The well was cased with 20-in. steel pipe, 3/8 in. thickness, from the surface to 101 ft. and with 16-in. steel pipe from the surface to 458 ft. A12-in. steel liner (0. 33 in. thickness) was setbetween 1091 and 1211 ft. The bore hole was 19 1/2 in. in diameter from the surface to 458 ft. and 15 1/2 in. in diameter from 458 to 1211 ft. From 1211 to 1395 ft. the hole was finished 12 in. in diameter. The 16-in. casing was pressure grouted in the 19 l/2-in. hole from the surface to 458 ft.

In a production test by the Driller on Apr. 2-3, 1958 the drawdown was 135 ft. from a nonpumping water level of 400 ft. below the top of the casing after 24 hr. pumping at a rate of 1033 gpm.

The permanent pump, installed about May 1958, includes 600 ft. of 10-in. column pipe; 12-in., 12-stage Layne and Bowler turbine pump, No. 38881, having an over-all length of 11 ft. 10 in. and rated at 1350 gpm. at 1770 rpm.; 10 ft. of 10-in, suction pipe; 300-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146377) collected in Apr. 1958, after 24 hr. pumping at a rate of 1033 gpm., showed the water in Well No. 2 to have a hardness of 19.2 gr. per gal., total dissolved minerals of 481 ppm., and an iron content of 0.1 ppm.

Pumpage for the 600 homes is estimated to average 120,000 gpd.

Pumpage will be increased considerably as the industries begin operation.

LABORATORY NO. 146377

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	8.7	
Manganese	Mn	0.0		Fluoride	F	0.9	
Calcium	Ca	89.4	4.47	Boron	B	0.4	
Magnesium	Mg	26.5	2.18	Chloride	Cl	21.	.59
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	0.5	.01
Sodium	Na	47.	2.03	Sulfate	SO_4	124.2	2.59
				Alkalinity (as	$CaCO_3$)	276.	5.52
Turbidity		0		Hardness (as	$CaCO_3$)	332.	6.65
Color		0					
Odor		0		Total Dissolved Minerals		481.	

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil	3	3
Till, yellowish-buff	11	14
Till, gravelly, brown	34	48
Sand, gravelly, very fine to fine	7	55
Gravel, very coarse, sand at base	15	70
Sand, very gravelly, fine to medium	10	80
Gravel, very coarse, sandy	19	99
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to light gray, very fine to fine	76	175
Alexandrian Series		
Dolomite, light buff to buff, very fine to fine	40	215
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, brown, light gray, weak; dolomite, buff to brown	224	439
Galena Formation		
Dolomite, buff, gray, brown, fine to medium	171	610
Decorah Formation		
Dolomite, buff, gray; trace of shale	27	637
Platteville Formation		
Dolomite, gray, buff, very fine to medium; limestone, buff, very fine	123	760
Glenwood Formation		
Sandstone, white, fine to medium incoherent; little shale, green, brittle at base	55	815
St. Peter Formation		
Sandstone, white to light gray, incoherent	230	1045
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, light buff, very fine to fine; shale, reddish brown at base	70	1115
Franconia Formation		
Dolomite, light gray; sandstone, light brown, incoherent; shale, gray, weak	90	1205
Ironton-Galesville Formations		
Sandstone, light gray, very coarse to medium, incoherent	166	1371
Eau Claire Formation		
Sandstone, pinkish-brown, very fine to medium; little shale at base	24	1395

ELLIS GROVE
Randolph County
July 9, 1956

A public water supply was installed in 1956 for the village of Ellis Grove (218).

WELL NO. 1 was completed in 1956 to a depth of 86 ft. by Layne-Western Co., Kirkwood, Mo., and located in the Mississippi bottomland about 1 3/4 miles southwest of town, or approximately 100 ft. N. and 2400 ft. W. of the S. E. corner of Section 24, T6S, R8W. The ground surface elevation at the well is 380. The well was cased with 26-in. steel pipe, cemented in a 34-in. hole, from the surface to 20 ft., below which the hole was finished 26 in. in diameter to the bottom at 86 ft. An 8-in. steel casing was set from the surface to 76 ft. followed by 10 ft. of 8-in. stainless steel screen. The 8-in. and 26-in. casings were extended to 15 ft. above L. S. D. and an envelope of Meramec gravel was placed around the 8-in. screen and casing.

A production test was conducted by representatives of the Driller, the State Water Survey, Rochester and Goodell, Consulting Engineers, and the Village officials. After 6 hr. pumping at a rate of 80 gpm., the drawdown was 26 ft. from a static water level of 19 ft.

The Driller reported that the well was developed by surge pumping and Weltone treatment at capacities up to 130 gpm. with 64 ft. pumping level.

A partial chemical analysis of a sample (Lab. No. 140960) collected July 9, 1956, after 6 hr. pumping at 80 gpm., showed the water in Well No. 1 to have a hardness of 19.3 gr. per gal., total dissolved minerals of 365 ppm., turbidity of 19 ppm., and an iron content of 5.4ppm.

Pumpage is estimated to average 10,000 gpd.

A well, INDIAN FARM TEST WELL NO. 1, was drilled for E. E. Brands in 1955 to a depth of 210 ft. by Braun Drilling Co., Red Bud. The well was located about 1 mile west of Ellis Grove Well No. 1, or approximately 1600 ft. N. and 1800 ft. E. of the S. W. corner of Section 23, T6S, R8W. The ground surface elevation at the well is 378.

Sample study summary and correlated driller's log of INDIAN FARM TEST WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Top soil"	30	30
"Silt, sand"	90	120
"Sand, coarse (fine streaks)"	19	139
"Blue shale, sandy"	5	144
MISSISSIPPIAN SYSTEM		
Point Creek Formation		
"Red shale"	23	167
Yankeetown Formation		
Chert, sandy	18	185
Renault Formation		
Limestone, cherty, light gray, gray, little green	6	191
Shale, medium, dark greenish gray	9	200
"Blue shale"	10	210

LABORATORY NO. 140960

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	5.4		Fluoride	F	0.1	
				Chloride	Cl	8.	.23
				Nitrate	NO_3	0.2	Tr.
				Alkalinity (as	$CaCO_3$)	324.	6.48
Turbidity		19		Hardness (as	$CaCO_3$)	332.	6.64
Color		0					
Odor		0		Total Dissolved Minerals		365.	

ELMHURST
DuPage County
August 6, 1958

Water for the city of Elmhurst (36,991) is furnished from six wells. Wells No. 1, 2, 3, 4 and 5 are described in Bulletin 40. Well No. 6 has been added since Bulletin 40 was published.

Rehabilitation of WELL NO. 1 was started in Mar. 1951 by J. P. Miller Artesian Well Co., Brookfield. Holes were found in the pump column and in the casing, the latter hole at about 180 ft. depth. The 13-in. casing was pulled, repaired, and replaced with the bottom set on a shoulder at 476 ft. The 13-in. casing was cemented in a 15-in. hole by the Holland Co. using about 350 bags of cement. The well had been cleaned out to 1483 ft. depth. When the work was started the static water level was 385. 6 ft., and in July 1951 after completion of the work, the water level was 379. 5 ft.

A new 9-stage Peerless pump was installed on 520 ft. of 8-in. column pipe; 520 ft. of air line; 20 ft. of suction pipe; 200-hp. electric motor.

Well No. 1 was rehabilitated again in Oct. 1955 by J. P. Miller Artesian Well Co. Three shots of nitrogengel, totaling 800 lb., were exploded between depths of 1415 and 1435 ft. Very little sand was removed after the shots. The depth to water in the well on Oct. 13 was 503 ft.

The pumping equipment installed included a Peerless turbine pump, rated at 1000 gpm., set at 650 ft.; 20 ft. of suction pipe; 200-hp. U S electric motor. On Feb. 10, 1956, during pumping at 700 gpm., the drawdown was 16 ft. from a static water level of 456 ft. In May 1958 the drawdown was reported to be 36 ft. from a nonpumping water level of 458 ft.

In Oct. 1952 the pump in WELL NO. 2 became locked and the shaft could not be rotated. J. P. Miller Artesian Well Co. removed the pump for repair. A hole in the casing at about 78 ft. was reportedly not repaired. The depth to water measured 323 ft. The well was returned to service in Dec. 1952.

Well No. 2 was shot at several depths in Oct. 1955 but very little sand was removed afterwards. The pumping equipment, installed at the time, included a Peerless turbine pump, rated at 1000 gpm. at 650 ft. T. D.H., and set at 600 ft. Power is furnished by a 250-hp. General Electric motor. In Mar. 1956, during pumping at 1100 gpm., the drawdown was 9 ft. from a nonpumping water level of 385 ft.

Original Well No. 3, now known as Old Well No. 3, has been abandoned and filled in. WELL NO. 3 was originally called 3-A but renumbered as Well No. 3 after Old Well No. 3 was abandoned. J. P. Miller Artesian Well Co. cleaned out the well in Mar. 1950 by removing about 140 ft. of fill from the bottom of the well. In Apr. 1950 the pumping equipment was installed as follows: 560 ft. of 10-in. column pipe; 12-in., 9-stage Peerless turbine pump, No. 76821, rated at 1000 gpm. and 9 1/2 ft. long; 10 1/2 ft. of 8-in. suction pipe with strainer; 560 ft. of 1/4-in. brass air line; 250-hp. General Electric motor. On Apr. 21, 1950 the static water level was 391 ft. and the pumping water level was 500 ft.

In Feb. 1957 some repair work was started on the pump in Well No. 3 by J. P. Miller Artesian Well Co. After the repairs the pump was reinstalled at a setting of 690 ft. The well was returned to service in May 1957.

Due to complaints from customers that the water from WELL NO. 4 contained hydrogen sulfide, quality tests were made by the State Water Survey. Table A shows the results of partial analyses made on eight samples of water collected on Mar. 6, 1953 from Well No. 4, while pumping at a rate of 1000 gpm. Before the tests were started, the pump had been idle for 16 1/2 hr. and the static water level was 140 ft.

At the end of 2 hr. pumping the drawdown was 78 ft.

WELL NO. 5 was rehabilitated in Oct. - Dec. 1955 by J. P. Miller Artesian Well Co. Three shots of 256 lb. each of nitrogengel and 8 lb. of 60% dynamite primer were exploded between depths of 1405 and 1425 ft. Before the shooting, the well was sounded and found to have about 14 ft. of fill. After the shooting, the well was cleaned out to its original depth of 1474 ft. The depth to water in the well was reportedly 495 ft. after it was cleaned out. A new pump was installed and now includes 710 ft. of 10-in. column pipe; 11 l/2-in., 14-stage Peerless bronze turbine pump (No. 11501), 12 ft. 8 in. long; 22 ft. of 10-in. suction pipe; two 710-ft. air lines, one of brass and one of carlon tubing; the old 250-hp. U S electric motor was used.

In Aug. 1958 the pumping water level was reported at 645 ft. while pumping at 1050 gpm., and Well No. 5 together with Well No. 1 was reportedly supplying most of the water.

WELL NO. 6 was completed in Oct. 1953 to a depth of 1476 ft. by J. P. Miller Artesian Well Co. and located at Milton and Walnut St., more than 2 miles northwest of Well No. 5, or approximately 2590 ft. S. and 2430 ft. E. of the N. W. corner of Section 35, T40N, R11E. The ground elevation at the well is 700.

The well was cased with 28-in. od. pipe from the surface to 111 ft. and with 20-in. od. pipe from the surface to 484 ft. 7 in., below which the hole was finished 19 l/4 in. in diameter to 1185 ft. and 15 1/4 in. in diameter from 1185 ft. to the bottom at 1470 ft. The annulus outside the 20-in. casing was filled with 800 bags of cement and 25 bags of bentonite.

During the development of the well, four shots were exploded at equal spacing between 1417 ft. and 1360 ft. depth. Each charge consisted of 342 lb. of 100% nitrogengel and 7 lb. of 60% dynamite primer used in a 10-ft. by 10-in. galvanized shell. Several truck loads of sand were removed following the shots.

A production test was conducted onNov. 2, 1953 by representatives of the Driller and the State Water Survey. A 13 l/2-in., 6-stage Peerless turbine test pump, 7 1/2 ft. in length was set on 550 ft. of 10-in. column pipe; 10 ft. of 10-in. suction pipe; 550 ft. of plastic air line; two gasoline engines, bolted together, and rated 250 hp. After 24 hr. pumping at a final rate of 1165 gpm., the drawdown was 83 ft. from a nonpumping water level of 466 ft. below the top of the casing (2 ft. above ground level). Following the test, the recovery was slow. At 17 min. the water level had recovered to 500 ft. below the top of the casing.

In Mar. 1957 the pumping equipment being installed in Well No. 6 included 680 ft. of 10-in. column pipe; 12-in., 12-stage Layne and Bowler turbine pump, 11 ft. 4 in. long; 20 ft. of 8-in. suction pipe; 680 ft. of plastic air line; 300-hp. electric motor.

A mineral analysis of a sample (Lab. No. 133385) collected Nov. 3, 1953, after 22 hr. pumping at rates 520 to 1370 gpm., showed the water in Well No. 6 to have a hardness of 17. 6 gr. per gal., total dissolved minerals of 474 ppm., and an iron content of 0. 4 ppm.

Table B shows the depth to water (nonpumping level) in the Elmhurst wells for the years 1915-1957.

Pumping water levels in Aug. 1957 are shown in Table C.

Pumpage for the Elmhurst wells in Aug. 1957 are shown in Table D.

Total pumpage for all Elmhurst wells July-Dec. 1957 amounted to 594. 94 mg. averaging 3. 24 mgd.

TABLE A

Time	Depth to Water ft.	Temp. °F	Turb.	Fe	Cl	NO_3	SO_4	Alk.	Hd.	TDM
A. M.			Pump started - water discharging							
8:20	410									
8:24										
8:26	468	57.2°	Tr.	.9	87.	.5	65.4	272	268	530
8:30	471	58. 1°	Tr.	.8	69.	.3	67. 1	272	252	495
8:33	474	58. 4°	Tr.	.4	69.	.5	67.7	272	260	502
8:43	477	58. 9°	Tr.	.3	88.	.2	71. 0	268	264	525
8:54	480	58. 9°	Tr.	.3	85.	.7	72. 8	272	268	530
9:20	483	58. 9°	Tr.	.3	87.	.4	71. 2	272	268	534
9:50	485	58. 9°	Tr.	.3	87.	.4	71. 4	268	268	531
10:24	487. 5	59. 0°	Tr.	.3	86.	.6	73. 2	268	268	525

"These analyses show the samples to be generally similar in mineral character. There is some indication that a very small amount of water having a relatively low

hardness, low chloride, and low sulfate content may be entering the well during the idle period as well as during the pumping period. This is evidenced by the samples collected at 8:30 and 8:33 when a slight difference in general mineral composition is indicated. This difference in mineral composition may be due to the entrance of water from the Galena-Platteville Formation at a very low rate. "

TABLE B

Well No.	1	2	3	4	5	6
Surface Elev.	678	686	690	669	677	
Depth	1480	1930	1502	1390	1480	1476
Aquifer	ss	ss	ss	ss	ss	ss
Date			Depth to Water in Feet			
1915	25					
1918	35					
1923		62				
1924	62	66				
1925	300					
1926		300	138			
			242			
1927		130				
1928		72		135		
		135				
1936	80					
	265					
1937				85		
				325		
1938				255		
1940					280	
1941					278	
1942	286				282	
1943			346			
			380			
1944	364	315			353	
1947	364			347	356	
	374				368	
1948				350		
				365		
1950	368					
1951	386					
1952		323				
1953				410		465
1954			440		438	
					448	
1955	503	495				
1956	456	385	500	486	490	556
					495	
1957			528			

4 - Elmhurst

TABLE C

Well No.	Depth to Water ft.
1	574
2 -	
3 -	
4	570
5	662
6	578

TABLE D

Well No.	Pumpage mg.
1	11.79
2	9.07
3	13.75
4	4.98
5	49.05
6	8.08
Total	96. 72

LABORATORY NO. 133385

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	1.5	
Manganese	Mn	0.0		Fluoride	F	0.9	
Calcium	Ca	76.7	3.84	Chloride	Cl	21.	.59
Magnesium	Mg	26.8	2.20	Nitrate	NO_3	2.7	.04
Ammonium	NH_4	Tr.	Tr.	Sulfate	SO_4	109.0	2.27
Sodium	Na	57.	2.46	Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		4		Hardness (as	$CaCO_3$)	302.	6.04
Color		0					
Odor		0					
Temp. (reported)		58.2°F		Total Dissolved Minerals		474.	

ELMWOOD
Peoria County
April 1, 1959

Two wells are in service for the public supply of the city of Elmwood (1882).

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2, described in Bulletin 40, was retired due to inadequate yield.

WELL NO. 3 was completed in May 1951 to a depth of 1572 ft. by Layne-Western Co., Aurora, and located about 40 ft. south and 25 ft. west of Well No. 2 (shallow sand and gravel well), or approximately 2175 ft. N. and 1925 ft. E. of the S. W. corner of Section 7, T9N, R5E. The ground surface elevation at the well is 640. The well was cased with 10-in. pipe from the surface to 688 ft. and with 8-in. pipe from 688 to 1121 ft., swedge connection and pressure cemented throughout.

A production test' was conducted on May 15, 1951 by representatives of the Driller, the State Water Survey, City officials, and Austin Engineering Co., Consulting Engineers. After 24 hr. pumping at 260 gpm., the drawdown was 171 ft. from a static water level of 115 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 125277) collected May 16, 1951, after 24 hr. pumping at a rate of 260 gpm., showed the water in Well No. 3 to have a hardness of 19. 9 gr. per gal., total dissolved minerals of 1513 ppm., and an iron content of 0. 5 ppm.

The pumping equipment consists of 340 ft. of 10-in. column pipe; 6-stage Byron Jackson submersible pump, rated at 300 gpm.; 337 ft. of copper air line; 20-hp. electric motor.

There are approximately 550 meters. Pumpage is reported to average 125, 000 gpd.

LABORATORY NO. 125277

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 5		Silica	SiO_2	14. 9	
Manganese	Mn	0. 0		Fluoride	F	2. 8	
Calcium	Ca	84. 9	4. 25	Chloride	Cl	215.	6. 06
Magnesium	Mg	31. 0	2. 55	Nitrate	NO_3	0. 2	Tr.
Ammonium	NH_4	1. 6	. 09	Sulfate	SO_4	647. 7	13. 48
Sodium	Na	390.	16. 97	Alkalinity (as	$CaCO_3$)	216.	4. 32
Turbidity		Tr.		Hardness (as	$CaCO_3$)	340.	6. 80
Color		0					
Odor		0					
Temp. (reported)		76. 8°F		Total Dissolved Minerals		1513.	

Summary sample study log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
No samples	21	21
Gravel to 1/2 in., clean	3	24
No samples	51	75
Gravel to 1/2 in., clayey, gray; little till, silty, gray	20	95
PENNSYLVANIAN SYSTEM		
Shale, dark gray, black, grayish brown; limestone yellowish brown to green, fine (105-125)	290	385
MISSISSIPPIAN SYSTEM		
Burlington Formation		
Chert, weak, dense	20	405
Limestone, cherty, light yellow gray, fine to coarse	40	445
Kinderhook Formation		
Shale, grayish green to grayish brown, firm to weak (no samples from 680'-690')	245	690
Dolomite, yellowish gray to yellowish brown, fine to coarse	25	715
DEVONIAN SYSTEM		
Cedar Valley-Wapsipinicon Formations		
Limestone, yellowish gray, fine	35	750
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite, light yellowish gray, fine to coarse; shale grayish brown to brown, weak to firm at base	258	1008
Edgewood Formation		
Dolomite, pale yellowish brown, fine to coarse	12	1020
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, dark brown, fine to medium; shale, dark brown, firm to weak	95	1115
Galena-Platteville Formations		
Dolomite, pale grayish brown, fine to coarse	315	1430
Glenwood-St. Peter Formations		
Sandstone, light gray, fine to coarse, incoherent	132	1562
Shakopee Formation		
Sandstone, white, fine to coarse, incoherent; dolomite, light yellowish gray to green, very fine	10	1572

EL VISTA SUBDIVISION
Cook County
October 28, 1960

Two wells are in service for the El Vista Subdivision public water supply, installed inl959. The system is owned and operated by Medema Builders, Inc.

WELL NO. 1 was completed in July 1959 to a depth of 140 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 1/2 mile west of Oak Forest, or approximately 1263 ft. N. and 250 ft. E. of the S. W. corner of Section 9, T36N, R13E. The ground elevation at the well is 672. The well was cased with 4-in. pipe to limestone at 51 ft.

The well was acidized with 26 gal. of HC1 and is equipped with 110 ft. of 2 l/2-in. column pipe; Peerless turbine pump; 5-hp. U S electric motor.

WELL NO. 2 was completed in Dec. 1959 to a depth of 1701 ft. by J. P. Miller and located 1263 ft. N. and 500 ft. E. of the S. W. corner of Section 9. The well was cased with 16-in. pipe from the surface to 60 ft. and 14-in. pipe from the surface to 599 ft. (cemented in using 190 bags of cement). A 10-in. gwi. liner was set from 1074 to 1324 ft., below which the hole was finished 10 in. in diameter to the bottom.

A production test was conducted by the Driller on Dec. 10-11, 1959. After 24 hr. pumping at 910 gpm., the drawdown was 85 ft. from a nonpumping water level of 476 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 151182) collected Dec. 11, 1959, after 12 hr. pumping at rates of 800 to 900 gpm., showed the water in Well No. 2 to have a hardness of 31 gr. per gal., total dissolved minerals *oi* 1155 ppm., and an iron content of 1. 9 ppm.

The permanent pumping equipment consists of 600 ft. of 8-in. column pipe; 12-in., 13-stage Peerless turbine pump, No. 134864, all bronze bowls and rated at 850 gpm. against 690 ft. T.D.H.; 10 ft. of 8-in. suction pipe with strainer; 600 ft. stainless steel air line; 250-hp. Ideal polyphase electric motor.

Pumpage amounts have not been made available.

LABORATORY NO. 151182

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Fluoride	F	0.7	
				Chloride	Cl	184.	5.19
				Nitrate	NO_3	1.1	.02
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		13		Hardness (as	$CaCO_3$)	530.	10.60
Color		0					
Odor		0		Total Dissolved Minerals		1155.	

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Soil and clay"	19	19
"Sandy clay"	24	43
"Sand and gravel"	9	52
SILURIAN SYSTEM		
Niagaran and Alexandrian Series		
"Chalky lime"	8	60
"Gray lime"	165	225
"White lime"	177	402
"Dark gray lime"	17	419
ORDOVICIAN SYSTEM		
Maquoketa Formation		
"Lime and shale"	23	442
"Brown lime"	8	450
"Broken lime and shale"	24	474
"Gray shale"	91	565
Galena Formation		
"Brown lime"	250	815
"Gray lime hard"	81	896
Glenwood-St. Peter Formations		
"St. Peter sand"	278	1174
"White lime"	23	1197
"Green shale"	3	1200
"Lime and dolomite"	16	1216
"Gray shale"	60	1276
"Lime"	10	1286
"Red rock"	25	1311
"Blue shale"	18	1329
CAMBRIAN SYSTEM		
Franconia Formation		
"Gray lime broken, some shale"	98	1427
"Hard gray lime sandy"	53	1480
Ironton-Galesville Formations		
"Sand hard"	90	1570
"White sand soft"	88	1658
"Hard sand"	9	1667
Eau Claire Formation		
"Shale"	4	1671
"Lime"	12	1683
"Blue shale"	6	1689
"Green shale"	12	1701
		T.D.

EMROY-HOWARD
SUBDIVISION
DuPage County
April 21, 1958

A public water supply was installed in 1946 by the Emroy-Howard (est. 250) Water Association serving an area north of Elmhurst on both sides of Emroy and Howard between Lake (Route No. 20) and Armitage.

WELL NO. 1 was completed in Aug. 1946 to a depth of 270 ft. by J. P. Miller Artesian Well Co., Brookfield, and located on the south side of Armitage between Emroy and Howard, or approximately 2600 ft. N. and 2200 ft. E. of the S. W. corner of Section 36, T40N, R11E. The ground surface elevation at the well is 680.

The well was cased with 8-in. pipe from the surface to rock at 120 ft. below which the hole was finished 8 in. in diameter. The pumping installation includes 90 ft. of 5-in. column pipe; Peerless turbine pump, No. 34515, rated at 100 gpm. at 220 ft. T.D.H.; 90 ft. of air line; 10-hp, General Electric motor.

On Apr. 16, 1956 the static water level was reported to be 45 ft. A mineral analysis of a sample (Lab. No. 146389) collected Apr. 21, 1958 showed the water in Well No. 1 to have a hardness of 25.2 gr. per gal., total dissolved minerals of 579 ppm., and an iron content of 1. 4 ppm.

Pumpage is estimated to average 25,000 gpd.

LABORATORY NO. 146389

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Silica	SiO_2	16.7	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	87.9	4.40	Boron	B	0.3	
Magnesium	Mg	51.5	4.24	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.4	.02
Sodium	Na	36.	1.56	Sulfate	SO_4	130.4	2.71
				Alkalinity (as	$CaCO_3$)	368.	7.36
Turbidity		6		Hardness (as	$CaCO_3$)	432.	8.64
Color		0					
Odor		0					
Temp. (reported)		52.2°F		Total Dissolved Minerals		579.	

ERIE
Whiteside County
November 17, 1960

Two wells are in service for the public water supply of the village of Erie (1215),

WELL NO. 1, described in Bulletin 40, is in service. In 1952, when pumping at 92 gpm., the drawdown was 6 ft. from a nonpumping water level of 6 ft.

WELL NO. 2 was completed in Sept. 1953 to a depth of 172 ft. 3 in. by Varner Well Co., Dubuque, Iowa, and located at the site of the 6-in. Test Well about 150 ft. east of Well No. 1, or approximately 5 ft. N. and 1000 ft, W. of the S. E. corner of Section 6, T19N, R4E. The ground surface elevation at the well is 585. A 6-in. Test Well had been drilled at the site and when tested on Apr. 14-15, 1953, it produced 200 gpm. after 24 hr. pumping with a drawdown of 9. 5 ft. from a static water level of 16. 5 ft. Ten min. after the pump was stopped, the water level had recovered to 14 ft.

Well No. 2 was cased with a 12-in. wi. pipe, in a 30-in. open hole, from the surface to 137 ft. followed by a 12-in. screen from 137 to 162 ft. The annulus between the screen and the wall of the 30-in. hole was packed with graded gravel from the bottom up to 12 7 ft. and with' native clay from 127 ft. to the surface.

The Well No. 2 is equipped with a Fairbanks-Morse Pomona turbine pump, rated at 500 gpm. and connected to a 30-hp. electric motor.

On Sept. 23, 1953, after 15 l/2 hr. pumping at 964 gpm., the drawdown was 12 ft. from a nonpumping water level of 17 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 153619) collected Nov. 16, 1960 showed the water in Well No. 2 to have a hardness of 10.4 gr. per gal., total dissolved minerals of 246 ppm., and a trace of iron.

There are approximately 310 services. Pumpage is estimated to average 60, 000 gpd.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Surface soil	5	5
Sand, silty	15	20
Sand, medium, silty	30	50
Gravel, medium, coarse sand, with silt	20	70
Sand, medium to very fine, silty	40	110
Fine gravel to fine sand, silty	13	123
Sandy clay	3	126
Fine gravel to fine sand	19	145
Coarse to fine sand	20	165
Medium gravel to fine sand	5	170
SILURIAN SYSTEM		
Limestone		

LABORATORY NO. 153619

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	22.4	
Manganese	Mn	0.4		Fluoride	F	0.2	
Calcium	Ca	45.7	2.29	Boron	B	0.1	
Magnesium	Mg	15.4	1.27	Chloride	Cl	2.	.06
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	22.9	.37
Sodium	Na	2.	.09	Sulfate	SO_4	28.0	.58
				Alkalinity (as	$CaCO_3$)	132.	2.64
Turbidity		0		Hardness (as	$CaCO_3$)	178.	3.56
Color		0					
Odor		0					
Temp. (reported)		53.5°F		Total Dissolved Minerals		246.	

A public water supply was installed in 1956 for the Eugenia Subdivision (est. 1000), a part of Domestic Utilities Service Co. Water is obtained from one well,

WELL NO. 1 was completed in Apr. 1956 to a depth of 1414 ft. by Layne-Western Co., Aurora, and located on the Yacktman farm south of Glenview, or approximately 925 ft. N. and 450 ft. E. of the S. W. corner of Section 12, T41N, R12E. The ground elevation at the well is 656. The hole and casing record is shown in Table A.

TABLE A

Hole Record

19 l/4-in. from 0 to 485 ft.
15 l/4-in. from 485 to 1414 ft.

Casing Record

20-in. from 0 to 1 3 1 ft.
1 6-in. from 0 to 485 ft.
The 16-in. casing was pressure cemented in place.

A production test was conducted on Apr. 18, 1956. For test purposes, a Layne turbine pump was attached to an 8-in. column pipe. Power was furnished from a 150-hp. General Electric motor. A 445-ft. air line was in place for measuring water levels. After 11 hr. pumping at a rate of 955 gpm., the drawdown was 124 ft. from a nonpumping water level of 304 ft. below the ground surface.

On May 31, 1956 water was pumped at a rate of 1140 gpm. with a drawdown of 95 ft. from a nonpumping water level of 304 ft.

On June 4-8, 1956 water was pumped at a rate of 1260 gpm. with a drawdown of 75 ft. from the nonpumping water level of 304 ft.

On June 9, 1958, after 1/2 hr. pumping at a rate of 1150 gpm., the drawdown was 38 ft. from a nonpumping water level of 341 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 147068) collected June 9, 1958 showed the water from Well No. 1 to have a hardness of 23. 5 gr. per gal., total dissolved minerals of 696 ppm., and an iron content of 0. 2 ppm.

The pumping equipment includes 440 ft. of 8-in. column pipe; Byron Jackson submersible pump rated at 1150 gpm.; 440 ft. of air line; 200-hp. electric motor.

Pumpage from Sept. 1956 to date has averaged 65, 000 gpd.

LABORATORY NO. 147068

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 2		Silica	SiO_2	9. 4	
Manganese	Mn	Tr.		Fluoride	F	0. 2	
Calcium	Ca	91. 9	4. 60	Boron	B	0. 3	
Magnesium	Mg	42. 3	3. 48	Chloride	Cl	35.	. 99
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2. 8	. 05
Sodium	Na	74.	3. 22	Sulfate	SO_4	250. 7	5. 22
				Alkalinity (as	$CaCO_3$)	252.	5. 04
Turbidity		Tr.		Hardness (as	$CaCO_3$)	404.	8. 08
Color		0					
Odor		0					
Temp. (reported)		57. 2°F		Total Dissolved Minerals		696.	

2 - Eugenia Subdivision

Correlated sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellow brown	25	25
Till, gravel	40	65
Gravel, till	60	125
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to light buff, very fine to fine	40	165
Dolomite, buff, pink, green, very fine to fine	20	185
Alexandrian Series		
Dolomite, light gray to buff, very fine to fine	110	295
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, brownish-gray, weak to tough; interbedded dolomite, light gray	165	460
Galena Formation		
Dolomite, buff, very fine to fine, little shale at base	205	665
Platteville Formation		
Dolomite, buff to gray, very fine to fine	115	780
Glenwood Formation		
Dolomite, very sandy, light gray; sandstone, white to light buff, fine to coarse, incoherent	45	825
St. Peter Formation		
Sandstone, white to light gray, fine to coarse, incoherent; some shale at base	85	910
Prairie du Chien Series		
Oneota Formation		
Dolomite, light buff, very fine to fine	100	1010
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, light buff to buff, very fine to fine	137	1147
Franconia Formation		
Shale, light buff to gray, weak; sandstone, white to light gray; incoherent	80	1227
Ironton Formation		
Sandstone, white to gray, incoherent	83	1310
Galesville Formation		
Sandstone, white to light gray, very fine to medium, incoherent; little dolomite at base	105	1415

FAIR ACRES ESTATES
Rock Island County
May 5, 1959

A public water supply was installed in 1948 for the Fair Acres Estates (est. 200), a subdivision located about 1 mile south of Silvis. The system is owned and operated by the Fair Acres Subdivision Association.

WELL NO. 1 was drilled abput 1938 to a depth of 455 ft. by C. F. Teeple, Moline, and deepened to 550 ft. in 1948 by Carl Larson, Orion. The well is located approximately 675 ft. N. and 200 ft. E. of the S. W. corner of Section 5, T17N, R1E. The ground surface elevation at the well is 700.

The well was cased with 6-in. pipe from 1 ft. above ground level (about 5 in. above the pump house floor) to 300 ft. depth. Below the casing, the hole was finished 6 in. in diameter.

Water is pumped by a new Red Jacket submersible pump installed in Sept. 1958 and powered by an electric motor. A mineral analysis of a sample (Lab. No. 149558) collected May 5, 1959 showed the water in the well to have a hardness of 15.6 gr. per gal., total dissolved minerals of 434 ppm., and an iron content of 7. 5 ppm.

There are 54 services and pumpage is estimated to average 20, 000 gpd.

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
No sample	135	135
DEVONIAN SYSTEM		
Limestone, light gray, white; little shale light green, weak	95	230
SILURIAN SYSTEM		
Dolomite, light gray, white, very fine; vesicular at base	225	455

LABORATORY NO. 149558

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	7.5		Silica	SiO_2	11.0	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	61.3	3.07	Boron	B	0.0	
Magnesium	Mg	27.4	2.25	Chloride	Cl	5.	.14
Ammonium	NH_4	3.7	.21	Nitrate	NO_3	0.3	.01
Sodium	Na	66.	2.88	Sulfate	SO_4	39.1	.81
				Alkalinity (as	$CaCO_3$)	372.	7.44
Turbidity		14		Hardness (as	$CaCO_3$)	266.	5.32
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		52°F		Total Dissolved Minerals		434.	

FARINA
Fayette County
June 11, 1959

The village of Farina (692) obtains its public water supply from five wells.

WELL NO. 1 (Allen) was described in Bulletin 40. In Dec. 1958 the well was rehabilitated. New 6-in. casing was set from the surface to 170 ft. The casing was perforated with l/8-in. slots from 65 to 117 ft. and cement grout placed below 117 ft. and from 65 ft. to the surface. Following the rehabilitation work, the well was treated with polyphosphate. The well was then pumped at a rate of 35,000 gpd. In Jan. 1959 the State Department of Public Health reported that the well had been abandoned and "discontinued because of strong sulphuric odors and tastes from the supply."

WELL NO. 2 (Boston), described in Bulletin 40, is equipped with an F. E. Myers single-acting vertical reciprocating pump, rated at 15 gpm. and connected to an electric motor. In June 1958 the well was currently out of service because of a need of rehabilitation.

WELL NO. 3 (Curry), described in Bulletin 40, is reportedly equipped with a Gould's vertical, reciprocating pump, rated at 6 gpm. and directly connected to an electric motor. The well is reportedly producing about 8000 gpd.

WELL NO. 4 (Fain, and sometimes called Wade Well), described in Bulletin 40, is reportedly 210 ft. deep and equipped with a Myers vertical, reciprocating pump directly connected to an electric motor. The well is reported to be capable of producing 15, 000 gpd.

WELL NO. 5 (Weale) was completed to a depthof 133 ft. in June 1958 by JohnLowry, Olney, and located on the Weale property at the southeast corner of Illinois and Madison St., or approximately 1400 ft. N. and 75 ft. E. of the S. W. corner of Section 33, T5N, R4E. The ground elevation at the well is 580. Well No. 5 was cased with 133 ft. of 5-in. id. steel pipe (15 lb. per ft.). The casing was perforated with l/4-in. slots between 49 and 131 ft. depth.

A production test was conducted on Well No. 5 on June 5, 1958 by representatives of the Driller, the State Water Survey, and Clark, Daily and Dietz, Consulting Engineers. Two observation wells, each one dug and drilled to a depth of 90 ft. were located: O. W. No. 1 at 200 ft. northwest of Well No. 5 and O. W. No. 2 at 220 ft. north of Well No. 5. After 5 hr. pumping at a rate of 34 1/2 gpm., the drawdown in Well No. 5 was 65 ft. from a static water level of 23 ft. One and one-half hr. after pumping was stopped, the water level had recovered to 33. 5 ft.

In O. W. No. 1 the water level was lowered 0. 04 ft. and in O. W. No. 2 the water lowered 0.20 ft.

The pumping equipment includes a 3-hp. electric Sta-Rite submersible pump rated at 30 gpm.

A mineral analysis of a sample (Lab. No. 146816) collected June 5, 1958, after 5 1/2 hr. pumping at a rate of 34. 5 gpm., showed the water in Well No. 5 to have a hardness of 18 gr. per gal., total dissolved minerals of 427 ppm., and an iron content of 0. 5 ppm.

WELL NO. 6 was completed in June 1959 to a depth of 146 ft. by John Lowry and located about 1000 ft. northeast of Well No. 5, or approximately 2550 ft. N. and 1000 ft. E. of the S. W. corner of Section 33. The ground elevation at the well is 580.

The well was cased with 5-in. pipe (15 lb. per ft.) in an 8-in. hole from 2 ft. above ground level to the bottom at 146 ft. The casing was perforated with four l/8-in. by 3-in. slots per ft. from 70 ft. to 135 ft. and from 143 ft. to 144 ft. The annulus outside the 5-in. casing was packed with pea gravel from the bottom up to 64 ft. and cemented from 64 ft. up to 3 ft.

A production test was conducted on June 11, 1959 by representatives of the Driller, the State Water Survey, and Village officials. For test purposes the pumping equipment consisted of a 2-in., 5-stage Deming Rapidayton submersible pump connected to a 3-hp. electric motor. A 110-ft. air line was in place attached to the top of the pump about 3 ft. above ground level. After 6 1/2 hr. pumping at a rate of 17 gpm., the drawdown was 68 ft. from a static water level of 32 ft. Thirty min. after pumping was stopped, the water level had recovered to 40 ft.

A mineral analysis of a sample (Lab. No. 149873) collected June 11, 1959, after 3 hr. pumping at a rate of 17 gpm., showed the water in Well No. 6 to have a hardness of 17. 6 gr. per gal., total dissolved minerals of 458 ppm., and an iron content of 0. 2 ppm.

There are 250 services, all metered. Pumpage for 1958 was reported to average 60,000 gpd.

2 - Farina

LABORATORY NO. 149873

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	25.3	
Manganese	Mn	0.1		Fluoride	F	0.3	
Calcium	Ca	72.8	3.64	Boron	B	0.0	
Magnesium	Mg	28.9	2.38	Chloride	Cl	26.	.73
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.4	.04
Sodium	Na	61.	2.67	Sulfate	SO_4	5.8	.12
				Alkalinity (as	$CaCO_3$)	390.	7.80
Turbidity		0		Hardness (as	$CaCO_3$)	301.	6.02
Color		10					
Odor		0					
Temp. (reported)		58.5°F		Total Dissolved Minerals		458.	

FARMER CITY
DeWitt County
June 27, 1960

Four wells are in service for the public water supply of Farmer City (1838).

WELL NO. 1, described in Bulletin 40 as being drilled in 1932, was abandoned and filled about 1954.

WELL NO. 2, described in Bulletin 40, was equipped in 1955 with a Jacuzzi 2-pipe jet pump, rated at 75 gpm., directly connected to a 15-hp. U S electric motor. This well is in service.

WELL NO. 3 was completed to a depth of 172 ft. in Sept. 1951 by G. C. Mashburn, Maroa. The well was placed in operation in June 1953 and located in the northeast part of town, or approximately 1750 ft. S. and 1050 ft. W. of the N. E. corner of Section 28, T21N, R5E. The elevation of the ground surface at the well is 730. The well was cased with 6-in. black steel pipe to 158 ft. followed by a 14 ft. length of 6-in. Cook silica brass screen, the upper 8 ft. having No. 14 slot openings and the lower 6 ft. having No. 25 slots.

In a production test on Sept. 11, 1951 the Driller reported pumping for 4 hr. with a drawdown of 11 ft. from a static water level of 60 ft. below the top of the casing (2 ft. above ground level). For the test a piston type pump was used, operated from the drill rig.

In a test in Nov. 1952, when pumping at 135 gpm., the drawdown was 25.6 ft. from a nonpumping water level of 67. 5 ft. below the pump base.

The pumping equipment consists of a Deming turbine pump, rated at 140 gpm., connected to a 10-hp. U S electric motor. The present estimated capacity of the pump is 75 gpm.

Well No. 3 is in service.

WELL NO. 4 was completed to a depth of 167 ft. in Dec. 1954 by Layne-Western Co., Aurora, and located on the golf course, east of U. S. Highway 150, or approximately 1550 ft. S. and 750 ft. W. of the N. E. corner of Section 28. The elevation of the ground surface at the well is 730. The well was drilled 30 in. in diameter from the surface to the bottom. A 12-in. inner casing was set from the surface to 152 ft. followed by 15 ft. of 12-in. stainless steel screen, having No. 6 slot openings. The annulus outside the 12-in. casing and screen was gravel packed.

A production test was conducted on Dec. 9-10, 1954 by representatives of the Driller, the State Water Survey, Municipal officials, and George Farnsworth, Consulting Engineer. After 24 hr. pumping at a rate of 212 gpm., the drawdown was 77. 5 ft. from a nonpumping water level of 48 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level had recovered to 62. 8 ft.

A partial mineral analysis of a sample (Lab. No. 136442) collected Dec. 10, 1954 showed the water in Well No. 4 to have a hardness of 14 gr. per gal., total dissolved minerals of 684 ppm., and an iron content of 1. 8 ppm.

The pumping equipment consists of a Cook turbine pump, No. 8804, rated at 190 gpm., connected to a 20-hp. U S electric motor. The pump had been removed from Well No. 1.

On July 13-15, 1955 in a second production test, the drawdown was 30. 5 ft. from a nonpumping water level of 47. 5 ft. after 12 hr. pumping at 197 gpm.

Well No. 4 is in service.

WELL NO. 5 was drilled to a depth of 150 ft. in Sept. 1955 by Layne-Western Co. and located 350 ft. N. and 1900 ft. E. of the S. W. corner of Section 28. A 12-in. casing (125 ft. long) followed by 25 ft. of Layne No. 6 shutter screen was set in a 34-in. hole and gravel packed.

A production test was conducted on Oct. 6-7, 1955 by representatives of the Driller and the State Water Survey. After 24 hr. pumping at 150 gpm., the drawdown was 85 ft. from a nonpumping water level of 40 ft. Forty-five min. after the pump was stopped, the water level had recovered to 70 ft.

The well did not fill the specifications and was later abandoned and filled.

WELL NO. 6 was completed to a depth of 177 ft. in Nov. 1955 by Layne-Western Co. and located about 300 ft. west and 500 ft. north of Well No. 4, or approximately 780 ft. S. and 1080

ft. W. of the N. E. corner of Section 28. The well was cased with 152 ft. of 12-in. pipe and 20 ft. of Layne No. 5 stainless steel screen, set in a 30-in. hole. The annulus between the screen, casing, and the wall of the 30-in. hole was packed with 1/4 to 1/8-in. "little buckshot gravel" from 175 up to 95 ft. and the hole was backfilled with clay up to the surface.

A production test was conducted on Dec. 6-7, 1955 by representatives of the Driller, the State Water Survey, Village officials, and George Farnsworth, Consulting Engineer. After 24 hr. pumping at a rate of 222 gpm., the drawdown was 40 ft. from a nonpumping water level of 61 ft. One and one-half hr. after the pump was stopped, the water level had recovered to 67.5 ft.

The well is equipped with 140 ft. of 6-in. column pipe; 10-in., 7-stage Layne turbine pump, No." 33919, rated at 200 gpm. against 310 ft. T.D.H.; 25-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152583) collected June 27, 1960 showed the water to have a hardness of 16. 5 gr. per gal., total dissolved minerals of 712 ppm., and an iron content of 0. 8 ppm.

Pumpage is reported to average 200, 000 gpd.

Sample study summary log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil black, dark brown	5	5
Till, buff, light brown, gray, very gravelly, sandy	30	35
Sand, fine to coarse, poorly sorted	5	40
Till, gray, very sandy and gravelly	80	120
Sand, medium to coarse, poorly sorted, dirty; gravel granular	5	125
Gravel, green, red, buff, granular poorly sorted, clean	5	130
Till, buff, gravelly (coarse)	5	135
Sand, fine to medium, well sorted, clean	5	140
Sand, fine to coarse, poorly sorted	5	145
Sand, fine to medium, well sorted, clean	5	150
Till, (?) red brown, gravelly; little gray shale partings	10	160

LABORATORY NO. 152583

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.8		Silica	SiO_2	16.3	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	69.3	3.47	Boron	B	0.2	
Magnesium	Mg	27.1	2.23	Chloride	Cl	84.	2.37
Ammonium	NH_4	4.6	.25	Nitrate	NO_3	0.7	.01
Sodium	Na	170.	7.40	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	536.	10.72
Turbidity		5		Hardness (as	$CaCO_3$)	285.	5.70
Color		35					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		712.	

FARMINGTON
Fulton County
May 22, 1958

Two wells are in service for the public supply of the city of Farmington (2831).

WELL NO. 1, described in Bulletin 40, was equipped in 1955 with a Byron Jackson submersible pump, ratedat 250 gpm. at 460 ft. T.D.H. Power is furnished from a40-hp. electric motor. At the time of the installation of the new pump the casing was reported to be out of alignment at a depth of 300 ft.

WELL NO. 2 was completed to a depth of 1743 ft. in Nov. 1956 by Varner Well and Pump Co., Dubuque, Iowa, and located on the south of the city about 1 mile southwest of Well No. 1, or approximately 800 ft. S. and 300 ft. W. of the N. E. corner of Section 11, T8N, R4E. The elevation of the ground surface at the well is 710.

The well was cased with 26-in. drive pipe from the surface to 21 ft. A 20-in. liner was set from 95 to 360 ft. A 12-in. casing was set from 1 ft. above to 877 ft. below ground level and a 10-in. liner was set from 1067 to 1280 ft. The annulus outside the 12-in. casing was pressure cemented.

A production test was conducted on Nov. 14-15, 1956 by representatives of the Driller, the State Water Survey, the City officials, and Pat Tiernan, Consulting Engineer. After 22 1/2 hr. pumping at a rate of 152 gpm., the drawdown was 94 ft. from a nonpumping water level of 291 ft. During the production test, Well No. 1 was being pumped continuously at 150 gpm. Following the test the well was surged for 1. 0+ hr.

A mineral analysis of a sample (Lab. No. 146687) collected May 22, 1958, after 12 hr. pumping, showed the water in Well No. 2 to have a hardness of 10.9 gr. per gal., total dissolved minerals of 1965 ppm., chloride of 530 ppm., and an iron content of 0. 5 ppm.

A submersible pump is installed and set at approximately 500 ft.

Pumpage in July 1958 was reported to average 175, 000 gpd.

LABORATORY NO. 146687

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	10.8	
Manganese	Mn	Tr.		Fluoride	F	2.4	
Calcium	Ca	43.9	2.20	Boron	B	1.0	
Magnesium	Mg	18.7	1.54	Chloride	Cl	530.	14.95
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.8	.01
Sodium	Na	634.	27.56	Sulfate	SO_4	461.8	9.61
				Alkalinity (as	$CaCO_3$)	420.	8.40
Turbidity		2		Hardness (as	$CaCO_3$)	187.	3.74
Color		0					
Odor		0					
Temp. (reported)		74°F		Total Dissolved Minerals 1965.			

FERNWAY SUBDIVISION
Cook County
April 11, 1960

A public water supply was installed in 1959 for the Fernway Subdivision (est. 750) owned and operated by Citizens Utilities Co. of Illinois. The subdivision is located about 2 miles southeast of Orland Park.

WELL NO. 1 was completed in Feb. 1959 to a depth of 125 ft. by J. P. Miller Artesian Well Co., Brookfield, and located near 88th Ave. and 161st St., or approximately 2700 ft. S. and 1200 ft. W. of the N. E. corner of Section 22, T36N, R12E. The ground surface elevation at the well is 710.

The well was cased with 10-in. black steel pipe from 18 in. above L.S.D. to limestone at 118 ft., below which the hole was finished 10 in. in diameter.

When the well was completed in Feb. 1959 the Driller reported pumping for 6 hr. at a rate of 400 gpm. with a drawdown of 7 ft. from a static water level of 38 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 152020) collected Apr. 11, 1960 showed the water in Well No. 1 to have a hardness of 10. 1 gr. per gal., total dissolved minerals of 695 ppm., and an iron content of 0. 5 ppm. Apparently the water was zeolite softened and blended with raw water.

The pumping equipment consists of 80 ft. of 6-in. column pipe; 10-in., 6-stage Peerless turbine pump rated at 500 gpm., connected to a 40-hp. U S electric motor.

There are 212 services, all metered and all population served. Pumpage is estimated to average 35,000 gpd.

LABORATORY NO. 152020

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	19.8	
Manganese	Mn	0.0		Fluoride	F	0.5	
Calcium	Ca	46.0	2.30	Boron	B	0.1	
Magnesium	Mg	15.3	1.26	Chloride	Cl	2.	.06
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	0.3	Tr.
Sodium	Na	193.	8.41	Sulfate	SO_4	207.6	4.32
				Alkalinity (as	$CaCO_3$)	380.	7.60
Turbidity		2		Hardness (as	$CaCO_3$)	178.	3.56
Color		0					
Odor		0		Total Dissolved Minerals		695.	

FLOSSMOOR
Cook County
November 19, 1958

Five wells are in service for the village of Flossmoor (4624).

No changes are reported for WELL NO. 1.

It is reported that a Byron Jackson submersible pump, No. 297907, rated at 400 gpm., was in place in WELL NO. 2 (Park) attached to 150 ft. of 8-in. column pipe. An air line 150 ft. long was in place and power was furnished by a 30-hp. electric motor. On Dec. 17, 1957 the nonpumping water level was reported to be 48 ft.

No changes in WELL NO. 3 (Garage) have been reported. On Dec. 17, 1957 the nonpumping water level was reported to be 59 ft.

WELL NO. 4 was drilled in Sept. 1952 to a depth of 250 ft. by Layne-Western Co., Aurora, and located 850 ft. N. and 1650 ft. W. of the S. E. corner of Section 12, T35N, R13E. The ground elevation at the well is 653.

The well was cased with 12-in. gwi. pipe to a depth of 42 ft. 9 in., below which the open hole was finished 12 in. in diameter to the bottom at 250 ft. Ina production test by the Driller during the last week of Sept. 1952 "when pumping at a rate of 544 gpm., the drawdown was 52 ft. from a static water level of 7 ft. below the ground surface. "

The pumping equipment includes 130 ft. of 6-in. column pipe; 9 l/2-in., 7-stage Peerless turbine pump, No. 105725, rated at 475 gpm. and having an over-all length of 5 ft. 8 1/8 in.; 10 ft. of 6-in. suction pipe; 130 ft. of air line; 50-hp. U S electric motor. A Peerless right angle drive, No. J21274, is installed.

On Dec. 17, 1957 the nonpumping water level was 50 ft.

A mineral analysis of a sample (Lab. No. 148252) collected Nov. 11, 1958 showed the water in Well No. 4 to have a hardness of 38. 4 gr. per gal., total dissolved minerals of 890 ppm., and an iron content of 1. 5 ppm.

WELL NO. 5 was completed in Oct. 1956 to a depth of 501 ft. by Wehling Well Works, Beecher, and located 1961 ft. S. and 367 ft. E. of the N. W. corner of Section 12. The well was cased to 91 ft. with 12-in. wi. pipe. Rock was reportedly penetrated at 84 ft. From 92 ft. to the bottom at 501 ft. the hole was finished 11 1/2 in. in diameter.

In a production test reported by the Driller in Oct. 1956 water was pumped for 7 hr. at a rate of 450 gpm. with a drawdown of 47 ft. from a nonpumping water level of 40 ft. below the ground surface (691).

The pumping equipment includes 160 ft. of 6-in. column pipe; 10-in., 6-stage Fairbanks-Morse Pomona turbine pump, No. AW2501, rated at 450 gpm. against 212 ft. T.D.H.; 160 ft. of air line; 40-hp. Fairbanks-Morse electric motor.

Analysis of a sample (Lab. No. 147271) collected July 17, 1958, after 7 hr. pumping at 320 gpm., showed the water in Well No. 5 to have a hardness of 41.4 gr. per gal., total dissolved minerals of 994 ppm., and an iron content of 0. 2 ppm.

Pumpage for 1956 was reported to average 400,000 gpd.

LABORATORY NO. 147271

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	10.3	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	164.3	8.22	Boron	B	0.7	
Magnesium	Mg	72.7	5.98	Chloride	Cl	4.	.11
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.5	.01
Sodium	Na	51.	2.21	Sulfate	SO_4	469.2	9.76
				Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		Tr.		Hardness (as	$CaCO_3$)	710.	14.20
Color		0					
Odor		0					
Temp. (reported)		52.7°F		Total Dissolved Minerals		994.	

2 - Flossmoor

LABORATORY NO. 148252

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.5		Silica	SiO_2	13.1	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	154.4	7.72	Boron	B	0.5	
Magnesium	Mg	66.4	5.46	Chloride	Cl	39.	1.10
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	39.	1.70	Sulfate	SO_4	353.4	7.35
				Alkalinity (as	$CaCO_3$)	320.	6.40
Turbidity		9		Hardness (as	$CaCO_3$)	659.	13.18
Color		0					
Odor		0		Total Dissolved Minerals		890.	

FOREST HOMES - MAPLE PARK PUBLIC WATER DISTRICT
Madison County
January 19, 1960

A public water supply was installed in Jan. 1960 for the Forest Homes-Maple Park Public Water District (est. 450) located about 1 mile west of Bethalto.

WELL NO. 1 was completed in Nov. 1959 to a depth of 67 ft. by Layne-Western Co., Kirkwood, Mo., and located about 175 ft. east of the East Fork of Wood River about 1 mile northeast of the Water District, or approximately 675 ft. S. and 2600 ft. W. of the N. E. corner of Section 2, T5N, R9W. The ground surface elevation at the well is 450. The hole was drilled 20 in. in diameter from top to bottom. The well was cased with 24-in. pipe to a depth of 8 ft. and 10-in. pipe from 1 ft. above the surface to 54 1/2 ft. followed by 20 ft. of Layne stainless steel No. 5, shutter type, screen. Five tons of torpedo gravel were packed in the annulus between the 10-in. casing and screen and the wall of the hole.

A production test was conducted on Nov. 9, 1959 by representatives of the Driller, the State Water Survey, and Clifford Abraham, Consulting Engineer. For the test a Johnston turbine test pump, 3. 5 ft. long, was attached to 46 ft. of column pipe. Ten ft. of suction pipe was installed and power was from a gas engine. Water level measurements were made by tape. After 4 hr. pumping at 150 gpm., the drawdown was 46 ft. below a static water level of 12. 9 ft. below the top of the casing. Or.e hr. after the pump was stopped, the water level had recovered to 17.4 ft. Pumping was then resumed at 140 gpm. and after 3 hr. the drawdown was 28 ft. Fifteen min. after the pump was stopped, the water level had recovered to 20. 9 ft. and at 14 hr. the water level was 14.1 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 150976) collected Nov. 9, 1959, after 4 hr. pumping at a rate of 150 gpm., showed the water in Well No. 1 to have a hardness of 12. 4 gr. per gal., total dissolved minerals of 294 ppm., turbidity of 86 ppm., and an iron content of 12 ppm.

WELL NO. 2 was completed in Jan. 1960 to a depth of 66 ft. by Layne-Western Co. and located about 180 ft. east of East Fork, 100 ft. southwest of Well No. 1, or approximately 773 ft. S. and 2620 ft. W. of the N. E. corner of Section 2. The hole was drilled 20 in. in diameter from top to bottom and cased with 10-in. pipe from 1 ft. above the surface to 46 ft. followed by 20 ft. of Layne No. 5 shutter screen.

A production test was conducted on Jan. 19, 1960 by representatives of the Driller, the State Water Survey, and Village officials. For the test the pumping equipment included a Johnston turbine pump, 3. 5 ft. long, attached to 46 ft. of column pipe and with 10 ft. of suction pipe. Power was furnished by a gasoline engine. Water level measurements were made with a steel tape. After 4 hr. pumping at a rate of 111 gpm., the drawdown was 16. 7 ft. from a static water level of 12.1 ft, below the top of the casing. Pumping was stopped to observe the recovery of water level in Well No. 2. After 1 hr. the water level had recovered to 14. 8 ft. Pumping was resumed at a rate of 122 gpm. for 15 min., followed by 15 min. pumping at 130 gpm., and for an additional 15 min. pumping at 146 gpm., at the end of which the final drawdown was 20 ft. Pumping was then continued at a rate of 111 gpm. and after 3 hr. the drawdown was 16.6 ft. below the original static level of 12. 1 ft. below the top of the casing. Fifteen min. after the pump was stopped, the water level had recovered to 17 ft. and 14 1/2 hr. later the water level was 12. 7 ft.

During the pumping in Well No. 2 water levels were observed (by tape) in Well No. 1. At the end of the 1 hr. recovery after the first pumping at 111 gpm. in Well No. 2 the water level in Well No. 1 recovered 4 ft. from a low of 19.1 ft. below a static level of 12, 3 ft. At the end of pumping in Well No. 2 the water level in Well No. 1 had lowered to 6.5 ft. below the static level of 12. 3 ft. At the end of 14 l/2 hr. recovery period the water level in Well No. 1 had raised to 12. 9 ft.

In each well at the end of 14 1/2 hr. the water level had recovered to 0. 6 ft. of the initial static level.

A partial chemical analysis of a sample (Lab. No. 151498) collected Jan. 19, 1960, after 8 hr, pumping at rates of 111 to 146 gpm., showed the water in Well No. 2 to have a hardness of 14.1 gr, per gal., total dissolved minerals of 291 ppm., turbidity of 100 ppm., and an iron content of 12 ppm.

The permanent pumping equipment has not been installed and pumpage is not being recorded. Requirement for 450 persons is estimated to average 27, 000 gpd.

2 - Forest Homes - Maple Park Public Water District

LABORATORY NO. 151498

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	12.		Fluoride	F	0.3	
Manganese	Mn	0.5		Chloride	Cl	2.	.06
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	276.	5.52
Turbidity		100		Hardness (as	$CaCO_3$)	220.	4.40
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		291.	

FOREST LAKE ADDITION
Lake County
December 4, 1959

A public water supply was installed in 1939 for the Forest Lake Addition (est. 160), an unincorporated subdivision located about 2 miles northeast of Lake Zurich and about 6 miles southwest of Mundelein. The system is owned and operated by Henry Boysen, Libertyville.

WELL NO. 1 was completed in 1939 to a depth of 240 ft. by Henry Boysen and located at the southeast corner of Arbor Lane and Lakeside Drive, or approximately 600 ft. N. and 1900 ft. W. of the S. E. corner of Section 10, T43N, R10E. The ground surface elevation at the well is 810.

The well was cased with 6-in. pipe from the surface to 211 ft. (limestone), below which the hole was finished 6 in. in diameter. When the well was completed in 1939 the Driller reported pumping at a rate of 40 gpm. for 7 hr. The static water level was 42 ft. below the surface but the drawdown was not reported.

The pumping equipment includes a Deming turbine pump connected to a 5-hp. U S electric motor.

Pumpage is estimated to average 12, 000 gpd.

FORRESTON
Ogle County
October 10, 1960

One well furnishes the public water supply of the village of Forreston (1153).

WELL NO. 1, described in Bulletin 40, is now maintained for stand-by use only. A new Johnston turbine pump was installed in 1952. The pump is rated at 200 gpm. and connected to a 20-hp. U S electric motor. An Amarillo right angle drive is mounted with power to be supplied by a tractor stationed outside of the building.

WELL NO. 2 was completed in Nov. 1952 to a depth of 1000 ft. by Neely and Schimelpfenig, Batavia, and located in the southeast part of town south of Well No. 1, or approximately 2370 ft. S. and 2030 ft. W. of the N. E. corner of Section 33, T25N, R8E. The ground surface elevation at the well is 920. The well was cased with 43 ft. of surface pipe and 12-in. pipe from the surface to 254 ft. (grouted in) followed by a 12-in. hole from 254 to 455 ft. A 10-in. liner was set from 455 to 590 ft. followed by a 10-in. hole from 590 to 760 ft. An 8-in. liner was set from 760 to 840 ft. followed by an 8-in. hole from 840 to the bottom at 1000 ft.

A production test was conducted by the Driller on Nov. 3, 1952. After 9 hr. pumping at 455 gpm., the drawdown was 28 ft. from a nonpumping water level of 158 ft. below the ground surface.

Layne-Western Co. installed the permanent pump assembly consisting of 220 ft. of 6-in. column pipe; 10-in., 9-stage Layne turbine pump, No. 25185, rated at 400 gpm.; 220 ft. of gi. pipe air line; 10 ft. of 6-in. suction pipe; 40-hp. electric motor,

A mineral analysis of a sample (Lab. No. 153353) collected Oct. 6, 1960, after 15 min. pumping at a rate of 400 gpm., showed the water to have a hardness of 17.2 gr. per gal., total dissolved minerals of 286 ppm., and an iron content of 0. 4 ppm.

Pumpage for the village in 1958 averaged 150,000 gpd.

LABORATORY NO. 153353

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	11.6	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	63.2	3.16	Boron	B	0.0	
Magnesium	Mg	33.2	2.73	Chloride	Cl	0.	.00
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	1.	.04	Sulfate	SO_4	26.9	.56
				Alkalinity (as	$CaCO_3$)	268.	5.36
Turbidity		2		Hardness (as	$CaCO_3$)	295.	5.89
Color		0					
Odor		0		Total Dissolved Minerals		286.	

2 - Forreston

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
No samples	45	45
ORDOVICIAN SYSTEM		
Galena-Platteville Formations		
Dolomite, yellowish gray, gray, pale brown	195	240
Glenwood Formation		
Sandstone, gray, coarse to very coarse, incoherent, shale at base, green, weak	15	255
St. Peter Formation		
Sandstone, light gray, pinkish gray, fine to coarse, incoherent	65	320
"No samples"	100	420
Sandstone, light yellowish gray, fine to coarse, incoherent	10	430
"No sample"	35	465
Shale, red, weak	5	470
Sandstone, pink, fine to very coarse; shale, dark reddish pink, firm, some light green, weak	30	500
Chert, white dense; sandstone and shale	15	515
"No samples"	20	535
Oneota Formation		
Dolomite, light pinkish gray, brown; little shale, green, weak; little sandstone, light gray, fine to coarse, incoherent	55	590
CAMBRIAN SYSTEM		
Jordan Formation		
Dolomite, light pinkish gray; sandstone, light gray to light pink, medium to coarse, incoherent	45	635
Trempealeau Formation		
Dolomite, yellowish gray, pinkish brown, some green; little sandstone light gray; little shale, green, weak	125	760
Franconia Formation		
Sandstone, green, yellow, fine to medium, compact; shale, green, weak	75	835
"No samples"	25	860
Ironton Formation (top estimated)		
"No samples"	15	875
Sandstone, light yellow, pinkish gray, fine to very coarse, incoherent	105	980
Eau Claire Formation		
Shale, grayish green, weak	5	985

FOX RIDGE STATE PARK
Coles County
May 6, 1959

Fox Ridge State Park WELL NO. 1 was completed in Mar. 1938 to a depth of 157 ft. by Ed Piercy, Charleston, and located approximately 1380 ft. S. and 1800 ft. E. of the N. W. corner of Section 13, T11N, R9E. The ground surface elevation at the well is 670 to 685. The well was cased with 6-in. pipe to an unknown depth. The hole was finished 6 in. in diameter.

The well was equipped with a Fairbanks-Morse plunger pump, rated at 400 gal. per hr. with the 30-in. cylinder set at 145 ft. The pump had a 9-in. stroke. Power was furnished by an electric motor and also a gas engine. In 1941, after 5 3/4 hr. pumping at a rate of 20 gpm., the drawdown was 44 ft. from a static water level of 32 ft.

A mineral analysis of a sample (Lab. No. 97301) collected Aug. 31, 1943, after 5 min. pumping at 5 gpm., showed the water in Well No. 1 to have a hardness of 4. 6 gr. per gal., total dissolved minerals of 575 ppm., and an iron content of 1 ppm.

Well No. 1 (Test Well No. 1-54) was completed in Mar. 1954 by the Driller and observed by representatives of the State Division of Architecture and Engineering and the State Water Survey. For test purposes a 15-stage Fairbanks-Morse submersible rated at 23 1/2 gpm. was in place with the bottom of the suction set at 157 ft. Power was furnished by a 1-hp. electric motor. The old park well nearby was used to observe water levels. After 24 hr. pumping at 29 ppm., the drawdown was 35.8 ft. from a nonpumping water level of 122. 3 ft. below the top of the casing. -During the pumping period the water level in the observation well was lowered 8. 3 ft. from a static water level of 122. 2 ft.

A mineral analysis of a sample (Lab. No. 149506) collected Apr. 30, 1959 showed the water in Test Well No. A 1-54 (formerly 1-54) to have a hardness of 4 gr. per gal., total dissolved minerals of 562 ppm., and an iron content of 3.1 ppm.

The yield of the test well was not sufficiently adequate to warrant development.

On May 6, 1959 it was reported that Well No. 1 is equipped with a Jacuzzi jet pump with a Century 1 l/2-hp. electric motor.

WELL NO. 2 (Test Well No. 2-54) was completed in Apr. 1954 to a depth of 221. 5 ft. by E. C. Baker and Sons, Sigel, and located on the east side of the park, or approximately 1300 ft. S. and 700 ft. E. of the N. W. corner of Section 18, T11N, R10E. The ground surface elevation at the well is 720. The well was cased with 8-in. pipe from 2. 5 ft. above ground level to 212 ft. followed by 9. 5 ft. of screen with . 015-in. slot openings.

Sample study summary log of WELL NO. 2-54 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, dark yellow brown, gray, gravelly at base	93	93
Till, dark gray brown, sandy, gravelly	23	116
Sand, very fine to coarse, dirty; little gravel, coarse; little till	2	118
Till, yellowish gray, dark brownish gray, gravelly	88	206
Gravel, fine to very coarse, poorly sorted; little till	6	212
Till, dark brownish gray, gravelly, calc.	1	213
Sand, fine to very coarse, poorly sorted, clean; little gravel, granular	5	218
Sand, fine to medium, clean; little gravel, fine	4	222
PENNSYLVANIAN SYSTEM		
Shale, very dark gray brown, firm to weak	1	223
		T. D.

A production test was conducted on May 18-19, 1954 on Test Well No. 2-54 by the Driller. For the test a submersible test pump was installed with power furnished from an electric motor. After 24 hr. pumping at a rate of 5 gpm., the drawdown was 58. 4 ft. from a nonpumping water level of 136.8 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 134864) collected May 18, 1954 showed the water in Test Well No. 2-54 to have a hardness of 13. 8 gr. per gal., total dissolved minerals of 400 ppm., and an iron content of 1. 9 ppm.

2 - Fox Ridge State Park

LABORATORY NO. 149506

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.1		Silica	SiO_2	11.1	
Manganese	Mn	0.4		Fluoride	F	1.8	
Calcium	Ca	14.1	.71	Boron	B	0.4	
Magnesium	Mg	7.9	.65	Chloride	Cl	6.	.17
Ammonium	NH_4	2.7	.15	Nitrate	NO_3	0.1	Tr.
Sodium	Na	196.	8.52	Sulfate	SO_4	0.4	.01
				Alkalinity (as	$CaCO_3$)	492.	9.84
Turbidity		14		Hardness (as	$CaCO_3$)	68.	1.36
Color		45					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		562.	

LABORATORY NO. 134864

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Fluoride	F	0.3	
				Chloride	Cl	2.	.06
				Nitrate	NO_3	0.1	Tr.
				Alkalinity (as	$CaCO_3$)	416.	8.32
Turbidity		10		Hardness (as	$CaCO_3$)	236.	4.72
Color		15					
Odor		0		Total Dissolved Minerals		400.	

FOX RIVER GROVE
McHenry County
October 9, 1958

Two wells are in service for the public water supply of the village of Fox River Grove (1866).

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 was completed in 1956 to a depth of 120 ft. by Layne-Western Co., Aurora, and located about 160 ft. northeast of Well No. 1, or approximately 250 ft. N. and 1100 ft. W. of the S. E. corner of Section 18, T43N, R9E. The ground surface elevation at the well is 740. The well was cased with 10-in. steel pipe with welded joints from 3 ft. above to 101 ft. below the surface. From 101 to 120 ft. the hole was finished at 10 in. in diameter.

When the well was finished in Sept. 1956, the Driller reported pumping for 9 hr. at a rate of 320 gpm. with a drawdown of 35 ft. from a static water level of 17 ft. below the top of the casing. The length of the test was 20 hr.

The pumping equipment consists of 80 ft. of 5-in. column pipe; 8-in., 8-stage Layne turbine pump (No. 36028), 5 ft. 8 in. long, and rated at 300 gpm.; 10 ft. of 6-in. suction pipe; 82 ft. of air line; 20-hp. U S electric motor.

On Apr. 10, 1958, when pumping at capacity, the drawdown was 23 ft. from a nonpumping water level of 9 ft.

A mineral analysis of a sample (Lab. No. 146280) collected Apr. 11, 1958 showed the water in Well No. 2 to have a hardness of 21.8 gr. per gal., total dissolved minerals of 433 ppm., and an iron content of 2.1 ppm.

Meters were installed in Apr. 1958 and pumpage for May, June, and July 1958 averaged 146,160 gpd.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown	3	3
Silt, sandy, brown	5	8
Gravel, very sandy, granule	22	30
Sand, very gravelly	5	35
Till, gravelly, reddish brown	55	90
Gravel, sandy, silty, granular to medium	12	102
SILURIAN SYSTEM		
Dolomite, white to buff, very fine to medium	8	110
No sample	10	120

LABORATORY NO. 146280

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.1		Silica	SiO_2	17.2	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	78.8	3.94	Boron	B	0.1	
Magnesium	Mg	43.2	3.55	Chloride	Cl	9.	.25
Ammonium	NH_4	0.1	Tr.	Nitrate	NO_3	0.3	Tr.
Sodium	Na	9.	.41	Sulfate	SO_4	75.3	1.57
				Alkalinity (as	$CaCO_3$)	304.	6.08
Turbidity		19		Hardness (as	$CaCO_3$)	375.	7.49
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		433.	

One collector well is in service for the city of Galesburg (37, 243). Prior to the construction of this well, the Galesburg water supply was obtained from five rock wells. These are being maintained for emergency service.

WELL NO. 1 (Collector) was constructed by Ranney Method Water Supplies, Inc. and placed in service in May 1959. In 1956 a number of test holes were drilled by Layne-Western Co., Aurora, in the Mississippi River alluvium near Oquawka in Henderson County. The collector was located at the site of Test Well No. AW-2 on the south side of the village, less than 100 ft. from the river bank, or approximately 1540 ft. S. and 4480 ft. W. of the N. E. corner of Section 22, T11N, R5W. A 13-ft. id. by 16-ft. od. reinforced concrete caisson was constructed to a depth of 97 ft. below a ground surface elevation of 528. The inside depth of the collector is 108.25 ft. below the elevation of the top (539.25). Nine 12-in. diameter perforated steel pipe laterals project radially from the collector at elevation 438. The total lineal length of the laterals is 1800 ft. distributed as shown in Table A.

A partial chemical analysis of a sample (Lab. No. 145738), after 84 hr. pumping at a rate of 5700 gpm., showed the water to have a hardness of 10.9 gr. per gal., total dissolved minerals of 210 ppm., and an iron content of 0.5 ppm.

TABLE A

Lateral No.	Length ft.	Lateral No.	Length ft.
		5	236
1	108	6	232
2	216	7	200
3	232	8	208
4	168	9	208

The collector well is equipped with 24-in. Byron Jackson, type KXL pumps, rated at 5000 gpm. at 400 ft. T.D.H. and 600-hp., 2400-volt electric motor.

Water is pumped 30. 5 miles to Galesburg, through a prestressed concrete pipe line (25.3 miles of 36-in. diameter pipe and 5. 2 miles of 42-in. pipe) and discharged into a 5-mg. ground storage reservoir located at the Main St. station.

Pumpage is reported to average 6.00 mgd.

LABORATORY NO. 145738

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 5		Chloride	Cl	3.	.08
Manganese	Mn	0. 2		Nitrate	NO_3	0. 1	Tr.
				Alkalinity (as	$CaCO_3$)	172.	3. 44
Turbidity		1		Hardness (as	$CaCO_3$)	184.	3. 68
Color		0					
Odor		0					
Temp. (reported)		53. 5°F		Total Dissolved Minerals		210.	

GARY AVENUE GARDENS
DuPage County
October 30, 1958

A public water supply was installed in 1929 for Gary Avenue Gardens (est. 200), a subdivision located north of Wheaton. The system is owned by Mrs. Elizabeth Bird.

WELL NO. 1 was completed in 1929 to a depth of 200 ft., reportedly by a Driller from Batavia, and located at the southeast corner of Gary and Doris St., or approximately 2550 ft. N. and 2550 ft. W. of the N. E. corner of Section 5, T39N, R10E. The ground elevation at the well is 770.

The well is cased with 4-in. pipe to an unreported depth. The pumping equipment includes 60 ft. of 2 l/2-in. column pipe; Pomona turbine pump, No. AH54181, rated at 45 gpm. against 60 ft. T.D.H.; 3-hp. Fairbanks-Morse electric motor.

A partial chemical analysis of a sample (Lab. No. 148125) collected Oct. 30, 1958 showed the water in Well No. 1 to have a hardness of 17.1 gr. per gal., total dissolved minerals of 340 ppm., and an iron content of 0. 2 ppm.

Pumpage in Oct. 1957 was estimated to average 17,500 gpd.

LABORATORY NO. 148125

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Fluoride	F	0.5	
				Boron	B	.0.1	
				Chloride	Cl	1.	.03
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		Tr.		Hardness (as	$CaCO_3$)	292.	5.84
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		340.	

GERMANTOWN
Clinton County
January 13, 1958

Water for the village of Germantown (983) is obtained from three gravel packed wells. The dug well, reported in Bulletin 40, was deepened in 1954 by placing a 36-in. vitreous tile from the bottom of the dug portion to a depth of 30 ft. The well is no longer in service but is maintained for fire protection.

A well was drilled in Oct. 1955 to a depth of 223 ft. by Layne-Western Co., Aurora, and located about 200 ft. southeast of the old dug well. The well was cased with 8-in. pipe to 88 ft. A production test was conducted on Oct. 27 by representatives of the Driller and the State Water Survey. After 1 3/4 hr. pumping at a rate of 5 gpm., the drawdown was 129 ft. from a nonpumping water level of 33 ft. below the top of the casing.

An analysis of a sample (Lab. No. 138930) showed the water to have a hardness of 3. 3 gr. per gal., total dissolved minerals of 876 ppm., chloride of 162 ppm., and an iron content of 27 ppm. The turbidity was 850 ppm.

A short production test of the old dug well was conducted on Nov. 3, 1955 by representatives of J. Paul Rhoads, Consulting Engineer, and the State Water Survey. After 58 min. pumping at a rate of 41. 6 gpm., the drawdown was 5. 6 ft. from a nonpumping water level of 13 ft. below the top of the well. During the last 10 min. of pumping the rate fluctuated. Water level readings, after the level had fallen below the top of the tile, were made in the outer diameter of the well.

Several test holes were drilled under the supervision of J. Paul Rhoads, Engineer, in an attempt to obtain a minimum water supply of 80 gpm. for the. village. Subsequently, Wells 1, 2 and 3 were drilled by Layne-Western Co., Aurora.

WELL NO. 1 was located on the west side of Green St. and 40 ft. south of the center line of the Southern Railroad right-of-way, or approximately 1250 ft. N. and 2300 ft. W. of the S. E. corner of Section 4, T1N, R4W. The hole was bored 30 in. in diameter and cased with 8-in. steel pipe to 21 ft. 5 1/2 in. followed by 5 ft. of Layne shutter-type screen to 26 ft. 5 1/2 in. below the top of the casing which was left 1 ft. 6 in. above the ground surface. The annulus outside the screen and casing was backfilled with gravel up to about 14 ft. above the bottom of the well.

A production test was conducted on Jan. 18, 1956 by representatives of the Driller, the Consulting Engineer, and the State Water Survey. After 5 hr. 20 min. pumping at a rate of 47 gpm., the drawdown was 4. 9 ft. from a nonpumping water level of 15. 5 ft. below the top of the casing. Fifteen min. after pumping was stopped, the water level had recovered to 16. 5 ft.

Analysis of a sample (Lab. No. 145463) collected Jan. 9, 1958, after 5 min. pumping at 40 gpm., showed the water in Well No. 1 to have a hardness of 17.9 gr. per gal., total dissolved minerals of 465 ppm., and a trace of iron.

The permanent pump installation includes 19 ft. of column pipe; 5 5/8-in., 10-stage Layne turbine pump, Factory No. 34263, having an over-all length of 4 ft. 11 in. and rated at 35 gpm.; 20 ft. of air line; 3-hp. U S electric motor.

WELL NO. 2 was constructed similar to Well No. 1 and located 318 ft. west of Well No. 1. The 8-in. casing and 5 ft. of No. 5 gage Layne screen were set in a 30-in. hole with the bottom of the screen at 26 ft. 8 in. below the top of the casing which was left 1 ft. 8 in. above the ground level. The well was backfilled with gravel up to 14 ft. A production test was conducted on Jan. 25, 1956. After 8 hr. pumping at a rate of 42 gpm., the drawdown was 4 ft. 5 in. from a nonpumping water level of 15 ft. 8 in. below the top of the casing. Nine min. after pumping was stopped, the water level had recovered to 16 ft. 10 in. During the test the water level in Well No. 1 was lowered 3 1/4 in.

The permanent pump assembly in Well No. 2 is identical with the installation in Well No. 1.

WELL NO. 3 was constructed similar to Wells 1 and 2, and located 316 ft. west of Well No. 2, or approximately 1250 ft. N. and 2934 ft. W. of the S. E. corner of Section 4. The 8-in. casing and 5 ft. of No. 5 gage Layne screen were set in a 30-in. hole with the bottom of the screen at 28. 5 ft. and the top of the casing at 1. 2 ft. above the ground surface. The well was backfilled with gravel up to 14 ft.

A production test was conducted on Feb. 1, 1956. After 8 hr. pumping at 45 gpm., the drawdown in Well No. 3 was 9 ft. from a nonpumping water level of 18.1 ft. below the top of the casing.

Seven min. after pumping was stopped, the water level had recovered to 19.7 ft.

The permanent pump assembly in Well No. 3 is reported to be identical with that in Wells No. 1 and 2.

A partial analysis of a sample (Lab. No. 139706) collected Feb. 1, 1956, after 4 1/2 hr. pumping at 38 gpm., showed the water in Well No. 3 to have a hardness of 19.2 gr. per gal., total dissolved minerals of 369 ppm., and an iron content of 1 ppm.

Pumpage is reported to average 6000 gpd.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil	1	1
Hard clay	4 1/2	5 1/2
Reddish sandy clay	1 1/2	7
Sandy clay	10	17
Medium coarse sand	5	22
Coarse sand and gravel	3	25
Hard blue clay	3 1/2	28 1/2

LABORATORY NO. 145463

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	15.6	
Manganese	Mn	0.0		Fluoride	F	0.4	
Calcium	Ca	75.3	3.77	Boron	B	0.1	
Magnesium	Mg	28.7	2.36	Chloride	Cl	17.	.48
Ammonium	NH_4	0.0	.00	Nitrate	NO_3	15.4	.25
Sodium	Na	42.	1.82	Sulfate	SO_4	102.9	2.14
				Alkalinity (as	$CaCO_3$)	254.	5.08
Turbidity		0		Hardness (as	$CaCO_3$)	307.	6.13
Color		0					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		465.	

GILMAN
Iroquois County
September 9, 1960

Water for the public supply of the city of Gilman (1704) is principally obtained from one 12-in. well with two older wells in service for supplemental supply.

Subsequent to the construction of the 5-in. well by Lowell French, Ashkum, described in Bulletin 40, a production test was conducted on June 8, 1950 by representatives of the Driller, the City, the State Geological Survey, and the State Water Survey. After 3/4 hr. pumping at a rate of 63 gpm., the drawdown was 24.3 ft. from a static water level of 0. 95 ft. below the top of the casing. Ten min. after pumping was stopped, the water level had recovered to 1.1 ft. Before the start of pumping, the natural flow of the 5-in. well was measured in the smaller one of the two ground storage reservoirs near the well. The natural flow was 12 gprm.

The natural flow of the south 6-in. well, described in Bulletin 40, was measured at the same time and while the air lift was idle. The flow rate from the 6-in. well was 14 gpm.

The free flow of the 5-in. well was apparently insufficient and the well was equipped with an air pipe, an air compressor, and a 1 l/2-hp. electric motor.

The north 8-in. well, described in Bulletin 40, was deepened to 191 ft. in late 1950 by a Mr. Hutchens of Gilman. A 6-in. casing was set from the bottom of the 8-in. casing to the bottom of the well at 191 ft. The lower 2 ft. of 6-in. pipe was perforated.

This well was reported in 1951 to be free flowing with discharge into the main reservoir. However, a 210-gpm. Fairbanks-Morse centrifugal pump was installed for pumping the well. Power for pumping was from a 5-hp. electric motor.

In July 1952, WELL NO. '52 was completed to a depth of 195 ft. by J. Bolliger and Sons, Fairbury, and located at the southwest corner of the intersection of Maple and Crescent St., about 400 ft. east of the water works, or approximately 100 ft. S. and 2570 ft. E. of the N. W. corner of Section 6, T26N, R14W. The ground surface elevation at the well is 654. The well was cased with 181 ft. of 12-in. steel (49 lb./ft.) pipe, from 2. 5 ft. above ground level, followed by a 16 ft. length of 5-in. Houston stainless steel screen. The joints in the upper 114 ft. of casing were screw coupled and in the lower 67 ft. were welded. The screen had No. 14 slot openings at the top and No. 16 slots at the bottom.

Correlated driller's log of WELL NO. '52 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Black soil and yellow clay"	3	3
Yellow caving clay	1	4
Gray rubbery clay	71	75
Hardpan	10	85
Gray clay	31	116
Dirty coarse sand	8	124
Water sand, coarse with gravel	6	130
Dirty coarse sand	4	134
Gray clay	6	140
Brown silty clay	23	163
Water sand, fine, dirty	10	173
Water sand, medium, fine clean	16	189
Water sand, medium, coarse, clean	5	194
PENNSYLVANIAN SYSTEM		
Shale, dark	1	195

A production test was conducted on Well No. '52 on Aug. 20, 1952 by representatives of the Driller, the City officials, the State Water Survey, and Warren and VanPraag, Inc., Consulting Engineers. For test purposes, the well was equipped with a Peerless turbine pump set at 65 ft. below the top of the casing. Power for pumping was furnished by a right angle gear drive from a Mercury V-8 gasoline engine. After 5 hr. pumping at a rate of 302 gpm., the drawdown was 22 ft. from a static water level at the top of the casing. For the next 3/4 hr. the pumping rate was stepped up to 482 gpm. with a total drawdown of 37 ft. Twenty-two min. after pumping was stopped, the water level had recovered to 3. 2 ft.

A complete mineral analysis of a sample (Lab. No. 129689) collected Aug. 20, 1952, after 4 1/2 hr. pumping at 300 gpm., showed the water in Well No. '52 to have a hardness of 35. 2 gr. per gal., total dissolved minerals of 964 pprn., and an iron content of 2. 4 ppm.

Well No. '52 is equipped with a Layne turbine pump, rated at 300 gpm., connected to a

10-hp. U S electric motor. Water is discharged from the well to the aerator at the treatment plant.

The Well No. '52 is the principal source of supply. Water is pumped only from the collecting reservoir, which receives the free flow from the smaller wells when the water level in the reservoir reaches the overflow load.

At times the static water level in Well No. '52 rises to the surface. The free flow then discharges through a vent pipe in the top of the casing.

WELL NO. 8 (in the order of drilling) was completed in Sept. 1960 to a depth of 197 ft. by J. Bolliger and Sons and located about 500 ft. west of Well No. 7 ('52), or approximately 100 ft. S. and 2100 ft. E. of the N. W. corner of Section 6. The ground surface elevation at the well is 654.

The well was cased with 12-in. pipe from 3 ft. above to 185 ft. below the surface followed by a 12-in. Johnson stainless steel screen to 197 ft. The lower 4 ft. of screen had No. 20 slot openings, the middle 4 ft. had No. 18 slots, and the upper 4 ft. had No. 15 slots.

A production test was conducted on Sept. 9, 1960 by representatives of the Driller, the State Water Survey, and Vail Moore, Consulting Engineer. For test purposes an 8-in., 8-stage Pomona test turbine, 10 ft. long, was set at 85 ft. The base of the pump was 4 ft. above the ground surface. A gas engine furnished the power for pumping. After 5 l/2 hr. pumping at a constant rate of 280 gpm., the drawdown was 37. 4 ft. from a nonpumping water level of 4.1 ft. below the pump base.

Pumping was then continued at 190 gpm. and after 15 min. the drawdown was 24. 5 ft.

Then after 15 min. pumping at 165 gpm., the drawdown remained steady at 21.4 ft.

A partial chemical analysis of a sample (Lab. No. 153207) collected Sept. 9, 1960, after 4 hr. pumping at 280 gpm., showed the water in Well No. 8 to have a hardness of 35. 4 gr. per gal., total dissolved minerals of 993 ppm., and an iron content of 2. 3 ppm.

There are 600 services not metered.

Pumpage for 1956 was reported to average 100,000 gpd.

LABORATORY NO. 129689

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 4		Silica	SiO_2	19. 0	
Manganese	Mn	Tr.		Fluoride	F	0. 4	
Calcium	Ca	143. 0	7. 15	Chloride	Cl	24.	. 68
Magnesium	Mg	59. 2	4. 87	Nitrate	NO_3	0. 2	Tr.
Ammonium	NH_4	2. 1	. 12	Sulfate	SO_4	411. 4	8. 56
Sodium	Na	79.	3. 42	Alkalinity (as	$CaCO_3$)	316.	6. 32
Turbidity		9		Hardness (as	$CaCO_3$)	601.	12. 02
Color		0					
Odor		0					
Temp. (reported)		54. 2°F		Total Dissolved Minerals		964.	
pH (reported)		7. 7		Free CO_2 (calc.)		13.	

GLEN CARBON
Madison County
July 20, 1959

One well is in service for the public water supply of the village of Glen Carbon (1241).

WELL NO. 1, described in Bulletin 40, was acidizedinl953 by Harold Watson, East St. Louis. New pumping equipment was installed due to corrosion of parts. The well was subsequently abandoned in 1956 and was to be filled and sealed.

WELL NO. 2 was completed in Nov. 1951 to a depth of 66 ft. 3 in. by Harold Watson and located on the north side of Route 162, about 150 ft. north of Well No. 1, or approximately 1650 ft. S. and 4500 ft. E. of the N. W. corner of Section 5, T3N, R8W. The elevation of the ground surface at the well is 440. The well was cased with 46 ft. of 12-in. pipe from 1 ft. above the ground level to approximately 45 ft. below followed by 21 ft. 7 in. of 12-in. Cook screen. The upper part of the screen had No. 14 slot openings and the lower part had No. 25 slots.

A production test was conducted on Nov. 2, 1951 by representatives of the Driller, the State Water Survey, and Village officials. For test purposes the well was equipped with a Cook turbine pump set at 50 ft. below the top of the casing. After 24 hr. pumping at a rate of 98 gpm., the drawdown was 13. 6 ft. from a static water level of 22. 2 ft. below the top of the casing. One and one-half hr. after the pump was stopped, the water level had recovered to 23 ft.

A mineral analysis of a sample (Lab. No. 126915) collected Nov. 3, 1951, after 24 hr. pumping at a rate of 98 gpm., showed the water in Well No. 2 to have a hardness of 27. 7 gr. per gal., total dissolved minerals of 590 ppm., and an iron content of 0. 9 ppm.

The pumping equipment consists of 40 ft. of column pipe; Cook turbine pump (No. 13284); 10 ft. of 4-in. suction pipe; 3-hp. U S electric motor.

Since July 1959 Well No. 2 has been maintained for emergency use only.

WELL NO. 3 (Peters Station) was completed in May 1956 to a depth of 62 ft. by Thorpe Concrete Well Co., Alton, and located about 230 ft. west of Well No. 1, or approximately 1800 ft. S. and 4220 ft. E. of the N. W. corner of Section 5. The elevation of the ground surface at the well is 398. The well was cased with 12 ft. of 40-in. od. by 30-in. id. blank concrete pipe followed by 48 ft. of porous concrete pipe screen. The top of the concrete pipe is 3/4 ft. above L. S.D.

A production test was conducted on Dec. 6, 1956 by representatives of the Driller, the State Water Survey, and Sheppard, Morgan and Schwaab, Consulting Engineers for the village. The permanent pumping equipment was in place for the test. After 3/4 hr. pumping at a rate of 104 gpm., the drawdown was 7 ft. below a static water level of 30 ft. below the pump base. Due to the short air line, the drawdown for a higher pumping rate could not be measured. With the valve wide open the pumping rate fluctuated between 250 and 210 gpm. With the valve partially closed and pumping at about 232, there was little fluctuation.

The pumping equipment includes 41 ft. of 5-in. column pipe; 4-stage American Well Works turbine pump, 3 ft. in length and rated at 300 gpm. when pumping to discharge; 10 ft. of 5-in. suction pipe; 40 ft. of air line; 7 l/2-hp. U S electric motor.

mineral analysis of a sample (Lab. No. 146493) collected Apr. 28, 1958 showed the water in Well No. 3 to have a hardness of 30 gr. per gal., total dissolved minerals of 666 ppm., and an iron content of 0. 4 ppm.

In Jan. 1957 pumpage was reported to average 35,000 gpd.

Z - Glen Carbon

LABORATORY NO. 146493

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	20.3	
Manganese	Mn	0.2		Fluoride	F	0.3	
Calcium	Ca	119.2	5.96	Boron	B	0.2	
Magnesium	Mg	52.7	4.33	Chloride	Cl	17.	.48
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.9	.03
Sodium	Na	23.	.98	Sulfate	SO_4	251.8	5.24
				Alkalinity (as	$CaCO_3$)	276.	5.52
Turbidity		2		Hardness (as	$CaCO_3$)	515.	10.29
Color		0					
Odor		0					
Temp. (reported)		57.5°F		Total Dissolved Minerals		666.	

GLENDALE ADDITION
Rock Island County
May 21, 1959

A public water supply was installed in 1955 for the Glendale First and Second Additions (est. 80), a subdivision located at Ninth St. and Colona Road, about 2 miles south of Silvis. The system is owned and operated by Glendale Improvement Association.

WELL NO. 1 was completed in 1955 to a depth of 595 ft. by Peerless Service Co., Orion, and located at the south end of Ninth St., 1 block south of Colona Road, or approximately 1065 ft. S. and 269 ft. W. of the N. E. corner of Section 7, T17N, R1E. The ground surface elevation at the well is 7.02.

The well was cased with 10-in. pipe from 1 ft. above to 227 ft. below the ground surface, followed by 8-in. pipe from 227 ft. to 318 ft. From 318 to 595 ft. the hole was finished 8 in. in diameter.

A production test was conducted onMay 19, 1959 by representatives of the Driller, the State Water Survey, and the Consulting Engineers, Missman, Stanley, Farmer & Associates. The permanent pumping equipment was in place and consisted of 443 ft. of column pipe; a Red Jacket submersible pump, rated at 150 gpm.; 443 ft. of air line; 20-hp. electric motor. After 5 hr. 40 min. pumping at 121 gprn., the drawdown was 219 ft. from a nonpumping water level of 162. 5 ft. below the top of the casing. One hr. after pumping was stopped, the water level had recovered to 175 ft.

A mineral analysis of a sample (Lab. No. 149637) collected May 19, 1959, after 6 hr. pumping at a rate of 125 gpm., showed the water in Well No. 1 to have a hardness of 14. 3 gr. per gal., total dissolved minerals of 452 ppm., and an iron content of 1. I ppm. An odor of H_2S was present.

Pumpage is estimated to average 5000 gpd.

LABORATORY NO. 149637

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1. 1		Silica	SiO_2	10. 8	
Manganese	Mn	Tr.		Fluoride	F	0. 3	
Calcium	Ca	55. 8	2. 79	Boron	B	0. 3	
Magnesium	Mg	25. 7	2. 11	Chloride	Cl	8.	.23
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	11. 8	.19
Sodium	Na	86.	3. 76	Sulfate	SO_4	34. 4	. 72
				Alkalinity (as	$CaCO_3$)	376.	7. 52
Turbidity		4		Hardness (as	$CaCO_3$)	245.	4. 90
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		55. 5°F		Total Dissolved Minerals		452.	

GLEN ELLYN
DuPage County
July 6, 1959

Three wells furnish the water supply for the village of Glen Ellyn (15, 972).

WELL NO. 1, described in Bulletin 40, was abandoned several years ago.

WELL NO. 2, described in Bulletin 40, was equipped in Oct. 1956 with new pump bowls set at 270 ft. The static water level at the time was 72.1 ft. Also a new suction pipe and air line were installed. Well No. 2 is in service.

WELL NO. 3 is in service, without any change since Bulletin 40. In July 1957 Wells No. 2 and 3 furnished 14% of the total pumpage for the village.

A TEST WELL was drilled in Dec. 1953 to a depth of 418 ft. by Neely, Schimelpfenig and Neely, Batavia, and located in the southeast corner of the intersection of Newton Ave. and DuPage Blvd. in Glen Ellyn Manor Subdivision, or approximately 1040 ft. N. and 625 ft. W. of the S. E. corner of Section 15, T39N, R10E. The ground surface elevation at the well is 760. The test well was cased with 8-in. pipe to 138 ft,, below which the hole was finished at 8 in. in diameter.

A production test was conducted on Dec. 28, 1953 by representatives of the Driller, the State Water Survey, and Walter E. Deuchler Co., Aurora, Consulting Engineers. For test purposes the pumping equipment consisted of 200 ft. of 4-in. column pipe; 5 l/2-in., 8-stage Cook turbine test pump belt-driven from a stationary gasoline engine; 200 ft. of air line. After 4 hr. pumping at a rate of 228 gpm., the drawdown was 5 ft. from a nonpumping water level of 73 ft. After Well No. 4 was put into service, the Test Well was filled and abandoned.

WELL NO. 4 was completed in Feb. 1954 to a depth of 422 ft. by L. Cliff Neely, Batavia, and located about 200 ft. S. of the Test Well, or approximately 860 ft. N. and 645 ft. W. of the S. E. corner of Section 15. The ground surface elevation at the well is 760. The well was cased with 26-in. pipe from the surface to 20 ft. and with 20-in. pipe from 1.7 ft. above to 150 ft. below the ground surface.

A production test was conducted on Feb. 26, 1954 by representatives of the Driller, the Engineers, and the State Water Survey. For test purposes the pumping equipment consisted of 200 ft. of column pipe; a Peerless turbine test pump directly connected to a Buda gasoline engine. A 200-ft. air line was installed. After 21 hr. pumping at a rate of 995 gpm., the drawdown was 27 ft. from a nonpumping water level of 85 ft. below the top of the casing.

On Apr. 24, 1956 the pumping water level was 115 ft. and on July 9, 1957 the pumping level was 119 ft. In July and August 1957 the nonpumping water level fluctuated between 94 and 96.

The permanent pumping equipment installed in Aug. 1954 consists of 160 ft. of 10-in. column pipe; 9 l/2-in., 9-stage Layne turbine pump, No. 27943, rated at 1350 gpm.; 10 ft. of 10-in. suction pipe; 174 1/2 ft. of air line; 100-hp. Westinghouse electric motor.

For July 1957, Well No. 4 furnished 86% of the total pumpage for the village.

A mineral analysis of a sample (Lab. No. 146388) collected Apr. 18, 1958, after 6 hr. pumping at 995 gpm., showed the water in Well No. 4 to have a hardness of 16. 5 gr. per gal., total dissolved minerals of 456 ppm., and an iron content of 0.5 ppm.

Total pumpage for the village for Jan. to June 1959 inclusive averaged 1.20 mgd.

2 - Glen Ellyn

LABORATORY NO. 146388

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	16.3	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	54.5	2.73	Boron	B	0.4	
Magnesium	Mg	35.3	2.90	Chloride	Cl	5.	.14
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	1.4	.02
Sodium	Na	52.	2.25	Sulfate	SO_4	117.7	2.45
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		2		Hardness (as	$CaCO_3$)	282.	5.28
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		456.	

GLEN ELLYN
HEIGHTS SUBDIVISION
DuPage County
August 15, 1960

A public water supply was installed in 1946 for the Glen Ellyn Heights Subdivision (est. 350). The system is owned and operated by the King-Ash Water Co.

WELL NO. 1 was completed in 1946 to a depth of 350 ft. by J. P. Miller Artesian Well Co., Brookfield, and located north of Glen Ellyn, or approximately 100 ft. S. and 2625 ft. W. of the N. E. corner of Section 2, T39N, R10E. The ground surface elevation at the well is 702. A 10-in. hole was drilled to 242 ft. followed by an 8-in. hole to the bottom. The well was cased with 10-in. pipe to limestone at 135 ft.

The pumping equipment includes a Reda submersible pump connected to a 1 l/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153024) collected Aug. 15, 1960 showed the water to have a hardness of 7. 9 gr. per gal., total dissolved minerals of 697 ppm., and an iron content of 0. 3 ppm.

There are 75 services, 58 of them metered. Pumpage is estimated to average 21,000 gpd.

LABORATORY NO. 153024

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	9.9	
Manganese	Mn	0.0		Fluoride	F	4.0	
Calcium	Ca	31.2	1.56	Boron	B	0.6	
Magnesium	Mg	12.6	1.04	Chloride	Cl	10.	.28
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	0.8	.01
Sodium	Na	211.	9.19	Sulfate	SO_4	179.8	3.74
				Alkalinity (as	$CaCO_3$)	388.	7.76
Turbidity		0		Hardness (as	$CaCO_3$)	130.	2.60
Color		0					
Odor		0					
Temp. (reported)		53.6°F		Total Dissolved Minerals		697.	

Four wells are in service for Glenview Countryside and 11 other subdivisions (est. 3330). All 12 subdivisions are listed near the end of this article. The water system is owned by the Illinois Municipal Water Co.

WELL NO. 1 was last reported being used as a stand-by unit.

WELL NO. 2 was last reported being in service and in July 1957 the nonpumping water level was 300 ft. During pumping, the drawdown was reported to be 35 ft.

WELL NO. 3 was completed in June 1954 to a depth of 917 ft. by Layne-Western Co., Aurora, and located at Linneman and Wedell, approximately 1300 ft. N. and 600 ft. W. of the S. E. corner of Section 33, T42N, R12E. The drilling was stopped at 650 ft. depth in May 1954 and a production test was conducted May 25-26. The casing and hole record is shown in Table A.

TABLE A

Hole Record

16-in. to 175 ft.
14-in. to 460 ft.
12-in. to 650 ft.

Casing Record

16-in. drive pipe from +1 ft. to 1 33 ft.
12-in. casing from 116 ft. to 460 ft.
14-in. liner from 129 ft. to 1 77 ft.

The production test of May 25-26 was conducted by representatives of the Driller, H. B. Bleck Engineering Co., Consulting Engineers, and the State Water Survey. Water was pumped for 24 hr. at a rate of 230 gpm. with a drawdown of 128 ft. from a static water level of 279 ft. below the top of the casing. Ten min. after pumping was stopped, the water level had recovered to 320 ft.

At the end of the test, a water sample was collected for partial analysis (Lab. No. 134921) which showed the water to have a hardness of 23. 1 gr. per gal., turbidity of 14 ppm., total dissolved minerals of 612 ppm., and an iron content of 0. 6 ppm.

Immediately following the production test of May 26, the well was deepened to 917 ft. The open hole was finished 12 in. in diameter from 650 ft. to the bottom at 917 ft. Upon completion of the deepening, a production test was conducted on June 15-16. After 24 hr. pumping at a rate of 305 gpm., the drawdown was 87 ft. from a nonpumping water level of 273 ft. below the top of the casing. Seven min. after pumping was stopped, the water level had recovered to 311 ft.

The permanent pumping equipment includes a Layne turbine pump set at 380 ft. and rated at 300 gpm. against 515 ft. T.D.H.; 380 ft. of air line; 50-hp. U S electric motor.

Analysis of a sample (Lab. No. 147066) collected May 20, 1958 showed the water in Well No. 3 to have a hardness of 22. 6 gr. per gal., a trace of turbidity, total dissolved minerals of 709 ppm., and an iron content of 0. 2 ppm.

WELL NO. 4 was drilled in Apr. 1957 to a depth of 1405 ft. by Layne-Western Co. and located in the northwest portion of the Glenview Woodlands Subdivision, or approximately 474 ft. N. and 100 ft. W. of the S. E. corner of Section 29, T42N, R12E. The ground elevation at the well is 677. The casing and hole record is shown in Table B.

TABLE B

Hole Record

19 1/4-in. from 0 to 499 ft.
15 1/4-in. from 499 to 1185 ft.
12-in. from 1185 to 1405 ft.

Casing Record

20-in. from 0 to 145 ft.
16-in. from 0 to 499 ft.
1 2-in. liner from 107. 5 to 1185 ft.
The 16-in. casing was cemented in place from bottom to top.

In a production test, conducted by the Driller on Apr. 15-18, 1957 water was pumped for 20 1/2 hr. at a rate of 906 gpm. with a drawdown of 164 ft. from a nonpumping water level of 316 ft. below the top of the casing.

The pumping equipment includes 550 ft. of 10-in. column pipe; 12-in., 10-stage Layne turbine pump, No. 36864, having an over-all length

of 9 ft. 10 in. and rated at 1000 gpm.; 10 ft. of 8-in. suction pipe; 560 ft. of air line; 250-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 147069) collected May 26, 1958 showed the water in Well No. 4 to have a hardness of 22 gr. per gal., total dissolved minerals of 693 ppm., and an iron content of 0. 5 ppm.

On Sept. 1, 1958 it was reported that 1073 services were installed and that ultimately the developed area would consist of 1700 homes, a population of approximately 6000.

Pumpage from Mar. 1 to Sept. 1, 1958 averaged 236,000 gpd. based on quarterly billings.

The 12 subdivisions served by this water system are:

GLENVIEW COUNTRYSIDE

COUNTRY PARK SUBDIVISION NO. 2

SUNSET TERRACE

MORTON PARK

GLENVIEW TERRACE

BELWOOD

GLENVIEW WOODLANDS

PAM-ANNE ESTATES

KEMPSTON COUNTRYSIDE

BEL-AIR GARDENS NO. 2

BEL-AIR GARDENS NO. 3

NIXON'S GREENWOOD-CENTRAL

LABORATORY NO. 147069

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	8.6	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	96.0	4.80	Boron	B	0.3	
Magnesium	Mg	33.0	2.71	Chloride	Cl	37.	1.04
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.8	.02
Sodium	Na	91.	3.95	Sulfate	SO_4	253.8	5.28
				Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		10		Hardness (as	$CaCO_3$)	376.	7.51
Color		0					
Odor		0					
Temp. (reported)		56.5°F		Total Dissolved Minerals		693.	

GOLF-GREENWOOD
SUBDIVISION
Cook County
June 1, 1960

A public water supply was installed in 1939 for the Golf-Greenwood Subdivision.

WELL NO. 1 was drilled in 1939 to a depth of 1000 ft. and deepened in 1958 to 1147 ft. by J. P. Miller Artesian Well Co., Brookfield, and located northeast of DesPlaines, approximately 575 ft. S. and 675 ft. E. of the N. W. corner of Section 14, T41N, R12E. The ground surface elevation at the well is 649.

The well was cased with 10-in. pipe from the surface to 132 ft. and with 8-in. pipe from the surface to 527 ft. A 7-in. pipe was set from 514 to 684 ft., below which the hole was finished 6 in. in diameter to the bottom.

On Nov. 26, 1958 the nonpumping water level was reported to be 322 ft. (air line reading) and on May 7, 1959, during pumping at 125 gpm., the water level was 336 ft.

The pumping equipment consists of 360 ft. of column pipe; Peerless turbine pump (No. 8768), 10 ft. in length; 360 ft. of air line; 20 ft. of suction pipe; 7 1/2-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 149544) collected May 7, 1959, during pumping at 125 gpm., showed the water in Well No. 1 to have a hardness of 21.4 gr. per gal., total dissolved minerals of 949 ppm., and an iron content of 1. 2 ppm.

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Blue clay"	110	110
Gravel (dolomite, silty, gray, fine)	30	140
MISSISSIPPIAN SYSTEM		
Kinderhook Series		
Shale, green to brown, weak, little firm; little dolomite, dark brown	365	505
SILURIAN SYSTEM		
Dolomite, cherty, white, buff, gray, fine, granular to crystalline	35	540
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, green, brownish-gray, weak; little dolomite, silty, gray	100	640
"Shale"	5	645
Galena-Platteville Formations		
Dolomite, buff, brown, gray, medium to coarse; no samples ("lime") 725-1025 feet	393	1038
Glenwood-St. Peter Formations		
Sandstone, partly dolomitic, buff, very fine to coarse; little shale, sandy, green, upper 7 feet; no samples ("sandstone") 1135 to 1147 feet	109	1147

2 - Golf-Greenwood Subdivision

LABORATORY NO. 149544

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	10.1	
Manganese	Mn	Tr.		Fluoride	F	0.1	
Calcium	Ca	84.3	4.22	Boron	B	0.8	
Magnesium	Mg	37.5	3.08	Chloride	Cl	130.	3.67
Ammonium	NH_4	1.1	.06	Nitrate	NO_3	0.2	Tr.
Sodium	Na	187.	8.12	Sulfate	SO_4	333.9	6.95
				Alkalinity (as	$CaCO_3$)	240.	4.80
Turbidity		7		Hardness (as	$CaCO_3$)	365.	7.30
Color		0					
Odor		0					
Temp. (reported)		60.5°F		Total Dissolved Minerals		949.	

One well is in service and two wells are available for service for the public water supply of the village of Grays Lake (3762).

WELL NO. 1, described in Bulletin 40 as being drilled in 1915, is equipped with 240 ft. of 5-in. column pipe; 8-in., 17-stage Pomona turbinepump, No. 5H2562, ratedat 150 gpm. against 320 ft. T.D.H.; 240 ft. of air line; 20-hp. General Electric motor.

On Feb. 2, 1959 the nonpumping water level was 127 ft. below the pump base.

Well No. 1 is maintained for stand-by use.

WELL NO. 2, described in Bulletin 40 as being drilled in 1924, is equipped with 330 ft. of 5-in. column pipe; 8-in., 19-stage Pomona turbine pump, No. SW 3114, ratedat 150 gpm. against 450 ft. T.D.H.; 330 ft. of air line; 20-hp. General Electric motor. On Feb. 2, 1959 the nonpumping water level was 228 ft. below the pump base.

Well No. 2 is maintained for stand-by use.

WELL NO. 3 was completed in 1958 to a depth of 337 ft. by Henry Boysen, Libertyville, and located 3/4 mile northwest of Well No. 2 (at the pumping station), or approximately 2000 ft. N. and 2500 ft. E. of the S. W. corner of Section 27, T45N, R10E. The elevation of the ground surface at the well is 794.

The well was cased with 12-in. pipe to 250 ft., penetrating 2 ft. of limestone. Below the casing, the hole was finished at 12 in. in diameter to the bottom.

The pumping equipment consists of 250 ft. of (?)-in. column pipe; 10-in., 7-stage Johnston turbine pump, rated at 400 gpm. against 360 ft. T.D.H.; 250 ft. of air line; 50-hp. U S electric motor.

On Dec. 3, 1959, during pumping at a rate of 710 gpm., the drawdown was 106 ft. from a nonpumping water level of 87 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 151192) collected Dec. 3, 1959 showed the water in Well No. 3 to have a hardness of 7. 5 gr. per gal., total dissolved minerals of 424 ppm., and a trace of iron.

Well No. 3 is in service.

Pumpage for Grays Lake in Sept. 1958 averaged 150,000 gpd.

LABORATORY NO. 151192

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	9.8	
Manganese	Mn	0.0		Fluoride	F	0.9	
Calcium	Ca	25.2	1.26	Boron	B	0.5	
Magnesium	Mg	16.1	1.32	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.9	.01
Sodium	Na	92.	4.01	Sulfate	SO_4	211.9	4.41
				Alkalinity (as	$CaCO_3$)	100.	2.00
Turbidity		3		Hardness (as	$CaCO_3$)	129.	2.58
Color		0					
Odor		0					
Temp. (reported)		52.2°F		Total Dissolved Minerals		424.	

GREENFIELD
Greene County
September 17, 1959

Four wells are in service for the city of Greenfield (1064).

WELL NO. 1 is described in Bulletin 40 as the well drilled in 1936 by Thorpe Concrete Well Co., Alton, and located 3 ft. east of Test Well No. 20. The well is equipped with a Fairbanks-Morse turbine pump with power from a 2 1/2-hp. electric motor.

WELL NO. 2 is described in Bulletin 40 as the North Well drilled in 1944 by Thorpe. Pumping equipment includes a jet pump with power from a 2-hp. electric motor.

WELL NO. 3 was completed in 1949 to a depth of 30 ft. by Walter Vette, Drilling Contractor, Beardstown, and located at the north end of the High School athletic field about 1000 ft. north of Well No. 2, or approximately 4340 ft. N. and 50 ft. W. of the S. E. corner of Section 4, T10N, R10W. The ground surface elevation at the well is 545.

The well was double cased with 8-in. outer pipe from 2 ft. above to 18 ft. 4 in. below ground level and with a 6-in. id. inner pipe from 4 ft. below the top of the 8-in. casing to a depth of 4 ft. below the bottom of the 8-in. casing, or 22 ft. 4 in. below the ground level. The 6-in. casing was followed by 8 ft. of 6-in. Johnson silicon red brass screen with No. 60 slot openings.

The pumping equipment includes a Fairbanks-Morse double cylinder suction pump, rated at 1300 gal. per hr., with the intake of the discharge column set near the bottom of the well. Power for pumping is from a 2-hp. Fairbanks-Morse electric motor.

A partial chemical analysis of a sample (Lab. No. 150646) collected Sept. 17, 1959, after several hours pumping, showed the water in Well No. 3 to have a hardness of 27.4 gr. per gal., total dissolved minerals of 631 ppm., and an iron content of 1. 3 ppm.

In Feb. 1954 Greenfield was reportedly getting about 9000 gpd. from its wells and about 35,000 to 40,000 gpd. were being hauled to Greenfield from Brighton.

In an effort to find an additional water supply locally, several Test Wells were drilled in 1955 by Calhoun Drilling Co., Batchtown. Test Well No. 3 was selected for a production test. The Test Well was drilled to a depth of 36 ft. and located about 250 ft. northeast of Well No. 1, or approximately 1800 ft. S. and 100 ft. E. of the N. W. corner of Section 3. The Test Well was cased with 6-in. pipe to 26 ft. followed by 10 ft. of slotted pipe to the bottom of the hole.

A production test of the Test Well was conducted on Aug. 4-5, 1955 by representatives of the Driller and the State Water Survey. During the test, water levels in an Observation Well located 42. 2 ft. east of Test Well No. 3 were observed. After 24 hr. pumping at a rate of 20. 4 gpm., the drawdown in Test Well No. 3 was 21 ft. from a nonpumping water level of 8. 5 ft. below the top of the casing (air line readings). At the end of the test, the water level in the Observation Well had lowered 4.7 ft. from a static level of 9. 6 ft.

WELL NO. 4, originally called 1-54, was completed in 1954 to a depth of 30 ft. by Calhoun Drilling Co. and located about 600 ft. N. and 1050 ft. W. of the S. E. corner of Section 3. The ground surface elevation at the well is 545.

The well was cased with 8-in. pipe to the bottom of the hole. An unreported length of the casing at the bottom was slotted, and the well was gravel packed.

The pumping equipment includes a Jacuzzi jet pump with power from a 1 1/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 150645) collected Sept. 17, 1959 showed the water in Well No. 4 to have a hardness of 22. 4 gr. per gal., total dissolved minerals of 485 ppm., an iron content of 4. 9 ppm., and a turbidity of 28 ppm.

There are approximately 374 services installed.

From July 1, 1958 through June 30, 1959, pumpage averaged 33, 600 gpd.

2 - Greenfield

LABORATORY NO. 150645

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4.9		Silica	SiO_2	17.2	
Manganese	Mn	0.4		Fluoride	F	0.2	
Calcium	Ca	86.3	4.32	Boron	B	0.0	
Magnesium	Mg	40.9	3.36	Chloride	Cl	18.	.51
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	2.2	.04
Sodium	Na	24.	1.06	Sulfate	SO_4	124.9	2.60
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		28		Hardness (as	$CaCO_3$)	384.	7.68
Color		0					
Odor		0					
Temp. (reported)		55.5°F		Total Dissolved Minerals		485.	

GREENUP
Cumberland County
April 30, 1959

The public water supply of the village of Greenup (1477), as described in Bulletin 40, included three wells. Since then well No. 4 has been constructed.

WELLS NO. 1 and 2 have been abandoned.

Since 1955 WELL NO. 3 has been maintained for emergency use.

WELL NO. 4 was completed in Mar. 1950 to a depth of 40 ft. by E. C. Baker, Sigel, and located about 7 ft. southeast of Well No. 2, or approximately 1450 ft. S. and 100 ft. E. of the N. W. corner of Section 2, T9N, R9E. The ground elevation at the well is 520.

The well was cased with 26 ft. 2 in. of 12-in. pipe from 5 ft. above ground level followed by a Houston stainless steel screen having No. 80 slot openings, and with 18 ft. 9 in. length of the screen exposed to the formation. The pumping equipment includes a Cook turbine pump, rated at 200 gpm. and directly connected to a 25-hp. U S electric motor.

In Mar. 1951 the well was reportedly producing 125 gpm. with a drawdown of 12 ft. from a nonpumping water level of 10 ft. below the ground surface, or 16 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 149508) collected Apr. 30, 1959, after 5 min. pumping at a rate of 250 gpm., showed the water in Well No. 4 to have a hardness of 16. 8 gr. per gal., total dissolved minerals of 345 ppm., and an iron content of 0. 4 ppm.

Pumpage for Apr. 1959 reportedly averaged 120,000 gpd.

LABORATORY NO. 149508

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	14.9	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	68.1	3.41	Boron	B	0.2	
Magnesium	Mg	28.8	2.37	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	9.3	.15
Sodium	Na	11.	.48	Sulfate	SO_4	60.1	1.25
				Alkalinity (as	$CaCO_3$)	236.	4.72
Turbidity		2		Hardness (as	$CaCO_3$)	289.	5.78
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		345.	

GREEN VALLEY
Tazewell County
June 8, 1960

Two wells are available for service in the public water supply system of the village of Green Valley (552).

WELL NO. 1, described in Bulletin 40, is in service.

A mineral analysis of a sample (Lab. No. 124958) collected Apr. 12, 1951 showed the water in Well No. 1 to have a hardness of 18. 8 gr. per gal., total dissolved minerals of 365 ppm., and an iron content of 1, 9 ppm.

WELL NO. 2 was completed in 1954 to a depth of 115 ft. by Chris Ebert, Washington, and located at the southwest corner of the village hall, about 60 ft. south of Well No. 1, or approximately 100 ft. N. and 400 ft. E. of the S. W. corner of Section 26, T23N, R5W. The ground surface elevation at the well is 538. The well was cased similarly to Well No. 1.

According to a State Department of Public Health report the permanent pump installation includes a Deming turbine pump, rated at 300 gpm. connected to a 20-hp. electric motor.

No water sample was collected from Well No. 2 due to construction obstacles.

Well No. 2 is reportedly maintained for stand-by use only. It is used in case of emergency when Well No. 1 cannot supply enough water.

There are 160 services. Pumpage is estimated to average 10,000 gpd.

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown; silt, brown	12	12
Sand, yellow brown, very gravelly, very coarse to fine	29	41
Sand, light gray, fine to very coarse	59	100
Sand, brown, very fine to very coarse; little gravel, granular to medium	15	115

LABORATORY NO. 124958

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1. 9		Silica	SiO_2	21. 8	
Manganese	Mn	0. 1		Fluoride	F	0. 1	
Calcium	Ca	76. 1	3. 81	Chloride	Cl	7.	. 20
Magnesium	Mg	32. 1	2. 64	Nitrate	NO_3	0. 0	. 00
Ammonium	NH_4	0. 1	. 01	Sulfate	SO_4	50. 8	1. 06
Sodium	Na	4.	. 16	Alkalinity (as	$CaCO_3$)	268.	5. 36
Turbidity		3		Hardness (as	$CaCO_3$)	323.	6. 45
Color		0					
Odor		H_2S (at well)		Total Dissolved Minerals		365.	
Temp. (reported)		54°F		pH (reported)		7. 5	

GREENVIEW
Menard County
October 16, 1956

Two drilled wells are in service for the public water supply of Greenview village (796). The old dug well has been abandoned and filled in.

WELL NO. 1, described in Bulletin 40 as the dug well, was abandoned and filled in about 1949.

WELL NO. 2, described in Bulletin 40, has been maintained as a stand-by unit since 1950, owing to the undesirable mineral quality of the water. The well is maintained for emergency fire protection use.

WELL NO. 3 was completed in Apr. 1950 to a depth of 159 ft. by Hayes and Sims, Champaign, and located about 1 1/2 miles northeast of town, or approximately 1845 ft. N. and 2610 ft. W. of the S. E. corner of Section 14, T19N, R6W. The ground elevation at the well is 520. The well was cased with 149 ft. of 10-in. welded pipe from 2 ft. above ground level followed by 13 ft. 5 in. of Johnson screen with 12 ft. exposed to the aquifer. The upper 8 ft. of screen had No. 14 slot openings and the lower 4 ft. had No. 18 slot openings.

A production test was conducted on Apr. 12, 1950 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Consulting Engineers. For the test a Pomona turbine pump, set at 60 ft. below the top of the casing, was operated from a flat belt off a tractor pulley. After 2 hr. pumping at a rate of 185 gpm., the drawdown was 11 ft. from a static water level of 20. 8 ft. The test was continued for an additional 2 hr. at a rate of pumping of 290 gpm. The drawdown was observed to be 17 ft. Seventeen min. after pumping was stopped, the water level had recovered to 21. 6 ft.

A mineral analysis of a sample (Lab. No. 121406) collected Apr. 12, 1950, after 4 hr. pumping at 290 gpm., showed the water in Well No. 3 to have a hardness of 18.2 gr. per gal., total dissolved minerals of 351 ppm., and an iron content of 2. 9 ppm.

The pumping equipment consists of a Jacuzzi jet pump, rated at 200 gpm., connected to a 15-hp. electric motor.

On Oct. 15, 1956 the pump, set at 37 ft., reportedly had broken suction. The well was treated with Calgon for 25hr. by Mr. Sims, Driller, after which water was pumped at a rate of 100 gpm. with a drawdown of 5 ft. from a static water level of 27 ft.

There are reported to be about 200 meters with 130 meters being read. Pumpage for 1956 averaged 48, 000 gpd.

LABORATORY NO. 121406

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.9		Silica	SiO_2	20.7	
Manganese	Mn	0.1		Fluoride	F	0.3	
Calcium	Ca	74.1	3.70	Chloride	Cl	7.	.20
Magnesium	Mg	30.9	2.54	Nitrate	NO_3	0.4	.01
Ammonium	NH_4	Tr.	Tr.	Sulfate	SO_4	56.8	1.18
Sodium	Na	0.7	.03	Alkalinity (as	$CaCO_3$)	244.	4.88
Turbidity		16		Hardness (as	$CaCO_3$)	312.	6.24
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		351.	

HAMMOND
Piatt County
January 5, 1960

Two wells are in service for the village of Hammond (471).

WELL NO. 1, described in Bulletin 40, is in service.

A mineral analysis of a sample (Lab. No. 150542) collected Sept. 9, 1959 showed the water in Well No. 1 to have a hardness of 21.2 gr. per gal., total dissolved minerals of 500 ppm., and an iron content of 9. 4 ppm.

WELL NO. 2 was completed in 1957 to a depth of 87 ft. by Swartz and Briggs, Atwood, and located about 45 ft. north of Well No. 1, or approximately 2310 ft. N. and 580 ft. E. of the S. W. corner of Section 36, T16N, R5E. The ground surface elevation at the well is 688. The well is cased with 6-in. pipe from 1 ft. above to 77 ft. below the surface.

The pumping equipment consists of a submersible pump, rated at 130 gpm. against 200 ft. T.D.H. and connected to a 7 l/2-hp. electric motor.

There are 165 services, all metered and serving 99% of the population. Pumpage is estimated to average 20,000 gpd.

LABORATORY NO. 150542

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	9.4		Silica	SiO_2	19.2	
Manganese	Mn	Tr.		Fluoride	F	0.4	
Calcium	Ca	82.9	4.14	Boron	B	0.3	
Magnesium	Mg	38.2	3.14	Chloride	Cl	32.	.90
Ammonium	NH_4	8.9	.50	Nitrate	NO_3	0.6	.01
Sodium	Na	46.	2.01	Sulfate	SO_4	0.2	Tr.
				Alkalinity (as	$CaCO_3$)	444.	8.88
Turbidity		25		Hardness (as	$CaCO_3$)	364.	7.28
Color		0					
Odor		0		Total Dissolved Minerals		500.	

Two wells are in service for the village of Hampshire (1309).

WELLS NO. 1 and 2, described in Bulletin 40, were abandoned in 1952.

WELL NO. 3 (formerly Interrieden Well No. 3) was purchased by the village about 1950. The well was drilled for the Interrieden Co. in July 1943 to a depth of 514 ft. by Neely and Schimelpfenig, Batavia, and located near the company's main building and elevated tank, or approximately 1500 ft. N. and 1850 ft. E. of the S. W. corner of Section 22, T42N, R6E. The ground surface elevation at the well is 905.

The well was drilled 8 in. in diameter from the surface to 275 ft. and 6 in. in diameter to the bottom at 514 ft.

The pumping equipment consists of 130 ft. of 4 l/2-in. column pipe; 6-in., 5-stage Pomona turbine pump, No. 63478, rated at 110 gpm. against 270 ft. T.D.H.; 130 ft. of air line; 30-hp. Westinghouse electric motor.

On Dec. 2, 1958, during pumping at capacity, the drawdown was 27. 7 ft. below a non-pumping water level of 60. 7 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 148811) collected Dec. 2, 1958 showed the water in this well to have a hardness of 14. 6 gr. per gal., total dissolved minerals of 315 ppm., and an iron content of 0. 6 ppm.

This well is in regular service.

WELL NO. 4 (formerly Interrieden Well No. 1) was also purchased by the village about 1950. The well was drilled in 1943 to a depth of 355 ft. by Neely and Schimelpfenig and located approximately 1500 ft. N. and 1500 ft. E. of the S. W. corner of Section 22. The ground surface elevation at the well is 905.

The well was cased with 10-in. pipe from the surface to 190 ft. followed by an 8-in., No. 40 slot Johnson screen from 190 to 200 ft., below which the hole was finished at 8 in. in diameter to the bottom at 355 ft.

The pumping installation consists of 170 ft. of 4 l/2-in. column pipe; 6-in., 8-stage Pomona turbine pump, No. SC1785, rated at 100 gpm. against 250 ft. T.D.H.; 10-hp. Westinghouse electric motor. An Amarillo right angle gear drive is installed for auxiliary power. A 5-in. strainer is attached to the suction end of the pump.

This well is maintained for stand-by use and is operated one day per week for about 8 hr.

Pumpage for the village is estimated to average 90,000 gpd.

LABORATORY NO. 148811

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 6		Silica	SiO_2	17. 2	
Manganese	Mn	0. 1		Fluoride	F	0. 3	
Calcium	Ca	54. 6	2. 73	Boron	B	0. 1	
Magnesium	Mg	27. 7	2. 28	Chloride	Cl	5.	.14
Ammonium	NH_4	1. 2	.07	Nitrate	NO_3	0. 6	.01
Sodium	Na	29.	1. 27	Sulfate	SO_4	0. 2	Tr.
				Alkalinity (as	$CaCO_3$)	310.	6. 20
Turbidity		5		Hardness (as	$CaCO_3$)	250.	5. 01
Color		0					
Odor		0					
Temp. (reported)		51. 3°F		Total Dissolved Minerals		315.	

HAMPTON PARK
Will County
June 30, 1959

Two wells are in service for the Hampton Park Subdivision.

WELL NO. 1 was completed for the Alexander Construction Co. in Aug. 1958 by J. M. Bilskey, Hinsdale. The well was drilled to a depth of 156 ft. and cased with 12-in. pipe to 41 ft., below which the hole was finished at 12 in. in diameter. The well is located just west of Romeoville, or approximately 100 ft. S. and 500 ft. W. of the N. E. corner of Section 33, T37N, R10E. The ground surface elevation is 640.

In a production test on Aug. 13, 1958, after 24 hr. pumping at 400 gpm., the drawdown was 140 ft. from a nonpumping water level of 20 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 147445) collected Aug. 13, 1958, after 24 hr. pumping at 400 gpm., showed the water in Well No. 1 to have a hardness of 23 gr. per gal., total dissolved minerals of 405 ppm., and an iron content of 0. 2 ppm.

WELL NO. 2 was completed in 1959 to a depth of 1520 ft. by J. M. Bilskey and located 50 ft. west of Well No. 1. The well was cased with 20-in. pipe from the surface to 44 ft., and with 16-in. pipe from the surface to 378 ft. A 12 1/2-in. liner was set from 967 to 1100 ft., below which the hole was finished 8 in. in diameter to the bottom.

The permanent pump equipment, installed in June 1959, consists of 620 ft. of 8-in. column pipe; 10-in., 12-stage Fairbanks-Morse submersible pump rated at 1150 gpm. at 637 ft. T.D. H.; 620 ft. of air line; 200-hp. electric motor.

A production test was conducted by the Driller on June 26-30, 1959, using the permanent pumping equipment. Over the 4 days, pumping was conducted during several periods, the last period on June 30 from 6 to 11 A.M. For the 5 hr. the pumping rate was 1375 gpm. with a drawdown of 122 ft. from a nonpumping water level of 415 ft.

A mineral analysis of a sample (Lab. No. 149965) collected June 30, 1959, after 5 hr. pumping, showed the water in Well No. 2 to have a hardness of 10. 5 gr. per gal., total dissolved minerals of 478 ppm., and an iron content of 0. 4 ppm.

LABORATORY NO. 149965

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	7.7	
Manganese	Mn	Tr.		Fluoride	F	1.1	
Calcium	Ca	47.2	2.36	Boron	B	0.3	
Magnesium	Mg	13.9	1.14	Chloride	Cl	47.	1.33
Ammonium	NH_4	0.9	.05	Nitrate	NO_3	1.2	.02
Sodium	Na	115.	5.01	Sulfate	SO_4	81.3	1.69
				Alkalinity (as	$CaCO_3$)	274.	5.48
Turbidity		3		Hardness (as	$CaCO_3$)	175.	3.50
Color		5					
Odor		0					
Temp. (reported)		59.0°F		Total Dissolved Minerals		478.	

2 - Hampton Park

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Drift"	44	44
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
"Limestone"	113	157
ORDOVICIAN SYSTEM		
Maquoketa Formation		
"Red shale"	21	178
"Blue shale"	75	253
"Brown shale"	7	260
"Shaly lime"	18	278
"Brown shale"	90	368
Galena-Platteville Formations		
"Second limestone"	330	698
Glenwood-St. Peter Sandstones		
"Sandstone"	270	968
"Shale"	3	971
CAMBRIAN SYSTEM		
Trempealeau Formation		
"Lime"	4	975
"Shale"	11	986
"Red shale"	11	997
"Blue shale"	11	1008
"Sandy lime"	8	1016
"White lime"	42	1058
"Gray shale"	36	1094
"White lime"	159	1253
Franconia Formation		
"Shale"	5	1258
"Lime"	4	1262
"Shale"	6	1268
"Lime"	32	1300
"Sandstone"	2	1302
"Sandy shale"	32	1334
"Hard white limestone"	13	1347
Ironton-Galesville Sandstones		
"Sandstone"	145	1492
Eau Claire Formation		
"Sandy lime"	8	1500
"Sandstone"	15	1515
"Blue shale"	5	1520
		T. D.

HARDIN
Calhoun County
April 25, 1958

Two wells are in service for the village of Hardin (356).

WELL NO. 1 was described in Bulletin 40.

WELL NO. 2 was drilled to a depth of 64 ft. in Jan. 1954 by Calhoun Drilling Co., Batchtown, and located about 75 ft. south and 10 ft. west of Well No. 1 in the pump house, or approximately 2525 ft. S. and 400 ft. W. of the N. E. corner of Section 27, T10S, R2W. The ground elevation at the well is 449.

Well No. 2 was cased with 49 ft. of 8-in. 28-lb. black pipe followed by 15 ft. of silicon bronze, wire-wound Cook screen having No. 30 slot openings. The top of the casing is approximately 1 ft. above the ground surface. A production test was conducted on Jan. 13, 1954 by representatives of the Drilling Contractor, Flagg & Corlew, Consulting Engineers, and the State Water Survey. After 8 hr. pumping at a rate of 150 gpm., the drawdown was 1. 3 ft. from a non-pumping water level of 21. 2 ft. below the top of the casing. For the test a Fairbanks-Morse centrifugal pump was used. Power was from a gasoline engine.

Subsequently, the permanent pump was installed consisting of 45 ft. of 5-in. column pipe; 10-stage Fairbanks-Morse turbine pump, 10 ft. 4 in. in length and rated at 160 gpm. at 75 psi. pressure head; 10-hp. electric motor.

Analysis of a sample (Lab. No. 146385) collected Apr. 25, 1958 showed the water in well No. 2 to have a hardness of 24. 9 gr. per gal., total dissolved minerals of 501 ppm., and a trace of iron.

Pumpage is reported to average 30, 000 gpd.

LABORATORY NO. 146385

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	21. 0	
Manganese	Mn	0. 1		Fluoride	F	0. 3	
Calcium	Ca	102. 0	5. 10	Boron	B	0. 1	
Magnesium	Mg	41. 9	3. 45	Chloride	Cl	23.	.65
Ammonium	NH_4	0. 2	.01	Nitrate	NO_3	1. 1	.02
Sodium	Na	15.	.65	Sulfate	SO_4	68. 1	1. 42
				Alkalinity (as	$CaCO_3$)	356.	7. 12
Turbidity		0		Hardness (as	$CaCO_3$)	428.	8. 55
Color		0					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		501.	

HARVARD
McHenry County
April 21, 1960

Three wells are in service for the public water supply of the city of Harvard (4248).

WELLS NO. 1 and 2, described in Bulletin 40, have been abandoned.

WELLS NO. 3 and 4, described in Bulletin 40, are in service.

WELL NO. 5 was completed in May 1958 to a depth of 68 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at 501 S. Ayer St., or approximately 650 ft. N. and 2300 ft. E. of the S. W. corner of Section 35, T46N, R5E. The ground surface elevation at the well is 925. The well was drilled 60 in. in diameter and cased with 20-in. pipe from the surface to 48 ft. followed by a 20-in. stainless steel screen from 48 to 68 ft. opposite the formation. The annulus outside the screen was packed with gravel from the bottom of the well up to 32 ft. below the surface.

When the well was completed the Driller reported pumping for 6 hr. at a rate of 400 gpm. with a drawdown of 29 ft. 5 in. from a static water level of 15 ft. 5 in. below the pump base.

A partial chemical analysis of a sample (Lab. No. 146494) collected Apr. 30, 1958, after 6 hr. pumping at 400 gpm., showed the water in Well No. 5 to have a hardness of 26. 4 gr. per gal., total dissolved minerals of 519 ppm., and a trace of iron.

The pumping equipment consists of 60 ft. of 6-in. column pipe; 10-in., 2-stage Layne turbine pump (No. 39198), 3 ft. long and rated at 450 gpm. against 72 ft. T.D.H.; 60 ft. of air line; 6-in. strainer; 15-hp. Westinghouse electric motor.

Metered pumpage for 1958 is reported to average 376, 000 gpd.

LABORATORY NO. 146494

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Fluoride	F	0. 1	
Manganese	Mn	0. 1		Chloride	Cl	28.	.79
				Nitrate	NO_3	0. 9	.15
				Alkalinity (as	$CaCO_3$)	340.	6.80
Turbidity		Tr.		Hardness (as	$CaCO_3$)	460.	9.20
Color		0					
Odor		0		Total Dissolved Minerals		519.	

HARVEST HOMES-
WAUKEGAN COUNTRYSIDE
Lake County
November 20, 1958

A public water supply was installed in 1956 for the Harvest Homes-Waukegan Countryside (est. 225), a subdivision located near Waukegan.

WELL NO. 1 was completed in Mar. 1956 to a depth of 208 ft. by Hoover Water Well Service, Zion, and located 665 ft. N. and 280 ft. W. of the S. E. corner of Section 2, T45N, RUE. The ground surface elevation at the well is 677. The well was cased with 5-in. pipe to 204 ft. followed by a 4 3/4-in. Johnson siliconbrass screen, 4 ft. 8 in. long, and having No. 30 slot openings. Limestone was encountered at 210 ft.

The Driller reported that during pumping at a rate of 20 gpm., the drawdown was 21 ft. from a static water level of 42 ft. below the surface.

The pumping equipment consists of 157 ft. of 1 l/4-in. column pipe; Reda submersible pump, No. 456J4537, rated at 1480 gal. per hr. (25 gpm.) at 70 ft. T.D.H. and 30 psi. discharge pressure; 1 l/2-hp. electric motor.

A partial chemical analysis of a sample (Lab. No. 148235) collected Nov. 20, 1958 showed the water in Well No. 1 to have a hardness of 6. 9 gr. per gal., total dissolved minerals of 453 ppm., and an iron content of 0. 2 ppm.

WELL NO. 2 was completed in Apr. 1957 to a depth of 285 ft. by L. J. Watson, Harvey, and located 300 ft. north of Well No. 1, or approximately 965 ft. N. and 260 ft. W. of the S. E. corner of Section 2. The well was cased with 6-in. pipe to limestone at 210 ft., below which the hole was finished 6 in. in diameter to the bottom at 285 ft. The top of the casing was left 3 ft. above ground level (elev. 672).

When the well was completed the Driller reported pumping at a rate of 22 gpm. with a drawdown of 175 ft. from a static water level of 25 ft. below the top of the casing.

The pumping equipment includes 225 ft. of 1-in. column pipe; Reda submersible pump, No. 656J4468, rated at 17 gpm. against 175 ft. T.D.H. at 30 psi. discharge pressure; 1 l/2-hp. electric motor.

Pumpage is estimated to average 11, 000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Yellow clay	10	10
Soft blue clay	75	85
Blue hardpan	55	140
Blue clay	61	201
Mixed sand and gravel fine to coarse	3	204
Blue clay	-	204

LABORATORY NO. 148235

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Fluoride	F	0.7	
				Boron	B	0.5	
				Chloride	Cl	13.	.37
				Sulfate	SO_4	230.6	4.80
				Alkalinity (as	$CaCO_3$)	88.	1.76
Turbidity		2		Hardness (as	$CaCO_3$)	118.	2.36
Color		0					
Odor		0					
Temp. (reported)		51.1°F		Total Dissolved Minerals		453.	

HATLEN HEIGHTS
Cook County
February 9, 1960

Hatlen Heights, a subdivision located at Lincoln and Busse Roads near Mt. Prospect, installed a public water supply in 1955. Water is obtained from two wells.

WELL NO. 1 was drilled in Oct. 1955 to a depth of 195 ft. by J. P. Miller Artesian Well Co., Brookfield, and located approximately 1395 ft. S. and 1775 ft. W. of the N. E. corner of Section 10, T41N, R11E. The ground elevation at the well is 680. The well was cased with 110 ft. of 14-in. pipe, below which the hole was finished at 13 1/4 in. in diameter.

A production test was conducted on Dec. 6, 1955 by the Drilling Contractor using a Peerless turbine test pump. After 48 hr. of intermittent pumping at 96 gpm., the drawdown was 100 ft. from a nonpumping water level of 24 ft. below the top of the casing.

On June 2, 1958 the nonpumping water level was 39 ft. below the pump base.

A partial analysis of a sample (Lab. No. 139243) collected Dec. 6, 1955 showed the water to have a hardness of 21. 2 gr. per gal., total dissolved minerals of 580 ppm., and an iron content of 2. 2 ppm.

Subsequently, the permanent pump was installed and included 150 ft. of 5-in. column pipe; 7-in., 13-stage Peerless turbine pump, No. 115835, rated at 108 gpm. at 302 ft. T.D.H.; 150 ft. of air line; 15-hp. U S electric motor.

WELL NO. 2 was completed in Mar. 1956 to a depth of 1765 ft. by J. P. Miller Artesian Well Co. and located about 100 ft. west of Well No. 1, or approximately 1400 ft. S. and 1875 ft. W. of the N. E. corner of Section 10. The well was cased with 14-in. pipe from the surface to 108 ft. and with 10-in. pipe from the surface to 440 ft. An 8-in. gwi. liner is set between 888 ft. 6 in. depth and 1005 ft. depth. From 1005 ft. to the bottom of the well, the hole was finishedat 8 in. in diameter. The annulus between the 14 and 10-in. casings was cemented.

On Mar. 16, 1956, when the drilling reached 1644 ft., a short production test was conducted by the Driller using a turbine test pump attached to 450 ft. of column pipe. After 4 hr. pumping at 445 gpm., the drawdown was 147 ft. from a static level of 318 ft. below the top of the casing.

The drilling was continued to 1765 ft., the final depth, and on Jan. 7, 1957 water was pumped for 70 hr. at a rate of 650 gpm. The nonpumping water level was reported at 325 ft. The drawdown was not reported.

The permanent pumping equipment includes 600 ft. of 7-in. column pipe; 10-in., 16-stage Peerless turbine pump, No. 119356, rated at 650 gpm. against a T.D.H. of 545 ft.; the pump was 12 ft. 3 1/2 in. long; 600 ft. of air line; 150-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 151697) collected Feb. 9, 1960, after 10 min. pumping at 450 gpm., showed the water to have a hardness of 14. 7 gr. per gal., total dissolved minerals of 441 ppm., and an iron content of 0. 9 ppm.

There are 350 residences.

Pumpage is estimated to average 200, 000 gpd.

LABORATORY NO. 151697

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	9.6	
Manganese	Mn	0.0		Fluoride	F	1.0	
Calcium	Ca	80.0	4.00	Boron	B	0.3	
Magnesium	Mg	22.7	1.87	Chloride	Cl	15.	.42
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.9	.03
Sodium	Na	48.	2.10	Sulfate	SO_4	100.2	2.08
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		2		Hardness (as	$CaCO_3$)	293.	5.87
Color		0					
Odor		0					
Temp. (reported)		59.3°F		Total Dissolved Minerals		441.	

2 - Hatlen Heights

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, grayish brown	20	20
Gravel, silty, slightly sandy, granular	5	25
Till, silty, grayish brown	10	35
Sand, very silty, gray, very fine to very coarse, little gravel	5	40
Till, silty grayish brown, gravelly at base	54	94
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, slightly silty, little chert, white to pink, very fine to fine	61	155
Alexandrian Series		
Dolomite, slightly silty, white to light buff, very fine to fine	32	187
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, gray, yellowish brown	52	239
Dolomite, silty, brownish gray, fine to coarse; shale, gray, weak	89	328
Shale, dolomitic, brownish gray, weak to tough	69	397
Galena Formation		
Dolomite, buff, fine to medium	178	575
Decorah Formation		
Dolomite, very fine to coarse	20	595
Platteville Formation		
Dolomite, buff to gray, mottled, very fine to coarse	55	650
Limestone, grayish brown to gray, mottled, very fine	35	685
Dolomite, buff to gray, mottled, very fine to fine	41	726
Glenwood Formation		
Sandstone, slightly silty, dolomitic, white, very fine to very coarse, rounded, frosted, incoherent; little dolomite	34	760
St. Peter Formation		
Sandstone, slightly silty, white to buff, fine to coarse, rounded, frosted, incoherent; lower 36 feet, very cherty	195	955
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, white to buff, very fine to fine	125	1080
Franconia Formation		
Sandstone, dolomitic, glauconitic, pink and green, little buff, very fine to medium, subrounded, incoherent to compact; little dolomite at base	85	1165
Ironton Formation		
Sandstone, dolomitic, buff to white, rounded to subrounded, slightly frosted, incoherent	75	1240
Galesville Formation		
Sandstone, slightly silty, buff to white, very fine to coarse, rounded, frosted, incoherent	100	1340
Eau Claire Formation		
Shale, dolomitic, micaceous, brown to greenish gray; sandstone, dolomitic, slightly glauconitic, white to gray, sooty in basal 40 feet, subrounded, incoherent to compact; dolomite	405	1745
Mt. Simon Formation		
Sandstone, white to light buff, very fine to coarse, subrounded to rounded, incoherent	20	1765

HEBRON
McHenry County
October 20, 1959

Two wells are in service for the public water supply of the village of Hebron (701).

WELL NO. 1, described in Bulletin 40, was equipped in May 1959 with a new 11-stage pump and the turbine lowered to a setting of 156 ft. The pump is rated at 230 gpm. against 140 ft. T.D.H. The installation was made by Hebron Hardware Co. with equipment from the Stannard Power and Equipment Co.

WELL NO. 2 was completed in 1948 to a depth of 276 ft. by Bottlemy, Well Drillers, Alden, and located about 15 ft. east of Well No. 1, or approximately 300 ft. N. and 295 ft. W. of the S. E. corner of Section 8, T46N, R7E. The ground surface elevation at the well is 930. The well is cased with 8-in. pipe from 18 in. above the pump house floor to 276 ft. A 10 ft. length of well screen is set at 266 ft.

The pumping equipment includes a '4-in. column pipe; Pomona turbine pump (No. SJ1293); 15-hp. General Electric motor. A Fairbanks-Morse right angle gear drive with a 25-hp. Wisconsin gas engine is installed for auxiliary use.

A mineral analysis of a sample (Lab. No. 146784) collected May 23, 1958 showed the water in Well No. 3 to have a hardness of 16. 2 gr. per gal., total dissolved minerals of 297 ppm., and an iron content of 1. 2 ppm.

There are 272 services, all metered. With the installation of a new Master Meter in 1959, it was reported that pumpage almost doubled the estimated consumption. Metered pumpage (maximum) in July 1959 reportedly averaged 140, 500 gpd. Pumpage is estimated to average 50, 000 gpd.

LABORATORY NO. 146784

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	13.7	
Manganese	Mn	0. 1		Fluoride	F	0. 3	
Calcium	Ca	53.2	2. 66	Boron	B	0. 1	
Magnesium	Mg	34. 3	2. 82	Chloride	Cl	3.	.08
Ammonium	NH_4	0. 6	.03	Nitrate	NO_3	0. 4	.01
Sodium	Na	12.	.51	Sulfate	SO_4	0. 6	.01
				Alkalinity (as	$CaCO_3$)	296.	5. 92
Turbidity		3		Hardness (as	$CaCO_3$)	274.	5. 48
Color		0					
Odor		0					
Temp. (reported)		51.1°F		Total Dissolved Minerals		297.	

Two wells are in service for the village of Hennepin (391).

WELL NO. 1, described in Bulletin 40, was abandoned in 1951.

WELL NO. 2 was completed in Jan. 1951 to a depth of 115 ft. by J. Bolliger, Fairbury, and. located in the northeast part of town 685 ft. N. and 460 ft. E. of the S. W. corner of Section 10, T32N, R2W. The ground surface elevation at the well is 505. The well was cased with 8-in. pipe from 2 ft. above ground level to 110 ft. followed by a Johnson Everdur screen with a 6 ft. length of No. 40 slot openings.

A production test was conducted on Jan. 24, 1951 by representatives of the Driller, the State Water Survey, Village officials, and Crenshaw and Jost, Consulting Engineers. After 3 hr. pumping at 127 gpm., the drawdown was 17 ft. from a nonpumping water level of 77. 3 ft. below the top of the casing. Two min. after the pump was stopped, the water level had recovered to 77.4 ft.

A mineral analysis of a sample (Lab. No. 124170) collected Jan. 24, 1951 showed the water in Well No. 2 to have a hardness of 16.4 gr. per gal., total dissolved minerals of 350 ppm., and an iron content of 3 ppm.

The pumping equipment included an Aurora turbine pump, rated at 60 gpm. connected to a 5-hp. U S electric motor.

Well No. 2 gave considerable trouble from sand clogging of the screen. It was treated on several occasions to remove the clogging and was finally abandoned and capped in 1958.

WELL NO. 3 was completed in Nov. 1955 to a depth of 100 ft. by Layne-Western Co., Aurora, and located 150 ft. south of old Well No. 1 and about l/2 mile west of Well No. 2, or approximately 1200 ft. N. and 1600 ft. W. of the S. E. corner of Section 9. The well was cased with 26-in. pipe from 2 l/2 ft. above to 90 ft. below the surface. An 8-in. stainless steel screen 10 ft. long was set from 90 ft. depth to the bottom of the well and an 8-in. casing was set on top of the screen and projected up 22 ft. from 90 to 68 ft. A gravel pack, 1/4 to l/8 in. gradation, was placed outside the 8-in. screen and casing from the bottom of the well up to 68 ft.

A production test was conducted on Nov. 28, 1955 by representatives of the Driller, the State Water Survey, Village officials, and Crenshaw and Jost. After 8 hr. pumping at 160 gpm., the drawdown was 1. 5 ft. from a nonpumping water level of 60.7 ft. below the top of the casing. Two min. after the pump was stopped, the water level had recovered to 60. 7 ft.

A mineral analysis of a sample (Lab. No. 153589) collected Nov. 10, 1960 showed the water in Well No. 3 to have a hardness of 20 gr. per gal., total dissolved minerals of 425 ppm., and an iron content of 0.1 ppm.

The pumping equipment includes a Layne turbine pump, rated at 60 gpm. connected to a 5-hp. electric motor.

Well No. 3 is in service.

WELL NO. 4 was completed in Sept. 1959 to a depth of 107 ft. by Layne-Western Co. and located about 800 ft. S. of Well No. 3, or approximately 400 ft. N. and 1300 ft. W. of the S. E. corner of Section 9. The well was cased with 20-in. pipe from 2 ft. above to 97 ft. below the surface. A 10 ft. length of 8-in. screen was set inside the 20-in. hole at the bottom of the well and an 8-in. casing was set on top of the screen and projected up in the well to 57 ft. The annulus outside the 8-in. casing and screen was packed with gravel from the bottom of the well at 107 ft. up to 57 ft. The amount of gravel used was 3 l/2 cu. yd.

When the well was completed the Driller reported pumping for 4 hr. at rates of 60 to 80 gpm. with no drawdown. The static water level was 68 ft.

The permanent pump is a Layne turbine, rated at 60 gpm. connected to a 5-hp. electric motor.

There are approximately 115 services. Pumpage is reported to average 11, 500 gpd.

2 - Hennepin

LABORATORY NO. 153589

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	15.8	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	81.6	4.08	Boron	B	0.2	
Magnesium	Mg	34.3	2.82	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	14.8	.24
Sodium	Na	10.	.43	Sulfate	SO_4	61.1	1.27
				Alkalinity (as	$CaCO_3$)	284.	5.68
Turbidity		0		Hardness (as	$CaCO_3$)	345.	6.90
Color		0					
Odor		0					
Temp. (reported)		53.1°F		Total Dissolved Minerals		425.	

One well is in service for the village of Herscher (658).

WELLS NO. 1, 2 and 3, described in Bulletin 40, are out of service.

WELL NO. 4, described in Bulletin 40, was taken out of regular service in 1954 but is now maintained for stand-by use only.

WELL NO. 5 was completed in 1953 to a depth of 789 ft. An oil field contractor drilled the well to the top of the sandstone and cemented in an 8-in. casing. Layne-Western Co., Aurora, then drilled the sand section. The well is locatedon Route 115, 1/2 blockwestof the Herscher Road, or approximately 100 ft. S. and 1000 ft. W. of the N. E. corner of Section 29, T30N, R10E. The well is cased with 8-in. pipe from 18 in. above the pump house floor to sandstone at approximately 654 ft. depth.

The pumping equipment includes 300 ft. of 4-in. column pipe; 7 5/8-in., 11-stage Layne and Bowler turbine pump rated at 100 gpm.; 30 ft. of 4-in. suction pipe; 25-hp. U S electric motor. A Johnston gear drive assembly is installed with a pulley wheel for tractor power, for emergency use when other power is not available.

A mineral analysis of a sample (Lab. No. 152587) collected June 24, 1960 showed the water in Well No. 5 to have a hardness of 23. 4 gr. per gal., total dissolved minerals of 1442 pprn., and an iron content of 0. 2 ppm.

There are 250 services, all metered. Pumpage is estimated to average 20, 000 gpd.

LABORATORY NO. 152587

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	8.1	
Manganese	Mn	0.0		Fluoride	F	1.6	
Calcium	Ca	87.7	4.39	Boron	B	0.4	
Magnesium	Mg	44.0	3.61	Chloride	Cl	365.	10.29
Ammonium	NH_4	1.0	.06	Nitrate	NO_3	0.9	.01
Sodium	Na	358.	15.58	Sulfate	SO_4	399.1	8.30
				Alkalinity (as	$CaCO_3$)	252.	5.04
Turbidity		0		Hardness (as	$CaCO_3$)	400.	8.00
Color		0					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		1442.	

HIGHLAND HILLS
SUBDIVISION
DuPage County
June 9, 1960

A public water supply was installed in 1954 for Highland Hills Subdivision (est. 600). The system is owned and operated by Midwest-York Water Co. and is located south of Lombard on both sides of Highland Ave. south of Roosevelt Road.

WELL NO. 1 was completed in Sept. 1954 to a depth of 241 ft. by J. P. Miller Artesian Well Co., Brookfield, and located on the west side of Highland Ave. about l/2 mile south of Lombard, or approximately 730 ft. S. and 1520 ft. E. of the N. W. corner of Section 20, T39N, R11E. The elevation of the ground surface at the well is 718.

The well was cased with 10-in. gwi. pipe from the surface to 106ft., below which the hole was finished 10 in. in diameter.

A production test was conducted by the Driller on Sept. 16 when the well was completed. After 6 hr. pumping at a rate of 485 gpm., the drawdown was 114 ft. from a static water level of 29 ft. below the top of the casing.

The permanent pumping equipment consists of 120 ft. of column pipe; 8-in., 8-stage Peerless turbine pump, rated at 250 gpm.; 120 ft. of air line; 20-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146025) collected Mar. 18, 1958, after 3 3/4 min. pumping, showed the water in Well No. 1 to have a hardness of 30 gr. per gal., total dissolved minerals of 622 ppm., and an iron content of 4. 6 ppm.

In a sample, collected in Sept. 1954 when the well was completed, the iron content was reduced to 1. 5 ppm. after 6 hr. pumping.

There are 155 services, all metered. Pumpage is estimated to average 36, 000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Mud	60	60 .
Sand and gravel	20	80
Gravel and muddy sand	26	106
SILURIAN SYSTEM		
Niagaran Series		
White limestone	124	230
Shale and limestone	11	241

LABORATORY NO. 146025

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4.6		Silica	SiO_2	16.7	
Manganese	Mn	Tr.		Fluoride	F	0.1	
Calcium	Ca	124.5	6.23	Boron	B	0.2	
Magnesium	Mg	49.4	4.06	Chloride	Cl	8.	.23
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.4	.02
Sodium	Na	13.	.56	Sulfate	SO_4	167.4	3.48
				Alkalinity (as	$CaCO_3$)	356.	7.12
Turbidity		12		Hardness (as	$CaCO_3$)	514.	10.29
Color		0					
Odor		0		Total Dissolved Minerals		622.	

HIGHLAND SHORES SUBDIVISION
McHenry County
May 29, 1958

One well is in service for the public water supply of the Highland Shores Subdivision (est. 850) located west of Wonder Lake and north of Route 120. The system is owned and operated by Ladd Enterprises.

WELL NO. 1 was completed to a depth of 260 ft. in 1956 by Art Wertz, Antioch, and located approximately 1650 ft. N. and 150 ft. W. of the S. E. corner of Section 14, T45N, R7E. The elevation of the ground surface at the well is 925. The well was cased with 8-in. pipe, followed by 12 ft. of 8-in. Johnson Everdur screen, exposed to sand and gravel.

The pumping equipment consists of 120 ft. of 4-in. column pipe; Jacuzzi turbine pump, No. MS8A9WGG336, rated at 240 gpm.; 120 ft. of air line (no gage); 15-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146790) collected May 29, 1958, after 2 hr. pumping at capacity rates. (240 gpm.), showed the water in Well No. 1 to have a hardness of 18.5 gr. per gal., total dissolved minerals of 332 ppm., and an iron content of 1. 4 ppm.

WELL NO. 2 (originally No. 1 in the order of drilling) was completed to a depth of 160 ft. in 1951 by Art Wertz and located approximately 1900 ft. N. and 1500 ft. E. of the S. W. corner of Section 13. (This location is about 1 3/4 mile east of where the present Well No. 1 was later drilled.) The ground elevation at the well is 890. The well was cased with 8-in. pipe. A 10-ft. section of screen was to be installed but the well is reportedly capped.

There are 240 services installed but not metered. Pumpage is estimated to average 51, 000 gpd.

LABORATORY NO. 146790

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Silica	SiO_2	20.2	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	69.2	3.46	Boron	B	0.0	
Magnesium	Mg	35.1	2.89	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.9	.01
Sodium	Na	6.	.24	Sulfate	SO_4	26.3	.55
				Alkalinity (as	$CaCO_3$)	296.	5.92
Turbidity		5		Hardness (as	$CaCO_3$)	318.	6.35
Color		0					
Odor		0					
Temp. (reported)		51.1°F		Total Dissolved Minerals		332.	

A public water supply was installed for the village of Hillside (7794) about 1927. The principal supply was obtained from one well until about 1954 when the village began using water from Chicago. The pumps are still in place but have not been operated for some time.

WELL NO. 1 was completed about 1927 to a depth of 591 ft. by Wm. H. Cater, Chicago, and deepened in 1940 to a depth of 1970 ft. by J. P. Miller Artesian Well Co., Brookfield. The well was located about 100 ft. west of Wolf Road and 100 ft. south of the Illinois Central Railroad right-of-way, or approximately 2900 ft. N. and 100 ft. W. of the S. E. corner of Section 18, T39N, R12E. The ground surface elevation at the well is 668.

Original production and water levels are not known but in Jan. 1937 the yield was reported to be less than 100 gpm.

When the well was deepened in 1940, the hole and casing record was as shown in Table A.

TABLE A

Hole Record

12-in.	from	0	to	467 ft.
10-in.	from	467	to	1288 ft.
8-in.	from	1288	to	1675 ft.
6-in.	from	1675	to	1947 ft.

Casing Record

12-in. drive pipe	from	0	to	22 ft.
10-in.	from	0	to	467 ft.
8-in. liner	from	1199	to	1288 ft.
6-in. liner	from	1447	to	1675 ft.

A production test was conducted June 8-9, 1940. After 24 hr. pumping at a rate of 300 gpm., the drawdown was 66 ft. from a nonpumping water level of 259 ft. below the pump base (elev. 699). The water levels started to decline and by July 3, 1944 the pumping level was below the 360-ft. air line. The yield had declined from 140 to 50 gpm. and considerable entrained air was being discharged. On July 24, 1944, after a 3-wk. rest period, the water level in the well was 268 ft. On Sept. 18 the water level was 77. 5 ft.

On Oct. 9, 1944 following the installation of pumping equipment, water was pumped for 8 hr. at a rate of 223 gpm. The pumping water level was 428 ft. below the pump base. The test indicated that equilibrium conditions were not approached and that practically all of the water pumped was from the upper limestone and was entering the well from behind the 10-in. liner.

Sometime during the year 1937, the village arranged to use the 180-ft. well of the Mater Dolorosa Seminary on Butterfield Road, about 1500 ft. west of Wolf Road. The well had been drilled by C. E. Pigg, Lisle, and was cased with 8-in. pipe from 3 ft. below the ground surface to 65 ft. and with a 6-in. perforated liner between depths of 80 and 140 ft. The holewas drilled 8 in. in diameter from the surface to 140ft. and 6 in. in diameter from 140 ft. to the bottom of the hole at 180 ft. After completion, the well produced 40 gpm. with a drawdown of 25 ft. from a nonpumping water level of 35 ft. below the surface.

About Oct. 1944 the use of the Seminary well was discontinued because the supply was too limited to meet emergency demands of the village.

A mineral analysis of a sample (Lab. No. 82463) collected Sept. 26, 1937 showed the water in the Seminary well to have a hardness of 25. 3 gr. per gal., total dissolved minerals of 569ppm., and an iron content of 1. 1 ppm.

In 1952 the nonpumping water level in Well No. 1 for two years had been reportedly 70 ft. below the surface and the pumping water level had been 440 ft. The well produced less than 150 gpm. with considerable entrapment of air that interfered with the operation of the pump. In July 1952 J. P. Miller Artesian Well Co., Brookfield, removed the 467 ft. of casing, which was found to be in very poor condition. New 10-in. casing was installed to a depth of 467 ft. with the bottom set in cement (20 bags) to hold out water from the upper formation. The well was found to be bridged at 778 ft. The well was cleaned out to a depth of 1956 ft. No gas or air was detected to be coming from the well.

The pumping equipment, some of the old and some new, was installed and consisted of 505 ft. of 6-in. column pipe (335 ft. was new); 140 ft. of new 2 1/2-in. shaft tubing; new 7 3/4-in. od., 21-stage pump bowls, 12 ft. 6 in. in length; 32 ft. 9 in. of 5-in. suction pipe; 505 ft. of air line, the lower section was brass tubing with 70 ft. of steel pipe at the upper end; the old 40-hp. electric mo-

tor was being used, although too small. A replacement was not available at the time.

A production test was conducted by the Well Contractor on July 24, 1952. After 4 hr. pumping at 161 gpm. the drawdown was 189 ft. when pumping against 45 lb. head pressure, and when pumping at 142 gpm. with the head pressure increased to 60 lb. the drawdown was 174 ft.

On July 29, 1952 the Holland Well Cementing Co., Brookfield, introduced 4100 gal. of 15% HCl through the pump. After 22 hr., the acid was pumped out and J. P. Miller Artesian Well Co. conducted a production test. After 4 hr. pumping at a rate of 235 gpm., the drawdown was 166 ft., and when pumping at 192 gpm., the drawdown was 153 ft. against a discharge pressure of 45 lb. After 19 hr. pumping at 230 gpm., the drawdown was 174 ft.

Apparently the well produced 65 gpm. more water with a decrease in drawdown of more than 30 ft. after acidization than it had produced before acidizing.

A mineral analysis of a sample (Lab. No. 88853) collected in Sept. 1940 showed the water from Well No. 1 to have a hardness of 27.4 gr. per gal., total dissolved minerals of 598 ppm., and an iron content of 1 ppm.

Correlated driller's log of Hillside WELL NO. 1 furnished by theState Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Glacial drift"	22	22
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
"Limestone"	218	240
ORDOVICIAN SYSTEM		
Maquoketa Formation		
"Shale"	218	458
Galena-Platteville Dolomite		
"Limestone"	132	590
Dolomite	194	784
Glenwood-St. Peter Sandstone		
Sandstone, partly dolomitic	76	860
Sandstone, incoherent	30	890
Sandstone, chert and shale	13	903
Oneota Dolomite		
Dolomite, little sandstone	147	1050
CAMBRIAN SYSTEM		
Trempealeau Dolomite	154	1204
Franconia Formation		
Sandstone dolomite, and shale	101	1305
Ironton-Galesville Sandstone		
Sandstone, partly dolomitic	110	1415
Sandstone, incoherent	49	1464
Eau Claire Formation		
Shale, dolomite, some sandstone	291	1755
Sandstone, incoherent	50	1805
Sandstone, dolomitic, and shale	15	1820
Sandstone, incoherent	50	1870
Mt. Simon Sandstone		
Sandstone, incoherent	100	1970

LABORATORY NO. 88853

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.0		Silica	SiO_2	10.5	
Manganese	Mn	0.0		Chloride	Cl	5.	.14
Calcium	Ca	102.0	5.10	Nitrate	NO_3	0.9	.01
Magnesium	Mg	52.4	4.30	Sulfate	SO_4	150.6	3.14
Ammonium	NH_4	0.1	.01	Alkalinity (as	$CaCO_3$)	350.	7.00
Sodium	Na	20.	.88				
Turbidity		20		Hardness (as	$CaCO_3$)	470.	9.40
Color		0					
Odor		0		Total Dissolved Minerals		598.	

The village of Hinckley (940) public water supply is obtained from one well.

WELL NO. 1, described in Bulletin 40 as having been drilled in 1913 to a depth of 708 ft., is now equipped with a pump and accessories consisting of 120 ft. of 6-in. column pipe; 8-in., 9-stage Aurora turbine pump, No. 40409, rated at 300 gpm. at 200 ft. T.D.H.; 120 ft. of air line; 30-hp. U S electric motor.

The pump base is 2 ft. above the ground surface datum.

The nonpumping water level, on May 14, 1959, was reportedly 16 ft.

There were 325 services reported in 1956 indicating a considerable increase in population which is now estimated at 1100. Pumpage in June 1959 was reported to average 90,000 gpd.

Six wells are in service for the village of Hinsdale (12, 859).

WELL NO. 1, described in Bulletin 40, was equipped in Mar. 1949 with a 40-hp. U S electric motor replacing the old steam turbine. In Mar. 1952 the pump base was raised 28 in. and the pump setting was 91 ft. to the bottom of the bowls with 11 ft. of suction pipe attached. The air line length was reported to be 98 ft.

In Jan. 1954 the pump was to be replaced by a new one. In June 1955 the static water level in Well No. 1 was reportedly 40 ft. below the surface (elev. 685). At the time during pumping at a rate of 210 gpm., the drawdown was 70 ft.

In Mar. 1958 and also Mar. 1959 the static water level was reportedly 53 ft.

WELL NO. 2 is described in Bulletin 40. In Nov. 1954 new plastic air lines were installed in the village wells. The air line in Well No. 2 was 160 ft. long, the same as the old one.

In Dec. 1954 the State Water Survey records indicated that water levels in Well No. 2 varied with the amount of rainfall in the area. In June 1955 the static water level in Well No. 2 was reported 40 ft. below the surface (elev. 686) and the drawdown, when pumping at 298 gpm., was 20 ft.

In July 1955 the pump became worn out. The bowl replacement was an old model and anew one was being made.

In Mar. 1959 the static water level was 74 ft. and the drawdown was 65 ft.

WELL NO. 3 is described in Bulletin 40. In Jan. 1953, due to declining production, the well was given an acid treatment by Layne-Western Co., Aurora. Before the treatment a production test was conducted on Jan. 28, 1953. After 4 l/2 hr. pumping at a rate of 516 gpm., the drawdown was 60 ft. During the last hr. Wells 1 and 2 were not operating. The two wells were started up and after 1 1/2 hr. pumping at 465 gpm., the drawdown was 74 ft. Wells 1 and 2 were again shut down and after l/2 hr. pumping at 512 gpm., the drawdown was 60 ft.

About 3000 gal. of 15% treating acid was then poured into the well through tubing. At first the reaction built up a pressure of 23 l/2 lb. and after fluctuating for about 2 hr. the pressure was down to zero. On Feb. 9 after the acid treatment, a production test was conducted. After 8 hr. pumping at a rate of 726 gpm., the drawdown was 72 ft. from a static water level of 65 ft.

Before the acid treatment the top capacity of Well No. 3 with Well No. 2 in operation, was 465 gpm. and following the treatment, with No. 2 operating, the top capacity was 726 gpm. The specific capacity of the well was calculated to be 6. 3 gpm. per ft. of drawdown before the treatment, and afterwards it was calculated to be 10.1.

The depth of the well was determined to be 210 ft. 6 in. In Mar. 1959 the static water level was reported to be 75 ft. and the drawdown 93 ft.

WELL[1] NO. 4 was completed to a depth of 291 ft. in Mar. 1954 by Layne-Western Co. and located at Clay and Hickory Street about 6 or 7 blocks west of the Water Works, or approximately 1400 ft. N. and 500 ft. E. of the S. W. corner of Section 1, T38N, R11E. The elevation of the top of the casing is 705. 7. The elevation of the pump house floor is 705. 2. The Driller reported the top of the limestone was 93 ft. below the surface. The drilling was continued to 291 ft. and the bottom of the limestone was reached at 289 ft.

The test well, constructed before finishing the permanent well, was tested at 212 ft. depth. When pumping at 360 gpm., the drawdown was 12 ft. from a static water level of 73 ft. below the surface. When the test well was completed to the final depth, the Driller reported that, when pumping at a rate of 388 gpm., the drawdown was 7 ft. from a static water level at 70 ft.

The permanent well was cased with 100 ft. of 15-in. pipe, below which the hole was finished at 15 in. to the bottom.

The pumping equipment includes 180 ft. of 8-in. column pipe; 12-in., 3-stage Layne turbine pump, rated at 600 gpm. at 152 ft. T.D.H.; 30 ft. of 8-in. suction pipe; 212 ft. of air line; 30-hp. electric motor.

In Mar. 1959 the nonpumping water level was reportedly 80 ft. and, during pumping, the drawdown was 49 ft.

WELL NO. 5 was completed in Apr. 1954 to a depth of 319 ft. and located at the southeast

corner of Clay and Chicago St., or approximately 200 ft. S. and 500 ft. E. of the N. W. corner of Section 12, T38N, R11E. The elevation of the top of the casing is 690. The elevation of the pump house floor is 680. 5. The well was cased with 15-in. pipe to 89 ft., below which the hole was finished at 15 in. in diameter to the bottom.

When the well was completed, the Driller reported that, when pumping at a rate of 708 gpm., the drawdown was 10 ft. from a static water level of 69 ft. below the surface. In Mar. 1959 the nonpumping water level was 66 ft. and, during pumping, the drawdown was 69 ft.

The permanent pump assembly consists of 200 ft. of 8-in. column pipe; 12-in., 3-stage Layne turbine pump, rated at 700 gpm. at 163 ft. T.D.H.; 30 ft. of 8-in. suction pipe; 232 ft. of air line; 40-hp. electric motor.

WELL NO. 6 was completed in Aug. 1956 to a depth of 307 ft. by Layne-Western Co. and located at Madison and Chestnut at the C. B. & Q. Railroad, or approximately 800 ft. S. and 25 ft. W. of the N. E. corner of Section 11, T38N, R11E. The elevation of the ground surface at the well is 695. The well was cased with 16-in. welded steel pipe from the surface to 105 ft., below which the hole was finished at 15 l/4 in. in diameter to the bottom.

The permanent pumping equipment consists of 150 ft. of 8-in. column pipe; 12-in., 3-stage Layne turbine pump, No. 34816, rated at 600 gpm. at 158 ft. T.D.H.; 30 ft. of 8-in. suction pipe; 180 ft. of air line; 40-hp. Westinghouse electric motor.

On Mar. 24, 1959 the nonpumping water level was reportedly 66 ft. and the drawdown, during pumping, was 68 ft.

The Driller reported a production test conducted Aug. 6, 1956. After 6 hr. pumping at a rate of 645 gpm., the drawdown was 38 ft. from a nonpumping water level of 77 ft. below the ground surface.

A partial chemical analysis (Lab. No. 150961) of a sample collected Oct. 15, 1959 showed the water from Well No. 6 to have a hardness of 29. 4 gr. per gal., total dissolved minerals of 635 ppm., and an iron content of 1. 4 ppm.

Pumpage for Hinsdale from Jan. 1 to Dec. 10, 1959 averaged 1.92 mgd.

LABORATORY NO. 150961

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	0.3	
Manganese	Mn	0.0		Chloride	Cl	5.	.14
				Nitrate	NO_3	1.2	.02
				Alkalinity (as	$CaCO_3$)	348.	6.96
Turbidity		5		Hardness (as	$CaCO_3$)	500.	10.00
Color		0					
Odor		0					
Temp. (reported)		52.0°F		Total Dissolved Minerals		635.	

Summary sample study log of WELL NO. 6 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, black	5	5
Till, slightly gravelly, buff to yellowish buff	10	15
Till, slightly gravelly, brownish gray	20	35
Till, gravelly, very clayey, gray	5	40
Gravel, slightly silty, multi-colored	5	45
Till, gravelly, buff	20	65
No samples	15	80
Gravel, multi-colored	22	102
SILURIAN SYSTEM		
Niagaran Series		
Waukesha Formation		
Dolomite, slightly cherty, slightly silty to silty, light grayish buff, very fine, crystalline	28	130
Joliet Formation		
Dolomite, buff, very fine to fine, crystalline, slightly silty, little grayish buff at base	65	195
Dolomite, slightly silty, grayish buff to buff, trace of pink, fine, crystalline	40	235
Alexandrian Series		
Kankakee Formation		
Dolomite, glauconitic, slightly silty, buff, fine to very fine, crystalline	10	245
Edgewood Formation		
Dolomite, silty, slightly cherty, grayish brown to buff, slightly black speckled, very fine to fine, crystalline, trace of shale partings	67	312

A public water supply was installed in 1955 for Hoffman Estates Subdivision incorporated in 1960 as village of Hoffman Estates (est. 5100) located about 3 miles north of Roselle. The water system is owned and operated by the Citizens Utilities Co. of Illinois.

WELL NO. 1 was completed in 1955 to a depth of 225 ft. by Layne-Western Co., Aurora, and located 1440 ft. S. and 15 ft. W. of the N. E. corner of Section 15, T41N, R10E. The ground elevation at the well is 750. The well was cased with 12-in. pipe to 137 ft. and cemented at the bottom of the casing. The well was finished 12 in. in diameter to the bottom of the hole at 225 ft.

The pumping equipment consists of 150 ft. of 10-in. column pipe; 10-in., 10-stage Layne turbine pump, No. 34705, rated at 400 gpm. at 350 ft. T.D.H. and having a length of 8 ft.; 10 ft. of 6-in. suction pipe; 150 ft. of air line; 50-hp. U S electric motor.

On Apr. 22, 1958, during pumping at 300 gpm., the drawdown was 28 ft. from a nonpumping water level of 20 ft. below the pump base. A mineral analysis of a sample (Lab. No. 146380) collected Apr. 22, 1958 showed the water in Well No. 1 to have a hardness of 30.4 gr. per gal., total dissolved minerals of 840 ppm., and an iron content of 0. 5 ppm.

WELL NO. 2 was completed in 1955 to a depth of 1391 ft. by Layne-Western Co. and located 10 ft. north of Well No. 1, or approximately 1430 ft. S. and 15 ft. W. of the N. E. corner of Section 15. The hole and casing record is shown in Table A.

TABLE A

Hole Record

1 9 1/4-in. from surface to 449 ft.
1 5 1/4-in. from 449 to 982 ft.
12-in. from 982 to 1391 ft.

Casing Record

20-in. from surface to 142 ft.
1 6-in. from surface to 449 ft. (cemented)
12-in. from 901.5 to 982 ft.

The pumping equipment consists of 510 ft. of 10-in. column pipe; 10-in., 15-stage Layne turbine pump, No. 33541, rated at 500 gpm. against 630 ft. T.D.H.; 100-hp. General Electric motor.

On Apr. 22, 1958, during pumping at 657 gpm. for 1 hr., the drawdown was 42 ft. from a nonpumping water level of 378 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 146381) collected Apr. 22, 1958 showed the water in Well No. 2 to have a hardness of 15.2 gr. per gal., total dissolved minerals of 392 ppm., and an iron content of 1.1 ppm.

Well No. 2 furnished most of the supply in 1957.

WELL NO. 3 was completed in 1956 to a depth of 236 ft. by Layne-Western Co. and located about 3/8 mile west of Wells No. 1 and 2, or approximately 1550 ft. S. and 2150 ft. W. of the N. E. corner of Section 15. The ground elevation at the well is 753. The well was cased with 12-in. pipe to a depth of 156 ft., below which the hole was finished 12 in. in diameter to the bottom at 236 ft.

The pumping equipment in Well No. 3 consists of 150 ft. of 8-in. column pipe; 8-in., 12-stage Layne turbine pump, No. 36854, having a length of 7 ft. 8 in. and rated at 350 gpm. at 312 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 150 ft. of air line; 40-hp. U S electric motor.

On Apr. 22, 1958, after 3 hr. pumping at a rate of 305 gpm., the drawdown was 81 ft. from a nonpumping water level of 28 ft. below the pump base.

The water in Well No. 3 was of similar quality to that in Well No. 1.

WELL NO. 4 was completed in May 1959 to a depth of 1380 ft. by Layne-Western Co. and located about 1/4 mile north of Well No. 3. The elevation of the ground surface at Well No. 4 is 775. The hole and casing record is shown in Table B.

A production test was conducted by the Drilling Contractor on May 4, 1959. For the test, a test turbine set at 500 ft. was used. After 4 hr. pumping at a rate of 1018 gpm., the drawdown was 66 ft. from a nonpumping water level of 423 ft. below the top of the casing. Pumping was continued for an additional 20 hr. at a rate

of 990 gpm. with a final drawdown of 101 ft.

A partial chemical analysis of a sample (Lab. No. 149556) collected May 4, 1959, after 4 hr. pumping, showed the water in Well No. 4 to have a hardness of 15.5 gr. per gal., total dissolved minerals of 354 ppm., and an iron content of 0. 6 ppm.

There were 1125 services in Apr. 1958, and 10,000 services were expected when construction was completed.

Total pumpage for 1957 was 90. 35 mg., an average of 247,000 gpd.

TABLE B

Hole Record

20-in. from surface to 461 ft. 8 in.
15-in. from 461 ft. 8 in. to 1019 ft.
12-in. from 1019 ft. to 1382 ft.

Casing Record

20-in. from surface to 158 ft. 4 in.
1 6-in. from surface to 465 ft. 8 in.
12-in. from 929 ft. 6 in. to 1019 ft.
The annulus between the 16 and 20-in. casings was filled with cement.

LABORATORY NO. 146380

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	18.8	
Manganese	Mn	0.0		Fluoride	F	0.5	
Calcium	Ca	115.1	5.76	Boron	B	0.6	
Magnesium	Mg	57.0	4.69	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.4	.04
Sodium	Na	48.	2.10	Sulfate	SO_4	467.8	9.73
				Alkalinity (as	$CaCO_3$)	132.	2.64
Turbidity		4		Hardness (as	$CaCO_3$)	522.	10.45
Color		0					
Odor		0					
Temp. (reported)		52.2°F		Total Dissolved Minerals		840.	

LABORATORY NO. 146381

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	10.0	
Manganese	Mn	0.0		Fluoride	F	1.0	
Calcium	Ca	70.7	3.54	Boron	B	0.4	
Magnesium	Mg	22.8	1.88	Chloride	Cl	12.	.34
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	0.5	.01
Sodium	Na	42.	1.82	Sulfate	SO_4	32.9	0.68
				Alkalinity (as	$CaCO_3$)	312.	6.24
Turbidity		2		Hardness (as	$CaCO_3$)	271.	5.42
Color		0					
Odor		0					
Temp. (reported)		57.5°F		Total Dissolved Minerals		392.	

Summary sample study log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, slightly sandy to sandy, buff	80	80
Sand and gravel	70	150
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to gray, very fine to fine, crystalline	55	205
Alexandrian Series		
Dolomite, buff to white, fine to very fine, crystalline	25	230
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Shale, silty, little dolomitic, gray to green, reddish brown at top; dolomite, silty, gray, buff to white, very fine to fine, crystalline	215	445
Mohawkian Series		
Galena Formation		
Dolomite, buff to gray, fine to medium, crystalline, slightly porous	180	625
Decorah Formation		
Dolomite, buff to gray, very fine to medium, crystalline, slightly porous	35	660
Platteville Formation		
Dolomite, slightly calcareous, buff to gray, very fine to medium, crystalline; limestone, little dolomitic, buff to gray, extra fine to very fine, crystalline	110	770
Glenwood Formation		
Sandstone, little dolomitic, slightly silty at top, white to buff, fine to medium; little dolomite near top	85	855
Chazy Series		
St. Peter Formation		
Sandstone, very chert at base, white to buff, fine to very fine	90	945
Shale, cherty, green, red to buff	10	955
Prairie Du Chien Series		
Oneota Formation		
Dolomite, sandy, slightly cherty at base, buff to white, very fine to extra fine; sandstone, buff, fine to medium; little shale	50	1005
CAMBRIAN SYSTEM		
St. Croixan Series		
Trempealeau Formation		
Dolomite, buff to white, fine to very fine, crystalline, little geodic quartz	125	1130
Franconia Formation		
Sandstone, glauconitic, dolomitic, buff to gray, fine to very fine; dolomite and shale	70	1200
Ironton-Galesville Sandstone		
Sandstone, little slightly dolomitic, slightly silty, white to buff, fine to coarse; little dolomite	165	1365
Eau Claire Formation		
Sandstone, very dolomitic, silty, buff, fine to medium; dolomite	15	1380
		T.D.

Three wells are in service for the public water supply of the village of Homer (1276).

WELL NO. 1, described in Bulletin 40, was treated with 500 gal. of acid in Mar. 1953. Before the treatment the well produced 50 gpm. with a pumping level at 50 ft. Following the treatment the well produced 85 gpm. with a 50 ft. pumping level.

It was stated in Bulletin 40 that a well was drilled in Nov. 1947 to a depth of 68 ft. 4 in. by Hayes and Sims. The well was subsequently tested for yield and then was abandoned due to insufficient yield.

WELL NO. 2 was completed to a depth of 60. 5 ft. in 1952 by Layne-Western Co., Aurora, and located about 660 ft. southwest of Well No. 1, or approximately 1860 ft. N. and 1953 ft. W. of the S. E. corner of Section 8, T18N, R14W. The ground surface elevation at the well is 670.

A 28-in. hole was drilled to a depth of 60 ft. 4 in. and cased with 40 ft. of 26-in. steel pipe with welded joints. A 10-ft. section of 12-in. Layne bronze shutter screen was set in the 28-in. hole with the bottom at 60 ft. 4 in. A 12-in., 45 lb. per ft. steel casing was welded to the top of the screen with the top of the 12-in. casing extended to the pump foundation. The annulus between the screen and the wall of the 28-in. hole was packed with gravel, and above the gravel (at top of screen) the annulus between the casings was filled with clay up to 3. 6 ft. above ground level.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Black top soil	2	2
Yellow clay	16	18
Blue clay	25	43
Fine sand with clay streaks	7	50
Medium gravel	10.5	60.5

The well is equipped for pumping with a 2-stage Layne turbine pump, rated at 80 gpm., connected to a 5-hp. U S electric motor. A 50-ft. air line is installed.

On Oct. 5, 1952, when pumping at capacity, the drawdown was 6 ft. from a nonpumping water level of 22 ft.

A mineral analysis of a sample (Lab. No. 152174) collected Apr. 29, 1960 showed the water in Well No. 2 to have a hardness of 15. 5 gr. per gal., total dissolved minerals of 478 ppm., and an iron content of 0. 4 ppm.

WELL NO. 3 was completed in Nov. 1959 to a depth of 59 ft. by J. P. Miller Artesian Well Co., Brookfield, and located 8. 5 ft. N. and 2. 5 ft. E. of Test Hole No. 2-59, or about 870 ft. west of Well No. 2, or approximately 1820 ft. N. and 2457 ft. E. of the S. W. corner of Section 8.

A 36-in. hole was drilled to 59 ft. below the ground surface and a 12 ft. length of 36-in. steel casing was installed from about 3 in. above ground level. A 12-in. stainless steel screen, 10 ft. long and . 06 in. slot openings was set with the bottom at 59 ft. A 12-in. steel casing, screwed to the top of the screen, extends upward to 3 ft. 9 in. above ground level. Silica gravel was packed in the annulus outside the screen up to 34 ft. below ground level. The remaining space was filled with gravel pack mixed with some earth and torpedo sand mixed with bentonite. The well was developed by light pump-surging for 2 hr. on Nov. 21, 1959. This was followed with an application of two charges (polyphosphate 50 lb., soda ash 5 lb., and detergent 3 to 5 lb.) together with pump-surging on Nov. 21 and again on Nov. 23.

Aproduction test was conducted on Nov. 24, 1959 by representatives of the Driller, Village officials, and Wilson and Anderson, Consulting Engineers. For the test, the pumping equipment included a turbine test pump with bottom of suction set at 58 ft. below the top of the 12-in. casing (3 ft. 7 in. above ground level) and extending about 5 ft. 9 in. into the 10 ft. length of screen. A plastic air line was installed with the bottom at 58 ft. below the pump base. Power was furnished from a gas engine. From 7:00 A.M. to noon, Nov. 23, Wells 1 and 2 were operated at rates of 35 to 30 gpm. and 95 to 85 gpm. respectively. On Nov. 24, after 5 hr. pumping at rates of 150 to 118 gpm., the drawdown was 30 ft. from a nonpumping water level of 28 ft. Ten min. after the pump was stopped, the water level had recovered to 38 ft.

There are 485 services, 35 of which are metered. Pumpage in 1958 was reported to average 90, 000 gpd.

2 - Homer

LABORATORY NO. 152174

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	18.4	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	64.7	3.23	Boron	B	0.5	
Magnesium	Mg	25.2	2.07	Chloride	Cl	28.	.79
Ammonium	NH_4	2.3	.13	Nitrate	NO_3	0.1	Tr.
Sodium	Na	80.	3.48	Sulfate	SO_4	6.0	.12
				Alkalinity (as	$CaCO_3$)	400.	8.00
Turbidity		2		Hardness (as	$CaCO_3$)	265.	5.30
Color		30					
Odor		Cs		Total Dissolved Minerals		478.	

HOMEWOOD
Cook. County
November 19, 1958

There are six wells in service for the village of Homewood (13, 371), as follows: No. 1, 3 (Dixmoor), 5, 6, 7 and 8.

WELL NO. 1, described in Bulletin 40, was acidized in 1954 with 4000 gal. of HC1. Before treatment, the pumping rate was 100 gpm. and after treatment the pumping rate was 234 gpm.

In July 1949 Well No. 1 was reported to be furnishing 90% of the supply. In Aug. 1957 it was reported that Well No. 1 was producing a maximum of 7 to 8 mg, per month.

The following pumping equipment was installed in June 1958: 150 ft. of 5-in. column pipe; Reda submersible pump rated at 500 gpm.; 20-hp. electric motor. With the new pump, the well produced 500 gpm. with a drawdown of 42 ft. from a nonpumping water level of 24 ft.

The pump in WELL NO. 2 was pulled in 1948. On July 19, 1948 the static water level was 341 ft. below the pump base and on May 23, 1949 it dropped to 357 ft. below the pump base.

In Mar. 1950 the pump was removed to be repaired, but on attempting to operate a water-level recorder in the well, it was discovered that the well casing had a defect in it. Subsequently, about Aug. 1952, Well No. 2 was capped andabandoned.

A test well, drilled by Layne-Western Co., Aurora, in 1945 did not develop as expected and was not put into service. It was eventually abandoned in 1945.

WELL NO. 3 (Dixmoor Well), as designated by the Village officials, was equipped in Mar. 1947 with a new pump and accessories as follows: 180 ft. of column pipe; 8-in., 17-stage Pomona turbine pump, 8 ft. in length, and rated at 270 gpm. against 350 ft. T.D.H.; 186 ft. of l/4-in, plastic air line; 20-hp. electric motor. It was subsequently found that the effective length of air line was 112 ft. A crooked bore hole made the pump installation difficult and this may have been the cause of the break in the air line.

On Mar. 10, 1947 the static water level was 23 ft. below the pump base.

Table A indicates the results of analyses made for the iron content and turbidity of six samples of water collected Apr. 27, 1947 from Well No. 3.

In June 1948 Well No. 3 was reportedly producing at a rate of 254 gpm. and in Nov. 1958 the production rate was 175 gpm.

In Feb. 1954 Well No. 3 was acidized with 1500 gal. of HC1. Before the treatment the pump would break suction. On Feb. 24, 1954, after considerable surging following the acid treatment, the well produced 150 gpm. against a discharge head of 40 psi.

In 1956 new 4-in. column pipe 180 ft. in length was installed. The following old pump and motor were reinstalled: 8-in., 17-stage Pomona turbine pump (No. AL4769), 8 ft. in length, and rated at 270 gpm. against 350 ft. T.D.H.; 20-hp. Fairbanks-Morse electric motor. No air line was installed.

The 6-in. Test Well, drilled by Kramer Bros. of Homewood in 1946 and designated by the village as WELL NO. 4, was reportedly abandoned in 1956.

WELL NO. 5 was drilled by Kramer Bros. in 1951 to a depth of 250 ft., and located 520 ft. S. and 2270 ft. E. of the N. W. corner of Section 5, T35N, R14E. The elevation of the ground surface at the well is 628.

The well was cased with 42 ft. 6 in. of 12-in. pipe, below which the hole was finished 12 in. in diameter to the bottom. A production test was conducted by the Drilling Contractor on Apr. 13, 1951. A horizontal centrifugal test pump was used, and after 4 1/4 hr. pumping at a rate of 495 gpm., the drawdown was 16 ft. from a nonpumping water level of 2 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 125331) collected Apr. 13, 1951 showed the water in Well No. 5 to have a hardness of 26 gr. per gal., total dissolved minerals of 605 ppm., and a trace of iron.

The following pumping equipment, installed in 1951, is in service: 140 ft. of 6-in. column pipe; 15-stage Pomona turbine pump rated at 225 gpm. against 430 ft. T.D.H.; 50-hp. Westinghouse electric motor; 140 ft. of air line (no gage).

In Nov. 1958 Well No. 5 was reportedly producing at a rate of 450 gpm. The nonpumping water level was approximately 16 ft.

WELL NO. 6 was drilled by Kramer Bros. in 1953 to a depth of 250 ft., and located 520 ft. S. and 2215 ft. E. of the N. W. corner of Section 5. The well was cased with 15-in. pipe to an unreported depth. The elevation of the ground surface at the well is 628.

A production test was conducted on Feb. 19, 1953 by the Drilling Contractor. After 3 l/2 hr. pumping at a rate of 495 gpm., the drawdown was reportedly 33 ft. from a nonpumping water level of 26 ft. below the top of the casing. The rate was reduced after 2 3/4 hr. and then after 3 1/4 hr. pumping. When pumping beyond 15 ft. suction, the rate leveled off at 560 gpm.

The following pumping equipment was installed in 1953: 140 ft. of 8-in. column pipe; 12-in., 5-stage (all bronze bowls) Layne turbine pump, No. 26447, rated at 1000 gpm. at 275 ft. T.D.H.; 140 ft. of air line (no gage); 75-hp. U S electric motor; Johnston right angle gear head for auxiliary power, 70 B.H.P.

In Feb. 1953 during a production test of Well No. 6 the pumping rate from Well No. 5 was 425 gpm. However, there was no meter or air line in Well No. 5, and consequently no data were collected.

In Nov. 1958 Well No. 6 was reportedly producing at a rate of 830 gpm. The nonpumping water level was approximately 16 ft.

WELL NO. 7 was drilled by J. P. Miller Artesian Well Co., Brookfield, in Jan. 1954 to a depth of 275 ft. and located about 120 ft. northeast of the intersection of Kedzie Ave. and Olive Road, or approximately 850 ft. N. and 125 ft. E. of the S. W. corner of Section 36, T36N, R13E. The elevation of the ground surface at the well is 675.

The well was cased with 12-in. pipe from the surface to 73 ft. 6 in. A 10-in. gwi. liner was set from 140 to 184 ft. The hole was finished at 12 in. in diameter from the surface to 184 ft. and 10 in. in diameter from 184 to 275 ft.

A production test was conducted by the Driller on Feb. 1, 1954. For test purposes an 8-in., 12-stage Peerless turbine pump was set on 130 ft. of 6-in. column pipe with 132 ft. of air line. Power was furnished from a Mack motor. After 5 1/4 hr. pumping at a rate of 695 gpm., the drawdown was 36 ft. from a nonpumping water level of 22 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 133943) collected Feb. 1, 1954 showed the water in Well No. 7 to have a hardness of 30 gr. per gal., total dissolved minerals of 670 ppm., and an iron content of 1. 3 ppm.

The following pumping equipment was installed in the fall of 1954: 120 ft. of 8-in. column pipe; 12-in., 5-stage Byron Jackson submersible pump, No. 292616, rated at 650 gpm. against 240 ft. T.D.H.; 60-hp. electric motor; 160 ft. of air line (no gage).

In Nov. 1958 Well No. 7 was reportedly producing at a rate of 700 gpm.

WELL NO. 8 was drilled in 1956 by Kramer Bros. to a depth of 300 ft. and located about 1 mile northeast of Well No. 7 and about 50 ft. from Well No. 3(Dixmoor), or approximately 150 ft. S. and 2050 ft. E. of the N. W. corner of Section 31, T36N, R14E. The ground elevation at the well is 635.

The well was cased with 12-in. pipe to about 70 ft. depth.

The pumping equipment includes 285 ft. of 5-in. column pipe; 10-in., 4-stage Byron Jackson submersible pump, No. 331104, rated at 300 gpm. against 440 ft. T.D.H.; 50-hp. electric motor. No air line was installed.

A partial chemical analysis (Lab. No. 148239) collected Nov. 18, 1958, while pumping at 400 gpm. showed the water in Well No. 8 to have a hardness of 34. 7 gr. per gal., total dissolved minerals of 811 ppm., and an iron content of 0. 6 ppm.

Total pumpage for Homewood for 1957 was reported to be 483.84 mg. or an average of 1.326 mgd.

TABLE A

Analyses No. 110093-110099

Time	Temp. °F	Fe ppm.	Alk. ppm.	Hd. ppm.	Turb. ppm.
4-27-47					
7:25A. M.	pump started				
7:30	51.5	0.7	336	492	31
8:25	51.0	0.1	300	537	0
9:30	51.0	0.1	288	612	1
10:30	51.0	0.1	292	552	1
11:30	51.0	0.3	292	545	2
4:00P. M.	51.0	0.1	292	552	3
6:20	51.0	0.4	288	545	5

LABORATORY NO. 148239

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Fluoride	F	0.5	
				Boron	B	0.7	
				Chloride	Cl	16.	.45
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		5		Hardness (as	$CaCO_3$)	590.	11.80
Color		0					
Odor		0					
Temp. (reported)		53.0°F		Total Dissolved Minerals		811.	

HOPEDALE
Tazewell County
June 8, 1960

Four wells are either in service or available for service for the public water supply of the village of Hopedale (737).

WELLS NO. 1 and 2 were described in Bulletin 40 as Wells No. 2 and 3. Well No. 1 is maintained as a stand-by unit and Well No. 2 is in service.

WELL NO. 3 (Railroad Well) was purchased from the G. M. andO. Railroadinl952. The well is 185 ft. deep and cased with 8-in. pipe to an unknown depth. It is equipped with a Fairbanks-Morse turbine pump rated at 100 gpm. and connected to a 7 l/2-hp. Fairbanks-Morse electric motor. Well No. 3 is maintained for service and is pumped about once weekly.

WELL NO. 4 was completed to a depth of 225 ft. in 1958 by M. Ebert Co., Washington, and located about 2 blocks south of Well No. 2, or approximately 1800 ft. S. and 1200 ft. E. of the N. W. corner of Section 26, T23N, R3W. The ground surface elevation is 635. Well No. 4 was cased with 8-in. pipe to 205 ft. followed by 20 ft. of screen.

The well is equipped with a Layne and Bowler turbine pump connected to a 15-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152388) collected June 8, 1960 showed the water in Well No. 4 to have a hardness of 18. 6 gr. per gal., total dissolved minerals of 627 ppm., and an iron content of 2. 9 ppm.

There are 225 services. Pumpage is estimated to average 60, 000 gpd.

LABORATORY NO. 152388

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.9		Silica	SiO_2	17.7	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	70.4	3.52	Boron	B	0.2	
Magnesium	Mg	35.0	2.88	Chloride	Cl	155.	4.37
Ammonium	NH_4	1.6	.09	Nitrate	NO_3	0.8	.01
Sodium	Na	118.	5.15	Sulfate	SO_4	2.7	.06
				Alkalinity (as	$CaCO_3$)	360.	7.20
Turbidity		5		Hardness (as	$CaCO_3$)	320.	6.40
Color		15					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		627.	

HUDSON
McLean County
November 23, 1960

A public water supply was installed in 1955 for the village of Hudson (493).

WELL NO. 1 was completed in Aug. 1955 to a depth of 160 ft. by Layne-Western Co., Aurora, and located 400 ft. N. and 2200 ft. W. of the S. E. corner of Section 21, T25N, R2E. The ground surface elevation at the well is 765. The well bore was drilled 30 in. in diameter to the bottom at 160 ft. and cased with 150 ft. of 8-pipe followed by 10 ft. of Layne No. 6 shutter screen. The annulus between the 8-in. casing and screen and the wall of the hole was gravel packed.

A production test was conducted on Aug. 4, 1955 by representatives of the Driller, the State Water Survey, and Caldwell-Rhoads Co., Consulting Engineers. After 12 hr. pumping at 67 gpm., the drawdown was 45 ft. from a nonpumping water level of 47. 5 ft. Three hr. after the pump was stopped, the water level had returned to 63.9 ft.

A mineral analysis of a sample (Lab. No. 153665) collected Nov. 23, 1960 showed the water to have a hardness of 26.7 gr. per gal., total dissolved minerals of 644 ppm., and an iron content of 2. 3 ppm.

The well is equipped with a Layne turbine pump, rated at 50 gpm. and connected to a 3-hp. U S electric motor.

There are approximately 110 services and 100% of the population is served. Pumpage in 1957 averaged 35,248 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Yellow clay	23	23
Hard gray blue clay	39	62
Sand and gravel	3	65
Hard red and blue clay	86	151
Sand and gravel	6	157
Very fine sand	3	160
Soft green clay	5	165

LABORATORY NO. 153665

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 3		Silica	SiO_2	18. 0	
Manganese	Mn	0. 0		Fluoride	F	0. 5	
Calcium	Ca	91. 7	4. 59	Boron	B	0. 2	
Magnesium	Mg	46. 8	3. 85	Chloride	Cl	5.	.14
Ammonium	NH_4	8. 2	.45	Nitrate	NO_3	0. 9	.01
Sodium	Na	86.	3. 75	Sulfate	SO_4	0. 4	.01
				Alkalinity (as	$CaCO_3$)	624.	12. 48
Turbidity		9		Hardness (as	$CaCO_3$)	422.	8. 44
Color		50					
Odor		0					
Temp. (reported)		54. 2°F		Total Dissolved Minerals		644.	

Two wells are in service for the public water supply of the village of Huntley (1143).

WELLS NO. 1 and 2, described in Bulletin 40, have been abandoned.

WELL NO. 3 was completed at the site of Test Well No. 1-53 in Nov. 1953 to a depth of 63 ft. by Layne-Western Co., Aurora, and located about 40 ft. west of Well No. 2, or approximately 200 ft. S. and 1800 ft. E. of the N. W. corner of Section 33, T43N, R7E. The ground surface elevation at the well is 889. Well No. 3 was cased with 12-in. standard pipe from the surface to 53 ft. followed by 10 ft. of No. 8 Layne bronze shutter screen. The diameter of the hole was 34 in. from top to bottom and the annulus between the casing and screen and the wall of the hole was packed with a mixture of sand and pea gravel from the bottom of the well to 28 ft. and was backfilled above the 28-ft. level.

Sample study summary log of TEST WELL NO. 1-53 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, brown	5	5
Till, very gravelly, sandy	20	25
Sand, very gravelly, medium to very coarse	10	35
Gravel, very sandy, granular	27.5	62.5
Sand, very gravelly, medium to very coarse	2.5	65
Sand, silty, coarse to very fine	5	70
Sand, gravelly, very coarse to medium	6	76

A production test was conducted on Well No. 3 on Nov. 11-12, 1953 by representatives of the Driller, the State Water Survey, and Baxter and Woodman, Consulting Engineers. For test purposes the well was equipped with an 8-in. turbine test pump; 58 ft. of 4-in. column pipe; 58 ft. of air line; Hercules gas engine. After 24 hr. pumping at a rate of 317 gpm., the drawdown was 10 ft. from a static water level of 22 ft. (gage reading). Ten min. after the pump was stopped, the water level had recovered to 26 ft.

A mineral analysis of a sample (Lab. No. 133375) collected Nov. 11, 1953, after 24 hr. pumping at 317 gpm., showed the water in Well No. 3 to have a hardness of 20.2 gr. per gal., total dissolved minerals of 396 ppm., and an iron content of 1 ppm.

Well No. 3 is equipped with 50 ft. of 4-in. column pipe; 6-in., 11-stage Aurora turbine pump (No. 11687), 5 ft. 4 in. long and rated at 100 gpm. against 140 ft. T.D.H.; 4-in. strainer on suction; 50 ft. of air line; 5-hp. U S electric motor (newly installed in June 1958).

WELL NO. 4 was completed in 1953 to a depth of 63 ft. and located about 50 ft. west of Well No. 3, or approximately 200 ft. S. and 1750 ft. E. of the N. W. corner of Section 33. The well was cased with 12-in. pipe from the surface to 53 ft. followed by a Layne 12-in. bronze No. 8 shutter screen to 63 ft. The hole was bored 34 in. in diameter from top to bottom and the annulus between the well wall and the casing and screen was packed with 11 1/2 yd. of gravel.

When the well was completed, the Driller reported pumping for 24 hr. at 319 gpm. with a drawdown of 9. 6 ft. from a static water level of 22 ft. below the pump base.

The pumping equipment consists of 40 ft. of 5-in. column pipe; 8-in., 8-stage Layne turbine pump (No. 26745), 4 ft. 2 in. long; 5 ft. of 6-in. suction pipe; 40 ft. of air line; 15-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 148164) collected Nov. 7, 1958, after 5 min. pumping, showed the water in Well No. 4 to have a hardness of 26 gr. per gal., total dissolved minerals of 437 ppm., and an iron content of 1. 4 ppm.

Pumpage in Jan. 1957 was reported to average 100,000 gpd.

LABORATORY NO. 148164

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	0.3	
				Boron	B	0.0	
				Chloride	Cl	12.	.34
				Alkalinity (as	$CaCO_3$)	346.	6.92
Turbidity		8		Hardness (as	$CaCO_3$)	440.	8.80
Color		0					
Odor		0					
Temp. (reported)		52.0°F		Total Dissolved Minerals		437.	

HUTSONVILLE
Crawford County
May 17, 1960

One well is in service for the public water supply of the village of Hutsonville (583).

WELL NO. 1, described in Bulletin 40 as North Well, has been abandoned and equipment removed.

WELL NO. 2, described in Bulletin 40 as South Well, is available for emergency use.

WELL NO. 3 was completed in July 1958 to a depth of 32 ft. by Layne-Western Co., Kirkwood, Mo., and located 100 ft. south of the center line of Mechanic St. east of Water St. and 36 ft. south of Well No. 2, or approximately 645 ft. S. and 2000 ft. W. of the N. E. corner of Section 29, T8N, R11W. The elevation of the ground surface at the well is 435.

The hole was drilled:

42 in. in diameter from the surface to 9 ft.
38 in. in diameter from 9 to 19 ft.
36 in. in diameter from 19 to 32 ft.

The well is double cased as follows: an outer casing of 26-in. No. 3 gage Armco iron pipe, 25 ft. in length, was set with the top 5ft. 8 in. above ground level. An inner casing of 12-in. pipe, 36 ft. 5 in. long, was set with the top 9 ft. above ground. A 5 ft, length of 12-in. stainless steel shutter screen was set below the 12-in. casing.

A 6-in. clay plug was placed in the bottom of the 38-in. drill hole. A l/4-.in. steel plate was welded on to the bottom of the 12-in. casing, as a seal. Concrete was placed with a 3-in. Tremy pipe in the annulus in the 38-in. drill hole outside the 26-in. casing up to 9 ft. 6 in. and in the annulus between the wall of the 42-in. hole and the 26-in. casing, 9 ft. up to the surface.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness	Bottom
	ft.	ft.
PLEISTOCENE SERIES		
Gravel fill	1	1
Clay	1	2
Mucky gravel	5	7
Gray coarse sand and gravel	25	32
Limestone boulder	-	32

A production test was conducted on July 28-29, 1958 by representatives of the Driller, the State Water Survey, Village officials, and Marbry and Johnson, Consulting Engineers. After 24 hr. pumping at a rate of 344 gpm., the drawdown was 9. 5 ft. from a static water level of 12 ft. 3 in. below the top of the well.

The pumping equipment consists of 30 ft. of 6-in. column pipe; 8-in., 6-stage Layne turbine pump (No. 39454), 4 ft. 8 in. long and rated at 275 gpm.; 6-in. suction pipe; 15-hp. U S electric motor,

A partial chemical analysis of a sample (Lab. No. 147307) collected July 28, 1958, after 13 1/2 hr. pumping at 245 gpm., showed the water in Well No. 3 to have a hardness of 17.'8 gr. per gal., total dissolved minerals of 370 ppm., and an iron content of 0.1 ppm.

There are approximately 237 services, all of which are metered. Pumpage in 1958 averaged 50, 000 gpd.

LABORATORY NO. 147307

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Fluoride	F	0. 1	
Manganese	Mn	0. 0		Chloride	Cl	17.	.48
				Nitrate	NO_3	7. 1	.11
				Alkalinity (as	$CaCO_3$)	260.	5. 20
Turbidity		2		Hardness (as	$CaCO_3$)	304.	6. 08
Color		0					
Odor		0					
Temp. (reported)		62°F		Total Dissolved Minerals		370.	

ILLINI STATE PARK
LaSalle County
September 13, 1960

Two wells are in service for the Illini State Park. The wells are connected to separate distribution systems. In 1939 both wells were reported as "flowing wells. "

WELL NO. 1 (Camp Illini) was drilled in 1934 to a depth of 225 ft. by J. O. Heflin, Joliet, and later deepened to 440 ft. by J. T. Anderson, Morris. The well is located at the site of the old C.C.C. camp approximately 1740 ft. S. and 1000 ft. E. of the N. W. corner of Section 23, T33N, R4E. The well was cased with 8-in. pipe from the surface to 94 ft. and with 6-in. pipe from the surface to 365 ft., below which the hole was finished 6 in. in diameter to the bottom. The ground surface elevation at the well is 500.

In Mar. 1935 the static water level was reported to be 14 ft. above ground level. At the time an Aermotor plunger pump was installed. The pump, operating at 39 strokes per minute, had a rated capacity of 25 gpm.

The well was subsequently equipped with a Burks turbine pump (Decatur Pump Co.) connected to a 5-hp. electric motor,

A mineral analysis of a sample (Lab. No. 153218) collected Sept. 13, 1960 showed the water to have a hardness of 20 gr. per gal., total dissolved minerals of 555 ppm., and an iron content of 1. 9 ppm.

Well No. 1 provides water to Camp Illini which is currently being used as the summer camp of the Illinois Youth Commission.

About 1500 gpd. is used.

WELL NO. 2 (Park Well) is reportedly 600 ft. deep and located about 50 ft. west of the Custodian's residence, approximately 1600 ft. S. and 1300 ft. W. of the N. E. corner of Section 24.

The well is equipped with 50 ft. of 4-in. column pipe; 5-in. Aurora turbine pump, No. 8070, rated at 50 gpm. against 170 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 5-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 153219) collected Sept. 13, 1960 showed the water in Well No. 2 to have a hardness of 20 gr. per gal., total dissolved minerals of 581 ppm., and an iron content of 0. 6 ppm.

In the winter time Well No. 2 furnishes water to the Custodian's house, but during the summer months this well furnishes water for general Park use, about 3000 gpd.

LABORATORY NO. 153218

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Silica	SiO_2	6.9	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	77.5	3.88	Boron	B	0.4	
Magnesium	Mg	37.0	3.04	Chloride	Cl	93.	2.62
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	1.2	.02
Sodium	Na	76.	3.31	Sulfate	SO_4	81.7	1.70
				Alkalinity (as	$CaCO_3$)	296.	5.92
Turbidity		9		Hardness (as	$CaCO_3$)	346.	6.92
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		555.	

INDIAN HEAD PARK
Cook County
January 16, 1960

One well is in service for the village of Indian Head Park (385) located on U. S. Highway 66 about 2 miles southeast of Hinsdale. The distribution system is owned and operated by the homeowners, as a corporation entitled Indian Head Park Improvement Corporation.

WELL NO. 1 was completed to a depth of 295 ft. in 1947 by J. P. Miller Artesian Well Co., Brookfield, and located on Blackhawk Trail about 3/4 mile from Brainard Road entrance to the village, or approximately 1825 ft. S. and 1200 ft. W. of the N. E. corner of Section 19, T38N, R12E. The ground surface elevation at the well is 658. The well was cased with 10-in. pipe from the surface to 22 ft. and with 8-in. pipe from the surface to 42 ft. (cemented in), below which the hole was finished at 10 in. in diameter to 165 ft. and 8 in. in diameter from 165 to 295 ft. Limestone was penetrated at 20 ft. depth.

The pumping equipment consists of 150 ft. of 5-in. column pipe; 8-in., 8-stage Peerless turbine pump, No. 33951, rated at 320 gpm.; 150 ft. of air line; 15-hp. U S electric motor.

On June 20, 1958, after 4 hr. pumping at a rate of 135 gpm., the drawdown was 75 ft. from a nonpumping water level of 48 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 151557) collected Jan. 16, 1960 showed the water in Well No. 1 to have a hardness of 40. 9 gr. per gal., total dissolved minerals of 956 ppm., and an iron content of 0. 3 ppm.

There are 96 services. Pumpage is estimated to average 18,000 gpd.

LABORATORY NO. 151557

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Fluoride	F	0.1	
				Chloride	Cl	68.	1.92
				Nitrate	NO_3	4.3	.07
				Sulfate	SO_4	300.1	6.24
				Alkalinity (as	$CaCO_3$)	404.	8.08
Turbidity		1		Hardness (as	$CaCO_3$)	700.	14.00
Color		0					
Odor		0		Total Dissolved Minerals		956.	

One well is in service for the public water supply of the village of Island Lake (1639). The village, incorporated in 1950, was described in Bulletin 40 as Island Lake Estates Subdivision.

WELL NO. 1, described in Bulletin 40 as Well 19-U drilled in 1940 to a depth of 116 ft., is equipped with 90 ft. of 5-in. column pipe; 8-in., 11-stage Aurora turbine pump, No. 69213, rated at 200 gpm. against 250 ft. T.D.H.; 90 ft. of air line; 20-hp. electric motor.

The static water level on Oct. 27, 1959 was 26 ft. below the surface elevation of 770.

Well No. 1 is maintained for emergency use.

WELL NO. 2 is described in Bulletin 40 as Well K-9 drilled in 1943 to a depth of 87 ft. The Island Lake Water Co. reports its records show this well to have been drilled to 95 ft. and cased with 8-in. pipe to 84 ft. followed by an 8-in. screen from 84 to 95 ft.

The well is equipped with 70 ft. of 4-in. column pipe; 7-in., 11-stage Byron Jackson turbine pump; 10 ft. of 4-in. suction pipe; 90 ft. of air line; 15-hp. electric motor.

On Sept. 23, 1959 the static water level was 40 ft. below the ground surface elevation of 770.

Well No. 2 is maintained for emergency use.

WELL NO. 3 was described in Bulletin 40 as Well A-6, which was drilled in 1941 to a depth of 190 ft. The well was reportedly worked over in 1954 and finished at 122 ft. depth with 8-in. casing from the surface to 110 ft. followed by a 7 1/2-in. Cook screen from 110 to 122 ft.

On Oct. 14, 1959 this well was reportedly not used.

WELL NO. 4 was completed to a[1] depth of 1223 ft. in July 1957 by Milaeger Well Drilling Co., Milwaukee, Wis., and located about 3/8 mile south of Well No. 3, or approximately 1200 ft. N. and 450 ft. W. of the S. E. corner of Section 20, T44N, R9E, McHenry County. Wells No. land 2 are located in Section 21, Lake County, about l/2 mile east and 1/2 mile northeast, respectively. The ground surface elevation at Well No. 4 is 725. The well was cased with 12-in. pipe from the surface to 175 ft. and with a 10-in. liner from 360 to 460 ft. The liner was cemented in. From 465 ft. to the bottom, the hole was finished 10 in. in diameter.

Correlated driller's sketch log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Glacial drift"	175	175
SILURIAN SYSTEM		
"Niagaran Alexandrian"	185	360
ORDOVICIAN SYSTEM		
Maquoketa Formation		
"Maquoketa"	105	465
Galena-Platteville Formations		
"Platteville"	275	740
Glenwood Formation		
"Glenwood shale"	160	900
St. Peter Formation		
"St. Peter sandstone"	100	1000
CAMBRIAN SYSTEM		
Franconia Formation		
"Franconian"	55	1055
Ironton-Galesville Sandstone		
"Galesville sandstone"	178	1233

A production test was reported by the Driller on July 1, 1957. After 16 hr. pumping at a rate of 282 gpm., the drawdown was 159 ft. from a static water level of 136 ft. below the top of the casing. Two min. after the pump was stopped, the water level had recovered to 203 ft. Twenty-four hr. after the pump was stopped, the water level had recovered to 168 ft.

On July 24, 1959, after 20 min. pumping at a rate of 300 gpm., the drawdown was 75 ft. from a nonpumping water level of 227 ft.

The permanent pumping equipment consists of 340 ft. of 5-in. column pipe; 10-in., 12-stage Byron Jackson turbine pump, No. 344228, rated at 300 gpm. at 480 ft. T.D.H.; 340 ft. of air line; 60-hp. Allis electric motor.

A mineral analysis of a sample (Lab. No. 150133) collected July 23, 1959, after 20 min. pumping at a rate of 300 gpm., showed the water in Well No. 4 to have a hardness of 14. 2 gr. per gal., total dissolved minerals of 335 ppm., and an iron content of 0. 2 ppm.

In July 1958 pumpage was reported to average 36, 502 gpd.

2 - Island Lake

LABORATORY NO. 150133

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	9.6	
Manganese	Mn	0.1		Fluoride	F	0.6	
Calcium	Ca	63.9	3.19	Boron	B	0.1	
Magnesium	Mg	20.6	1.69	Chloride	Cl	8.	.23
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	1.2	.02
Sodium	Na	32.	1.41	Sulfate	SO_4	3.1	.06
				Alkalinity (as	$CaCO_3$)	300.	6.00
Turbidity		4		Hardness (as	$CaCO_3$)	244.	4.88
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		56.1°F		Total Dissolved Minerals		335.	

ITASCA
DuPage County
May 10, 1960

Three wells furnish water for the public supply of the village of Itasca (3564).

WELL NO. 1, described inBulletin 40, was to be abandoned and filled when Well No. 2 was constructed.

WELL NO. 2, described in Bulletin 40, was reported in Mar. 1958 to have a static water level of 68 ft. In Mar. 1959 Well No. 2 was reported abandoned and filled.

WELL NO. 3, described in Bulletin 40, had a static water level of 7 ft. in Mar. 1958 and during pumping, the drawdown was 14 ft. Well No. 3 furnishes the principal supply for the village.

Correlated driller's log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Drift"	82	82
SILURIAN SYSTEM		
Niagaran Series		
"Lime"	98	180
"Shale"	10	190

WELL NO. 4 was completed in Jan. 1952 to a depth of 216 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located at the village hall, or approximately 2470 ft. S. and 1210 ft. E. of the N. W. corner of Section 8, T40N, R11E. The ground surface elevation at the well is 685. The well was cased with 12-in. pipe to 78 ft., below which the hole was finished 12 in. in diameter.

When completed the well reportedly yielded 350 gpm. in a test by the Driller.

The permanent pumping equipment consists of 150 ft. of column pipe; 8-in., 8-stage American Well Works turbine pump, rated at 275 gpm. at 230 ft. T. D.H.; 10 ft. of suction pipe; 150 ft. of air line; 30-hp. U S electric motor. Auxiliary power is installed consisting of a Johns ton right angle gear drive No. 18286.

Well No. 4 is used only as a stand-by unit when Well No. 3 cannot supply the demand. In Mar. 1957 the static water level was reportedly 125 ft. and during pumping, the drawdown was 30 ft.

A partial chemical analysis (Lab. No. 150667) collected Sept. 15, 1959, after 12 hr. pumping, showed the water in Well No. 4 to have a hardness of 24. 9 gr. per gal., total dissolved minerals of 570 ppm., and an iron content of 0. 9 ppm.

WELL NO. 5 was completed in 1958 to a depth of 190 ft. by Hoover Well Drilling Co., DesPlaines, and located at the northwest corner of the Park at Irving Park and Rush St., or approximately 1750 ft. N. and 1900 ft. E. of the S. W. corner of Section 8. The ground elevation at the well is 700. The well was cased with 16-in. pipe from the surface to 82 ft. and with 12-in. pipe from the surface to 102 ft. (cemented in). Below the casing the hole was finished at 12 in. in diameter to the bottom at 190 ft.

When the well was completed a production test was conducted by the Driller using a turbine test pump, with power from a gas engine through a right angle gear drive. After 5 1/2 hr. pumping at a rate of 70 gpm., the drawdown was 22 ft. from a nonpumping water level of 28 ft. below the top of the casing. Following this test the well was reportedly acidized and yielded 134 gpm.

A partial chemical analysis of a sample (Lab. No. 148124) collected Oct. 29, 1958, after 5 1/2 hr. pumping at 70 gpm., showed the water in Well No. 5 to have a hardness of 21. 7 gr. per gal., total dissolved minerals of 506 ppm., an iron content of 7. 7 ppm., and a turbidity of 144 ppm.

The permanent pump assembly includes an 8-in., 23-stage Johnston turbine pump, rated at 500 gpm. with power from an International stationary engine.

Following the permanent pump installation a production test was conducted by the Driller. After pumping 24 hr. at a rate of 400 gpm., the drawdown was 64 ft. from a nonpumping water level o£ 22 ft.

A partial chemical analysis of a sample (Lab. No. 152230) collected May 10, 1960, after 24 hr. pumping at 400 gpm., showed the water in Well No. 5 to have a hardness of 32 gr. per gal., total dissolved minerals of 695 ppm., a turbidity of 15 ppm., and an iron content of 3. 4 ppm.

Pumpage in July 1958 was reported to average 149,475 gpd.

WELL NO. 6 was completed to a depth of 181 ft. in 1959 by Hoover Well Drilling Co. and located about 1/4 mile north of Well No. 5, or approximately 2100 ft. S. and 2050 ft. E. of the N. W. corner of Section 8. The ground surface elevation at the well is 680.

The well was cased with 24-in. pipe from the surface to 78 ft. and with 20-in. pipe from the surface to 88 ft. The annulus between the casings was cemented in.

LABORATORY NO. 152230

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.4		Fluoride	F	0.5	
Manganese	Mn	Tr.		Chloride	Cl	80.	2.26
				Nitrate	NO_3	0.5	.01
				Alkalinity (as	$CaCO_3$)	352.	7.04
Turbidity		15		Hardness (as	$CaCO_3$)	520.	10.40
Color		0					
Odor		0		Total Dissolved Minerals		695.	

Summary sample study log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, brownish black; trace till, grayish-brown	10	10
Sand and gravel, light gray (gravel is shale and chert)	20	30
Sand and gravel, light gray, green, buff (gravel is shale, dolomite, and chert)	45	75
SILURIAN SYSTEM		
Niagaran Series		
Dolomite slightly clayey and silty, some chert, white, fine	15	90
Dolomite, slightly clayey and silty, white, light green (at base) fine	30	120
Alexandrian Series		
Kankakee Formation		
Dolomite, silty, light gray, some light pink and green, extra fine	30	150
Dolomite, silty to slightly silty, some glauconite, buff to yellowish-gray, extra fine to very fine, crystalline	80	230
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, clayey, buff, greenish-gray; shale, greenish-gray, yellowish-gray, weak	3	233

Water for the public supply of the city of Jerseyville (7420) is obtained from Stamps spring (No. 1), Humiston spring (No. 2), Wells No. 54-1 and 54-2. Wells No. 1 and 2 are maintained for emergency usage but neither well has been in service for some time and there is some doubt about any future service from them.

The Stamps spring and the Humiston spring are described in Bulletin 40. In Jan. 1955 the springs were reportedly supplying sufficient water for Jerseyville and no water was being used from the new well field which had been developed in 1953 and 1954.

A partial chemical analysis of a sample (Lab. No. 136807) collected Jan. 18, 1955 showed the water from Stamps spring to have a hardness of 17. 8 gr. per gal., total dissolved minerals of 326 ppm., and an iron content of 0. 1 ppm.

WELL NO. 1 completed in 1943 to a depth of 34 ft. by Elmer Franke, Batchtown, was described in Bulletin 40. The well is located about 1 1/2 miles southwest of Springs pumping station, approximately 1000 ft. N. and 990 ft. W. of the S. E. corner of Section 4, T7N, R12W. The ground surface elevation at the well is 492. A partial chemical analysis (Lab. No. 132535) collected July 21, 1953, after 24 hr. pumping at a rate of 70 gpm., showed the water to have a hardness of 15. 6 gr. per gal., total dissolved minerals of 288 ppm., and an iron content of 16. 5 ppm. Well No. 1 is available for stand-by use and was used to some extent during the summer of 1956, It may ultimately be abandoned.

WELL NO. 2 was completed in July 1953 to a depth of 42 ft. by Elmer Franke and located at the site of Test Well No. 4-53 which is about 725 ft. south of Well No. 1, or approximately 275 ft. N. and 990 ft. W. of the S. E. corner of Section 4. The ground surface elevation at the well is 487.

The finished well was cased with 8-in. steel pipe from about 6 ft. above the original ground level to 40 ft. below the surface. The bottom 10 ft. of the casing is perforated. The well is located in the flat of Otter Creek and the location is subject to flooding.

A production test of Test Well No. 4-53 was conducted on July 21, 1953 by representatives of the Driller and the State Water Survey. For test purposes the well was equipped with a 12-stage Fairbanks-Morse vertical turbine pump connected to a 6-hp. Fairbanks-Morse gas engine. The pump was rated at 75 gpm. at 50 psi. After 6 hr. pumping at a rate of 58 gpm., the drawdown was 19. 2 ft. from a static water level of 16. 75 ft. below the top of the casing (approximately 2 ft. above ground level).

A mineral analysis of a sample (Lab. No. 132534) collected July 21, 1953, after 6 hr. pumping at a rate of 57 gpm., showed the water to have a hardness of 12. 7 gr. per gal., total dissolved minerals of 264 ppm., and an iron content of 12. 2 ppm.

Well No. 2 is available for use but has not been reported in service since the construction of Wells No. 54-1 and 54-2. It may ultimately be abandoned.

In 1954 in an effort to find an additional supply for the city, Crawford, Murphy and Tilly, Consulting Engineers, supervised the drilling of three test wells in the Otter Creek valley flat downstream from the wells drilled in 1943 and 1953, Wells No. 1 and 2 respectively.

WELL NO. 3 was drilled to a depth of 41. 5 ft. in Mar. 1954 by E. W. Franke. The well was located approximately 10 ft. from the bank of Otter Creek, or about 1000 ft. S. and 10 ft. W. of the N. E. corner of Section 8, T7N, R12W. The ground surface elevation at the well was 476.

The well was cased with 8-in. pipe from 1 ft. above to 33. 5 ft. below ground level followed by 10 ft. of screen having No. 80 slot openings. A production test was conducted by representatives of the Driller, the State Water Survey, City officials, and the Consulting Engineers. After 5 hr. pumping at 30 to 35 gpm., the drawdown was 8.9 ft. from a static water level of 29. 6 ft. below the top of the casing. Thirty-six min. after pumping was stopped, the water level had recovered to 30.7 ft.

Well No. 2, 115 ft. distant, was pumping to the treatment plant while the test was being conducted in Well No. 3. The two wells produced 75 to 80 gpm., not much more than was being produced from Well No. 2. Also Well No.

3 could not be pumped over 35 gpm. without breaking suction. Well No. 3 was to be abandoned.

WELL NO. 54-1 was completed to a depth of 48 ft. in Dec. 1954 by Hydramatics Corporation, Milan, and located 5 ft. east of Test Well No. 5, or approximately 850 ft. N. and 500 ft. W. of the S. E. corner of Section 7. The ground surface elevation at the well is 468.

The well was cased with 26 ft. of 12-in. pipe coupled to 29 ft. 9 l/2 in. of 12-in. screen having No. 120 slot openings. The annulus between the screen and the 16-in. bore hole was gravel packed. A 16-in. outer casing extends from the top of the screen to the surface and is encased in a 6-in. concrete envelope from 10 ft. below the surface to the casing top which is about 16 in. above the original ground surface.

A production test was conducted on Jan. 18-20, 1955 by representatives of the Driller, the State Water Survey, and the Consulting Engineers. After 40 hr. pumping at a rate of 360 gpm., the drawdown was 8. 7 ft. from a static water level of 11.2 ft. below the top of the casing (3.9 ft. above ground level). One hr. after pumping was stopped, the water level had recovered to 12. 9 ft. and 4 hr. after pumping was stopped, the water level had recovered to 12. 3 ft.

In 1957 the maximum flood level in Otter Creek was about 16 in. below the pump pedestal.

A partial chemical analysis of a sample (Lab. No. 136876) collected Jan. 19, 1955, after pumping 40 hr. at a rate of 360 gpm., showed the water in Well No. 54-1 to have a hardness of 16.1 gr. per gal., total dissolved minerals of 297 ppm., and an iron content of 1 ppm.

The pumping equipment includes 35 ft. of 5-in. column pipe; 7 l/2-in., 5-stage Aurora turbine pump, rated at 300 gpm. at 55 ft. T. D, H. connected to a 10-hp. A. O. Smith electric motor. Ten ft. of 5-in. suction pipe is installed.

Well No. 54-1 is temporarily out of service due to an accident to the column pipe. A new pump has been ordered.

WELL NO. 54-2 was completed in 1954 to a depth of 51 ft. by the Hydramatics Corporation and located in the Otter Creek flat about 1000 ft. northwest of Well No. 54-1, or approximately 1600 ft. N. and 1500 ft. W. of the S. E. corner of Section 7. The construction of the well was identical in all details to that of Well No. 54-1. The pumping equipment is also identical, including an 8-in. MC. Aurora turbine pump, No. 89956, rated at 300 gpm. at 55 ft. T.D.H.; 10-hp. A. O. Smith electric motor.

The top of the casing on Well No. 54-2 was raised 12 ft. to elevation 491. 9.

A production test was conducted on Well No. 54-2 on Feb. 1, 2 and 3, 1955 by representatives of the Driller, City officials, State Water Survey, and the Consulting Engineers. During the test, water levels were observed in three wells located as follows:

Name of Well	Distance from Well No. 54-2
Test Well No. 4	25 ft.
Test Well No. 5	215 ft.
Well No. 5 (observation well)	350 ft.

After 48 hr. pumping at a rate of 300 gpm., the drawdown in Well No. 54-2 was 10.75 ft. from a static water level of 12.15 ft. below the top of the casing. Two and one-half hr. after pumping was stopped, the water level had recovered to 13. 45 ft.

At the end of pumping the water level in Test Well No. 4 had lowered 6.3 ft. from a static water level of 11. 9 ft.

At the end of pumping the water level in Test Well No. 5 had lowered 1.4 ft. from a static of 10. 4 ft.

At the end of pumping the water level in Well No. 5 (observation) had lowered 0.8 ft. from a static of 14. 8 ft.

A mineral analysis of a sample (Lab. No. 152184) collected Apr. 22, 1960, after 10 min. pumping, showed the water in Well No. 54-2 to have a hardness of 15.7 gr. per gal., total dissolved minerals of 295 ppm., and an iron content of 0. 5 ppm.

Well No. 54-2, currently is furnishing

about 75% of the municipal supply and the springs furnish the balance.

Test Well No. 8 was drilled to a depth of 72 ft. in May 1955 by E. W. Franke at a location about 325 ft. west of Well No. 54-1. The well was cased with 8-in. pipe to 57 ft., below which the hole was finished 6 in. in diameter to the bottom at 72 ft. The elevation at the top of the casing, 2 ft, above ground level, is 468. 3. A production test was conducted on May 3, 1955 by representatives of the Driller, City officials, State Water Survey, and the Consulting Engineers. For test purposes the well was equipped withl3-stage American Well Works turbine pump, 8 ft. in length, with the top of the bowls set at 20 ft.; 10 ft. of suction pipe; Allis Chalmers gasoline engine.

After pumping at a rate of 175 gpm., the drawdown was 21. 6 ft. from a nonpumping water level of 11.1 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 137574) collected May 3, 1955, after 9 hr. pumping at a rate of 175 gpm., showed the water in Test Well No. 8 to have a hardness of 16. 5 gr, per gal., total dissolved minerals of 315 ppm., and an iron content of 9.1 ppm.

Test Well No. 8 was not put into service.

From Jan. 1, 1959 to Dec. 31, 1959 inclusive, pumpage for the city of Jerseyville was reported to average 366, 000 gpd.

Correlated driller's log of WELL NO. 54-1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Coarse sand"	4	4
"Sand, coarse gravel"	2	6
"Boulders, coarse gravel"	4	10
"Coarse sand and gravel-water"	15	25
"Sand and gravel-finer"	6	31
"Sand and gravel - some yellow clay. Won't take water"	5	36
"Shows more clay. Won't take water"	2	38
"Coarse gravel, sand and clay"	2	40
"Coarse gravel, sand and some boulders, little cleaner"	2	42
"Some boulders, cleaner, and some finer"	2	44
"Cleaner, finer sand and gravel"	6"	44'6"
"Coarse gravel, boulders"	4'10"	49'4"
"Finer gravel, clay formation. No water"	1'8"	51
"Muddy gravel, and no water"	1	52
"Fine silt and gravel," and -		
MISSISSIPPIAN SYSTEM		
Keokuk-Burlington Formations		
"Limestone bedrock"	2'4"	54'4"

LABORATORY NO. 136876

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.0		Fluoride	F	0. 1	
Calcium	Ca	75.	3. 75	Chloride	Cl	8.	.23
Magnesium	Mg	22.	1. 77	Nitrate	NO_3	0. 1	Tr.
				Alkalinity (as	$CaCO_3$)	272.	5. 44
Turbidity		15		Hardness (as	$CaCO_3$)	276.	5. 52
Color		0					
Odor		0		Total Dissolved Minerals		297.	

4 - Jerseyville

LABORATORY NO. 152184

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	9.1	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	70.9	3.54	Boron	B	0.0	
Magnesium	Mg	22.4	1.84	Chloride	Cl	7.	.20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.2	.02
Sodium	Na	8.	.33	Sulfate	SO_4	42.0	.87
				Alkalinity (as	$CaCO_3$)	232.	4.64
Turbidity		3		Hardness (as	$CaCO_3$)	269.	5.38
Color		0					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		295.	

There are 13 wells in service for the public water supply of the city of Joliet (66, 780). Five deep sandstone wells are within the Joliet city limits and eight wells are in the Hadley Valley area.

JOLIET WELLS

RUBY ST. WELL, described in Bulletins 34 and 40, was in service until Dec. 7, 1957. Nonpumping water levels were recorded monthly until Oct. 4, 1956 when the turbine pump was removed and the well filled shortly thereafter. The booster pump is being used to force water to that part of the city lying west of the Sanitary Canal.

OTTAWA ST. WELL, describedinBulletins 34 and 40, was repaired from June 1953 to Jan. 1954. The old liner was removed and a new 12-in. liner, 303 ft. long, was cemented in with the bottom at 323 ft. The pump was set at 550 ft. to the top of the bowls and a 550-ft. air line was installed.

Due to a hole in the column pipe, repairs were made between July 8 and Sept. 10, 1959, when the pump was reinstalled with 550 ft. of new column pipe. The old pump shaft and the 550 ft. of air line were retained.

After the pump was removed on June 6, 1953 the static water level was measured 362 ft. On Aug. 19, 1959, while the pump was out, the static water level was measured 414 ft.

The Ottawa St. Well is in regular service.

JASPER ST. WELL, described in Bulletins 34 and 40, was repaired in Oct. 1952 by J. P. Miller Artesian Well Co., Brookfield, when the pump shaft was found to be broken. While the pump was out the well was shot with 228 lb. of nitrogengel between depths of 1530 and 1540 ft. After the well was cleaned out to 1560 ft., the clean out was discontinued. The static water level was 342 ft.

The old Cook pump was repaired and reinstalled with 590 ft. of 10-in. column pipe; 14-in., 14-stage Cook turbine pump, 10 ft. 4 in. long; 10 ft. of 10-in. suction pipe; 588 ft. of air line. Production was resumed on June 10, 1953 and, except for minor repairs, there have been very few interruptions in the service since that time.

WASHINGTON ST. WELL NO. 1, described in Bulletins 34 and 40, was out of service between June 11 and 15, 1951 whena hole in the pump column was repaired. J. P. Miller conducted the rehabilitation of the well. On Nov. 29, 1956 the upper liner was removed and the hole reamed out from 350 to 370 ft. A new 16-in. od. liner was installed with the bottom at 357 ft. and the liner cemented in. A fill of 90 ft. of material was cleaned out of the well to its original depth of 1609 ft.

The well was then shot with 114 lb. of nitrogengel and 4 lb. of 60% dynamite between 1544 and 1550 ft. depths. A second shot of 185 lb. of 100% nitrogengel and 10 lb. of 60% dynamite was exploded between 1527 and 1540 ft. depths. The well was cleaned out to 1609 ft. The static water level was 402 ft.

The old pump was reinstalled Feb. 20, 1957 with the top of the bowls at 580 ft. The 580-ft. stainless steelair line is defective and not usable. A production test was conducted by the Contractor on Feb. 21, 1957. After 3 hr. pumping at 1000 gpm., the drawdown was 70 ft. from a nonpumping water level of 420 ft. There have been no interruptions since Feb. 1957.

WILLIAMSON AVE. WELL, described in Bulletins 34 and 40, was shut down for reconditioning and rehabilitation on Feb. 5, 1957. J. P. Miller conducted the rehabilitation of the well. All old liners were removed. A new 16-in. od. casing was set from the surface to 367 ft. and grouted with 320 bags of cement.

A 13-in. od. liner with a drive shoe on top was set from 1105 to 1170 ft. depths.

The well was shot atfive levels, with amount and depth of charges shown in Table A.

TABLE A

Shot No.	Charge: Amount 100% nitrogengel lb.	Charge: Amount 60% dynamite lb.	Depth ft.
1	228	8	1515 to 1525
2	228	8	1495 to 1505
3	285	8	1475 to 1485
4	342	12	1557 to 1570
5	228	8	1525 to 1535

After the well was cleaned out to 1575 ft. the water level was 438 ft. On Dec. 16, 1957 the pump was reinstalled at 600 ft. A 590-ft. air line was also installed. Production was started on Feb. 16, 1958 with a nonpumping water level of 422 ft.

The well has been in regular service since Feb. 1958. Presently the air line is in poor condition.

SPRUCE SLIP WELL, described in Bulletins 34 and 40, was rehabilitated between Jan. and Apr. 1958. The well was filled up to 1470 ft. depth, presumably from an earlier shooting. About 19 cu. yd. of material was cleaned out to a depth of 1556 ft.

On Jan. 20, 1958 the static water level was 388 ft. The pump was reinstalled on Apr. 1, 1958 and set with 650 ft. of 8-in. column pipe (270 ft. of which was new); 545 ft. of new shaft tubing; 12-stage bowl section, 13 ft. long; 24 ft. of 8-in. tail pipe; 650 ft. of threaded brass air line.

Spruce Slip Well has been in regular service since Apr. 1958, without any serious interruptions.

A record of the water level recession in the Joliet sandstone wells is shown in Table B. Automatic water level recorders are installed by the State Water Survey in the well of the Public Service Co. of Northern Illinois, Station No. 55 located near Stateville Penitentiary, and in the Des Plaines St. Well in Joliet. The other data are actual measurements. The Ruby St., Williamson St., Washington St. No. 1, and Spruce Slip Wells have had defective air lines since 1958.

The ground-water level in different areas varies from time to time due to pumping conditions. The minimum water levels are shifting toward the southwest part of the city as factory construction moves in that direction.

TABLE B

Well	From	To	Water Level Recession ft.
P. S. C. N. I.	1947	Sept. 1960	77
DesPlaines St.	1947	Sept. 1960	64
Ottawa St.	1948	Sept. 1960	76
Jasper St.	1952	Sept. 1960	60
Ruby St.	1952	1956	17
Williamson St.	1948	1958	43
Washington No. 1	1948	1958	50
Spruce Slip	1948	1958	58
Jasper St.	1952	1958	40

HADLEY VALLEY WELLS

In 1941 it was noted that during the previous 30 yr. static water levels in Joliet City Wells had lowered 200 to 2,50 ft. Due to the erection of defense and munition plants in the area, the prospect of greatly increased pumpage made the groundwater supply situation appear to be approaching a critical stage.

According to geologists, two large buried bedrock valleys east of Joliet, roughly coincide with the existing valleys of Spring and Hickory Creeks. A third, Hadley bedrock valley, connects the other two. In 1942 and 1943, as a result of the cooperative field studies and joint reports prepared by the State Water Survey and State Geological Survey on the respective hydrologic and geologic factors involved, 11 test wells and a number of observation wells were drilled in the area extending 1 mile in width and from 8 to 10 miles northeast from the city of Joliet. Pumping tests were conducted to determine the potential capabilities of the glacial drift and shallow bedrock aquifers.

Out of this investigational program, five gravel wells and three deep sandstone permanent wells were constructed from 1948 to 1951. Water from the eight wells is discharged into a concrete pipe line leading to the city's iron removal plant at the northeast corner of Joliet. Treatment of the water is necessary because of the high iron content of the water from the gravel wells.

GRAVEL WELLS

WELL NO. 2, SITE 6 was completed to a depth of 103 ft. in the spring of 1950 by Layne-Western Co., Aurora, and located 562 ft. S. and 730 ft. E. of the N. W. corner of Section 5, T35N, RUE, Will County. The pump base elevation is 649.78. The well was cased with 29 ft. of 48-in. surface pipe. A 36-in. pipe was then set from the surface to 54 ft. and the annulus between the casings was filled with cement. Below the 36-in. casing the hole was finished at 36 in. in diameter to the bottom of the well. A 16-in. casing was then set from the surface to 60 ft. followed by 40 ft. (effective length) of Layne brass shutter screen to the bottom of the well at 103 ft.

A production test was conducted on June 21-22, 1950 by representatives of the Driller and Consoer, Townsend and Associates, Consulting Engineers. After 48 hr. pumping at a rate of 1280 gpm., the drawdown was 31 ft. from a nonpumping water level of 7 ft. below the top of the casing. Twenty min. after the pump was stopped, the wa-

ter level had recovered to 14 ft.

Water levels daring the production test were recorded in four observation wells as shown in Table C.

TABLE C

Well	Distance from Well No. 1 ft.	Depth to Water Before pumping ft.	Depth to Water At end of pumping ft.
0- 1	20 east	7.2	21.0
A	1850 {south west	37.	5.2
0-10	2000 south	30.0	31.0
0- 3	2300 {east north	17.7	18.3

Twenty min. after the pump was stopped, the water level in O. W. No. 0-1 had recovered to 14 ft.

The permanent pumping equipment includes a Peerless turbine, rated at 600 gpm., directly-connected to a 50-hp. U S electric motor. The air line length is 84 ft.

WELL NO. 2, SITE 2 was completed to a depth of 90 ft. in Apr.-May 1950 by Layne-Western Co. and located approximately 2570 ft. N. and 980 ft. E. of the S. W. corner of Section 5, T35N, R11E, Will County. The pump base elevation is 668.38. The well was cased with 48-in. steel pipe from the surface to 25 ft. and with 36-in. pipe from the surface to a depth of 50 ft., below which the hole was finished 36 in. in diameter to thebottom at 90 ft. An 18-in. steel casing was set from 1 ft. 8 in. below to 60 ft. below the surface, followed by 30 ft. of Layne No. 6 shutter screen (0.08-in. by 2-in. openings). Gravel was placed inside the 36-in. casing from the bottom of the well to the surface. The annulus between the 36 and 48-in. casings was cemented.

A production test was conducted on May 11-12, 1950 by representatives of the Driller and the State Water Survey. After 8 hr. pumping at 812 gpm., the drawdown was 47.5 ft. from a non-pumping water level of 30 ft. (air line reading). Fifteen min. after the pump was stopped, the water level had recovered to 32 ft. Pumping was then resumed and after 15 hr. pumping at 609 gpm., the drawdown was 34. 5 ft.

The specific capacity of the well during each pumping period was 17.7 gpm. per ft. of drawdown.

During the test, water levels were automatically recorded in the 6-in. Well No. 0-10 located 13 ft. north of Well No. 2. At the end of the 8-hr. pumping period, the water level in O. W. No. 0-10 had lowered to 16. 5 ft. below a static level of 30 ft. The water level then raised to 11. 7 ft. drawdown and remained at that level while the pumping rate was steady to the end at 609 gpm.

The pumping equipment includes a Peerless turbine pump, rated at 600 gpm., connected to a 50-hp. U S electric motor. The air line length is 70 ft.

At each one of the operating drift wells, an observation drift well is located about 16 ft. distant. At Well No. 2, Site 2 a State Water Survey automatic water level recorder has been ins tailed in the O. W. No. 0-10 since July 1950. Table D shows some of the water level readings picked at critical points from the hydrographs.

TABLE D

Depth to water in feet below bench mark elevation 670. 51

Date	Depth to Water ft.	Date	Depth to Water ft.
		June 1955	44. 1
Aug. 1950	30.0	Nov. 1955	46.6
Dec. 1950	31.5	May 1956	36.9
May 1951	29.5	Sept. 1956	48.8
Jan. 1952	35.0	Nov. 1956	38.9
June 1952	34.0	July 1957	32.7
Jan. 1953	39.0	Sept. 1957	48.3
Apr. 1953	39.0	Jan. 1958	38.0
Apr. 1953	50.0	Aug. 1958	44.0
June 1953	41.0	Dec. 1958	43.0
May 1954	49.0	Apr. 1959	44.0
June 1954	54.5	July 1959	41.5
Oct. 1954	37.2	Jan. 1960	43.8
Dec. 1954	48.3	June 1960	41.6
Apr. 1955	32.6	Nov. 1960	42.4

WELL NO. 3, SITE 5 was constructed between Oct. 1949 and Aug. 1950 to a final depth of 85 ft. by Layne-Western Co. and located 60 ft. S. and 540 ft. E. of the N. W. corner of Section 8, T35N, R11E, Will County. The pump base

elevation is 673. 63. The well was cased similarly to gravel Well No. 2 except that the 18-in. screen was 27 ft. long and set with the bottom at 85 ft. Otherwise the annular spaces between the casings were gravel packed and cemented as in Well No. 2.

In a production test on Aug. 14, 1950, after 24 hr. pumping at 1200 gpm., the drawdown was 27 ft. from a static water level of 37. 3 ft. Thirty min. after the pump was stopped, the water level had recovered to 45.8 ft.

During the pumping in Well No. 3, the water level in an observation well located 16.5 ft. east of Well No. 3, was lowered 18. 5 ft. from a static level of 36.7 ft.

The pumping equipment is similar to that in gravel Well No. 2. The air line length is 78 ft.

A mineral analysis of a sample (Lab. No. 122742) collected Aug. 15, 1950, after 24 hr. pumping at 1200 gpm., showed the water in Well No. 3, Site 5, to have a hardness of 30. 5 gr. per gal., total dissolved minerals of 617 ppm., and an iron content of 2. 1 ppm.

WELL NO. 4, SITE 9 was completed in Sept. 1950 to a depth of 114 ft. 8 in. by Layne-Western Co. and located approximately 1963 ft. N. and 1700 ft. W. of the S. E. corner of Section 32, T36N, R11E. The pump base elevation is 688.25. In the fall of 1949 a 48-in. casing was set from the surface to a depth of 25 ft. In Aug. 1950 a 36-in. casing was set from the surface to a depth of 50 ft., below which the hole was finished 36 in. in diameter to the bottom. An 18-in. Layne brass shutter screen, 40 ft. long, was set in the bottom of the well and an 18-in. casing was placed from the top of the screen to the surface, a length of 74 ft. 8 in. The annulus between the screen with its connecting casing and the wall of the 36-in. hole and casing was packed with selected gravel. The annulus between the 36 and 48-in. casings was filled with cement.

The well was developed by short pumping periods and sand bailing over a period of several days. A production test was conducted on Sept. 8-9, 1950 by representatives of the Driller and the Consulting Engineers. After 17 hr. pumping at 1125 gpm., the drawdown was 22 ft. from a nonpumping water level of 36 ft. below the top of the casing. Ten min. after the pump was stopped, the water level had recovered to 37 ft.

The permanent pumping equipment is a duplicate of gravel Well No. 2. The air line length in Well No. 4 is 101 ft.

On Dec. 15, 1959 the pump was removed and the working parts cleaned of fine sand. The pump was reinstalled at its former depth.

WELL NO. 5, SITE 3 was completed to a depth of 94 ft. in Aug. 1950 by Layne-Western Co. and located 579 ft. N. and 2740 ft. E. of the S. W. corner of Section 32, T36N, R11E, Will County. The well was constructed similar to gravel Well No. 2 with the bottom of the 34-ft. screen set at 94 ft. The annular spaces between the casings were gravel packed and cemented similar to those in Well No. 2. The ground surface elevation at the well is 658.

A production test was conducted on Aug. 21, 1950. After 16 hr. pumping at 1018 gpm., the drawdown was 47 ft. from a nonpumping water level of 17.8 ft. Twenty min. after the pump was stopped, the water level had recovered to 19.3 ft.

The water level in O. W. No. 0-3, a short distance from Well No. 5, was lowered 12.4 ft. from the starting level of 17. 5 ft. during the pumping in Well No. 5.

The pumping equipment in Well No. 5 is a duplicate of the installation in Well No. 2. The length of the air line in Well No. 5 is 84 ft.

A mineral analysis of a sample (Lab. No. 122795) collected Aug. 22, 1950, after 18 hr. pumping, showed the water in Well No. 5 to have a hardness of 34.2 gr. per gal., total dissolved minerals of 736 ppm., and an iron content of 1.7 ppm.

SANDSTONE WELLS

WELL NO. 1, SITE 6, the first of three Galesville Sandstone wells to be drilled in the Hadley Valley, was completed in the fall of 1949 to a depth of 1660 ft. by J. P. Miller Artesian Well Co., Brookfield, and located approximately 562 ft. S. and 730 ft. E. of the N. W. corner of Section 5, T35N, R11E, Will County. The ground surface elevation at the well is 645, and the elevation of the pump base is 648. 44. The well was cased with 28-in. id. pipe to dolomite at 140 ft., below which the hole was finished 28 in. in diameter to 652 ft. A 19-in. casing was set from the surface to 652 ft. and the annulus filled with 800 bags of cement. The cement was not returned to the surface and at a later date the top 96 ft. of the annulus was filled from above. The 19-in.

hole was continued to 1028 ft. and a 15-.in. liner set with the bottom at 1028 ft. The top of the liner was left at 955 or 980 ft. Below the liner, the hole was finished 15 in. in diameter to the bottom of the well at 1660 ft.

The well was shot at five depths between Aug. and Nov. 1949, after which the sandstone was found to be very soft and flowed into the well. Bailing was discontinued at 1608 ft. in Feb. 1950, and a second production test was conducted by the Driller and the State Water Survey. After 24 hr. pumping at 1000 gpm., the drawdown was 133 ft. from a nonpumping water level of 427 ft.

The permanent pump is a Peerless turbine rated at 900 gpm., connected to a 300-hp. U S electric motor. The air line is 680 ft. long.

A mineral analysis of a sample (Lab. No. 121163) collected Mar. 24, 1950, after 18 hr. pumping at 980 gpm., showed the water in rock Well No. 1 to have a hardness of 10 gr. per gal., total dissolved minerals of 619 ppm., and an iron content of 0. 7 ppm.

Well No. 1 is operated in rotation with Well No. 3 (gravel) and has had no major repairs.

WELL NO. 2, SITE 5 was completed in June 1950 to a depth of 1701 ft. by J. P. Miller Artesian Well Co. and located 60 ft. S. and 530 ft. E. of the N. W. corner of Section 8, T35N, RUE, Will County. The well was cased with 28-in. pipe from the surface to 113.5 ft. and with 20-in. pipe from the surface to 549 ft., below which the hole was finished 20 in. in diameter to 1294 ft. and 15 in. in diameter from 1294 to 1701 ft. No liner was reported to be installed. The well was cemented from the surface to 551 ft. with 700 bags of cement and 20 bags of bentonite.

The well was shot on May 23, 1950 with 400 lb. of 100% nitrogengel and 60 lb. of 60% dynamite following which the well was filled with sand up to a depth of 1600 ft.

A production test was conducted on June 26, 1950 by representatives of the Driller and the State Water Survey. After 24 hr. pumping at 1050 gpm., the drawdown was 128 ft. from a nonpumping water level of 457 ft. Forty-five min. after the pump was stopped, the water level had recovered to 503 ft.

The pump was removed on June 6, 1960 due to a leak in the shaft tubing. The well had filled up to 1606 ft. and 130 cy. yd. were removed. The water level was measured 533 ft. A new stainless steel air line was installed.

The elevation of the pump base is 673.63.

The pumping equipment is a duplicate of that in rock Well No. 1. The air line is 680 ft. long.

WELL NO. 3, SITE 1 was completed to a depth of 1659 ft. in May 1950 by J. P. Miller Co. and located approximately 650 ft. N. and 580 ft. E. of the S. W. corner of Section 31, T36N, RUE, Will County.

The well was reportedly cased with 26-in. steel pipe from the surface to 98 ft. and with 20-in. steel pipe from the surface to 577 ft. (pressure grouted). A 16-in. steel liner was installed from 1210 to 1451 ft. depths, below which the hole was finished 16 in. in diameter to the bottom of the well.

The elevation of the pump base is 642.

A production test was conducted on May 25-26, 1950 by representatives of the Driller and the State Water Survey. After 20 hr. pumping at 680 gpm., the drawdown was 153 ft. from a nonpumping water level of 449 ft. Fifty min. after the pump was stopped, the water level had recovered to 490 ft. and 3 days later the water level was noted at 451 ft.

The well is equipped for pumping as are rock Wells No. 1 and 2. The air line is 700 ft. long.

PUMPAGE

Due to cheaper power costs for pumping from the gravel wells, the latter are rotated in groups of three every 24 hr.

Ground-water levels in the Hadley gravel field are quite sensitive to rainfall. Roughly, a 1 1/2-in. rainfall raises the ground-water level as much as 1 ft. However with average precipitation the well field has been evaluated to yield from 120 to 150 mg. per month.

Total pumpage for the city of Joliet, Jan. through Sept. 1960, averaged 7.9 mgd. from all wells (Table E).

TABLE E

	Pumpage from wells			
	In	Hadley Valley		
Period	Joliet	Gravel	Sandstone	Total
days	mgd.	mgd.	mgd.	mgd.
273	3.51	3.04	1.35	7.9

Sample study summary log of WELL NO. 2, SITE 5, furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, clayey, dark yellowish orange	14	14
Till, silty, yellowish gray	56	70
Sand, gravel to 1/2", yellowish gray	20	90
Till, silty, gray	15	105
Gravel to 1/2", yellowish gray	7	112
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, silty, light yellowish gray, fine to very fine; dolomite, yellowish gray, pink, green at base	118	230
Alexandrian Series		
Dolomite, light yellowish gray to dark yellowish gray, fine	75	305
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, light yellowish gray to yellowish brown, fine	70	375
Shale, dark yellowish gray, weak	60	435
Galena Formation		
Dolomite, light yellowish gray, fine to coarse	195	630
Platteville Formation		
Dolomite, light yellowish brown, fine to coarse	145	775
Glenwood Formation		
Limestone, lighty yellowishgray, to light yellowish brown, very fine; sandstone, gray, fine to coarse, incoherent	20	795
St. Peter Formation		
Sandstone, light gray, very fine to coarse, incoherent; shale, yellowish gray to green, weak at base	115	910
Shakopee Formation		
Dolomite, light yellowish brown, very fine to medium; sandstone, light gray, medium to coarse, incoherent; shale, light green, weak	30	940
Oneota Formation		
Dolomite, light yellowish gray, white, pink, fine to coarse; shale, pink, light green, weak at base	260	1200
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, light yellowish brown, fine to medium	163	1363
Franconia Formation		
Dolomite, purplish pink, grayish green, fine to coarse; sandstone light gray, incoherent to compact; dolomite, gray to brownish gray, fine to medium	132	1495
Ironton Formation		
Sandstone, light gray, very fine to coarse, incoherent	55	1550
Galesville Formation		
Sandstone, light gray, very fine to very coarse, incoherent to compact	115	1665
Eau Claire Formation		
Dolomite, grayish brown, fine to medium; shale, yellowish gray, weak; sandstone, yellowish gray, fine to compact	35	1700

LABORATORY NO. 121163

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Silica	SiO_2	12.9	
Manganese	Mn	0.0		Fluoride	F	1.5	
Calcium	Ca	47.6	2.38	Chloride	Cl	81.	2.28
Magnesium	Mg	13.9	1.14	Nitrate	NO_3	0.1	Tr.
Ammonium	NH_4	0.7	.04	Sulfate	SO_4	125.9	2.62
Sodium	Na	165.	7.18	Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		14		Hardness (as	$CaCO_3$)	176.	3.52
Color		0					
Odor		0					
Temp. (reported)		60.4°F		Total Dissolved Minerals		619.	

LABORATORY NO. 122795

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.7		Silica	SiO_2	22.6	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	138.0	6.90	Chloride	Cl	3.	.08
Magnesium	Mg	57.9	4.76	Nitrate	NO_3	0.0	.00
Ammonium	NH_4	0.0	.00	Sulfate	SO_4	276.9	5.76
Sodium	Na	21.	.90	Alkalinity (as	$CaCO_3$)	336.	6.72
Turbidity		16		Hardness (as	$CaCO_3$)	583.	11.66
Color		0					
Odor		0					
Temp. (reported)		51.8°F		Total Dissolved Minerals		736.	

JOY
Mercer County
July 16, 1958

Two wells are in service for the public water supply of the village of Joy (503).

WELL NO. 1, described in Bulletin 40, is available for service but is maintained for stand-by use only.

WELL NO. 2 was completed in Feb. 1948 to a depth of 420 ft. by Varner Well Co., Dubuque, Iowa, and located about 1/4 mile east of Well No. 1, or approximately 1760 ft. S. and 75 ft. E. of the N. W. corner of Section 20, T14N, R4W. The ground surface elevation at the well is 690. The well was cased with 18-in. pipe from the surface to 89 ft. and with 13 3/8-in. od. pipe from 2 ft. 11 in. above the surface to 151 ft. below. The annulus between the 2 casings was cemented in. The hole was finished 12 in. in diameter from the bottom of the inner casing to the bottom of the hole.

Static water levels during the drilling are shown in Table A.

TABLE A

Depth of drilling ft.	Depth to water ft.
Top to 214	0
234	145
292	140
302	144
322	135
344	130
366	137
420	132

A production test was conducted on Feb. 4-5, 1948 by representatives of the Driller, the State Water Survey, Village officials, and Beling Engineering Consultants. For test purposes the well was equipped with a turbine test pump assembly consisting of 2 50 ft. of 6-in. column pipe; 10 ft. of bowl section; 253 ft. of air line; 12 ft. of 6-in. suction pipe.

After 23 hr. pumping at a rate of 98 gpm., the drawdown was 113 ft. from a static water level of 137. 5 ft. below the top of the casing. Twenty-five min. after the pump was stopped, the water level had recovered to 144 ft.

A chemical analysis of a sample (Lab. No. 113403) collected Feb. 5, 1948, after 22 1/2 hr. pumping at 97 gpm., showed the water in Well No. 2 to have a hardness of 10 gr. per gal., total dissolved minerals of 664 ppm., and an iron content of 0. 8 ppm.

The permanent pump is a Fairbanks-Morse turbine rated at 85 gpm. and connected to a 7 l/2-hp. Fairbanks-Morse electric motor.

There are 185 services. Pumpage in July 1958 is estimated to average 33, 000 gpd.

Sample study summary and correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Drift"	57	57
"Blue shale and gravel"	13	70
MISSISSIPPIAN SYSTEM		
Kinderhook Formation		
"Sandy shale"	30	100
Shale, yellow, light gray, brownish gray, light olive gray, weak	70	170
DEVONIAN SYSTEM		
Cedar Valley Formation		
Limestone, light gray, white, very fine to coarse; little dolomite light brown at top	90	260
Wapsipinicon Formation		
Limestone, buff to light brown, fine to coarse	45	305
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light gray, white, very fine to fine	115	420

LABORATORY NO. 113403

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.8		Silica	SiO_2	12.7	
Manganese	Mn	Tr.		Fluoride	F	0.8	
Calcium	Ca	39.2	1.96	Chloride	Cl	48.	1.35
Magnesium	Mg	17.4	1.42	Nitrate	NO_3	Tr.	Tr.
Ammonium	NH_4	1.3	.07	Sulfate	SO_4	92.2	1.92
Sodium	Na	180.	7.82	Alkalinity (as	$CaCO_3$)	400.	8.00
Turbidity		10		Hardness (as	$CaCO_3$)	169.	3.38
Color		0		Total Dissolved Minerals		664.	
Odor		H_2S (at well)		Free CO_2 (calc.)		20.	
Temp. (reported)		55.7°F		pH = 7.1			

JUSTICE
Cook County
October 6, 1958

A public water supply was installed in 1954 for the village of Justice (2803).

Water is obtained from a well completed in Mar. 1954 to a depth of 145 ft. by J. P. Miller Artesian Well Co., Brookfield. The well is owned and operated by Midwest-Justice Water Co. and is located in the southwest quadrant of the intersection of 79th St. and 80th Ave., or approximately 1430 ft. S. and 2150 ft. W. of the N. E. corner of Section 35, T38N, RUE. The ground elevation at the well is 618.

The well is cased with 86 ft. 9 in. of 10-in. gwi. pipe, below which the bore hole was finished at 10 in. in diameter. In a production test by the Driller in May 1954, the drawdown was 19 ft. below a nonpurr.ping water level of 15 ft. below the top of the casing, after 8 hr. pumping at a rate of 235 gpm.

The permanent pumping equipment includes 50 ft. of 5-in. column pipe; 8-in., 6-stage Peerless turbine pump, No. 38380, rated at 250 gpm. at 1760 rpm.; 50 ft. of air line; 15-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146026) collected Mar. 18, 1958, after 5 min. pumping at a rate of 137 gpm., showed the water to have a hardness of 89. 5 gr. per gal., total dissolved minerals of 2025 ppm., and an iron content of 2. 6 ppm.

Pumpage for 1957 averaged 21, 040 gpd.

Correlated driller's log furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	80	80
SILURIAN SYSTEM		
Limestone	65	145

LABORATORY NO. 146026

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.6		Silica	SiO_2	25.3	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	283.0	14.15	Boron	B	0.3	
Magnesium	Mg	201.6	16.58	Chloride	Cl	10.	.28
Ammonium	NH_4	0.7	.04	Nitrate	NO_3	0.4	.01
Sodium	Na	41.	1.78	Sulfate	SO_4	1079.1	22.50
				Alkalinity (as	$CaCO_3$)	488.	9.76
Turbidity		16		Hardness (as	$CaCO_3$)	1536.	30.73
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		2025.	

KAMPSVILLE
Calhoun County
September 17, 1959

A public water supply was installed for the village of Kampsville (453) in June 1959.

A Test Well was completed to a depth of 58 ft. in Apr. 1956 by Calhoun Drilling Co., Batchtown, and located on the west side of Route 100 in the flat of Crawford Creek, 50 ft. west of the center line of the pavement and about 0. 9 mile south of Kampsville. An 8-in. casing was set to the bottom of the hole. The bottom 5 ft. of casing was slotted and exposed to the aquifer. The elevation of the top of the casing was 426.9 ft. According to the driller's log, the lower 8 ft. of the hole penetrated broken cherty rock and gravel. A production test was conducted on Apr. 4, 1956 by representatives of the Driller, the State Water Survey, and W. H. Klingner and Associates, Consulting Engineers. After 9 hr. pumping at a rate of 100 gpm., the drawdown was 23.52 ft. from a static water level of 18.92 ft. below the top of the casing. Twenty min. after pumping was stopped, the water level had recovered to 20. 05 ft.

WELL NO. 1 was completed to a depth of 60 ft. in July 1956 by Calhoun Drilling Co. and located at the site of the Test Well, or approximately 2400 ft. N. and 1700 ft. E. of the S. W. corner of Section 11, T9S, R2W. An 8-in. casing was set with the bottom at 45 ft. followed by 15 ft. of Cook Everdur screen. The top 9 ft. of screen had No. 30 slot openings and the bottom 6 ft. had No. 80 slots.

A production test was conducted on July 11, 1956 by representatives of the Driller, the State Water Survey, and the Consulting Engineers. After 9 hr. pumping at a rate of 100 gpm., the drawdown was 16. 25 ft. from a nonpumping water level of 18. 83 ft. below the pump base (elev. 427.16). Thirty-five min. after pumping was stopped, the water level had recovered to 19.89 ft.

During the test, water levels were noted in an observation well 65 ft. to the south. Elevation of the top of the casing in the observation well was 428. 20. At the end of the test, the water was lowered in the observation well to 1.5 ft. from the initial level of 20 ft. below the top of the casing.

The pumping equipment, ins tailed about Feb. 1959, consists of 45 ft. of 4-in. column pipe; 6-in., 4-stage MC. Fairbanks-Morse turbine pump (Serial No. A-284702), 3 ft. in length and rated at 100 gpm. ; 3-hp. Fairbanks-Morse electric motor.

A mineral analysis of a sample (Lab. No. 150648) collected Sept. 17, 1959 showed the water in Well No. 1 to have a hardness of 23. 4 gr. per gal., total dissolved minerals of 430 ppm., and an iron content of 1. 9 ppm.

There are 150 meters installed andpumpage is estimated to average 12, 000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, bluish muck, silt	50	50
Broken, cherty rock, and gravel	8	58

LABORATORY NO. 150648

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Silica	SiO_2	21.3	
Manganese	Mn	0.2		Fluoride	F	0.2	
Calcium	Ca	94.6	4.73	Boron	B	0.0	
Magnesium	Mg	40.2	3.31	Chloride	Cl	6.	.17
Ammonium	NH_4	0.0	.00	Nitrate	NO_3	1.0	.02
Sodium	Na	9.	.38	Sulfate	SO_4	41.8	.87
				Alkalinity (as	$CaCO_3$)	368.	7.36
Turbidity		11		Hardness (as	$CaCO_3$)	402.	8.04
Color		0					
Odor		0					
Temp. (reported)		55.5°F		Total Dissolved Minerals		430.	

KANGLEY
LaSalle County
October 26, 1960

The public water supply for the village of Kangley (267) was not completely installed in Oct. 1960.

WELL NO. 1 was drilled to a depth of 542 ft, in 1958 by Layne-Western Co., Aurora, and located adjacent to the village hall, or approximately 660 ft. S. and 660 ft. E. of the N. W. corner of Section 22, T31N, R3E. The elevation of the ground surface at the well is 635.

The well was cased with 20-in. steel pipe from the surface to 85 ft., with 16-in. steel pipe from the surface to 245 ft., and with 10-in. pipe from the surface to 351 ft., below which the hole was finished 10 in. in diameter to the bottom. The 10-in. casing was cemented in the 15-in. hole to 351 ft.

A production test was conducted by the Driller on Sept. 25, 1958. For the test a 6-in. Layne turbine test pump was installed on 4-in. column pipe. A 245-ft. air line was in place and power for pumping was from a Ford gas engine. After 8 hr. pumping at 100 gpm., the drawdown was 90 ft. from a nonpumping water level of 147 ft.

The permanent pump has not been installed.

A partial analysis of a sample (Lab. No. 148369) collected in Sept. 1958, after 8 hr. pumping at 100 gpm., showed the water to have a hardness of 19 gr. per gal., total dissolved minerals of 1401 ppm., and an iron content of 0. 3 ppm.

LABORATORY NO. 148369

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 3		Fluoride	F	0. 7	
				Chloride	Cl	600.	16. 92
				Nitrate	NO_3	0. 8	. 01
				Alkalinity (as	$CaCO_3$)	196.	3. 92
Turbidity		3		Hardness (as	$CaCO_3$)	324.	6. 48
Color		0					
Odor		0		Total Dissolved Minerals		1401.	

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, gravelly, sandy, grayish-buff to buff; sand and gravel beds at 25 ft. (5 ft. thick) and at 40 ft. (10 ft. thick)	70	70
PENNSYLVANIAN SYSTEM		
Sandstone and siltstone, gray, buff, compact to incoherent, micaceous; limestone, silty, gray, brown, extra fine, crystalline; shale, partly sandy, gray to black, tough to weak; coal (3 beds)	160	230
ORDOVICIAN SYSTEM		
Galena-Platteville Formations		
Limestone, silty, buff to light gray, extra fine, crystalline; dolomite, extremely calcareous, clayey, buff, very fine, granular, little shale, dark buff, brittle to weak	110	340
Glenwood-St. Peter Formations		
Sandstone, slightly silty, white, fine to medium, little coarse, little very fine, rounded, frosted, incoherent to partly compact	202	542

Five wells are in use for the water supply serving the public and visitors to the Kankakee River State Park.

WELL NO. 1 was completed in Apr. 1953 to a depth of 96 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located at the Custodian's office, 160 ft. south of the center line of Illinois Route 113N, about 900 ft. north of the north bank of the Kankakee River, or approximately 700 ft. S. and 1500 ft. W. of the N. E. corner of Section 5, T31N, RUE. The well was cased with a 10-in. drive pipe to 6 ft. depth and a 6-in. pipe from the surface to 25 ft. (cemented in), below which the hole was finished 6 in. in diameter to the bottom. The 6-in. casing was first set to a depth of 43 ft. but was pulled back to 25 ft. just above a crevice. The well was then acidized with 500 gal. of HC1. The ground surface elevation at the well is 605.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil and yellow stone	6	6
SILURIAN SYSTEM		
Gray limestone	20	26
White limestone	45	71
Blue shale	25	96

A production test was conducted on May 5, 1953 by representatives of the Driller, the State Water Survey, and the State of Illinois Division of Architecture and Engineering. For test purposes the well was equipped with a rig-operated plunger pump with the bottom of the cylinder set at 44 ft. below the top of the 6-in. casing. After 12 hr. pumping on May 5, the test was discontinued because of pump failure. Pumping was resumed on May 6 and after 23 hr. of continuous pumping at 7. 9 gpm., the drawdown was 20. 3 ft. from a nonpumping water level of 13 ft. below the top of the 6-in. casing. One hr. after pumping was stopped, the water level had recovered to 15. 5 ft.

The permanent pumping equipment includes a Jacuzzi turbine pump attached to 2-in. drop pipe with power furnished from a 2-hp. Century electric motor.

A mineral analysis of a sample (Lab. No. 153486) collected Oct. 10, 1960, after 15 min. pumping at 8 gpm., showed the water to have a hardness of 29 gr. per gal., total dissolved minerals of 573 ppm., and an iron content of 0.1 ppm.

There is little information available on three other wells at the Park, which were drilled for private cottages before the land was purchased for use as a State Park.

CARDOSI COTTAGE WELL or Well No. 2 (this may now be the Camp Area Well) was reportedly drilled to a depth of 95 ft. and located 1500 ft. N. and 1200 ft. E. of the S. W. corner of Section 4. The well was cased with 4-in. pipe to an unknown depth.

A partial chemical analysis of a sample (Lab. No. 129305) collected July 14, 1952 showed this water to have a hardness of 22. 3 gr. per gal., total dissolved minerals of 429 ppm., and an iron content of 0. 3 ppm.

DWYER COTTAGE WELL (Well No. 3) was reportedly drilled about 1940 to a depth of 65 ft. and located approximately 900 ft. N. and 1500 ft. E. of the S. W. corner of Section 4. The well was cased with 30 ft. of 4-in. pipe. The static water level in 1940 was 27 ft. below the top of the casing.

PARK CUSTODIAN'S RESIDENCE WELL (called Well No. 4 in State Department of Public Health reports) was reportedly drilled in 1940 to a depth of 65 ft. and located approximately 150 ft. S. and 2700 ft. E. of the N. W. corner of Section 9, T31N, RUE. This is located on Lot 8 of Block 7, village of Altorf.

The well was cased with 22 ft. of 4-in. pipe. A jet pump is connected to a 30-gal. pressure tank. Water is furnished to theCustodian's residence and also a drinking fountain in the Custodian's yard.

This well is not located on State property but the water is available to Park patrons.

A well drilled at the WARD COTTAGE site to a depth of 80 ft. was located approximately 2025 ft. N. and 725 ft. E. of the S. W. corner of Section 4. The well has been abandoned and plugged.

WELL NO. 4, new camp site, was completed in 1958 to a depth of 102 ft. by Cecil Griffy, Kankakee, and located 2800 ft. N. and 2500 ft. E. of the S. W. corner of Section 36, T32N, R10E, Kankakee County,

When completed the static water level was 50 ft. below a surface elevation of 610.

2 - Kankak.ee River State Park

LABORATORY NO. 153486

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	10.8	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	99.0	4.95	Boron	B	0.0	
Magnesium	Mg	60.4	4.97	Chloride	Cl	13.	.37
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	26.2	.42
Sodium	Na	1.	.03	Sulfate	SO_4	148.1	3.08
				Alkalinity (as	$CaCO_3$)	304.	6.08
Turbidity		0		Hardness (as	$CaCO_3$)	496.	9.92
Color		0					
Odor		0					
Temp. (reported)		55.8°F		Total Dissolved Minerals		573.	

KEENSBURG
Wabash County
April 29, 1959

The installation of a public water supply for the village of Keensburg (263) was initiated in 1959, but the distribution system was not completed. Water was obtained from a tap off a 4-in. pipe line to water-flood Well No. 1 owned by the T. W. George Oil Co. of Keensburg.

WELL NO. 1 was completed in May 1958 to a depth of 50 ft. by T. and M. Pump and Equipment Co., Evansville, Ind., and located about 3/4 mile southeast of Keensburg, or approximately 675 ft. N. and 1650 ft. W. of the S. E. corner of Section 16, T2S, R13W. The ground surface elevation at the well is 395.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Overlay"	8	8
"Sand and gravel"	12	20
"Coarse sand and gravel"	10	30
"Sand and gravel"	10	40
"Sand and gravel, finer"	10	50

Well No. 1 was cased with 12-in. steel pipe from 1. 5 ft. above L. S. D. to 25 ft. followed by 25 ft. of 12-in. Cook brass screen having three sections of slot openings; the upper 5 ft. had No. 100 slots, the next 10 ft. had No. 35 slots, and the bottom 10 ft. with No. 25 slots.

A production test was conducted on Apr. 29, 1959 by representatives of the Driller, the State Water Survey, and the Barger Engineering Co. The permanent pump installation consisted of 40 ft. of 4-in. column pipe; 8-in., 17-stage Byron Jackson turbine, No. 357015, having a length of 8 ft. and rated at 160 gpm. against 300 ft. T.D.H.; 20-hp. U S electric motor. After 1 hr. pumping at a rate of 100 gpm., the drawdown was 1 ft. from a nonpumping water level of 5. 72 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 149509) collected Apr. 29, 1959, after 1 hr. pumping at a rate of 100 gpm., showed the water in Well No. 1 to have a hardness of 17. 5 gr. per gal., total dissolved minerals of 376 ppm., and an iron content of 1. 8 ppm.

There are 48 service connections and 110 residents have signed for service. All services are metered.

Pumpage at present is estimated to average 7000 gpd.

LABORATORY NO. 149509

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	16.6	
Manganese	Mn	0.2		Fluoride	F	0.1	
Calcium	Ca	81.3	4.07	Boron	B	0.0	
Magnesium	Mg	24.2	1.99	Chloride	Cl	42.	1.18
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.4	.01
Sodium	Na	12.	.50	Sulfate	SO_4	54.7	1.14
				Alkalinity (as	$CaCO_3$)	212.	4.24
Turbidity		9		Hardness (as	$CaCO_3$)	303.	6.06
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		376.	

KEITHSBURG
Mercer County
September 26, 1949

Two wells are in service for the public water supply of the city of Keithsburg (963).

The wells described in Bulletin 40 were abandoned about 1949 and after three test holes were drilled, two permanent wells were completed and a new system was installed.

WELL NO. 1 was completed in 1949 to a depth of 81 ft. by Layne-Western Co., Ames, Iowa, and located in the northeastern part of town, at the site of Test Well No. 1-49, or approximately 1000 ft. N. and 2530 ft. E. of the S. W. corner of Section 23, T13N, R5W. The ground surface elevation at the well is 545. A 10-in. hole was drilled to 64 ft. 5 in. then reduced to 8 in. in diameter to the bottom of the well at 81 ft. The hole was cased with 10-in. id. welded steel pipe to a depth of 64 ft. 5 in. A 9 ft. 8 in. length of 8-in. pipe attached to the top of a 15 ft. length of 8-in. No. 8 Layne shutter screen, was baled in with the bottom of the screen set at 81 ft.

The pumping equipment, installed in Sept. 1949 prior to the production tests consists of 40 ft. of 4-in. steel column pipe; 8-in., 8-stage Layne turbine pump (No. 19966), 5 ft. long and rated at 100 gpm. against 215 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 10-hp. U S electric motor. The pump is equipped with an auxiliary drive. The total length of column pipe, bowl section, and suction pipe is 55 ft. 5 in.

Production tests of Wells No. 1 and 2 were conducted on Sept. 22-23, 1949 by representatives of the Driller, the State Water Survey, City officials, and L. S. Pappmeier, Consulting Engineer.

On Sept. 22, after 6 l/2 hr. pumping in Well No. 1 (with No. 2 idle) at a rate of 191 gpm., the drawdown was 26. 3 ft. from a static water level of 8.1 ft. below the pump base. During the pumping in Well No. 1, the water level in Well No. 2 dropped 2 ft.

WELL NO. 2 was completed in 1949 to a depth of 81. 5 ft. by Layne-Western Co. and located at the site of Test Well No. 2-49, about 9 ft. west of Well No. 1, or approximately 1000 ft. N. and 2520 ft. E. of the S. W. corner of Section 23.

Test Well No. 3-49 was located 20 ft. west of Well No. 2, or approximately 1000 ft. N. and 2500 ft. E. of the S. W. corner of Section 23.

Sample study summary log of TEST WELL NO. 3-49 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown, silty; silt, buff	5	5
Sand, buff, fine to very coarse, fairly clean	15	20
Sand, buff, medium to very coarse, clean	8	28
Gravel, buff, granular to fine pebbles, clean; little sand, buff, medium to coarse	12	40
Sand, buff, medium to very coarse; little gravel, granular to fine pebble, clean	10	50
Gravel, buff, fine to medium, clean	30	80

Well No. 2 was drilled 10 in. in diameter to a depth of 64 ft. 5 in. and below that the diameter of the hole was 8 in. to the bottom. The well was cased identical to that of Well No. 1.

The pumping equipment in Well No. 2 was identical to that in Well No. 1 except no auxiliary drive was installed. The Layne pump number is 19967.

On Sept. 23, 1949, the day following the production test in Well No. 1, a production test was conducted in Well No. 2. Nonpumping water levels were recorded in Well No. 1. The data recorded during the test of Well No. 2 were comparable to that recorded the day before when Well No. 1 was pumped.

Upon completion of the production test in Well No. 2, both wells were pumped simultaneously. After 1 1/2 hr. pumping at rates of 150 gpm. in each well, the drawdowns were 20 ft. and 24. 2 ft. in Wells No. 1 and 2, respectively. Within 2 min. after the pump was stopped, the water levels had recovered completely.

A mineral analysis of a sample (Lab. No. 119408) collected Sept. 23, 1949, after 6 hr. pumping, showed the water in Well No. 2 to have a hardness of 10.9 gr. per gal., total dissolved minerals of 234 ppm., and an iron content of 0. 5 ppm.

Pumpage is estimated to average 40,000 gpd.

LABORATORY NO. 119408

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	28.3	
Manganese	Mn	0.2		Fluoride	F	0.3	
Calcium	Ca	47.7	2.39	Chloride	Cl	4.	.11
Magnesium	Mg	16.3	1.34	Nitrate	NO_3	6.0	.10
Ammonium	NH_4	0.2	.01	Sulfate	SO_4	34.4	.72
Sodium	Na	2.	.07	Alkalinity (as	$CaCO_3$)	144.	2.88
Turbidity		7		Hardness (as	$CaCO_3$)	187.	3.74
Color		0					
Odor		0		Total Dissolved Minerals		234.	
Temp. (reported)		54.4°F		Free CO_2 (calc.)		13.	

There are five wells in service in the public water supply for the village of LaGrange (15,285).

WELL NO. 1, described inBulletin 40, was plugged at a depth of 459 ft. in 1957 by J. P. Miller Artesian Well Co., Brookfield. Before the plug was placed, water could be heard flowing into the well. The float and line measurement indicated water was entering the well at a depth of about 192 ft. The nonpumping water level, measured with counter attached to float and line was 220 ft. below the pump base (elev. 648. 5). Within a few min. after the plug was placed, the water level in the well was 162 ft., or 58 ft. higher than before the plugging operation.

Prior to the plugging of Well No. 1, the nonpumping water level in Well No. 3, approximately 150 ft. southwest of Well No. 1, was 164 ft. below the pump base (645. 9) and after plugging Well No. 1, the water level in Well No. 3 was 146 ft. or 18 ft. higher.

The pumping equipment was reinstalled and consisted of an American Well Works turbine pump, No. 71337, rated at 1000 gpm.; 290 ft. of air line; 125-hp. General Electric motor.

WELL NO. 2 was abandoned several years ago. In Mar. 1956 J. P. Miller Artesian Well Co. completed sealing the well. The hole was opened to a depth of 960 ft. A 40 ft. length of cement plug was placed in the hole with the bottom at 960 ft. The hole was then filled successively with pea gravel, cement grout, pea gravel, and topped with ready-mix concrete which was allowed to overflow the top of the casing which was 6 ft. below the surrounding ground surface.

WELL NO. 3 was treated with 5000 gal. of 15% HC1 on June 25, 1956. A bridge was found at a depth of 575 ft. Cement was poured in the well from 575 to 475 ft.

Before the cement was placed the hole had been backfilled with pea gravel and bank sand from 1196 to 575 ft., and before any of the backfilling the water level was 176 ft. After the hole was plugged at 475 ft. depth, the water level was 151 ft.

The following pumping equipment was installed in Well No. 3: 260 ft. of 8-in. column pipe; 12-in., 6-stage Peerless turbine pump (No. 98072); 30 ft. of 8-in. suction pipe; 262 ft. of air line; 100-hp. U S electric motor. For auxiliary power, a 4-cylinder, 100-hp. Climax gasoline engine was installed with a Peerless right angle gear drive, No. J17210.

Prior to the plugging of Well No. 1 in 1957, the nonpumping water level in Well No. 3 was 164 ft. below the pump base. Following the plugging operation the water level in Well No. 3 was 146 ft. or 18 ft. higher.

WELL NO. 4 is in service. No changes have been reported since Bulletin 40.

WELL NO. 5 was equipped in July 1950 with the following pump assembly: 295 ft. of 8-in. column pipe; 12-in., 5-stage Peerless turbine pump, No. 78484, rated at 700 gpm. at 325 ft. T.D.H.; 30 ft. of 8-in. suction pipe; 296 ft. of air line; 75-hp. General Electric motor.

A production test was conducted on Sept. 6, 1950 by representatives of J. P. Miller Artesian Well Co. and the State Water Survey. After 5 hr. pumping at a rate of 475 gpm., the drawdown was 200 ft. from a nonpumping water level of 78 ft. below the pump base. Well No. 6, 1100 ft. east of Well No. 5, was being pumped at the same time and an interference of 2 ft. was noted while No. 5 was in operation.

A mineral analysis of a sample (Lab. No. 122864) collected Sept. 6, 1950, after 4 l/2 hr. pumping at 470 gpm., showed the water in Well No. 5 to have a hardness of 53. 5 gr. per gal., total dissolved minerals of 1138 ppm., and an iron content of 0. 9 ppm.

WELL NO. 6 was completed to a depth of 352 ft. in Oct. 1949 by J. P. Miller Artesian Well Co. and located near the intersection of the west side of Edgewood St. with the southproperty line of the C. B. & Q. Railroad, or approximately 2750 ft. N. and 3650 ft. E. of the S. W. corner of Section 5, T38N, R12E. The ground elevation at the well is 652. 4.

The well was cased with 24-in. pipe from the surface to 26 ft. 8 in., below which the hole was finished at 23 l/4 in. in diameter to the bottom at 352 ft.

A production test was conducted on Oct. 1, 1949 by representatives of the Drilling Contractor

and the Village. After 16 hr, pumping at a rate of 1100 gpm., the drawdown was 205 ft. from a static water level of 75 ft. below the top of the casing.

Subsequently, the permanent pump assembly was installed, consisting of 200 ft. of 8-in. column pipe; 12-in., 5-stage Peerless turbine pump, No. 76716, having an over-all length of 5 ft. 5 in. and rated at 800 gpm. at 225 ft. T.D.H.; 30 ft. of 8-in. suction pipe; 196 ft. of air line; 75-hp. U S electric motor.

A partial chemical analysis of a sample (Lab. No. 148177) collected Oct. 31, 1958 showed the water in "Well No. 6 to have a hardness of 50. 6 gr. per gal., total dissolved minerals of 1199 ppm., and an iron content of 1. 3 ppm.

Pumpage for July 1957 averaged 1. 68 mgd.

LABORATORY NO. 148177

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Fluoride	F	0.1	
				Boron	B	0.1	
				Chloride	Cl	32.	.90
				Alkalinity (as	$CaCO_3$)	384.	7.68
Turbidity		5		Hardness (as	$CaCO_3$)	880.	17.60
Color		0					
Odor		0					
Temp. (reported)		52.0°F		Total Dissolved Minerals		1199.	

LAKE BLUFF
Lake County
October 22, 1958

Since publication of Bulletin 40, the village of Lake Bluff (3494) has renumbered the municipal wells; new pumping equipment has been installed in Well No. 2 (formerly Well No. 4); and a new well, No. 3, has been drilled.

WELL NO. 1 (formerly No. 3) is maintained for emergency use.

WELL NO. 2 (formerly No. 4) was drilled in 1921 by Wm. Cater, Chicago, to a depth of 1804 ft.

A production test was conducted on Mar. 3, 1950 by representatives of the Village and the State Water Survey. After 3 hr. pumping at a rate of 270 gpm., the drawdown was 28. 6 ft. from a nonpumping water level of 148.5 ft. Thirty m.in. after pumping was stopped, the water level had recovered to 150. 3 ft. In Dec. 1951 the Stannard Power Equipment Co., Chicago, installed new pumping equipment, consisting of 270 ft. of 6-in. column pipe; 10-in., 8-stage Fairbanks-Morse turbine pump, No. AM2416, rated at 500 gpm. at 180 ft. T.D.H.; 20 ft. of 6-in. suction pipe; 270 ft. of air line; 60-hp. U S electric motor.

On Nov. 28, 1951 the static water level was 156 ft. below the surface compared to a static level of 57 ft. 9 in. in 1920 when the well was drilled.

WELL NO. 3 (fifth well of the village in order of drilling) was completed in Nov. 1956 to a depth of 1828 ft. by L. Cliff Neely, Batavia. Well No. 3 is located about 700 ft. west of Well No. 2, or approximately 1700 ft, S. and 300 ft. W. of the N. E. corner of Section 20, T44N, R12E. The ground elevation at the well is 685. The hole and casing record is shown in Table A.

TABLE A

Hole Record

30-in. from 0 to 180 ft.
25-in. from 180 to 665 ft.
19-in. from 665 to 1260 ft.
15-in. from 1260 to 1693 ft.
12-in. from 1693 to 1828 ft.

Casing Record

30-in. od. from 0 to 171 ft.
20-in. od. from 0 to 665 ft. (cemented)
16-in. gwi. liner from 1109 to 1260 ft.
12-in. gwi. liner from 1378 to 1693 ft.

A production test was conductedon Nov. 20, 1956 by the Drilling Contractor. After 11 hr. pumping at a rate of 1420 gpm., the drawdown was 90 ft. from a nonpumping water level of 165 ft. below the surface.

Subsequently, the permanent pumping equipment was installed, consisting of 450 ft. of 8-in. column pipe; 10-stage Byron Jackson submersible pump (No. 328456); 200-hp. electric motor.

A mineral analysis of a sample (Lab. No. 148037) collected Oct. 22, 1958, while pumping at a rate of 1526 gpm., showed the water in Well No. 3 to have a hardness of 20. 9 gr. per gal., total dissolved minerals of 510 ppm., and an iron content of 2. 8 ppm.

Pumpage in July 1958 averaged 200, 000 gpd.

LABORATORY NO. 148037

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.8		Silica	SiO_2	9.4	
Manganese	Mn	0.0		Fluoride	F	0.9	
Calcium	Ca	110.5	5.52	Boron	B	0.2	
Magnesium	Mg	19.9	1.64	Chloride	Cl	10.	.28
Ammonium	NH_4	0.3	.02	Nitrate	NO_3	0.2	Tr.
Sodium	Na	31.	1.34	Sulfate	SO_4	156.7	3.26
				Alkalinity (as	$CaCO_3$)	248.	4.96
Turbidity		6		Hardness (as	$CaCO_3$)	358.	7.16
Color		0					
Odor		0					
Temp. (reported)		63.5°F		Total Dissolved Minerals		510.	

LAKE COUNTY
PUBLIC WATER DISTRICT
Lake County
January 28, 1960

Two collectors are in service for the Lake County Public Water District (est. 15,000). The Water District furnishes water to Zion, Winthrop Harbor, Illinois Beach State Park, and a number of retail users in unincorporated communities.

WELL NO. 1 was originally constructed in Nov. 1952 by Ranney Method Water Supplies Inc., Columbus, Ohio, and reconditioned in 1957 when one 8-in. lateral and two 12-in. laterals were added to the original installation. The collector is located southeast of Zion, near the shore of Lake Michigan, or approximately 1320 ft. S. and 1056 ft. E. of the N. W. corner of Section 26, T46N, R12E. The ground surface elevation at the collector is 584. The reinforced concrete caisson (13 ft. id. by 16 ft. od.) was constructed 32 ft. 2 in. inside depth below the top (elev. 591. 3) and set on a 3/4-ft. thick concrete plug at the bottom. Two tiers of perforated steel pipe laterals were pushed out at depths of 27 and 30 ft. below the top of the caisson. The diameters and lengths of the laterals in each tier are shown in Table A. The perforations were approximately 1-in. by l/4-in. openings.

TABLE A

A Tier

Depth 30 ft.

Lateral	Diameter	Length
A-1	8 in.	200 ft.
A-2	8 in.	72 ft.
A-3	8 in.	80 ft.
A-4	8 in.	80 ft.
A-5	8 in.	184 ft.

B Tier

Depth 27 ft.

Lateral	Diameter	Length
B-1	12 in.	47 ft.
B-2	12 in.	76 ft.
B-3	12 in.	104 ft.
B-4	8 in.	264 ft.
B-5	8 in.	96 ft.

Subsequently, the A laterals were closed and the B laterals were open except B-5. The collector was placed in service Aug. 1, 1957 with the following pumping equipment: 28 ft. of 8-in. column pipe; two 12-in., 5-stage Pomona turbine pumps, No. AV2516, rated at 750 gpm. against 230 ft. T.D.H.; 60-hp. Fairbanks-Morse electric motor. A Fairbanks-Morse right angle gear drive with a 6 cylinder, 70-hp. Continental gas engine was installed for auxiliary power.

On Nov. 20, 1958, after 1 hr. pumping at a rate of 700 gpm., the drawdown was 7 ft. from a nonpumping water level of 15 ft. below the pump base.

A partial chemical analysis of a sample Lab. No. 143242) collected 44 l/2 hr. after pumping began at a rate of 1200 gpm., showed the water in Well No. 1 to have a hardness of 11.2 gr. per gal., total dissolved minerals of 222 ppm., and an iron content of 0. 7 ppm.

Water from Well No. 1 is pumped directly into the distribution system.

WELL NO. 2 was constructed in Mar. - July 1959 by Ranney, identical to Well No. 1 and located about 300 ft. south and 25 ft. east of Well No. 1, or approximately 300 ft. S. and 1080 ft. E. of the N. W. corner of Section 26.

Following the completion of the well, the Contractor reported pumping for 36 hr. at a rate of 700 gpm.

A partial chemical analysis of a sample (Lab. No. 150131) collected after 36 hr. pumping at a rate of 700 gpm., showed the water in Well No. 2 to have a hardness of 9 gr. per gal., total dissolved minerals of 182 ppm., and an iron content of 0. 6 ppm.

Well No. 2 was placed in service Oct. 1, 1959 and is equipped with two submersible pumps rated at 1000 gpm. and 325 gpm. against 20 ft. T.D.H. Water from Well No. 2 is pumped into Well No. 1.

A 100, 000 gal. elevated storage tank is located in Zion and a 60, 000 gal. elevated tankis in Winthrop Harbor.

Pumpage to Zion in 1959 averaged 0. 57 mgd.

Pumpage to Winthrop Harbor July 1, 1959 to Jan. 1, 1960 averaged 0.16 mgd.

Total pumpage to Illinois Beach State Park in 1959 amounted to 67,000 gal. and to retail users in unincorporated areas, 52, 000 gal.

Total pumpage in 1959 was 236.4 mg., an average of 0. 65 mgd. for the period the system was in service.

LABORATORY NO. 150131

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Fluoride	F	0.2	
Manganese	Mn	Tr.		Chloride	Cl	8.	.23
				Nitrate	NO_3	1.0	.02
				Sulfate	SO_4	25.1	.52
				Alkalinity (as	$CaCO_3$)	124.	2.48
Turbidity		3		Hardness (as	$CaCO_3$)	152.	3.04
Color		0					
Odor		0		Total Dissolved Minerals		182.	

LAKELAND PARK SUBDIVISION
McHenry County
February 10, 1959

One well is in service for the public water supply of Lakeland Park Subdivision (est. 1000), located west of McHenry.

WELL NO. 1 was completed in 1954 to a depth of 86 ft. by Art Wertz, Antioch, and located approximately 1000 ft. S. and 1600 ft. E. of the N. W. corner of Section 27, T45N, R8E. The ground surface elevation at the well is 758. The well was cased with 86 ft. of 8-in. pipe.

WELL NO. 2 was completed in 1956 to a depth of 85 ft. by Henry Boysen, Libertyville, and located about 1/8 mile east of Well No. 1, or approximately 1150 ft. S. and 2300 ft. E. of the N. W. corner of Section 27. The elevation of the ground surface at the well is 757. The well was cased with 12-in. pipe followed by 15 ft. of 12-in. Cook screen having No. 14 slot openings.

When the well was being developed in 1956, a quantity of acid was introduced, following which the yield rate was 146 gpm. On May 23, 1958 the well was flowing.

The permanent pumping equipment consists of 20 ft. of 4-in. suction pipe; Weinman centrifugal pump; 20-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 146785) collected May 23, 1958 showed the water in Well No. 2 to have a hardness of 23. 8 gr. per gal., total dissolved minerals of 469 ppm., and an iron content of 1. 3 ppm.

WELL NO. 3 was completed in 1954 to a depth of 190 ft. by Henry Boysen and located about 1/8 mile north of Well No. 2, or approximately 600 ft. S. and 2250 ft. E. of the N. W. corner of Section 27. The ground surface elevation at the well is 760.

The well was capped.

There are 310 services and pumpage is estimated to average 60, 000 gpd.

LABORATORY NO. 146785

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Silica	SiO_2	20.2	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	89.5	4.47	Boron	B	0.1	
Magnesium	Mg	44.6	3.67	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	6.	.26	Sulfate	SO_4	75.9	1.58
				Alkalinity (as	$CaCO_3$)	332.	6.64
Turbidity		21		Hardness (as	$CaCO_3$)	407.	8.14
Color		0					
Odor		0					
Temp. (reported)		50.3°F		Total Dissolved Minerals		469.	

Illinois State Water Survey
Bulletin 40 - Supplement II

LAKEWOOD SHORES
SUBDIVISION
Will County
May 25, 1960

A public water supply was installed in 1953 for the Lakewood Shores Subdivision, located along the Kankakee River about 1 1/2 miles south of Wilmington. Water is obtained from three wells. The system is owned and operated by the Lakewood Shores Real Estate Development Co.

WELL NO. 1 was completed to a depth of about 720 ft. and located at 1800 Roberts St. The well is cased with 5-in. steel pipe to an unreported depth. A Reda submersible pump is installed and connected to a 3-hp. electric motor.

WELL NO. 2 was constructed about the same time as Well No. 1 but no definite information is available other than that it was similar to Well No. 1 and located at 211 Lakewood Drive.

WELL NO. 3 was completed in Oct. 1953 to a depth of 700 ft. by Dreher and Schorie, Joliet, and located at 332 Sumac St., or approximately 1650 ft. N. and 3500 ft. W. of the S. E. corner of Section 1, T32N, R9E. The ground surface elevation at the well is 562. The well was first drilled to 300 ft. in the fall of 1952 but when it produced about 5 gpm., it was drilled deeper penetrating the St. Peter sandstone. The well is cased with 6-in. steel pipe to an unreported depth. "

The permanent pump is a Red Jacket submersible driven by a 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152393) collected May 25, 1960 showed the water to have a hardness of 19.9 gr. per gal., total dissolved minerals of 385 ppm., and an iron content of 0.2 ppm.

There are 130 services. Pumpage is estimated to average 26,000 gpd.

LABORATORY NO. 152393

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	15.8	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	76.0	3.80	Boron	B	0.1	
Magnesium	Mg	36.0	2.96	Chloride	Cl	12.	.34
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.4	.01
Sodium	Na	11.	.48	Sulfate	SO_4	69.7	1.45
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		0		Hardness (as	$CaCO_3$)	338.	6.76
Color		0					
Odor		0					
Temp. (reported)		53.9°F		Total Dissolved Minerals		385.	

LAKE ZURICH
Lake County
February 10, 1959

Two wells are in service for the public water supply of the village of Lake Zurich (3458).

WELL NO. 1 has been abandoned and filled in.

WELL NO. 2, described in Bulletin 40 as the "second well" and drilled in 1921 to a depth of 213 ft., was deepened in 1957 to a depth of 421 ft. by Henry Boysen, Libertyville. The well is located 690 ft. S. and 1950 ft. E. of the N. W. corner of Section 20, T43N, R10E. The ground surface elevation at the well is 855. The well was cased with 10-in. pipe to rock at 272 ft. and finished 10 in. in diameter to the bottom.

A production test was conducted by representatives of the Driller and the State Water Survey on July 26, 1957. After 4 hr. pumping at a rate of 505 gpm., the drawdown was 11 ft. from a static water level of 108 ft. below the top of the casing (2 ft. above floor).

A mineral analysis of a sample (Lab. No. 125969) collected July 26, 1951, after 4 hr. pumping, showed the water in Well No. 2 to have a hardness of 51 gr. per gal., total dissolved minerals of 1514 ppm., and an iron content of 1.1 ppm.

The pumping equipment consists of 180 ft. of 8-in. column pipe; 10-in., 8-stage Cook turbine pump, No. 13863, rated at 550 gpm. against 255 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 180 ft. of air line; 40-hp. U S electric motor.

On June 6, 1958 the nonpumping water level was 134 ft. (air line reading).

Well No. 2 is in service,

WELL NO. 3, described in Bulletin 40, is equipped with a 5-in. Cook turbine pump, No. 12413, rated at 325 gpm., attached to 4-in. column pipe. Power for pumping is from a 20-hp. U S electric motor.

Well No. 3 is in service.

In June 1958 there were 885 dwelling units, with 730 meters.

Pumpage is estimated to average 156, 000 gpd.

LABORATORY NO. 125969

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	25.1	
Manganese	Mn	0.0		Fluoride	F	0.8	
Calcium	Ca	176.0	8.80	Chloride	Cl	6.	.17
Magnesium	Mg	104.3	8.58	Nitrate	NO_3	0.0	.00
Ammonium	NH_4	0.4	.02	Sulfate	SO_4	1003.4	20.87
Sodium	Na	119.	5.16	Alkalinity (as	$CaCO_3$)	76.	1.52
Turbidity		7		Hardness (as	$CaCO_3$)	869.	17.38
Color		0					
Odor		0		Total Dissolved Minerals		1514.	

LANARK
Carroll County
October 10, 1960

Two wells are in service for the public supply of the city of Lanark (1473).

WELL NO. 1, described in Bulletin 40, was abandoned in 1957.

WELL NO. 2, described in Bulletin 40, is in service.

WELL NO. 3 was completed in 1957 to a depth of 1300 ft. by Allabaugh Well Co., Rockford, and located about 1/8 mile southeast of Well No. 2, or approximately 2300 ft. S. and 2300 ft. E. of the N. W. corner of Section 5, T24N, R6E. The ground surface elevation at the well is 860. The well was cased with 18-in. pipe from the surface to 90 ft. and with 14-in. pipe from the surface to about 340 ft. (cemented in). The hole was finished 14 in. in diameter to the bottom.

The well is equipped with a Fairbanks-Morse Pomona turbine pump, rated at 400 gpm., connected to a 50-hp. electric motor.

On Oct. 6, 1960, after 15 min. pumping at 500 gpm., the pumping water level was 273. 5 ft. (air line reading).

A mineral analysis of a sample (Lab. No. 153354) collected Oct. 6, 1960, after 15 min. pumping, showed the water in Well No. 3 to have a hardness of 17. 7 gr. per gal., total dissolved minerals of 323 ppm., and an iron content of 0. 5 ppm.

For the 12-month period prior to Apr. 1, 1959 pumpage for the city of Lanark averaged 150,000 gpd.

LABORATORY NO. 153354

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	11.2	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	68.1	3.41	Boron	B	0.0	
Magnesium	Mg	33.2	2.73	Chloride	Cl	1.	.03
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.6	.01
Sodium	Na	0.	.00	Sulfate	SO_4	28.0	.58
				Alkalinity (as	$CaCO_3$)	276.	5.52
Turbidity		1		Hardness (as	$CaCO_3$)	307.	6.14
Color		0					
Odor		0		Total Dissolved Minerals		323.	

Sample study summary log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, sandy, brownish yellow	80	80
ORDOVICIAN SYSTEM		
Mohawkian Series		
Galena Formation		
Dolomite, yellowish brown to buff, very fine to medium, crystalline	125	205
Decorah Formation		
Dolomite, light gray to brown, very fine to medium	40	245
Platteville Formation		
Dolomite, buff to grayish buff, extra fine to fine, crystalline	70	315
Glenwood Formation		
Sandstone, white, light gray to buff, coarse to very fine	70	385
St. Peter Formation		
Sandstone, white to light gray, white to light red at base, very fine to coarse, incoherent; shale, reddish brown, weak, brittle from 598 to 610, 622 to 630, 635 to 647, 710 to 718	333	718
CAMBRIAN SYSTEM		
St. Croixan Series		
Trempealeau Formation		
Dolomite, light buff to buff, very fine to fine; shale reddish brown, weak brittle; sandstone, pinkish, buff, very fine to coarse	37	755
Dolomite, light gray to light pinkish-buff, fine, crystalline	72	827
Sandstone, reddish-brown to purple, very fine to fine, compact	13	840
Franconia Formation		
Sandstone, light gray to light grayish-brown, very fine to coarse, incoherent; shale, greenish-gray, weak, little brittle	70	910
Ironton Formation		
Sandstone, light gray to light buff, very fine to very coarse, rounded, incoherent	100	1010
Galesville Formation		
Sandstone, white to light buff, very fine to medium, little coarse, rounded, incoherent	45	1055
Eau Claire Formation		
Sandstone, light grayish buff, gray, very fine to fine, compact, incoherent	45	1100

LEMONT
Cook County
May 15, 1958

Two wells are in service for the village of Lemont (3397).

WELL NO. 1, which is described in Bulletin 40, was originally Well No. 2 or the Stephens St. Well, also locally known as the "Sandstone Well." The well is now maintained for emergency service. Due to its higher power cost, Well No. 1 is operated only when the present Well No. 2 is out of service.

WELL NO. 2, locally known as the "Limestone Well," was completed in Dec. 1954 to a depth of 240 ft. by J. P. Miller Artesian Well Co., Brookfield, and is located about 1 mile south of Well No. 1, or approximately 800 ft. N. and 2300 ft. W. of the S. E. corner of Section 29, T36N, R11E. The ground surface elevation at the well is 742.

The well was cased with 128 ft. of drive pipe, below which the hole was finished 12 in. in diameter to the bottom at 240 ft. An 8-in. test hole was authorized by the village but the Driller put down a 12-in. hole. When the test hole was completed, a production test was conducted by the Driller. After 5 1/2 hr. pumping at a rate of 530 gpm., the drawdown was 9 ft. from a static water level of 111 ft. below the top of the casing.

The permanent pump installation consists of 170 ft. of column pipe; Peerless turbine pump; 170 ft. of air line; 30-hp. electric motor.

In July 1956 the standing water level was reportedly 4 ft. above the pump bowls and the pumping level was below the top of the bowls. The permanent pump was originally set with the top of the bowls at 132 ft. In Sept. 1956 the pump was lowered to 170 ft. and the air line was extended to 170 ft.

A mineral analysis of a sample (Lab. No. 146786) collected May 15, 1958 showed the water in Well No. 2 to have a hardness of 38.4 gr. per gal., total dissolved minerals of 788 ppm., and an iron content of 0. 5 ppm.

In Mar. 1957, because of cheaper power costs, all water for the village supply was being pumped from Well No. 2.

Pumpage for the village in 1956 averaged 200,000 gpd.

LABORATORY NO. 146786

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	22.0	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	135.0	6.75	Boron	B	0.2	
Magnesium	Mg	77.6	6.38	Chloride	Cl	6.	.17
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	0.7	.01
Sodium	Na	21.	.91	Sulfate	SO_4	232.6	4.84
				Alkalinity (as	$CaCO_3$)	452.	9.04
Turbidity		9		Hardness (as	$CaCO_3$)	657.	13.13
Color		0					
Odor		0					
Temp. (reported)		51.7°F		Total Dissolved Minerals		788.	

Four wells are in service for the city of Lewistown (2603).

WELL NO. 1, described in Bulletin 40, was in service until 1958 when it was used as an observation well. On Nov. 13, 1958 the static water level was reportedly 16 ft. below the well top.

WELLS NO. 2, 3 and 4, described in Bulletin 40, were abandoned in 1952, 1953 and 1955, respectively.

WELL NO. 5 was completed to a depth of 46 ft. in 1950 by Thorpe Concrete Well Co., Alton, and located about 33 ft. north of Well No. 3, or approximately 400 ft. N. and 2100 ft. W. of the S. E. corner of Section 32, T5N, R3E. The elevation of the ground surface at the well is 455. The well was cased with 30-in. id. by 40-in. od. plain concrete pipe from 2 1/4 ft. above to 26 ft. below ground level, followed by a 30-in. id. by 40-in. od. porous concrete screen from 26 to 46 ft.

A production test was conducted on Apr. 26-27, 1955 by representatives of the Driller, the State Water Survey, and Casler and Stapleton, Consulting Engineers. After 6 hr. pumping at an average rate of 178 gpm., the drawdown was 11. 5 ft. from a static water level of 10. 9 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 137533) collected Apr. 27, 1955, after 6 hr. pumping at 178 gpm., showed the water in Well No. 5 to have a hardness of 23.2 gr. per gal., total dissolved minerals of 415 ppm., and an iron content of 0. 5 ppm.

The pumping installation consists ofa Deming turbine pump, rated at 725 gpm., connected to a 2-hp. U S electric motor.

WELL NO. 6 was completed in 1950 to a depth of 45 ft. by Thorpe Concrete Well Co. and located 70 ft. east of Well No. 5. Construction details and pumping equipment are identical with those for Well No. 5.

WELL NO. 7 was completed in Mar. 1956 to a depth of 35 ft. by Varner Well and Pump Co., Dubuque, Iowa, and located 10 ft. north and 175 ft. west of Well No. 5. The hole was drilled 42 in. in diameter from the surface to 35 ft. and is cased with 12-in. id., ci. pipe from 7 ft. above to 25 ft. below ground level followed by 10 ft. of 12-in. stainless steel screen having .050 slot openings. The annulus between the casing and screen and the wall of the 42-in. hole was filled with 1/4 to 1/8-in. gravel from 35 ft. up to 5 ft. below the surface.

A production test was conducted on Mar. 23, 1956 by representatives of the Driller, Village officials, the State Water Survey, and Casler and Stapleton, Consulting Engineers. After 8 hr. pumping at 300 gpm., the drawdown was 6. 5 ft. from a static water level of 11 ft. below ground level. Eighteen min. after the pump was stopped, the water level had recovered to 11.5 ft.

The pumping equipment consists of a Deming turbine pump, rated at 125 gpm., connected to a 2-hp. U S electric motor.

WELL NO. 8 was completed in 1956 to a depth of 35 ft. by Varner Well and Pump Co. and located 111 ft. west of Well No. 7, or approximately 410 ft. N. and 2386 ft. W. of the S. E. corner of Section 32.

Construction details and pumping equipment are identical with those of Well No. 7.

Correlated driller's log of WELL NO. 8 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Black top soil	5	5
Red clay	10	15
Medium white clean sand	5	20
Fine gravel, coarse sand	5	25
Coarse gravel	5	30
Coarse gravel, coarse white sand	5	35
Blue clay		35

A mineral analysis of a composite sample (Lab. No. 152608) collected June 23, 1960 showed the water from Wells No. 5, 6, 7 and 8 to have a hardness of 21. 2 gr. per gal., total dissolved minerals of 424 ppm., and an iron content of 1.2 ppm.

Pumpage in Mar. 1957 averaged 145,000 gpd. This is less than 1950 pumpage, probably because of change over of railroad locomotives from steam to diesel power.

2 - Lewistown

LABORATORY NO. 152608

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	14.4	
Manganese	Mn	0.6		Fluoride	F	0.2	
Calcium	Ca	84.3	4.22	Boron	B	0.0	
Magnesium	Mg	36.7	3.02	Chloride	Cl	12.	.34
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	7.5	.12
Sodium	Na	5.	.20	Sulfate	SO_4	96.9	2.02
				Alkalinity (as	$CaCO_3$)	248.	4.96
Turbidity		7		Hardness (as	$CaCO_3$)	362.	7.24
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		424.	

LIBERTY PARK
SUBDIVISION
DuPage County
June 25, 1958

A public water supply was installed in 1927 for the Liberty Park Subdivision (est. 720) located just east of Downers Grove and north of Westmont. The area is generally between Washington St. on the east and Jackson St. on the west and between Ogden Ave. on the south and 38th St. on the north. The system is owned and operated by the Liberty Park Home Owners Association.

WELL NO. 1 was constructed 120 ft. deep about 1926 or 1927. The name of the Driller is not known. The well was located in a 5-ft. pit at the corner of Washington St. and 41st St., or approximately 1900 ft. S. and 1500 ft. W. of the N. E. corner of Section 4, T38N, R11E. The elevation of the ground surface at the well is 745.

The size and amount of casing in the well are not known. The pumping equipment includes a Fairbanks-Morse Pomona turbine pump, No. SC1468, rated at 200 gpm. atl60ft. T.D.H. Power is from a 10-hp. Fairbanks-Morse electric motor.

Well No. 1 furnished the subdivision supply until Well No. 2 was constructed. At present Well No. 1 is maintained for stand-by use.

WELL NO. 2 was completed in July 1956 to a depth of 278 ft. 9 in. by Layne-Western Co., Aurora, and located about 25 ft. east of Well No. 1, or approximately 1875 ft. S. and 1475 ft. W. of the N. E. corner of Section 4. The well was cased with 8-in. steel pipe to 142 ft. 8 in. and the hole was finished at 8 in. in diameter to the bottom at 278 ft. 9 in. The casing sets in a pit 11 ft. 6 in. deep and the top of the casing is 6 in. above grade (ground level at entrance to pump house).

The Drilling Contractor reported that on July 31, 1956 water was pumped for 9 hr. at a rate of 156 to 96 gpm. with a final drawdown of 25 ft. from a static water level of 105 ft. below the pump base (3 ft. above ground level).

The pumping equipment consists of 760 ft. of 4-in. column pipe; 8-in., 10-stage Layne turbine pump (No. 34815), 6 ft. 2 in. long and rated at 100 gpm. at 275 ft. T.D.H.; 15-hp. U S electric motor.

A partial chemical analysis of a sample (Lab. No. 141147) collected in Aug. 1956 showed the water in Well No. 2 to have a hardness of 30.7 gr. per gal., total dissolved minerals of 539 ppm., and an iron content of 0. 7 ppm.

Pumpage for May 1958 averaged 30,000 gpd.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, gravelly, dark gray	25	25
Gravel, fine to medium, dark gray; fill, sandy, silty, dark gray	5	30
Till, gravelly, sandy, brown, gray	20	50
Gravel, gray, buff, granular, clean, little dirty, some till as above	15	65
Till, very sandy, gravelly, dark gray	10	75
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to buff, very fine to fine, compact	155	230
Alexandrian Series		
Dolomite, white, fine to very fine, compact	35	265
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, light green, weak; dolomite, white, fine to very fine, compact	10	275

2 - Liberty Park Subdivision

LABORATORY NO. 141147

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Fluoride	F	0.4	
				Chloride	Cl	7.	.20
				Nitrate	NO_3	0.6	.01
				Alkalinity (as	$CaCO_3$)	364.	7.28
Turbidity		7		Hardness (as	$CaCO_3$)	512.	10.24
Color		0					
Odor		0		Total Dissolved Minerals		539.	

Six wells are in service for the public water supply of the village of Libertyville (8560).

WELL NO. 1, described in Bulletin 40 as the Second St. Well, was the fifth well drilled for Libertyville. The four wells previously drilled were abandoned, as stated in Bulletin 40. The ground elevation at the well is 680. Well No. 1 is now equipped with 200 ft. of 6-in. column pipe; 8-in., 8-stage Pomona turbine pump, No. SD1605, ratedat 300 gpm. against 230 ft. T.D.H.; 200 ft. of air line; a 5-in. strainer on the suction; 25-hp. Westinghouse electric motor.

On Dec. 18, 1958, during pumping at a rate of 300 gpm., the drawdown was 57 ft. from a nonpumping water level of 96 ft. (air line reading).

WELL NO. 2, described in Bulletin 40 as the Garfield Ave. Well, the sixth well drilled for the village, is equipped with 73 ft. of 7-in. column pipe; 8-in., 9-stage Pomona turbine pump, No. L-2690, rated at 400 gpm. against 190 ft. T.D.H.; strainer at bottom of pump; 73 ft. of air line; 30-hp. General Electric motor.

On Dec. 18, 1958, during pumping at 400 gpm., the drawdown was 25 ft. from a nonpumping water level of 43 ft.

Well No. 2 is maintained for stand-by use and has not been in regular service since Oct. 1955.

WELL NO. 3, described in Bulletin 40 as Appley No. 1, the seventh well drilled by the village, was completed and tested in Jan. 1948. The well was subsequently equipped with 100 ft. of 6-in. column pipe; 8-in., 12-stage Pomona turbine pump, No. SF767, rated at 325 gpm. against 200 ft. T.D.H.; strainer on bottom of bowls; 100 ft. of air line; 20-hp. General Electric motor.

On Dec. 18, 1958, after 8 hr. pumping at a rate of 325 gpm., the drawdown was 14 ft. from a nonpumping water level of 52 ft. (air line reading). When Well No. 4, old Test Well 46-1 at 10 ft. away was also pumping, the drawdown in No. 3 was 25 ft.

WELL NO. 4, referred to in Bulletin 40 as Test Well No. 46-1, was drilled in 1946 to a depth of 286 ft. and located 10 ft. south of the permanent well, Appley St. No. 1 (now called Well No. 3). Following the favorable production test in the test well (Test Well No. 46-1), it was completed in 1947 as a permanent well (Appley St. No. 2) and now known as Well No. 4. The ground surface elevation at the well is 675, and the well was cased with 6-in. pipe to an unreported depth (probably about 172 ft., the same as Well No. 3).

The pumping equipment includes 130 ft. of 4-in. column pipe; 6-in., 23-stage Pomona turbine pump, No. AL4703, rated at 150 gpm. against 241 ft. T.D.H.; strainer at bottom of pump; 130 ft. of air line; 15-hp. General Electric motor.

On Dec. 18, 1958, during pumping at a rate of 150 gpm., the drawdown was 14 ft. from a nonpumping water level of 52 ft.

A partial chemical analysis of a sample (Lab. No. 122966) collected Sept. 13, 1950, after l/2 hr. pumping at rates of 200 to 250 gpm., showed the water in this well to have a hardness of 20.4 gr. per gal., total dissolved minerals of 630 gpm., and an iron content of 0.6 ppm.

WELL NO. 5 (Newberry Ave.) was completed in 1951 to a depth of 227 ft. by Henry Boysen, Libertyville, and located on Newberry Ave., about l/2 mile south of Wells No. 3 and 4, or approximately 2210 ft. N. and 2230 ft. W. of the S. E. corner of Section 16, T44N, R11E. The ground surface elevation at the well is 693. The well was cased with 12-in. pipe to 174 ft. (limestone), below which the hole was finished 12 in. in diameter.

A production test was conducted on Feb. 27, 1951 by representatives of the Driller and the State Water Survey. After 12 hr. pumping at rates of 305 to 590 gpm., the drawdown was 43 ft. from a static water level of 39 ft. below the pump base (1 ft. above ground level).

The well is equipped with 140 ft. of 8-in. column pipe; 10-in., 6-stage Pomona turbine pump, No. 5787, rated at 500 gpm. against 225 ft. T.D.H.; strainer at bottom of pump; 140 ft. of air line; 40-hp. Fairbanks-Morse electric motor.

On Dec. 18, 1958, when pumping at a rate

of 500 gpm., the drawdown was 26 ft. from a nonpumping water level of 79 ft. (air line reading).

A mineral analysis of a sample (Lab. No. 124509) collected Feb. 27, 1951, after 12 hr. pumping at rates of 305 to 590 gpm., showed the water to have a hardness of 17.5 gr. per gal., total dissolved minerals of 736 ppm., and an iron content of 0.1 ppm.

WELL NO. 6 (North Ave.) was completed in Apr. 1955 to a depth of 297 ft. by Henry Boysen and located at the end of North Ave., south of the sewage treatment plant, or approximately 1110 ft. N. aud 50 ft. W. of the S. E. corner of Section 16. This is about 1/2 mile southeast of Well No. 5. The ground surface elevation at the well is 648. The well was cased with 6-in. pipe to 198 ft., below which the hole was finished at 6 in. in diameter. The top 70 ft. of the casing was cemented in. The top of the casing was left 18 in. above the pump house floor. Limestone and shale were encountered at 188 ft.

When the well was completed, a production test was conducted and reported by the Driller. While pumping at a rate of 376 gpm., the drawdown was 180 ft. from a static water level of 20 ft. below the surface. Development of the well was continued on Apr, 13, 1955 by introducing 4000 gal. of HC1. On Apr. 15, during pumping at a rate of 728 gpm., the drawdown was 150 ft. from a nonpumping water level of 20 ft. below the surface.

The pumping equipment consists of 220 ft. of 4-in. column pipe; 6-in., 4-stage Pomona turbine pump, No. AT7273, rated at 200 gpm, against 380 ft. T.D.H.; strainer on bottom of pump; 220 ft. of air line; 30-hp. U S electric motor.

WELL NO. 7, the tenth well in the order of drilling for the village supply, was completed in May 1955 to a depth of 300 ft. by Henry Boysen and located 8 ft. west of Well No. 6, or approximately 1110 ft. N. and 58 ft. W. of the S. E. corner of Section 16, This well was originally drilled as a test well and used for observation of water levels during the production tests of Well No. 6. The finished well was cased with 24-in. outer pipe from the surface to 56 ft. and with a 16-in. inner pipe (cemented in) from the surface to 198 ft. Below the casing the hole was finished 16 in. in diameter.

On May 4, 1955, when pumping at a rate of 630 gpm., the drawdown was 155 ft. from a nonpumping water level of 33 ft. below the top of the casing. Prior to this test 3300 gal. of HC1 had been introduced into the well.

The pumping equipment consists of 260 ft. of 8-in. column pipe; 12-in., 6-stage Pomona turbine pump, No. 7277, rated at 700 gpm. against 290 ft, T.D.H.; strainer on bottom of pump; 260 ft. of air line; 75-hp. U S electric motor. A right angle gear drive with a 130-hp. Buda gas engine is installed for auxiliary power for pumping.

A partial chemical analysis of a sample (Lab. No. 137590) collected May 4, 1955, after 6 hr. pumping at a rate of 630 gpm., showed the water in Well No. 7 to have a hardness of 19.4 gr. per gal., total dissolved minerals of 552 ppm., and an iron content of 0. 6 ppm.

Pumpage for the village during 1957 averaged 700,000 gpd.

LABORATORY NO. 124509

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	24.6	
Manganese	Mn	0.0		Fluoride	F	0.8	
Calcium	Ca	71.7	3.59	Chloride	Cl	7.	.20
Magnesium	Mg	41.6	3.42	Nitrate	NO_3	0.0	.00
Ammonium	NH_4	0.6	.03	Sulfate	SO_4	421.0	8.76
Sodium	Na	94.	4.08	Alkalinity (as	$CaCO_3$)	108.	2.16
Turbidity		0		Hardness (as	$CaCO_3$)	301.	7.01
Color		0					
Odor		0		Total Dissolved Minerals		736.	

LINCOLNSHIRE
Lake County
August 15, 1958

A public water supply was installed in 1956 for Lincolnshire (555), a village near Half Day. The system was owned by the J. R. Ladd Enterprises.

WELL NO. 1 was completed in 1956 to a depth of 1305 ft. by Henry Boysen, Libertyville, and located about 1/2 mile southeast of Half Day, or approximately 800 ft. S. and 2100 ft. E. of the N. W. corner of Section 23, T43N, R11E. The ground surface elevation at the well is 650. The well was cased with 12-in. pipe from the surface to 138 ft. and with 10-in. pipe from the surface to 555 ft. An 8-in. liner was set from 941 to 1026 ft., below which the hole was finished 10 in. in diameter.

When the well was completed the Driller reported pumping for 8 hr. at a rate of 195 gpm. with a drawdown of 100 ft. from a static water level of 230 ft. below the surface.

The permanent pumping equipment consists of 310 ft. of 4-in. column pipe; 8-in., 10-stage Byron Jackson submersible pump, rated at 200 gpm. against 450 ft. T.D.H.; 320 ft. of air line; 35-hp. electric motor.

The nonpumping water level on Aug. 15, 1958 was 238 ft. (air line reading).

A partial chemical analysis of a sample (Lab. No. 145347) collected Dec. 27, 1957, after 8 hr. pumping at 195 gpm., showed the water in the well to have a hardness of 19.2 gr. per gal., total dissolved minerals of 539 ppm., and an iron content of 1. 4 ppm.

In Aug. 1958 there were 103 services. Pumpage was estimated to average 24, 000 gpd.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	138	138
SILURIAN SYSTEM		
Limestone	180	318
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale and limestone	158	476
Galena-Platteville Formations		
Limestone	324	800
Glenwood-St. Peter Formations		
Sandstone	151	951
CAMBRIAN SYSTEM		
Franconia Formation		
Limestone	150	1101
Ironton-Galesville Formations		
Sandstone	204	1305

LABORATORY NO. 145347

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	1.4	
				Chloride	Cl	33.	.93
				Nitrate	NO_3	0.1	Tr.
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		10		Hardness (as	$CaCO_3$)	328.	6.56
Color		0					
Odor		0		Total Dissolved Minerals		539.	

LOCKPORT HEIGHTS SUBDIVISION
Will County
April 3, 1958

A public water supply was installed in 1953 for the Lockport Heights Subdivision. Two wells are in service.

WELL NO. 1 was completed in 1953 to a depth of 200 ft. and located approximately 3050 ft. N. and 175 ft. E. of the S. W. corner of Section 7, T36N, R11E. The ground surface elevation at the well is 720. The well was cased with 6-in. pipe to an unreported depth.

Well No. 1 is equipped with a Reda submersible pump attached to a 4-in. discharge pipe and powered by a 3-hp. electric motor.

WELL NO. 2 was completed in 1955 to a depth of 200 ft. by Dreher and Schorie, Joliet, and located about 1/4 mile northeast of Well No. 1, or approximately 3600 ft. N. and 1425 ft. E. of the S. W. corner of Section 7. The ground surface elevation at the well is 745.

The well is cased with 6-in. pipe to an unreported depth, and is equipped with a Reda submersible pump attached to a 4-in. discharge pipe. Power is from a 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146279) collected Apr. 3, 1958 showed the water in Well No. 2 to have a hardness of 52 gr. per gal., total dissolved minerals of 1119 ppm., and an iron content of 1. 3 ppm.

Pumpage has not been reported.

LABORATORY NO. 146279

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Silica	SiO_2	17.2	
Manganese	Mn	0.0		Fluoride	F	0.4	
Calcium	Ca	201.5	10.08	Boron	B	0.3	
Magnesium	Mg	95.1	7.82	Chloride	Cl	7.	.20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	19.	.83	Sulfate	SO_4	486.5	10.12
				Alkalinity (as	$CaCO_3$)	420.	8.40
Turbidity		10		Hardness (as	$CaCO_3$)	895.	17.90
Color		0					
Odor		0					
Temp. (reported)		52.3°F		Total Dissolved Minerals		1119.	

LODA
Iroquois County
June 22, 1960

Two wells are in service for the village of Loda (585).

WELL NO. 1, described in Bulletin 40, was cleaned with Weltone in Nov. 1959 and the capacity reportedly increased from 80 to 110 gpm.

WELL NO. 2 was completed in June 1951 to a depth of 158 ft. by J. Bolliger and Sons, Fairbury, and located about 15 ft. northeast of Well No. 1, or approximately 190 ft. S. and 2505 ft. W. of the N. E. corner of Section 28, T24N, R10E. The elevation of the ground surface at the well is 780. The well was cased with 149 ft. of 8-in. pipe from 1. 5 ft. above ground level. A Houston stainless steel screen, 12 ft. 2 in. long, was installed by the casing "pull-back method. " The lower half of the screen had No. 21 slot sizes and the upper half had No. 30 slot sizes.

A production test was conducted on June 13, 1951 by representatives of the Driller, the State Water Survey, Village officials, and Tracy Pitzen, Consulting Engineer.

For the test a deep-well engine driven turbine pump was set with the bottom of the suction at a depth of 145 ft. Before the test, and with the pump in Well No. 1 not operating, the static water level in Well No. 2 was 99. 5 ft. below the top of the casing. After 2 l/2 hr. pumping at 157 gpm. in Well No. 2, with No. 1 still idle, the drawdown in Well No. 2 was 24. 8 ft. Two hr. after starting the Well No. 1 pump, and with simultaneous pumping in both wells (No. 2 at 154 gpm.) the drawdown in Well No. 2 was 28.1 ft.

The permanent pump is a Deming turbine, rated at 150 gpm. and connected to a 15-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152588) collected June 22, 1960 showed the water in Well No. 2 to have a hardness of 34. 6 gr. per gal., total dissolved minerals of 866 ppm., and an iron content of 1. 4 ppm.

There are 197 services, all metered, and pumpage is reported to average 37, 000 gpd.

A Poultry Packing Co. uses an average of 6000 gpd. from another well.

LABORATORY NO. 152588

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Silica	SiO_2	17.5	
Manganese	Mn	0. 1		Fluoride	F	0.2	
Calcium	Ca	123.2	6.16	Boron	B	0.5	
Magnesium	Mg	68.6	5.64	Chloride	Cl	5.	.14
Ammonium	NH_4	1.2	.07	Nitrate	NO_3	0.9	.01
Sodium	Na	56.	2.43	Sulfate	SO_4	338.0	7.03
				Alkalinity (as	$CaCO_3$)	356.	7.12
Turbidity		0		Hardness (as	$CaCO_3$)	590.	11.80
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		866.	

LOMBARD
DuPage County
May 14, 1959

Two wells, No. 4 and 5, are in service for the village of Lombard (22, 561). Two wells, No. 1 and 3, are available for emergency service and Well No. 2 is temporarily, at least, out of use.

WELL NO. 1, described in Bulletin 40, is equipped with a Layne-Western turbine pump set at 60 ft. and rated at 350 gpm. at 100 ft. T.D.H. Ten ft. of suction pipe and a 15-hp. U S electric motor are installed. Well No. 1 is maintained for emergency use.

WELL NO. 2, described in Bulletin 40, was rehabilitated in 1956 by J. P. Miller Artesian Well Co., Brookfield, but the well failed thereafter and is no longer in use, according to a State Department of Public Health report of Jan. 13, 1959.

WELL NO. 3, described in Bulletin 40, is equipped with a Layne-Western turbine pump set at 130 ft. and rated at 600 gpm. at 110 ft. T.D.H. The pump is directly connected to a 30-hp. U S electric motor.

WELL NO. 4 was completed to a depth of 2062 ft. in Mar. 1954 by Layne-Western Co., Aurora, and located at the south end of the new pumping station at Main and St. Charles Road, or approximately 335 ft. N. and 925 ft. E. of the S. W. corner of Section 6, T39N, R11E. The well was cased with 26-in. od. drive pipe to 57 ft. 8 in. and with 20-in. pipe from the surface to 706 ft. 5 in., below which the hole was finished 19 in. in diameter to 1351 ft. and 15 in. in diameter from 1351 to 2062 ft.

A production test was conducted on Mar. 31-Apr. 1, 1954 by representatives of the Drilling Contractor and the State Water Survey. After 24 hr. pumping at a rate of 628 gpm., the drawdown was 132 ft. from a static water level of 345 ft. below the pump base.

Following the test, the well was shot with 150-lb. charges of solidified gelatin set at depths of 1250, 1285, 1325, 1365, 1800, 1830, 1965 and 2020 ft. The well was then cleaned out and shot with 200-lb. charges of solidified gelatin at depths of 1300, 1370, 1825 and 1930 ft. The well was cleaned out and the test equipment reinstalled. On Apr. 20-21 a second test was conductedby representatives of the Driller and the State Water Survey. After 24 hr. pumping at a rate of 1200 gpm., the drawdown was 88 ft. from a nonpumping water level of 358 ft. below the pump base.

The permanent pumping equipment includes a 12-in., 10-stage Layne-Western turbine pump set at 550 ft. and rated at 1000 gpm. at 650 ft. T.D.H. There are 20 ft. of suction pipe and the pump is connected to a 250-hp. General Electric motor.

In Jan. 1959 the nonpumping water level was reported to be 471 ft. and the drawdown 26 ft.

WELL NO. 5 was completed in Apr. 1956 to a depth of 1793 ft. by S. B. Geiger & Co., Chicago, and located at North Ave. and West Road, outside the village limits, or approximately 626 ft. N. and 860 ft. E. of the S. W. corner of Section 31, T40N, R11E. The ground surface elevation at the well is 738. The well was cased with 26-in. pipe from the surface to 146 ft. and 20-in. pipe from the surface to 512 ft., below which the hole was finished at 16 1/4 in. in diameter to 1257 ft. and 12 in. from 1257 to 1793 ft.

A production test was conducted by the Driller when the well was completed. After 24 hr. pumping at rates of 980 to 1025 gpm., the drawdown was 105 ft. from a static water level of 452 ft. below the top of the casing (2 ft. above ground level).

A partial chemical analysis of a sample (Lab. No. 140383) collected 24 hr. after pumping began at 1025 to 980 gpm., showed the water in Well No. 5 to have a hardness of 12. 5 gr. per gal., total dissolved minerals of 470 ppm., and an iron content of 0. 2 ppm.

The pumping equipment installed in Well No. 5 includes 645 ft. of 8-in. column pipe; 12-in. Byron Jackson submersible pump, rated at 900 gpm.; 200-hp. electric motor.

Nonpumping water levels in the Lombard wells from 1907-1956 are shown in Table A.

There are 5000 services, all metered, and 100% of population is served. Pumpage from July-Dec. 1957 averaged 1.4 mgd.

TABLE A

Well No.	1	2	3	4	5
Surface Elev.	692	695	693	700	738
Depth	84	2028	175	2026	1793
Aquifer	ls	ss	ls	ss	ss

Date	Depth to Water ft.			
1907	9			
1918	12			
1924	14			
	16			
1926		136		
1934		240		
1939	10	240		
1942	9			
1943	10			
1944		288		
1946		301		
1948	10	323		
1949	15	324		
1950	10	323	9	
1953		350		
		360		
		361		
		362		
		364		
1954			17	335
				345
				358
1955		386		452
		396		
		410		
1956		415	18	368
		425		392
		448		400
		454		444

LABORATORY NO. 140383

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Fluoride	F	2.0	
				Chloride	Cl	27.	.76
				Sulfate	SO_4	104.5	2.17
				Alkalinity (as	$CaCO_3$)	284.	5.68
Turbidity		4		Hardness (as	$CaCO_3$)	212.	4.24
Color		0					
Odor		0					
Temp. (reported)		60.0°F		Total Dissolved Minerals		470.	

LOMBARD HEIGHTS
DuPage County
November 15, 1958

A public water supply was installed in 1954 for Lombard Heights (est. 850), a subdivision northeast of Lombard. The supply is owned and operated by Midland Enterprises, a private company.

WELL NO. 1 was completed in Mar. 1954 to a depth of 209 ft. by Layne-Western Co., Aurora, and located on the east side of Joyce St. about 2 blocks south of North Ave., or approximately 1067 ft. S. and 3600 ft. E. of the N. W. corner of Section 5, T39N, R11E. The ground surface elevation at the well is 720. The well is cased with 15-in. id. pipe to 89 ft. The top of the casing is about 8 in. above the pump house floor. The diameter of the uncased hole is not known.

A production test was conducted in Nov. 1958 by the Drilling Contractor. After 10 hr. pumping at a rate of 335 gpm., the drawdown was 33 ft. from a nonpumping water level of 47 ft. below the pump base. On Jan. 28, 1958 the drawdown was 17 ft. from a nonpumping water level of 43 ft. below the pump base. The pumping rate was not reported.

The pumping equipment consists of 120 ft. of column pipe; 8-stage Layne turbine pump, No. 27708, rated at 200 gpm. at 160 ft. T.D.H.; 120 ft. of air line; 25-hp. U S electric motor.

A partial chemical analysis of a sample (Lab. No. 148200) collected Nov. 15, 1958, after 10 hr. pumping at a rate of 335 gpm., showed the water in Well No. 1 to have a hardness of 27.9 gr. per gal,, total dissolved minerals of 574 ppm., and an iron content of 1. 6 ppm.

There are 215 services, all metered, and 100% of the population is served.

Pumpage is estimated to average 40, 000 gpd.

LABORATORY NO. 148200

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.6		Fluoride	F	0.3	
				Boron	B	0.1	
				Chloride	Cl	14.	.39
				Alkalinity (as	$CaCO_3$)	326.	6.52
Turbidity		5		Hardness (as	$CaCO_3$)	480.	9.60
Color		0					
Odor		0					
Temp. (reported)		51.7°F		Total Dissolved Minerals		574.	

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark grayish brown, leached	5	5
Till, sandy, slightly gravelly, to gravelly, buff, grayish buff	50	55
Till, extremely gravelly and sandy, grayish buff	15	70
Gravel and sand, multi-colored, clean	15	85
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, slightly calcareous, light buff, white, extra fine to very fine, crystalline, some visible porosity (vugular)	10	95
Dolomite, cherty, white, little buff, fine to very fine, crystalline	10	105
Dolomite, slightly silty, slightly argillaceous, white, little yellow, buff, grayish-buff, very fine, crystalline	50	155
Alexandrian Series		
Kankakee Formation		
Dolomite, white, light buff, very fine, crystalline, partly granular	40	195
Edgewood Formation		
Dolomite, trace glauconite, slightly silty to silty, buff, dark brown, fine to very fine, crystalline	10	205
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, slightly dolomitic, slightly ferruginous, green, reddish-brown to yellowish brown, very weak (plastic), with small rounded dark pellets	5	210

LONETREE SUBDIVISION
Cook County
October 14, 1958

A public water supply was installed in 1957 for the Lonetree Subdivision (est. 130). Water is obtained from one well.

WELL NO. 1 was completed in Apr. 1957 to a depth of 1404 ft. by J. P. Miller Artesian Well Co., Brookfield. The subdivision, originally owned by A. L. Salzman & Sons, Inc., is located about 2 miles east of Wheeling. Well No. 1 is approximately 1975 ft. N. and 790 ft. E. of the S. W. corner of Section 5, T42N, R12E. The ground elevation at the well is 686. The well was cased with 16-in. pipe from the surface to 105 ft. and with 10-in. pipe (cemented in) from the surface to 565 ft. Below the 10-in. casing, the hole was finished 10 in. in diameter to the bottom.

Upon completion of the well, a pumping test was conducted by the Driller. After 13 l/2 hr. pumping at a rate of 320 gpm., the drawdown was 115 ft. from a static water level of 288 ft. below the top of the casing. For the test a turbine test pump was set at 460 ft.

The permanent pumping equipment consists of 450 ft. of 6-in. column pipe; 8-in., 17-stage Peerless turbine pump, No. 123992, rated at 220 gpm. against 488 ft. T.D.H.; 450 ft. of air line; 40-hp. U S electric motor.

On Oct. 14, 1958 the nonpumping water level was 314 ft. below the pump base and after 10 min. pumping the water level was 351 ft.

A mineral analysis of a sample (Lab. No. 147973) collected Oct. 14, 1958, after 10 min. pumping, showed the water to have a hardness of 22 gr. per gal., total dissolved minerals of 670 ppm., and an iron content of 0. 5 ppm.

There are 33 services installed and a total of 125 services is planned.

Pumpage at present is estimated to average 6500 gpd.

LABORATORY NO. 147973

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	6.9	
Manganese	Mn	0.0		Fluoride	F	1.3	
Calcium	Ca	106.5	5.32	Boron	B	0.2	
Magnesium	Mg	27.3	2.25	Chloride	Cl	37.	1.04
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	1.3	.02
Sodium	Na	81.	3.51	Sulfate	SO_4	228.9	4.76
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		1		Hardness (as	$CaCO_3$)	378.	7.57
Color		0					
Odor		0					
Temp. (reported)		56.8°F		Total Dissolved Minerals		670.	

2 - Lonetree Subdivision

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Soil, black"	3	3
Till, gravelly, buff	67	70
Gravel, little coarse sand	30	100
"Sand and broken gravel"	4	104
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white, little gray to buff, very fine, crystalline (No samples 104-110, 255-265)	161	265
Alexandrian Series		
Kankakee Formation		
Dolomite, slightly cherty, white to buff, very fine, crystalline	50	315
Edgewood Formation		
Dolomite, silty, cherty, white to buff, very fine	75	390
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, sandy, gray, little green, weak; little dolomite (no samples 500-515)	125	515
Galena Formation		
"Limestone, medium"	85	600
Dolomite, silty, buff to white, very fine, crystalline	75	675
Decorah Formation		
Dolomite, silty, gray to buff, black speckled, very fine	25	700
Platteville Formation		
Dolomite, silty, buff to gray, little white, very fine to extra fine, crystalline	120	820
Glenwood Formation		
Sandstone, silty, dolomitic, white, very fine to coarse, incoherent to friable	35	855
St. Peter Sandstone		
Sandstone, silty, white, fine to medium, little very fine, incoherent (no samples 905-915, 925-935)	84	939
Oneota Formation		
Dolomite, cherty, buff to white, little gray, very fine to medium, crystalline; little sandstone	106	1045
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, buff to grayish brown, little white, very fine, crystalline, glauconitic at base; little sandstone	98	1143
Franconia Formation		
Sandstone, very glauconitic, dolomitic, red to green, little gray, very fine to medium, compact; little shale and dolomite	72	1215
Ironton-Galesville Sandstones		
Sandstone, dolomitic, silty, white, medium to very fine, little coarse, compact to friable	160	1375
Eau Claire Formation		
Shale, sandy, dolomitic, glauconitic, gray to green, weak to tough; little sandstone and dolomite	29	1404

One well is in service for the village of Lostant (460).

WELLS NO. 1, 2 and 3, described in Bulletin 40, are no longer in use.

WELL NO. 4 was completed in Sept. 1953 to a depth of 1881 ft. by Layne-Western Co., Aurora, and located close to the elevated storage tank, approximately 2200 ft. S. and 1800 ft. E. of the N. W. corner of Section 24, T31N, R1E. The ground surface elevation at the well is 698. The hole and casing record is shown in Table A.

TABLE A

Hole Record

20-in. from surface to 128 ft.
16-in. from 128 to 554 ft.
14-in. from 554 to 720 ft.
111/2-in. from 720 to 1384 ft.
10-in. from 1384 to 1881 ft.

Casing Record

20-in. from surface to 128 ft.
16-in. from surface to 554 ft.
14-in. from 534 to 720 ft.
10-in. from surface to 1384 ft.
The 10-in. casing was cement grouted from bottom to top.

A production test was conducted on Sept. 10-11, 1953 by representatives of the Driller, the State Water Survey, and Caldwell-Rhoads Co., Consulting Engineers. For test purposes the well was equipped with a turbine test pump, with the bottom of the tail pipe below the bowl section set at 398 ft. below the top of the casing. The bottom of a plastic air line was installed at 393 ft. below the top of the casing. After 24 hr. pumping at 58. 5 gpm., the drawdown was 183 ft. from a nonpumping water level of 193 ft. One and one-half hr. after pumping was stopped, the water level had recovered to 202 ft.

The permanent pumping equipment consists of 360 ft. of 4-in. column pipe; 8-in., 13-stage Layne and Bowler turbine pump, No. 26340, rated at 80 gpm. against 382 ft. T.D.H., and having an over-all length of 8 ft. 2 in.; 10 ft. of 4-in. suction pipe; air line, length unreported; 20-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 133654) collected from Well No. 4 showed the water to have a hardness of 22 gr. per gal., total dissolved minerals of 1539 ppm., and an iron content of 3. 6 ppm.

There are 163 services, 100% metered. Pumpage is reported to average 10, 000 gpd.

Sample study summary and correlated driller's log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, grayish-brown, sandy, gravelly	90	90
Gravel, very coarse; till, sandy, reddish-buff	6	96
Till, sandy, gravelly	19	115
Gravel, slightly sandy, very coarse	10	125
PENNSYLVANIAN SYSTEM		
Shale, gray, light gray, brown, weak to brittle; little dolomite, buff, very fine (195-205); siltstone, gray, brittle (303-355); trace of coal	595	720
DEVONIAN-SILURIAN SYSTEMS		
Limestone, cherty, white, crystalline	492	1212
ORDOVICIAN SYSTEM		
Maquoketa Formation		
"Shale, green, gray; limestone (1303-1305, 1310-1338)"	162	1374
Galena-Platteville Formations		
"Limestone"	368	1742
Glenwood-St. Peter Formations		
"Sandstone"	135	1877
"Greenish-gray shale"	4	1881

2 - Lostant

LABORATORY NO. 133654

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.6		Silica	SiO_2	9.2	
Manganese	Mn	0.0		Fluoride	F	1.4	
Calcium	Ca	80.1	4.01	Boron	B	0.5	
Magnesium	Mg	42.2	3.47	Chloride	Cl	570.	16.07
Ammonium	NH_4	1.9	.11	Nitrate	NO_3	0.2	Tr.
Sodium	Na	428.	18.21	Sulfate	SO_4	225.2	4.69
				Alkalinity (as	$CaCO_3$)	252.	5.04
Turbidity		21		Hardness (as	$CaCO_3$)	374.	7.48
Color		0					
Odor		0		Total Dissolved Minerals		1539.	

MACKINAW
Tazewell County
May 26, 1960

Three wells are in service £or the village of Mackinaw (1163).

All wells drilled prior to 1941 have been abandoned and filled and their numbering has been dropped.

WELLS NO. 1 and 2, drilled in 1941 and 1946, described in Bulletin 40, are in service.

WELL NO. 3 was completed in 1956 to a depth of 41 ft. by Varner Well and Pump Co., now J. P. Miller Artesian Well Co., Brookfield. The well is located about 300 ft. north of Well No. 2 and is cased with 50-in. pipe from the surface to 7 ft. and with 24-in. pipe from the surface to 33. 5 ft. followed by a 30-in. stainless steel Cater-type screen from 33. 5 ft. to 38. 5 ft. The 40-in. hole was gravel packed outside the 30-in. screen and 24-in. casing from 38. 5 ft. to 26 ft. The gravel envelope was 1 ft. thick.

The Driller reported that after 7 hr. pumping at a rate of 185 gpm., the drawdown was 4 ft. from a nonpumping water level of 28 ft. below the top of the casing.

The pumping equipment consists of 29. 5 ft. of column pipe; 9-stage deep well turbine, 10. 5 ft. long, rated at 185 gpm. at 210 ft. T.D.H. An electric motor furnishes the power for pumping.

A mineral analysis of a sample (Lab. No. 152313) collected May 26, 1960 showed the water in Well No. 3 to have a hardness of 36. 6 gr. per gal., total dissolved minerals of 842 ppm., and a trace of iron.

Pumpage for 1957 was reported to average 60,000 gpd.

LABORATORY NO. 152313

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	16.9	
Manganese	Mn	0. 1		Fluoride	F	0. 2	
Calcium	Ca	145. 6	7. 28	Boron	B	0. 1	
Magnesium	Mg	64. 4	5. 30	Chloride	Cl	215.	6. 06
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	18. 3	. 29
Sodium	Na	66.	2. 89	Sulfate	SO_4	107. 8	2. 24
				Alkalinity (as	$CaCO_3$)	344.	6. 88
Turbidity		0		Hardness (as	$CaCO_3$)	629.	12. 58
Color		0					
Odor		0					
Temp. (reported)		53°F		Total Dissolved Minerals		842.	

MACON
Macon County
July 13, 1960

Three wells are in service for the public water supply of the city of Macon (1229).

WELL NO. 1, described in Bulletin 40, was equipped in 1950 with a new Aurora turbine pump, No. 48755, rated at 90 gpm. against 130 ft. T.D.H. A 5-hp. U S electric motor is installed.

WELL NO. 2 was completed in 1949 to a depth of 128 ft. by Woollen Bros., Wapella, and located about 65 ft. northwest of Well No. 1, or approximately 800 ft. N. and 50 ft. W. of the S. E. corner of Section 29, T15N, R2E. The ground surface elevation at the well is 715.

The well was cased with 8-in. pipe from the pump base, 12 in. above the pump house floor, to 118 ft. below ground level, followed by 10 ft. of screen to the bottom of the well. The upper 4 ft, of screen has 0.15-in. slot openings and the lower 6 ft. has 0.25-in. slot openings.

The pumping equipment includes an Aurora turbine pump, rated at 100 gpm. against 135 ft. T.D.H.; 116-ft. air line; 5-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 144786) collected Sept. 27, 1957 showed the water in Well No. 2 to have a hardness of 28. 2 gr. per gal., total dissolved minerals of 715 ppm., and an iron content of 10 ppm.

A partial analysis of a sample (Lab. No. 151964) collected Mar. 31, 1960 showed similar characteristics except the iron content which was 6. 2 ppm.

WELL NO. 3 was completed in July 1960 to a depth of 128 ft. by Layne-Western Co., Kirkwood, Mo., and located 50 ft. south of Well No. 2, or approximately 750 ft. N. and 50 ft. W. of the S. E. corner of Section 29. The well was cased with 16-in. pipe inside a 28-in. hole from the surface to 20 ft. The annulus between the two casings was cemented. An 8-in. casing was set from the surface to 111 ft. followed by an 8-in. Layne stainless steel screen with No. 5 slot openings from 111 to 126 ft. The annulus between the screen and wall of the hole was gravel packed from the bottom of the well to the surface.

A production test was conducted on July 13, 1960 by representatives of the Driller, the State Water Survey, and Caldwell-Rhoads, Consulting Engineers. For test purposes the well was equipped with a 6-stage Layne turbine pump connected to a 7 l/2-hp. Hollowshaft electric motor. An air line was installed.

After 6 hr. pumping at 100 gpm., the drawdown was 19. 6 ft. from a static water level of 87 ft. After 1 hr. the water level had recovered to 86.4 ft. Pumping in Well No. 3 was resumed and after 45 min. at 80 gpm., the drawdown was 12.9 ft.

A partial chemical analysis of a sample (Lab. No. 152746) collected July 13, 1960 showed the water in Well No. 3 to have a hardness of 28. 2 gr. per gal., total dissolved minerals of 735 ppm., and an iron content of 5. 3 ppm.

There are 371 services, all metered but many meters serve two users. Pumpage is reported to average 60,000 gpd.

LABORATORY NO. 144786

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	10.		Silica	SiO_2	29.7	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	116.5	5.83	Boron	B	0.9	
Magnesium	Mg	45.7	3.76	Chloride	Cl	19.	.54
Ammonium	NH_4	10.2	.56	Nitrate	NO_3	38.9	.63
Sodium	Na	66.	2.87	Sulfate	SO_4	42.6	.89
				Alkalinity (as	$CaCO_3$)	548.	10.96
Turbidity		32		Hardness (as	$CaCO_3$)	480.	9.59
Color		45					
Odor		0					
Temp. (reported)		55.5°F		Total Dissolved Minerals		715.	

MAGNOLIA
Putnam County
November 11, 1960

A public water supply was installed in 1951 for the town of Magnolia (245). Water is obtained from one well.

WELL NO. 1 was completed in Nov. 1951 to a depth of 222 ft. by Guy Defenbaugh, Dana, and located in the park on Main St., or approximately 1500 ft. S. and 1500 ft. E. of the N. W. corner of Section 35, T31N, R1W . The ground surface elevation is 670. The well is cased with 8-in. pipe to an unknown depth.

The pumping equipment includes a Myers plunger pump rated at 30 gpm., connected to a 2-hp. electric motor. In Mar. 1960 the well yield was reported to be decreasing.

A mineral analysis of a sample (Lab. No. 153590) collected Nov. 10, 1960 showed the water in Well No. 1 to have a hardness of 18. 8 gr. per gal., total dissolved minerals of 522 ppm., and an iron content of 0. 2 ppm.

There are approximately 72 services and pumpage is estimated to average 11, 000 gpd.

LABORATORY NO. 153590

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	22.6	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	77.3	3.87	Boron	B	0.2	
Magnesium	Mg	31.7	2.61	Chloride	Cl	12.	.34
Ammonium	NH_4	10.9	.60	Nitrate	NO_3	0.9	.01
Sodium	Na	75.	3.27	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	500.	10.00
Turbidity		1		Hardness (as	$CaCO_3$)	324.	6.48
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		522.	

MALTA
DeKalb County
March 3, 1959

The village of Malta (782) has added Well No. 2 to the village supply since publication of Bulletin 40.

New pumping equipment has been installed in WELL NO. 1 and consists of 240 ft. of 3-in. column pipe; 6-in., 9-stage Byron Jackson turbine pump, No. C-338587, having an over-all length of 17 ft. 11 in. and rated at 110 gpm. at 325 ft. T.D.H.; 240 ft. of air line; 15-hp. electric motor.

In Nov. 1958, during pumping at a rate of approximately 140 gpm., the drawdown was 6 ft. from a nonpumping water level of 173 ft. On Mar. 3, 1959 the nonpumping water level was observed at 130 ft.

Well No. 1 is now maintained as a stand-by unit.

WELL NO. 2 was completed in 1952 to a depth of 1254 ft. by Varner Well and Pump Co., Dubuque, Iowa, and located about 375 ft. E. of Well No. 1, or approximately 2250 ft. S. and 1600 ft. E. of the N. W. corner of Section 23, T40N, R3E. The ground surface elevation at the well is 915.

The hole and casing record is shown in Table A.

During the drilling operations the water levels in the well were reportedly as shown in Table B.

A production test was conducted on Oct. 21, 1952 by representatives of the Drilling Contractor, the State Water Survey, and S. W. Knetsch and Associates, Consulting Engineers. For test purposes the well was equipped with a shaft driven Peerless vertical turbine pump with power furnished from a Buda gasoline engine. The top of the bowl section was 270 ft. below the top of the casing and the bottom of the suction pipe was set at approximately 290 ft. An air line, 271 ft. long, was installed for measuring water levels. After 8 l/2 hr. pumping at rates gradually increased from 215 to 375 gpm., the drawdown was 56 ft. from a static water level of 147 ft. below the top of the casing. Thirty-five min. after the pump was stopped, the water level had recovered to 158 ft.

A complete mineral analysis of a sample (Lab. No. 130237) collected Oct. 21, 1952, after 8 l/2 hr. pumping at 370 gpm., showed the water in Well No. 2 to have a hardness of 10 gr. per gal., total dissolved minerals of 245 ppm., and an iron content of 0. 3 ppm.

Pumpage is estimated to average 350, 000 gpd.

TABLE A

Hole Record

20-in. from surface to 229 ft.
19 1/4-in. from 229 to 530 ft.
13 l/4-in. from 530 to 1254 ft.

Casing Record

20-in. od. from +2 ft. to 229 ft.
14-in. od. from +2 ft. to 530 ft.
The annulus between the casings was pressure grouted with 175 barrels of cement from 530 ft. to the top of the casings.

TABLE B

Depth of Well ft.	Depth to Water ft.
474	0
645	125
657	141
1069	140
1193	144
1254	141

LABORATORY NO. 130237

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	8.5	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	36.8	1.84	Chloride	Cl	1.	.03
Magnesium	Mg	21.0	1.72	Nitrate	NO_3	0.6	.01
Ammonium	NH_4	0.3	.02	Sulfate	SO_4	2.9	.06
Sodium	Na	27.	1.16	Alkalinity (as	$CaCO_3$)	232.	4.64
Turbidity		5		Hardness (as	$CaCO_3$)	178.	3.56
Color		0					
Odor		0					
Temp. (reported)		53°F		Total Dissolved Minerals		245.	

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, sandy, pale pinkish brown	215	215
Sand and gravel, silty, yellowish brown	5	220
Sand and little fine gravel, silty, gray; soil at top, silty, sandy, dark brown wood fragments	15	235
ORDOVICIAN SYSTEM		
Galena Formation		
Dolomite, yellow to light yellowish gray, fine to coarse	100	335
Platteville Formation		
Dolomite, pale yellowish brown, fine to coarse	135	470
Glenwood Formation		
Sandstone, pale grayish brown, fine to very coarse, incoherent	10	480
Dolomite, sandy, gray, very fine; sandstone at top, very fine to coarse, incoherent	35	515
Sandstone, gray, very fine to coarse, incoherent	10	525
St. Peter Formation		
Sandstone, bray, light pinkish gray, fine to coarse, incoherent	340	865
Dolomite, sandy, gray; sandstone as above	20	885
Sandstone, cherty, silty, pink, fine to very coarse, mostly incoherent	25	910
Chert, white, dense; shale, reddish pink, weak to firm; sandstone light gray, fine to very coarse	10	920
Sandstone, cherty, pink, fine to very coarse; little shale, reddish pink, weak	15	935
Chert, white, dense; quartz	20	955
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, light yellowish gray, fine to medium	15	970
Franconia Formation		
Sandstone, reddish pink, fine to coarse, incoherent to compact, dolomite, reddish pink, fine to medium; little shale, red, firm to weak; little dolomite	90	1060
Ironton Formation		
Sandstone, yellowish gray to pinkish gray, fine to very coarse, incoherent	170	1230
Eau Claire Formation		
Sandstone, yellowish gray, fine to coarse, incoherent; dolomite, grayish brown, fine to coarse	15	1245
Shale, grayish brown, weak to firm; little dolomite, grayish brown, fine to medium; little sandstone as above	8	1253

Water for the village of Manlius (374) is obtained from one well (No. 2).

WELL NO. 1, described in Bulletin 40, has been maintained for stand-by use for several years.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Loam, sandy	4	4
Clay, yellow	10	14
Clay, blue	161	175
Sand; water	50	225

WELL NO. 2 was completed in 1950 to a depth of 268 ft. by Albrecht and Sons, Ohio, and located 15 ft. east of Well No. 1, or approximately 1180 ft. N. and 1155 ft. W. of the S. E. corner of Section 15, T17N, R7E. The ground surface elevation at the well is 703. The well was cased with 8-in. pipe from the surface to 228 ft. followed by 20 ft. of 6-in. blank pipe and 20 ft. of 6-in. screen to the bottom of the well at 268 ft.

The permanent pump is an Aurora turbine rated at 135 gpm., connected to a 15-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 153662) collected Nov. 23, 1960 showed the water in Well No. 2 to have a hardness of 20 gr. per gal., total dissolved minerals of 411 ppm., and an iron content of 1.9 ppm.

There are 143 services. Pumpage is reported to average 50, 000 gpd.

LABORATORY NO. 153662

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Silica	SiO_2	25.2	
Manganese	Mn	0.3		Fluoride	F	0.2	
Calcium	Ca	96.1	4.81	Boron	B	0.1	
Magnesium	Mg	33.9	2.79	Chloride	Cl	0.	.00
Ammonium	NH_4	1.0	.06	Nitrate	NO_3	0.7	.01
Sodium	Na	7.	.30	Sulfate	SO_4	1.2	.03
				Alkalinity (as	$CaCO_3$)	396.	7.92
Turbidity		24		Hardness (as	$CaCO_3$)	380.	7.60
Color		0					
Odor		0					
Temp. (reported)		54.2°F		Total Dissolved Minerals		411.	

MAPLE HILL
IMPROVEMENT ASSOCIATION
DuPage County
November 26, 1960

A public water supply was installed in 1939 for the Maple Hill Improvement Association (est. 175).

WELL NO. 1 was completed in 1939 to a depth of 117 ft. by a Mr. Strong of Downer s Grove, and located just west of Downers Grove, or approximately 5 ft. S. and 650 ft. W. of the N. E. corner of Section 13, T38N, R10E. The ground surface elevation at the well is 748. The well was cased with 6-in. pipe from the surface to 80 ft., below which the hole was finished 6 in. in diameter.

The pumping equipment consists of 98 ft. of 3 l/4-in. discharge pipe; Deming reciprocal pump, No. 58829, with a 10-in. stroke and rated at 1400 gal. per hr. at 205 ft. T.D.H.; 3-hp. Century electric motor.

On July 3, 1958 the nonpumping water level was 94 ft.

Well No. 1 is maintained for emergency use only.

WELL NO. 2 was completed in 1954 to a depth of 158 ft. by DuPage Pump Sales Co., and located 10 ft. south of Well No. 1. The well was cased with 6-in. pipe to an unreported depth.

The pumping equipment consists of 140 ft. of 2-in. discharge pipe; 10-stage Reda submersible pump, rated at 43 gpm. at 205 ft. T.D.H.; 3-hp. electric motor.

On July 3, 1958, when pumping at 150 gpm. for 1/2 hr., the drawdown was 8 ft. from a nonpumping water level of 94 ft.

A mineral analysis of a sample (Lab. No. 153759) collected Nov. 26, 1960 showed the water in Well No. 2 to have a hardness of 26.4 gr. per gal., total dissolved minerals of 574 ppm., and an iron content of 7. 4 ppm.

There are 50 services. Pumpage is estimated to average 9000 gpd.

LABORATORY NO. 153759

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	7.4		Silica	SiO_2	10.4	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	101.0	5.05	Boron	B	0.1	
Magnesium	Mg	48.0	3.95	Chloride	Cl	30.	.85
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	9.1	.15
Sodium	Na	21.	.90	Sulfate	SO_4	147.7	3.07
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		7		Hardness (as	$CaCO_3$)	450.	9.00
Color		0					
Odor		0					
Temp. (reported)		51°F		Total Dissolved Minerals		574.	

MARENGO
McHenry County
April 30, 1958

One well is in service for the public water supply of the city of Marengo (3568).

WELL NO. 1 was reported in Bulletin 40 as abandoned and filled.

WELL NO. 2, described in Bulletin 40 as the shallow dug well constructed about 1938, has been retired and is maintained for emergency use only.

WELL NO. 3, formerly belonging to Borden Milk Co., was purchased by the city about 1955 or 1956. The well was drilled in 1951 to a depth of 1028 ft. by Varner Well Co., Dubuque, Iowa, and located on North Sponable St. south of West Railroad St., or approximately 960 ft. S. and 1540 ft. W. of the N. E. corner of Section 35, T44N, R5E. The ground surface elevation at the well is 815. The well was cased with 26-in. pipe from the surface to 70 ft., with 18-in. pipe from the surface to 182 ft., and with 12-in. pipe from the surface to 538 ft. (cemented in). Below 538 ft. the hole was finished 12 in. in diameter to the bottom. When the well was completed the static water level was 91 ft. below the top of the casing (4 ft. above L. S. D.).

The pumping equipment consists of 270 ft. of column pipe; Layne and Bowler turbine pump (No. 23294); 270 ft. of air line; 50-hp. Louis Allis electric motor.

On Apr. 30, 1958, when pumping at 300 gpm., the drawdown was 61 ft. from a nonpumping water level of 116 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 127064) collected Nov. 27, 1951 showed the water in Well No. 3 to have a hardness of 18.2 gr. per gal., total dissolved minerals of 320 ppm., and an iron content of 0. 7 ppm.

Pumpage from Mar. 1, 1957 through April 1958 averaged 71, 000 gpd.

LABORATORY NO. 127064

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Silica	SiO_2	10.7	
Manganese	Mn	0.2		Fluoride	F	0.3	
Calcium	Ca	70.3	3.52	Chloride	Cl	1.	.03
Magnesium	Mg	33.1	2.72	Nitrate	NO_3	0.4	.01
Ammonium	NH_4	0.5	.03	Sulfate	SO_4	0.0	.00
Sodium	Na	8.	.33	Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		2		Hardness (as	$CaCO_3$)	312.	6.24
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		320.	

Summary sample study log of City WELL NO. 3, formerly Borden Milk Co. well, furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SYSTEM		
Soil, sandy, dark brown	2	2
Till, sandy, gravelly, yellowish brown	33	35
Sand, silty, yellowish brown	35	70
Sand and gravel, clean, yellowish brown	15	85
Sand, silty, yellowish brown	5	90
Till, sandy, gravelly, grayish brown	100	190
ORDOVICIAN SYSTEM		
Galena Formation		
Dolomite, yellowish gray, fine to medium, crystalline; chert, white at base	170	360
Decorah Formation		
Dolomite, light gray, very fine to medium, crystalline	15	375
Platteville Formation		
Dolomite, greenish gray, buff, very fine to fine	110	485
Glenwood Formation		
Dolomite, light yellowish gray, some green, very fine to fine	35	520
Sandstone, white, medium to very coarse, incoherent	120	640
St. Peter Formation		
Sandstone, white, fine to coarse, incoherent; chert white, reddish brown at base	65	705
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, very sandy, weak; chert, white; sandstone, white, fine to coarse	10	715
Franconia Formation		
Dolomite, white buff to pinkish buff, very fine to fine; sandstone, buff to reddish buff, cemented to incoherent	110	825
Ironton Formation		
Sandstone, white to pinkish, fine to very coarse, subrounded, incoherent	130	955
Galesville Formation		
Sandstone, white, fine to medium some coarse well sorted; little dolomite cemented at base	65	1020
Eau Claire Formation		
Sandstone, white, red, fine to coarse; shale, red, light gray, weak	8	1028

MARTINTON
Iroquois County
June 23, 1960

A water supply was installed in 1959 for the village of Martinton (314). Water is obtained from one well.

WELL NO. 1 was completed in May 1959 to a depth of 265 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at the east end of Thomas St., or approximately 930 ft. S. and 1680 ft. E. of the N. W. corner of Section 16, T28N, R12W. The ground surface elevation at the well is 630. The well was cased with 10-in. steel pipe to limestone at 148 ft., below which the hole was finished 10 in. in diameter.

The Driller reported that on May 8, 1959. when pumping for 8 hr. at 530 gpm. with test pumping equipment, the drawdown was 13 ft. from a nonpumping water level of 9 ft. below the surface.

A partial analysis of a sample (Lab. No. 149533) collected May 8, 1959 showed the water in Well No. 1 to have a hardness of 15 gr. per gal., total dissolved minerals of 387 ppm., and an iron content of 1. 4 ppm.

The permanent pumping equipment includes a Peerless turbine rated at 280 gpm. connected to a 15-hp. U S electric motor.

Pumpage is estimated to average 15, 000 gpd.

LABORATORY NO. 149533

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	0.4	
Manganese	Mn	Tr.		Chloride	Cl	35.	.99
				Nitrate	NO_3	0. 1	Tr.
				Alkalinity (as	$CaCO_3$)	324.	6.48
Turbidity		10		Hardness (as	$CaCO_3$)	256.	5.12
Color		0					
Odor		0		Total Dissolved Minerals		387.	

WELL NO. 1 of the Matteson (3225) public water supply has been equipped, since publication of Bulletin 40, with a new Pomona turbine pump of 350 gpm. capacity and with power from a 25-hp. General Electric motor. This installation was made in 1950.

WELL NO. 2 was completed for the village supply in 1956. It was drilled to a depth of 300 ft. by Wehling Well Works, Beecher, and located 1430 ft. S. and 100 ft. E. of the N. W. corner of Section 26, T35N, R13E, nearly l/2 mile southwest of Well No. 1. The ground elevation at the well is 700. The well was cased with 92 ft. of extra heavy wi. pipe, below which the bore hole was finished at 11 3/4 in. in diameter to the bottom at 300 ft.

In a production test by the Driller in May 1956, water was pumped for 10 hr. at a rate of 650 gpm. with a drawdown of 25 ft. from a static level of 20 ft. below the surface.

On May 15, 1958, after 5 min. pumping at 580 gpm., the drawdown was 6 ft.

The permanent pumping equipment installed about May or June 1956, includes a Pomona turbine pump, No. 484537, and a 40-hp. Fairbanks-Morse electric motor. An air line is installed but the length is not known.

A mineral analysis of a sample (Lab. No. 146780) collected May 15, 1958, after 5 min. pumping at a rate of 580 gpm., showed the water in Well No. 2 to have a hardness of 27.2 gr. per gal., total dissolved minerals of 661 ppm., and an iron content of 0. 5 ppm.

Pumpage from Mar. 6 to Dec. 31, 1957 inclusive, averaged 106, 300 gpd.

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES (no samples 0-90')		
"Black dirt"	3	3
"Clay"	12	15
"Gravel and clay"	10	25
"Clay, gravel & boulder"	21	46
"Gravel & stones, little clay"	22	68
"Gravel"	20	88
SILURIAN SYSTEM		
Niagaran Series		
"Rock"	2	90
Dolomite, very silty, gray to greenish gray, buff, very fine to fine granular, partly crystalline	80	170
Limestone, slightly silty, white to light gray, very fine granular, partly extra fine, crystalline	55	225
Dolomite, slightly silty, partly cherty, buff, white to light gray, very fine, granular	75	300

LABORATORY NO. 146780

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	13.1	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	108.6	5.43	Boron	B	0.5	
Magnesium	Mg	47.3	3.89	Chloride	Cl	1.	.03
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.2	.04
Sodium	Na	37.	1.59	Sulfate	SO_4	263.7	5.48
				Alkalinity (as	$CaCO_3$)	268.	5.36
Turbidity		4		Hardness (as	$CaCO_3$)	466.	9.32
Color		0_					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		661.	

MAY STREET
SUBDIVISION
Will County
October 10, 1958

A public water supply was installed about 1946 for the May Street Subdivision (est. 300). Two wells are in service, each pumping into the two interconnected distribution systems. The systems are owned and operated by the May Street Water Association.

WELL NO. 1 (May St.) was completed in 1946 to a depth of 165 ft. by J. P. Miller Artesian Well Co., Brookfield, and located on the east side of May St. between Nobes and Dellwood St., or approximately 1850 ft. S. and 680 ft. E. of the N. W. corner of Section 35, T36N, R10E. The ground surface elevation at the well is 638. The well was cased with 6-in. pipe into limestone at an unreported depth, and equipped with a Reda Red Jacket submersible pump, rated at 30 gpm. and powered by a 1 l/2-hp. electric motor.

A partial chemical analysis of a sample (Lab. No. 147931) collected Oct. 10, 1958 showed the water to have a hardness of 39 gr. per gal., total dissolved minerals of 861 ppm., and an iron content of 0. 7 ppm.

There are 42 services in this system, none metered, but serving the entire population.

WELL NO. 2 (Nobes St.) was completed in 1948 to a depth of 200 ft. by Dreher and Schorie, Joliet, and located on the south side of Nobes St. between May and Brassel St., about 350 ft. northeast of Well No. 1, or approximately 1660 ft. S. and 990 ft. E. of the N. W. corner of Section 35. The ground surface elevation is 639. The well was cased into limestone at an unreported depth. When the well was completed the static water level was 62 ft. below the ground surface.

The well is equipped with a Reda Red Jacket submersible pump rated at 30 gpm., and powered by a 1 l/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 147932) collected Oct. 10, 1958 showed the water to have a hardness of 46. 5 gr. per gal., total dissolved minerals of 991 ppm., and an iron content of 1. 9 ppm.

There are 43 services on this system, none metered, but serving all the population.

Pumpage from the two distribution systems is estimated to average 18, 000 gpd.

LABORATORY NO. 147932

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1,9		Silica	SiO_2	18.2	
Manganese	Mn	0.3		Fluoride	F	0,1	
Calcium	Ca	156.0	7.80	Boron	B	0.0	
Magnesium	Mg	99.7	8.20	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.4	.02
Sodium	Na	7.	.31	Sulfate	SO_4	426.2	8.87
				Alkalinity (as	$CaCO_3$)	364.	7.28
Turbidity		5		Hardness (as	$CaCO_3$)	800.	16.00
Color		0					
Odor		0		Total Dissolved Minerals		991.	

MEADOWDALE SUBDIVISION
Kane County
April 23, 1958

Three wells are in service for the public water supply of Meadowdale Subdivision (est. 3400) located near Carpentersville. The system is owned and operated by the Meadowdale Corporation.

WELL NO. 1 was completed in 1955 (?) to a depth of 247 ft. for L. W. Besinger & Associates, Subdivision Developers, and located about 1 1/2 miles east of Carpentersville, or approximately 1450 ft. N. and 1600 ft. E. of the S. W. corner of Section 13, T42N, R8E. The ground surface elevation at the well is 900. The well was cased with 12-in. pipe from the surface to 210 ft. penetrating limestone. The Engineer later reported measuring the well depth at 200 ft.

When the well was completed the Driller reported pumping for 18 hr. at a rate of 125 gpm. with a drawdown of 20 ft. from a static water level of 145 ft. below the pump base.

The permanent pumping equipment consists of 170 ft. of 6-in. column pipe; 8-in., 10-stage Layne turbine pump, No. 34307, rated at 350 gpm. at 292 ft. T.D.H.; 10 ft. of suction pipe; 170 ft. of air line; 30-hp. U S electric motor.

WELL NO. 2 consists of 45 well points of 1 1/2 in. in diameter each and spaced 15 ft. apart. These were jetted-in in 1954 by the owners. The points are located in the subdivision close to the Fox River, The well points are not in service and reportedly there are no plans for their future use.

WELL NO. 3 was completed in Oct. 1955 to a depth of 72 ft. by Layne-Western Co., Aurora, for the owners, L. W. Besinger & Associates. The well is located northeast of Carpentersville, or approximately 1500 ft. S. and 400 ft. W. of the N. E. corner of Section 15. The ground surface elevation at the well is 800. The well was cased with 16-in. pipe from the surface to 52 ft. followed by 20 ft. of 16-in. Layne shutter screen. The annulus outside the screen was gravel packed.

A production test was reported by the Driller as of Oct. 18, 1955. After 8 hr. pumping at a rate of 1223 gpm., the drawdown was 21 ft. from a static water level of 18 ft. below the pump base.

The permanent pumping equipment consists of 45 ft. of 8-in. column pipe; 8 stages of Layne turbine pump, No. 31881, rated at 1000 gpm. at 325 ft. T.D.H.; 50 ft. of air line; 100-hp. U S electric motor.

WELL NO. 4 was completed in Feb. 1957 to a depth of 177 ft. by Layne-Western Co. for L. W. Besinger & Associates.

Summary sample study log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown, gravelly	27	27
Gravel, granule to pebble size; sand coarse to very coarse	22	49
Silt, light chocolate brown; granule gravel	5	54
Sand, medium to coarse; some yellow silt and granule gravel	6	60
Silt, light chocolate brown, platy	43	103
Sand, coarse to medium; granule gravel	17	120
Till, yellowish brown, silty; granule gravel	5	125
Gravel, granule to pebble; some medium to very coarse sand	24	149
Till, yellowish brown	3	152
Gravel, granule to pebble; sand	13	165
Sand, medium to very coarse; subangular, much chert and dolomite	5	170
Sand, fine to medium; some gravel and silt	5	175
Sandstone, quartzitic (boulder?) at		175

The well is located 1230 ft. west of the center line of Route 25 and 70 ft. south of the center line of the Lake Marion Road, or approximately 1450 ft. S. and 1230 ft. W. of the N. E. corner of Section 14. This location is about 1 mile west of Well No. 3. The ground surface elevation at the well is 870.

The well was cased from the surface to 157 ft. with 18-in. steel pipe with welded joints,

followed by 20 ft. of Armco iron shutter screen with No. 5 slot openings. The 8-in. annulus outside the screen was packed with 15 cu. yd. of pea gravel.

A production test was conducted by the Driller on Feb. 19, 1957, using a Layne test turbine set at 130 ft. An air line 130 ft. long was installed. Power was furnished by a Continental engine. After 8 hr. pumping at a rate of 1100 gpm., the drawdown was 11 ft. from a static water level of 69 ft. below the surface.

The permanent pumping equipment consists of 110 ft. of 10-in. column pipe; 15-in., 3-stage Layne turbine pump, No. 36704, rated at 1800 gpm.; 110 ft. of air line;150-hp. General Electric motor. Also installed for auxiliary power, is a Johnston right angle gear drive, No. 27764, connected to an 8-cylinder Chrysler engine.

On Apr. 23, 1958, during pumping at 1800 gpm., the drawdown was 17 ft. from a nonpumping water level of 84 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 146387) collected Apr. 23, 1958 showed the water in Well No. 4 to have a hardness of 23.6 gr. per gal., total dissolved minerals of 448 ppm., and an iron content of 1. 8 ppm.

Pumpage for the subdivision for Apr. 1958 was principally from Well No. 4 and averaged 630,000 gpd.

LABORATORY NO. 146387

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	19.0	
Manganese	Mn	0.1		Fluoride	F	0.3	
Calcium	Ca	87.4	4.37	Boron	B	0.0	
Magnesium	Mg	44.8	3.68	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.7	.01
Sodium	Na	6.	.27	Sulfate	SO_4	60.7	1.26
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		13		Hardness (as	$CaCO_3$)	403.	8.05
Color		0					
Odor		0					
Temp. (reported)		50.9°F		Total Dissolved Minerals		448.	

MELVIN
Ford County
July 29, 1959

Two wells are in service for the village of Melvin (559).

WELL NO. 1, described in Bulletin 40, was abandoned about 1950.

WELL NO. 2 was described in Bulletin 40 as being a failure.

WELL NO. 3, described in Bulletin 40, is maintained for emergency service by being pumped about once a week.

WELL NO. 4 was completed in June 1954 to a depth of 260 ft. by J. Bolliger and Sons, Fairbury, and located about 12 ft. south of Well No. 1, or approximately 1300 ft. S. and 1700 ft. E. of the N. W. corner of Section 1, T24N, R8E. The ground surface elevation at the well is 805. The well is cased with 242 ft. of 8-in. pipe followed by 20 ft. of 8-in. Johnson Everdur screen having No. 12 slot openings.

A production test was conducted on June 9, 1954 by representatives of the Driller and the State Water Survey. After 5 1/2 hr. pumping at 153 gpm., the drawdown was 13 ft. from a non-pumping water level of 118 ft. Ten min. after the pump was stopped, the water level had recovered to 118 1/2 ft.

There are 240 services and pumpage is estimated to average 45, 000 gpd.

Five wells are in service for the public water supply of the city of Metropolis (7339).

WELL NO. 1 (old well) is described in Bulletin 40. The present pumping equipment reportedly consists of 70 ft. of column pipe; 5-stage Worthington turbine pump, rated at 650 gpm.; 10 ft. of suction pipe; 25-hp. electric motor.

WELL NO. 2 (new well) is described in Bulletin 40. The present pumping equipment reportedly consists of 100 ft. of 8-in. column pipe; 9-stage Worthington turbine pump, 9 ft. 11 in. long and rated at 1000 gpm.; 20 ft. of suction pipe; 40-hp. electric motor.

WELL NO. 3 was completed in July 1950 to a depth of 286 ft. by Diehl Pump and Supply Co., Louisville, Ky., and located east of the municipal electric plant, about 180 ft. southwest of Well No. 2, or approximately 800 ft. S. and 1000 ft. W. of the N. E. corner of Section 11, T16S, R4E. The elevation of the ground surface at the well is 3 10. The well is cased with 12-in. steel pipe to limestone at 261 ft., below which the hole was finished at 12 in. in diameter.

The well is equipped with a Cook turbine pump, rated at 1800 gpm.; 180 ft. of l/4-in. air line; 40-hp. electric motor.

A mineral analysis of a sample (Lab. No. 145940) collected Mar. 4, 1958 showed the water in Well No. 3 to have a hardness of 12. 3 gr. per gal., total dissolved minerals of 233 ppm., and an iron content of 0. 3 ppm.

WELL NO. 4 (Metropolis Ice and Fuel Co. Well) was put in service for the city as an auxiliary supply in the summer of 1952. The well was formerly owned by the C. I. P. S. and is now the property of Walter Owens, operator of the Metropolis Ice and Fuel Co. The well was reportedly drilled to a depth of 400 ft. at the south edge of town just east of the main street running through the old business section. The well is casedwith 8-in. pipe from 4 ft. above ground level.

The pumping equipment includes a Pomona turbine pump, rated at 600 gpm., and a 40-hp. electric motor.

WELL NO. 5 (Hospital Well) was completed inMayl955 to a depth of 400 ft. by Layne-Western Co., Kirkwood, Mo., and located about 1 1/2 miles northwest of Well No. 2, about 100 yards north of U. S. Highway 45 near the Massac Memorial Hospital, or approximately 1200 ft. N. and 1750 ft. E. of the N. W. corner of Section 35, T15S, R4E. The elevation of the ground surface at the well is 360. The well was cased with 16-in. welded pipe from the surface to 243 ft. 4 in.; with 12-in. threaded and coupled pipe from the surface to 335 ft., and with 10-in. threaded and coupled pipe from 308 ft. to 398 ft., the bottom 66 ft. being slotted. The annulus between the 16-in. and 12-in. casings was pressure grouted with 205 sacks of cement. During the drilling, the first static water level was 58 ft. below the surface. After bailing and surging to develop the well the static water level was 35 ft.

A production test was conducted on May 16, 1955 by representatives of the Driller, the State Water Survey, and J. W. Blankenship, Consulting Engineer. For the test the well was equipped with a Layne turbine test pump set at 160 ft. and powered by a gasoline engine. An air line, 159 ft. in length, was in place. After 6 hr. pumping at a rate of 305 gpm., the drawdown was 54 ft. from a static water level of 35 ft. below the top of the casing. Within 5 min. after the test was stopped, the water level had recovered to 39 ft.

A partial chemical analysis of a sample (Lab. No. 137686) collected May 16, 1955, after 6 hr. pumping at a rate of 300 gpm., showed the water in Well No. 5 to have a hardness of 12.9 gr. per gal., total dissolved minerals of 266 ppm., turbidity of 346 ppm., and an iron content of 11 ppm.

The permanent pump installation includes a Fairbanks-Morse turbine pump, rated at 500 gpm.; an air line of unreported length; 60-hp. Fairbanks-Morse electric motor.

Pumpage in 1958 averaged 800, 000 gpd.

2 - Metropolis

LABORATORY NO. 145940

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	10.9	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	67.0	3.35	Boron	B	0.0	
Magnesium	Mg	10.9	.90	Chloride	Cl	8.	.23
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.1	Tr.
Sodium	Na	2.	.10	Sulfate	SO_4	17.3	.36
				Alkalinity (as	$CaCO_3$)	188.	3.76
Turbidity		1		Hardness (as	$CaCO_3$)	213.	4.25
Color		5					
Odor		0					
Temp. (reported)		59°F		Total Dissolved Minerals		233.	

MILAN
Rock Island County
May 5, 1959

The village of Milan (3065) has three wells. Wells No. 1 and 2 pump into the old reserve tank and Well No. 3 furnishes the principal supply.

WELLS NO. 1 and 2, described in Bulletin 40, are maintained for emergency use only. New pumping equipment was installed in Well No. 2 about Nov. 1956, consisting of 210 ft. of 5-in. column pipe; 7 l/2-in., 14-stage American Well Works turbine pump, rated at 120 gpm. and having an over-all length of pump and column of 225 ft.; 210 ft. of l/4-in. air line; 15-hp. electric motor.

In Nov. 1956, after 3 hr. pumping at 115 gpm., the drawdown was reportedly 200 ft. from a nonpumping water level of 25 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 149618) collected May 5, 1959 showed the water in Well No. 2 to have a hardness of 20.4 gr. per gal., total dissolved minerals of 399 ppm., and an iron content of 4. 2 ppm.

WELL NO. 3 was completed in Oct. 1954 to a depth of 453 ft. by Quad City Drilling Co., Milan, and located on U. S. Highway 67 south of town about 1 mile south of Well No. 2, or approximately 650 ft. S. and 590 ft. W. of the N. E. corner of Section 26, T17N, R2W. The ground surface elevation at the well is 600. The well was cased with 12-in. pipe from the surface to 49 ft. 10 in. and 10-in. pipe from the surface to 159 ft. 11 in. The bore hole was finished 12 in. in diameter to 260 ft. and 10 in. in diameter from 260 to 453 ft. at the bottom of the hole. The annulus outside the 10-in. casing was packed and cemented from the bottom of the casing to the surface.

A production test was conducted on Jan. 25-26, 1955 by representatives of the Driller, the State Water Survey, and Interstate Engineering Co. For the test, a 7 l/2-in., 13-stage Peerless turbine pump was set at 310 ft. and belt-driven from a Red Seal gasoline engine. After 12 hr. pumping at a rate of 310 gpm., the drawdown was 33. 4 ft. from a nonpumping water level of 74.1 ft. below the top of the casing (1.2 ft. above ground level). One hr. after pumping was stopped, the water level had recovered to 86. 5 ft.

The permanent pumping equipment consists of 5-in. column pipe; 5 l/4-in., 8-stage Fairbanks-Morse turbine pump, PT1202, rated at 250 gpm.; 127 ft. of l/4-in. air line; 30-hp. electric motor.

A mineral analysis of a sample (Lab. No. 149562) collected May 5, 1959 showed the water in Well No. 3 to have a hardness of 19. 8 gr. per gal., total dissolved minerals of 385 ppm., and an iron content of 0. 3 ppm.

Pumpage for a 6-mo. period in 1958 was estimated to average 288, 000 gpd.

LABORATORY NO. 149562

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 3		Silica	SiO_2	17. 2	
Manganese	Mn	Tr.		Fluoride	F	0. 1	
Calcium	Ca	81. 1	4. 05	Boron	B	0. 1	
Magnesium	Mg	33. 7	2. 77	Chloride	Cl	5.	.14
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3. 4	.05
Sodium	Na	15.	.65	Sulfate	SO_4	3. 7	.08
				Alkalinity (as	$CaCO_3$)	360.	7. 20
Turbidity		3		Hardness (as	$CaCO_3$)	341.	6. 82
Color		10					
Odor		H_2S (at well)					
Temp. (reported)		54. 5°F		Total Dissolved Minerals		385.	

MISSISSIPPI PALISADES
STATE PARK
Carroll County
September 25, 1957

Water for the Mississippi Palisades State Park is obtained from three wells and one spring, located in the three sections of the Park.

MAIN SECTION

WELL NO. 1 was completed to a depth of 285 ft. in 1933 by Davis and Blackman, Preston, Iowa, and located approximately 1050 ft. N. and 430 ft. E. of the S. W. corner of Section 27, T25N, R3E. The ground elevation at the well is 655. The well was cased with 6-in. pipe to 84 ft. 10 in. and finished as a 6-in. hole to the bottom.

The well was equipped with a Fairbanks-Morse cylinder pump with power from a 2-hp. Fairbanks-Morse electric motor.

A partial analysis of a sample (Lab. No. 88745) collected Aug. 22, 1940 showed the water in this well to have a hardness of 17. 6 gr. per gal., total dissolved minerals of 316 ppm., and an iron content of 0. 5 ppm.

Well No. 1 in the Main Section was abandoned and sealed in 1951, according to a State Department of Public Health report.

WELL NO. 2 was completed to a depth of 515 ft. in 1935 by C. H. Coad and Son, Apple River, and is located in the easterly portion of the Section on a hill, approximately 2150 ft. N. and 150 ft. W. of the S. E. corner of Section 33, T25N, R3E. The ground surface elevation at the well is 830. The casing record is not available.

The well is equipped with a Deming cylinder pump, connected to a 4-hp. General Electric motor.

A partial analysis of a sample (Lab. No. 88746) collected Aug. 22, 1940 showed this water to have a hardness of 16.1 gr. per gal., total dissolved minerals of 306 ppm., and an iron content of 0. 1 ppm.

Well No. 2 is in service. Water is pumped into a small concrete collecting reservoir from which it flows by gravity to lower sections of the Park.

WELL NO. 3 was completed to a depth of 560 ft. in Oct. 1951 by Varner Well Co., Dubuque, Iowa, and located about 17 ft. east of old Well No. 1, approximately 1050 ft. N. and 450 ft. E. of the S. W. corner of Section 27. The well was cased with 10-in. pipe from 1 ft. above to 53 ft. below the surface and with 6-in. pipe from 1 ft. above to 266 ft. below the surface. The annulus between the casings was cement grouted.

Sample study summary log of WELL NO. 3, Main Section, furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Silt, sandy, yellowish orange	40	40
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, grayish green, some pink, weak; dolomite, dark yellowish gray, green, fine to medium	195	235
Galena Formation		
Dolomite, yellowish brown, fine	220	455
Decorah Formation		
Dolomite, sandy, gray to pale yellowish brown, fine to coarse	35	490
Platteville Formation		
Dolomite, pale grayish brown, fine to coarse	70	560

A production test was conducted on Oct. 22-23, 1951 by representatives of the Driller, the State Water Survey, and the State Department of Architecture and Engineering. For test purposes the well was equipped with a Peerless Hi-Lift turbine pump, set at 145 ft. below the top of the casing. Power was from a U S electric motor. After 24 hr. pumping at a rate of 40 gpm., the drawdown was 24 ft. from a nonpumping water level of 50 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 126751) collected Oct. 23, 1951, after 24 hr. pumping at 40 gpm., showed the water in Well No. 3 to have a hardness of 16. 5 gr. per gal., total dissolved minerals of 287 ppm., and an iron content of 0. 5 ppm.

The well is equipped with a Peerless turbine pump, rated at 25 gpm., connected to a 7

1/2-hp. electric motor.

Well No. 3 is in service.

NORTH SECTION

WELL NO. 1 was completed, according to the State Department of Public Health, in 1940 to a depth of 445 ft. by J. P. Miller Artesian Well Co., Brookfield, and located near the center of the cabin area. The well was cased with 6-in. pipe to 387 ft., below which the hole was finished 6 in. in diameter to the bottom.

Pumping equipment includes a Fairbanks-Morse Pomona turbine connected to a 2-hp. electric motor.

MILLERS HOLLOW SECTION

Water is obtained from springs located approximately 1050 ft. N. and 900 ft. W. of the S. E. corner of Section 28, T25N, R3E.

A short partial analysis of a sample (Lab. No. 104677) collected Oct. 25, 1945 showed the water from one of the springs to have a hardness of 19 gr. per gal., total dissolved minerals of 374 ppm., and a trace of iron.

LABORATORY NO. 126751

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	12.3	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	54.9	2.75	Chloride	Cl	3.	.08
Magnesium	Mg	34.3	2.82	Nitrate	NO_3	Tr.	Tr.
Ammonium	NH_4	0.1	.01	Sulfate	SO_4	2.1	.04
Sodium	Na	7.	.30	Alkalinity (as	$CaCO_3$)	288.	5.76
Turbidity		2		Hardness (as	$CaCO_3$)	279.	5.57
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		287.	

Two wells are in service for the village of Montgomery (2122).

WELL NO. 1 is described in Bulletin 40. The well has been maintained only as a stand-by unit since 1958.

WELL NO. 2 was completed in 1949 to a depth of 718 ft. by Layne-Western Co., Aurora, and located south of Well No. 1, or approximately 1825 ft. N. and 1460 ft. W. of the S. E. corner of Section 32, T38N, R8E. The ground surface elevation at the well is 642.

The well was cased with 20-in. pipe from the surface to 25 ft., with 18-in. pipe from the surface to 200 ft., and with 14-in. pipe from the surface to 221 ft. Below this depth the diameter of the hole was not reported.

The pumping installation consists of 250 ft. of column pipe; Aurora turbine pump, No. 44635 (?), rated at 240 gpm. against 280 ft. T.D.H.; 250 ft. of air line; 25-hp. U S electric motor.

Since July 10, 1958, when Well No. 3 went into service, Well No. 2 has been maintained as a stand-by unit.

WELL NO. 3 was completed to a depth of 1336 ft. in Nov. 1957 by Layne-Western Co. and located about 3/8 mile east of Well No. 2, or approximately 1350 ft. N. and 750 ft. E. of the S. W. corner of Section 33. The ground surface elevation at the well is 633.

A production test was conducted on Nov. 6, 1957 by representatives of the Driller. The well was cased with 26-in. pipe from the surface to 36 ft., with 20-in. pipe from the surface to 539 ft., and with a 16-in. liner from 860 to 1000 ft.

The 20-in. casing was cemented in.

The well was shot with 150-lb. explosives at depths of 1310, 1280, 1250 and 1230 ft.

A production test was conducted by representatives of the Driller on Nov. 6, 1957. After 23 hr. pumping at a rate of 1022 gpm., the drawdown was 120 ft. from a static water level of 253 ft. below the top of the casing (1 ft. above ground level). For the teat, a Pomona turbine test pump was installed.

On July 30, 1958, after the permanent pump was installed, water was pumped for 1/4 hr. at a rate of 1150 gpm. with a drawdown of 83 ft. from a nonpumping water level of 250 ft. below the top of the casing.

The pumping installation consists of 450 ft. of 8-in. column pipe; 12-in., 9-stage Byron Jackson submersible pump, No. 346708, rated at 1000 gpm. against 550 ft. T.D.H.; 450 ft. of air line; 200-hp. electric motor.

A mineral analysis of a sample (Lab. No. 147410) collected July 30, 1958, after 15 min. pumping at 1150 gpm., showed the water in Well No. 3 to have a hardness of 15.7 gr. per gal., total dissolved minerals of 466 ppm., and a trace of iron.

WELL NO. 4 was completed in 1958 to a depth of 1353 ft. by Layne-Western Co. and located near the All Steel Products Plant about 3/4 mile southwest of Well No. 3, or approximately 1475 ft. S. and 2115 ft. W. of the N. E. corner of Section 32.

The well was cased with 26-in. pipe from the surface to 25 ft. and with 20-in. pipe cemented in, from the surface to 553 ft., below which the hole was finished at 19 1/4 in. in diameter to the bottom. The well was shot with four 150-lb. charges at depths of 1330, 1305, 1285 and 1250 ft.

A production test was conducted by the Driller on Jan. 22, 1958. For the test a Layne turbine test pump was used. After 16 hr. pumping at a rate of 1326 gpm., the drawdown was 142 ft. from a static water level of 250 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 145594) collected Jan. 22, 1958, after 16 hr. pumping at 1326 gpm., showed the water in Well No. 4 to have a hardness of 15.2 gr. per gal., total dissolved minerals of 406 ppm., and an iron content of 0.4 ppm.

The well is not equipped for pumping and is not ready for service,

Metered pumpage from July 10 to 30, 1958, averaged 200,000 gpd.

Sample study summary log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, slightly gravelly, slightly sandy, buff	5	5
Gravel, sandy, yellowish buff, clean	30	35
SILURIAN SYSTEM		
Alexandrian Series		
Dolomite, white to light gray, fine to medium, crystalline	10	45
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, light gray, reddish brown, fine to medium; shale, pinkish, purple, weak	95	140
Shale, brown, light greenish gray at base, weak to brittle; little dolomite, brown	55	195
Galena Formation		
Dolomite, buff to grayish buff, fine to very fine, crystalline; limestone, light buff to buff, extra fine to fine; crystalline	160	355
Decorah Formation		
Dolomite, light buff to gray, very fine to fine, crystalline	25	380
Platteville Formation		
Dolomite, light gray to grayish buff, very fine, crystalline	150	530
Glenwood Formation		
Sandstone, light gray, very fine to coarse, incoherent	80	610
St. Peter Formation		
Sandstone, light gray to white, fine to medium, incoherent to friable	165	775
Oneota Formation		
Dolomite, white to light gray, very fine to medium, crystalline; sandstone, white to light gray, fine to coarse, incoherent	160	935
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, buff, very fine, crystalline	138	1073
Franconia Formation		
Sandstone, light greenish-gray to gray, very fine to fine, incoherent; shale, green, weak; dolomite, light buff, fine to medium	92	1165
Ironton Formation		
Sandstone, white to light, gray, fine to coarse, rounded, incoherent	100	1265
Galesville Formation		
Sandstone, slightly silty, light gray, very fine to fine, rounded, frosted, incoherent	70	1335
"Limestone"	1	1336

LABORATORY NO. 147410

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	8.1	
Manganese	Mn	0.0		Fluoride	F	0.7	
Calcium	Ca	66.6	3.33	Boron	B	0.4	
Magnesium	Mg	25.0	2.06	Chloride	Cl	23.	.65
Ammonium	NH_4	0.9	.05	Nitrate	NO_3	0.5	.01
Sodium	Na	64.	2.80	Sulfate	SO_4	110.7	2.30
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		Tr.		Hardness (as	$CaCO_3$)	270.	5.39
Color		0					
Odor		0					
Temp. (reported)		57.0°F		Total Dissolved Minerals		466.	

MONTICELLO
Piatt County
November 22, 1960

Three wells are in service for the city of Monticello (3219). Three old wells that were drilled between 1892 and 1912 were described in Bulletin 40 as having been abandoned in 1922 and 1935.

WELL NO. 1, according to the present system of numbering of the municipal wells, is described in Bulletin 40 and is presently in service.

WELL NO. 2, described in Bulletin 40, is in service.

WELL NO. 3 was completed in June 1958 to a depth of 263 ft. by Layne-Western Co., Aurora, and located at the pumping station, 100 ft. north of the old wells, or approximately 765 ft. N. and 1418 ft. E. of the S. W. corner of Section 7, T18N, R6E. The ground surface elevation at the well is 668. A 34-in. hole was drilled from the surface to the bottom at 263 ft. A 26-in. outer steel casing was set from the surface to 25 ft. and a 12-in. inner casing was set from the surface to 243 ft. followed by 20 ft. of Layne stainless steel shutter screen. The annulus outside the screen and 12-in. casing was packed with 65 cu. yd. of gravel.

A production test was conducted on June 9-10, 1958 by representatives of the Driller, the State Water Survey, City officials, and Engineering Service Corporation, Consulting Engineers. After 24 hr. pumping at 1005 gpm., the drawdown was 13 ft. from a nonpumping water level of 34 ft. (air line). Six min. after the test was stopped, the water level had recovered to 35 ft.

The permanent pumping equipment consists of a 10-in., 5-stage turbine pump set with the bottom of the bowls at 120 ft. and the pump rated at 750 gpm. at 150 ft. T.D.H.; 10 ft. of suction pipe; 40-hp. electric motor with auxiliary power from a 59-hp. Continental gas engine, Type M-330.

A mineral analysis of a sample (Lab. No. 153660) collected Nov. 22, 1960 showed the water in Well No. 3 to have a hardness of 15.5 gr. per gal., total dissolved minerals of 356 ppm., and an iron content of 1.6 ppm.

There are 1150 services, all metered. Pumpage is reported to average 600,000 gpd.

LABORATORY NO. 153660

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.6		Silica	SiO_2	12.2	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	58.0	2.90	Boron	B	0.4	
Magnesium	Mg	29.2	2.40	Chloride	Cl	5.	.14
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	1.3	.02
Sodium	Na	34.	1.49	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	332.	6.64
Turbidity		3		Hardness (as	$CaCO_3$)	265.	5.30
Color		0					
Odor		0					
Temp. (reported)		55.5°F		Total Dissolved Minerals		356.	

Three wells are in service for the city of Morris (7935).

WELLS NO. 1 and 2, as described in Bulletin 40, have been abandoned and sealed.

WELL NO. 3 is described in Bulletin 40. In Aug. 1951 the Layne pump was removed and rehabilitated after a break in the oil tube had permitted a considerable amount of oil to enter the well. After repairs, the reconditioned pump was restored at the same setting. Eight 10-ft. lengths of pump column and twenty-one 5-ft. lengths of shaft tubing were replaced with new parts. A new 200-ft. length of air line was installed. While the pump was out, the static water level was 52. 2 ft.

Well No. 3 is in service.

WELL NO. 4 is described in Bulletin 40. In June 1955 the Layne pump was removed for repairs, due to holes in the column pipe and corrosion of the threads of several sections of the column. The old 12-in., 3-stage pump, Layne, No. 9091, was reinstalled in Sept. 1955 with 160 ft. of 8-in. column pipe; 10 ft. of,8-in. suction pipe; new bowls; 170 ft. of air line; self-reading gage; the 50-hp. U S motor was reinstalled. The static water level was 59.1 ft. The depth of the well was measured 1492 ft. by Layne-Western workmen.

Well No. 4 is in service.

WELL NO. 5 was completed in 1954 to a depth of 1462 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located about 3/4 mile north of Well No. 4, or approximately 1800 ft. N. and 2250 ft. W. of the S. E. corner of Section 4, T33N, R7E. The ground surface elevation at the well is 505.8. The hole and casing record is shown in Table A.

TABLE A

Hole Record

24-in. from surface to 63 ft.
23-in. from 63 ft. to 3 12 ft.
17-in. from 312 ft. to 1462 ft.

Casing Record

24-in. pipe from surface to 63 ft.
18-in. pipe from surface to 312 ft.
1 6-in. liner from 280 ft. to 800 ft.
The 18-in. pipe was cement grouted in place from 312 ft. to the surface.
The 16-in. liner was perforatedbetween depths of 425 and 600 ft.

The well was shot with four 150-lb. charges of 80% Hi-velocity gelatinat depths of 1390, 1370, 1340 and 1320 ft. The sand dislodged by the explosions was removed after shooting.

A production test was conducted on May 11-12, 1954 by representatives of the Driller, the State Water Survey, and Walter E. Deuchler Co., Consulting Engineers. For test purposes, the well was equipped with a 12-in., 9-stage turbine test pump, 8. 5 ft. long and 11 ft. of tail pipe; 303 ft. of air line; electric motor. The top of the bowl section was set at a depth of 303 ft. Water levels in city wells No. 3 and 4 were measured on May 12 and 13. These and previous levels obtained from State Water Survey files are shown in Table B.

After 24 hr. pumping on May 11-12 at a rate of 1470 gpm., the drawdown was 150 ft. from a nonpumping water level of 35 ft. below the top of the casing. Twenty-two min. after pumping was stopped, the water level had recovered to 74 ft. and at 7:25 A. M. the following day or 13 hr. after pumping was stopped, the water level had

recovered to 43. 5 ft.

On Mar. 4, 1955 the pump house was not yet constructed. The static water level in Well No. 5 was 49 ft.

In July 1955 a drawdown was reported in Well No. 4 when Well No. 5 was pumping. This was shortly after Well No. 5 had been placed in service.

On Oct. 14, 1958, after l/4 hr. pumping at 900 gpm., the drawdown was 193 ft. from a non-pumping water level of 46 ft. below the pump base.

The pumping equipment in Well No. 5 consists of 220 ft. of 10-in. column pipe (a heavy pipe with two coats of bitumastic paint); 15-in., 3-stage Layne turbine pump (No. 29137), 4 ft. 9 in. long and rated at 1300 gpm. at 254 ft. T.D.H.; 10 ft. of 10-in. suction pipe; 220 ft. of copper air line; 125-hp. U S electric motor.

A partial chemical analysis of a sample (Lab. No. 147974) collected Oct. 14, 1958, after 15 min. pumping at a rate of 900 gpm., showed the water in Well No. 5 to have a hardness of 15.2 gr. per gal., total dissolved minerals of 419 ppm., and an iron content of 0. 3 ppm.

Pumpage from Aug. 1957 through Apr. 1958 was reported to average 825, 000 gpd.

Pumpage in July 1958 was reported to average 870,000 gpd.

TABLE B

Date	Water level below pump base (ft.)	Remarks
WELL NO. 3		
6-11-51	52.2	Pump out of well
Feb.-Apr. 1953	69	Nonpumping levels
During 1953	173 to 175	Pumping levels
5-12-54--1:15 P. M.	179	Pumping since 6 A. M.
5-12-54--3:30 P. M.	180	Pumping since 6 A. M.
5-12-54--6:45 P. M.	91	Not pumping since 6 P. M.
5-12-54--7:00 A. M.	81	Not pumping since 6 P. M.
5-13-59--8:18 A. M.	177	Pumping since 7 A. M.
WELL NO. 4		
1938	16	Nonpumping
1938 when well was drilled	106	Pumping at 450 gpm.
Aug. 1945	38	Nonpumping
Aug. 1945	135	Pumping at 450 gpm.
5-12-54--7:15 P. M.	151.7	Pumping since 4:00 P. M.
5-13-54--11:10 P. M.	59.5	Nonpumping for 25 min.

LABORATORY NO. 147974

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Fluoride	F	0.5	
				Boron	B	0.2	
				Chloride	Cl	37.	1.04
				Alkalinity (as	$CaCO_3$)	300.	6.00
Turbidity		0		Hardness (as	$CaCO_3$)	260.	5.20
Color		0					
Odor		0					
Temp. (reported)		60.5°F		Total Dissolved Minerals		419.	

MOUND PUBLIC
WATER DISTRICT
St. Clair County
August 3, 1958

A well was completed for Mound Public Water District in Aug. 1958. The District extends over approximately 400 acres located on the south side of U. S. Highway 40 about 2 miles west of Collinsville and l/4 mile east of Black Lane.

WELL NO. 1 was completed in July 1958 to a depthof 90 ft. by Layne-Western Co., St. Louis, Mo., and located 1380 ft. S. and 1450 ft. W. of the N. E. corner of Section 1, T2N, R9W. The well was located at the site of a test hole which had been drilled a week previous. The well is cased with 80 ft. of 8-in. pipe and 10 ft. of Layne stainless steel shutter screen, having No. 5 slot openings. The hole had been drilled 30 in. in diameter to a depth of 92 ft. but the bottom of the screen was set at 90 ft. due to the fine sand at that depth.

The casing is joint-welded pipe with the top 0. 5 ft. above the ground surface elevation of 418. It was intended to extend the casing top to 2 ft. or more above the ground level. The annulus outside the screen and casing was filled with 14 tons of Meramec gravel up to 40 ft. Fine sand was then packed in the annulus from 40 ft. up to 15 ft. and clay was packed in the upper 15 ft.

A production test was conducted on July 29-30, 1958 by representatives of the Driller, Caldwell-Rhoads Co., Consulting Engineers, and the State Water Survey. For test purposes the well was equipped with a 3-stage Johnston turbine pump with the bottom of the bowls set at 50 ft. Power was furnished from a gasoline engine connected to the pump by a drive shaft. A 48 1/2-ft. air line was installed for measuring water levels. After 24 hr. pumping at a rate of 336 gpm., the drawdown was 9 ft. from a static water level of 8.5 ft. below the top of the casing. Two min. after pumping was stopped, the water level had recovered to 8. 5 ft.

A partial analysis of a sample (Lab. No. 147294) collected July 30, 1958, after 19 hr. pumping at 336 gpm., showed the water to have a hardness of 495 ppm., total dissolved minerals of 525 ppm., and an iron content of 3. 8 ppm.

Correlated driller's log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Gumbo	4	4
Clay	8	12
Fine sand	23	35
Medium sand	4	39
Fine sand	3	42
Medium sand	13	55
Log	2	57
Medium to coarse, sand and gravel	33	90
Fine sand mixed with clay	2	92

LABORATORY NO. 147294

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.8		Fluoride	F	0.1	
				Chloride	Cl	5.	.14
				Nitrate	NO_3	0.3	Tr.
				Alkalinity (as	$CaCO_3$)	352.	7.04
Turbidity		32		Hardness (as	$CaCO_3$)	495.	9.90
Color		0					
Odor		0		Total Dissolved Minerals		525.	

MOUNT PROSPECT
Cook County
October 6, 1958

Since publication of Bulletin 40, one additional well has been drilled for Mount Prospect (18, 906). Well No. 1 was abandoned and plugged; Well No. 2 is maintained for stand-by use; and Wells No. 3, 4 and 5 furnish the village supply.

WELL NO. 1 was acidized with 1000 gal. in Aug. 1950 and new pumping equipment was installed. By Dec. 23, 1955 the well had been abandoned and plugged.

WELL NO. 2 was equipped in 1953 with 120 ft. of 4-in. column pipe; 6-in., 10-stage Peerless turbine pump, No. 107644, rated at 100 gpm. against 135 ft. T.D.H.; 40 ft. of 4-in. suction pipe; 120 ft. of air line; 7 l/2-hp. U S electric motor.

In Dec. 1953, during pumping at a rate of 100 gpm., the drawdown was 100 ft. from a nonpumping water level of 37 ft. below the pump base (elev. 672).

Well No. 2 has been maintained for stand-by use, since 1957.

WELL NO. 3 is now equipped with 550 ft. of 8-in. column pipe; 12-in., 8-stage Peerless turbine pump (No. 109343); 10 ft. of 8-in. suction pipe; 556 ft. of air line; 150-hp. U S electric motor.

On Aug. 31, 1958 the nonpumping water level was 408 ft. below the pump base and, during pumping to the system, the drawdown was 86 ft.

WELL NO. 4 is now equipped with 500 ft. of 8-in. column pipe; 10-in., 13-stage Fairbanks-Morse turbine pump, No. 3901, rated at 500 gpm.; 10 ft. of 8-in. suction pipe; 500 ft. of air line; 125-hp. U S electric motor.

On Aug. 31, 1958, during pumping to the system, the drawdown was 46 ft. from a nonpumping water level of 430 ft. below the pump base (elev. 693).

WELL NO. 5 was completed to a depth of 1822 ft. in Jan. 1955 by S. B. Geiger & Co., Chicago, and is located northeast of the intersection of Emerson Ave. and Highland St., or approximately 800 ft. S. and 2300 ft. W. of the N. E. corner of Section 34, T42N, R11E. This is about 1 mile east of Well No. 3. The ground elevation at the well is 673.

The hole and casing record is shown in Table A.

TABLE A

Hole Record

24-in. to 442 ft.
17-in. to 1190 ft.
16-in. to 1583 ft.
12-in. to 1822 ft.

Casing Record

24-in. od. from surface to 130 ft. 7 in.
18-in. od. from surface to 442 ft. 10 in.
16-in. od. liner from 1008 to 1190 ft.
The annulus outside the 18-in. casing was filled with cement grout to a depth of 442 ft. 10 in. using 740 bags of cement.

When the well was completed in Feb. 1955, a production test was conducted by representatives of the Driller and the State Water Survey. After 24 hr. pumping at a rate of 910 gpm., the drawdown was 171 ft. from a nonpumping water level of 246 ft. below the top of the casing (2 ft. above the ground surface). Following the first test, it was decided to conduct a second test with a pump of larger capacity; however, when the pump was removed, it was found that sand had filled the hole up to 1660 ft. The hole was cleaned out with considerable difficulty because sand kept rolling in. One 200-lb. shot of nitrogengel was exploded with the bottom of the shot at 1670 ft. After several cu. yd. had been removed, a pump of larger capacity was installed and on Apr. 12 a second test was run. After a few min. pumping at a high rate, the rate dropped to 570 gpm. with a considerable amount of mud and sand in the water. Upon removing the pump, it was found that an impeller was broken and that sand had again filled the well up to 1262 ft.

On May 10th, after the sand had been cleaned out, a third test was run for 3 hr. at a rate of 570 gpm. with sand in the water at the end of the period. The pump was then operated at high speed for short periods with the sand present in the water. The test was discontinued and the well surged for a 15-hr. period in order to draw all loose sand possible into the bore hole.

After removing a sand bridge between 1270 and 1330 ft. and also a 20-ft. fill of sand in the bottom of the well, a fourth test was started on May 14th, with the same pump as used in the previous tests, but terminated when the main pump bearing failed after 3 hr. pumping.

A production test was then conducted on May 15-16 by representatives of the Driller, Consoer, Townsend and Associates, Consulting Engineers, and the Village. After 24 hr. pumping at a rate of 1207 gpm., the drawdown was 160 ft. from a nonpumping water level of 295 ft. The water was reported clear at the end of the test.

The permanent pumping equipment in Well No. 5 includes 550 ft. of 10-in. column pipe; 12-in., 10-stage Peerless turbine pump, No. 113960, rated at 1200 gpm.; 10 ft. of 10-in. suction pipe; 550 ft. of air line; 750-hp. Ideal Electric motor.

A mineral analysis of a sample (Lab. No. 146788) collected June 2, 1958, after 10 min. pumping at a rate of 1200 gpm., showed the water in Well No. 5 to have a hardness of 15. 3 gr. per gal., total dissolved minerals of 453 ppm., and an iron content of 0. 6 ppm,

Pumpage in July 1958 was reported to average 1. 4 mgd.

LABORATORY NO. 146788

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	7.8	
Manganese	Mn	Tr.		Fluoride	F	1.1	
Calcium	Ca	72.2	3.61	Boron	B	0.3	
Magnesium	Mg	19.8	1.63	Chloride	Cl	16.	.45
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	55.	2.37	Sulfate	SO_4	135.1	2.81
				Alkalinity (as	$CaCO_3$)	216.	4.32
Turbidity		5		Hardness (as	$CaCO_3$)	262.	5.24
Color		0					
Odor		0					
Temp. (reported)		60.7°F		Total Dissolved Minerals		453.	

Sample study summary log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown	15	15
Till, grayish brown	8	23
Sand and gravel, silty, clayey, grayish brown	10	33
Till, grayish brown	47	80
Gravel, slightly sandy	10	90
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, partly cherty, gray, pink, fine	70	160
Alexandrian Series		
Dolomite, slightly cherty, white to gray	54	214
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, dolomitic, grayish green to brown; dolomite, light gray to brown	206	420
Galena Formation		
Dolomite, cherty near base, buff, fine	191	611
Decorah Formation		
Dolomite, brown, gray speckles	4	615
Platteville Formation		
Dolomite, slightly cherty, pale brown	70	685
Limestone, slightly dolomitic, light brown	25	710
Dolomite, yellowish brown, gray; sandstone	35	745
Glenwood Formation		
Sandstone, slightly silty, incoherent, white; shale	50	795
St. Peter Formation		
Sandstone, partly silty, white, incoherent, chert at base	236	1031
Shale, cherty, dolomitic, red; sandstone	39	1070
CAMBRIAN SYSTEM		
Franconia Formation		
Sandstone, glauconite, gray; dolomite	23	1093
Shale, sandy, light gray; dolomite	32	1125
Ironton Formation		
Sandstone, pale orange; shale; dolomite	55	1180
Sandstone, partly dolomite, light gray, incoherent	65	1245
Galesville Formation		
Sandstone, partly dolomitic, white, medium, incoherent	65	1310
Eau Claire Formation		
Shale, sandstone, and dolomite	135	1445
Sandstone, glauconitic, brownish gray	80	1525
Dolomite, glauconitic, buff	55	1580
Sandstone, sooty in lower half; little shale, incoherent	200	1780
Mt. Simon Formation		
Sandstone, slightly silty, incoherent	40	1820

Four wells are in service for the city of Mt. Pulaski (1689).

WELLS NO. 1 and 2, described in Bulletin 40, are in service. A production test was conducted on the two wells on Dec. 8, 1953. The test was conducted by pumping Well No. 2 (East Well) which was equipped to measure discharge, and observing the drawdown in Well No. 1 (West Well) which was equipped with an air line. The wells are 27 ft. apart. The rate of production, as determined in the test compared favorably with the rate of production observed when the wells were rehabilitated in 1932, at which time water was pumped at 180 gpm. for 4 hr. When pumping at 200 gpm., the water was drawn down below the 50 ft. length of air line. The water level in 1932 was reported to be 24 ft. 10 in. below floor level as compared with 20 ft. 7 in. in the 1953 test.

WELL NO. 3 was completed in Mar. 1954 to a depth of 104 ft. by Sims Drilling Co., Champaign, and located 400 ft. north of Wells No. 1 and 2 at the pumping station, or approximately 740 ft. S. and 1567 ft. E. of the N. W. corner of Section 14, T18N, R2W. The land surface elevation at the well is 660. The well was cased with 85 ft. of 16-in. outer pipe and with 84 ft. of 8-in. inner pipe from 2 ft. above ground level, followed by 20 ft. of 8-in. screen with No. 60 slot openings. The annulus outside the 8-in. screen and casing was gravel packed. The Driller reported a sand formation from 20 ft. to the bottom of the well.

A production test was conducted on Mar. 10, 1954 by representatives of the Driller, the State Water Survey, and the City officials. For the test a Pomona turbine test pump was installed with the bottom of the suction set at 77 ft. 6 in. Power was furnished from a Ford industrial gas engine. After 4 l/2 hr. pumping at a rate of 96 gpm., the drawdown was 21.2 ft. from a static water level of 47. 6 ft. Pumping was continued for 1 hr. at a rate of 132 gpm. but the drawdown was below the air line. Five min. after the pump was stopped, the water level had recovered to 49 ft.

The permanent pump is a 10-stage Fairbanks-Morse Pomona turbine, 10 ft. long and rated at 125 gpm. The pump is set at 80 ft. and is followed by 10 ft. of 5-in. suction pipe. Power is furnished from a 10-hp. Fairbanks-Morse electric motor.

A mineral analysis of a sample (Lab. No. 152584) collected June 27, 1960 showed the water in Well No. 3 to have a hardness of 32. 2 gr. per gal., total dissolved minerals of 630 ppm., and a trace of iron.

WELL NO. 4 (60-1) was completed in Aug. 1960 to a depth of 34 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at the site of Test Well No. 1, along Salt Creek, or approximately 1480 ft. N. and 2640 ft. E. of the S. W. corner of Section 35, T19N, R2W. The land surface elevation at the well is 585. (Test Well No. 1 had been drilled in Sept. 1959 following an electrical earth resistivity survey by the State Geological Survey. The survey was made along Salt Creek about 3 miles north of the pump station).

Well No. 4 was cased with 10-in. pipe from 4. 3 ft. above to 27 ft. below land surface, followed by 7 ft. of 10-in. stainless steel screen to the bottom at 34 ft. A production test was conducted on Aug. 3-5, 1960 by representatives of the Driller, City officials, State Water Survey, and Crawford, Murphy and Tilly, Consulting Engineers. For test purposes the well was equipped with 25 ft. of 4-in. column pipe; 5 5/8-in. Peerless turbine test pump, 6 ft. 11 1/4 in. long. After 45 hr. pumping at 100 gpm., the drawdown was 2. 7 ft. from a nonpumping water level of 15. 9 ft.

During the test, water levels were noted in three observation wells. The data are shown in Table A.

TABLE A

Obs. Well No.	Distance to Well No. 4 ft.	Depth to water Pumping ft.	Depth to water Static ft.
Test Well 1-60	15. 7	15. 5	0. 9
Test Well 3-59	55. 5	14. 8	0. 5
Test Well 2-59	154. 7	15. 5	0. 7

There are 650 services, 90% of which are metered. Pumpage is estimated to average 75,000 gpd.

2 - Mt. Pulaski

LABORATORY NO. 152 584

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	19.1	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	119.2	5.96	Boron	B	0.0	
Magnesium	Mg	61.5	5.06	Chloride	Cl	30.	.85
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	40.5	.65
Sodium	Na	13.	.55	Sulfate	SO_4	138.0	2.87
				Alkalinity (as	$CaCO_3$)	360.	7.20
Turbidity		0		Hardness (as	$CaCO_3$)	551.	11.02
Color		0					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		630.	

MUDDY
Saline County
October 21, 1958

A public water supply was being installed in Oct. 1958 for the village of Muddy (95).

WELL NO. 1 was completed in 1958 to a depth of 100 ft. by Quentin Richey, Carrier Mills, and located approximately 1500 ft. N. and 2500 ft. E. of the S. W. corner of Section 2, T9S, R6E. The ground surface elevation at the well is 360.

The well was cased with 7-in. pipe to 32 ft., below which the hole was finished in limestone and shale at 6 1/2 in. in diameter to the bottom at 100 ft.

A production test was conducted on Oct. 21, 1958 by representatives of the Driller, the State Water Survey, and the Village officials. For test purposes the well was equipped with a 5-hp. jet pump. A 65-ft. air line was installed. After 7 hr. pumping at a rate of 40 gpm., the drawdown was 58. 9 ft. from a static water level of 13. 5 ft. One hr. after the pump was stopped, the water level had recovered to 27. 7 ft.

A mineral analysis of a sample (Lab. No. 148016) collected Oct. 21, 1958, after 7 hr. pumping at 40 gpm., showed the water in Well No. 1 to have a hardness of 30.4 gr. per gal., total dissolved minerals of 969 ppm., and an iron content of 0. 4 ppm.

The distribution system had not yet been installed.

LABORATORY NO. 148016

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	25.0	
Manganese	Mn	0.2		Fluoride	F	0.3	
Calcium	Ca	98.0	4.90	Boron	B	0.1	
Magnesium	Mg	68.0	5.59	Chloride	Cl	78.	2.20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.1	.05
Sodium	Na	162.	7.04	Sulfate	SO_4	178.5	3.72
				Alkalinity (as	$CaCO_3$)	578.	11.56
Turbidity		1		Hardness (as	$CaCO_3$)	524.	10.49
Color		0					
Odor		0					
Temp. (reported)		59.5°F		Total Dissolved Minerals		969.	

MULBERRY GROVE
Bond County
January 9, 1958

Public water supply for the village of Mulberry Grove (745) is obtained from two wells.

WELL NO. 1, described in Bulletin 40, was acidized in Apr. 1954. During the 3-day period, while the well was out of service, water was pumped directly from a nearby creek to the iron removal treatment plant, using the jet pump from Well No. 2. The acidizing was reported to improve the yield of Well No. 1 considerably.

WELL NO. 2 was drilled in 1951 to a depth of 38 ft. by Smith Drilling Co., Farina, and located 11 ft. west of the Well No. 1 pump house. The well was reportedly cased with 8-in. pipe from 1 ft. above the ground surface to the bottom of the well. A 3-in. suction pipe was installed from 5 ft. below the top of the well casing and extended into the Well No. 1 pump house where it was screwed into the pump base of Well No. 1. Water was pumped by a jet pump of unknown capacity directly connected to a 3-hp. electric motor. No. 2 well was to be alternated with No. 1, but because it broke suction too frequently, it was abandoned and the pump removed about 1954.

After six test holes were drilled in 1954 and 1955, at locations from 100 to 275 ft. distant in various directions from Well No. 1, a new well, WELL NO. 3, was constructed to a depth of 37 ft. by Willeford Bros., Highland, and located at the site of the most favorable of the six test holes, or approximately 1000 ft. S. and 1800 ft. E. of the N. W. corner of Section 6, T5N, R1W. The casing and screen sizes are shown in Table A.

TABLE A

12-in. casing from 2 ft. above to 30 ft. below ground level
8-in. casing from 0 to 29 ft. 2 in. below ground level
8-in. id. Cook screen (No. 100 slot openings) from 29 ft. 2 in. to 37 ft. 8 in.
The annulus outside the screen was packed with gravel.

A production test was run on Mar. 24, 1955 by the Drilling Contractor and observed by representatives of the Friedewald Engineering Co., the Village, and the State Water Survey. The well was equipped for pumping with a jet pump set at 32 ft. below the top of the casing and an additional 2 ft. of suction pipe below the jet. Power was applied from a Fairbanks-Morse electric motor furnished by the village. After 5 hr. pumping at an average rate of 17.5 gpm., the drawdown was 11 ft. from a nonpumping water level of 19 ft. below the top of the casing (2 ft. above ground level).

Analysis of a sample (Lab. No. 145462) collected Jan. 9, 1958 showed the water from Well No. 3 to have a hardness of 20 gr. per gal., total dissolved minerals of 501 ppm., and an iron content of 29 ppm.

Apparently the permanent pump was installed at the time of the test in Mar. 1955.

Pumpage is estimated to average 23,000 gpd.

LABORATORY NO. 145462

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	29.		Silica	SiO_2	21.8	
Manganese	Mn	1.5		Fluoride	F	0.1	
Calcium	Ca	88.0	4.40	Boron	B	0.0	
Magnesium	Mg	29.7	2.44	Chloride	Cl	14.	.39
Ammonium	NH_4	1.4	.08	Nitrate	NO_3	0.8	.01
Sodium	Na	27.	1.18	Sulfate	SO_4	185.7	3.86
				Alkalinity (as	$CaCO_3$)	192.	3.84
Turbidity		500		Hardness (as	$CaCO_3$)	342.	6.84
Color		0					
Odor		0					
Temp. (reported)		57.5°F		Total Dissolved Minerals		501.	

MULFORDS SUBDIVISION
Winnebago County
January 16, 1961

A public water supply was installed in 1957 for Mulfords Subdivision (est. 105) located near Rockford.

WELL NO. 1 was completed in Aug. 1957 to a depth of 531 ft. by Layne-Western Co., Aurora, and located 35 ft. N. and 2140 ft. W. of the S. E. corner of Section 34, T44N, R2E. The ground surface elevation at the well is 820. The well was cased with 16-in. pipe from the surface to 42 ft. penetrating limestone and with 8-in. pipe from the surface to 329 ft. (penetrating sandstone at 308 ft.), below which the diameter of the hole was finished at 8 in. to the bottom.

A production test was conducted on Aug. 27, 1957 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Inc., Consulting Engineers. After 10 hr. pumping at 230 gpm., the drawdown was 70 ft. from a static water level of 65 ft. (air line) below the top of the casing (3 ft. above ground level).

A partial chemical analysis of a sample (Lab. No. 144291) collected Aug. 27, 1957 showed the water in Well No. 1 to have a hardness of 18.4 gr. per gal., total dissolved minerals of 330 ppm., and an iron content of 0.7 ppm.

The pumping equipment consists of 160 ft. of 5-in. column pipe; 7-in., 15-stage turbine pump, rated at 200 gpm. against 280 ft. T.D.H.; 160 ft. of plastic air line; 25-hp. electric motor.

There are approximately 30 services. Pumpage is estimated to average 6000 gpd.

LABORATORY NO. 144291

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Fluoride	F	0.2	
				Chloride	Cl	3.	.08
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	320.	6.40
Turbidity		12		Hardness (as	$CaCO_3$)	318.	6.36
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		330.	

Six wells are in service for the public water supply of the village of Mundelein (10,526).

WELL NO. 1 was described in Bulletin 40. The pumping equipment includes a Pomona turbine pump rated at 90 gpm. and connected to a 10-hp. Fairbanks-Morse electric motor. The 150-ft. air line is reportedly defective. Well No. 1 is in service.

WELL NO. 2, described in Bulletin 40 as the East Well, was treated with 1500 gal. HC1 in 1956 by Fred Kiene and Sons, Mundelein. Following this treatment the production rate was increased from 60 gpm. to 210 gpm.

The pumping equipment consists of 175 ft. of 5-in. column pipe; 8-in., 12-stage Aurora turbine pump, No. 62542, rated at 190 gpm. against 280 ft. T.D.H.; 5-in. strainer on the bottom of the bowls; 175 ft. of air line; 30-hp. U S electric motor.

On Nov. 19, 1958 the nonpumping water level was 49 ft.

Well No. 2 is in service.

Old WELL NO. 3, described in Bulletin 40 as being drilled in 1946, was abandoned and filled prior to 1956.

Old WELL NO. 4 was completed as a test well to a depth of 200 ft. in June 1949 by Fred Kiene and Sons and located in Lakewood Park in the southern part of the village, or approximately 1835 ft. N. and 1465 ft. E. of the S. W. corner of Section 30, T44N, R11E. The well was cased with 6-in. pipe from 2 ft. above the surface to 192 ft. followed by 8 ft. of effective length 6-in. Johnson screen having No. 30 slot openings.

On June 8, 1949 a production test was conducted by representatives of the Driller, the State Water Survey, and Baxter, Nelson and Woodman, Consulting Engineers. After 4 hr. pumping at a rate of 103 gpm., the drawdown was 55 ft. from a static water level of 46. 5 ft. below the pump base.

A partial analysis of a sample (Lab. No. 118449) collected June 8, 1949, after 4 hr. pumping, showed the water to have a hardness of 18. 9 gr. per gal., total dissolved minerals of 558 ppm., and an iron content of 0. 7 ppm.

The well was equipped with an Aurora turbine pump rated at 100 gpm. connected to a 15-hp. U S electric motor.

Well No. 4 was in production during the month when Well No. 5 was being developed. Subsequently, Well No. 4 was abandoned and capped with concrete.

Old WELL NO. 5 was constructed in 1950 as a gravel packed well by R. E. Milaeger, Milwaukee, Wis., and located 12 ft. north of Well No. 4 (6-in. test well), or approximately 1845 ft. N. and 1465 ft. E. of the S. W. corner of Section 30. The elevation of the ground surface is 780. The well was cased with a 16-in. od. outer pipe from 18 in. above ground level to 174 ft. and with an 8-in. id. pipe from the surface to 174 ft. followed by 20 ft. of 8-in. Johnson No. 100 slot screen. The annulus between the 8-in. and 16-in. casings was filled with l/2-in. graded gravel from a local pit. No satisfactory production test could be made owing to the failure of the water to clear. Reportedly, the well capacity varied from 50 to 100 gpm. and at the latter rate the well pumped off. From all available information pumping in either Well No. 4 or Well No. 5 had no effect on the water level in the other well.

Sample study summary log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown; till, yellow; clay, fine	15	15
Soil, dark brown, little till; gravel fine	10	25
Clay, gray, silt, gray	40	65
Till, gray, sandy	10	75
Sand, yellow, fine to coarse, clean	10	85
Clay, gray; some silt	85	170
Sand, medium to coarse; gravel, fine, clean	20	190

On Oct. 31, 1951 Dowell Inc. introduced 2000 gal. HC1 into the well at the rate of 100 gpm. On Nov. 1 the well was pumped for 3 hr. at a rate of 138 gpm. with a drawdown of 105 ft. from a

static water level of 50 ft. below the surface.

The pumping equipment included a 245-gpm. Aurora turbine pump connected to a 30-hp, U S electric motor. Old Well No. 5 was subsequently-abandoned and capped with concrete sometime prior to 1956.

In 1956 after village Wells 3, 4 and 5 had been abandoned, the village of Mundelein purchased the wells and distribution system of the Loch Lomond Subdivision. The village well numbering was revised and Well No. 8 in the order of numbering is now Well No. 3.

WELL NO. 3 (formerly Loch Lomond Well No. 2 and sometimes called Beach Street East Well) was completed for the subdivision in 1954 toa depth of 276 ft. by Henry Boysen, Libertyville, and located about 8 ft. east of Well No. 7, or approximately 2400 ft. N. and 1492 ft. W. of the S. E. corner of Section 24. The elevation of the ground surface at the well is 750. Well No. 3 was cased with 12-in. pipe to limestone at 234 ft., below which the hole was finished at 12 in. in diameter. When the well was being developed 2200 gal. HC1 was introduced into the well, increasing the production from 59 to 350 gpm.

On Dec. 3, 1959, when pumping at 300 gpm., the pumping water level was 162 ft. below the pump base.

The pumping equipment consists of 220 ft, of 6-in. column pipe; 10-in., 11-stage Byron Jackson turbine pump (No. C299322); 240 ft. of air line; 10 ft. of 6-in. suction pipe; 40-hp. U S electric motor.

Since Oct. 1959 this well has been maintained for emergency service only.

WELL NO. 4 (Loch Lomond Well No. 1, formerly Well No. 7 in the order of numbering) was completed to a depth of 270 ft. in 1954 for the subdivision by Henry Boysen and located in the southeast portion of the subdivision on Beach St., or approximately 2400 ft. N. and 1500 ft. W. of the S. E. corner of Section 24, T44N, R10E. The ground surface elevation at the well is 750. Reportedly the well was a test well and cased with 12-in. pipe to limestone at 231 ft. depth.

The Driller reported a production test. After 1 hr. pumping at a rate of 120 gpm., the drawdown was 7 ft. from a static water level of 91 ft. below the surface.

The pumping equipment installed in 1956 consists of 170 ft. of 4-in. column pipe; 6-in., 22-stage Aurora turbine pump, No. 52685, rated at 100 gpm. against 217 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 170 ft. of air line; 15-hp. U S electric motor.

Auxiliary power is also installed by means of one 30-hp. Fairbanks-Morse right angle gear drive, No. AV6620, connected to 45-hp. Waukesha gas engine.

Well No. 4 is in service.

WELL NO. 5 (Loch Lomond Well No. 3, formerly Well No. 9 in the order of numbering) was completed for the subdivision in 1954 to a depth of 140 ft. by Henry Boysen and located on Killarney Pass Circle, about l/4 mile north of Loch Lomond Wells 1 and 2, village Wells 4 and 3, or approximately 1225 ft. S. and 1550 ft. W. of the N. E. corner of Section 24. The ground surface elevation at the well is 750. The well was cased with 12-in. pipe to 116. 5 ft. followed by a 12-in. screen in a 24-in. hole from 116 to 140 ft. exposed to the formation.

The pumping equipment consists of 111 ft. of 8-in. column pipe; 12-in., 5-stage Pomona turbine pump, No. AV950, rated at 700 gpm. against 250 ft. T.D.H.; 120 ft. of air line; 50-hp. General Electric motor.

On Dec. 3, 1959 the nonpumping water level was 90 ft.

A mineral analysis of a sample (Lab. No. 151195) collected Dec. 3, 1959 from a discharge main, showed the water in the well to have a hardness of 16. 2 gr. per gal., total dissolved minerals of 529 ppm., and an iron content of 0. 6 ppm.

WELL NO. 6 was completed for the village in May 1955 to a depth of 106 ft. by J. P. Miller Artesian Well Co., Brookfield, and located on Hawley St. (Route 176) in the north end of the village, or approximately 1300 ft. N. and 1800 ft. W. of the S. E. corner of Section 24. The elevation of the ground surface at the well is 740. The well was cased with 12-in. pipe grouted in a 30-in. hole from the surface to 84 ft. followed by a 12-in. screen from 84 to 104 ft. exposed to the formation.

When the well was completed the Driller reported pumping for 24 hr. at a rate of 500 gpm. with a drawdown of 19 ft. from a static water level of 56 ft. below the pump base.

The pumping equipment consists of 80 ft. of 8-in. column pipe; 10-in., 6-stage Peerless turbine pump, No. 34465, having a length of 60 5/8 in. and rated at 500 gpm. against 217 ft. T.D.H.; 10ft. of8-in. suction pipe witha 21l/4-in. strainer; 80 ft. of air line (defective); 40-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 151197) collected Dec. 3, 1959 from discharge main (pump not running) showed the water in Well No. 6 to have a hardness of 15.5 gr. per gal., cotal dissolved minerals of 465 ppm., and an iron content of 2. 5 ppm.

Well No. 6 is in service.

Village WELL NO. 10 (Loch Lomond No. 4) was drilled to a depth of 351 ft. in 1953 by Henry Boysen and located 2500 ft. S. and 2200 ft. W. of the N. E. corner of Section 24. The well was capped and never put in service.

Pumpage for the village from May 1, 1957 through Apr. 30, 1958 averaged 660, 000 gpd.

LABORATORY NO. 151195

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	17.3	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	53.5	2.68	Boron	B	0.3	
Magnesium	Mg	35.0	2.88	Chloride	Cl	8.	.23
Sodium	Na	68.	2.94	Nitrate	NO_3	0.6	.01
				Sulfate	SO_4	243.3	5.06
				Alkalinity (as	$CaCO_3$)	160.	3.20
Turbidity		3		Hardness (as	$CaCO_3$)	278.	5.56
Color		0					
Odor		0					
Temp. (reported)		50.0°F		Total Dissolved Minerals		529.	

LABORATORY NO. 151197

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.5		Silica	SiO_2	20.7	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	45.2	2.26	Boron	B	0.2	
Magnesium	Mg	37.2	3.06	Chloride	Cl	7.	.20
Sodium	Na	55.	2.38	Nitrate	NO_3	2.3	.04
				Sulfate	SO_4	200.8	4.18
				Alkalinity (as	$CaCO_3$)	164.	3.28
Turbidity		6		Hardness (as	$CaCO_3$)	266.	5.32
Color		0					
Odor		0					
Temp. (reported)		51.0°F		Total Dissolved Minerals		465.	

NAPERVILLE
DuPage County
October 10, 1958

Two wells are in service for the public water supply of the city of Naperville (12,933)and two wells are maintained for emergency use.

WELLS NO. 1 and 2, described in Bulletin 40, have been abandoned and the pumps removed, but the wells have not been filled in.

WELL NO. 3, described in Bulletin 40, was reportedly filled with clay about Feb. 1958.

WELL NO. 4, described in Bulletin 40, is maintained for emergency use, without change since Bulletin 40.

WELL NO. 5, describedin Bulletin 40, was treated with acid on Dec. 8, 1956. On Jan. 28, 1957 the nonpumping water level was reportedly 15. 3 ft. below the pump base and after l/2 hr. pumping at 590 gpm., the drawdown was 34 ft. In Aug. 1957, after 7 hr. pumping at 715 gpm., the water level was 71 ft. Well No. 5 is in service.

WELL NO. 6, described in Bulletin 40, is not used when Well No. 5 is pumping due to interference between the wells. Otherwise Well No. 6 is in service and is maintained as an emergency unit.

WELL NO. 7 was completed to a depth of 1445 ft. in Jan. 1958 by Egerer-Galloway Co., Milwaukee, Wis., and located near the power plant at Jackson and Webster St., or approximately 1050 ft. N. and 925 ft. W. of the S. E. corner of Section 13, T38N, R9E. The elevation of the ground surface at the well is 680.

The hole and casing sizes are shown in Table A.

When the well was completed a production test was conducted by representatives of the Driller. For test purposes the pumping equipment consisted of an 8-stage turbine test pump set at 550 ft. with power from a diesel engine. A 550-ft. air line was installed for measuring water levels. After 23 l/2 hr. pumping at 1070 gpm., the drawdown was 152 ft. from a nonpumping water level of 370 ft. below the top of the casing.

TABLE A

Hole Size

30-in. from surface to 25 ft.
20-in. from 25 ft. to 685 ft.
19-in. from 685 ft. to 1425 ft.
16-in. from 1425 ft. to 1445 ft.

Casing Size

30-in. from surface to 25 ft.
20-in. from surface to 685 ft.

Cemented with 1200 sacks.
The top of the casing was left
3 ft. above surface.

The permanent pumping equipment consists of 620 ft. of 8-in. column pipe; 12-in., 13-stage Byron Jackson submersible pump, No. 351229, rated at 1000 gpm. at 770 ft. T.D.H.; 300-hp. electric motor.

On Oct. 10, 1958, after 10 min. pumping at 1080 gpm., the water level was 505 ft.

A mineral analysis of a sample (Lab. No. 147979) collected Oct. 10, 1958, after 30 min. pumping at 1080 gpm., showed the water in Well No. 7 to have a hardness of 16. 9 gr. per gal., total dissolved minerals of 482 ppm., and an iron content of 0. 3 ppm.

Well No. 7 is in service.

Pumpage in 1957 was reported to average 598,000 gpd.

LABORATORY NO. 147979

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	8.3	
Manganese	Mn	0.1		Fluoride	F	1.0	
Calcium	Ca	70.0	3.50	Boron	B	0.3	
Magnesium	Mg	28.1	2.31	Chloride	Cl	23.	.65
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	0.5	.01
Sodium	Na	69.	3.02	Sulfate	SO_4	103.3	2.15
				Alkalinity (as	$CaCO_3$)	302.	6.04
Turbidity		3		Hardness (as	$CaCO_3$)	290.	5.81
Color		0					
Odor		0					
Temp. (reported)		56.2°F		Total Dissolved Minerals		482.	

Two wells are in service for the village of Neponset (495).

WELL NO. 1, described in Bulletin 40, is in limited service.

WELL NO. 2 was completed in Feb. 1955 to a depth of 250 ft. by Hydromatics Corporation, Milan, and located about 40 ft. west of Well No. 1, or approximately 1240 ft. N. and 2275 ft. E. of the S. W. corner of Section 10, T15N, R6E. The ground surface elevation at the well is 830. The well was cased with 130 ft. of 14-in. pipe, below which the hole was finished at 14 in. in diameter.

When completed the well produced 15.8 gpm. for 3 l/2 hr. with a drawdown of 64. 6 ft. from a nonpumping water level of 44. 4 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 137128) collected Mar. 14, 1955 showed the water to have a hardness of 17.9 gr. per gal., total dissolved minerals of 443 ppm., and an iron content of 0.6 ppm.

Well No. 2 is not in use. It is not equipped for pumping.

WELL NO. 3 was completed in Feb. 1956 to a depth of 1640 ft. by Hydromatics Corporation and located about 200 ft. southwest of Well No. 2, or approximately 900 ft. N. and 2050 ft. E. of the S. W. corner of Section 10. The ground surface elevation at the well is 826.

The hole and casing record is shown in Table A.

A production test was conducted on Feb. 29, 1956 by representatives of the Driller, the State Water Survey, and Dwain M. Wallace, Consulting Engineer. After 3 1/2 hr. pumping at 150 gpm., the drawdown was 17 ft. from a nonpumping water level of 308 ft. below the top of the 12-in. casing, 1. 5 ft. above ground level. Ten min. after the pump was stopped, the water level had recovered to 311 ft.

TABLE A

Hole Size

Diameter at top of hole is 22 in.
From 1070 to 1640 ft. is 6 in.

Casing Size

22-in.	from surface	to	60. 5	ft.
16-in.	from surface	to	136	ft.
12-in.	from surface	to	430	ft.
10-in.	from 329	to	552	ft.
8-in. liner	from 951	to	1070	ft.

The 12, 16 and 22-in. casings were cemented.

The permanent pumping equipment consists of 350 ft. of 4-in. column pipe; 6-in., 32-stage Fairbanks-Morse turbine pump, rated at 100 gpm. at 350 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 350 ft. of air line; 15-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153664) collected Nov. 23, 1960 showed the water in Well No. 3 to have a hardness of 5.5 gr. per gal., total dissolved minerals of 793 ppm., and an iron content of 0. 6 ppm.

There are approximately 175 services. Pumpage is reported to average 17, 500 gpd.

LABORATORY NO. 153664

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	8.2	
Manganese	Mn	0.0		Fluoride	F	0.8	
Calcium	Ca	21.4	1.07	Boron	B	1.0	
Magnesium	Mg	9.8	.81	Chloride	Cl	40.	1.13
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	5.7	.09
Sodium	Na	267.	11.62	Sulfate	SO_4	144.6	3.01
				Alkalinity (as	$CaCO_3$)	464.	9.28
Turbidity		3		Hardness (as	$CaCO_3$)	94.	1.88
Color		0					
Odor		0					
Temp. (reported)		62.0°F		Total Dissolved Minerals		793.	

Summary sample study log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
QUATERNARY SYSTEM		
Pleistocene Series		
"Top soil clay"	23	23
"Hardpan blue, green and brown shale"	12	35
Till, silty, grayish green to brown, micaceous, gray at base	18	53
"Driftwood"	1 1/2	54 1/2
PENNSYLVANIAN SYSTEM		
Shale, limestone, sandstone, and coal	432 1/2	487
DEVONIAN SYSTEM		
Limestone, white to buff, fine, hard	63	550
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light gray, white to brown, very fine to fine, little medium, crystalline, upper 45 feet and basal 30 feet slightly porous	310	860
Alexandrian Series		
Dolomite, slightly cherty to cherty, light brown to light gray, very fine to fine, crystalline, little granular	103	963
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, gray, little greenish gray to brownish gray, weak, little brittle; little dolomite	87	1050
Dolomite, slightly silty to silty, gray to brownish gray, very fine to fine, little medium, crystalline	40	1090
Shale, dolomite, gray to brown, weak	84	1174
Galena Formation		
Dolomite, buff, very fine to medium, crystalline	216	1390
Decorah Formation		
Dolomite, cherty, buff, brown to reddish brown, little gray, red speckled, little black speckled, very fine to medium, crystalline	20	1410
Platteville Formation		
Dolomite, cherty to slightly cherty, buff, brown to gray, very fine to fine, little medium, crystalline, little granular, lower 15 feet calcareous, basal 5 feet very sandy	105	1515
Glenwood-St. Peter Formations		
Sandstone, silty, slightly dolomitic, light gray to light buff, very fine to coarse, little very coarse, rounded to subrounded, incoherent	55	1570
Sandstone, silty, slightly dolomitic, light gray, very fine to fine, little medium to coarse, rounded to subangular, frosted, incoherent	65	1635
Shale, sandy, greenish gray, weak	5	1640
		T. D.

NEW BADEN
Clinton County
May 6, 1959

One well is in service for the village of New Baden (1464) and one well is maintained for emergency use. Three other wells have been abandoned from service.

MILL WELL: The motor has been repaired and the well is pumped about once weekly for 1 hr. This well is being maintained for emergency service.

PARK WELL (formerly Well No. 2): This well is still hooked to the system but the pump parts are in bad repair and the pump motors have been removed.

BAER WELL (formerly Well No. 3): This well had a low yield for several years and has been abandoned since about 1953.

WELL NO. 4 (old Well No. 1): This well has been abandoned since about 1953.

WELL NO. 5 was completed in Sept. 1951 to a depth of 52 ft. 10 in. by Layne-Western Co., St. Louis, Mo., and located south of New Memphis and about 6 miles southeast of the Mill Well in New Baden, or approximately 2054 ft. N. and 30 ft. W. of the S. E. corner of Section 9, T1S, R5W. The ground surface elevation at the well is 400.

Well No. 5 is gravel packed in a 48-in. hole, having a 30-in. od. outer pipe from the surface to 25 ft. and a 10-in. id. inner pipe from the surface to 32 ft. 10 in. followed by 20 ft. of stainless steel No. 5 Layne shutter screen.

The annulus between the casings and outside the 10-in. casing and screen was filled with gravel from the bottom of the well to the top of the casings. The annulus between the 30-in. casing and the wall of the hole was filled with cement.

A production test was conducted by the Drilling Contractor in Sept. 1951. For the test a Layne turbine test pump was connected to a gasoline engine. After 8 hr. pumping at a rate of 360 gpm., the drawdown was 8.4 ft. from a static water level of 7. 9 ft. below the top of the 10-in. casing (1. 5 ft. above ground level). Later the casing was extended to 20 ft. above ground level.

Correlated driller's log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Black top soil	1 1/2	1 1/2
Yellow and brown clay	17 1/2	19
Brown sandy clay	4	23
Fine brown sand	12	35
Medium coarse brown sand	5	40
Medium coarse gray sand	5	45
Coarse gray sand and some gravel	7	52
Blue clay		52 +

The pumping equipment includes a Layne horizontal turbine pump rated at 180 gpm. and directly connected to a 25-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 149495) collected Apr. 30, 1959, after 5 min. pumping at a rate of 180 gpm., showed the water in Well No. 5 to have a hardness of 9.1 gr. per gal., total dissolved minerals of 219 ppm., and an iron content of 6. 9 ppm.

Well No. 5 is the principal source of supply. There are 375 services of which 12 services are located in New Memphis and 18 services are on the main between New Memphis and the corporation limit of New Baden.

Pumpage for New Baden for 1958 averaged 62, 410 gpd.

2 - New Baden

LABORATORY NO. 149495

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	6.9		Silica	SiO_2	16.3	
Manganese	Mn	0.5		Fluoride	F	0.1	
Calcium	Ca	37.5	1.88	Boron	B	0.0	
Magnesium	Mg	14.8	1.22	Chloride	Cl	10.	.28
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	16.	.70	Sulfate	SO_4	33.1	.69
				Alkalinity (as	$CaCO_3$)	140.	2.80
Turbidity		22		Hardness (as	$CaCO_3$)	155.	3.10
Color		0					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		219.	

NEWMAN
Douglas County
March 27, 1959

Water for the public water supply of the city of Newman (1097) is obtained from two wells.

WELLS NO. 1 and 2, described in Bulletin 40, have been abandoned.

WELL NO. 3 was completed in Nov. 1949 to a depth of 30 ft. by Hayes and Sims, Champaign, and located about 1 1/4 miles southeast of Well No. 2, or approximately 60 ft. N. and 2000 ft. E. of the S. W. corner of Section 32, T16N, R14W. The ground surface elevation at the well is 646. The well was cased with 23 ft. 10 in. of 10-in. id. pipe followed by a slotted bronze Cook screen, 11 ft. 2 in. long and connected to the casing by means of a lead packer.

A production test was conducted on Nov. 21-22, 1949 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Consulting Engineers. For the test the well was equipped with a Jaeger centrifugal dewatering pump with a 2-in. suction line. After 24 hr. pumping at 70 gpm., the drawdown was 9. 5 ft. from a nonpumping water level of 4. 5 ft. below the top of the casing. Three hr. after the pump was stopped, the water level had returned to 6 ft.

A mineral analysis of a sample (Lab. No. 119976) collected Nov. 22, 1949 showed the water to have a hardness of 16. 7 gr. per gal., total dissolved minerals of 318 ppm., and an iron content of 1.1 ppm.

_T.he pumping equipment includes a Jacuzzi 2-pipe jet pump, Model No. 5-T-4, rated at 66 gpm. at 160 ft. T.D.H. Well No. 3 is maintained for stand-by use.

WELL NO. 4 was completed in June 1953 to a depth of 58. 3 ft. by Hayes and Sims and located at the site of a test hole, about l/2 mile west of the corporate limits or about 2 miles northwest of Well No. 3, or approximately 140 ft. S. and 2260 ft. W. of the N. E. corner of Section 31, T14N, R11E. The elevation of the ground surface at the well is 649. The well was cased with 10-in. pipe from 1.8 ft. above the surface to 41 ft. below, followed by a 70 ft. length of 10-in. screen to the bottom. (The well was originally reported 62 ft. deep but on day of production test, the well was measured 58. 3 ft. deep.) The top 10 ft. of screen had No. 30 slot openings and the bottom 10 ft. had No. 40 slots.

A production test was conducted on June 22, 1953 by representatives of the Driller, the State Water Survey, City officials, and Warren and VanPraag. After 5 hr. pumping at a rate of 115 gpm., the drawdown was 5. 4 ft. from a nonpumping water level of 10. 2 ft. below the top of the casing. After 11 1/2 hr. additional pumping at 297 gpm., the final drawdown was 12. 4 ft. Eight min. after the pump was stopped, the water level had returned to 14.1 ft.

A mineral analysis of a sample (Lab. No. 132251) collected June 22, 1953, after 6 hr. pumping at 300 gpm., showed the water to have a hardness of 16. 3 gr. per gal., total dissolved minerals of 379 ppm., and an iron content of 1.1 ppm.

The pumping equipment includes 30 ft. of 5-in. column pipe; 6 l/2-in., 8-stage Peerless turbine pump, rated at 125 gpm. at 155 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 7 l/2-hp. U S electric motor.

Pumpage for the city in Jan. 1957 averaged 40,000 gpd.

LABORATORY NO. 132251

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	22.0	
Manganese	Mn	0.1		Fluoride	F	0.5	
Calcium	Ca	69.4	3.47	Chloride	Cl	5.	.14
Magnesium	Mg	26.2	2.16	Nitrate	NO_3	0.0	.00
Ammonium	NH_4	1.3	0.07	Sulfate	SO_4	1.8	.04
Sodium	Na	33.	1.44	Alkalinity (as	$CaCO_3$)	348.	6.96
Turbidity		1		Hardness (as	$CaCO_3$)	281.	5.63
Color		0					
Odor		0					
Temp. (reported)		54.4°F		Total Dissolved Minerals		379.	

NIANTIC
Macon County
June 28, 1960

Two wells are in service for the village of Niantic (629).

WELL NO. 1 is described in Bulletin 40. The location of the well has subsequently been corrected to 1944 ft. N. and 39 ft. W. of the S. E. corner of Section 2, T16N, R1W.

WELL NO. 2 was completed in Aug. 1958 to a depth of 49.5 ft. by G. C. Mashburn and Sons, Maroa, and located about 220 ft. south of Well No. 1, or approximately 1724 ft. N. and 39 ft. W. of the S. E. corner of Section 2. The ground surface elevation at the well is 595.

The well was cased with 10-in. pipe from the surface to 40 ft. followed by 10-in. Cook wire-wound Red Brass screen from 40 to 49. 5 ft. The screen had No. 22 slot openings.

A production test was conducted on Aug. 13, 1958 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Inc., Consulting Engineers. After 5 hr. pumping at a rate of 68 gpm., the drawdown was 13. 4 ft. from a static water level of 8. 2 ft. below the top of the casing (2 ft. above ground level). Ten min. after the pump was stopped, the water level had recovered to 8. 4 ft.

The well is equipped with a Fairbanks-Morse submersible pump, rated at 150 gpm., with a 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152610) collected June 28, 1960 showed the water in Well No. 2 to have a hardness of 19. 3 gr. per gal., total dissolved minerals of 416 ppm., and an iron content of 1. 8 ppm.

There are 210 services, 95% of which are metered. In 1958 numerous leaks in the system had been reportedly stopped and pumpage was subsequently reported to average 24, 000 gpd.

LABORATORY NO. 152610

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	15.8	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	84.1	4.21	Boron	B	0.1	
Magnesium	Mg	28.9	2.38	Chloride	Cl	14.	.39
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	4.7	.08
Sodium	Na	22.	.97	Sulfate	SO_4	18.1	.38
				Alkalinity (as	$CaCO_3$)	336.	6.72
Turbidity		7		Hardness (as	$CaCO_3$)	330.	6.59
Color		0					
Odor		0					
Temp. (reported)		59°F		Total Dissolved Minerals		416.	

NOBLE
Richland County
September 20, 1960

Four wells are in service for the village of Noble (761).

WELL NO. 1, described in Bulletin 40, is equipped with a Fairbanks-Morse jet pump rated at 50 gpm. and connected to a 5-hp. electric motor.

In Mar. 1949, after 2 hr. pumping at 50 gpm., the drawdown was reported to be 2 ft. from a static water level of 30 ft. (estimated).

WELL NO. 2 was completed in July 1948 to a depth of 210 ft. by Sutherland Drilling Co. and located 600 ft. southeast of Well No. 1, or approximately 1709 ft. S. and 532 ft. E. of the N. W. corner of Section 4, T3N, R9E. The ground elevation at the well is 500.

The well was cased with 8 l/2-in. diameter steel pipe to about 80 ft. and otherwise the construction of the well was similar to Well No. 1. The lower section of the casing was cut with 44 slots of 1/4 in. by 12 in. length.

In 1959 the following pumping unit was installed: 180 ft. of 2-in. discharge pipe; 3-in., 20-stage Jacuzzi submersible pump, model 3MA-18, Special T100B; 1. 5ft. of 3-in. suction strainer; 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152272) collected May 17, 1960, after 15 min. pumping, showed the water in Well No. 2 to have a hardness of 22 gr. per gal., total dissolved minerals of 619 ppm., and an iron content of 0.1 ppm.

WELL NO. 3 was completed to a depth of 210 ft. in 1948 by Sutherland Drilling Co. and located about 600 ft. east of Well No. 1, or approximately 2202 ft. S. and 308 ft. E. of the N. W. corner of Section 4. The well has been deepened from 210 to 238 ft. and the 8 l/2-in. diameter steel casing cut with 1-ft. long slots at 90, 100 and 110 ft. depths. Otherwise the construction of the well is similar in all respects to Well No. 1.

Well No. 3 is equipped with a Reda submersible pump rated at 11 gpm. at 100 ft. T.D.H., with a 3-hp. electric motor.

WELL NO. 4 was completed in Sept. 1960 to a depth of 230. 5 ft. by John Lowry, Olney, and located about 1000 ft. northeast of Well No. 3, or approximately 1700 ft. S. and 1000 ft. E. of the northwest corner of Section 4. The ground surface elevation at the well is 485.

The well was cased with 8-in. pipe in a 10-hole from 1 ft. above to 76 ft. below the surface, below which the hole was finished at 7 7/8 in. in diameter to the bottom. The annulus between the 8-in. casing and the wall of the 10-in. hole was cemented.

A production test was conducted on Sept. 15, 1960 by representatives of the Driller, the State Water Survey, and the Village officials. For the test a 4-in., 13-stage Sta-Rite submersible pump, 6 ft. in length, was set at 210 ft. and powered by a 2-hp. electric motor. After 4 hr. pumping at a rate of 15 gpm., the drawdown was 73. 6 ft. from a nonpumping water level of 87. 6 ft. below the top of the casing. One hr. after the pump was stopped, the water level had recovered to 91. 9 ft. Pumping was resumed and after 25 min. pumping at rates of 15, 20 and 28 gpm., the final drawdown was 85 ft.

When the system was installed, there were 191 services and 70% of the population was served. Pumpage in 1960 has been estimated to average 30,000 gpd.

LABORATORY NO. 152272

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	26. 0	
Manganese	Mn	Tr.		Fluoride	F	0. 2	
Calcium	Ca	72. 8	3. 64	Boron	B	0. 1	
Magnesium	Mg	47. 9	3. 94	Chloride	Cl	20.	. 56
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1. 1	. 02
Sodium	Na	98.	4. 26	Sulfate	SO_4	68. 3	1. 42
				Alkalinity (as	$CaCO_3$)	492.	9. 84
Turbidity		0		Hardness (as	$CaCO_3$)	379.	7. 58
Color		0					
Odor		0		Total Dissolved Minerals		619.	

NOKOMIS
Montgomery County
March 4, 1959

Six wells are in service for the public water supply of the city of Nokomis (2476).

WELLS NO. 1, 2, 3 and 4 are described in Bulletin 40 and are in service.

WELL NO. 5 was completed Aug. 25, 1950 to a depth of 37 ft. by L. R. Burt, Decatur, and located about 900 ft. southwest of the treatment plant, or approximately 650 ft. N. and 2255 ft. W. of the S. E. corner of Section 22, T10N, R2W. The ground surface elevation at the well is 675. Well No. 5 was cased with 30 ft. of 24-in. od. steel pipe from 2 ft. above the surface and with 12-in. wi. pipe from 2 ft. above to 29 ft. below the surface, followed by 8 ft. of 12-in. Johnson Everdur screen with No. 150 slot openings. The screen was welded to the bottom of the 12-in. casing. The hole was finished 24 in. in diameter from top to bottom, and the annulus between the casings and between the well wall and the 12-in. casing and screen was packed with selected gravel.

A production test was conducted on Aug. 16, 1950 by representatives of the Driller, the State Water Survey, and J. J. Woltmann, Consulting Engineer. For test purposes the pumping equipment included an engine driven turbine pump assembly with 30 ft. of 6-in. column pipe; 7 l/2 ft. of 8-in. pump bowls; 2 ft. of 6-in. suction pipe. The pump base was l/2 ft. above the top of the casings. After 4 l/2 hr. pumping at a rate of 88 gpm., the drawdown was 16. 3 ft. from a static water level of 17. 9 ft. below the top of the casings (20 ft. above ground level). Thirty min. after the pump was stopped, the water level had recovered to 18. 6 ft. Pumping was resumed at 106 gpm. and after 10 min. the drawdown was 15.1 ft. Following some intermittent surging, pumping was resumed at a rate of 75 gpm. and after 45 min. the drawdown was 9.5 ft. Ten min. after final pumping was stopped, the water level had recovered to 18.7 ft. or 0.8 ft. below the static level at the start of the test.

The permanent pump is an Aurora turbine, No. 49183, ratedatlOO gpm. against 60 ft. T.D.H. connected to a 3-hp. U S electric motor. An altitude gage and flow meter are installed.

A mineral analysis of a sample (Lab. No. 122707) collected Aug. 16, 1950, after 4 l/2 hr. pumping, showed the water in Well No. 5 to have a hardness of 20.1 gr. per gal., total dissolved minerals of 542 ppm., and an iron content of 4.1 ppm.

WELL NO. 6 was completed in Aug. 1951 to a depth of 41 ft. by Hayes and Sims, Champaign, and located 200 ft. east and 200 ft. north of Well No. 5, or approximately 840 ft. N. and 2040 ft. W. of the S. E. corner of Section 22. Well No. 6 was 480 ft. south of Test Hole No. 2-48, one of two test holes drilled for the city in 1948, by Hayes and Sims. Test Hole No. 2-48 was drilled to a depth of 39 ft. and located 1320 ft. N. and 2000 ft. W. of the S. E. corner of Section 22.

Sample study log of TEST HOLE NO. 2-48 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SYSTEM		
Till, yellow, buff, silty, noncalcareous	15	15
Sand, fine to coarse, mostly clean, partly silty, noncalcareous	5	20
Soil, light brown, silty, gravelly, noncalcareous	5	25
Gravel, granule and sand, medium to coarse, partly dirty, partly calcareous	14	39

Well No. 6 was cased with 12-in. pipe from 1 ft. above ground level to 29 ft. 2 in. below, followed by 13 ft. of 12-in. silicon red brass screen, the top 4 ft. having No. 14 slot openings and the bottom 8 ft. having No. 40 slot openings.

A production test was conducted on Aug. 22, 1951 by representatives of the Driller, the State Water Survey, City officials, and J. J. Woltmann. For test purposes the well was equipped with a Pomona turbine test pump, belt driven from a John Deere tractor. An air line was installed to a depth of 35 ft. from the top of the casing. After 7 1/4 hr. pumping at rates of 100 to 255 gpm., the drawdown was 10. 9 ft. from a nonpumping water level of 18 ft. below the top of the casing. Seven min. after the pump was stopped, the water level had recovered to 18. 7 ft.

A mineral analysis of a sample (Lab. No. 126205) collected Aug. 22, 1951, after 7 1/4 hr. pumping at 255 gpm., showed the water in Well

No. 6 to have a hardness of 22.7 gr. per gal., total dissolved minerals of 632 ppxn., and an iron content of 5. 8 ppm.

The permanent pump includes an Aurora turbine, No. 59514, rated at 140 gpm. against 60 ft. T.D.H. connected to a 5-hp. U S electric motor.

There are 900 services in Nokomis all metered.

Water is furnished the village of Coalton (352). Pumpage for Nokomis and Coalton is estimated to average 141,000 gpd. Pumpage for Nokomis only is estimated to average 125,000 gpd.

LABORATORY NO. 126205

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	5.8		Silica	SiO_2	28.5	
Manganese	Mn	0.2		Fluoride	F	0.4	
Calcium	Ca	110.6	5.53	Chloride	Cl	47.	1.33
Magnesium	Mg	27.4	2.25	Nitrate	NO_3	0.0	.00
Ammonium	NH_4	0.5	.03	Sulfate	SO_4	225.4	4.69
Sodium	Na	55.	2.37	Alkalinity (as	$CaCO_3$)	208.	4.16
Turbidity		16		Hardness (as	$CaCO_3$)	389.	7.78
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		632.	

NORTH AURORA
Kane County
July 31, 1958

One well is in service for the public water supply of the village of North Aurora (2088).

WELL NO. 1 is described in Bulletin 40. The 10-in. casing was extended 60 ft. in the summer of 1949. The well was given acid treatment on Aug. 11, 1953. Before treatment the static water level was 228 ft. below the pump base and, when pumping at a rate of 30 gpm., the drawdown was 55 ft. After treatment, when pumping at 125 gpm., the drawdown was 67 ft. below the static water level of 228 ft.

The depth of the well was reported 807 ft. Due to a clogged screen and other ailments the well production was curtailed until Well No. 2 was put into service. Well No. 1 presently is being maintained for emergency use.

WELL NO. 2 was completed to a depth of 1272 ft. in 1955 by Layne-Western Co., Aurora, and located behind the village hall, or approximately 1750 ft. S. and 500 ft. W. of the N. E. corner of Section 4, T38N, R8E. The elevation of the ground surface at the well is 680. The well is cased with 18-in. od. pipe, cemented in. from the surface to a depth of 530 ft., below which the hole was finished at 17 l/4 in. in diameter to the bottom.

A production test was conducted Mar. 31 Apr. 1, 1955 by representatives of the Driller, the State Water Survey, and Walter E. Deuchler, Associates, Consulting Engineers. For test purposes a 10-in., 16-stage Layne turbine pump was set at 330 ft. Power was obtained from a gasoline engine. After 24 hr. pumping at a rate of 480 gpm., the drawdown was 155.8 ft. from a static water level of 176. 2 ft. One and one-half hr. after the pump was stopped, the water level had recovered to 187.7.

The permanent pump assembly consists of 384 ft. of 6-in. column pipe; 9-stage Byron Jackson submersible pump, No. 311794, rated at 500 gpm. against 550 ft. T.D.H.; 384 ft. of air line; 100-hp. electric motor.

A mineral analysis of a sample (Lab. No. 147411) collectedJuly 30, 1958, after l/2 hr. pumping at a rate of 525 gpm., showed the water in Well No. 2 to have a hardness of 15 gr. per gal., total dissolved minerals of 385 ppm., and an iron content of 0. 2 ppm.

Well No. 2 furnishes the entire supply for the village. Pumpage in July 1958 was reported to average 164,000 gpd.

LABORATORY NO. 147411

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	7.6	
Manganese	Mn	Tr.		Fluoride	F	1.0	
Calcium	Ca	59.2	2.96	Boron	B	0.4	
Magnesium	Mg	26.3	2.16	Chloride	Cl	10.	.28
Ammonium	NH_4	0.7	.04	Nitrate	NO_3	0.8	.01
Sodium	Na	52.	2.24	Sulfate	SO_4	59.0	1.23
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		1		Hardness (as	$CaCO_3$)	256.	5.12
Color		0					
Odor		0					
Temp. (reported)		54.8°F		Total Dissolved Minerals		385.	

NORTHBROOK WEST
SUBDIVISION
Cook County
February 10, 1959

A public water supply was installed in 1955-56 for Northbrook West Subdivision. Water is obtained from one well, drilled in Dec. 1955 and Jan. 1956 by Henry Boysen, Libertyville, and located about 1 mile west of Northbrook, or approximately 1650 ft. S. and 900 ft. E. of the N. W. corner of Section 17, T42N, R12E. The elevation of the ground surface at the well is 688.

The well was cased with 12-in. pipe to limestone at 150 ft. and finished at 12 in. in diameter to a total depth of 286 ft. The Driller reported a crevice at 187 ft. and, when pumping at a rate of 64 gpm., the drawdown was 142 ft. from a nonpumping water level of 50 ft. below the surface. On Dec. 27, 1955 the Driller reported the well was acidized with 2000 gal. of 15% HC1 through the pump column, the bottom of which was set at 220 ft. On Jan. 3, 1956 following the acid treatment, when pumping at a rate of 99 gpm., the drawdown was 122 ft. from a nonpumping water level of 50 ft.

Subsequently, the permanent pumping equipment was installed and includes 250 ft. of 4-in. column pipe; 8-in., 14-stage Byron Jackson turbine pump, No. C322387, rated at 100 gpm. at 310 ft. T.D.H.; 250 ft. of air line; 20-hp. U S electric motor.

On Nov. 17, 1958 the nonpumping water level was 83 ft. by air line reading. A partial chemical analysis of a sample (Lab. No. 148282) collected Nov. 17, 1958 from a water main showed the water to have a hardness of 18. 6 gr. per gal., total dissolved minerals of 710 ppm., and an iron content of 0.1 ppm. Polyphosphate was present in the sample.

LABORATORY NO. 148282

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Fluoride	F	0. 1	
				Boron	B	0. 5	
				Chloride	Cl	15.	.42
				Alkalinity (as	$CaCO_3$)	100.	2. 00
Turbidity		1		Hardness (as	$CaCO_3$)	319.	6. 38
Color		0					
Odor		0					
Temp. (reported)		53. 0°F		Total Dissolved Minerals		710.	

NORTH CHILLICOTHE
Peoria County
May 29, 1958

Two wells are in service for the village of North Chillicothe (2259).

WELL NO. 1 is described in Bulletin 40. The pump and motor were overhauled in 1957 or 1958 and Weltone treatment was applied twice. The yield was reportedly increased.

WELL NO. 2 was completed in 1951 to a depth of 100 ft. by M. Ebert Co., Washington, and located on the south side of W. Wilmot St. about 5 blocks west of Well No. 1, or approximately 1045 ft. S. and 1210 ft. E. of the N. W. corner of Section 20, TUN, R9E. The ground surface elevation at the well is 529. The well was cased with 85 ft. of 10-in. black steel pipe followed by 15 ft. of Johnson Everdur screen, exposed to the aquifer, with No. 30 slot openings in the top 3 ft. of the screen, No. 40 slots in the next 2 ft., and the lower 10 ft. had No. 60 slots.

A production test was conducted onAug. 27, 1951 by representatives of the Driller, the State Water Survey, Village officials, and Austin Engineering Co., Consulting Engineers. For test purposes the well was equipped with a 9-stage Pomona turbine test pump set at 90 ft. and belt driven from a tractor. At the time of the test the top of the 10-in. casing was 1 ft. above ground level. After 2 hr. pumping at 365 gpm., the drawdown was 7.6 ft. from a static water level of 61. 6 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 126311) collected Aug. 27, 1951, after 2 hr. pumping at 365 gpm., showed the water in Well No. 2 to have a hardness of 17.6 gr. per gal., total dissolved minerals of 389 ppm., and an iron content of 0.1 ppm.

The pumping" equipment includes a Fairbanks-Morse Pomona turbine pump rated at 250 gpm. and connected to a 20-hp. General Electric motor.

There are 633 services.

Pumpage is reported to average 135, 000 gpd.

LABORATORY NO. 126311

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	17. 2	
Manganese	Mn	Tr.		Fluoride	F	0. 1	
Calcium	Ca	72. 1	3. 61	Chloride	Cl	19.	. 52
Magnesium	Mg	29. 4	2. 42	Nitrate	NO_3	6. 7	. 11
Ammonium	NH_4	0. 0	. 00	Sulfate	SO_4	90. 5	1. 89
Sodium	Na	19.	. 81	Alkalinity (as	$CaCO_3$)	216.	4. 32
Turbidity		Tr.		Hardness (as	$CaCO_3$)	302.	6. 03
Color		0					
Odor		0					
Temp. (reported)		60. 5°F		Total Dissolved Minerals		389.	

NORTHERN AIRE ESTATES
Cook County
February 10, 1960

A public water supply was installed in 1958 for Northern Aire Estates (est. 50), a subdivision formerly known as Ferndale Heights Utility Co., located north of Palatine. Two wells are in service.

WELL NO. 1 was completed to a depth of 342 ft. in 1958 by Layne-Western Co., Aurora, and located 680 ft. S.and 2100 ft. W. of the N. E. corner of Section 11, T42N, R10E. The ground surface elevation at the well is 760.

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, brown to dark buff	2	2
Till, slightly sandy, buff to brown	18	20
Till, slightly sandy, buff to gray	10	30
Till, slightly sandy, gray	5	35
Till, slightly sandy, very gravelly 70-120, 130-145, buff	140	175
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, slightly silty, white to buff, little green at base, very fine, crystalline	30	205
Alexandrian Series		
Dolomite, white to buff, very fine to fine, crystalline, cherty at base	33	238
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Shale, dolomitic, green to greenish gray, little red to yellow near top, weak; little dolomite	32	270
Dolomite, slightly silty to silty, gray, little buff, very fine to fine, crystalline; little shale; little siltstone at base	72	342

The well was cased with 18-in. steel pipe from the surface to 22 ft. and with 12-in. steel pipe with welded joints from the surface to 197 ft., below which the hole was finished 12 in. in diameter to the bottom at 342 ft. In a production test by the Driller on Nov. 6, 1958, when the well was completed, water was pumped for 8 hr. at a rate of 40 gpm. with a drawdown of 170 ft. from a static water level of 32 ft. below the top of the casing. For the test a 10-in. Layne turbine test pump with 6-in. discharge pipe was used with power from a Chrysler motor. An air line, 205 ft. long, was in place.

A partial chemical analysis of a sample (Lab. No. 148238) collected Nov. 4, 1958, after 3 l/2 hr. pumping at a rate of 30 gpm., showed the water in Well No. 1 to have a hardness of 14.1 gr. per gal., total dissolved minerals of 647 ppm., an iron content of 2 ppm., and a turbidity of 55 ppm.

WELL NO. 2 was completed in 1959 to a depth of 1550 ft. by Layne-Western Co. and located about 55 ft. north of Well No. 1, or approximately 630 ft. S. and 2085 ft. W. of the N. E. corner of Section 11. The ground surface elevation at the well is 755. The hole and casing record is shown in Table A.

TABLE A

Hole Record

24-in.	from	surface	to	192 ft.
17 1/4-in.	from	192	to	450 ft.
15-in.	from	450	to	995 ft.
12-in.	from	995	to	1550 ft.

Casing Record

24-in. from surface to 192 ft.
18-in. from surface to 450 ft. (cemented)

A production test was conducted by the Driller on Mar. 30, 1959, when the well was completed. For the test, a turbine test pump attached to 510 ft. of 8-in. column pipe was connected to a gasoline engine. After 4 hr. pumping at a rate of 663 gpm., the drawdown was 164 ft. from a static water level of 340 ft. below the top of the casing.

A partial chemical analysis (Lab. No. 149227) collectedMar. 30, 1959, after 4 hr. pumping, showed the water in Well No. 2 to have a

hardness of 15.6 gr. per gal., total dissolved minerals of 345 ppm., an iron content of 1.4 ppm., and a turbidity of 25 ppm.

The permanent pump is not yet installed.

A record of pumpage is not yet available. There are about 12 houses in the subdivision and fewer than 4 are occupied. Pumpage was estimated to average 500 to 1000 gpd. for the latter part of 1959.

LABORATORY NO. 148238

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.0		Fluoride	F	1.2	
				Chloride	Cl	10.	.28
				Nitrate	NO_3	2.5	.04
				Alkalinity (as	$CaCO_3$)	172.	3.44
Turbidity		55		Hardness (as	$CaCO_3$)	244.	4.88
Color		0					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		647.	

LABORATORY NO. 149227

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	0.5	
				Chloride	Cl	6.	.17
				Sulfate	SO_4	58.2	1.21
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		25		Hardness (as	$CaCO_3$)	267.	5.34
Color		0					
Odor		0					
Temp. (reported)		60.3°F		Total Dissolved Minerals		345.	

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown	1	1
Till, buff to brown	19	20
Till, gravelly, gray; little sand and gravel	162	182
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, slightly silty, white to buff, very fine to extra fine, crystalline	18	200
Alexandrian Series		
Dolomite, silty, slightly cherty, light buff, white, very fine to extra fine	40	240
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, slightly dolomite, green, brown, weak to brittle; dolomite, silty, buff, gray, fine	200	440
Galena Formation		
Dolomite, white, buff, fine to medium, crystalline	183	623
Decorah Formation		
Dolomite, white to light gray, light buff, fine to medium, black speckled; little shale	22	645
Platteville Formation		
Dolomite, silty, buff, gray, very fine to fine, granular to crystalline, mottled	110	755
Glenwood-St. Peter Formations		
Sandstone, slightly dolomitic at top, slightly silty, white to light gray, buff, fine to medium, incoherent to friable, very cherty and shaly at base	180	935
Oneota Formation		
Dolomite, sandy, cherty, white, buff, fine to very fine, crystalline	25	960
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, glauconitic at base, white to gray, very fine, crystalline; sandstone, white, fine to medium, incoherent	143	1103
Franconia Formation		
Sandstone, dolomitic, glauconitic, reddish-brown, fine, very fine, compact, little incoherent; little dolomite, shale and siltstone	42	1145
Ironton-Galesville Formations		
Sandstone, silty, slightly dolomitic, white, buff, fine to medium, little coarse, incoherent; little dolomite	165	1310
Eau Claire Formation		
Shale, dolomitic, grayish-green, weak to brittle; little dolomite	55	1365
Sandstone, dolomitic, glauconitic, very silty, gray, buff, very fine, friable to incoherent; little dolomite	185	1550 T. D.

NORTHFIELD WOODS
Cook County
July 18, 1958

A public water supply was installed in 1954 for Northfield Woods (est. 1080), a real estate development owned by the Weil-Built Homes and located at the intersection of Lake St. and Milwaukee Ave. about 3 miles northeast of Des Plaines. The development was planned to provide for 270 homes and a shopping center.

WELL NO. 1 was completed in July 1954 to a depth of 300 ft. by S. B. Geiger & Co., Chicago, and located approximately 2025 ft. N. and 725 ft. W. of the S. E. corner of Section 30, T42N, R12E. The well was cased with 12-in. od. pipe to a depth of 80 ft., below which the hole was finished 12 in. in diameter to the bottom. A production test was conducted on July 12, 1954 by representatives of the Drilling Contractor and the State Water Survey. A turbine test pump was set on a 3-in. column pipe at 240 ft. with the bottom of the suction pipe set at 260 ft. A 240-ft. air line was installed for measuring water levels. After 4 hr. pumping at a rate of 60 gpm., the drawdown was 179 ft. from a nonpumping water level of 55 ft. below the surface. One-half hr. after pumping was stopped, the water level had recovered to 61 ft.

A partial analysis of a sample (Lab. No. 135323) collected July 12, 1954, after 4 1/2 hr. pumping at 60 gpm., showed the water to have a hardness of 14 gr. per gal., total dissolved minerals of 380 ppm., and an iron content of 0. 8 ppm.

Well No. 1 was deepened in 1958 to 1369 ft. by S. B. Geiger & Co. The 12-in. bore hole was drilled to 469 ft. depth and the hole finished at 10 in. in diameter from 469 to the bottom at 1369 ft. The 12-in. casing from 0 to 80 ft. was left in place and a 10-in. liner was set from 213 to 469 ft. The elevation of the ground surface at the well is 658.

A production test was conducted on July 18, 1958 by representatives of the Drilling Contractor and the State Water Survey. For test purposes the pumping equipment included 400 ft. of 8-in. column pipe; 13-stage turbine test pump; 400 ft. of air line; 100-hp. electric motor. After 3 1/2 hr. pumping at a rate of 393 gpm., the drawdown was 22 ft. from a nonpumping water level of 303 ft. below the pump base.

A partial analysis of a sample (Lab. No. 147269) collected July 18, 1958, after 3 1/2 hr. pumping at a rate of 393 gpm., showed the water in Well No. 1 to have a hardness of 14.1 gr. per gal., total dissolved minerals of 447 ppm., and an iron content of 0. 5 ppm.

WELL NO. 2 was completed in Nov. 1954 to a depth of 830 ft. by S. B. Geiger fa Co. and located on Lot 212, at the corner of Maple and Linden St., or approximately 100 ft. N. and 600 ft. W. of the S. E. corner of Section 30. The ground elevation at the well is 652.

The well was cased with 12-in. od. pipe from the surface to 86 ft. and a 10-in. od. liner was set with the top at a depth of 265 ft. and extending to 480 ft.

A production test was conducted on Dec. 16, 1954 by representatives of the Drilling Contractor and the State Water Survey. For test purposes the well was equipped with 250 ft. of 4-in. column pipe; 6-in., 12-stage Sterling turbine pump; 15-hp. U S electric motor. After 5 l/2 hr. pumping at 153 gpm., the drawdown was 41 ft. from a nonpumping water level of 130 ft. Ten min. after pumping was stopped, the water level had recovered to 144 ft.

The permanent pumping equipment includes 300 ft. of 5-in. column pipe; 13-stage Byron Jackson turbine pump, No. C-308953, rated at 175 gpm. at 266 ft. T.D.H.; 20-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 147273) collected July 18, 1958 showed the water in Well No. 2 to have a hardness of 13. 2 gr. per gal., total dissolved minerals of 413 ppm., and an iron content of 0.1 ppm.

Pumpage for July 1958 averaged 43, 000 gpd.

2 - Northfield Woods

LABORATORY NO. 147273

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	10.4	
Manganese	Mn	0.1		Fluoride	F	0.3	
Calcium	Ca	46.0	2.30	Boron	B	0.9	
Magnesium	Mg	27.2	2.24	Chloride	Cl	22.	.62
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.8	.01
Sodium	Na	54.	2.36	Sulfate	SO_4	143.6	2.99
				Alkalinity (as	$CaCO_3$)	164.	3.28
Turbidity		0		Hardness (as	$CaCO_3$)	227.	4.54
Color		0					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		413.	

The city of Northlake (12, 318), described in Bulletin 40 as Northlake Village, was incorporated in July 1949.

During drilling in 1940, WELL NO. 1 was discontinued at a depth of 855 ft. owing to failure to recover several strings of tools lost in the well. This well was rehabilitated, reamed, and deepened in 1950 to a depth of 1520 ft. by S. B. Geiger & Co., Chicago. The well is located approximately 440 ft. N. and 2050 ft. E. of the S. W. corner of Section 32, T40N, R12E. The elevation of the ground surface at the well is 640.

While rehabilitating the well, the Driller reported encountering an iron object at 838 ft. which was "drilled by." More iron was encountered at 850 and 855 ft. which was "drilled by" also. The casing and hole sizes of the 855-ft. well were found as shown in Table A.

TABLE A

"15-in. casing from the surface to 60 ft.
Shouldered at 98 ft. to 12 in.
8-in. casing from 323 ft. to shoulder at 566 ft. 4 in.
8-in. hole at 850 ft.
The 15-in. casing was 15 in. out of plumb."

Following the deepening of Well No. 1, the hole size was reported as shown in Table B.

TABLE B

15-in. hole	from surface	to	310 ft.
12-in. hole	from 310	to	995 ft.
10-in. hole	from 995	to	1520 ft.

The water levels before and during the reconstruction of the well are shown in Table C.

TABLE C

Date 1950	Water Level (ft.)	Depth of Drilling (ft.)
Jan. 19	98	
Mar. 31	98	750
Apr. 21	98	855
May 17	98	1370
June 28	102	1520

A production test of Well No. 1 was conducted on July 27-28, 1950 by representatives of the Drilling Contractor, the State Water Survey, and Edwin Hancock Engineering Co., Consulting Engineers. For test purposes an 11 l/2-in. turbine pump was set on 480 ft. of 8-in. column pipe. A 480-ft. air line was installed. The water level during the final drilling stages was reportedly about 100 ft. below the drill floor. On the day prior to the production test, water was pumped for about 4 hr. The nonpumping water level was 340 ft. below the pump base. After 23 hr. of continuous pumping (300 gpm. for 4 hr., 400 gpm. for 4 hr., 500 gpm. for 9 hr., 600 gpm. for 4 hr., and 650 gpm. for 2 hr.), the rate of production was 650 gpm, and the water level was 478 ft. below the pump base, a drawdown of 138 ft. Pumping was then increased to 740 gpm. for 1/2 hr. but the water level could not be measured because it was below the bottom of the air line at 480 ft. One hr. after pumping was stopped on July 28, the water level had recovered to 360 ft. and on Sept. 9 the water level was reported at 286.5 ft.

On Apr. 11, 1957 the pump was out for repair and replaced by J. P. Miller Artesian Well Co., Brookfield. On the same date water could be heard running into the well. During the time the pump was out, water levels were recorded as shown in Table D.

TABLE D

Date 1957	Water Level
Apr. 11	291.0
May 15	276.5
June 24	261.0

In June 1957 S. B. Geiger & Co. installed new pumping equipment as follows: 695 ft. of 6-in. column pipe; 17-stage Byron Jackson submersible pump, Serial C-338811, rated at 500 gpm. at 610 ft. T.D.H.; 695 ft. of copper tubing air line; 100-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146605) collected May 6, 1958, after 126 hr. pumping at an estimated rate of 400 gpm., showed the water in Well No. 1 to have a hardness of 19. 6 gr. per gal., total dissolved minerals of 558 ppm., and an iron content of 0.1 ppm.

On May 8, 1958 the pumpage was estimated at 450,000 gpd.

On Aug. 14, 1957 the 315-ft. test well, or WELL NO. 2, drilled in 1946, was reported as "not in use. "

2 - Northlake

LABORATORY NO. 146605

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	12.6	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	83.7	4.19	Boron	B	0.2	
Magnesium	Mg	31.0	2.55	Chloride	Cl	27.	.76
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.3	.04
Sodium	Na	63.	2.74	Sulfate	SO_4	155.5	3.24
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		3		Hardness (as	$CaCO_3$)	337.	6.74
Color		0					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		558.	

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
No samples	850	850
ORDOVICIAN SYSTEM		
St. Peter Formation		
Sandstone, white, yellowish, fine to coarse, incoherent	134	984
Shale, yellowish orange, weak	1	985
Oneota Formation		
Dolomite, white to light gray; little chert at top	55	1040
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, white, yellowish gray, pinkish brown, fine to medium; little shale, green, weak; little chert	190	1230
Franconia Formation		
Dolomite, grayish to pinkish brown; sandstone, pinkish brown, fine to coarse, incoherent; little shale, green, brown, weak	82	1312
Galesville Formation		
Sandstone, white to light gray, medium to very coarse, incoherent	183	1495
Eau Claire Formation		
Sandstone, pale yellowish brown, gray, incoherent; dolomite, sandy, brownish-gray; little shale, gray, weak	25	1520

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NORTH TAZEWELL
PUBLIC WATER DISTRICT
Tazewell County
May 18, 1960

Three wells are in service for the North Tazewell Public Water District (est. 2100). The Water District serves the following subdivisions: Robein, Sunnyland, Doering Park, Maryland, and Lawnwood, When the Water District was organized, the facilities of the Robein Water Co. were taken over.

WELL NO. 1, described in Bulletin 40 under the Robein Subdivision, is in service.

A well, No. 1, of the Sunnyland Subdivision, was completed in 1938 to a depth of 283 ft. by Forest Ebert, Washington, andlocatedatPleasant St. near Theodore St. The well was cased with 285 ft. of 4-in. steel pipe and equipped with a Peerless lift pump connected toa5-hp. electric motor.

Sometime prior to 1952, this well was abandoned by the Robein Water Co.

WELL NO. 2 was completed in 1949 for the Robein Water Co. The well was drilled by Chris Ebert, Washington, and located in the main pumping station, about 35 ft. east of Well No. 1, or approximately 400 ft. N. and 1265 ft. W. of the S. E. corner of Section 24, T26N, R4W. The ground surface elevation at the well is 685. The well was cased with 10-in. pipe from 26 in. above floor level to 263 ft. followed by 20 ft. of 10-in. Johnson screen.

The pumping equipment reportedly includes 240 ft. of 5-in. column pipe; a 12-stage Peerless turbine pump, rated at 325 gpm., connected to a 25-hp. electric motor.

Well No. 2 is in service.

WELL NO. 3 was completed for the North Tazewell Public Water District in 1958 to a depth of 284 ft. by L. F. Winslow, Maysville, Iowa. The well is located about 400 ft. N. and 1200 ft. W. of the S. E. corner of Section 24. Well No. 3 was cased with 259 ft. 7 in. of 10-in. pipe from 1 ft. above ground level followed by 27 ft. of 8-in. screen with 5 ft. of blank steel pipe at the top of the screen. The lower part of the screen had a 12-ft. section of No. 15 slot openings and a 10-ft. section of No. 20 slot openings.

A production test was conducted on June 11, 1958 by representatives of the Driller, the State Water Survey, and Dwain Wallace, Consulting Engineer. After 5 1/2 hr. pumping at 425 gpm., the drawdown was 26 ft. from a nonpumping water level of 186 ft. (air line readings). Eleven min. after pumping was stopped, the water level had recovered to 186 ft.

The permanent pump assembly installed in Nov. 1958 consists of 237 ft. of 5-in. column pipe; 6-in., 7-stage HC. Fairbanks-Morse submersible turbine pump, No. 6917, rated at 400 gpm. at 230 ft. T.D.H.; 237 ft. of air line (with gage); 30-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152274) collected May 16, 1960 showed the water in Well No. 3 to have a hardness of 22 gr. per gal., total dissolved minerals of 411 ppm., and an iron content of 3 ppm.

Pumpage for 1959 averaged 232, 000 gpd.

LABORATORY NO. 152274.

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.0		Silica	SiO_2	15.0	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	84.9	4.25	Boron	B	0.1	
Magnesium	Mg	33.8	2.78	Chloride	Cl	8.	.23
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	0.2	Tr.
Sodium	Na	16.	.71	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	376.	7.52
Turbidity		9		Hardness (as	$CaCO_3$)	351.	7.03
Color		20					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		411.	

OAK FOREST
Cook County
January 12, 1959

Water for Oak Forest (3724) is obtained from one well. The water system, formerly owned by the Suburban Water Co., is now owned and operated by the Illinois Municipal Water Co.

WELL NO. 1, described in Bulletin 40, was disconnected from the distribution system some time after the construction of Well No. 2.

WELL NO. 2 was completed in Feb. 1952 to a depth of 297 ft. by Henry Boysen, Libertyville, and located on 151st St. between LaClaire and LaVerne Ave., about l/4 mile north and l/2 mile west of Well No. 1, or approximately 100 ft. S. and 1750 ft. W. of the N. E. corner of Section 16, T36N, R13E. The ground elevation at the well is 660.

Well No. 2 was cased with 20-in. od. steel pipe from the surface to 21 ft. and with 12-in. id. steel pipe from 12 in. above to 68 ft. below the surface. The hole was finished 12 in. in diameter to the bottom.

A production test was conducted on Feb. 6, 1952 by representatives of the Drilling Contractor, the State Water Survey, H. B. Bleck Engineering Co., Consulting Engineers, and the Owners. For test purposes a deep-well turbine pump, set at 120 ft., was used with power from a gasoline engine. An air line, 120 ft. in length', was installed for measurement of water levels. After 3 hr. pumping at a rate of 346 gpm., the drawdown was 31 ft. from a static level of 15 ft. below the top of the casing. Pumping was continued for an additional 3 l/2 hr. at a rate of 490 gpm. with a final drawdown of 55 ft.

The permanent pump assembly includes 120 ft. of 5-in. column pipe; 8-in., 9-stage Layne turbine pump, No. 24606, having a length of 6 ft. 2 in. and rated at 375 gpm.; 10 ft. of 6-in. suction pipe; 120 ft. of l/4-in. gi. air line; 25-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 147154) collected July 1, 1958 showed the water from Well No. 2 to have a hardness of 30 gr. per gal., total dissolved minerals of 679 ppm., and an iron content of 2 ppm.

Pumpage for 1958 averaged 75, 000 gpd.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, silty, dark brown; clay, silty, dark yellowish orange	10	10
Till, dark yellowish orange	15	25
Gravel and sand, yellowish gray	15	40
Sand and very fine gravel, yellowish gray	5	45
Gravel and sand yellowish gray	25	70
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light gray to light yellowish gray; little shale, pale yellowish gray, weak	225	295

LABORATORY NO. 147154

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.0		Silica	SiO_2	18.1	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	117.1	5.86	Boron	B	0.1	
Magnesium	Mg	53.0	4.34	Chloride	Cl	12.	.34
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	0.5	.01
Sodium	Na	29.	1.27	Sulfate	SO_4	215.8	4.49
				Alkalinity (as	$CaCO_3$)	332.	6.64
Turbidity		7		Hardness (as	$CaCO_3$)	510.	10.20
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		679.	

OAKVIEW AVENUE
SUBDIVISION
Will County
May 25, 1960

A public water supply was installed before 1946 for the Oakview Avenue Subdivision (est. 550). There are 150 houses in the subdivision. The water system is owned and operated by Mr. R. E. Snure, Joliet. Three wells have been drilled; one has been abandoned, one is maintained as a stand-by unit, and one is in regular service.

WELL NO. 1 was drilled to a depth of 110 ft. and cased with 4-in. pipe to limestone at 72 ft. The well is located on Washington St., approximately 800 ft. S. and 800 ft. W. of the N. E. corner of Section 14, T35N, R10E. The ground surface elevation at the well is 600.

The well is equipped with a Deming plunger pump, with 60 ft. of 2-in. discharge pipe and connected to a 3-hp. electric motor.

In July 1953 the nonpumping water level was 37 ft.

Well No. 1 is maintained for emergency use only.

WELL NO. 2, located on Hubbard St. about 500 ft. southeast of Well No. 1, or approximately 1750 ft. S. and 500 ft. W. of the N. E. corner of Section 14, was abandoned and plugged about 1950.

WELL NO. 3 was completed in 1946 to a depth of 257 ft. by Jack Hinton, Lockport, and located on Oakview Ave. about 1/2 mile southwest of Well No. 1, or approximately 2600 ft. S. and 1150 ft. W. of the N. E. corner of Section 14. The ground surface elevation at the well is 635. The well was cased with 6-in. pipe from the surface to 31 ft. and cemented in. Limestone was penetrated at 14 ft.

The pumping equipment consists of 150 ft. of 3-in. column pipe; 9-stage Peerless Hi-Lift pump, No. 34160, rated at 80 gpm.; 5-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152394) collected May 25, 1960 showed the water in Well No. 3 to have a hardness of 32.4 gr. per gal., total dissolved minerals of 557 ppm., and an iron content of 0.1 ppm.

Well No. 3 is in regular service.

There are 150 services. Pumpage is estimated to average 33, 000 gpd.

LABORATORY NO. 152394

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	11.1	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	106.2	5.31	Boron	B	0.1	
Magnesium	Mg	50.0	4.11	Chloride	Cl	21.	.59
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	14.4	.23
Sodium	Na	13.	.58	Sulfate	SO_4	141.3	2.94
				Alkalinity (as	$CaCO_3$)	312.	6.24
Turbidity		2		Hardness (as	$CaCO_3$)	471.	9.42
Color		0					
Odor		0					
Temp. (reported)		52.8°F		Total Dissolved Minerals		557.	

OAKVIEW SUBDIVISION
DuPage County
April 9, 1958

A public water supply was installed for Oakview Subdivision (est. 35). The system is owned and operated by the DuPage County Utility Co.

WELL NO. 1 was completed in May 1957 to a depth of 200 ft. by Layne-Western Co., Aurora, and located south of Lisle on the west side of Kingston between Gamble and Rolling Drive, or approximately 1965 ft. N. and 915 ft. E. of the S. W. corner of Section 11, T38N, R10E. The ground surface elevation at the well is 720. The well was cased with 12-in. steel welded pipe from the surface to 115 ft. and with 8-in. steel pipe from the surface to 119 ft., below which the hole was finished 8 in. in diameter to the bottom at 200 ft. The 8-in. casing was cemented in from 119 ft. to the surface.

The Drilling Contractor reportedly conducted a production test on May 7, 1957 using an 8-in. American Well Works test pump, No. 04126, on 5-in. column pipe. An air line, 140 ft. long, was installed and power was furnished from a gasoline engine. After 7 l/2 hr. pumping at a rate of 305 gpm., the drawdown was 12 ft. from a nonpumping water level of 96 ft. below the top of the casing (2 ft. above ground level).

The permanent pumping installation consists of 150 ft. of 6-in. column pipe; 8-in., 8-stage Layne turbine pump, rated at 300 gpm. at 215 ft. T.D.H.; 150 ft. of air line; 25-hp. U S electric motor.

A mineral analysis of a sample (Lab, No. 146277) collected Apr. 4, 1958, after 5 min. pumping, showed the water to have a hardness of 37. 3 gr. per gal., total dissolved minerals of 646 ppm., and an iron content of 0. 3 ppm.

In Nov. 1957 there were 8 services, all metered. Daily pumpage has not been estimated.

LABORATORY NO. 146277

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 3		Silica	SiO_2	16. 0	
Manganese	Mn	0. 0		Fluoride	F	0. 1	
Calcium	Ca	115. 6	5. 78	Boron	B	0. 1	
Magnesium	Mg	60. 3	4. 96	Chloride	Cl	24.	. 68
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 5	. 01
Sodium	Na	12.	. 51	Sulfate	SO_4	234. 5	4. 88
				Alkalinity (as	$CaCO_3$)	284.	5. 68
Turbidity		3		Hardness (as	$CaCO_3$)	537.	10. 74
Color		0					
Odor		0					
Temp. (reported)		51°F		Total Dissolved Minerals		646.	

Oakview Subdivision

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, slightly gravelly, partly slightly sandy, buff to grayish buff	15	15
Gravel, sand (dolomite and chert fragments), and till, gray, buff	60	75
Gravel (dolomite and chert fragments) white, gray, buff, very clean	25	100
Sand (quartz, dolomite, and chert), fine, medium to coarse, multi-colored, with little gravel (dolomite and chert), multi-colored, clean	15	115
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite, slightly cherty, white, very fine, crystalline	20	135
Dolomite, white, light buff, fine to very fine, with some visible porosity (vugular)	25	160
Dolomite, white, little yellow, fine to very fine, crystalline	15	175
Dolomite, cherty to slightly cherty, white to light buff, very fine to fine, crystalline	15	190
Dolomite, silty, slightly glauconitic yellow, light green, light pinkish-yellow, very fine, crystalline; siltstone, very dolomitic, slightly sandy, slightly glauconitic, purple, red, tough	10	200

OAKWOOD SHORES SUBDIVISION
McHenry County
November 16, 1959

One well is in service for the public water supply of the Oakwood Shores Subdivision (est. 350). The subdivision is located near McHenry on the eastern shore of Wonder Lake. The well is owned by Mr. T. P. Mathews.

WELL NO. 1 was completed to a depth of 222 ft. in 1959 by Art Wertz, Antioch, and located on the eastern shore of Wonder Lake, or approximately 1850 ft. N. and 1600 ft. W. of the S. E. corner of Section 18, T45N, R8E. The ground surface elevation at the well is 870. The well was cased with 8-in. pipe from 2 ft. above the surface to 215 ft. followed by 7 ft. of 8-in. Johnson Everdur screen.

A production test was conducted on Nov. 16, 1959 by representatives of the Driller, the State Water Survey, and Subdivision officials. The permanent pump was installed at the time of the test. After 1 hr. pumping at a rate of 250 gpm., the drawdown was 16 ft. from a static water level of 70 ft. below the top of the casing (2 ft. above L.S.D.).

A partial chemical analysis of a sample (Lab. No. 151002) collected Nov. 16, 1959, after 1 hr. pumping at 250 gpm., showed the water in Well No. 1 to have a hardness of 12.8 gr. per gal., total dissolved minerals of 305 ppm., and an iron content of 1.3 ppm.

The permanent pumping equipment consists of 100 ft. of 3-in. column pipe; 4-in., 6-stage Myers submersible pump, rated at 1989 gpm. against 100 ft. T.D.H.

No pumpage data are available as yet. Only a few homes are occupiedat present. Ninety-six homes will be constructed. Pumpage may then be estimated to average 20,000 gpd.

LABORATORY NO. 151002

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Fluoride	F	0.6	
Manganese	Mn	0.0		Chloride	Cl	0.	.00
				Nitrate	NO_3	0.8	.01
				Alkalinity (as	$CaCO_3$)	300.	6.00
Turbidity		2		Hardness (as	$CaCO_3$)	220.	4.40
Color		0					
Odor		0					
Temp. (reported)		51.0°F		Total Dissolved Minerals		305.	

OLYMPIA FIELDS
Cook County
March 4, 1959

At Olympia Fields (1503), WELL NO. 1 Pomona pump was overhauled about 1948. A new pump shaft and drop pipe were installed at that time. About 1949 the Westinghouse induction motor was overhauled. The well is now equipped with 60 ft. of 5-in. column pipe; 8-in., 9-stage Pomona turbine pump, No. SR-1600, rated at 250 gpm. at 201 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 15-hp. Westinghouse electric motor.

A production test was conducted by the State Water Survey on May 4, 1956. After 3 hr. pumping at a rate of 380 gpm., the drawdown was 3. 9 ft. from a nonpumping water level of 17 ft. below the pump base. Twenty-five min. after pumping was stopped, the water level had recovered to 17. 5 ft.

A partial analysis of a sample (Lab. No. 147812) collected Sept. 25, 1958 showed the mineral composition of the water to be generally similar to that shown in Lab. No. 107162. In addition, the boron content was shown to be 0. 5 ppm.

WELL NO. 2 was completed in Dec. 1958 to a depth of 270 ft. by Layne-Western Co., Aurora, and located 150 ft. N. and 1500 ft. E. of the S. W. corner of Section 14,. T35N, R13E. The ground surface elevationat the well is 7 11. The well was cased with 12-in. steel welded pipe to 92 ft. 9 in. and the hole was finished 12 in. in diameter to the bottom at 270 ft.

A production test was conducted by the Driller on Dec. 18, 1958, using test pumping equipment. After 8 hr. pumping at a rate of 560 gpm., the drawdown was 31 ft. from a static level of 42 ft. below the top of the casing (2 ft. above the ground surface).

A partial chemical analysis of a sample (Lab. No. 148886) collected Mar. 1959 showed the water in Well No. 2 to have a hardness of 29 gr. per gal., total dissolved minerals of 646 ppm., and an iron content of 0. 2 ppm.

Pumpage for the first 6 mo. of 1958 averaged 33,700 gpd.

LABORATORY NO. 148886

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Fluoride	F	0.1	
				Chloride	Cl	4.	.11
				Nitrate	NO_3	1.5	.02
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		4		Hardness (as	$CaCO_3$)	499.	9.98
Color		0					
Odor		0		Total Dissolved Minerals		646.	

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, black	5	5
Till, sandy, gray to buff	45	50
Sand, gravelly, silty; little till, buff	39	89
SILURIAN SYSTEM		
Siltstone, very dolomitic, green, tough; little dolomite slightly silty, buff to gray, little white, very fine, crystalline	61	150
Dolomite, slightly silty, buff to gray, very fine, crystalline; siltstone, grayish green, tough	10	160
Dolomite, slightly silty, slightly calcareous, buff to gray, very fine, crystalline; siltstone, very dolomitic, grayish green, tough	15	175
Dolomite, calcareous, slightly silty, brown to buff, little gray, mottled, lithographic to very fine, crystalline; little siltstone	20	195
Limestone, dolomitic, white to light grayish green, lithographic to very fine, crystalline	45	240
"Limestone, gray, soft" (no samples)	30	270

ONEIDA HEIGHTS
SUBDIVISION
Rock Island County
May 13, 1959

A public water supply was installed about 1953 for Oneida Heights Subdivision (est. 350).

Water is obtained from one well drilled about 1952 to a depth of 450 ft. and located about 1 1/2 miles southeast of Silvis at the junction of Tenth St. and Colona Road, or approximately 2900 ft. N. and 1600 ft. W. of the S. E. corner of Section 6, T17N, R1E. The ground surface elevation at the well is 700.

The well is cased with 6 or 8-in. pipe to an unknown depth and is equipped with a Red Jacket submersible pump.

A mineral analysis of a sample (Lab. No. 149559) collected May 5, 1959 showed the water in the subdivision well to have a hardness of 15.2 gr. per gal., total dissolved minerals of 394 ppm., and an iron content of 3. 5 ppm.

Pumpage is estimated to average 17, 000 gpd.

LABORATORY NO. 149559

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.5		Silica	SiO_2	11.2	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	60.2	3.01	Boron	B	0.2	
Magnesium	Mg	26.8	2.21	Chloride	Cl	3.	.08
Ammonium	NH_4	2.2	.12	Nitrate	NO_3	5.1	.08
Sodium	Na	53.	2.32	Sulfate	SO_4	25.9	.54
				Alkalinity (as	$CaCO_3$)	348.	6.96
Turbidity		16		Hardness (as	$CaCO_3$)	261.	5.22
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		57.5°F		Total Dissolved Minerals		394.	

A public water supply was installed for the village of Oreana (464).

WELL NO. 1 was completed in July 1958 to a depth of 131.5 ft. by Layne-Western Co., Aurora, and located 2950 ft. N. and 1250 ft. W. of the S. E. corner of Section 9, T17N, R3E. The ground surface elevation at the well is 685. The well was cased with 118 ft. of 6-in. pipe followed by 14.5 ft. of Layne wire-wrapped screen having No. 80 slot openings.

A production test was conducted on July 31, 1958 by representatives of the Driller, the State Water Survey, and Clark, Daily and Dietz, Consulting Engineers for the village. After 22 hr. pumping at a rate of 102 gpm., the drawdown was 13. 8 ft. from a static water level of 41.2 ft. below L. S. D. Pumping was then continued for 1 1/2 hr. at 150 gpm. with a drawdown of 17. 6 ft, and an additional 45 min. at 200 gpm. with a final drawdown of 23 ft. Forty-five min. after the test was stopped, the water level had recovered to 47 ft.

A partial chemical analysis of a sample (Lab. No. 147332) collected July 31, 1958, after 21 hr. pumping, showed the water in Well No. 1 to have a hardness of 21.7 gr. per gal., total dissolved minerals of 594 ppm., and an iron content of 9.1 ppm.

The permanent pumping equipment consists of 4-in. column pipe; 4-in., 9-stage Deming turbine pump, rated at 50 gpm. against 90 ft. T.D.H.; total length of column pipe, pump and strainer is 90 ft.; 10 ft. of 4-in. suction pipe; 75 (?) ft. of air line (defective); 2-hp. U S electric motor.

The well and pump are located outside of the building. Methane gas is present.

Pumpage records have not been made available. Pumpage is estimated to average 25,000 gpd.

LABORATORY NO. 147332

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	9. 1		Fluoride	F	0. 3	
Manganese	Mn	Tr.		Chloride	Cl	18.	.51
				Nitrate	NO_3	0. 4	.01
				Alkalinity (as	$CaCO_3$)	540.	10. 80
Turbidity		77		Hardness (as	$CaCO_3$)	372.	7. 44
Color		0					
Odor		0					
Temp. (reported)		54. 5°F		Total Dissolved Minerals		594.	

Water for the public supply of Orland Park (2592) is obtained from one well.

WELL NO. 1, described in Bulletin 40, is now equipped with a Deming pump, No. 16522, and a 7 l/2-hp. U S electric motor. The well is maintained for emergency use only.

WELL NO. 2 was completed in May 1956 to a depth of 397 ft. by Layne-Western Co., Aurora, and located north of 143rd St. and west of Keane Ave., about l/4 mile north and l/4 mile east of Well No. 1, or approximately 510 ft. N. and 175 ft. W. of the S. E. corner of Section 4, T36N, R12E. The ground elevation at the well is 712.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish brown, gray	50	50
Sand, silty, fine to very fine	5	55
Sand, gravelly, very fine to coarse	10	65
Till, gray	10	75
Sand, silty, fine to very fine	35	110
Till, dark brown, gray	15	125
Gravel, white, medium to coarse	15	140
Sand, white, fine to very coarse; broken limestone	5	145
Gravel, fine to coarse	5	150
SILURIAN SYSTEM		
Dolomite, white to buff, gray, very fine to crystalline	247	397

Well No. 2 was cased with 12-in. steel welded pipe to 160 ft., below which the hole was finished 12 in. in diameter. A production test was conducted on May 28, 1956 by representatives of the Drilling Contractor and the State Water Survey. For test purposes a turbine test pump was used at a setting of 145 ft. An air line, 145 ft. in length, was installed for measuring water levels. After 7 l/2 hr. pumping at a rate of 458 gpm., the drawdown was 103. 5 ft. from a nonpumping water level of 35 ft. below the top of the casing. Six min. after pumping was stopped, the water level had recovered to 37 ft.

The permanent pump assembly includes 170 ft. of 8-in. column pipe; 10-in., 6-stage Layne turbine pump, No. 34265, having a length of 5 ft. 6 in. and rated at 450 gpm.; air line 185 ft. long; 10 ft. of 6-in. suction pipe; 50-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146510) collected Apr. 29, 1958 showed the water in Well No. 2 to have a hardness of 26. 2 gr. per gal., total dissolved minerals of 563 ppm., and an iron content of 0. 4 ppm.

WELL NO. 3 was completed to a depth of 453 ft. in June 1960 by Layne-Western Co. and located about 264 ft. N. and 106 ft. E. of the S. W. corner of Section 9, T36N, R12E, which is the intersection of West Ave. and 151st St. The well was cased with 144 ft. 9 in. of 12-in. pipe cemented in a 16-in. hole. The hole was finished 12 in. in diameter to the bottom.

When the well was completed, the Driller reported pumping for 24 hr. at a rate of 560 gpm. with a drawdown of 35 ft. from a nonpumping water level of 52 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 152723) showed the water in Well No. 3 to have a hardness of 26.4 gr. per gal., total dissolved minerals of 468 ppm., and an iron content of 0. 5 ppm.

The permanent pump has not yet been installed.

Pumpage for 1957 averaged 75, 000 gpd.

2 - Orland Park

LABORATORY NO. 146510

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	19.0	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	91.9	4.60	Boron	B	0.2	
Magnesium	Mg	53.3	4.38	Chloride	Cl	1.	.03
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	1.2	.02
Sodium	Na	21.	.93	Sulfate	SO_4	112.5	2.35
				Alkalinity (as	$CaCO_3$)	376.	7.52
Turbidity		4		Hardness (as	$CaCO_3$)	449.	8.98
Color		0					
Odor		0					
Temp. (reported)		52.4°F		Total Dissolved Minerals		563.	

Three wells are in service for the public water supply of the village of Oswego (1510).

WELL NO. 1, described in Bulletin 40, was acidized on Dec. 8, 1953 with 1000 gal. HC1. The total depth of the well was measured 669 ft. The original depth was 680 ft. After the acidizing, the well produced at a rate of 100 gpm. with a drawdown of 37 ft. from a static water level of 143 ft. below the surface (elev. 620). In Feb. 1954 following the installation of a new pump, a production test was conducted. During pumping at a rate of 125 gpm., the drawdown was 63 ft. from a static water level of 143 ft. below the surface.

In July 1957 the air line length was reported to be 240 ft. and the pumping water level was 223 ft.

WELL NO. 2, described in Bulletin 40, was repaired in Sept. 1950 by Layne-Western Co., Aurora. The hole in the rock below the 8-in. drive pipe was reamed out from 6 in, to 8 in. in diameter. The completed depth of the well was 728 ft. or 26 ft. deeper than originally. Two shot charges of 50 lb. each were set off at depths of 718 and 711 ft. About 3 cu. yd. of sand was cleaned out. The static water level was 150 ft. below the surface.

The pump was lowered in Sept. 1954 by Layne-Western Co. The air line was then measured at 240 ft. and in a production test on Sept. 20, 1954, after 4 hr. pumping at a rate of 88 gpm., the drawdown was 37 ft. from a non-pumping water level of 166 ft. below the surface (elev. 656).

WELL NO. 3 was completed in Oct. 1957 to a depth of 1378 ft. by Layne-Western Co. and located about l/4 mile southwest of Well No. 2, or approximately 75 ft. S. and 650 ft. E. of the N. W. corner of Section 20, T37N, R8E. The ground surface elevation at the well is 640. The hole and casing record is shown in Table A.

The well was shot atfour levels with 150 lb. of 100% gelatin, to wit: 1350, 1313, 1280 and 1240 ft.

TABLE A

Hole Record

26-in.	from surface	to	32	ft.
25-in.	from 32	to	520	ft.
19 1/4-in.	from 520	to	789	ft.
15 1/4-in.	from 789	to	1380	ft.

Casing Record

26-in. steel pipe from surface to 32 ft.
20-in. steel pipe from surface to 520 ft.
16-in. steel pipe slotted from 709 to 789 ft.
The 20-in. casing was cemented in from bottom to top.

A production test was conducted by the Driller on Oct. 26, 1957. For the test, the pumping equipment consisted of al5-in., 5-stage Layne turbine test pump set on 8-in. column pipe; 455 ft. of air line; LeRoi engine. After 10 hr. pumping at a rate of 1227 gpm., the drawdown was 149 ft. from a static water level of 190 ft. below the pump base (1 ft. above ground level). One hr. after the pump was stopped, the water level had recovered to 262 ft.

The permanent pumping equipment consists of 400 ft. of 8-in. column pipe; 12-in., 9-stage Byron Jackson submersible pump, No. 344372, rated at 1000 gpm. at 550 ft. T.D.H.; 400 ft. of air line; 200-hp. electric motor.

A mineral analysis of a sample (Lab. No. 147412) collected July 31, 1958 showed the water in Well No. 4 to have a hardness of 13.4 gr. per gal., total dissolved minerals of 467 ppm., and an iron content of 0. 3 ppm.

In May 1958 there were 435 services.

Pumpage for the village in 1958 is estimated to average 75,000 gpd.

2 - Oswego

Summary sample study log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, slightly sandy, black	3	3
Till, slightly sandy, buff	4	7
Gravel and sand, clean; little till, (7-15), brownish buff	23	30
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Limestone, clayey, green, gray, fine to very fine, crystalline, partly granular	20	50
Limestone, slightly cherty, gray, fine to very fine, granular, shale partings; little siltstone	65	115
Shale, calcareous, very clayey, brown, weak; little siltstone	45	160
Mohawkian Series		
Galena Formation		
Limestone, slightly sandy, partly cherty, partly slightly argillaceous, chalky, weak, buff, white, fine to very fine, crystalline	205	365
Dolomite, partly very calcareous, white, buff, fine to medium, crystalline	55	420
Platteville Formation		
Limestone, gray, buff, very fine to fine, crystalline, little black mottled	65	485
Dolomite, buff, gray, fine to very fine, crystalline, some visible porosity	25	510
Glenwood-St. Peter Formations		
Sandstone, dolomitic, white, buff, medium to incoherent, friable	65	575
Sandstone, partly clayey, white, medium, fine to medium, incoherent, partly friable	150	725
Sandstone, very clayey, very cherty, dolomitic, white, buff, medium to coarse, incoherent, friable; shale, green, red, brown, tough; little dolomite	50	775
Prairie du Chien Series		
Oneota Formation		
Dolomite, cherty, slightly sandy, white, buff, fine to medium, crystalline; little sandstone at base	185	960
CAMBRIAN SYSTEM		
St. Croixan Series		
Trempealeau Formation		
Glauconitic, dolomite, glauconitic, buff, brown, gray, fine to very fine, granular to crystalline, basal 45' extremely pyrite	130	1090
Franconia Formation		
Sandstone, glauconitic, dolomitic, gray, fine to medium, compact to incoherent	90	1180
Ironton Formation		
Sandstone, dolomitic, buff, medium, fine, incoherent, compact	95	1275
Galesville Formation		
Sandstone, white, fine, little medium, incoherent	95	1370
Eau Claire Formation		
Sandstone, dolomitic, gray, buff, fine to very fine, compact, extremely pyritic; shale, sandy, green, brittle	2	1372

LABORATORY NO. 147412

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	7.5	
Manganese	Mn	Tr.		Fluoride	F	1.0	
Calcium	Ca	51.2	2.56	Boron	B	0.5	
Magnesium	Mg	24.9	2.05	Chloride	Cl	22.	.62
Ammonium	NH_4	1.1	.06	Nitrate	NO_3	0.6	.01
Sodium	Na	83.	3.61	Sulfate	SO_4	113.8	2.37
				Alkalinity (as	$CaCO_3$)	264.	5.28
Turbidity		2		Hardness (as	$CaCO_3$)	230.	4.61
Color		0					
Odor		0					
Temp. (reported)		58.0°F		Total Dissolved Minerals		467.	

There are four wells in service for the village of Palatine (11, 504). Well numbering, as described in Bulletin 40, has been changed, and old Wells No. 1, 2 and 4 have been abandoned.

WELL NO. 1 (formerly Well No. 3), located at 54 S. Broadway, was reported in June 1957 to be equipped with a 300-gpm. pump set at 140 ft. The nonpumping water level in June 1957 was 30 ft.

WELL NO. 2 (formerly Well No. 5) is in service with no reported change.

WELL NO. 3 was completed in June 1953 to a depth of 1380 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at 610 E. Lincoln St., or approximately 1000 ft. N. and 1500 ft. E. of the S. W. corner of Section 14, T42N, R10E.

The well was reportedly cased with 16-in. pipe. A production test was conducted by the Driller on June 10-11, 1953. A 12-in., 10-stage Peerless turbine pump was used at a setting of 500 ft. on 8-in. column pipe; 500 ft. of air line was installed for measuring water levels; power was furnished by a Hercules-Buda gas engine with an Amarillo gear drive.

After 24 hr. pumping at a rate of 1000 gpm., the drawdown was 90 ft. from a static water level of 288 ft. below the pump base.

In Sept. 1955, during pumping at a rate of 950 gpm., the water level in the well was 418 ft. below the surface.

WELL NO. 4, Winston Park Well, was completed in Mar. 1956 as Well No. 1 for Palatine Heights Subdivision. The well was drilled to a depth of 230 ft. by Layne-Western Co., Aurora, and located approximately 50 ft. S. and 1445 ft. W. of the N. E. corner of Section 24, T42N, R10E. The elevation of the ground surface at the well is 732. When completed in 1956, water was pumped for 24 hr. at rates of 200 to 212 gpm. with a drawdown of 66 ft. from a static water level of 29 ft.

The village of Palatine purchased Well No. 4 from Palatine Heights Subdivision. Between Nov. 1957 and Jan. 1958, the well was deepened to 1350 ft. by Wehling Well Works, Beecher. When the deepening had reached 1350 ft., six shots of 200 lb. each of nitrogel were exploded between depths of 1295 and 1235 ft.

The well had been cased with 16-in. pipe from the surface to an unknown depth and with 12-in. pipe from the surface to 480 ft., below which the hole was finished 12 in. in diameter to the bottom at 1350 ft. The 12-in. casing was cemented in. When construction was completed, the Driller reportedly pumped water for 7 1/2 hr. at a rate of 650 gpm. with a drawdown of 68 ft. from a static water level of 362 ft. below the pump base. The production test was conducted witha turbine test pump set at 500 ft. and powered by a diesel engine. A 500-ft. air line was installed for measuring water levels.

A mineral analysis of a sample (Lab. No. 148814) collected Jan. 8, 1959 showed the water in Well No. 4 to have a hardness of 16 gr. per gal., total dissolved minerals of 414 ppm., and an iron content of 0. 2 ppm.

The permanent pumping equipment in Well No. 4 consists of 560 ft. of 8-in. column pipe; 12-in., 11-stage Byron Jackson turbine pump, No. 351306, rated at 750 gpm. at 660 ft. T.D.H.; 10 ft. of 8-in. suction pipe; 560 ft. of air line; 200-hp. Ideal electric motor.

Pumpage for the village averaged 670, 000 gpd. Dec. 1956 to May 1957 inclusive.

2 - Palatine

LABORATORY NO. 148814

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	7.9	
Manganese	Mn	Tr.		Fluoride	F	0.9	
Calcium	Ca	74.5	3.72	Boron	B	0.2	
Magnesium	Mg	21.5	1.77	Chloride	Cl	15.	.42
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.7	.01
Sodium	Na	45.	1.95	Sulfate	SO_4	76.9	1.60
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		1		Hardness (as	$CaCO_3$)	274.	5.49
Color		0					
Odor		0					
Temp. (reported)		56.5°F		Total Dissolved Minerals		414.	

The public water supply, installed for Ridgeland Subdivision now annexed to the city of Palos Heights (3775), is owned and operated by the Ridgeland Water Service Co.

WELL NO. 1 was completed in July 1957 to a depth of 369 ft. by J. P. Miller Artesian Well Co., Brookfield, and located east of Ridgeland Ave. and south of 127th St., or approximately 773 ft. S. and 2550 ft. E. of the N. W. corner of Section 32, T37N, R13E. The ground elevation at the well is 617. The well was cased with 16-in. pipe from the surface to 50 ft. and with 10-in. pipe from the surface to 102 ft. (cemented in), below which the hole was finished 10 in. in diameter to the bottom at 369 ft. The Well Contractor reportedly pumped for 6 hr. at a rate of 80 gpm. with a drawdown of 82 ft. from a static water level of 8 ft. below the pump base. The turbine test pump was set at 105 ft.

Subsequently, the permanent pump assembly was installed consisting of 100 ft. of 3 1/2-in. column pipe; 6-in., 18-stage Pomona turbine pump, No. AW4944, rated at 75 gpm. against 205 ft. T.D.H.; 105 ft. of air line; 7 l/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 151090) collected Nov. 24, 1959 showed the water in Well No. 1 to have a hardness of 24. 4 gr. per gal., total dissolved minerals of 517 ppm., and an iron content of 0. 3 ppm.

In Dec. 1958 Well No. 1 was furnishing the entire supply for the subdivision.

In June 1958 J. P. Miller completed a well to a depth of 92 ft., located at the corner of Ridgeland Ave. and 129th St., or approximately 1100 ft. S. and 100 ft. E. of the N. W. corner of Section 32. The well was cased with 80 ft. 6 in. of 8-in. pipe, below which the hole was finished 8 in. in diameter to the bottom at 92 ft. A production test was conducted by the Well Contractor for 4 hr. at a rate of 120 gpm. with a drawdown of 12 ft. from a nonpumping water level of 7 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 147046) collected June 28, 1958, after 4 hr. pumping at a rate of 120 gpm., showed the water to have a hardness of 25. 9 gr. per gal., total dissolved minerals of 585 ppm., and an iron content of 0. 9 ppm.

This well was used only during the drilling of Well No. 2 and in June 1960 was reportedly filled with cement and bentonite.

WELL NO. 2 was completed in Oct. 1958 to a depth of 1580 ft. by J. P. Miller and located in the southwest part of the intersection of 128th St. and Central Ave., or approximately 720 ft. S. and 170 ft. W. of the N. E. corner of Section 32. The ground surface elevation at the well is 603. The well was cased with 16-in. od. pipe from the surface to 52 ft.; with 13 3/8-in. pipe from the surface to 575 ft. (cemented in); a 10-in. liner was set from 1152 to 1363 ft., below which the hole was finished 10 in. in diameter.

The Well Contractor conducted a production test on Oct. 16, 1958. After 8 hr. pumping at a rate of 840 gpm., the drawdown was 103 ft. from a static water level of 409 ft. below the top of the casing.

A mineral analysis of a sample (Lab. No. 152396) collected June 2, 1960, after 2 l/2 hr. pumping at 580 gpm., showed the water from Well No. 2 to have a hardness of 29.2 gr. per gal., total dissolved minerals of 973 ppm., and an iron content of 0. 5 ppm.

The permanent pump assembly includes 550 ft. of 8-in. column pipe; 10-in., 17-stage Peerless turbine pump, connected to a 125-hp. electric motor. An air line 550 ft. long is installed, but no gage.

Pumpage from Mar. 10 to June 2, 1960 averaged 75,000 gpd.

2 - Palos Heights

LABORATORY NO. 152396

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	8.4	
Manganese	Mn	Tr.		Fluoride	F	0.9	
Calcium	Ca	137.2	6.86	Boron	B	0.2	
Magnesium	Mg	38.2	3.14	Chloride	Cl	133.	3.75
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.6	.04
Sodium	Na	136.	5.91	Sulfate	SO_4	347.8	7.24
				Alkalinity (as	$CaCO_3$)	244.	4.88
Turbidity		0		Hardness (as	$CaCO_3$)	500.	10.00
Color		5					
Odor		0					
Temp. (reported)		60.3°F		Total Dissolved Minerals		973.	

PALOS HIGHLANDS
Cook County
March 11, 1958

A public water supply was installed in 1953 for Palos Highlands (est. 260), a subdivision located on the south of Palos Park. The water system is owned and operated by the Midwest-Palos Water Co. Water is obtained from one well.

WELL NO. 1 was completed in Sept. 1953 to a depth of 234 ft. by the J. P. Miller Artesian Well Co., Brookfield, and located 1225 ft. N. and 2170 ft. W. of the S. E. corner of Section 35, T37N, R12E. The ground elevation at the well is 7 10. Well No. 1 was drilled 10 in. from the surface to the bottom and cased with 10-in. gwi. pipe from 12 in. above the pump station floor to 134 ft. penetrating 6 ft. of limestone.

A production test was conducted by the Driller on Sept. 10, 1953. For the test a turbine test pump was used, with the setting at 115 ft. below the top of the casing. After 6 hr. pumping at a rate of 500 gpm., the drawdown was 25 ft. from a nonpumping water level of 57 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 132941) collected Sept. 10, 1953, after 6 hr. pumping, showed the water to have a hardness of 29 gr. per gal., total dissolved minerals of 667 ppm., an iron content of 2. 3 ppm., and a turbidity of 84 ppm.

The permanent pumping installation includes 70 ft. of column pipe; 7-in., 7-stage Peerless turbine pump rated at 100 gpm.; 10 ft. of suction pipe; 7 l/2-hp, electric motor.

A mineral analysis of a sample (Lab. No. 145962) collected Mar. 11, 1958 after 20 min. pumping, showed the water to have a hardness of 27 gr. per gal., total dissolved minerals of 640 ppm., an iron content of 1.1 ppm., and a turbidity of 16 ppm.

Pumpage is estimated to average 15, 000 gpd.

LABORATORY NO. 145962

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	17.7	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	113.0	5.65	Boron	B	0.5	
Magnesium	Mg	44.4	3.65	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.3	.05
Sodium	Na	35.	1.50	Sulfate	SO_4	234.5	4.88
				Alkalinity (as	$CaCO_3$)	288.	5.76
Turbidity		16		Hardness (as	$CaCO_3$)	465.	9.30
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		640.	

PAXTON
Ford County
June 24, 1960

Four wells are in service for the city of Paxton (4370).

WELLS NO. 1, 2, 3 and 4, described in Bulletin 40, have been abandoned. In 1953 Well No. 3 was equipped with an Aurora turbine pump, rated at 200 gpm. and set at 140 ft. Power was from a 20-hp. U S electric motor.

WELL NO. 5, described in Bulletin 40, is equipped with a Peerless turbine pump, rated at 100 gpm., connected to a 10-hp. General Electric motor. In 1957 the static water level was reported to be 102 ft. Well No. 5 is in occasional service.

WELL NO. 6 was completed in 1950 to a depth of 153 ft. by Hayes and Sims, Champaign, and located in the northwest part of town approximately 2190 ft.' N. and 1200 ft. E. of the S. W. corner of Section 7, T23N, R10E. The ground surface elevation at the well is 800. The well was cased with 135 ft. of 10-in. casing followed by 21 ft. 4 in. over-all length of Johnson screen. The top 6 ft. of screen had No. 30 slot openings, the middle 5 ft. had No. 25 slots, and the bottom 9 ft. had No. 18 slots.

A production test was reported by the Driller when the well was completed July 27, 1950. After 4 l/4 hr. pumping at 200 gpm., the drawdown was 20. 2 ft. from a nonpumping water level of 102. 2 ft. below the pump base (2 ft. above ground level).

A mineral analysis of a sample (Lab. No. 122482) collected July 27, 1950 showed the water to have a hardness of 17. 3 gr. per gal., total dissolved minerals of 451 ppm., and an iron content of 1. 3 ppm.

The permanent pump installation includes an Aurora turbine pump, rated at 200 gpm. at 225 ft. T.D.H., connected to a 15-hp. electric motor.

Well No. 6 is in occasional service.

WELL NO. 7 was completed in Oct. 1957 to a depth of 340 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 2 miles west of the corporate limits, or approximately 1200 ft. S. and 1200 ft. W. of the N. E. corner of Section 14, T23N, R9E. The ground surface elevation at the well is 755. A 36-in. hole was drilled from the surface to the bottom at 340 ft. A 16-in. casing was set to 240 ft. followed by a 16-in. screen, with No. 80 slot openings, from 240 to 340 ft. The annulus between the casing and screen was packed with 1/4 by l/8-in. Muscatine gravel at depths from 340 to 185 ft., with sand and bentonite from 185 to 30 ft., and with cement from 30 ft. to the ground surface.

A production test was conducted on Nov. 7-8, 1956 by representatives of the Driller, the State Water Survey, and Tracy Pitzen, Consulting Engineer. After 24 hr. pumping at rates from 880 to 1900 gpm., the drawdown was 14.5 ft. from a nonpumping water level of 65. 5 ft. Thirty min. after the pump was stopped, the water level had recovered to 66 ft.

During the production test, water levels were observed in a well 58 ft. south of Well No. 7. The observation well was constructed with a 10-in. casing and 10-in. screen set in a 20-in. diameter hole to a total depth of 130 ft. Gravel was packed in the observation well between the casing and screen and the wall of the hole. After 16 hr. pumping in Well No. 7, the water was drawn down 0. 85 ft. in the observation well.

The pumping installation includes a Peerless turbine pump, rated at 1000 gpm., connected to a 75-hp. Peerless electric motor.

A mineral analysis of a sample (Lab. No. 150859) collected Oct. 26, 1959, after 1 hr. pumping at 1000 gpm., showed the water in Well No. 7 to have a hardness of 18. 6 gr. per gal., total dissolved minerals of 387 ppm., and an iron content of 2. 2 ppm. During pumping at 1000 gpm. for 1 hr., the drawdown was 2 ft. from a nonpumping water level of 68 ft.

WELL NO. 8 was completed in Aug. 1959 to a depth of 340 ft. by J. P. Miller Artesian Well Co. and located about l/4 mile east of Well No. 7, or approximately 1250 ft. S. of the N. E. corner of Section 14. The ground surface elevation at the well is 765. A 36-in. diameter hole was drilled from the surface to 340 ft. A 16-in. diameter casing was set from 2 ft. above the surface to 235 ft. and followed by a 16-in. stainless steel screen from 235 to 335 ft., exposed to the sand and gravel aquifer.

A production test was conducted on Aug. 20-21, 1959 by the Driller. After 24 hr. pumping at a rate of 1200 gpm., the drawdown was 8 ft. from a nonpumping water level of 68 ft. below

the top of the casing.

The pumping installation includes a Peerless turbine pump, No. 131830, rated at 950 gpm., connected to a 75-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152590) collected June 22, 1960 showed the water in Well No. 8 to have a hardness of 20.4 gr. per gal., total dissolved minerals of 418 ppm., and an iron content of 1. 7 ppm.

There are 1563 services, all metered, and pumpage from July 1, 1958 through June 30, 1959 averaged 318, 000 gpd.

LABORATORY NO. 152590

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.7		Silica	SiO_2	17.5	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	86.6	4.33	Boron	B	0.3	
Magnesium	Mg	32.5	2.67	Chloride	Cl	0.	.00
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.6	.06
Sodium	Na	16.	.71	Sulfate	SO_4	21.4	.45
				Alkalinity (as	$CaCO_3$)	360.	7.20
Turbidity		9		Hardness (as	$CaCO_3$)	350.	7.00
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		418.	

PEKIN
Tazewell County
May 30, 1960

Five wells are in service for the public water supply of the city of Pekin (28, 146).

WELLS NO. 1, 2, 3 and 4, described in Bulletins 34 and 40, are in service. A new Aurora pump, rated at 1735 gpm., was installed in Well No. 1 in 1955. A 150-hp. motor was installed at the same time.

A test well was drilled in Feb. 1957 to a depth of 146. 5 ft. by M. Ebert Co., Washington, and located 2580 ft. N. and 2290 ft. W. of the S. E. corner of Section 35, T25N, R5W. The well was cased with 144. 5 ft. of 6-in. steel pipe and a 2 ft. length of Cook screen with No. 12 slot openings. The test well produced 15 gpm. The static water level was 70 ft.

WELL NO. 5 was completed in Oct. 1957 to a depth of 146 ft. by Kelly Well Co., Grand Island, Neb., and located at the site of the 6-in. test well drilled in 1957 by M. Ebert Co. at N. 12th and Willow St. The ground surface elevation at the well is 465. The well was cased with 100 ft. of 26-in. id. by 32-in. od. blank concrete pipe from 2 ft. above the surface to 98 ft., followed by 48 ft. of 26-in. id. by 32-in. od. porous concrete pipe screen exposed to the aquifer. The screen is set on a solid concrete plug, 6 in. thick. An envelope of gravel 4 1/2 in. thick was packed around the outside of the casing and screen, between them and the wall of the hole.

When the well was completed it was expected that the yield rate would be 1400 gpm.

The permanent pump assembly consists of 100 ft. of 10-in. column pipe; 4-stage Layne turbine, 4 ft. 8 in. long and rated at 1400 gpm.; 10 ft. of suction pipe; 150-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152374) collected May 30, 1960 showed the water in Well No. 5 to have a hardness of 24. 3 gr. per gal., total dissolved minerals of 567 ppm., and an iron content of 0. 3 ppm.

There are about 9000 services. In 1958 pumpage was reported to average 2 mgd.

LABORATORY NO. 152374

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Silica	SiO_2	17.4	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	104.0	5.20	Boron	B	0.3	
Magnesium	Mg	37.7	3.10	Chloride	Cl	29.	.82
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	8.9	.14
Sodium	Na	36.	1.57	Sulfate	SO_4	151.4	3.15
				Alkalinity (as	$CaCO_3$)	288.	5.76
Turbidity		Tr.		Hardness (as	$CaCO_3$)	415.	8.30
Color		5					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		567.	

There are 15 wells in service for the public water supply of the city of Peoria(103,162). In addition, an infiltration pit, of 4 to 5 mgd. capacity, is in service. The system is owned and operated by the Peoria Water Works Co.

NORTH FIELD

In the North Field, the MAIN WELL and RESERVE WELL NO. 3, described in Bulletin 40, at the main pumping station are in service. All other wells (2, 3, 4, 5 and 6) in the North Field, described in Bulletin 40, have been sealed and abandoned.

An infiltration pit, located south of the main pumping station, was constructed and placed in service in Apr. 1957. Illinois River water is pumped into the pit from an intake at the Narrows.

The bottom dimensions of the pit are 350 ft. long and 200 ft. wide at elevation 446. 0. The side slopes are 3:1 to the top of the berm at elevation 460. 0. A sand layer, 6 in. in thickness, is placed over the bottom and sides and acts as a filter. From 4 to 5 mgd. can be spread over the filter.

The new filtration plant, located east of the main station, was placed in service in 1959. It is capable of filtering 10 to 15 mgd. of Illinois River water. The effluent is discharged directly to the suction tank in the Main Well.

SANKOTY FIELD

In the Sankoty Field, WELLS NO. 7, 8, 9 and 10, described in Bulletin 40, and the booster pump at Well No. 7 are still available for service in delivering water to the Main Well in the North Field.

Wells No. 8 and 9 may be abandoned because of their high iron and manganese content.

At Well No. 12 a booster station has been erected for service from WELLS NO. 11, 12 and 13, described in Bulletin 40, to the bluff areas west and north of Sankoty Field, Two high service booster pump units are installed. Unit No. 1 is a 2-stage DeLaval centrifugal pump, rated at 1750 gpm. against 370 ft. T.D.H. Power is furnished from a 200-hp. General Electric motor.

Unit No. 2 is a 2-stage DeLaval centrifugal pump, rated at 1750 gpm. against 370 ft. T.D.H. Power is furnished from a 200-hp. Westinghouse electric motor.

CENTRAL FIELD

Six wells are in service in the Central Field.

DODGE ST. WELL NO. 1, described in Bulletin 40, was equipped in 1958 with a new pump assembly consisting of 100 ft. of 10-in. column pipe; 5-stage Peerless turbine pump, 5 ft. 10 in. over-all length and rated at 1500 gpm. against 340 ft. T. D.H.; 150-hp. General Electric motor.

Well No. 1 is in service.

DODGE ST. WELLS NO. 2 and 3, described in Bulletin 40, are in service.

DODGE ST. WELL NO. 4 was completed in 1950 to a depth of 122 ft. 2 in. by Kelly Well Co., Grand Island, Neb., and located 50 ft. southerly of Well No. 3, or approximately 820 ft. N. and 730 ft. E. of the S. W. corner of Section 17, T8N, R8E. The ground surface elevation at the well is 477.3. A 38-in. hole was drilled to the bottom at 122 ft. 2 in., and a concrete plug 1. 5 ft. thick was set at the bottom. A temporary steel casing 38 in. in diameter was set in the hole. A Kelly concrete screen (25-in. od. by 17-in. id.) was set on top of the plug with the top of the screen at 84 ft. 9 in. Plain concrete pipe 86 ft. 2 in. long was set on top of the screen to 1. 5 ft. above ground level. The elevation of the top of the concrete casing is 478.78. The annalas between the 38-in. steel casing and the concrete pipe sections (plain and screen) was filled with selected gravel up to 15 ft. of the top of the casing. From 15 ft. to the surface the annulus was filled with concrete for a seal.

The pumping equipment consists of 80 ft. of 12-in. column pipe; 3-stage Byron Jackson turbine pump, 4 ft. 6 1/4 in. in length and rated at 2800 gpm. at 180 ft. T.D.H.; 150-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152391) collected June 8, 1960 showed the water in Dodge St. Well No. 4 to have a hardness of 29.1 gr. per gal., total dissolved minerals of 658 ppm., and a trace of iron.

This well is in service.

GRISWOLD ST. WELL NO. 1 was completed in 1949 to a depth of 166 ft. 8 in. to shale bedrock by Kelly Well Co. and located at the intersection of Griswold St. and Lincoln Ave. in

the southwestern part of the city, or approximately 30 ft. N. and 2610 ft. E. of the S. W. corner of Section 7, T8N, R8E. The elevation of the top of the well is 514. 33.

The bore hole was completed at a diameter of 38 in. from the surface to the bottom. The bottom 11 in. of the hole was packed with selected gravel on which a concrete plug, 9 in. in thickness, was set. A 4 ft. length of 27-in. od. plain concrete pipe was set on top of the plug, and a 72 ft. length of Kelly concrete pipe screen was set on top of the 4 ft. length of pipe. An 89 ft. length of plain concrete pipe was set on top of the screen. The elevation of the top of the concrete casing is 514. 33. The annulus between the wall of the 38-in. bore hole and the 27-in. od. concrete pipe casing and screen was filled with selected pea gravel up to 78 ft. 8 in. above the bottom of the well. On top of this the annulus was backfilled with 48 ft. of drill cuttings. Twenty ft. of clay was added and a final 20 ft. of concrete was poured between the well casing and a 32-in. id. casing section.

On Apr. 14, 1949 the Driller reported pumping for 7 1/2 hr. at a rate of 1430 gpm. with a drawdown of 8 ft. 8 in. from a static water level of 87 ft. 9 in. below the top of the casing.

The pumping equipment consists of 120 ft. of 10-in. column pipe; 5-stage Peerless turbine pump, 5 ft. 10 in. long and rated at 2 mgd. at 300 ft. T.D.H.; 150-hp. General Electric motor.

Griswold St. Well No. 1 is in service.

GRISWOLD ST. "WELL NO. 2 was completed in Dec. 1953 to a depth of 162 ft. by Layne Western Co., Aurora, and located about 70 ft. north of Griswold St. Well No. 1, or approximately 100 ft. N. and 2610 ft. E. of the S. W. corner of Section 7. The elevation of the ground surface at the well is 511.

An 18-in. inner casing of Armco iron pipe was set from 2 ft. above ground level to 112 ft. followed by 50 ft. of Armco iron shutter screen with No. 6 slot openings. The annulus between the 18-in. casing and screen and the wall of the hole was packed with 28 cu. yd. of pea gravel from the bottom up to 50 ft. below ground level.

A production test was conducted on Dec. 30, 1953 by the Driller. After 8 hr. pumping at 1470 gpm., the drawdown was 8 ft. from a static water level of 91 ft. below the top of the casing (2 ft. above ground level).

The permanent pumping equipment consists of 76 ft. of 10-in. column pipe; 5-stage Peerless turbine pump, 5 ft. 10 in. over-all length and rated at 2 mgd. against 330 ft. T.D.
H.; 150-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 152311) collected May 24, 1960 showed the water in this well to have a hardness of 28. 2 gr. per gal., total dissolved minerals of 569 ppm., and a trace of iron.

Total pumpage of well water for the year 1959 by the Peoria Water Works Co. averaged 17.68 mgd.

LABORATORY NO. 152311

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	18.3	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	116.8	5.84	Boron	B	0.1	
Magnesium	Mg	46.5	3.82	Chloride	Cl	15.	.42
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	15.6	.25
Sodium	Na	6.	.26	Sulfate	SO_4	144.8	3.01
				Alkalinity (as	$CaCO_3$)	312.	6.24
Turbidity		0		Hardness (as	$CaCO_3$)	483.	9.66
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		569.	

LABORATORY NO. 152391

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	19.2	
Manganese	Mn	0.0		Fluoride	F	1.0	
Calcium	Ca	123.8	6.19	Boron	B	0.2	
Magnesium	Mg	45.8	3.77	Chloride	Cl	50.	1.41
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	8.5	.14
Sodium	Na	38.	1.65	Sulfate	SO_4	152.8	3.18
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		0		Hardness (as	$CaCO_3$)	498.	9.96
Color		0					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		658.	

PERCY
Randolph County
October 11, 1957

Two wells are in service for the public water supply of the village of Percy (810).

WELL NO. 1, described in Bulletin 40, was rehabilitated and deepened from 424 to 427 ft. in July-Aug. 1955 by L. W. Gwin Drilling Co., Percy. A short production test had been conducted by L. W. Gwin and the State Water Survey, on Aug. 11, 1953 for the purpose of determining the capacity of the well and the rate of pumping into the mains. Water was pumped for 1 hr. 40 min. at a rate of 33-39 gpm. with a drawdown of 128 ft. from a static water level of 100 ft. (air line). In Aug. 1955, after the well had been deepened to 510 ft. and then shot by introducing 100 qts. of nitroglycerine, it was cleaned out to 427 ft. A second production test was then conducted by representatives of L. W. Gwin and the State Water Survey. After 5 hr. pumping at a rate of 147 gpm., the drawdown was 105 ft. from a static water level of 99 ft. Fifty min. after the test was stopped, the water level had recovered all but 5. 5 ft. of the drawdown.

On Oct. 11, 1957 a third production test was conducted by representatives of L. W. Gwin and the State Water Survey. The permanent pump assembly was in place, consisting of the Cook turbine pump; 200 ft. of air line; 20-hp. U S electric motor.

After 2 1/2 hr. pumping at 115 gpm., the drawdown was 71 ft. from a static water level of 97 ft. and after an additional hr. pumping at 152 gpm. the drawdown was 97 ft.

A partial chemical analysis of a sample (Lab. No. 144689) collected Oct. 9, 1957 showed the water in Well No. 1 to have a hardness of 9.4 gr. per gal., total dissolved minerals of 277 ppm., and an iron content of 3. 3 ppm.

WELL NO. 2, described in Bulletin 40, is in service.

Pumpage is estimated to average 36, 000 gpd.

LABORATORY NO. 144689

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.3		Fluoride	F	0.2	
				Chloride	Cl	24.	.68
				Nitrate	NO_3	1.6	.03
				Alkalinity (as	$CaCO_3$)	224.	4.48
Turbidity		16		Hardness (as	$CaCO_3$)	160.	3.20
Color		0					
Odor		0					
Temp. (reported)		62°F		Total Dissolved Minerals		277.	

PISTAKEE HIGHLANDS
McHenry County
April 8, 1959

Two wells are in service for Pistakee Highlands (est, 1000), a subdivision owned by the Ladd Enterprises and located on U. S. Highway 12 about 2 miles northwest of Fox Lake.

WELL NO. 1 was completed to a depth of 93 ft. 4 in. in 1954 by Joe Huemann and Sons, McHenry, and located at Highland Drive and County Road, or approximately 2300 ft. N. and 2200 ft. W. of the S. E. corner of Section 5, T45N, R9E. The ground surface elevation at the well is 780. The well was cased with 12-in. pipe followed by 8 ft. of 12-in. screen exposed to a water-bearing gravel, according to the driller's log.

In 1954, after 12 hr. pumping at a rate of 250 gpm., the drawdown was 10 ft. from a non-pumping water level of 38 ft. below the pump base.

The permanent pumping equipment consists of 30 ft. of 3-in. column pipe; Deming submersible pump, rated at 90 gpm.; 5-hp. electric motor.

WELL NO. 2 was completed in 1956 to a depth of 202 ft. by Joe Huemann and Sons and located about 28 ft. northeast of Well No. 1, or approximately 2320 ft. N. and 2180 ft. W. of the S. E. corner of Section 5. The bottom of the concrete pump pit (elev. 770) is 10 ft. below ground level.

The well was cased with 8-in. pipe from the surface to 191 ft. followed by 10 ft. of 8-in. Johnson Everdur screen exposed to gravel and silt, according to the driller's log.

The Driller reported that when pumping at 270 gpm., the drawdown was 10 ft. from a non-pumping water level of 37 ft. below the pump base (in pit 10 ft. below ground level).

The pumping equipment includes a 7-in. Byron Jackson submersible pump, No. 341805, rated at 270 gpm., set at 105 ft.; 20-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146794) collected May 29, 1958, after 22 hr. pumping at 270 gpm., showed the water in Well No. 2 to have a hardness of 18.9 gr. per gal., total dissolved minerals of 366 ppm., and an iron content of 1. 2 ppm.

There are 270 services installed with an ultimate total of 600 or 700 expected. Pumpage is estimated to average 60,000 gpd.

LABORATORY NO. 146794

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	20.0	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	66.7	3.34	Boron	B	0.1	
Magnesium	Mg	38.3	3.15	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.2	.02
Sodium	Na	7.	.31	Sulfate	SO_4	40.1	.83
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		9		Hardness (as	$CaCO_3$)	325.	6.49
Color		0					
Odor		0					
Temp. (reported)		52.4°F		Total Dissolved Minerals		366.	

PORT BYRON
Rock Island County
May 7, 1959

One new well has been added to the public water supply of Port Byron (1153) since publication of Bulletin 40.

WELL NO. 1, described in Bulletin 40, was equipped in Nov. 1950 with a new pump consisting of a 15-stage Aurora turbine pump set at 180 ft. and rated at 175 gpm. against a total head of 370 ft. The well has not been in service for several years and apparently is maintained for emergency use.

A second well was drilled to a depth of 866 ft. in Aug. 1952 by Jones and Schmeiser, Burlington, Iowa. The location of the well is not known. It was reportedly cased with 10 ft. of 12-in. pipe and with 8-in. pipe from the surface to 204 ft. The well was cement grouted from the 204 ft. depth up to the surface. From 204 ft. to 561 ft. the hole was finished 8 in. in diameter, and from 561 to 866 ft. the hole was 6 5/8 in. in diameter. The Driller reported that water was bailed at a rate of 15 gpm. for 30 min. The static water level was 22 ft. below the ground surface. The well was abandoned.

WELL NO. 2 was completed in Sept. 1952 to a depth of 462 ft. by Jones and Schmeiser and located about 20 ft. west of the elevated tank on top of the bluff, or approximately 1900 ft. S. and 1500 ft. W. of the N. E. corner of Section 25, T19N, R1E. The ground elevation at the well is 720.

The well was cased with 131 ft. of 12-in. pipe and with 8-in. pipe from the surface to 240 ft. From 240 ft. to 462 ft. the hole was finished 8 in. in diameter. The annulus between the 8-in. casing and the 12-in. casing was cement grouted.

A production test was conducted on Sept. 26, 1952 by representatives of the Driller, Village officials, State Water Survey, and Interstate Engineering Co., Consulting Engineers. For test purposes, the well was equipped with a plunger pump operated from the drill rig. After 1 hr. pumping at a rate of 42 gpm., the drawdown was 9.5 ft. from a nonpumping water level of 127. 5 ft. below the top of the casing. Twelve min. after pumping was stopped, the water level had recovered to 128. 7 ft.

In Dec. 1955 the following pumping equipment was installed: 220 ft. of 4-in. id. column pipe; 5 1/2-in., 25-stage Fairbanks-Morse turbine pump, rated at 125 gpm.; 10 ft. of 4-in. id. suction pipe; 220 ft. of air line; 15-hp, electric motor.

In 1953, during pumping at 70 gpm., the drawdown was 10 ft. from a nonpumping water level of 132 ft.

A mineral analysis of a sample (Lab. No. 149560) collected May 4, 1959 showed the water in Well No. 2 to have a hardness of 10 gr. per gal,, total dissolved minerals of 212 ppm., and an iron content of 1. 4 ppm.

Pumpage in 1958 is reported to average 57,000 gpd.

LABORATORY NO. 149560

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Silica	SiO_2	9.9	
Manganese	Mn	Tr.		Fluoride	F	0.6	
Calcium	Ca	41.5	2.08	Boron	B	0.1	
Magnesium	Mg	17.5	1.44	Chloride	Cl	4.	.11
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.7	.01
Sodium	Na	15.	.67	Sulfate	SO_4	1.0	.02
				Alkalinity (as	$CaCO_3$)	204.	4.08
Turbidity		9		Hardness (as	$CaCO_3$)	176.	3.52
Color		5					
Odor		0					
Temp. (reported)		53.5°F		Total Dissolved Minerals		212.	

PRESTON HEIGHTS
SUBDIVISION
Will County
May 25, 1960

A public water supply was installed in 1960 for Preston Heights, a subdivision located about 1 1/2 miles southeast of Joliet. The supply is owned and operated by the Illinois Municipal Water Co.

WELL NO. 1 was completed in Apr. 1960 to a depth of 248 ft. and cased with 16-in. pipe to limestone at 56 ft., below which the hole was finished at 15 1/4 in. in diameter to the bottom. The ground surface elevation at the well is 632. On Apr. 13, 1960 the Contractor reported pumping at a rate of 267 gpm. for 8 hr. with a drawdown of 117 ft. from a nonpumping water level of 51 ft. below the top of the casing. For the test the well was equipped with an 8-in., 16-stage turbine test pump, 11 ft. 9 in. long, with power from a Continental gas engine.

A partial chemical analysis of a sample (Lab. No. 152066) collected Apr. 13, 1960, after 8 hr. pumping at a rate of 305 gpm., showed the water in Well No. 1 to have a hardness of 23.7 gr. per gal., total dissolved minerals of 467 ppm., and an iron content of 1. 8 ppm.

The permanent pump had not been installed May 25, 1960.

LABORATORY NO. 152066

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Fluoride	F	0.2	
Manganese	Mn	Tr.		Chloride	Cl	2.	.06
				Nitrate	NO_3	1.2	.02
				Alkalinity (as	$CaCO_3$)	352.	7.04
Turbidity		60		Hardness (as	$CaCO_3$)	405.	8.10
Color		0					
Odor		0		Total Dissolved Minerals		467.	

A public water supply was installed in 1949 for Prospect Meadows (est. 490), a subdivision located about l/4 mile north of Mount Prospect and about 3/4 mile east of Arlington Heights. The water plant and system is now owned and operated by the Prospect Meadows Water Co. Water is obtained from two wells.

WELL NO. 1 was completed for the National Mortgage & Investment Co. in Jan. 1949 to a depth of 201 ft. by Henry Boysen, Libertyville. The well is located south of the intersection of Rand Road and Euclid St., or approximately 2000 ft. N. and 300 ft. E. of the S. W. corner of Section 27, T42N, R11E. The ground elevation at the well is 675. The well was cased with 10-in. id. pipe from 1 l/2 ft. above to limestone at 108 ft. below the surface and the hole was finished at 10 in. in diameter to the bottom.

The Driller reported that on Jan. 10, 1949, after 6 hr. pumping at a rate of 117 gpm., with a turbine test pump, the drawdown was 117 ft. from a static water level of 33 ft. below the top of the casing. The permanent pump assembly includes 150 ft. of 4-in. column pipe; 7 5/8-in., 11-stage Cook deep-well turbine pump (No. 11846); 170 ft. of air line; 10-hp. U S electric motor.

A test to check both well and pump performance was conducted on Oct. 10,1950 by representatives of the Driller, the Owner, the Pump Manufacturer, and the State Water Survey. After 1 hr. pumping at varying discharge pressures, the final pumping rate was 135 gpm. with adrawdown of 68 ft. from a nonpumping water level of 33 ft. The results of this test indicated that the well was essentially in the same condition as when tested on Jan, 10, 1949.

A partial analysis of a sample (Lab. No. 134640) collected Apr. 17, 1954, after 1 hr. pumping, showed the water in Well No. 1 to have a hardness of 16. 8 gr. per gal., total dissolved minerals of 379 ppm., and an iron content of 0. 8 ppm.

WELL NO. 2 was completed in Aug. 1951 for the Crown Realty Co., then owners of the Prospect Meadows Subdivision. The well was drilled to a depth of 206 ft. by Henry Boysen and located about 1000 ft. northeast of Well No. 1, or approximately 1150 ft. N. and 1500 ft. E. of the S. W. corner of Section 27. The well was cased with 20-in. od. pipe from the surface to 20 ft. and with 12-in. id. drive pipe from 1 ft. above the surface to 109 ft. The completed bore was 12 in. in diameter. The annulus between the casings was filled with cement.

During drilling, the static water levels were:

55 ft. at 120 ft. depth of drilling
40 ft. at 150 ft. depth of drilling
39 ft. at 190 ft. depth of drilling

A production test was conducted on Aug. 30, 1951 by representatives of the Driller and the State Water Survey. For test purposes a vertical turbine pump was set at 160 ft. Power was supplied by a gasoline engine. Before the production test, a 7-hr. clean-up run was made on Aug. 28. In the production test, after 1 1/4 hr. pumping at a rate of 187 gpm., the drawdown was 45 ft. from a nonpumping water level of 42 ft. below the top of the casing. Then followed 4 l/2 hr. pumping at a rate of 283 gpm. with a drawdown of 70 ft.

The permanent pumping equipment includes 180 ft. of 5-in. column pipe; 7-in., 15-stage Peerless turbine pump, No. 101112, rated at 150 gpm. against 288 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 150 ft. of air line; 15-hp. U S electric motor.

In Jan. 1958, during pumping at a rate of 283 gpm., the drawdown was 70 ft. from a nonpumping water level of 42 ft. (air line measurement).

A partial analysis of a sample (Lab. No. 148234) collected Nov. 20, 1958 showed the water in Well No. 2 to have a hardness of 17. 7 gr. per gal., total dissolved minerals of 434 ppm., and an iron content of 0. 9 ppm.

Pumpage in 1958 was estimated to average 25,000 gpd.

2 - Prospect Meadows

LABORATORY NO. 148234

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Fluoride	F	0.3	
				Boron	B	0.3	
				Chloride	Cl	6.	.17
				Sulfate	SO_4	133.7	2.78
				Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		5		Hardness (as	$CaCO_3$)	304.	6.08
Color		0					
Odor		0					
Temp. (reported)		51.1°F		Total Dissolved Minerals		434.	

RED BUD
Randolph County
September 19, 1958

Four wells are in service for the public water supply of the city of Red Bud (1942).

WELLS NO. 1 and 2, described in Bulletin 40, are in service.

WELL NO. 3, described in Bulletin 40, was reconditioned in 1957 by Pringle Powder Co. and the Halliburton Co. A quantity of 100 qt. of nitroglycerine was exploded in the water yielding area of the well. Approximately 6 tons of sand were removed after the shooting, and in a production test (Apr. 16, 1957) following the clean out, water was pumped for 9 hr. at an average rate of 118 gpm. with a drawdown of 139 ft. from a static water level of 89 ft.

The well was equipped in Mar. 1957 with a Reda submersible pump, rated at 115 gpm. set at 270 ft., and with power from a 10-hp. electric motor.

WELL NO. 4 was completed in Jan. 1951 to a depth of 289 ft. by George Mueth, Hecker, and located about 600 ft. east of the pumping station. The well was cased with 242 ft. of 10-in. steel pipe, pressure cemented with 100 bags of cement by Texas Cementing Co. The top of the casing is 18 in. above ground level. The ground surface elevation at the well is 465.

A production test was conducted on Jan. 17, 1951 by representatives of the Driller, the State Water Survey, and Russell and Axon, Consulting Engineers. For test purposes the well was equipped with a Jacuzzi submersible turbine pump. An air line was installed. After 10 hr. pumping at a rate of 39 gpm., the drawdown was 154 ft. from a static water level of 58 ft.

The pumping equipment includes 230 ft. of column pipe; 5 1/2-in., 26-stage Jacuzzi turbine pump, No. 887731, rated at 95 gpm.; 30 ft. of 4-in. suction pipe; 10-hp. U S electric motor.

Table A gives the pumping rate from each well as of Mar. 10, 1958.

TABLE A

Well No.	Pumping Rate gpm.
1	30
2	50
3	115
4	59

A mineral analysis of a sample (Lab. No. 147734) collected on Sept. 19, 1958 from Well No. 4, five min. after pumping began, showed the water to have a hardness of 15.3 gr. per gal., total dissolved minerals of 304 ppm., and an iron content of 2 ppm.

There are 553 services, all metered, and 95% of the population is served. Pumpage is reported to average 36,000 gpd.

LABORATORY NO. 147734

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.0		Silica	SiO_2	7.9	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	68.2	3.41	Boron	B	0.1	
Magnesium	Mg	22.2	1.83	Chloride	Cl	10.	.28
Ammonium	NH_4	0.3	.02	Nitrate	NO_3	0.2	.00
Sodium	Na	20.	.87	Sulfate	SO_4	11.9	.25
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		8		Hardness (as	$CaCO_3$)	262.	5.24
Color		0					
Odor		0					
Temp. (reported)		59°F		Total Dissolved Minerals		304.	

RICHLAND SUBDIVISION
Will County
October 18, 1951

A public water supply was installed about 1945 for the Richland Subdivision (est. 150), located about 4 miles northwest of Joliet on U. S. Highway 30 (Plainfield Road). The system is owned and operated by the Richland Improvement Association. Two small limestone wells were used until about 1949.

WELL NO. 3 was completed in Oct. 1949 to a depth of 300 ft. by Simpson and Johnson, Lockport, and located on the west lot of the subdivision at the corner of Park Rose and Webb St., or approximately 510 ft. N. and 833 ft. E. of the S. W. corner of Section 31, T36N, R10E. The ground surface elevation at the well is 600. The well was originally cased with assorted lengths of pipe. In 1951, J. P. Miller Artesian Well Co., Brookfield, reconditioned the well. A 10-in. casing was set from the surface to limestone and shale at 55 ft. An 8-in. casing was set from 55 to 165 ft., below which the hole was finished 8 in. in diameter to the bottom. Water was encountered at 65 and 90 ft. below the surface.

Following the repair work a production test was conducted by representatives of the Driller and the State Water Survey. After 1 1/4 hr. pumping at 210 gpm., the drawdown was 15 ft. from a nonpumping water level of 30 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 126480) collected in Oct. 1951 showed the water to have a hardness of 21. 8 gr. per gal., total dissolved minerals of 440 ppm., and an iron content of 1. 7 ppm.

A second well was drilled to a depth of 100 ft. in 1952 by Dreher and Schorie, Joliet, and located in the rear of Lot 343 on Sycamore St. about 1/2 mile north of Well No. 1 in the N. W. 1/4 of Section 31. The well was cased with 6-in. steel pipe to limestone at 80 ft., below which the hole was finished 6 in. in diameter.

The Driller reported pumping at a rate of 15 gpm. with a drawdown of 3 ft. from a nonpumping water level of 35 ft. below the top of the casing.

The present status of the well is not known.

There are about 40 services. Pumpage is estimated to average 8000 gpd.

LABORATORY NO. 126480

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.7		Fluoride	F	.3	
				Chloride	Cl	10.	.28
				Nitrate	NO_3	2.0	.03
				Sulfate	SO_4	95.2	1.98
				Alkalinity (as	$CaCO_3$)	324.	6.48
Turbidity		13		Hardness (as	$CaCO_3$)	378.	7.56
Color		0					
Odor		0					
Temp. (reported)		52°F		Total Dissolved Minerals		440.	

RICHMOND
McHenry County
May 23, 1958

Two wells are in service for the public supply of the village of Richmond (855).

WELL NO. 1, described in Bulletin 40, is in service.

WELL NO. 2 was completed in Apr. 1956 to a depth of 144 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 60 ft. from the elevated tank on Route 31 in the north end of the village, or approximately 1600 ft. S., and 2400 ft. W. of the N. E. corner of Section 9, T46N, R8E. The ground surface elevation at the well is 832. The well was cased with 12-in. black pipe from 3 ft. above the surface to 119 ft. followed by 25 ft. of 12-in. Cook red brass screen, having No. 45 slot openings. The screen was set opposite the formation. The hole was bored 30 in. in diameter, and from 144 to 119 ft. the annulus outside the screen was packed with "red flint" filter sand. From 96 ft. to the surface the annulus was filled with torpedo sandand bentonite and with 10 lb. of HTH.

A production test was conducted on Apr. 16, 1956 by representatives of the Driller, the State Water Survey, and Baxter and Woodman, Consulting Engineers. After 15 hr. pumping at rates up to 300 gpm., the drawdown was 50.2 ft. from a static water level of 29 ft. below the top of the casing. Ten min. after the pump was stopped, the water level had recovered to 35 ft.

The permanent pumping equipment consists of 100 ft. of 8-in. column pipe; 8-in., 8-stage Layne turbine pump (No. 36033), 5. 9 ft. long and rated at 300 gpm. against 220 ft. T.D.H.; 100 ft. of air line; 10 ft. of 8-in. suction pipe; 25-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146783) collected May 23, 1958, after 5 min. pumping at 300 gpm., showed the water in Well No. 2 to have a hardness of 21 gr. per gal., total dissolved minerals of 382 ppm., and an iron content of 0. 8 ppm.

There are 300 services but no master meter. Pumpage is estimated to average 80, 000 gpd.

LABORATORY NO. 146783

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 8		Silica	SiO_2	20. 7	
Manganese	Mn	0. 1		Fluoride	F	0. 3	
Calcium	Ca	82. 4	4.12	Boron	B	0. 1	
Magnesium	Mg	39. 4	3. 24	Chloride	Cl	1.	.03
Ammonium	NH_4	0. 4	.02	Nitrate	NO_3	0. 5	.01
Sodium	Na	2.	.10	Sulfate	SO_4	7. 8	.16
				Alkalinity (as	$CaCO_3$)	364.	7. 28
Turbidity		9		Hardness (as	$CaCO_3$)	361.	7. 36
Color		0					
Odor		0					
Temp. (reported)		51. 0°F		Total Dissolved Minerals		382.	

RICHTON PARK
Cook County
October 9, 1958

WELL NO. 1 at Richton Park (933) is now equipped with 200 ft. of 4-in. column pipe; 6-in., 24-stage Pomona turbine pump, No. SJ-1280, rated at 100 gpm. against 308 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 10-hp. General Electric motor. There is no air line installed. The ground elevation at the well is 733.

A mineral analysis of a sample (Lab. No. 147811) collected on Sept. 9, 1958 showed the water in Well No. 1 to have a hardness of 28 gr. per gal., total dissolved minerals of 633 ppm., and an iron content of 0.1 ppm.

There are 250 services. Pumpage is estimated to average 50,000 gpd.

LABORATORY NO. 147811

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	11.1	
Manganese	Mn	0.0		Fluoride	F	0.5	
Calcium	Ca	125.1	6.26	Boron	B	0.9	
Magnesium	Mg	40.3	3.31	Chloride	Cl	2.	.06
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	0.2	.00
Sodium	Na	32.	1.39	Sulfate	SO_4	198.5	4.13
				Alkalinity (as	$CaCO_3$)	340.	6.80
Turbidity		0		Hardness (as	$CaCO_3$)	479.	9.57
Color		0					
Odor		0					
Temp. (reported)		52.1°F		Total Dissolved Minerals		633.	

RIDGEWOOD HOMES
Cook County
June 24, 1958

A public water system was installed for Ridgewood Homes (est. 1000), a subdivision located south and west of 115th St. and Ridgeland Ave., and north of the Calumet-Sag Channel. Water is obtained from one well, which was originally constructed as a private well for Judge Humphrey and is now owned by the Southwest Water Co.

The subdivision well was drilled as an oil test in 1925 to a depth of 1408 ft. by E. L. Feel. The well is located about 1/2 mile southeast of Worth, or approximately 250 ft. N. and 300 ft. W. of the S. E. corner of Section 19, T37N, R13E. The ground surface elevation at the well is 605. The well was reportedly cased with 10-in. pipe to rock at 43 ft., below which the hole was 6 l/2 in. in diameter to the bottom. In 1954 when the well was cleaned to a depth of 1032 ft. by S. B. Geiger & Co., Chicago, it was found that an 8-in. casing extends to 1015 ft., below which a 6-in. casing extends at least to 1032 ft.

On Jan. 25, 1954 a production test was conducted by representatives of the Geiger Co. and the State Water Survey. For test purposes, the Drilling Contractor installed 210 ft. of 6-in. column pipe; an 8-stage turbine test pump, 6 ft. in length; 10 ft. of suction pipe; 210 ft. of air line; belt driven stationary gasoline engine. The air line was in very poor condition, and depths to pumping water levels were approximated. After 2 hr. pumping, the rate decelerated from 220 to 124 gpm. with a drawdown of 9 ft. from a non-pumping water level of 11 ft. below the ground level. During the following 4 hr. the pumping rate varied from 260 to 300 gpm. with a final drawdown of 36 ft.

Subsequently, the permanent pump assembly was installed and includes 80 ft. of 6-in. column pipe; 8-in., 5-stage Layne turbine pump, No. 28932, having a length of 4 ft. 2 in. and rated at 200 gpm.; 10 ft. of 6-in. suction pipe; 15-hp. U S electric motor.

On June 24, 1958, after 5 min. pumping at 250 gpm., the drawdown was 14 ft, from a non-pumping water level of 20 ft. below the pump base.

A mineral analysis (Lab. No. 147019) collected June 24, 1958, after 5 min. pumping at 250 gpm., showed the water in this well to have a hardness of 37. 5 gr. per gal., total dissolved minerals of 842 ppm., and an iron content of 3. 1 ppm.

Pumpage for 1957 averaged 47, 000 gpd.

LABORATORY NO. 147019

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3. 1		Silica	SiO_2	12. 8	
Manganese	Mn	Tr.		Fluoride	F	0. 3	
Calcium	Ca	145. 9	7. 30	Boron	B	0. 3	
Magnesium	Mg	67. 7	5. 57	Chloride	Cl	14.	.39
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 7	.01
Sodium	Na	12.	.52	Sulfate	SO_4	339. 6	7. 07
				Alkalinity (as	$CaCO_3$)	296.	5. 92
Turbidity		11		Hardness (as	$CaCO_3$)	644.	12. 87
Color		0					
Odor		0					
Temp. (reported)		51. 8°F		Total Dissolved Minerals		842.	

RIDGEWOOD SUBDIVISION
Cook County
May 1, 1958

A public water system was installed for Ridgewood Subdivision (est. 100) located about 1 mile southeast of Hinsdale, south of 55th St. and west of Wolf Road. Water is obtained from one well.

WELL NO. 1 was completed in Aug. 1957 to a depth of 349 ft. by J. P. Miller Artesian Well Co., Brookfield, and located 1050 ft. S. and 1200 ft. W. of the N. E. corner of Section 18, T38N, R12E. The ground surface elevation at the well is 647.

The well was cased with 10-in. pipe, cemented in a 12-in. hole from the surface to 50 ft., below which the hole was finished 10 in. in diameter to the bottom. When the well was completed, the Driller reported that during pumping at a rate of 450 gpm. for 7 hr. the drawdown was 45 ft. from a static water level of 25 ft.

Subsequently, the permanent pump assembly was installed, including 60 ft. of 4-in. column pipe; 6-stage Peerless turbine pump, No. 125524, rated at 150 gpm. against 130 ft. T.D.H.; 60 ft. of air line; 7 1/2-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146499) collected Apr. 30, 1958, after 2 min. pumping, showed the water in Well No. 1 to have a hardness of 73.7 gr. per gal., total dissolved minerals of 1614 ppm., turbidity of 17 ppm., and an iron content of 3. 7 ppm.

In May 1958 there were 20 services installed and it was reported that eventually there would be 200 services.

Pumpage in May 1958 was estimated to average 5000 gpd.

LABORATORY NO. 146499

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3.7		Silica	SiO_2	13.1	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	305.5	15.28	Boron	B	0.1	
Magnesium	Mg	120.1	9.88	Chloride	Cl	17.	.48
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	1.3	.02
Sodium	Na	17.	.75	Sulfate	SO_4	824.4	17.15
				Alkalinity (as	$CaCO_3$)	412.	8.24
Turbidity		17		Hardness (as	$CaCO_3$)	1258.	25.16
Color		0					
Odor		0					
Temp. (reported)		51.2°F		Total Dissolved Minerals		1614.	

RIDGEWOOD
WATER ASSOCIATION
Will County
March 20, 1959

A public water supply was installed about 1930 for the Ridgewood Water Association (est. 300). One well is in service.

WELL NO. 1 was completed about 1927 or 1930 to a depth of 277 ft. by a Mr. Dorsey and located on Walnut St. between Sterling and Ridgewood Ave., or approximately 2300 ft. S. and 2800 ft. W. of the N. E. corner of Section 11, T35N, R10E. The ground surface elevation at the well is 640. The well was cased with 8-in. pipe from the surface to 35 ft. and with 6-in. pipe from the surface to 92 ft., below which the hole was finished at 6 in. in diameter to the bottom.

The well is equipped with 150 ft. of 4-in. column pipe; 6-in., 22-stage Peerless turbine pump, No. 6940, rated at 80 gpm. against 276 ft. T.D.H.; 10-hp. Fairbanks-Morse electric motor. The pump was installed new in 1945.

On Mar. 20, 1959, when pumping at capacity, the drawdown was 15 ft. from a nonpumping water level of 128 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 147934) collected Oct. 10, 1958 showed the water in Well No. 1 to have a hardness of 43.5 gr. per gal., total dissolved minerals of 955 ppm., and an iron content of 0.1 ppm.

There are approximately 80 services. Pumpage is estimated to average 17,000 gpd.

LABORATORY NO. 147934

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	12.5	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	149.0	7.45	Boron	B	0.1	
Magnesium	Mg	89.3	7.34	Chloride	Cl	27.	.76
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	11.0	.18
Sodium	Na	21.	.91	Sulfate	SO_4	359.6	7.48
				Alkalinity (as	$CaCO_3$)	364.	7.28
Turbidity		0		Hardness (as	$CaCO_3$)	739.	14.79
Color		0					
Odor		0					
Temp. (reported)		53.6°F		Total Dissolved Minerals		955.	

RIO
Knox County
December 8, 1958

A public water supply was installed for the village of Rio (177) in 1958.

WELL NO. 1 was completed in Dec. 1958 to a depth of 675 ft. by Peerless Service Co., Andover, and located approximately 193 ft. N. and 207 ft. W. of the S. E. corner of Section 17, T13N, R1E. The ground surface elevation at the well is 780. The well was cased with 8-in. pipe from the surface to 422 ft., below which the hole was finished 8 in. in diameter.

A production test was conducted on Dec. 8, 1958 by representatives of the Driller, the State Water Survey, and L. S. Pappmeier, Consulting Engineer. For the test a submersible pump rated at 50 gpm. was set at 290 ft. After 5 hr. pumping at a rate of 62 gpm., the drawdown was 9 ft. from a static water level of 257 ft.

A mineral analysis of a sample (Lab. No. 148358) collected Dec. 8, 1958, after 5 hr. pumping at a rate of 62 gpm., showed the water in Well No. 1 to have a hardness of 6. 5 gr. per gal., total dissolved minerals of 860 ppm., and an iron content of 0. 2 ppm.

No record of pumpage has been furnished as yet. It is estimated to average 11, 000 gpd.

LABORATORY NO. 148358

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	8.1	
Manganese	Mn	Tr.		Fluoride	F	2.0	
Calcium	Ca	25.4	1.27	Boron	B	0.8	
Magnesium	Mg	11.7	.97	Chloride	Cl	84.	2.37
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.6	.01
Sodium	Na	310.	13.47	Sulfate	SO_4	68.5	1.43
				Alkalinity (as	$CaCO_3$)	595.	11.90
Turbidity		3		Hardness (as	$CaCO_3$)	112.	2.24
Color		0					
Odor		0					
Temp. (reported)		59.5°F		Total Dissolved Minerals		860.	

ROBERTS
Ford County
November 17, 1960

Four wells are in service for the village of Roberts (504).

WELLS NO. 1 and 3 were described in Bulletin 40 as having been abandoned and filled in 1916 and 1939.

WELLS NO. 2 and 4, described in Bulletin 40, are either in service occasionally or maintained as stand-by units. Their present status is not definitely known.

WELL NO. 5 was completed to a depth of 226 ft. in Sept. 1950 by J. Bolliger and Sons, Fairbury, and located about 1/4 mile southwest of Well No. 2, or approximately 920 ft. S. and 2550 ft. E. of the N. W. corner of Section 21, T25N, R9E. The ground surface elevation at the well is 775. The well was cased with 8-in. pipe from 1. 5 ft. above to 214. 5 ft. below the surface followed by a Johnson Everdur screen, 12.3 ft. long, with the bottom set at 226 ft. below the surface. The upper 5 ft. of screen had No. 10 slot openings and the lower 6 ft. had No. 20 slots. Nine ft. of openings were exposed to the formation.

A production test was conducted on Sept. 22, 1950 by representatives of the Driller, the State Water Survey, Village officials, and Tracy Pitzen, Consulting Engineer. After 4 hr. pumping at 105 gpm., the drawdown was 34. 6 ft. from a nonpumping water level of 81.1 ft. below the top of the 8-in. casing. Twenty-five min. after the pump was stopped, the water level had returned to 81. 7 ft.

The pumping equipment includes a Sterling turbine rated at 105 gpm., connected to a 15-hp. U S electric motor. An air line, 155 ft. long, is installed. On Sept. 20, 1951, when pumping at capacity (105 gpm.), the drawdown was 21 ft. from a nonpumping water level of 85 ft.

WELL NO. 6 was completed to a depth of 228 ft. in Nov. 1960 by J. Bolliger and Sons and located about 250 ft. west of Well No. 5, or approximately 900 ft. S. and 2300 ft. E. of the N. W. corner of Section 21. The well was cased with 8-in. pipe from the surface to 215 ft. followed by a 13 ft. length of Johnson Everdur 8-in. diameter screen having No. 16 slot openings.

A production test was conducted on Nov. 17, 1960 by representatives of the Driller, the State Water Survey, Village officials, and Vail H. Moore, Consulting Engineer. After 5 hr. pumping at a rate of 128 gpm., the drawdown was 19. 8 ft. from a nonpumping water level of 86.6 ft. below the top of the pit (1 ft. above ground level). Thirty min. after the pump was stopped, the water level had recovered to 87.2 ft.

The permanent pump includes a Red Jacket submersible, rated at 130 gpm., set at 152 ft. with an electric motor rated at 10-hp. against 226 ft. T. D.H.

A partial chemical analysis of a sample (Lab. No. 153647) collected Nov. 17, 1960 showed the water in Well No. 6 to have a hardness of 24.8 gr. per gal., total dissolved minerals of 681 ppm., and an iron content of 1. 2 ppm.

There are approximately 180 services, all metered and serving approximately the entire village. Pumpage is reported to average 21, 600 gpd.

LABORATORY NO. 153647

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Fluoride	F	0.5	
Manganese	Mn	Tr.		Chloride	Cl	1.	.03
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	288.	5.76
Turbidity		3		Hardness (as	$CaCO_3$)	426.	8.52
Color		0					
Odor		0					
Temp. (reported)		56.5°F		Total Dissolved Minerals		681.	

ROCK CITY
Stephenson County
October 10; 1960

A public water supply was installed in 1957 for the village of Rock City (202).

WELL NO. 1 was completed to a depth of 432 ft. in Aug. 1957 by Allabaugh Well Co., Rockford, and located on N. Main St., approximately 700 ft. S. and 2200 ft. E. of the N. W. corner of Section 21, T28N, R8E. The ground surface elevation at the well is 940. The well was cased to sandstone with 220 ft. of steel pipe, below which the hole was finished 10 in. in diameter.

The Driller reported pumping for 6 hr. at 318 gpm. (pump capacity) with a drawdown of 61 ft. from a static water level of 105 ft. (air line reading).

The pumping equipment includes a Fairbanks-Morse Pomona turbine pump, rated at 200 gpm., connected to a 25-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153351) collected Oct. 5, 1960 showed the water to have a hardness of 15.7 gr. per gal., total dissolved minerals of 268 ppm., and a trace of iron.

There are 60 services, without meters. Pumpage is estimated to average 9500 gpd.

LABORATORY NO. 153351

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	14.4	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	58.2	2.91	Boron	B	0.0	
Magnesium	Mg	30.5	2.51	Chloride	Cl	0.0	.00
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	8.1	.13
Sodium	Na	0.	.02	Sulfate	SO_4	9.3	.19
				Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		0		Hardness (as	$CaCO_3$)	271.	5.42
Color		0					
Odor		0		Total Dissolved Minerals		268.	

There are 23 wells in service for the public water supply of the city of Rockford (128,075). There are the 6 Group wells, the 15 Unit wells, and the 2 wells of the Edgebrook Subdivision, now owned by the Rockford Water Department.

The 6 GROUP WELLS, located at Tay and Cedar St., are described in Bulletin 40. Wells No. 1, 2, 4 and 5 have been improved by extending the casings above ground level and replacing the air lift equipment in the Stanley St. station with new Layne and Bowler turbines, rated at 1000 gpm. in each well and each pump connected to a 50-hp. General Electric motor. Wells No. 3 and 5 are to be equipped likewise.

A mineral analysis of a sample (Lab. No. 147386) collected Aug. 7, 1958 from Group Well No. 1, showed the water to have a hardness of 15. 7 gr. per gal., total dissolved minerals of 314 ppm., and a trace of iron.

The 10 UNIT WELLS, described in Bulletin 40, are in service. There is no Well No. 2. Apparently the number was never assigned.

UNIT WELL NO. 11 was completed in 1950 to a depth of 245 ft. by Layne-Western Co., Aurora, and located at 7th Ave. and 9th St. The well is cased with 30-in. pipe from 6 in. above to 30 ft. below the surface and with 20-in. pipe from 6 in. above to 160 ft., followed by 85 ft. of 15-in. Layne silicon brass shutter screen to the bottom at 245 ft. The annulus between the screen and the wall of the 30-in. hole was gravel packed. The annulus between the casings and between the 20-in. casing and the wall of the 30-in. hole was filled with cement grout from 160 ft. to the surface.

The pumping equipment includes a Layne and Bowler turbine pump, rated at 4200 gpm., connected to a 2-speed GeneralElectric motor, 100/33 hp. The output of the well is automatically controlled by the depth of the water in the reservoir.

The water from Well No. 11 is discharged into the 53,000-gal. capacity storage reservoir.

UNIT WELL NO. 12 was completed in 1954 to a depth of 245 ft. by Layne-Western Co. and located at 1030 Benton St. The well was cased with 20-in. ci. pipe to 163 ft. followed by 82 ft. of uncased hole to the bottom. The well is cement grouted from 163 ft. to the surface.

The pumping equipment includes a Fairbanks-Morse Pomona turbine rated at 2100/4200 gpm., connected to a 100/56-hp. General Electric motor. The pump and motor are of the 2-speed type, being automatically controlled to meet the demand from the reservoir.

The water from Well No. 12 is discharged into the 40, 000-gal. capacity concrete reservoir located nearby.

UNIT WELL NO. 13 was completed in 1957 to a depth of 1457 ft. by Layne-Western Co. and located at 4623 Guilford Road (east of Alpine Road). The well is cased with 30-in. steel pipe from the surface to the limestone, below which the hole is finished 30 in. in diameter to 20 ft. below the top of the St. Peter sandstone. A 20-in. ci. pipe is set from the surface to 325 ft., below which is open hole. The annular space between the 20-in. casing and the 30-in. casing and hole is filled with cement grout.

The pumping equipment includes a Layne and Bowler turbine pump, No. 34073, rated at 2000 gpm. and connected to a 200-hp. General Electric motor.

The water from Well No. 13 is discharged into the 5-mg. concrete Guilford-Alpine storage reservoir.

UNIT WELL NO. 14 was completed in 1957 to a depth of 235 ft. by Layne-Western Co. and located at Harrison Ave. and Hyde St. The well was cased with 155 ft. of ci. pipe, below which is an uncased hole to the bottom. The well is cement grouted from the bottom of the casing to the surface.

The pumping equipment includes a Layne and Bowler turbine, No. 38761, rated at 4200 gpm. and connected to a 100-hp. General Electric motor.

A mineral analysis of a sample (Lab. No. 147389) collected Aug. 7, 1958 showed the water in Well No. 14 to have a hardness of 24 gr. per gal., total dissolved minerals of 457 ppm., and an iron content of 1. 7 ppm.

The water from Well No. 14 is discharged into the 30, 000-gal. underground reinforced concrete reservoir nearby.

UNIT WELL NO. 8A was completed in 1959 to a depth of 243. 5 ft. by Layne-Western Co. and located adjacent to Unit Well No. 8 in the north-

western part of the city in the triangular park at the intersection of Auburn, Camp, and Douglas St., or approximately 2050 ft. N. and 1900 ft. E. of the S. W. corner of Section 13, T44N, R1E. The ground surface elevationat the well is 723.9.

The well was cased with 135 ft. of 20-in. ci. pipe followed by 10 ft. of 16-in. stainless steel inside pipe to the top of the screen. A 100 ft. length of 16-in. Layne No. 6 stainless steel, shutter screen was set from 145 ft. to the bottom of the well.

The Driller reported pumping for 6 hr. at a rate of 1900 gpm. with a drawdown of 6 ft. from a static water level of 29 ft.

The pumping equipment has not yet been installed.

UNIT WELL NO. 15 was completed in Aug. 1959 to a depth of 1355 ft. by Layne-Western Co. and located about l/2 block west of the Willardand Chestnut St. intersection (3100 west). The well was cased with 30-in. steel pipe from the surface to 33 ft. and with 20-in. ci. pipe in a 29-in. hole from the surface to 260 ft, followed by a 20-in. hole to the bottom of the well. The annulus between the 20-in. casing and the 30-in. casing and wall of the hole was cement grouted from 260 ft. to the surface.

When the well was completed the Driller reported pumping for 6 hr. at a rate of 963 gpm. with a drawdown of 49 ft. from a static water level of 155 ft.

The pumping equipment includes a Layne and Bowler turbine pump, rated at 2000 gpm., and connected to a 200-hp. U S electric motor.

The water is discharged into the 5-mg. Willard-Chestnut reservoir, located about 300 ft. west of Well No. 15.

UNIT WELL NO. 16 was completed in Nov. 1959 to a depth of 1310 ft. by Layne-Western Co. and located at the northeast corner of Alpine Road and Harrison Ave. The well was cased with 30-in. steel pipe from the surface to 71. 5 ft. and with 20-in. pipe in a 29-in. hole from the surface to 330 ft. followed by a 19-in. hole to the bottom of the well. The annulus between the casings and between the 20-in. casing and the wall of the 29-in. hole was cement grouted.

When the well was completed, the Driller reported pumping 3 hr. at a rate of 963 gpm. with a drawdown of 43 ft. from a static water level of 127 ft.

The pumping equipment includes a Layne and Bowler turbine pump rated at 2000 gpm. against 290 ft. T.D.H. and connected to a 200-hp. U S electric motor.

The water from Well No. 16 is discharged into a 40,000-gal. concrete reservoir located nearby.

The Edgebrook Subdivision, comprising about 1000 homes and located on Spring Creek Road about 5 miles north of Rockford, was annexed to the city of Rockford early in 1960 and the two existing wells and distribution system were taken over by the Rockford Water Department.

EDGEBROOK WELL NO. 1 was completed in 1928 for the Edgebrook Water Co., by P. E. Millis Co., Byron, and located on Brookview Road about 200 ft. west of Edgebrook Road, or approximately 1250 ft. S. and 1550 ft. E. of the N. W. corner of Section 17, T44N, R2E. The well was originally reported to be 1210 ft. deep but in 1952 the Francis Engineering Co. reported the measured depth of the well to be 907 ft. The elevation of the top of the well is 776. 2. The well was cased with 12-in. pipe to an unknown depth.

When taken over by the Rockford Water Department the pumping installation included a 9 l/2-in., 2-stage Price turbine with 80 ft. of 7-in. column pipe connected to a 25-hp. Fairbanks-Morse electric motor. At the time the well reportedly produced 747 gpm. with a drawdown of 48. 5 ft. from a static water level of 20 ft. Five min. after the pump was stopped, the water level had recovered to 33 ft.

Well No. 1 is to be worked on and a new pump installed.

EDGEBROOK WELL NO. 2 was completed in 1927 to a depth of 1200 ft. but recently reported to be 750 ft. deep. The well is located about 50 ft. east of Well No. 1 and is reportedly cased with 12-in. pipe to an unknown depth.

Well No. 2 was worked over by Allabaugh Well Co., Rockford, in 1957. The casing was extended upward to 14 in. above the pump house floor. A new Deming turbine, No. 19568, and rated at 500 gpm. was installed and connected to a 60-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 147387) collected Aug. 7, 1958 showed the water in Edgebrook Well No. 2 to have a hardness of 19.4 gr. per gal., total dissolved minerals of 349 ppm., and a trace of iron.

A new 25,000-gal. capacity storage reservoir is to be constructed near the wells.

Pumpage for the city of Rockford for the year 1959 averaged 20. 890 mgd.

LABORATORY NO. 147386

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	11.0	
Manganese	Mn	0.0		Fluoride	F	0.0	
Calcium	Ca	60.1	3.01	Boron	B	0.0	
Magnesium	Mg	33.6	2.76	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.7	.01
Sodium	Na	4.	.19	Sulfate	SO_4	11.7	.24
				Alkalinity (as	$CaCO_3$)	280.	5.60
Turbidity		0		Hardness (as	$CaCO_3$)	289.	5.77
Color		0					
Odor		0					
Temp. (reported)		56.3°F		Total Dissolved Minerals		314.	

LABORATORY NO. 147387

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	18.1	
Manganese	Mn	Tr.		Fluoride	F	0.0	
Calcium	Ca	76.8	3.84	Boron	B	0.0	
Magnesium	Mg	34.2	2.81	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.8	.06
Sodium	Na	6.	.28	Sulfate	SO_4	25.7	.54
				Alkalinity (as	$CaCO_3$)	308.	6.16
Turbidity		0		Hardness (as	$CaCO_3$)	333.	6.65
Color		0					
Odor		0					
Temp. (reported)		53.6°F		Total Dissolved Minerals		349.	

4 - Rockford

LABORATORY NO. 147389

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.7		Silica	SiO_2	17.6	
Manganese	Mn	0.2		Fluoride	F	0.0	
Calcium	Ca	97.5	4.88	Boron	B	0.0	
Magnesium	Mg	40.8	3.36	Chloride	Cl	13.	.37
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	0.4	.01
Sodium	Na	5.	.20	Sulfate	SO_4	57.0	1.19
				Alkalinity (as	$CaCO_3$)	344.	6.88
Turbidity		10		Hardness (as	$CaCO_3$)	412.	8.24
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		457.	

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, sandy, gravelly, brown	80	80
Gravel and sand	10	90
Till, brown	5	95
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light gray to brownish gray, very fine to fine	55	150
Alexandrian Series		
Dolomite, light gray to white, fine to very fine	40	190
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, gray to greenish gray, very fine to fine; shale streaks brown	155	345
Shale, gray, weak to tough; dolomite, streaks	55	400
Galena Formation		
Dolomite, pale yellow brown, brown, fine to medium; shale streaks at base	190	590
Decorah Formation		
Limestone, light gray to brown, fine to medium	15	605
Platteville Formation		
Limestone, pale brown to yellowish brown, very fine to fine	35	640
Dolomite, pale yellowish brown, very fine	10	650
Limestone, pale brownish gray, very fine	48	698
Dolomite, pale yellowish brown, very fine to fine	32	730
Glenwood Formation		
Sandstone, light gray, fine and coarse, incoherent; dolomite, very sandy, gray, very fine to fine at top	65	795
St. Peter Formation		
Sandstone, pale yellowish gray, light gray, fine to coarse, incoherent; some dolomite, light gray, very fine, and shale red, firm at base	163	958
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, pale yellowish gray to pinkish gray, very fine to medium	96	1054
Franconian Formation		
Sandstone, green, red, fine, incoherent to little compact; shale grayish green, weak	56	1110
Ironton Formation		
Sandstone, light gray, pale yellowish gray, fine to very coarse, mostly incoherent; some streak dolomite, pale brown	135	1245
Galesville Formation		
Sandstone, yellowish gray, fine to coarse, incoherent	45	1290
Eau Claire		
Shale, greenish gray, weak to firm, sandstone, buff to brown, extra fine to compact, little incoherent	111	1401

ROSELLE
DuPage County
December 4, 1959

Two wells are in service for the public water supply of the village of Roselle (3581).

WELL NO. 1 pump was overhauled in Feb. 1955, and on Mar. 1, 1955 a production test was conducted by J. P. Miller Artesian Well Co., Brookfield. During pumping at a rate of 140 gpm., the drawdown was 60 ft. from a static water level of 47 ft. On Mar. 9, 1955 about 1000 gal. HC1 was poured into the well. On Mar. 11, after 1 hr. 20 min. pumping at a rate of 97 gpm., the drawdown was 78 ft. below a static water level of 42 ft.

The pumping equipment in Well No. 1 consists of 140 ft. of 5-in. column pipe; 7-in., 15-stage Peerless turbine pump, No. 34545, rated at 175 gpm. against 235 ft. T.D.H.; 140 ft. of air line; 10 ft. of 5-in. suction pipe; 15-hp. U S electric motor.

WELL NO. 2 was completed in 1954 to a depth of 183 ft. by J. P. Miller Artesian Well Co., Brookfield, and located in the village hall about 75 ft. south of Well No. 1, or approximately 2000 ft. S. and 2400 ft. W. of the N. E. corner of Section 3, T40N, R10E. The elevation of the top of the well is 770.2. The well was cased with 10-in. pipe from the surface to 145 ft., below which the hole was finished 10 in. in diameter to the bottom.

The pumping equipment consists of 140 ft. of 5-in. column pipe; 8-in., 8-stage Layne turbine pump (No. 27653), 5 ft. 8 in. long and rated at 300 gpm. against 237 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 140 ft. of air line (defective); 25-hp. U S electric motor.

In July 1956 the nonpumping water level was reportedly 48 ft. and on Mar. 19, 1959, during pumping at a rate of 400 gpm., the drawdown was 36 ft. from a nonpumping water level of 54 ft.

A mineral analysis of a sample (Lab. No. 151193) collected Dec. 4, 1959, after 20 min. pumping at 400 gpm., showed the water in Well No. 2 to have a hardness of 18.3 gr. per gal., total dissolved minerals of 447 ppm., and an iron content of 0.7 ppm.

Pumpage is estimated to average 110,000 gpd.

LABORATORY NO. 151193

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Silica	SiO_2	19.0	
Manganese	Mn	Tr.		Fluoride	F	0.4	
Calcium	Ca	66.2	3.31	Boron	B	0.2	
Magnesium	Mg	35.4	2.91	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.3	.04
Sodium	Na	39.	1.71	Sulfate	SO_4	154.9	3.22
				Alkalinity (as	$CaCO_3$)	228.	4.56
Turbidity		4		Hardness (as	$CaCO_3$)	311.	6.22
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		447.	

Two wells are in service for the public water supply of the village of Round Lake (997). Cross connection with the Round Lake Park public water supply was completed in Oct. 1951.

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 is partially described in Bulletin 40. The pumping equipment, installed about 1947 includes an Aurora turbine pump, rated at 250 gpm. against 275 ft. T.D.H. and a 25-hp. U S electric motor.

Pumpage in Dec. 1956 was reported to average 60, 000 gpd.

ROUND LAKE PARK
Lake County
August 8, 1958

A public water supply was installed for Round Lake Park (2565) in 1939. At that time the community was a subdivision, but in 1947 it was incorporated as a village.

Two wells furnish water to the village.

WELL NO. 1 is described in Bulletin 40 and is in service.

A well drilled in 1943 (No. 2 in the order of drilling) is described in Bulletin 40 as being abandoned as a dry hole,

WELL NO. 2, described in Bulletin 40 as Well No. 3, is in service. A partial chemical analysis of a sample (Lab. No. 147409) collected in July 1958 from the distribution system showed the water to have a hardness of 9.1 gr. per gal., total dissolved minerals of 387 ppm., and an iron content of 7.4 ppm.

There are approximately 800 services. None of the residential services is metered, but the business stores are metered. Reportedly 95% of the population is served.

Pumpage is estimated to average 176, 000 gpd.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Black earth	3	3
Yellow clay, hard and stony	15	18
Blue clay, soft	130	148
Sandy clay, hard	28	176
Quicksand	35	211
Gravel, clay and sand	25	236
Clay and some gravel	13	249
Gravel	9	258
SILURIAN SYSTEM		
Limestone, blue, white, brown	10	268
Limestone, gray	4	272
Limestone, brownish gray	41	313

LABORATORY NO. 147409

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	7.4		Fluoride	F	1.0	
				Boron	B	1.0	
				Chloride	Cl	8.	.23
				Nitrate	NO_3	0.6	.01
				Alkalinity (as	$CaCO_3$)	116.	2.32
Turbidity		42		Hardness (as	$CaCO_3$)	156.	3.12
Color		0					
Odor		0		Total Dissolved Minerals		387.	

RUTLAND
LaSalle County
September 13, 1960

One well is in active service for the village of Rutland (509).

WELL NO. 1, described in Bulletin 40, is maintained only for emergency use.

WELL NO. 2 was completed in July 1955 to a depth of 55 ft. by Daniel Schmidt, Mendota, and located 7 ft. north and 28 ft. east of Well No. 1, or approximately 82 ft. N. and 678 ft. E. of the S. W. corner of Section 7, T29N, R2E. The ground surface elevation at the well is 704. The well was cased with 8-in. pipe from 2 ft. above to 48 ft. 9 in. below ground level followed by 8 ft. of 8-in. No. 60 slot Johnson screen.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil	10	10
Clay	10	20
Putty clay	22	42
Hardpan	5	47
Sand	8	55

A production test was conducted on July 8, 1955 by representatives of the Driller, the State Water Survey, and Russell Dunlap, Architect-Engineer. For test purposes the well was equipped with a plunger pump having a 3 3/4-in. cylinder with a 30-in. stroke in a 4-in. column pipe, and operated from a Star drill rig and a Red Seal gasoline motor. After 5 hr. pumping at a rate of 52 gpm., the drawdown was 14. 3 ft. from a nonpumping water level of 22. 3 ft. below the top of the casing. Forty min. after the pump was stopped, the water level had recovered to 24.1 ft.

During the pumping in Well No. 2 water levels were observed in Well No. 1. At the end of pumping in Well No. 2 the water level in Well No. 1 had been lowered 2 ft. from a static level of 34 ft.

The permanent pumping equipment includes an American Well Works turbine pump, rated at 60 gpm. against 60 ft. T.D.H. A 2-hp. U S electric motor is in place.

A mineral analysis of a sample (Lab. No. 153213) collected Sept. 13, 1960 showed the water in Well No. 2 to have a hardness of 43. 5 gr. per gal., total dissolved minerals of 1397 ppm., and an iron content of 2. 9 ppm.

There are 145 services, 75 of which are metered. Pumpage is reported to average 20, 000 gpd.

LABORATORY NO. 153213

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 9		Silica	SiO_2	13. 4	
Manganese	Mn	0. 2		Fluoride	F	0. 7	
Calcium	Ca	188. 0	9. 40	Boron	B	1. 4	
Magnesium	Mg	66. 9	5. 50	Chloride	Cl	14.	. 39
Ammonium	NH_4	1. 6	. 09	Nitrate	NO_3	0. 3	Tr.
Sodium	Na	133.	5. 78	Sulfate	SO_4	806. 3	16. 78
				Alkalinity (as	$CaCO_3$)	180.	3. 60
Turbidity		20		Hardness (as	$CaCO_3$)	745.	14. 90
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		1397.	

ST. CHARLES
Kane County
November 3, 1958

Four wells are in service for the city of St. Charles (9269).

WELLS NO. 1 and 2 were described in Bulletin 40 and reported as being abandoned.

WELL NO. 3 is described in Bulletin 40. The pump failed in May 1950 and after repairs were made, the air line was reinstalledandmeasured 240 ft. in length. The well was returned to service. In Sept. and Oct. 1952 the static water level measured 148 ft. below the pump base(elev. 690). In Nov. 1952 the air line was found inoperative.

In Dec. 1953 the rehabilitation of Well No.' 3 was started by J. P. Miller Artesian Well Co., Brookfield. The old casing and the liner were removed and the hole reamed out to 19 in. in diameter from the surface to 665 ft.; 17 in. in diameter from 665 to 710 ft., and 10 in. in diameter to the bottom at 2197 ft. By Apr. 1955 the well had been recased with 16-in. pipe, cemented in, from the surface to 690 ft. A 12-in. liner was set between 823 and 935 ft. depths.

On Apr. 21, 1955 the static water level was 167 ft. below the surface.

On May 4, 1955 a production test was conducted by the Contractor. For test purposes the well was equipped with 330 ft. of 10-in. column pipe; 7-stage Peerless turbine test pump; 10 ft. of suction pipe; 100-hp, electric motor. After 24 hr. continuous pumping at a rate of 1065 gpm., the drawdown was 143 ft. from a nonpumping water level of 177 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 137602) collected May 4, 1955, after 24 hr. pumping at 1065 gpm., showed the water in Well No. 3 to have a hardness of 20.9 gr. per gal., total dissolved minerals of 689 ppm., and an iron content of 0.4 ppm.

WELL NO. 4 is described in Bulletin 40. In Dec. 1950 C. W. Varner removed the pump to rework the well and repair the pump. By Mar. 1951 the well had been shot at three depths: 400 lb. at 2130 ft., 700 lb. at 2070 ft., and 350 1b. at 2020 ft. Very little sand was bailed out so additional charges were set off as follows: 400 lb. at 2130 ft., 400 lb. at 2020 ft., 400 lb. at 1940 ft., and 350 lb. at 1380 ft.

In Mar. 1952 the production fell off. The depth of the well was measured and found to be 1833 ft. or 367 ft. above the original depth of 2200 ft. The static water level at the time was 151 ft. below the surface. In May 1952 the well had been cleaned out a second time to a depth of 2190 ft. The static water level at the time was 145 ft. below the pump base (elev. 691. 6). New pump bowls and shaft were installed and the pump bearings were replaced. In a production test conducted on May 31, 1952, during pumping at a maximum rate of 1146 gpm., the drawdown was 95 ft. from a static water level of 145 ft. below the pump base.

WELL NO. 5 is described in Bulletin 40. On May 20, 1950 this well had not yet been connected to the system. In a production test, much sand was pumped for the first 30 hr. During the last 9 hr. there was very little sand pumped. During pumping at 1200 gpm., the drawdown was 30 ft. from a static water level of 250 ft. below the pump base (elev. 760).

In Nov. 1952 the static water level was reportedly 240 ft. below the pump base.

WELL NO. 6 was completed to a depth of 2250 ft. in Oct. 1955 by L. Cliff Neely, Batavia, and located on the same lot as Well No. 5, or approximately 1900 ft. S. and 1400 ft. E. of the N. W. corner of Section 34, T40N, R8E. The elevation of the top of the pump base is 766.1. The well was cased with 26-in. pipe from the surface to 79 ft. with 20-in. pipe from the surface to 334 ft., and with a 16-in. liner from 1021 to 1172. 7 ft., below which the hole was finished 15 1/4 in. in diameter. The 20-in. casing was pressure grouted. The well was shot with 800 qt. of liquid nitro at a depth of 1925 ft. The static water level was 243 ft. below the surface.

A production test was conducted on Oct. 17, 1955 by representatives of the Driller, the State Water Survey, and Caldwell-Rhoads, Consulting Engineers. After 11 hr. pumping at a rate of 1300 gpm., the drawdown was 118 ft. from a static water level of 240 ft. below the pump base. Thirty min. after pumping was stopped, the water level had recovered to 270 ft.

The permanent pump assembly consists of 400 ft. of 8-in. column pipe; 11-in., 7-stage Byron Jackson submersible pump, No. 328548,

rated at 1000 gpm. at 410 ft. T.D.H.; 400 ft. of air line; 150-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146378) collected in June 1958, after 1 hr. pumping at a rate of 1000 gpm., showed the water in Well No. 6 to have a hardness of 12. 5 gr. per gal., total dissolved minerals of 302 ppm., and an iron content of 0. 4 ppm.

Pumpage in July 1958 was reported to average 1. 2 mgd.

LABORATORY NO. 146378

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	11.0	
Manganese	Mn	Tr.		Fluoride	F	0.9	
Calcium	Ca	45.5	2.28	Boron	B	0.2	
Magnesium	Mg	24.4	2.01	Chloride	Cl	36.	1.02
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.3	.02
Sodium	Na	37.	1.61	Sulfate	SO_4	29.6	.62
				Alkalinity (as	$CaCO_3$)	212.	4.24
Turbidity		2		Hardness (as	$CaCO_3$)	215.	4.29
Color		0					
Odor		0					
Temp. (reported)		59.7°F		Total Dissolved Minerals		302.	

ST. DAVID
Fulton County
June 2, 1960

A public water supply was being installed in 1960 for the village of St. David (862). Water is to be obtained from one well, the third of three test wells which had been drilled.

WELL NO. 1 was completed from Test Well No. 3-60 in June 1960 to a depth of 50. 5 ft. by Layne-Western Co., Aurora, and located about 1 l/2 miles northeast of town, or approximately 1100 ft. N. and 2100 ft. W. of the S. E. corner of Section 10, T6N, R4E. The land surface elevation at the well is 630. The well was cased with 6-in. pipe from 1. 5 ft. above to 40. 5 ft. below ground level, followed by 10 ft. of 5-in. screen to the bottom at 50. 5 ft.

A production test was conducted on June 2, 1960 by representatives of the Driller, the State Water Survey, and W. H. Klingner and Associates, Consulting Engineers. After 6 hr. pumping at a rate of 42 gpm., the drawdown was 29. 3 ft. from a nonpumping water level of 9. 6 ft. (measuring point 1 ft. above land surface).

During the test, two observation wells were used to measure water levels. O. W. No. 1-60 was located 165 ft. east of the pumped well and O. W. No. 2-60 was located 20 ft. west of the pumped well. Each observation well had 40 ft. of 2-in. casing with 7 to 8 ft. of 2-in. diameter screen. During the test the water level in O. W. No. 1-60 lowered 12.4 ft. from 8.9 ft. below the top of the casing and in O. W. No. 2-60 the water level lowered 17. 7 ft. from 8. 2 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level in O. W. No. 2-60 had recovered to 8. 6 ft.

A partial chemical analysis of a sample (Lab. No. 152422) collected June 2, 1960, after 6 hr. pumping at 62 gpm., showed the water to have a hardness of 21. 5 gr. per gal., total dissolved minerals of 394 ppm., an iron content of 2. 6 ppm., and a turbidity of 16 ppm.

The permanent pump is not installed.

LABORATORY NO. 152422

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 6		Fluoride	F	0. 3	
Manganese	Mn	0. 1		Chloride	Cl	2.	. 06
				Nitrate	NO_3	1. 3	. 02
				Alkalinity (as	$CaCO_3$)	364.	7. 28
Turbidity		16		Hardness (as	$CaCO_3$)	368.	7. 36
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		54. 5°F		Total Dissolved Minerals		394.	

ST. FRANCISVILLE
Lawrence County
April 29, 1959

Water for the public supply of the city of St. Francisville (1040) is obtained from three wells.

WELL NO. 1, described in Bulletin 40, was equipped in 1951 witha new pumping installation consisting of a Fairbanks-Morse Pomona turbine pump, rated at 50 gpm. and connected to a 5-hp. Fairbanks-Morse electric motor. In Aug. 1952 the nonpumping water level was 35 ft. below the ground surface and during pumping at 50 gpm. the drawdown was 89 ft.

WELL NO. 2: No change since Bulletin 40.

WELL NO. 3 was completed in 1951 to a depth of 136 ft. by E. I. Potts & Son, St. Francisville, and located about 1/4 mile south of Well No. 1 (South Well), or approximately 2000 ft. N. and 900 ft. W. of the S. E. corner of Section 20, T2N, R11W. The ground surface elevation at the well is 400. The well was cased with 10-in. drive pipe to 35 ft.

A production test was conducted on Sept. 28, 1951 by representatives of Heldt-Monroe Co., the City, and the State Water Survey. After 1 1/4 hr. pumping at a rate of 50 gpm., the drawdown was 91 ft. from a nonpumping water level of 33 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level had returned to 33. 5 ft.

The pumping equipment consists of a Fairbanks-Morse Pomona turbine pump, rated at 50 gpm., connected to a 5-hp. electric motor.

A mineral analysis of a sample (Lab. No. 149505) collected Apr. 29, 1959, while pumping at a rate of 40 gpm., showed the water in Well No. 3 to have a hardness of 16 gr. per gal., total dissolved minerals of 335 ppm., and an iron content of 1.1 ppm.

Pumpage is estimated to average 40, 000 gpd.

LABORATORY NO. 149505

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	19.3	
Manganese	Mn	0.4		Fluoride	F	0.2	
Calcium	Ca	72.3	3.62	Boron	B	0.1	
Magnesium	Mg	22.6	1.86	Chloride	Cl	13.	.37
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.1	Tr.
Sodium	Na	7.	.31	Sulfate	SO_4	56.8	1.18
				Alkalinity (as	$CaCO_3$)	212.	4.24
Turbidity		12		Hardness (as	$CaCO_3$)	274.	5.48
Color		0					
Odor		0					
Temp. (reported)		60°F		Total Dissolved Minerals		335.	

ST. MARIE
Jasper County
July 1, 1960

A public water supply was installed in 1954 for the village of St. Marie (347). One well is in service.

WELL NO. 1 was completed in Sept. 1953 to a depth of 54 ft. by Sims Drilling Co., Champaign, and located north of the Embarrass River, about 1/4 mile north of the village, or approximately 530 ft. N. and 80 ft. E. of the S. W. corner of Section 19, T6N, R14W. The elevation of the ground surface at the well is 465. The well was cased with 8-in. pipe from 3. 3 ft. above to 44. 4 ft. below the surface followed by 10 ft. 10. 5 in. of 8-in. diameter screen having No. 8 slot openings. The bottom of the screen was seated in 2 ft. of shale.

The well site is subject to flooding from the river. A 36-in. casing was set with the top 20 ft. above and the bottom 3 ft. below the ground surface.

A production test was conducted on Sept. 30, 1953 by representatives of the Driller, the State Water Survey, and Village officials. For test purposes the well was equipped with a plunger pump operated from a Bucyrus-Erie drill rig. An air line was installed for measuring water levels. After 6 hr. pumping at rates of 33.5 to 61 gpm., the drawdown was 15. 5 ft. from a non-pumping water level of 14. 3 ft. Eleven min. after the pump was stopped, the water level had recovered to 14. 3 ft.

During the test water levels were noted in O. W. No. 1 located 500 ft. S. and 50 ft. W. of Well No. 1. During the pumping in Well No. 1, water levels in the O. W. No. 1 were lowered 0. 3 ft. from 16. 38 ft. below the surface.

A mineral analysis of a sample (Lab. No. 133026) collected Sept. 30, 1953, after 6 hr. pumping at a rate of 61 gpm., showed the water in Well No. 1 to have a hardness of 14.8 gr. per gal., total dissolved minerals of 295 ppm., an iron content of 8. 3 ppm., and a turbidity of 63 ppm.

The pumping equipment includes a Jacuzzi submersible pump, rated at 120 gpm.

There are 111 services. Pumpage is estimated to average 18,000 gpd.

LABORATORY NO. 133026

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	8.3		Silica	SiO_2	19.0	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	76.9	3.85	Chloride	Cl	8.	.22
Magnesium	Mg	14.8	1.21	Nitrate	NO_3	0.1	Tr.
Ammonium	NH_4	0.6	.03	Sulfate	SO_4	20.6	.43
Sodium	Na	18.	.76	Alkalinity (as	$CaCO_3$)	260.	5.20
Turbidity		63		Hardness (as	$CaCO_3$)	253.	5.06
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		295.	

SANDWICH
DeKalb County
May 14, 1959

Two wells are in service for the city of Sandwich (3842).

WELL NO. 1, described in Bulletin 40 as having been drilled in 1911 to a depth of 600 ft., is equipped with 100 ft. of 8-in. column pipe; 12-in., 5-stage Byron Jackson turbine pump, rated at 800 gpm. against 92 ft. T.D.H.; 100 ft. of air line; 40-hp. U Selectric motor. AJohnston right angle gear drive is installed with power from a Continental engine.

On May 14, 1959 the nonpumping water level was 18 ft. below the pump base (elev. 661) which is 6 ft. below L. S. D.

WELL NO. 2, described in Bulletin 40 as having been drilled in 1939 to a depth of 600 ft., is equipped with 110 ft. of 8-in. column pipe; 12-in., 2-stage Byron Jackson turbine pump, No. 358514, rated at 750 gpm. against 110 ft. T.D.H.; 110 ft. of air line; 30-hp. U S electric motor.

On May 14, 1959 the nonpumping water level was 26 ft. below the pump base (elev. 667) at L. S. D.

There are 1300 services, all metered. Pumpage is reportedly estimated to average 400, 000 gpd.

SAUK VILLAGE
Cook County
December 5, 1959

A public water supply was installed in May 1957 for Sauk Village (4687) on Sauk Trail about 2 miles east of Chicago Heights. The system is owned and operated by the Indian Hill Utility Co.

WELL NO. 1 was drilled in 1957 to a depth of 470 ft. by Wehling Well Works, Beecher, and located 1400 ft. N. and 1950 ft. W. of the S. E. corner of Section 25, T35N, R14E. The ground elevation at the well is 650. The well was cased with 8-in. pipe to limestone. A production test was conducted on May 1, 1957 using the following pumping equipment: 100 ft. of 6-in. column pipe; 7-stage Peerless turbine test pump. Power was furnished from a gear drive. The static water level was reportedly 32 ft. With no air line installed, the drawdown was not reported. The pumping rate was started at 550 gpm. and maintained at that rate for 4 hr., then accelerated to 860 gpm.; and after 1 l/4 hr. pumping, the pumping rate was decreased to 705 gpm. and maintained at that rate for 1 l/4 hr.

Subsequently, the permanent pump was installed consisting of 100 ft. of column pipe; Peerless turbine pump, No. 124490, rated at 1000 gpm.; 100 ft. of air line; 40-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 146508) collected Apr. 27, 1958, after 5 min. pumping, showed the water in Well No. 1 to have a hardness of 21. 8 gr. per gal., total dissolved minerals of 554 ppm., and an iron content of 0. 4 ppm.

A production test was conducted by the Driller on Dec. 5, 1959 after Well No. 2 was tested. After 2 hr. pumping at pump capacity, the drawdown was 15 ft. from a nonpumping water level of 23 ft. (air line reading).

WELL NO. 2 was completed to a depth of 480 ft. in Dec. 1959 by Wehling Well Works and located about 1/4 mile northeast of Well No. 1, or approximately 2300 ft. N. and 235 ft. W. of the S. E. corner of Section 25. The ground surface elevation at the well is 635. The well was cased with 12-in. pipe to an unreported depth.

A production test was conducted by the Driller on Dec. 3-5, 1959. For test purposes the well was equipped with 250 ft. of column pipe; 11 5/8-in. Byron Jackson turbine pump (No. 1234560); 248 ft. of air line; LeRoi gas engine. After 24 hr. pumping at a rate of 1000 gpm., the drawdown was 11 ft. from a static water level of 27 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 151228), collected 24 hr. after pumping began at a rate of 1000 gpm., showed the water in Well No. 2 to have a hardness of 23. 3 gr. per gal., total dissolved minerals of 522 ppm., and an iron content of 0. 5 ppm.

There are 1000 services all metered.

Pumpage for the village for Jan. -Mar. 1958 averaged 264, 000 gpd.

LABORATORY NO. 146508

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	11.9	
Manganese	Mn	0.0		Fluoride	F	0.7	
Calcium	Ca	74.7	3.74	Boron	B	0.8	
Magnesium	Mg	45.4	3.73	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.8	.01
Sodium	Na	64.	2.78	Sulfate	SO_4	98.5	2.05
				Alkalinity (as	$CaCO_3$)	404.	8.08
Turbidity		1		Hardness (as	$CaCO_3$)	374.	7.47
Color		0					
Odor		0					
Temp. (reported)		52.4°F		Total Dissolved Minerals		554.	

SAVANNA
Carroll County
April 30, 1953

Two wells (No. 4 and 5) are in service for the city of Savanna (4950).

WELLS NO. 1 and 2, described in Bulletin 40, were abandoned and filled in about 1953.

WELL NO. 3, described in Bulletin 40, was in stand-by use in 1956. Since then it has not been in service and reportedly maybe abandoned.

WELL NO. 4, described in Bulletin 40, is in service.

WELL NO. 5 was completed to a depth of 1804 ft. in Apr. 1953 by Milaeger Well Drilling Co., Milwaukee, Wis., and located at the north end of Main St., about 1 block south of the Mississippi River bridge about 3/4 mile northwest of Well No. 4, or approximately 1678 ft. N. and 690 ft. W. of the S. E. corner of Section 4, T24N, R3E. The ground surface elevation at the well is 600.

The well was first drilled to a depth of 1504 ft. in Dec. 1952 and cased as shown in Table A. A 6-hr, production test was conducted on Dec. 10, 1952 by representatives of the Driller, the State Water Survey, City officials, and Beling Engineering Consultants. After 6 hr. pumping at a rate of 300 gpm., the drawdown was 63.5 ft. from a nonpumping water level of 3. 5 ft.

TABLE A

Hole Sizes

26-in. from surface to 155 ft.
25-in. from 155 to 555 ft.
19-in. from 555 to 893 ft.
15-in. from 893 to 1277 ft.
12-in. from 1277 to 1504 ft.

Casing Record

26-in. id. from surface to 155 ft.
20-in. id. from surface to 555 ft.
16-in. id. from 632 to 783 ft. (liner)
12-in. id. from 1096 to 1172 ft. (liner)

Following the test the hole was drilled 12 in. in diameter to a depth of 1804 ft. and shot with 450 lb. of explosives at seven levels as shown in Table B.

TABLE B

Shot	Size of shot lb.	Depth of shot ft.
1	50	1692
2	100	1590
3	100	1515
4	50	1327
5	50	1390
6	50	1250
7	50	1240

A second production test was conducted on Apr. 29-30, 1953 by the same representatives. For the test the well was equipped with 200 ft. of column pipe; a turbine pump, with 7-ft. bowl section; air line 207 ft, long; electric motor. After 24 hr. pumping at rates of 350 gpm. gradually increased to 900 gpm., the final drawdown was 191 ft. from a nonpumping water level of 5 ft. One and one-half hr. after the pump was stopped, the water level had recovered to 50 ft.

A mineral analysis of a sample (Lab. No. 131834) collected Apr. 30, 1953, after 23 hr. pumping at a rate of 850 gpm., showed the water in Well No. 5 to have a hardness of 15. 7 gr. per gal., total dissolved minerals of 286 ppm., and an iron content of 0. 6 ppm.

The pumping equipment includes 200 ft. of 8-in. column pipe; 10-in., 13-stage Fairbanks-Morse Pomona turbine pump (No. AN4107), 10 ft. 2 in. long and rated at 500 gpm. at 390 ft. T.D.
H.; 20 ft. of 8-in. suction pipe; air line; 60-hp. U S electric motor.

There are approximately 2000 services.

Pumpage for 1956 averaged 433, 000 gpd.

Sample study summary log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Silt, sandy, gravelly, yellowish brown	20	20
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, grayish brown, fine to medium; shale, green, streaks	160	180
Galena Formation		
Dolomite, pale grayish brown, fine to coarse	255	435
Decorah Formation		
Dolomite, grayish brown, fine to coarse; little dolomite at base	30	465
Platteville Formation		
Dolomite, grayish brown to gray, fine	70	535
Glenwood Formation		
Sandstone, yellowish gray, fine to coarse, incoherent; dolomite, gray to pale grayish brown, fine to medium	25	560
St. Peter Formation		
Sandstone, gray, yellowish gray, fine to coarse, incoherent; shale streaks; little dolomite at base	95	655
Shakopee Formation		
Dolomite, sandy, light gray, fine to medium	55	710
New Richmond Formation		
Sandstone, light gray, fine to coarse, dolomite, cherty, sandy at top	20	730
Oneota Formation		
Dolomite, light gray, fine to coarse; little sandstone and shale	170	900
CAMBRIAN SYSTEM		
Jordan Formation		
Dolomite, grayish brown, fine to medium; sandstone, light gray, medium to very coarse, incoherent, compact	50	950
Trempealeau Formation		
Dolomite, light gray to light yellow, pink, fine to medium; little sandstone, light gray, medium to coarse, incoherent to compact at base	160	1110
Franconia Formation		
Sandstone, clayey, green, very fine	60	1170
Ironton Formation		
Sandstone, white, very fine to coarse, hard to friable	115	1285
Eau Claire Formation		
Sandstone, cemented, very fine to coarse; shale, dark gray; dolomite, gray at top	40	1325
Sandstone, white, pink at base, fine to very coarse, mostly medium to coarse, friable, incoherent	200	1525
Mt. Simon Formation		
Sandstone, mostly silty, pink, white, very fine to very coarse, incoherent; some maroon shale at base	250	1775
Sandstone, very clean, white, very fine to coarse, well sorted incoherent	35	1810
Sandstone, very silty, pinkish white, fine to coarse	20	1830
Sandstone, clean, fine to coarse, mainly medium grained, well sorted, incoherent; little maroon shale	5	1835

LABORATORY NO. 131834

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.6		Silica	SiO_2	10.7	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	50.5	2.53	Chloride	Cl	2.	.06
Magnesium	Mg	34.7	2.86	Nitrate	NO_3	0.3	Tr.
Ammonium	NH_4	0.1	.01	Sulfate	SO_4	18.7	.39
Sodium	Na	4.	.17	Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		12		Hardness (as	$CaCO_3$)	270.	5.39
Color		0					
Odor		0					
Temp. (reported)		63.5°F		Total Dissolved Minerals		286.	

SCHAUMBURG
Cook and Lake Counties
September 9, 1960

A public water supply was installed in 1958 for Sturm's Subdivision, now village of Schaumburg (986), located about 2 miles south of Lake Zurich, and about 2 miles east of Barrington.

WELL NO. 1 was completed in Jan. 1958 to a depth of 295 ft. by Hoover Water Well Service, Zion, and located approximately 300 ft. S. and 2590 ft. W. of the N. E. corner of Section 33, T43N, R10E. The elevation of the ground surface at the well is 840. The well was cased with 8-in. pipe to limestone at 238 ft., below which the hole was finished 8 in. in diameter to the bottom.

The pumping equipment consists of 126 ft. of 3-in. column pipe; 4-in. Fairbanks-Morse submersible pump, No. LCBC1002XB; 1-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146911) collected June 5, 1958 showed the water in the well to have a hardness of 26. 7 gr. per gal., total dissolved minerals of 877 ppm., and an iron content of 0. 5 ppm.

There were 18 services at the time of this report. Pumpage is estimated to average 6000 gpd.

LABORATORY NO. 146911

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 5		Silica	SiO_2	18. 0	
Manganese	Mn	Tr.		Fluoride	F	0. 5	
Calcium	Ca	97. 5	4. 88	Boron	B	0. 3	
Magnesium	Mg	60. 4	4. 97	Chloride	Cl	3.	. 08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2. 4	. 04
Sodium	Na	74.	3. 23	Sulfate	SO_4	503. 6	10. 48
				Alkalinity (as	$CaCO_3$)	124.	2. 48
Turbidity		3		Hardness (as	$CaCO_3$)	493.	9. 85
Color		0					
Odor		0					
Temp. (reported)		54. 5°F		Total Dissolved Minerals		877.	

SCOTS PLAINS
SUBDIVISION
DuPage County
September 29, 1960

A public water supply was installed in 1960 for the Scots Plains Subdivision. The system is owned and operated by the Westview Utilities Co.

WELL NO. 1 was completed in Sept. 1960 to a depth of 205 ft. by Layne-Wes tern Co., Aurora, and located about 2 1/2 miles northwest of Naperville, or approximately 2523 ft. S. and 1285 ft. W. of the N. E. corner of Section 9, T38N, R9E. The elevation of the ground surface at the well is 709. The well was cased with 18-in. pipe to limestone at 69. 5 ft. and with 12 3/4-in. pipe from the surface to 79. 5 ft. (cemented in), below which the hole was finished at 12 in. in diameter to the bottom at 205 ft.

A production test was conducted on Sept. 28-29, 1960 by representatives of the Driller and the State Water Survey. After 23 hr. pumping at 600 gpm., the drawdown was 17 ft. from a nonpumping water level of 25 ft. below the top of the casing (2 ft. above ground level). For the test the pumping equipment consisted of 150 ft. of 8-in. column pipe; 12-in., 4-stage. Layne test turbine; 150 ft. of air line; Continental gas engine.

A partial chemical analysis of a sample (Lab. No. 153371) collected Sept. 29, 1960, after 23 hr. pumping at 600 gpm., showed the water to have a hardness of 17.4 gr. per gal., total dissolved minerals of 339 ppm., and an iron content of 0. 5 ppm.

The permanent pump is not yet installed.

LABORATORY NO. 153371

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 5		Fluoride	F	0. 6	
Manganese	Mn	0. 0		Chloride	Cl	3.	. 08
				Nitrate	NO_3	1. 1	. 02
				Alkalinity (as	$CaCO_3$)	284.	5. 68
Turbidity		0		Hardness (as	$CaCO_3$)	298.	5. 96
Color		0					
Odor		0					
Temp. (reported)		51. 3°F		Total Dissolved Minerals		339.	

Three wells furnish the entire public supply for the city of Shelbyville (4821).

A completely new well field has been located southwest of Shelbyville about 3 miles from the wells described in Bulletin 40, which have been retired.

WELL NO. 1 was completed in Sept. 1955 to a depth of 59 ft. 10 in. by Layne-Western Co., Kirkwood, Mo., and located 640 ft. S. and 2387 ft. W. of the N. E. corner of Section 26, T11N, R3E. The ground surface elevation at the well is 557. A 34-in. hole was drilled from the surface to 59 ft. 10 in. The well was then cased with 26-in. pipe from the surface to 15 ft. and with 12-in. pipe from the surface to 44 ft. 10 in. followed by 15 ft. of Layne stainless steel screen, 12 in. in diameter. The annulus between the screen and casing and the wall of the hole was packed with gravel.

A production test was conducted on Oct. 24, 1955 by representatives of the Driller, the State Water Survey, and the Engineering Service Corporation. For test purposes the well was equipped with a Fairbanks-Morse Pomona test turbine pump with 30 ft. of column pipe with power from a right angle gear head operated from a gasoline engine. After 6 1/2 hr. pumping at 328 gpm., the drawdown was 6. 5 ft. from a nonpumping water level of 22. 2 ft. below the top of the casing. Thirty min. after the pump was stopped, the water level had recovered to 22. 9 ft.

The permanent pumping equipment consists of 40 ft. of 6-in. column pipe; 5-stage Layne turbine pump, rated at 500 gpm.; 5 ft. of 6-in. suction pipe; 43 ft. 8 in. of l/4-in. air line; 20-hp. U S electric motor. Auxiliary power is available from a Johns ton right angle gear drive connected to a 4-cylinder Hercules gas engine.

A partial chemical analysis of a sample (Lab. No. 138899) collected Oct. 24, 1955, after 6 1/2 hr. pumping, showed the water in Well No. 1 to have a hardness of 23. 5 gr. per gal., total dissolved minerals of 476 ppm., and a trace of iron.

WELL NO. 2 was completed in Sept. 1955 to a depth of 57 ft. 10 in. by Layne-Western Co. and located about 300 ft. north of Well No. 1, or approximately 340 ft. S. and 2387 ft. W. of the N. E. corner of Section 26. The hole was drilled 34 in. in diameter from the surface to the bottom, and cased with 26-in. pipe from the surface to 15 ft. A 12-in. casing was set from the surface to 42 ft. 10 in. followed by 15 ft. of 12-in. Layne stainless steel shutter screen. The annulus between the screen and 12-in. casing and the wall of the hole was packed with gravel.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, dark brown, silty, sandy	5	5
Silt, yellow brown, sandy	5	10
Clay, light brown to tan; silt; gravel	5	15
Gravel, medium to coarse, clean	10	25
Gravel, fine to medium, clean	5	30
Gravel, medium to coarse	5	35
Gravel, fine to coarse, sandy	5	40
Sand, fine to coarse, gravelly, slightly silty	5	45
Gravel, fine to coarse, very silty, sandy	5	50
Sand, mostly medium to coarse, gravelly, clean	15	65

A production test was conducted on Oct. 20, 1955 by representatives of the Driller, the State Water Survey, and the Consulting Engineer. After 12 hr. pumping at a rate of 545 gpm., the drawdown was 11. 2 ft. from a nonpumping water level of 18. 5 ft. below the surface. Thirty-six min. after the pump was stopped, the water level had recovered to 17.1 ft.

The permanent pumping equipment consists of 40 ft. of 6-in. column pipe; 5-stage Layne turbine pump, 3 ft. 8 in. long and rated at 500 gpm.; 43 ft. 8 in. of air line; 5 ft. of 6-in. suction pipe; 20-hp. U S electric motor. Auxiliary power for pumping is provided by the installation

of a 4-cylinder Hercules gas engine connected to a right angle gear drive.

WELL NO. 3 (the first in order of drilling) was completed in May 1955 to a depth of 56 ft. 8 in. by Layne-Western Co. and located 600 ft. north of Well No. 1, or approximately 40 £t. S. and 2387 ft. W. of the N. E. corner of Section 26. The hole was drilled 38 in. in diameter from top to bottom and cased with 30-in. pipe to 13 ft. and 12-in. pipe to 39 ft. followed by 15 ft. of 12-in. Layne stainless steel shutter screen. The annulus between the screen and 12-in. casing and the wall of the hole was gravel packed.

A production test was conducted on June 8, 1955 by representatives of the Driller, the State Water Survey, and the Consulting Engineer. After 24 hr. pumping at a rate of 500 gpm., the drawdown was 10. 3 ft. from a non-pumping water level of 15. 5 below the top of the casing.

A mineral analysis of a sample (Lab. No. 137848) collected June 10, 1955, after 24 hr. pumping, showed the water in Well No. 3 to have a hardness of 27. 8 gr. per gal., total dissolved minerals of 508 ppm., and an iron content of 0.1 ppm.

The permanent pumping equipment consists of 40 £t. of 6-in. column pipe; 5-stage Layne turbine pump, 3 ft. 8 in. long; 44 ft. of air line; 5 ft. of 6-in. suction pipe; 20-hp. U S electric motor.

There are 1900 services, 100% metered, and 95% of the population is served. Pumpage is reported to average 500,000 gpd.

LABORATORY NO. 137848

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	16. 5	
Manganese	Mn	0. 4		Fluoride	F	0. 1	
Calcium	Ca	117. 6	5. 88	Boron	B	0. 0	
Magnesium	Mg	43. 7	3. 59	Chloride	Cl	24.	. 68
Ammonium	NH_4	0. 5	. 03	Nitrate	NO_3	2. 2	. 04
Sodium	Na	0.	. 00	Sulfate	SO_4	87. 3	1. 82
				Alkalinity (as	$CaCO_3$)	348.	6. 96
Turbidity		2		Hardness (as	$CaCO_3$)	474.	9. 47
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		508.	

SIDNEY
Champaign County
April 29, 1960

Two wells are in service for the public water supply of the village of Sidney (686).

WELL NO. 1, described in Bulletin 40, was equipped in 1956 with a new Deming pump, rated at 75 gpm., connected to a 1 l/2-hp. U S electric motor.

The new pump was installed because the pumping rate with the old one had declined to 20 gpm.

WELL NO. 2 was completed to a depth of 58 ft. 9 in. in Nov. 1954 by Guy McElwee and Son, Sidney, and located at the site of Test Hole No. 54-7, or approximately 1090 ft. S. and 850 ft. W. of the N. E. corner of Section 16, T18N, R10E. The test hole was drilled in Oct. 1954 to a depth of 61.6 ft. by C. M. Hayes, Champaign. The elevation of the ground surface at the well is 665.

A 16-in. hole was drilled to a depth of 58 ft. 9 in. below ground level. A 16-in. outer casing was set from ground level to 48 ft. 9 in. and 48 ft. of 8-in. inner casing was set from 2. 5 ft. above ground level to 45. 5 ft. followed by 13 ft. of 8-in. screen with No. 50 slot openings. The annulus between the screen and the wall of the hole and between the two casings was packed with 1/4 to 3/8-in. Covington gravel.

A production test was conducted on Nov. 16, 1954 by representatives of the Driller, the State Water Survey, Village officials, and Wilson and Anderson, Consulting Engineers. For the test a Fairbanks-Morse turbine pump, belt driven from a Ford gas engine, was installed. An air line was installed but it was defective. Water levels were measured by dropline. After 5 hr. pumping at rates of 150 to 318 gpm., the drawdown was 13.1 ft. from a static water level of 25 ft. below the top of the casing. Fifteen min. after the pump was stopped, the water level had recovered to 31. 2 ft.

Correlated driller's log of TEST HOLE NO. 54-7 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Top soil	2	2
Yellow clay	8	10
Blue clay	25	35
Dark, gravelly clay	10. 5	45. 5
Sand, gravel with compact streaks and boulders 59 1/4 to 60'	14. 5	60
Blue clay	1. 6	61. 6

The pumping equipment includes a Deming turbine pump, rated at 140 gpm., connected to a 3-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 152155) collected Apr. 26, 1960, after 45 min. pumping, showed the water in Well No. 2 to have a hardness of 12.8 gr. per gal., total dissolved minerals of 455 ppm., and an iron content of 7 ppm. The well had not been in use for several weeks.

From Apr. 1, 1959 to Mar. 31, 1960 pumpage averaged 56, 000 gpd.

LABORATORY NO. 152155

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	7. 0		Silica	SiO_2	17. 8	
Manganese	Mn	0. 1		Fluoride	F	0. 5	
Calcium	Ca	54. 1	2. 70	Boron	B	0. 5	
Magnesium	Mg	20. 7	1. 70	Chloride	Cl	28.	. 79
Ammonium	NH_4	5. 8	. 32	Nitrate	NO_3	0. 4	. 01
Sodium	Na	87.	3. 78	Sulfate	SO_4	0. 8	. 02
				Alkalinity (as	$CaCO_3$)	384.	7. 68
Turbidity		20		Hardness (as	$CaCO_3$)	220.	4. 40
Color		40					
Odor		0		Total Dissolved Minerals		455.	

SILVIS
Rock Island County
May 7, 1959

One new well has been added to the public water supply of Silv.is (3973) since publication of Bulletin 40. The supply is now obtained from two drilled wells.

WELL NO. 1, the shallow dug well described in Bulletin 40, has been abandoned, filled in, and covered over.

WELL NO. 2, described in Bulletin 40, was repaired in May 1957 and equipped with a new pump assembly. In 1956 the 10-in. casing was extended to ground level. There was reportedly 11 ft. of interference between Wells No. 1 and 2. The new pump installation includes 210 ft. of 6-in. id. column pipe; 9 l/2-.in., 10-stage Peerless turbine pump, rated at 400 gpm.; 30 ft. of 6-in. suction pipe; 210 ft. of l/4-in. air line; 30-hp. electric motor.

In 1956, after 5 hr. pumping at 400 gpm., the drawdown was 67 ft. from a nonpumping water level of 113 ft. below the discharge head.

WELL NO. 3 was completed to a depth of 1680 ft. in Apr. 1956 by Thorpe Well Drilling Co., DesMoines, Iowa, and located about 250 ft. north of Well No. 2, or approximately 1000 ft. S. and 1250 ft. E. of the N. W. corner of Section 32, T18N,. R1E. The elevation of the ground surface at the well is 580.

The hole and casing record is shown in Table A.

A production test was conducted on May 1, 1956 by representatives of the Drilling Contractor, the State Water Survey, and Missman, Stanley, Farmer & Associates, Consulting Engineers, Rock Island. After 7 1/2 hr. pumping at a rate of 483 gpm., the drawdown was 136 ft. from a nonpumping water level (Well No. 2 pumping simultaneously) of 122 ft. Five min. after pumping was stopped, the water level had recovered to 173 ft.

TABLE A

Hole Size

26-in.	from	0 to	123 ft.
23-in.	from	123 to	672 ft.
17 l/4-in.	from	672 to	1680 ft.

Casing Size

24-in.	from	0 to	119 l/2 ft.
18-in.	from	0 to	672 ft.

(cemented with 835 sacks of cement)

The permanent pumping equipment installed in 1956 consists of 300 ft. of 6-in. column pipe; 9 l/2-in., 10-stage Fairbanks-Morse submersible turbine pump, No. PV4230, rated at 600 gpm.; 2 air lines, No. 1 is 203 ft. long and No. 2 is 300 ft. long; 60-hp. electric motor.

In Apr. 1957, after pumping for 5 hr. at a rate of 600 gpm., the drawdown was 177 ft. from a nonpumping water level of 118 ft.

A mineral analysis of a sample (Lab. No. 149561) collected May 5, 1959 showed the water in Well No. 3 to have a hardness of 20 gr. per gal., total dissolved minerals of 1456 ppm., and an iron content of 0. 4 ppm.

Pumpage for 1958 averaged 261, 370 gpd.

LABORATORY NO. 149561

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 4		Silica	SiO_2	8. 8	
Manganese	Mn	Tr.		Fluoride	F	1. 1	
Calcium	Ca	77. 7	3. 89	Boron	B	0. 7	
Magnesium	Mg	37. 1	3. 05	Chloride	Cl	453.	12. 77
Ammonium	NH_4	0. 1	.01	Nitrate	NO_3	5. 6	.09
Sodium	Na	404.	17. 55	Sulfate	SO_4	338. 4	7. 04
				Alkalinity (as	$CaCO_3$)	230.	4. 60
Turbidity		5		Hardness (as	$CaCO_3$)	347.	6. 94
Color		5					
Odor		0					
Temp. (reported)		65°F		Total Dissolved Minerals		1456.	

Summary sample study log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Sand, clean, fine to medium, little coarse	33	33
PENNSYLVANIAN SYSTEM		
Shale, slightly sandy, gray, green to brownish gray, weak to brittle; little sandstone, limestone and dolomite	97	130
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite, calcareous, little slightly argillaceous, slightly cherty, white to buff, little gray, very fine, crystalline	318	448
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, slightly dolomitic, slightly sandy, gray, greenish gray, brown to buff, weak to brittle; dolomite, silty, gray, buff to brown, very fine to fine, crystalline	214	662
Galena Formation		
Dolomite, slightly calcareous, slightly cherty, buff to brown, little gray, fine to very fine, crystalline, little porous	228	890
Decorah Formation		
Dolomite, cherty, buff, fine, little medium, crystalline, little black speckled	20	910
Limestone, dark buff, fine to very fine, crystalline, brown shale partings, little red speckled	25	935
Platteville Formation		
Limestone, cherty, slightly dolomitic, buff, gray to white, very fine, crystalline	52	987
Glenwood Formation		
Sandstone, little slightly calcareous, white, fine to coarse; incoherent; little shale and dolomite	88	1075
St. Peter Formation		
Sandstone, slightly silty, white, very fine to fine, little medium, incoherent; shale, greenish gray, in lower 20 feet	45	1120
Shakopee-New Richmond Formations		
Dolomite, silty, slightly argillaceous, cherty, buff, brown to gray, very fine to extra fine, crystalline; little interbedded sandstone; little chert at base	190	1310
Oneota Formation		
Dolomite, cherty, slightly silty, white to light buff, very fine to medium, little extra fine, crystalline	208	1518
Gunter-Jordan Formations		
Sandstone, dolomitic, white, very fine to medium, little coarse, incoherent to compact; little interbedded dolomite	92	1610
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, slightly silty, little glauconite, white to light buff, fine to very fine, crystalline; little sandstone; little geodic quartz	70	1680

SILVIS HEIGHTS SUBDIVISION
Rock Island County
November 13, 1958

Two wells are in service for the public water supply of Silvis Heights Subdivision (est, 12Z5).

WELL NO. 1 was described in Supplement I of Bulletin 40.

WELL NO. 2 was completed to a depth of 556 ft. in Nov. 1957 by Carl Larson, Peerless Service Co., Orion, and located about 50 ft. east of Well No. 1, or approximately 40 ft. N. and 2040 ft. W. of the S. E. corner of Section 31, T18N, R1E. The ground surface elevation at the well is 690. The well was cased with 16-in. pipe from the surface to 79 ft. and with 10-in. pipe from the surface to 225 ft. An 8-in. liner was set from 380 to 440ft., below which the hole was finished 8 in. in diameter.

A production test was conducted on Jan. 24, 1958 by representatives of the Driller, the State Water Survey, and Louis Pappmeier, Consulting Engineer. The permanent pump was installed consisting of a Deming vertical turbine connected to a 25-hp. electric motor. A 250-ft. air line was installed. After 3 hr. pumping at rates accelerated from 130 to 225 gpm., the final drawdown was 7. 5 ft. from a static water level of 168. 5 ft. One min. after pumping was stopped, the water level had recovered to 170 ft.

A mineral analysis of a sample (Lab. No. 145584) collected Jan. 24, 1958, after 2 1/2 hr. pumping at 225 gpm., showed the water in Well No. 2 to have a hardness of 14.2 gr. per gal., total dissolved minerals of 356 ppm., and an iron content of 0. 6 ppm.

There are approximately 350 services. Pumpage is estimated to average 60,000 gpd.

LABORATORY NO. 145584

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 6		Silica	SiO_2	11. 0	
Manganese	Mn	0. 0		Fluoride	F	0. 4	
Calcium	Ca	56. 5	2. 83	Boron	B	0. 2	
Magnesium	Mg	25. 2	2. 07	Chloride	Cl	7.	. 20
Ammonium	NH_4	3. 5	. 19	Nitrate	NO_3	0. 8	. 01
Sodium	Na	20.	. 87	Sulfate	SO_4	9. 3	. 19
				Alkalinity (as	$CaCO_3$)	328.	6. 56
Turbidity		6		Hardness (as	$CaCO_3$)	245.	4. 90
Color		0					
Odor		slight H_2S (at well)					
Temp. (reported)		54°F		Total Dissolved Minerals.		356.	

2 - Silvis Heights Subdivision

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, buff, brown and gray, partly oxidized, organic fragments	70	70
PENNSYLVANIAN SYSTEM		
Shale, gray, little buff and black, weak to brittle, little micaceous, mostly laminated; little siltstone, gray, tough	100	170
DEVONIAN SYSTEM		
Cedar Valley-Wapsipinicon Formations		
Limestone, white to buff, lithographic, compact, little porous	20	190
Shale, gray to buff, little black, weak to brittle; little interbedded limestone, white to buff, lithographic to very fine, crystalline	30	220
SILURIAN SYSTEM		
Niagaran Series		
Port Byron-Racine Formations		
Dolomite, calcareous, buff, little gray, very fine to medium, crystalline	125	345
Waukesha Formation		
Dolomite, very silty, gray to white, little buff, fine to medium, crystalline	40	385
Shale, gray, little black, weak, little brittle; little dolomite, gray to white, fine, crystalline	50	435
Dolomite, silty, gray to white, little speckled, weak, fine to medium, crystalline, little porous	20	455
Shale, gray to white, weak, little brittle, laminated; dolomite, very silty, gray to white, speckled	5	460
Joliet Formation		
Dolomite, buff to white, little gray to white, little speckled, very fine to medium, crystalline, compact	35	495
Dolomite, buff to gray, fine to medium, crystalline, porous to compact	25	520
Alexandrian Series		
Kankakee Formation		
Dolomite, cherty, buff, fine to medium, crystalline, compact	30	550
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Shale, slightly dolomitic, gray, weak; little siltstone, gray tough	10	560
		T. D.

Two wells are in service for the village of Somonauk (899).

WELL NO. 1 (East Well), described in Bulletin 40 as having been drilled to a depth of 190 ft. in 1880, is equipped with 70 ft. of 5-in. column pipe; 8-in., 9-stage Byron Jackson submersible pump, No. 341954, rated at 300 gpm. against 150 ft. T.D.H.; 70 ft. of air line; 20-hp. electric motor.

On May 14, 1959 the nonpumping water level was 15 ft. below the pump base (elev. 685) which is 5 ft. below L. S. D.

WELL NO. 2 (West Well), described in Bulletin 40 as having been drilled to a depth of 502 ft. in 1903, is equipped with 70 ft. of 5-in. column pipe; 8-in., 9-stage Byron Jackson submersible pump, No. 341955, rated at 300 gpm. against 150 ft. T.D.H.; 70 ft. of air line; 20-hp. electric motor.

On May 14, 1959 the nonpumping water level was 13 ft. below the pump base (elev. 685) which is 5 ft. below L. S. D.

There are 290 services, 16 of which are metered and none is read. Pumpage is estimated to average 50,000 gpd.

SOUTH CHICAGO HEIGHTS
Cook County
April 29, 1958

The village of South Chicago Heights (4043) obtains its water supply from two wells.

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 was completed in Mar. 1956 to a depth of 250 ft. by Wehling Well Works, Beecher, and located at the rear of the village hall, about 40 ft. from Well No. 1, or approximately 1650 ft. N. and 118 ft. W. of the S. E. corner of Section 29, T35N, R14E. The ground surface elevation at the well is 715.

The well was cased with 63 ft. of genuine wi. pipe, below which the hole was finished at 11 1/2 in. in diameter to the bottom at 250 ft. The Drilling Contractor reported a production test was conducted on May 26, 1956. After 3 hr. pumping at a rate of 500 gpm., the drawdown was 66 ft. from a nonpumping water level of 82 ft. below the top of the casing (24 in. above ground level).

The permanent pumping equipment consists of a Peerless turbine pump, No. 120550, rated at 450 gpm. powered by a 50-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146509) collected Apr. 29, 1958 showed the water in Well No. 2 to have a hardness of 25. 9 gr. per gal., total dissolved minerals of 503 ppm., and an iron content of 0. 4 ppm.

From Apr. 11, 1957 to Mar. 7, 1958 pumpage averaged 270,000 gpd.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Cinders and fill	3	3
Clay and very little gravel	53	56
Soft broken rock	7	63
SILURIAN SYSTEM		
Limestone	187	250

LABORATORY NO. 146509

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	16.0	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	93.4	4.67	Boron	B	0.2	
Magnesium	Mg	51.1	4.20	Chloride	Cl	3.	.08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.6	.01
Sodium	Na	17.	.72	Sulfate	SO_4	56.8	1.18
				Alkalinity (as	$CaCO_3$)	416.	8.32
Turbidity		0		Hardness (as	$CaCO_3$)	444.	8.87
Color		0					
Odor		0					
Temp. (reported)		52.5°F		Total Dissolved Minerals		503.	

SOUTH ELGIN
Kane County
June 16, 1959

Two wells are in service for the village of South Elgin (2624).

WELL NO. 1, described in Bulletin 40, was deepened in 1952 to a depth of 1400 ft. New pumping equipment was installed consisting of 340 ft. of 5-in. column pipe; 8-in., 11-stage Aurora turbine pump, No. 66519, rated at 150 gpm. against 300 ft. T.D.H.; 340 ft. of air line; 20-hp. U S electric motor.

On Feb. 20, 1959 water was pumped at a rate of 175 gpm. for a 20 min. period. The drawdown was 30 ft. from a nonpumping water level of 260 ft. below the pump base (elev. 761. 2).

WELL NO. 2 was completed in 1951 to a depth of 133 ft. by Ed O'Brien, Elgin, and located in the Crystal Springs Subdivision in the southeast part of town near the intersection of Spring and Fulton St., or approximately 500 ft. N. and 1400 ft. W. of the S. E. corner of Section 35, T41N, R3E. The ground surface elevation at the well is 730. The well was cased with 111 ft. of 12-in. pipe followed by 10 ft. of No. 12 Cater shutter screen.

A production test was conducted on Apr. 15, 1952 by representatives of the Driller, the State Water Survey, and City Engineer, Victor Kasser. After 2 hr. pumping at a rate of 271 gpm., the drawdown was 33 ft. 2 in. from a static water level of 29 ft. 9 in. below the top of the casing (1 ft. above ground level). Thirty min. after the pump was stopped, the water level had recovered to 31. 5 ft. For the test a vertical turbine pump was set at 80 ft.

The permanent pumpassembly, installed in 1952, consists of 90 ft. of 5-in. column pipe; 8-in., 11-stage Aurora turbine pump, No. 60909, rated at 200 gpm. at 260 ft. T.D.H.; 90 ft. of air line; 20-hp. U S electric motor.

A partial chemical analysis of a sample (Lab. No. 149964) collected June 16, 1959 showed the water in Well No. 2 to have a hardness of 26.7 gr. per gal., total dissolved minerals of 538 ppm., and an iron content of 1.1 ppm.

Meters were not being read in 1958.

Pumpage was estimated to average 100,000 gpd.

LABORATORY NO. 149964

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1. 1		Fluoride	F	0. 3	
				Chloride	Cl	38.	1. 07
				Nitrate	NO_3	1. 9	. 03
				Alkalinity (as	$CaCO_3$)	320.	6. 40
Turbidity		4		Hardness (as	$CaCO_3$)	455.	9. 10
Color		0					
Odor		0		Total Dissolved Minerals		538.	

Illinois State Water Survey
Bulletin 40 - Supplement II

SOUTHLANDS SUBDIVISION
Cook County
January 10, 1958

A public water supply was installed for the Southlands Subdivision (est. 250) in 1954. The subdivision is located about 1/2 mile west of Tinley Park and the water system is owned and operated by Midwest-Tinley Water Co.

WELL NO. 1 was completed in Oct. 1954 to a depth of 459 ft. by J. P. Miller Artesian Well Co., Brookfield, and located on 173rd St. and Overhill Ave., or approximately 1325 ft. N. and 2400 ft. E. of the S. W. corner of Section 25, T36N, R12E. The ground surface elevation at the well is 705. The well was cased with 10-in. gwi. pipe from 12 in. above the pump station floor to 98 ft. below the ground level. The hole was finished 10 in. in diameter to the bottom of the hole at 459 ft. total depth.

A production test was conducted by the Driller on Oct. 28, 1954 using test pumping equipment. After 8 l/2 hr. pumping at a rate of 265 gpm., the drawdown was 66 ft. from a non-pumping water level of 28 ft. below the top of the casing (about 2 ft. above the ground level). Analysis of a sample (Lab. No. 136174) collected Oct. 28, 1954, after 8 l/2 hr. pumping, showed the water to have a hardness of 42.4 gr. per gal., total dissolved minerals of 824 ppm., and an iron content of 1. 4 ppm.

Subsequently, the permanent pump assembly was installed and consists of 100 ft. of column pipe; 8-stage Peerless turbine pump rated at 130 gpm. at 168 ft. T.D.H.; 100 ft. of air line; 10 ft. of suction pipe; 7 l/2-hp. U S electric motor.

Pumpage for 1957 averaged 4700 gpd.

LABORATORY NO. 136174

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Fluoride	F	0.4	
				Chloride	Cl	4.	.11
				Nitrate	NO_3	1.9	.03
				Alkalinity (as	$CaCO_3$)	304.	6.08
Turbidity		38		Hardness (as	$CaCO_3$)	728.	14.56
Color		5					
Odor		0		Total Dissolved Minerals		824.	

SOUTH WILMINGTON
Grundy County
October 30, 1958

One well is in service for the public water supply of the village of South Wilmington (730). Another well is maintained for emergency use, and a third one has been abandoned.

WELL NO. 1, described in Bulletin 40, has been cross connected to the system, according to a State Department of Public Health report of Mar. 15, 1955. The water is discharged to the fire reservoir without treatment, and can be used only for fire protection.

WELL NO. 2, the shallow drilled well described in Bulletin 40, has been sealed andabandoned.

WELL NO. 3 was completed to a depth of 993. 5 ft. in May 1950 by Joliet Pump Co., Joliet, and located at the rear of the village hall near Fourth St., or approximately 820 ft. N. and 1294 ft. E. of the S. W. corner of Section 11, T31N, R8E. The elevation of the ground surface at the well is 600. The well was cased with 10-in. pipe from the ground surface to 77 ft. 6 in., and with 8-in. pipe from the ground surface to a depth of 294 ft.

A production test was conducted on May 31, 1950 by representatives of the Driller and the State Water Survey. For test purposes a working barrel, operated by the engine for the drill rig, was installed with the cylinder set on 4-in. discharge column at a depth of 255 ft. 6 in. After 8 hr. pumping at 40 gpm., the drawdown was 121 ft. from a nonpumping water level of 112 ft.

A mineral analysis of a sample (Lab. No. 121959) collected June 15, 1950, after 8 hr. pumping at 40 gpm., showed the water in Well No. 3 to have a hardness of 21.8 gr. per gal., total dissolved minerals of 1304 ppm., and an iron content of 0. 4 ppm.

On July 7, 1950 the permanent pump was installed consisting of 300 ft. of 5-in. column pipe; 9-stage Berkeley turbine pump, No. 3540-F, 10 ft. in length and rated at 45 gpm.; 10 ft. of suction pipe; 15-hp. electric motor. A 5-hp. Berkeley centrifugal booster pump, rated at 150 gpm. was also installed. In Mar. 1952 the pump was out of the well for repairs for several months. The pump shaft was broken and other sections showed considerable corrosion. After numerous breakdowns in the pump, during which Well No. 1 was put into emergency service, a new Reda submersible pump was installed about Feb. 1, 1955. The pump is rated at 30 gpm. and operated by an electric motor.

In June 1956 a new 25,000 gal. elevated steel storage tank was erected.

A partial chemical analysis of a sample (Lab. No. 137231) collected Mar. 17, 1955 showed the water in Well No. 3 to have a hardness of 19.8 gr. per gal., total dissolved minerals of 1284 ppm., and an iron content of 0.1 ppm.

There are approximately 150 services, and pumpage for Oct. 1958 averaged 20, 000 gpd.

LABORATORY NO. 121959

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 4		Silica	SiO_2	11. 7	
Manganese	Mn	0. 2		Fluoride	F	2. 5	
Calcium	Ca	84. 3	4. 22	Chloride	Cl	295.	8. 32
Magnesium	Mg	39. 8	3. 27	Nitrate	NO_3	0. 0	. 00
Ammonium	NH_4	1. 5	. 08	Sulfate	SO_4	361. 0	7. 51
Sodium	Na	311.	13. 54	Alkalinity (as	$CaCO_3$)	264.	5. 28
Turbidity		5		Hardness (as	$CaCO_3$)	375.	7. 49
Color		0					
Odor		0					
Temp. (reported)		60. 2°F		Total Dissolved Minerals		1304.	

Sample study summary log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, calcareous, silty, olive to gray	65	65
PENNSYLVANIAN SYSTEM		
Shale, partly calcareous, greenish gray, black, weak to firm; little coal	45	110
Sandstone, silty, gray, fine to medium	5	115
Shale, silty, greenish to grayish, weak; little coal	85	200
Limestone, yellowish gray, fine	5	205
Shale, partly calcareous, gray brown, weak, little coal	90	295
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Limestone, gray, fine; little shale	40	335
Dolomite, gray, brown; limestone fine	30	365
Shale, grayish, weak to firm	55	420
Galena-Decorah Formations		
Dolomite, grayish to brownish, fine to coarse; limestone, yellowish brown, fine to coarse	225	645
Platteville Formation		
Limestone, grayish to pale yellowish brown, fine; dolomite, grayish, fine to medium at top	115	760
Dolomite, light yellowish brown, fine to medium; limestone, buff, fine	70	830
Glenwood Formation		
Sandstone, fine to coarse, incoherent	45	875
St. Peter Formation		
Sandstone, yellowish gray, partly silty, fine to medium, incoherent	45	920

STARVED ROCK
STATE PARK
LaSalle County
September 13, 1960

Three wells are in service for Starved Rock State Park. There are four other wells of minor importance but incidental to the Park water supply.

WELLS NO. 1 (Park Swimming Pool) and 2 (Park Garage) are described in Bulletin 40.

WELL NO. 3 was completed in Sept. 1953 to a depth of 401 ft. by Varner Well Drilling Co., Dubuque, Iowa, and located about 250 ft. west of Well No. 2 (Park Garage Well), or approximately 1250 ft. S. and 700 ft. W. of the N. E. corner of Section 21, T33N, R2E. The ground surface elevation at the well is 460. The well was cased with 12-in. od. pipe from the surface to 205 ft., below which the hole was finished 12 in. in diameter.

A production test was conducted on Sept. 18-19, 1953 by representatives of the Driller, the State Water Survey, and the State Division of Architecture and Engineering. After 8 hr. pumping at 355 gpm., the drawdown was 43 ft. from a nonpumping water level of 47. 5 ft. below the top of the casing.

During the test, water levels were observed in Well No. 2. The water in Well No. 2 lowered 18 ft. from a starting level of 37 ft.

The Well No. 3 is equipped with a Fairbanks-Morse turbine pump connected to a 40-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 153217) collected Sept. 13, 1960 showed the water in Well No. 3 to have a hardness of 21.2 gr. per gal., total dissolved minerals of 424 ppm., and an iron content of 2. 4 ppm.

Well No. 3 is used as the main source of the Park's water supply.

The old C. C. Camp Wells No. 1 and 2, the old Salt Weil, and the old Sulphur Well are available for limited use although only incidental to the Park's main water supply.

The daily pumpage is reported to average 20,000 gpd.

LABORATORY NO. 153217

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.4		Silica	SiO_2	9.1	
Manganese	Mn	0.0		Fluoride	F	0.4	
Calcium	Ca	89.1	4.46	Boron	B	0.3	
Magnesium	Mg	33.4	2.75	Chloride	Cl	52.	1.47
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.5	.04
Sodium	Na	25.	1.10	Sulfate	SO_4	11.6	.24
				Alkalinity (as	$CaCO_3$)	328.	6.56
Turbidity		10		Hardness (as	$CaCO_3$)	361.	7.21
Color		0					
Odor		0					
Temp. (reported)		53°F		Total Dissolved Minerals		424.	

STILLMAN VALLEY
Ogle County
October 10, 1960

Two wells furnish water to the public supply of Stillman Valley (598).

WELL NO. 1, described in Bulletin 40, was completely rehabilitated and the pump repaired in 1957 or 1958. The well now is maintained for emergency service.

WELL NO. 2 was completed in Sept. 1954 to a depth of 445 ft. by Allabaugh Well Co., Rockford, and located adjacent to the elevated tank, or approximately 300 ft. N. and 750 ft. E. of the S. W. corner of Section 1, T24N, R11E. The ground elevation at the well is 740. The well was cased with 159 ft. 6 in. of 12-in. pipe and with 8-in. pipe from the surface to 179 ft. 6 in., below which the hole was finished 8 in. in diameter to the bottom. The annulus between the two casings and between the 8-in. casing and the wall of the 12-in. hole was pressure grouted.

During the drilling of the well, water levels were observed as shown in Table A.

The pumping equipment includes a Fairbanks-Morse Pomona turbine pump, No. 175987, rated at 280 gpm. and connected to a 25-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153360) collected Oct. 6, 1960 showed the water in Well No. 2 to have a hardness of 16. 5 gr. per gal., total dissolved minerals of 294 ppm., and an iron content of 0. 9 ppm.

There are 150 services. Pumpage is reported to average 40,000 gpd.

TABLE A

Water Level from	to	Depth ft.
0	164	0
164	190	60
190	235	58
235	290	53
290	430	50
430	460	38

LABORATORY NO. 153360

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 9		Silica	SiO_2	10.8	
Manganese	Mn	Tr.		Fluoride	F	0.2	
Calcium	Ca	63.0	3.15	Boron	B	0.0	
Magnesium	Mg	30.3	2.49	Chloride	Cl	0.	.00
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.6	.01
Sodium	Na	4.	.17	Sulfate	SO_4	6.0	.12
				Alkalinity (as	$CaCO_3$)	284.	5.68
Turbidity		5		Hardness (as	$CaCO_3$)	282.	5.64
Color		0					
Odor		0		Total Dissolved Minerals		294.	

Three wells are in service for the village of Stockton (1800).

WELLS NO. 1, 2 and 3, described in Bulletin 40, have been capped and abandoned.

WELL NO. 4, described in Bulletin 40, was repaired in 1955 and a new Sterling turbine pump installed. The pump is set at 400 ft. On Feb. 2, 1957, after 10 hr. pumping at 300 gpm., the drawdown was 80 ft. from a nonpumping water level of 260 ft. Well No. 4 is in service.

WELL NO. 5, described in Bulletin 40, is in service.

WELL NO. 6 was completed in 1952 to a depth of 1088 ft. by Egerer-Galloway Well Drilling Co., Milwaukee, Wis., and located on vacant lot next to village hall, or approximately 2500 ft. S. and 1960 ft. W. of the N. E. corner of Section 11, T27N, R4E. The elevation of the ground surface at the well is 1025. The hole and casing record is shown in Table A.

TABLE A

Hole Record

24-in.	from surface	to	93 ft.
15 1/4-in.	from 93	to	509 ft.
12-in.	from 509	to	1088 ft.

Casing Record

24-in.	from surface	to	60 ft.
1 6-in.	from surface	to	93. 2 ft.
12-in. id. gwi. liner	from 455.3	to	509 ft.

The 16-in. od. casing was grouted in from 2 ft. above to 93. 2 ft. below the ground surface.

Two production tests were conducted on Well No. 6, the first on Jan. 22-23, 1953 and the second on Mar. 24-25, 1953. In the first test, water was pumped for 10 hr. at 753 gpm. with a drawdown of 198 ft. from a nonpumping water level of 120 ft. One and one-half hr. after the pump was stopped, the water level had recovered to 239 ft.

Following this testfour shots of DuPont Hi-Velocity gelatin explosive, 80% strength, were fired as shown in Table B.

TABLE B

Shot No.	Amount Explosive lb.	Depth of Explosive ft.
1	150	1050
2	100	1010
3	150	980
4	100	935

On Mar. 24-25, 1953, following the shooting, after pumping for 7 1/4 hr. at a rate of 753 gpm., the drawdown was 170 ft. from a nonpumping water level of 187 ft. Five hr. after the pump was stopped, the water level had recovered to 187 ft.

On Feb. 2, 1957, after 8 hr. pumping at a rate of 425 gpm., the drawdown was 115 ft. from a nonpumping water level of 265 ft. below the pump base.

The pumping equipment consists of 400 ft. of column pipe; A. O. Smith turbine pump, rated at 500 gpm.; 75-hp. electric motor.

A mineral analysis of a sample (Lab. No. 142534) collected Feb. 2, 1957 showed the water in Well No. 6 to have a hardness of 19. 2 gr. per gal., total dissolved minerals of 346 ppm., and an iron content of 0. 2 ppm.

There are 540 domestic and 3 industrial services. For the first 6 mo. of 1958, pumpage was reported to average 317, 338 gpd.

2 - Stockton

LABORATORY NO. 142534

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	11.4	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	72.6	3.63	Boron	B	0.1	
Magnesium	Mg	36.0	2.96	Chloride	Cl	2.	.06
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	1.4	.02
Sodium	Na	10.	.42	Sulfate	SO_4	6.6	.14
				Alkalinity (as	$CaCO_3$)	340.	6.80
Turbidity		0		Hardness (as	$CaCO_3$)	330.	6.59
Color		0					
Odor		0		Total Dissolved Minerals		346.	

STONEFORT
Saline and Williamson Counties
July 18, 1960

A public water supply is being installed for the village of Stonefort (349).

Village WELL NO. 1, originally American Legion Post Well No. 1, was completed about 1950 or 1951 to a depth of 90 ft. by Quentin Richey, Carrier Mills, and located 1100 ft. N. and 2000 ft. E. of the S. W. corner of Section 30, T10S, R5E. The ground surface elevation at the well is 400. The well was cased with 7-in. pipe to 41 ft. 6 in.

A production test was conducted on Aug. 18, 1958 by representatives of the Driller, the State Water Survey, and Robert R. Callaghan, Inc., Consulting Engineers. For the test the well was equipped with the American Legion Post pump installation of a Rex centrifugal suction pump, rated at 15, 000 gal. per hr. connected to a Wisconsin gas engine with 3-in. piston and 3 1/4-in. stroke. After 9 hr. of interrupted pumping the final rate of pumping was 70 gpm. and the drawdown was 21 ft. from a nonpumping water level of 0. 7 ft. below the top of the casing. Fifteen min. after the pump was stopped, the water level had recovered to 11.1 ft.

During the production test in Well No. 1, water levels were observed in American Legion Post Well No. 2, 500 ft. to the southwest of Well No. 1. After 6 3/4 hr. pumping in Well No. 1, the water level in Well No. 2 was lowered 8. 3 ft. from a static level of 3. 1 ft. below the top of the casing.

The permanent pump in Well No. 1, installed recently by Lane Machinery Co., consists of 50 ft. of 2 1/2-in. column pipe; 12-stage Johnston turbine pump, rated at 50 gpm. at 250 ft. T.D.H.; 2 1/2-in. suction strainer; 5-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152355) collected June 1, 1960 showed this water to have a hardness of 11 gr. per gal., total dissolved minerals of 669 ppm., and an iron content of 1. 2 ppm.

LABORATORY NO. 152355

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	16.5	
Manganese	Mn	0.0		Fluoride	F	0.2	
Calcium	Ca	50.1	2.51	Boron	B	0.1	
Magnesium	Mg	15.2	1.25	Chloride	Cl	14.	.39
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.6	.04
Sodium	Na	153.	6.67	Sulfate	SO_4	272.8	5.68
				Alkalinity (as	$CaCO_3$)	216.	4.32
Turbidity		4		Hardness (as	$CaCO_3$)	188.	3.72
Color		15					
Odor		0					
Temp. (reported)		63°F		Total Dissolved Minerals		669.	

A public water supply was installed in 1957 for the village of Streamwood (4821) originally called Streamwood Development Corporation, located about 1 mile north of Bartlett. The water system is owned and operated by Streamwood Utilities Corporation.

Three test wells were drilled in 1956 by J. P. Miller Artesian Well Co., Brookfield.

TEST WELL NO. 1 was drilled to a depth of 108 ft. and located 65 ft. S. and 2045 ft. E. of the N. W. corner of Section 23, T41N, R9E. The well penetrated sand and gravel from 100 to 106 ft. and was cased with 6-in. pipe to a depth of 97 ft. 8 in. followed by 10 ft. of Houston screen. The Driller reported that after 3 hr. pumping at a rate of 50 gpm., the drawdown was 2 ft. from a static water level of 61 ft. below the surface (elev. 827).

The well was subsequently capped below the ground surface.

TEST WELL NO. 2 was drilled to a depth of 134 ft. and located 635 ft. S. and 1135 ft. E. of the N. W. corner of Section 23. The well penetrated sand and gravel from 115 to 135 ft. and was cased with 6-in. pipe from the surface to 117 ft. followed by 10 ft. of Houston screen. The Driller reported that after 3 l/2 hr. pumping at a rate of 50 gpm., the drawdown was 3 ft. below a static water level of 52 ft. below the surface (elev. 817).

The well was subsequently capped.

TEST WELL NO. 3 was drilled to a depth of 76 ft. in Nov. 1956 and located 1460 ft. S. and 1000 ft. E. of the N. W. corner of Section 23. The well penetrated sand and gravel from 60 to 75 ft. and was cased with 5-in. pipe to 66 ft. 5 in. followed by 10 ft. of Houston screen. The Driller reported that after 3 hr. pumping at a rate of 30 gpm., the drawdown was 1 ft. from a static level of 65 ft. below the surface (elev. 825).

WELL NO. 1, Source Well, was completed in Aug. 1957 to a depth of 120 ft. by J. P. Miller Artesian Well Co. and located at McCabe Drive and Grow Lane, or approximately 760 ft. S. and 2156 ft. E. of the N. W. corner of Section 23. The ground surface elevation at the well is 830. The Driller reported encountering a gravel formation from 95 ft. to bedrock at 132 ft. The well was cased with 10-in. pipe from 30 in. above to 110 ft. below the ground surface followed by 10 ft. of 10-in. brass screen to the bottom at 120 ft. The bore hole was finished 15 in. in diameter from the surface to 120 ft., and the annular space outside the casing and screen was backfilled from 120 to 100 ft. with silica gravel and from 100 ft. to the surface with an impervious material.

The Well Contractor reportedly conducted a production test on Aug. 7, 1957 using pumping test equipment. After 7 1/2 hr. pumping at a rate of 1300 gpm., the drawdown was 10 ft. from a nonpumping water level of 60 ft. below the top of the casing.

Subsequently, the permanent pump assembly was installed and consists of 80 ft. of 6-in. column pipe; 5-stage Peerless turbine pump, No. 125835, rated at 315 gpm. at 212 ft. T.D.H.; 80 ft. of air line; 25-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 147272) collected July 14, 1958 showed the water to have a hardness of 28.5 gr. per gal., total dissolved minerals of 583 ppm., and an iron content of 2. 9 ppm.

WELL NO. 2 was completed in Aug. 1957 to a depth of 121 ft. by J. P. Miller Artesian Well Co. and located about 16 ft. west of Well No. 1. The well was cased with 16-in. pipe from 12 in. above to 91 ft. below the ground level, followed by 30 ft. of 16-in. stainless steel screen to the bottom at 121 ft. The hole was finished 36 in. in diameter to the bottom at 121 ft. The annular space outside the screen and casing was backfilled from 121 to 80 ft. with silica gravel and from 80 ft. to the surface with an impervious material. Upon completion of the well, the Contractor reportedly pumped 9 hr. at a rate of 1300 gpm. with a drawdown of 10 ft. from a nonpumping water level of 60 ft. below the top of the casing.

Correlated driller's log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness	Bottom
	ft.	ft.
PLEISTOCENE SERIES		
Clay	95	95
Gravel	26	121

In July 1958 there were 300 services and 5000 are planned. Pumpage is estimated to average 50, 000 gpd.

2 - Streamwood

LABORATORY NO. 147272

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.9		Silica	SiO_2	23.9	
Manganese	Mn	0.1		Fluoride	F	0.1	
Calcium	Ca	103.7	5.19	Boron	B	0.0	
Magnesium	Mg	55.7	4.58	Chloride	Cl	3.	.08
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	0.4	.01
Sodium	Na	13.	.56	Sulfate	SO_4	138.8	2.89
				Alkalinity (as	$CaCO_3$)	368.	7.36
Turbidity		31		Hardness (as	$CaCO_3$)	489.	9.77
Color		0					
Odor		0					
Temp. (reported)		51.5°F		Total Dissolved Minerals		583.	

SUGAR GROVE
Kane County
June 23, 1960

Two wells are in service for the village of Sugar Grove (326).

WELL NO. 1, described in Bulletin 40, is not in service.

WELL NO. 2, described in Bulletin 40, is in service.

WELL NO. 3 was completed to a depth of 104 ft. in 1948 by Hayes and Sims, Champaign, and located approximately 2400 ft. S. and 2500 ft. W. of the N. E. corner of Section 21, T38N, R7E. Land surface elevation at the well is 727. The permanent well was drilled about 12 ft. north of a test well which had been drilled to the same depth penetrating a sand and gravel formation. Well No. 1 was cased with 10-in. pipe from the surface to 41 ft. 7 in. and with 8-in. pipe from the surface to 91 ft. 8 in., below which was 12 ft. of exposed length of 8-in. Johnson Everdur telescope screen having No. 30 slot openings.

A production test was conducted on Apr. 28, 1948 by representatives of the Driller, the State Water Survey, and the Village officials. After 4 1/2 hr. pumping at a rate of 106 gpm., the drawdown was 5. 8 ft. from a nonpumping water level of 49.6 ft. below the top of the 10-in. casing. Five min. after the pump was stopped, the water level had recovered to 49. 6 ft.

On Mar. 9, 1960, when pumping at 100 gpm. for 5 min., the drawdown was 30 ft. from a nonpumping water level of 40 ft.

A chemical analysis of a sample (Lab. No. 151911) collected Mar. 9, 1960 showed the water to have a hardness of 25.2 gr. per gal., total dissolved minerals of 503 ppm., and an iron content of 0. 2 ppm.

The pumping equipment consists of 70 ft. of 6-in. column pipe; 8-in., 6-stage Aurora turbine pump, No. 80952, rated at 100 gpm. against 180 ft. T.D.H.; 70 ft. of air line; 10-hp. U S electric motor.

In June 1960 this pump was reportedly having trouble from sand clogging and was producing about 30 gpm.

There are 95 services, all metered. Pumpage is estimated to average 18, 000 gpd.

LABORATORY NO. 151911

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 2		Silica	SiO_2	14. 8	
Manganese	Mn	0. 1		Fluoride	F	0. 1	
Calcium	Ca	97. 2	4. 86	Boron	B	0. 1	
Magnesium	Mg	45. 2	3. 72	Chloride	Cl	16.	.45
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0. 8	.01
Sodium	Na	18.	.78	Sulfate	SO_4	123. 8	2. 58
				Alkalinity (as	$CaCO_3$)	316.	6. 32
Turbidity		1		Hardness (as	$CaCO_3$)	429.	8. 58
Color		0					
Odor		0					
Temp. (reported)		52. 0°F		Total Dissolved Minerals		503.	

SUNCREST HIGHLANDS
DuPage County
May 1, 1958

A public water supply was installed in 1956 for Suncrest Highlands (est. 300), a subdivision located south of Bloomingdale.

WELL NO. 1 was completed in 1956 to a depth of 1395 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located 2150 ft. N. and 600 ft. E. of the S. W. corner of Section 14, T40N, R10E. The elevation of the ground surface at the well is 790. The well was cased with 20-in. steel pipe from the surface to 104 ft. and with 16-in. steel pipe from the surface to 425 ft. The annulus outside the 16-in. casing was filled with cement. A 12-in. steel liner was set from 1027 to 1160 ft., below which the hole was finished 12 in. in diameter to the bottom of the well at 1395 ft.

The pumping equipment consists of 550 ft. of 5-in. column pipe; Reda submersible pump rated at 400 gpm.; 75-hp. electric motor.

On May 1, 1958, during pumping at 400 gpm., the drawdown was reported to be 100 ft. from a nonpumping water level of 325 ft.

A mineral analysis of a sample (Lab. No. 146507) collected May 1, 1958 showed the water in Well No. 1 to have a hardness of 16. 6 gr. per gal., total dissolved minerals of 439 ppm., and an iron content of 0.1 ppm,

WELL NO. 2 was drilled in 1956 to a depth of 420 ft. penetrating limestone. The well was drilled by Milaeger Well Drilling Co. and located 2150 ft. N. and 590 ft. E. of the S. W. corner of Section 14. This location is about 10 ft. west of Well No. 1. The elevation of the ground surface at Well No. 2 is 750. When the well was completed, the static water level was 50.2 ft. below the top of the casing.

Well No. 2 has not been equipped for service.

There are 80 services now installed, and 600 services are planned within 5 years.

Pumpage for the subdivision is estimated to average 23,000 gpd.

LABORATORY NO. 146507

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	7.4	
Manganese	Mn	Tr.		Fluoride	F	1.3	
Calcium	Ca	64. 7	3.24	Boron	B	0.5	
Magnesium	Mg	29. 5	2.43	Chloride	Cl	14.	.39
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	1.9	.03
Sodium	Na	60.	2.62	Sulfate	SO_4	82.9	1.72
				Alkalinity (as	$CaCO_3$)	308.	6.16
Turbidity		0		Hardness (as	$CaCO_3$)	284.	5.67
Color		0					
Odor		0					
Temp. (reported)		53.3°F		Total Dissolved Minerals		439.	

Sample study summary log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellowish buff to dark gray	38	38
Gravel, slightly silty, very coarse	12	50
Till, very gravelly, slightly sandy, grayish-brown	15	65
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white to light gray, very fine to medium	70	135
Alexandrian Series		
Kankakee Formation		
Dolomite, buff to light gray, fine to medium	28	163
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Shale, reddish-brown, green, gray, weak; little dolomite, very fine to fine	72	235
Dolomite, light gray to gray, very fine to medium, little shale, gray, buff, weak	50	285
Shale, grayish brown, weak, tough in lower part	96	381
Mohawkian Series		
Galena Formation		
Dolomite, grayish-buff to buff, very fine to fine	184	565
Decorah Formation		
Dolomite, grayish-buff to gray, very fine to medium	30	595
Platteville Formation		
Dolomite, buff to grayish buff, very fine to medium; limestone gray to buff, extra fine to very fine	115	710
Glenwood Formation		
Sandstone, light gray to light buff, very fine to coarse, incoherent, little compact	35	745
Chazy Series		
St. Peter Formation		
Sandstone, light gray to buff, fine to medium, little coarse; little shale, reddish-brown, purple, weak to brittle at base	320	1065
CAMBRIAN SYSTEM		
St. Croixan Series		
Trempealeau Formation		
Dolomite, light gray to pinkish-buff, very fine to fine, little shale, reddish brown; green, weak to brittle	75	1140
Franconia Formation		
Shale, light green, gray to brown, weak; sandstone, light gray, very fine to fine, incoherent	50	1190
Ironton Formation		
Sandstone, silty, light pinkish buff, very fine to coarse, incoherent	145	1335
Galesville Formation		
Sandstone, very silty, light grayish-buff, very fine to fine, incoherent to friable; little dolomite, pinkish to light buff, fine	45	1380
Eau Claire Formation		
Dolomite, brown to light, brown very fine to crystalline; shale, brown, gray, weak to tough	15	1395

SUNNYLAND
SUBDIVISION
Will County
September 9, 1958

A public water supply was installed about 1945 for Sunnyland Subdivision (est. 300), a community of about 85 homes located on U. S. Highway 30 about 4 1/2 miles southeast of Plainfield. The water system is owned and operated by the Sunnyland Improvement Association. Two wells are in service.

WELL NO. 1 was completed in 1946 to a depth of 140 ft. by Dreher and Schorie, Joliet, and located north of Flower St. and west of Gaylord Road, or approximately 1530 ft. N. and 730 ft. W. of the S. E. corner of Section 25, T36N, R9E. The ground surface elevation at the well is 615. The well was cased with 6-in. pipe to a reported depth of 60 ft.

The well is equipped with a Clayton-Marks submersible pump set on 1 l/2-in. column pipe at 60 ft. and rated at 1900 gal. per hr., and powered by a 2-hp. electric motor.

A partial analysis of a sample (Lab. No. 147643) collected Sept. 9, 1958 showed the water in Well No. 1 to have a hardness of 32. 8 gr. per gal., total dissolved minerals of 430 ppm., and an iron content of 1. 2 ppm.

Well No. 1 serves 60 houses.

WELL NO. 2 was completed in 1948 to a depth of 140 ft. by Dreher and Schorie and located about 350 ft. east of Well No. 1, or approximately 1500 ft. N. and 460 ft. W. of the S. E. corner of Section 25. The ground surface elevation at the well is 618. The well was cased with 6-in. pipe to an unknown depth and the hole was finished at 6 in. in diameter at the bottom.

The well is equipped with a Reda Red Jacket submersible pump attached to 60 ft. of 2-in. discharge pipe with power from a 3-hp. electric motor. The nonpumping water level was 20 ft. below the surface.

A mineral analysis of a sample (Lab. No. 147644) collected Sept.' 9, 1958 showed the water in Well No. 2 to have a hardness of 26.1 gr. per gal., total dissolved minerals of 508 ppm., and an iron content of 1. 8 ppm.

Well No. 2 serves 25 houses. The supply from the two systems is 100% metered and all the population served. Pumpage is estimated to average 18,000 gpd.

LABORATORY NO. 147644

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	16.1	
Manganese	Mn	0.2		Fluoride	F	0.2	
Calcium	Ca	102.0	5.10	Boron	B	0.0	
Magnesium	Mg	46.5	3.82	Chloride	Cl	24.	.68
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.5	.01
Sodium	Na	11.	.46	Sulfate	SO_4	121.8	2.53
				Alkalinity (as	$CaCO_3$)	308.	6.16
Turbidity		12		Hardness (as	$CaCO_3$)	446.	8.92
Color		0					
Odor		0					
Temp. (reported)		53.7°F		Total Dissolved Minerals		508.	

SUNNYSIDE
McHenry County
July 23, 1958

One well is in service for the village of Sunnyside (303), formerly Sunnyside Estates Subdivision located on the south side of the Fox River about 1/4 mile west of Lake Pistakee. Work was started on this subdivision in 1940.

WELL NO. 1 was drilled in 1942 to a depth of 260 ft. by Joseph Huemann, McHenry, and located in what is now known as the old section of the subdivision. Water in the so-called new section was supplied from an old farm well until Well No. 2 was drilled. Well No. 1 is not in use.

WELL NO. 2 was completed in June 1955 to a depth of 297 ft. for Ladd Enterprises, then owners of the subdivision. The well was drilled by Joseph Huemann and located on Indian Ridge Drive, or approximately 2200 ft. N. and 500 ft. E. of the S. W. corner of Section 7, T45N, R9E. The ground surface elevation at the well is 855. The well was cased with 12-in. pipe from the surface to 260 ft. penetrating limestone at 246 ft.

When the well was completed in 1955, the Driller reported pumping for 12 hr. at a rate of 40 gpm. with a drawdown of 66 ft. from a static water level of 84 ft. below the pump base (about 18 in. above L. S. D.).

The pumping equipment consists of 160 ft. of 3-in. column pipe; Reda submersible pump rated at 90 gpm.; 7 1/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 146789) collected May 29, 1958 showed the water in Well No. 2 to have a hardness of 15.2 gr. per gal., total dissolved minerals of 289 ppm., and an iron content of 0. 4 ppm.

In May 1958 there were 85 services, none metered. Pumpage is estimated to average 20, 000 gpd.

LABORATORY NO. 146789

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	20.0	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	46.5	2.33	Boron	B	0.1	
Magnesium	Mg	35.6	2.93	Chloride	Cl	2.	.06
Ammonium	NH_4	0.1	.01	Nitrate	NO_3	1.3	.02
Sodium	Na	8.	.33	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	276.	5.52
Turbidity		2		Hardness (as	$CaCO_3$)	263.	5.26
Color		0					
Odor		0					
Temp. (reported)		53.8°F		Total Dissolved Minerals		289.	

Illinois State Water Survey
Bulletin 40 - Supplement II

SYCAMORE-GREENGOLD
SUBDIVISION
Will County
October 8, 1958

A public water supply was installed in 1952 for Sycamore-Greengold Subdivision (est. 100), a community located about 3 1/2 miles southwest of Lockport on U. S. Highway 30. One well serves about 27 homes and the water system is ownedand operated by the Sycamore-Greengold Real Estate Development Co.

WELL NO. 1 was completed to a depth of 280 ft. in 1952 by Dreher and Schorie, Joliet, and located 620 ft. S. and 800 ft. E. of the N. W. corner of Section 31, T36N, R10E. The ground surface elevation at the well is 624. A 6-in. casing extends from the surface to about 80 ft.

The well is equipped with a Reda Red Jacket submersible pump, rated at 35 gpm. and connected to a 1 1/2-hp. electric motor.

In 1956 the nonpumping water level was 35 ft. below the surface, and when pumping at capacity the drawdown was 3 ft.

A mineral analysis of a sample (Lab. No. 147933) collected Oct. 8, 1958 showed the water in Well No. 1 to have a hardness of 20.6 gr. per gal., total dissolved minerals of 443 ppm., and an iron content of 0. 7 ppm.

There are about 27 services, all metered, and all of the population served. Pumpage is estimated to average 6000 gpd.

LABORATORY NO. 147933

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Silica	SiO_2	15.1	
Manganese	Mn	0.0		Fluoride	F	0.4	
Calcium	Ca	78.5	3.92	Boron	B	0.2	
Magnesium	Mg	38.4	3.15	Chloride	Cl	4.	.11
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.3	.04
Sodium	Na	20.	.89	Sulfate	SO_4	67.7	1.41
				Alkalinity (as	$CaCO_3$)	320.	6.40
Turbidity		Tr.		Hardness (as	$CaCO_3$)	353.	7.07
Color		0					
Odor		0					
Temp. (reported)		52.7°F		Total Dissolved Minerals		443.	

TEUTOPOLIS
Effingham County
January 13, 1958

Water for the public supply of the village of Teutopolis (1140) is obtained from two wells.

WELL NO. 1 is described in Bulletin 40.

In 1953 six test wells were drilled in the vicinity of Teutopolis by E. C. Baker and Sons, Sigel. The wells were drilled to depths of 150 to 170 ft. and yielded 10 to 30 gpm. In 1955 a number of test holes were drilled in Section 8, 16 and 17 about 2 l/2 miles northeast of town by E. C. Baker and Sons.

WELL NO. 2, originally Test Well No. 2-55, was completed in Mar. 1955 to a depth of 31 ft. and located in the flat of Salt Creek about 2 miles northeast of town, or approximately 1000 ft. S. and 2500 ft. E. of the N. W. corner of Sectionl6, T8N, R7E. The elevation of the ground surface at the well is 590. The well was cased with 10-in. pipe from 2 ft. above to 22 ft. below the surface followed by 10 ft. of 10-in. No. 30 slot Cook screen, exposed to the aquifer from 27 to 32 ft.

A production test was conducted on Mar. 14-16, 1955 by representatives of the Driller, the State Water Survey, and Warren and VanPraag, Consulting Engineers. During the test, a dug well located about 3. 5 ft. northwest of Well No. 2 was used for observing water levels. After 48 hr. pumping at a rate of 100 gpm., the drawdown in Well No. 2 was 7. 6 ft. from a static water level of 6. 5 ft. below the top of the casing. The water was lowered in the observation well 7. 6 ft. from a static level of 4. 9 ft. below the ground level. Twenty-four hr. after pumping was stopped, the water level in Well No. 2 had recovered to 9. 6 ft. below the top of the casing. Occasional water level readings were made in Well No. 2 for several days after pumping was stopped. After 48 hr. the water level had recovered to 6. 6 ft.

The pumping equipment in Well No. 2 consists of 65 ft. of 4-in. id. column pipe; 6-in., 6-stage MC. Fairbanks-Morse turbine pump (No. A60994), 7 ft. long and rated at 100 gpm. at 80 ft. T.D.H.; 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 145466) collected Jan. 10, 1958, after 4 hr. pumping at 78 gpm., showed the water in Well No. 2 to have a hardness of 20 gr. per gal., total dissolved minerals of 466 ppm., and an iron content of 1. 8 ppm.

There are 210 services all of which are metered.

Pumpage is reported to average 40, 000 gpd.

LABORATORY NO. 145466

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	19.0	
Manganese	Mn	0.1		Fluoride	F	0.4	
Calcium	Ca	88.5	4.43	Boron	B	0.1	
Magnesium	Mg	29.6	2.43	Chloride	Cl	23.	.65
Ammonium	NH_4	0.4	.02	Nitrate	NO_3	1.0	.02
Sodium	Na	39.	1.71	Sulfate	SO_4	99.2	2.06
				Alkalinity (as	$CaCO_3$)	292.	5.84
Turbidity		8		Hardness (as	$CaCO_3$)	343.	6.86
Color		0					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		466.	

Wells No. 1, 2 and 3 of the public water supply of Thornton (2895) were described in Bulletin 40.

WELL NO. 1 was cleaned out from 433 to 481 ft. depth in July 1947 by Kramer Bros., Homewood. The Pomona pump was reinstalled in the well with 317 ft. 5 in. of column pipe; 8-ft. 7-in. bowl section; 10 ft. of 5-in. suction pipe with 18-in. strainer; 317 ft. of air line; the 20-hp. electric motor was reinstalled. The static water level was 44 ft. and after 35 min. pumping, the water level dropped below the air line. The pump was shut downand about 50 min. later, the water level had recovered to 44 ft.

Wells No. 1 and 2 are not being used.

WELL NO. 3 is described in Bulletin 40 and is in service.

WELL NO. 4 was completed in June 1954 to a depth of 1785 ft. by L. Cliff Neely, Batavia, and is located about l/2 mile south of Well No. 3, or approximately 2550 ft. N. and 2630 ft. E. of the S. W. corner of Section 34, T36N, R14E. The ground surface elevationat the well is 617. The well was cased with 16-in. od. pipe from the surface to 48 ft. and with 10-in. gwi. pipe from the surface to 675 ft., below which the hole was finished 10 in. in diameter to the bottom at 1785 ft. The 10-in. casing was cemented in.

When the well was completed the Driller reported that after 8 hr. pumping at a rate of 572 gpm., the drawdown was 19 ft. from a static water level of 325 ft. below the top of the casing.

The permanent pumping equipment consists of 400 ft. of 6-in. column pipe; 14-stage Peerless turbine pump, No. 4540, rated at 300 gpm.; 400 ft. of air line; 50-hp. U S electric motor.

On May 14, 1958, during pumping at 300 gpm. for 2 hr., the drawdown was 5 ft. from a nonpumping water level of 345 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 146633) collected May 14, 1958, after 2 hr. pumping at 300 gpm., showed the water in Well No. 4 to have a hardness of 42. 5 gr. per gal., total dissolved minerals of l715 ppm., andaniron content of 2.1 ppm.

Well No. 4 is being maintained for reserve use.

Thornton WELL NO. 5 (Old Brewery Well No. 3 purchased by the village several years ago) was drilled to a depth of 1724 ft. in 1944 by J. P. Miller Artesian Well Co., Brookfield, and located south of Well No. 3, or approximately 1050 ft. S. and 2400 ft. E. of the N. W. corner of Section 34. The ground elevation at the well is 612. The well was cased with 14-in. pipe from the surface to 25 ft. and with 10-in. pipe from the surface to 666 ft. The casing was apparently not cemented in and, reportedly, is defective. The well has been pumping shale with iron scales.

The well is equipped with a Peerless turbine pump rated at 400 gpm. and a 75-hp. electric motor.

A partial analysis of a sample (Lab. No. 148014) collected Oct. 20, 1958 showed the water in Well No. 5 to have a hardness of 35. 6 gr. per gal., total dissolved minerals of 998 ppm., and an iron content of 1. 6 ppm.

Well No. 5 is the main source of supply for the village.

Pumpage for 1957 averaged 120, 000 gpd.

LABORATORY NO. 146633

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2. 1		Silica	SiO_2	8. 3	
Manganese	Mn	Tr.		Fluoride	F	1. 2	
Calcium	Ca	198. 0	9. 90	Boron	B	0. 8	
Magnesium	Mg	56. 8	4. 67	Chloride	Cl	275.	7. 76
Ammonium	NH_4	0. 1	.01	Nitrate	NO_3	3. 0	.05
Sodium	Na	285.	12. 40	Sulfate	SO_4	706. 0	14. 69
				Alkalinity (as	$CaCO_3$)	224.	4. 48
Turbidity		7		Hardness (as	$CaCO_3$)	729.	14. 57
Color		0					
Odor		0		Total Dissolved Minerals		1715.	

Summary sample study log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Drift"	40	40
SILURIAN SYSTEM		
Niagaran Series		
"Lime"	80	120
Dolomite, very silty to extra silty, gray, extra fine, slightly micaceous	40	160
Dolomite, gray to brownish-gray, very fine to fine, silty	90	250
Dolomite, gray to white, very fine to fine, some vuggy porosity at base	100	350
Dolomite, very silty, gray, very fine, dark speckled	20	370
Alexandrian Series		
Kankakee Formation		
Dolomite, partly cherty, gray to white, very fine	90	460
Edgewood Formation		
Dolomite, very silty, clayey, dark gray, very fine, grades to siltstone; shale (at base) gray, weak	30	490
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, partly silty and clayey, brown to grayish-brown, very fine to coarse, with interbedded shale	35	525
Shale, dolomite, gray, greenish brown, weak to firm, with dolomite streaks	105	630
Galena-Platteville Formations		
Dolomite, buff, gray, brown, fine to medium	325	955
Glenwood-St. Peter Formations		
Sandstone, buffish-gray, very fine to coarse, incoherent, chert at base; no sample 1065-1095	169	1124
Oneota Formation		
Dolomite, slightly chert to cherty, slightly sandy, buffish gray, gray, brown, very fine to fine; little sandstone, medium to coarse, incoherent	121	1245
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, partly slightly glauconitic, buffish-gray, very fine to fine, sandy at base	174	1419
Franconia Formation		
Sandstone, very dolomitic, very glauconitic, clayey, greenish-gray, very fine to fine, compact	81	1500
Shale, glauconitic, greenish-gray, weak	3	1503
Sandstone, very dolomitic, very glauconitic, clayey, gray, very fine to fine, compact	12	1515
No sample	15	1530
Dolomite, glauconitic, gray, very fine	10	1540
Ironton-Galesville Formations		
Sandstone, partly dolomitic, buffish-gray, gray, fine to coarse, incoherent, glauconitic at top	215	1755
Eau Claire Formation		
Shale, slightly sandy, green, weak; interbedded dolomite, very sandy, glauconitic, firm, very fine	25	1780

TOLEDO
Cumberland County
May 6, 1959

WELLS NO. 1 and 2 of the public water supply for the village of Toledo (998) are described in Bulletin 40.

WELL NO. 3 was completed in July 1952 to a depth of 29 ft. by E. C. Baker and Sons, Sigel, and located at the site of Test Hole No. 4-52, or 98 ft. west of Well No. 2 (dug well), or approximately 1300 ft. N. and 700 ft. E. of the S. W. corner of Section 29, T10N, R9E. The ground surface elevation at the well is 555.

Before the permanent well was completed, a production test was conducted on Test Hole No. 4-52 on July 28, 1952 by representatives of the Drilling Contractor, the Village, and the State Water Survey. The Test Hole No. 4-52 was drilled to a depth of 29 ft. and cased with 19 ft. 4 in. of 10 3/4-in. od. welded pipe (which was extended 2 ft. above the ground level) followed by a 9 l/2-in. od. Cook wire-wound screen, with an over-all length of 12 ft. 4 in. The screen was constructed with 4 ft. of No. 45 slot-size openings and 7 ft. of No. 35. The joint between the screenand casing was sealed witha lead packer. For test purposes the well was equipped with 20 ft. of 4-in. column pipe; 5 5/8-in., 9-stage Aurora turbine pump rated at 50 gpm. against 113 ft. T.D.H. and having an over-all length of 5 ft. 4 in.; 4 ft. of 4-in. suction pipe. Power was furnished through a right angle drive from a 7 l/2-hp. Briggs and Stratton gasoline engine.

During the test, water levels were observedin TestHole No. 1-52, located 7 ft. eastand 5 ft. south of Test Hole No. 4-52. Test Hole No. 1-52 was cased with 8-in. pipe to an unknown depth but reportedly not extended through the water-bearing formation of Test Hole No. 4-52.

Water levels were also observed in Well No. 2, which was 98 ft. east of Test Hole No. 4-52.

After 6 l/2 hr. pumping at a rate of 81 gpm. from TestHole No. 4-52, the drawdown was 11. 2 ft. from a static water level of 7. 7 ft. below the top of the casing. Thirty min. after pumping was stopped, the water level in Test Hole No. 4-52 recovered to 10. 55 ft. During the same period the water in Test Hole No. 1-52 was lowered 4. 4 ft. from a static level of 5. 9 ft. below the top of the casing. Thirty min. after pumping was stopped in 4-52, the water level in 1-52 had recovered to 8. 51 ft. In Well No. 2 the water was lowered 3 ft., and 30 min. after pumping was stopped, there was no recovery in Well No. 2.

A mineral analysis of a sample (Lab. No. 149503) collected Apr. 30, 1959 showed the water in Well No. 3 to have a hardness of 12. 9 gr. per gal., total dissolved minerals of 333 ppm., and an iron content of 1. 3 ppm.

In May 1959 the pumpage for the village averaged 39,000 gpd.

LABORATORY NO. 149503

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.3		Silica	SiO_2	14.3	
Manganese	Mn	0.1		Fluoride	F	0.5	
Calcium	Ca	52.5	2.63	Boron	B	0.1	
Magnesium	Mg	21.8	1.79	Chloride	Cl	24.	.68
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.7	.06
Sodium	Na	44.	1.92	Sulfate	SO_4	26.7	.56
				Alkalinity (as	$CaCO_3$)	252.	5.04
Turbidity		5		Hardness (as	$CaCO_3$)	221.	4.42
Color		0					
Odor		0					
Temp. (reported)		54°F		Total Dissolved Minerals		333.	

One well is in servicefor the cityof Toluca (1352).

WELL NO. 1, described in Bulletin 40, was retired after Well No. 2 was constructed and placed in service in 1951.

WELL NO. 2 was completed in Nov. 1951 to a depth of 1870 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 300 ft. east of Well No. 1, or approximately 200 ft. S. and 2480 ft. E. of the N. W. corner of Section 8, T29N, R1E. The ground surface elevation at the well is 695. The hole and casing record is shown in Table A.

TABLE A

Hole Record

24-in. from surface to 94 ft.
19-in. from 94 to 617 ft.
12-in. from 617 to 1358 ft.
8-in. from 1358 to 1884 ft.
A concrete plug was placed from 1884 to 1870 ft.

Casing Record

20-in. from +2 ft. to 94 ft.
12-in. from +2 ft. to 593 ft.
16-in. liner from 314 to 617 ft.
8-in. casing from 593 to 1358 ft.
The 12-in. and 8-in. casings were cemented with 903 bags of cement and 45 bags of bentonite.

A production test was conducted on Nov. 5, 1951. After 10 hr. pumping at a rate fluctuating from 60 to 102 gpm., the drawdown was 174 ft. from a nonpumping water level of 192 ft. below the top of the 12-in. casing. Twenty min. after the pump was stopped, the water level had recovered to 205 ft.

Following the production test, three shots were set off in the well as shown in Table B.

TABLE B

Shot No.	Explosive 100% Nitrogengel lb.	Primer 60% Dynamite lb.	Depth ft.
1	203	12	1805-1791
2	228	14	1790-1766
3	228	14	1810-1795

Following the shots a second production test was conducted on Dec. 11, 1951 by representatives of the Driller, the State Water Survey, City officials, and Austin Engineering Co., Consulting Engineers. After 10 hr. pumping at 420 gpm., the drawdown was 186 ft. from a nonpumping water level of 187 ft. Twenty-two min. after the pump was stopped, the water level had recovered to 216 ft.

The pumping equipment consists of 400 ft. of column pipe; 8-in., 10-stage Peerless turbine pump, rated at 200 gpm.; 400 ft. of air line; 20-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153666) collected Nov. 23, 1960 showed the water in Well No. 2 to have a hardness of 12.5 gr. per gal., total dissolved minerals of 1550 ppm., and an iron content of 1.2 ppm.

There are approximately 450 services. Pumpage is reported to average 115,000 gpd.

LABORATORY NO. 153666

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.2		Silica	SiO_2	9.9	
Manganese	Mn	0.0		Fluoride	F	1.6	
Calcium	Ca	50.6	2.53	Boron	B	0.8	
Magnesium	Mg	21.5	1.77	Chloride	Cl	580.	16.36
Ammonium	NH_4	1.8	.10	Nitrate	NO_3	0.4	.01
Sodium	Na	500.	21.76	Sulfate	SO_4	224.2	4.67
				Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		4		Hardness (as	$CaCO_3$)	215.	4.30
Color		0					
Odor		0					
Temp. (reported)		75°F		Total Dissolved Minerals		1550.	

Sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
No sample	30	30
Gravel	20	50
Gravel; till	15	65
Gravel	35	100
PENNSYLVANIAN SYSTEM		
Shale, gray, brown, black, weak to firm; limestone, light gray	530	630
DEVONIAN SYSTEM		
Niagaran Series		
Dolomite, grayish buff, white, very fine to medium; limestone, white, light gray	460	1090
Dolomite, buff, gray, pink, green, very fine to coarse	25	1115
Alexandrian Series		
Kankakee Formation		
Dolomite, buff, very fine to medium	25	1140
Edgewood Formation		
Dolomite, buff, fine to medium	40	1180
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, grayish green, brown; weak; dolomite, light gray	155	1335
Galena-Platteville Formations		
Dolomite buff, light brown; limestone, light to medium brown	371	1706
St. Peter Formation		
Sandstone, white, fine to coarse, incoherent	168	1874

TOWNER SUBDIVISION
Lake County
December 3, 1959

Two wells are in service for the public water supply of the Towner Subdivision (est. 200). The ownership of the system is reportedly cooperative.

WELL NO. 1 was completed in 1910 to a depth of 265 ft. by H. Luebbe, Mundelein, and located west of Willow Springs Road about 4miles south of Mundelein, southwest of the intersection of Routes 83 and 45, or approximately 860 ft. S. and 900 ft. E. of the N. W. corner of Section 6, T43N, RUE. The well was cased with 4-in. pipe to an unreported depth, followed by 2-in. pipe to an unknown depth. The ground surface elevation at the well is 755. The pumping equipment included a Myers plunger pump, belt-connected to a 1-hp. General Electric motor.

The well was abandoned and filled in 1957.

WELL NO. 2 was completed in 1950 to a depth of 180 ft. by Fred Kiene, Mundelein, and located north of Osage Road and 1 block west of Route 83, or approximately 2125 ft. S. and 2900 ft. W. of the N. E. corner of Section 6. This is about 1/2 mile southeast of Well No. 1. The well was cased with 8-in. pipe to limestone at 180 ft. below a ground surface elevation of 728.

The pumping equipment consists of 100 ft. of 4-in. column pipe; 6-in., 16-stage Byron Jackson turbine pump, No. C-299428, rated at 60 gpm. against 204 ft. T.D.H.; 10 ft. of 4-in. suction pipe; 100 ft. of air line; 4-hp. U S electric motor.

A mineral analysis of a sample (Lab. No. 151196) collected Dec. 3, 1959 showed the water in Well No. 2 to have a hardness of 26 gr. per gal., total dissolved minerals of 961 ppm., and an iron content of 0.1 ppm.

WELL NO. 3 was completed in 1957 to a depth of 280 ft. by Henry Boysen, Libertyville, and located near Well No. 1, or approximately 850 ft. S. and 900 ft. E. of the N. W. corner of Section 6. The well was cased with 6-in. pipe to 241 ft., below which the hole was finished 6 in. in diameter. Limestone was encountered at 235 ft.

The pumping equipment consists of 168 ft. of 2-in. column pipe; Red Jacket submersible pump (No. 8PKP376); 3-hp. electric motor.

The Driller reportedly pumped at a rate of 50 gpm. with a drawdown of 75 ft. from a static water level of 85 ft. below the surface.

There are approximately 50 services. Pumpage for the subdivision is estimated to average 12, 000 gpd.

LABORATORY NO. 151196

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	16.7	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	81.0	4.05	Boron	B	0.4	
Magnesium	Mg	59.0	4.85	Chloride	Cl	8.	.23
Sodium	Na	117.	5.07	Nitrate	NO_3	2.8	.05
				Sulfate	SO_4	573.3	11.93
				Alkalinity (as	$CaCO_3$)	88.	1.76
Turbidity		5		Hardness (as	$CaCO_3$)	445.	8.90
Color		0					
Odor		0					
Temp. (reported)		54.5°F		Total Dissolved Minerals		961.	

TRENTON
Clinton County
January 9, 1958

The public water supply for the city of Trenton (1866) is obtained from seven wells.

WELL NO. 1 (reported in Bulletin 40 as Old Well No. 2 - City Well No. 3) was reported in 1955 to yield 9 gpm. Some improvements to the pump were planned.

WELL NO. 2 (reported in Bulletin 40 as Old Well No. 3) was reported in 1951 as having been abandoned and capped with concrete.

WELL NO. 3 (called City Well No. 1 in Bulletin 40) was reported in 1952 to be equipped with a Jacuzzi deep well pump rated at 25 gpm. The electric motor bearings had beenburned out twice in 3 weeks. In 1954 the pump was reportedly throttled to 11 gpm. and the pumping water level was 183 ft. on the altitude gage. In 1955 the discharge line was choked and the well reportedly delivered 10-11 gpm.

WELL NO. 4 (called City Well No. 2 in Bulletin 40) was reported to be equipped with a new pump late in 1952. The well, at the time, measured 233 ft. in depth and 125 ft. to static water level. The new pump installation included 205 ft. of column pipe; Jacuzzi jet pump rated at 25 gpm. but throttled to 10 gpm.; 12 ft. of suction pipe with screen; 5-hp. electric motor.

WELL NO. 5 was drilled in 1950 to a depth of 244 ft. by M. M. Butler Well Drilling Co., St. Louis, Mo. The well is located at the east end of Front St., or approximately 1800 ft. N. and 2600 ft. W. of the S. E. corner of Section 20, T2N, R5W. Well No. 5 is reportedly cased with 8-in. steel pipe to a depth of 100 ft., below which the diameter of the hole is not known.

Water is pumped by a Fairbanks-Morse Pomona turbine pump directly connected to a 5-hp. Westinghouse electric motor. Analysis of a sample (Lab. No. 145464) collected Jan. 9, 1958, after 2 mo. continuous pumping at 20 gpm., showed the water in Well No. 5 to have a hardness of 1.5 gr. per gal., total dissolved minerals of 950 ppm., and a trace of iron.

WELL NO. 6 was drilled in 1951 to a depth of 244 1/2 ft. by M. M. Butler Well Drilling Co. and located about 1000 ft. east of the granary and about 75 ft. southof the railroad, or approximately 1000 ft. N. and 1700 ft. W. of the S. E. corner of Section 20. The ground elevation is 498.

The well was cased with 12-in. pipe to an unknown depth. A 3-ft. berm is constructed around the well to prevent flooding.

Water is pumped by a Pomona turbine pump rated at 25 gpm. connected to a 5-hp. Fairbanks-Morse electric motor. In 1954 it was reported that the pump was throttled to 11 gpm.

An altitude pressure gage is installed.

WELL NO. 7 was drilled in 1951 to a depth of 210 or 220 ft. and located about 800 ft. east of Well No. 6 and about 200 ft. south of the railroad, or approximately 875 ft. N. and 1000 ft. W. of the S. E. corner of Section 20. The well was cased with 15-in. pipe to an unknown depth. A 3-ft. high berm is constructed aroundWell No. 7.

Water is pumped by a Jacuzzi deep well pump rated at 25 gpm. and connected to a 5-hp. Robbins and Myers electric motor. An altitude pressure gage is installed.

WELL NO. 8 was drilled in 1954 to a depth of 238 ft. below the ground surface by the M. M. Butler Well Drilling Co. The well is located about 650 ft. west of Well No. 6 on E. Main St., or approximately 1000 ft. N. and 2350 ft. W. of the S. E. corner of Section 20. The well was cased with 115 ft. of standard wrought steel pipe from ground level. Below the casing the hole was finished 10 in. in diameter to the bottom. Later a 5 l/2-ft. berm was built up around the casing.

A concrete envelope was poured around the casing to 10 ft. below ground level. When the well was completed the yield was 10 gpm. and in Apr. 1956 the static water level was reported by the Driller to be 146 ft.

The permanent pumping installation includes a 5-stage Jacuzzi multistage deep well pump, Serial No. H2029, attached to 225 ft. of 2 l/2-in, discharge pipe. Power is furnished by a 5-hp. U S electric motor.

Pumpage is reported to average 60, 000 gpd.

LABORATORY NO. 145464

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Silica	SiO_2	7.8	
Manganese	Mn	0.0		Fluoride	F	1.0	
Calcium	Ca	4.5	.23	Boron	B	0.5	
Magnesium	Mg	3.1	.25	Chloride	Cl	215.	6.06
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	1.1	.02
Sodium	Na	386.	16.79	Sulfate	SO_4	1.0	.02
				Alkalinity (as	$CaCO_3$)	562.	11.24
Turbidity		0		Hardness (as	$CaCO_3$)	24.	.48
Color		0					
Odor		0					
Temp. (reported)		58.5°F		Total Dissolved Minerals		950.	

Correlated driller's log of WELL NO. 8 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Yellow clay	30	30
Blue clay and gravel	5	35
Soft blue clay	5	40
Blue clay mixed with little gravel	5	45
Soft blue clay	15	60
PENNSYLVANIAN SYSTEM		
Soft shale	5	65
Soft blue clay	30	95
Soft shale	5	100
Gray shale	10	110
Gray slate	10	120
Sandy gray slate	10	130
Gray sandrock	95	225
Sandrock, limestone and little shale	5	230
Gray cherty limestone	10	240

TRI-STATE VILLAGE
DuPage County
May 12, 1958

A public water supply was installed in 1940 for Tri-State Village (est. 400), an unincorporated community about 4 miles south of Hinsdale. The system is owned and operated by the Tri-State Village Water Association. Water is obtained from two drilled wells.

WELL NO. 1 was completed about 1940 to a depth of 200 ft. by William Wenz, Lyons, and located immediately south of the fire station at Sunrise near Central St., or approximately 1850 ft. N. and 1925 ft. E. of the S. W. corner of Section 35, T38N, R11E. The ground surface elevation at the well is 725. The well is cased with 6-in. gwi. pipe from 18 in. above the pump housefloor to rock atapproximately 110 ft. depth.

The pumping equipment installed in 1952 by J. P. Miller Artesian Well Co., Brookfield, includes a Peerless turbine pump, No. 79398, rated at 50 gpm. at 110 ft. T. D.H.; 105 ft. of air line; 5-hp. U S electric motor.

On May 5, 1958 the nonpumping water level was 59 ft.

A mineral analysis of a sample (Lab. No. 146607) collected May 5, 1958 showed the water to have a hardness of 23.8 gr. per gal., total dissolved minerals of 526 ppm., and an iron content of 1. 8 ppm.

WELL NO. 2 was completed to a depth of 206 ft. about 1940 by William J. Wenz. The well was located at the northeast corner of Highland and Sunrise St. approximately 1000 ft. south of Well No. 1, or approximately 750 ft. N. and 1600 ft. E. of the S. W. corner of Section 35. The ground elevation at the well is 724. The well is cased with 6-in. gwi. pipe from 18 in. above ground level to an unreported depth.

The pumping equipment includes 110 ft. of 3-in. column pipe; Peerless Hi-Lift turbine pump, No. 77296, rated at 50 gpm. against 115 ft. T.D.H. connected to a 5-hp. U S electric motor.

There are 102 services. Pumpage from Apr. 21, 1958 to May 5, 1958 averaged 3340 gpd.

LABORATORY NO. 146607

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.8		Silica	SiO_2	19.6	
Manganese	Mn	Tr.		Fluoride	F	0.4	
Calcium	Ca	98.0	4.90	Boron	B	0.2	
Magnesium	Mg	38.5	3.17	Chloride	Cl	3.	.08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	4.	.01
Sodium	Na	25.	1.09	Sulfate	SO_4	132.1	2.75
				Alkalinity (as	$CaCO_3$)	316.	6.32
Turbidity		9		Hardness (as	$CaCO_3$)	404.	8.07
Color		0					
Odor		0					
Temp. (reported)		51.0°F		Total Dissolved Minerals		526.	

ULLIN
Pulaski County
May 25, 1960

A public water supply was installed in 1959 for the village of Ullin (577). Water is obtained from one well.

WELL NO. 1 was completed in 1959 to a depth of 150 ft. by Layne-Western Co., St. Louis, Mo., and located 600 ft. N. and 1800 ft. W. of the S. E. corner of Section 23, T14S, R1W. The land surface elevation at the well is 345.

The well was cased with 20-in. pipe from 1. 5 ft. above to 18 ft. below the surface and with 8-in. pipe from 0. 75 ft. above to 140 ft. below the surface, followed by an 8-in. Layne-Western No. 11 shutter screen from 140 to 150 ft.

A production test was conducted on July 30, 1959 by representatives of the Driller, the State Water Survey, and the Village officials. For the test the well was equipped with a turbine test pump set at 67 ft. with power from a gasoline engine. An air line, 67 ft. long, was installed. After 4 hr. pumping at a rate of 300 gpm., the drawdown was 26. 7 ft. from a static water level of 11 ft. One and three-fourth hr. after the pump was stopped, the water level had recovered to 11 ft.

The permanent pumping equipment consists of 50 ft. of 5-in. column pipe; 8-in., 4-stage Johnston turbine pump, rated at 200 gpm. against 110 ft. T.D.H.; 5-in. suction strainer; 7 1/2-hp. electric motor.

A mineral analysis of a sample (Lab. No. 152302) collected May 25, 1960 showed the water in Well No. 1 to have a hardness of 14. 9 gr. per gal., total dissolved minerals of 290 ppm., and an iron content of 4. 8 ppm.

No pumpage has been reported to date. Pumpage is estimated to be about 50, 000 gpd.

LABORATORY NO. 152302

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4.8		Silica	SiO_2	17.5	
Manganese	Mn	0.2		Fluoride	F	0.2	
Calcium	Ca	72.6	3.63	Boron	B	0.0	
Magnesium	Mg	17.9	1.47	Chloride	Cl	6.	.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.3	.04
Sodium	Na	5.	.23	Sulfate	SO_4	0.2	Tr.
				Alkalinity (as	$CaCO_3$)	256.	5.12
Turbidity		30		Hardness (as	$CaCO_3$)	255.	5.10
Color		10					
Odor		0					
Temp. (reported)		57°F		Total Dissolved Minerals		290.	

VALLEY VIEW
SUBDIVISION
DuPage County
October 9, 1958

A public water supply was installed in 1957 for the Valley View Subdivision (est. 160) located about 2 miles south of Glen Ellyn. The system is owned and operated by Citizens Utilities Co. of Illinois. Two wells are in service.

WELL NO. 1 was completed in May 1957 to a depth of 290 ft. by Layne-Western Co., Aurora, and located at the north end of the subdivision, or approximately 820 ft. S. and 1630 ft. E. of the N. W. corner of Section 35, T39N, R10E. The ground elevation at the well is 745. Well No. 1 was cased with 12-in. steel pipe to 117 ft., below which the hole was finished 12 in. in diameter to the bottom.

A production test of Well No. 1 was conducted on May 27, 1957 by the Driller. For the test, a 12-in., 2-stage Layne turbine pump attached to 8-in. column pipe was used. After 5 hr. pumping at a rate of 537 gpm., the drawdown was 11 ft. from a nonpumping water level of 80 ft. below the top of the casing (2 ft. above ground level).

The permanent pump consists of 120 ft. of 6-in. column pipe; 10-in., 4-stage Layne turbine pump (No. 38105), 4 ft. 3 in. long and rated at 500 gpm. at 170 ft. T.D.H.; 120 ft. of air line; 10 ft. of 6-in. suction pipe; 30-hp. Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 146912) collected June 12, 1958 showed the water in Well No. 1 to have a hardness of 18. 6 gr. per gal., total dissolved minerals of 408 ppm., and an iron content of 0. 9 ppm.

A second well was drilled about June 1957 but proved to be a dry hole and was immediately abandoned and filled.

WELL NO. 2 (originally No. 3 in the order of drilling) was completed by Layne-Western Co. in July 1957 to a depth of 250 ft. and located about 400 ft. southeast of Well No. 1, or approximately 975 ft. S. and 2000 ft. E. of the N. W. corner of Section 35. The ground elevation at the well is 720. The well was cased with 12-in. steel pipe to 81 ft., below which the hole was finished 12 in. in diameter.

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Silt, buff; broken dolomite (?)	50	50
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, white, buff, gray, purple at base, fine to very fine, compact, crystalline	145	195
Alexandrian Series		
Dolomite, buff, white, little greenish gray, compact	45	240
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, grayish green, purple-red, weak; dolomite, buff, fine	10	250

A production test was conducted by the Driller on July 17, 1957 using a Layne turbine test pump attached to 8-in. column pipe and powered by a gas engine. An air line, 105 ft, in length, was installed. After 12 hr. pumping at a rate of 560 gpm., the drawdown was 7. 5 ft. from a nonpumping water level of 32 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 144001) collected July 16, 1957, after 12 hr. pumping at a rate of 560 gpm., showed the water in Well No. 2 to have a hardness of 18 gr. per gal., total dissolved minerals of 378 ppm., and an iron content of 0. 3 ppm.

On Oct. 9, 1958 the nonpumping water level was 35 ft. below the pump base. The permanent pumping equipment consists of 60 ft. of 6-in. column pipe; 10-in., 4-stage Layne turbine pump (No. 38374), 4 ft. 3 in. in length and rated at 500 gpm. at 150 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 60 ft. of air line; 25-hp. Westinghouse electric motor.

Pumpage is estimated to average 12, 000 gpd.

2 - Valley View Subdivision

LABORATORY NO. 146912

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	16.9	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	72.4	3.62	Boron	B	0.3	
Magnesium	Mg	33.2	2.74	Chloride	Cl	3.	.08
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2.9	.05
Sodium	Na	32.	1.39	Sulfate	SO_4	73.7	1.54
				Alkalinity (as	$CaCO_3$)	304.	6.08
Turbidity		.6		Hardness (as	$CaCO_3$)	318.	6.36
Color		0					
Odor		0					
Temp. (reported)		51.4°C		Total Dissolved Minerals		408.	

VILLA GROVE
Douglas County
June 27, 1960

One well is in service for the public water supply of the city of Villa Grove (2308) and one well is maintained for stand-by use.

WELL NO. 1, described in Bulletin 40, is maintained for stand-by use.

WELL NO. 2, described in Bulletin 40, was equipped in 1954 with a new pump installation following a production test of the well. On Mar. 11, 1954 the production test was conducted by L. R. Burt, Decatur, and observed by representatives of the State Water Survey, City officials, and the Engineering Service Corporation. Well No. 1 is located about 170 ft. west of Well No. 2. Before the pump was started on Well No. 2, the pump in Well No. 1 was operating for 45 min. with a lowering of the water level in Well No. 2 of 0. 5 ft. The pump in Well No. 1 continued to operate during the test of Well No. 2. After 3 hr. pumping in Well No. 2 at a rate of 252 gpm., the drawdown was 4. 4 ft. below a non-pumping water level of 114. 4 ft. below the pump house floor. Fifteen min. after the pump was stopped in Well No. 2 with No. 1 still pumping, the water level had recovered to 115 ft.

The new pump assembly consists of 160 ft. of 6-in. id. column pipe; 7 3/4-in., 8-stage Fairbanks-Morse turbine pump, rated at 350 gpm.; 20 ft. of 6-in. suction pipe; 25-hp. electric motor.

A partial chemical analysis of a sample (Lab. No. 134183) collected Mar. 11, 1954, after 2-3 hr. pumping at 250 gpm., showed the water in Well No. 2 to have a hardness of 12. 8 gr. per gal., total dissolved minerals of 662 ppm., and an iron content of 0. 8 ppm.

A mineral analysis of a sample (Lab. No. 152579) collected June 27, 1960 showed the water in Well No. 1 to have a hardness of 13. 7 gr. per gal., total dissolved minerals of 529 ppm., and an iron content of 0.1 ppm.

There are 790 services, of which 740 are metered. Pumpage for the city July 1, 1957 through June 30, 1958 averaged 123, 900 gpd.

LABORATORY NO. 152579

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	10. 4	
Manganese	Mn	0. 0		Fluoride	F	0. 4	
Calcium	Ca	51. 4	2. 57	Boron	B	0. 1	
Magnesium	Mg	25. 9	2. 13	Chloride	Cl	83.	2. 34
Ammonium	NH_4	0. 5	. 03	Nitrate	NO_3	0. 9	. 01
Sodium	Na	118.	5. 15	Sulfate	SO_4	11. 9	. 25
				Alkalinity (as	$CaCO_3$)	364.	7. 28
Turbidity		0		Hardness (as	$CaCO_3$)	235.	4. 70
Color		0					
Odor		0					
Temp. (reported)		64°F		Total Dissolved Minerals		529.	

One new well has been added to the public water supply of Villa Park (20, 391) since publication of Bulletin 40. Wells No. 1, 2 and 7 are in service and Wells No. 3 and 4 are maintained for emergency use. Well No. 5 has been abandoned.

WELL NO. 1, described in Bulletin 40, was rehabilitated in 1955 by Layne-Western Co., Aurora, The well was cleaned out to 1400 ft., and a production test was conducted in Sept. 1955. After 1 hr. pumping at a rate of 602 gpm., the drawdown was 72 ft. from a nonpumping water level of 490 ft.

In May 1959 the pumping equipment included 680 ft. of 8-in. column pipe; 12-in., 11-stage Layne turbine pump, No. 22871, rated at 700 gpm.; 29 ft. of suction pipe; 680 ft. of air line (defective); 150-hp. U S electric motor.

Well No. 1 is in service.

WELL NO. 2, described in Bulletin 40, is equipped with 680 ft. of 8-in. column pipe; 12-in., 23-stage Layne turbine pump, No. 25837, rated at 650 gpm. at 700 ft. T.D.H.; 680 ft. of air line; 200-hp. Westinghouse electric motor.

When Well No. 1 was shut down, the nonpumping water level in Well No. 2 was reportedly 528 ft. and the drawdown, when pumping from the well, was 50 ft.

Well No. 2 is in service.

WELL NO. 3, described in Bulletin 40, is maintained for emergency use. The well is equipped with 160 ft. of 6-in. column pipe; 8-in., 14-stage Layne turbine pump, No. 20255, rated at 400 gpm. at 300 ft. T.D.H.; 10 ft. of 6-in. suction pipe; 50-hp. U S electric motor.

In May 1958 the static water level was reportedly 54 ft., and after 30 min. pumping, the drawdown was 24 ft.

WELL NO. 4, described in Bulletin 40, is maintained for emergency use. In Feb. 1955 the well was reamed to 8 in. in diameter to 180 ft. and 6 in. in diameter from 180 to 212 ft. Following the reaming, 750 gal. of 15% HC1 was poured in the well.

Well No. 4 is equipped with 160 ft. of 5-in. column pipe; 8-in., 14-stage Layne turbine pump (No. 29787); 160 ft. of air line; 10 ft. of 6-in. suction pipe; 50-hp, U S electric motor.

A partial chemical analysis of a sample (Lab. No. 147513) collected Aug. 20, 1958, after 1 hr. pumping, showed the water in Well No. 4 to have a hardness of 24.9 gr. per gal., total dissolved minerals of 537 ppm., and an iron content of 8. 4 ppm.

A production test was conducted on May 14, 1959 by a representative of the State Water Survey. After 3 1/2 hr. pumping at a rate of 425 gpm., the drawdown was 23 ft. from a nonpumping water level of 53 ft. below the pump base. One hr. after the pumping was stopped, the water level had recovered to 54 ft. below the pump base.

WELL NO. 5, described in Bulletin 40, was filled and abandoned in Aug. 1957.

No. 6 is a booster pump and does not exist as a water well.

WELL NO. 7 was completed in Nov. 1956 to a depth of 1419 ft. by Layne-Western Co. and located about 170 ft. east of Well No. 5, or approximately 2050 ft. S. and 550 ft. W. of the N. E. corner of Section 4, T39N, R11E. The elevation of the top of the unfinished casing is 702. 8. The hole and casing record is shown in Table A.

TABLE A

Hole Record

26-in.	from surface	to	67 ft.
24-in.	from 67 ft.	to	401 ft.
19-in.	from 401 ft.	to	1136 ft.
15 1/4-in.	from 1136 ft.	to	1419 ft.

Casing Record

26-in.	from surface	to	67 ft.	
20-in.	from surface	to	401ft.	(cemented)
16-in.	from 970. 5 ft.	to	1136 ft.	(liner)

In an attempt to develop the well, a charge of 250 lb. of nitrogengel was set off. The shot caused the liner to collapse with its top settled down to about 1040 ft. After repairing the liner, four shots of 250 lb. each were exploded between 1350 and 1240 depths.

During drilling, water levels were reported as shown in Table B.

TABLE B

Depth of Well ft.	Depth to Water ft.
325	41
695	475
840	478
950	490
1337	440
1419	482

A production test was conducted by the Driller on Oct. 23, 1956. After 24 hr. pumping at a rate of 812 gpm., the drawdown was 106 ft. from a static water level of 490 ft. below the top of the casing. Following this test, about 75 ft. of sand was removed from the well. Following the removal of the sand a second test was conducted on Nov. 5. After 24 hr. pumping at a rate of 842 gpm., the drawdown was 112 ft. from a static water level of 476 ft. below the top of the casing. Six ft. of sand was found in the well following the second test.

The pump assembly, installed about Mar. 1957, consists of 680 ft. of 10-in. column pipe; 12-in., 12-stage Layne turbine pump (No. 36145), 11 ft. 4 in. long and rated at 1025 gpm.; 20 ft. of 8-in. suction pipe; 680 ft. of plastic air line; 300-hp. Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 146384) collected Apr. 22, 1958, after 5 min. pumping, showed the water in Well No. 7 to have a hardness of 21 gr. per gal., total dissolved minerals of 665 ppm., and an iron content of 0. 2 ppm.

Well No. 7 is in service.

Nonpumping water levels in the Villa Park municipal wells from 1923 to 1957 are shown in Table C.

Pumpage for 1958, entirely from Wells No. 1, 2 and 7, averaged 1.128 mgd.

TABLE C

Well No.	1	2	3	4	5	7
Surface Elev.	695	699	702	702	753	703
Depth	1912	2125	285	251	235	1420
Aquifer	ss	ss	ls	ls	ls	ls
Date			Feet To Water			
1923				40		
1925				40		
1928	42					
1931		64				
1942	404	330				
1944					34	
1945		343				
1946			55			
1947		363	55			
1948	50					
	40					
	214					
1949			55	60		
1951	402					
	410					
1952		320				
1954					30	
1955	490		55		38	
1956		480				476
1957		496				512
1959		528				

Summary sample study log of WELL NO. 7 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, gravelly, sandy, grayish-buff	64	64
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, partly cherty, white, buff, pink, fine to very fine, crystalline, some vuggy porosity in upper 16 feet, little shale	76	140
Alexandrian Series		
Kankakee Formation		
Dolomite, slightly glauconitic, white, buff, fine to very fine, crystalline	35	175
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, silty to very silty, partly dolomitic, grayish green, little firm, brittle, weak, little tough; dolomite, partly very silty, gray, brown, fine, medium, crystalline	215	390
Galena Formation		
Dolomite, buff, white, fine to medium, crystalline, slightly cherty (595-605)	230	620
Platteville Formation		
Dolomite, buff, gray, fine to very fine, crystalline to granular, slightly sandy at base; limestone (663-695)	100	720
Glenwood Formation		
Sandstone, dolomitic to slightly dolomitic, gray, white, fine, medium to coarse, incoherent, little compact, little slightly clayey	110	830
St. Peter Formation		
Sandstone, partly slightly silty, little slightly argillaceous, white, gray, buff, fine to medium, little coarse, incoherent, very cherty at base	170	1000
Oneota Formation		
Dolomite, cherty, argillaceous, buff, white; little shale; little sandstone	40	1040
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, cherty, slightly sandy, slightly glauconitic, buff, white, fine to very fine, crystalline; shale, green, incoherent to brittle; sandstone, buff, white, medium to coarse, firm, compact, incoherent	93	1133
Franconia Formation		
Sandstone, glauconitic to very glauconitic, dolomitic, brownish to buff, gray, fine, medium, very fine, compact; little shale; little dolomite	82	1215
Ironton-Galesville Formations		
Sandstone, partly silty, dolomitic, white, coarse to very coarse, fine to medium, incoherent, compact	175	1390
Eau Claire Formation		
Sandstone, glauconitic to very glauconitic, dolomitic, buff, fine to very fine, compact; little shale	30	1420

4 - Villa Park

LABORATORY NO. 146384

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	7.6	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	80.3	4.02	Boron	B	0.6	
Magnesium	Mg	38.5	3.17	Chloride	Cl	33.	.93
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	1.3	.02
Sodium	Na	95.	4.11	Sulfate	SO_4	238.6	4.96
				Alkalinity (as	$CaCO_3$)	272.	5.44
Turbidity		0		Hardness (as	$CaCO_3$)	360.	7.19
Color		0					
Odor		0					
Temp. (reported)		55.4°F		Total Dissolved Minerals		665.	

Three wells are in service for the village of Walnut (1192).

WELLS NO. 1, 2 and 3, described in Bulletin 40, have been abandoned and covered over.

WELL NO. 4, described in Bulletin 40, was drilled in 1918 to a depth of 247 ft. and located about 4 ft. north of Well No. 3 (old East Well), or approximately 2090 ft. N. and 1090 ft. W. of the S. E. corner of Section 8, T18N, R8E. The ground surface elevation at the well is 711.

WELL NO. 5, described in Bulletin 40, was drilled in 1936 to a depth of 272 ft. and located about 14 ft. south of Well No. 4.

In 1951 a 16-stage pump was installed with a rated capacity of 250 gpm. at 340 ft. T. D.H. The pump was set at 160 ft. An air line, 158 ft. 11 in. long, is in place.

Correlated driller's log of WELL NO. 5furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Yellow clay and gravel	40	40
Blue clay	140	180
Blue clay and sand	10	190
Fine sand	83	273

WELL NO. 6 was completed in 1951 to a depth of 267 ft. by Milaeger Well Drilling Co., Milwaukee, Wis., and located about 600 ft. south of Well No. 4, or approximately 1500 ft. N. and 1140 ft. W. of the S. E. corner of Section 8. The well is cased with 239 ft. of 10-in. id. pipe followed by 28 ft. of 9 5/8-in. od. Johnson Everdur screen with No. 10 slot size from 0 to 5 ft. and with No. 24 slot size from 10 to 30 ft.

A pump efficiency test was conducted on Oct. 15-16, 1951 by representatives of the Driller, the State Water Survey, andFrancis Engineering Co., Consulting Engineers. The pumping equipment consisted of a 9 1/4-in., 12-stage Fairbanks-Morse Pomona turbine pump, 7 ft. 10 in. long, with the top of the bowls set at 149 ft. 10 in. The pump was rated at 350 gpm. at 340 ft. T. D.H.;150. 5 ft. of air line; 40-hp. U S electric motor. Also installed is a Fairbanks-Morse right angle gear drive hooked to a Chrysler Industrial 12 gas engine. Pumping was carried on intermittently for 28 hr. at rates of 370 to 420 gpm. with a final drawdown of 17. 6 ft. from a nonpumping water level of 89 ft. Seven min. after the pump was stopped, the water level had recovered to 89.1 ft.

A mineral analysis of a sample (Lab. No. 126678) collected Oct. 15, 1951 showed the water in Well No. 6 to have a hardness of 17.9 gr. per gal., total dissolved minerals of 320 ppm., and an iron content of 4. 2 ppm.

There are 485 services. Pumpage is reported to average 175, 000 gpd.

LABORATORY NO. 126678

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4. 2		Silica	SiO_2	25. 8	
Manganese	Mn	0. 1		Fluoride	F	0. 3	
Calcium	Ca	77. 2	3. 86	Chloride	Cl	4.	.11
Magnesium	Mg	27. 5	2. 26	Nitrate	NO_3	0. 4	.01
Ammonium	NH_4	0. 8	.04	Sulfate	SO_4	0. 0	.00
Sodium	Na	6.	.28	Alkalinity (as	$CaCO_3$)	316.	6. 32
Turbidity		32		Hardness (as	$CaCO_3$)	306.	6. 12
Color		0					
Odor		0					
Temp. (reported)		53°F		Total Dissolved Minerals		320.	

One well furnishes the entire supply for the village of Warren (1470).

WELLS NO. 1 and 2, described in Bulletin 40, have been abandoned and the pumps removed.

WELL NO. 3 was completed in 1952 to a depth of 1000 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at the water works on W. Main St., or approximately 2200 ft. S. and 830 ft. W. of the N. E. corner of Section 24, T29N, R4E. The ground surface elevation at the well is 1008. The well was cased with 12-in. pipe, in a 17 1/4-in. hole, to 338 ft. 3 in., below which the hole was finished 12 in. in diameter. The casing was grouted in.

Following an unsatisfactory production test on Sept. 22, 1952 the well bore was shot at twolevels. Shot No. 1(228 lb.) was set off between 950 and 960 ft. depths and Shot No. 2 (228 lb.) was set off at 930 to 940 ft. depths. A second production test was conducted by the Driller on Sept. 22. For the test the pumping installation consisted of 300 ft. of 8-in. column pipe; 12-in., 10-stage Peerless turbine pump (No. 11707); 300 ft. of air line; Buda gas engine. After 10 hr. pumping at a rate of 320 gpm., the drawdown was 58 ft. from a nonpumping water level of 196 ft. Thirty min. after the pump was stopped, the water level had recovered to 198 ft.

The permanent pump assembly consists of a Peerless turbine pump rated at 285 gpm. and connected to a 40-hp. electric motor.

A mineral analysis of a sample (Lab. No. 153363) collected Oct. 5, 1960, after 10 min. pumping, showed the water in Well No. 3 to have a hardness of 21. 7 gr. per gal., total dissolved minerals of 374 ppm., and an iron content of 0. 1 ppm.

There are 480 services. Pumpage in 1959 was reported to average 146,400 gpd.

LABORATORY NO. 153363

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Silica	SiO_2	12. 1	
Manganese	Mn	0. 0		Fluoride	F	0. 2	
Calcium	Ca	78. 0	3. 90	Boron	B	0. 0	
Magnesium	Mg	43. 0	3. 54	Chloride	Cl	4.	.11
Ammonium	NH_4	0. 1	.01	Nitrate	NO_3	0. 4	.01
Sodium	Na	0.	.01	Sulfate	SO_4	22. 0	.46
				Alkalinity (as	$CaCO_3$)	344.	6. 88
Turbidity		0		Hardness (as	$CaCO_3$)	372.	7. 44
Color		0					
Odor		0		Total Dissolved Minerals		374.	

Two wells are in service for the village of Warrensburg (681).

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 was completed in Dec. 1955 to a depth of 132 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 130 ft. southeast of Well No. 1, or approximately 40 ft. S. and 40 ft. E. of the N. W. corner of Section 14, T17N, R1E. The ground surface elevation at the well is 690. The well was finished in a sand and gravel formation and cased with 10-in. pipe to 120 ft. followed by 12 ft. of Cook screen.

A production test was conducted on Jan. 3, 1956 by representatives of the Driller, the State Water Survey, and Wilson and Anderson, Consulting Engineers. After 6 hr. pumping at 350 gpm., the drawdown was 22 ft. from a nonpumping water level of 73 ft. below the pump base (2 ft. above ground level). One hr. after the pump was stopped, the water level had recovered to 78.1 ft.

The well is equipped with 100 ft. of 4-in. column pipe; 5 1/2-in., 6-stage Fairbanks-Morse Pomona turbine pump, 6 ft. long and rated at 120 gpm.; 10 ft. of 4-in. suction pipe; 115 ft. of air line; 5-hp. Fairbanks-Morse electric motor.

A mineral analysis of a sample (Lab. No. 152577) collected June 27, 1960 showed the water in Well No. 2 to have a hardness of 18. 8 gr. per gal., total dissolved minerals of 504 ppm., and an iron content of 3.1 ppm.

There are 250 services, all metered. Pumpage is reported to average 30, 000 gpd.

LABORATORY NO. 152577

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	3. 1		Silica	SiO_2	21. 1	
Manganese	Mn	0. 0		Fluoride	F	0. 5	
Calcium	Ca	72. 4	3. 62	Boron	B	0. 4	
Magnesium	Mg	34. 0	2. 80	Chloride	Cl	6.	.17
Ammonium	NH_4	5. 6	.31	Nitrate	NO_3	0. 7	.01
Sodium	Na	66.	2. 89	Sulfate	SO_4	0. 0	.00
				Alkalinity (as	$CaCO_3$)	472.	9. 44
Turbidity		15		Hardness (as	$CaCO_3$)	321.	6. 42
Color		35					
Odor		0					
Temp. (reported)		55. 5°F		Total Dissolved Minerals		504.	

WARRENVILLE
DuPage County
September 9, 1958

A public water supply was installed for Warrenville (unincorporated-3134) in 1949. Three wells are in service.

WELL NO. 1 was drilled to a depth of 125 ft. in 1949 by C. C. Diebold, West Chicago, and located at the west end of Richard St., approximately 1600 ft. S. and 950 ft. E. of the N. W. corner of Section 35, T39N, R9E. The elevation of the ground surface at the well is 710. The well was cased with 8-in. pipe from the surface to limestone at 65 ft., below which the hole was finished 8 in. in diameter to the bottom.

The pumping equipment, presently installed, includes 90 ft. of column pipe; 4-stage Pomona turbine pump, No. AK3169, rated at 150 gpm. at 186 ft. T.D.H.; 90 ft. of air line; 10-hp. General Electric motor.

On Sept. 9, 1958, after 10 min. pumping at pump capacity, the drawdown was 42 ft. from a nonpumping water level of 20 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 147701) collected 10 min. after pumping began, showed the water in Well No. 1 to have a hardness of 22. 2 gr. per gal., total dissolved minerals of 609 ppm., and an iron content of 0. 5 ppm.

WELL NO. 2, drilled about 1949 to a depth of 120 ft., was located on the Moore Lumber Co. property on the east side of Curtiss Ave. south of Rodgers. According to a State Department of Public Health report in Nov. 1950, the well was cased with 6-in. wi. pipe and equipped with an American Well Works centrifugal pump designed to deliver 75 gpm. Power was furnished by a 3-hp. U S electric motor. In 1956 the well was reportedly not used and sometime later was abandoned and filled in.

WELL NO. 3 was completed to a depth of 162 ft. about 1925 or 1930 by C. C. Diebold and located on the north side of Central Ave. east of Elizabeth St., approximately 1500 ft. N. and 850 ft. E. of the S. W. corner of Section 36. Well No. 3 serves a completely separate distribution system on the east side of the river. The well was cased with 6-in. pipe to 115 ft., below which the hole was finished 6 in. in diameter to the bottom. The elevation of the ground surface at the well is 745. Water is pumped by a submersible pump connected to an electric motor,

WELL NO. 4 was completed in 1955 to a depth of 256 ft. by Ray Feuerborn, Batavia, and located in the northeast part of the intersection of Rodgers and Warren St., approximately 725 ft. N. and 2990 ft. W. of the S, E. corner of Section 35. The well is cased with 10-in. pipe to an unreported depth. The elevation of the ground surface at the well is 693.

Water is pumped by an 8-in. Aurora turbine pump, No. 91614, rated at 200 gpm. at 220 ft. T.D.H.; connected to a 15-hp. U S electric motor.

There are 300 services of which 274 are metered. Pumpage for the year 1957 was estimated at 66,500 gpd.

LABORATORY NO. 147701

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	13.5	
Manganese	Mn	0.0		Fluoride	F	0.6	
Calcium	Ca	85.5	4.28	Boron	B	0.4	
Magnesium	Mg	40.6	3.34	Chloride	Cl	77.	2.17
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	0.6	.01
Sodium	Na	75.	3.26	Sulfate	SO_4	114.6	2.38
				Alkalinity (as	$CaCO_3$)	316.	6.32
Turbidity		0		Hardness (as	$CaCO_3$)	381.	7.62
Color		0					
Odor		Cc					
Temp. (reported)		52.2°F		Total Dissolved Minerals		609.	

WAUCONDA
Lake County
November 7, 1958

Three wells are in service for the public water supply of the village of Wauconda (3227).

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 is described in Bulletin 40 as the well drilled to a depth of 257 ft. by W. R. Boetsch, Crystal Lake.

WELL NO. 3 was completed to a depth of 325 ft. in Mar. 1957 by R. C. Hoover Water Well Service, Zion, and located about l/4 mile southwest of Well No. 1, or approximately 1000 ft. N. and 1600 ft. W. of the S. E. corner of Section 26, T44N, R9E. The ground surface elevation at the well is 780. The well was cased with 12-in. pipe from 14 in. above L. S. D. to limestone at 194 ft., below which the hole was finished at 12 in. in diameter to the bottom at 325 ft.

A production test was conducted on Mar. 18-19, 1957 by representatives of the Driller, the State Water Survey, and Baxter and Woodman, Consulting Engineers. For test purposes a vertical turbine test pump was set on 220 ft. of column pipe. Power was furnished from a gasoline engine. An air line, 220 ft. long, was installed for measurement of water levels. After 24 hr. pumping at a rate of 297 gpm., the drawdown was 155 ft. from a static water level of 25 ft. below the top of the casing. Ten min. after the pump was stopped, the water level had recovered to 40 ft.

A partial chemical analysis of a sample (Lab. No. 143884) collected July 10, 1957, while pumping at a rate of 380 gpm., showed the water in Well No. 3 to have a hardness of 22 gr. per gal., total dissolved minerals of 373 ppm., and an iron content of 0. 7 ppm.

The pumping equipment consists of 250 ft. of 6-in. column pipe; 10-in., 10-stage Layne turbine pump, No. 38442, rated at 400 gpm. at 360 ft. T.D.H.; 250 ft. of air line (defective); 50-hp. Westinghouse electric motor.

Pumpage for the Wauconda supply for the years 1949 through 1957 averaged 134,000 gpd.

LABORATORY NO. 143884

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.7		Fluoride	F	0.6	
				Chloride	Cl	3.	.08
				Nitrate	NO_3	0.7	.01
				Alkalinity (as	$CaCO_3$)	352.	7.04
Turbidity		0		Hardness (as	$CaCO_3$)	368.	7.36
Color		0					
Odor		0		Total Dissolved Minerals		373.	

WAYCINDEN PARK
Cook County
April 8, 1960

A public water supply was installed for Waycinden Park (est. 700), a subdivision located on Route 62 about 1 1/2 miles south of Mount Prospect. The system is owned and operated by the Citizens' Waycinden Co. Two wells are in service.

WELL NO. 1 was completed in Mar. 1958 to a depth of 487 ft. by L. Cliff Neely, Batavia, and located on Mount Prospect Road about 1/4 mile north of Route 62, or approximately 1250 ft. S. and 100 ft. W. of the N. E. corner of Section 24, T41N, R11E. The ground surface elevation at the well is 660. The well was cased with 20-in. pipe from the surface to 20 ft. and with 12-in. pipe from the surface to 202 ft. (cemented in) and with 10-in. pipe from 202 to 302 ft. Below the 10-in. casing, the hole was finished 10 in. in diameter.

A production test was conducted on Mar. 25, 1958 by representatives of the Driller. After 6 hr. pumping at 144 gpm., the drawdown was 80 ft. from a static water level of 370 ft. below the top of the casing (1 ft. above L. S. D.).

A partial analysis of a sample (Lab. No. 150305) collected Aug. 11, 1959 showed the water in Well No. 1 to have a hardness of 18. 5 gr. per gal., total dissolved minerals of 526 ppm., and an iron content of 0. 3 ppm.

The pumping equipment includes a Reda submersible pump rated at 150 gpm. connected to a 30-hp. electric motor.

WELL NO. 2 was completed in May 1959 to a depth of 1601 ft. by L. Cliff Neely and located near Well No. 1, or approximately 1200 ft. S. and 110 ft. W. of the N. E. corner of Section 24. The hole and casing record is shown in Table A.

TABLE A

Hole Record

19-in.	from	500	to	690 ft.
15 1/4-in.	from	690	to	821 ft.
12-in.	from	925	to	1309 ft.
10-in.	from	1500	to	1652 ft.

Casing Record

26-in.	from	0	to	194 ft.	(cemented)
20-in.	from	0	to	500 ft.	
22-in. liner	from	182	to	500 ft.	
12-in. liner	from	821	to	925 ft.	
10-in. liner	from	1309	to	1500 ft.	

A production test was conducted by the Driller when the well was completed. After 4 hr. pumping at 680 gpm., the drawdown was 25 ft. from a static water level of 405 ft., below the pump base.

A mineral analysis of a sample (Lab. No. 152023) collected Apr. 8, 1960, after l/2 hr. pumping at 700 gpm., showed the water in Well No. 2 to have a hardness of 19.9 gr. per gal., total dissolved minerals of 537 ppm., and an iron content of 0. 2 ppm.

The pumping equipment consists of 500 ft. of 8-in. column pipe; Layne turbine pump, No. 7045, rated at 700 gpm.; 500 ft. of air line; 100-hp. Westinghouse electric motor.

Thereare 200 services, all metered, serving 100% of the population. Pumpage for the subdivision is estimated to average 30, 000 gpd. During Jan. through Mar. 1960, pumpage from the subdivision wells averaged 140, 000 gpd. because 110, 000 gpd. was purchased by DesPlaines.

LABORATORY NO. 152023

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	7.9	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	75.9	3.79	Boron	B	0.3	
Magnesium	Mg	36.4	2.99	Chloride	Cl	26.	.73
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	1.2	.02
Sodium	Na	66.	2.88	Sulfate	SO_4	172.2	3.58
				Alkalinity (as	$CaCO_3$)	268.	5.36
Turbidity		Tr.		Hardness (as	$CaCO_3$)	339.	6.78
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		56.0°F		Total Dissolved Minerals		537.	

WELDON SPRINGS
STATE PARK
DeWitt County
June 27, 1960

There are five wells and three springs serving the Weldon Springs State Park. The Park covers about 80 acres including the lake in the W. 1/2 of the N. E. 1/4 of Section 12, T19N, R2E.

The designation of the wells is in accordance with the Park Custodian's records.

WELL NO. 1 was completed about 1949 to a depth of 55 ft. by Woollen Bros., Wapella, and located in the picnic area south of the pavilion, or approximately 2600 ft. S. and 2200 ft. W. of the N. E. corner of Section 12, T19N, R2E. The ground surface elevation at the well is 705.

A mineral analysis of a sample (Lab. No. 152601) collected June 27, 1960 showed the water to have a hardness of 17. 5 gr. per gal., total dissolved minerals of 338 ppm., and an iron content of 2. 6 ppm.

WELL NO. 2 was completed to a depth of 135 ft. in 1939 by Woollen Bros. and located in the picnic area near the dam. No casing or pumping equipment records are available.

WELL NO. 3 was completed in 1957 to a depth of 67 ft. and serves the picnic area on the east side of the lake. No casing or pumping equipment records are available.

WELL NO. 4 (Custodian's house) was completed in 1950 to a depth of 73 ft. and located approximately 40 ft. northwest of the Park Custodian's house. The well reportedly serves only the Custodian's house and is not used by patrons of the Park. A Burks' shallow well pump, originally located in a well pit 45 ft. east of the well, has been installed in the furnace room which is above ground level.

WELL NO. 5 was completed in 1959 to a depth of 60 ft. by G. C. Mashburn and Sons, Maroa, and located in the S. W. 1/4 of the S. W. N. E. 1/4 of Section 12. The ground surface elevation at the well is 705. The well was cased with 4-in. pipe from the surface to 57 ft. followed by a 3 ft. length of 4-in. red brass screen havingNo. 16 slot openings, and exposed to coarse sand, according to the Driller's report.

The Driller reported that after pumping 1 hr. at a rate of 12 gpm., the drawdown was 6 ft. from a static water level of 36 ft. below the surface.

Summary sample study log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, yellow, pebbly at base	20	20
Sand, yellow, fine to medium, dirty	10	30
Till, brown, silty	10	40
Till, partly pink	15	55
Gravel, granule; sand, coarse, clean	5	60

SPRING NO. 1 serves the shelter house. The lower portion was constructed as a reinforced concrete box about 4 l/2 ft. square and 8 to 10 ft. deep. In 1954 it was reported that this spring was to be abandoned.

SPRING NO. 2 (Old Faithful) was constructed as a reinforced concrete box 6 ft. below the surface. In 1954 it was recommended that this spring be reconstructed.

SPRING NO. 3 (Twin Springs) was constructed as a cemented rock box about 9 ft. below the surface.

Pumpage at the Park is estimated to average 1000 gpd. over a 120-day period per year.

2 - Weldon Springs State Park

LABORATORY NO. 152601

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	2.6		Silica	SiO_2	13.5	
Manganese	Mn	0.2		Fluoride	F	0.2	
Calcium	Ca	68.5	3.43	Boron	B	0.0	
Magnesium	Mg	31.0	2.55	Chloride	Cl	2.	.06
Ammonium	NH_4	0.2	.01	Nitrate	NO_3	4.7	.08
Sodium	Na	6.	.24	Sulfate	SO_4	21.8	.45
				Alkalinity (as	$CaCO_3$)	284.	5.68
Turbidity		28		Hardness (as	$CaCO_3$)	299.	5.98
Color		0					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		338.	

WEST CHICAGO
DuPage County
August 5, 1960

Three wells are in service for the city of West Chicago (6854).

WELL NO. 1, described in Bulletin 40, is now equipped with 180 ft. of 5-in. column pipe; 8-in., 9-stage Aurora turbine pump, No. 67073, rated at 450 gpm. at 130 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 25-hp. U S electric motor.

The nonpumping water level was reportedly 91 ft. below the pump base on Apr. 24, 1958.

WELL NO. 2, described in Bulletin 40, was treated on Oct. 16, 1952 with 2750 gal. of 15% HC1. All three wells were shut down. Two hr. after placing the last acid in the well and before pumping was started, the static water level was 86 ft. After 4 hr. pumping at 430 gpm., the drawdown was 82 ft. The water was clear and turned into the system. There was little trace of the acid in Well No. 1.

Well No. 2 is now equipped with 180 ft. of 5-in. column pipe; 8-in., 9-stage Aurora turbine pump, No. 65186, rated at 450 gpm, at 130 ft. T.D.H.; 10 ft. of 5-in. suction pipe; 180 ft. of air line (defective); 25-hp. General Electric motor.

WELL NO. 3 was completed in 1950 to a depth of 310 ft. by Layne-Western Co., Aurora, and located about 1000 ft. northwest of Wells No. 1 and 2, or approximately 1000 ft. N. and 1000 ft. W. of the S. E. corner of Section 4, T39N, R9E. The elevation of the top of the well is 762.

The well was cased with 28-in. od. pipe from the surface to 83 ft. and with 24-in. od. pipe from the surface to 86 ft., below which the hole was finished 24 in. in diameter to the bottom at 310 ft. The annulus between the casings was cemented by the gravity method. A production test was conducted on Jan. 24-25, 1950 by representatives of the Driller, City officials, Wells Engineering Co., Consulting Engineers, and the State Water Survey. For test purposes a 4-stage Layne turbine pump, 5 ft. in length, was set on 180 ft. of 6-in. column pipe and powered by a 150-hp. gasoline engine directly connected to a Johnston right angle gear drive.

After 22 hr. pumping at a rate of 510 gpm., the drawdown was 40. 5 ft. from a static water level of 72. 5 ft. below the top of the air line (2 ft. above the top of the casing).

On Aug. 19, 1953 the well capacity had receded from 750 to 375 gpm. with a drawdown of 112 ft. from a nonpumping water level of 88 ft. The well was then' acidized with 3000 gal. of HC1. On Aug. 29, 1953, after 8 hr. pumping at a rate of 800 gpm., the drawdown was 80 ft. from a static level of 88 ft. below the surface.

Well No. 3 is equipped with 250 ft. of 6-in. column pipe; 9-stage Aurora turbine pump, No. 50633, rated at 750 gpm. at 250 ft. T.D.H.; 250 ft. of air line; 60-hp. U S electric motor.

On Apr. 24, 1958, after 12 hr. pumping at a rate of 395 gpm., the drawdown was 90 ft. from a nonpumping water level of 160 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 146374) collected Apr. 24, 1958 showed the water in Well No. 3 to have a hardness of 22. 6 gr. per gal., total dissolved minerals of 425 ppm., and an iron content of 0. 3 ppm.

WELL NO. 4 was completed in Mar. 1960 to a depth of 1465 ft. by Wehling Well Works, Beecher, and located about 1 1/4 miles southeast of Well No. 3, or approximately 100 ft. S. and 1000 ft. E. of the N. W. corner of Section 15, T39N, R9E. The land surface elevation at the well is 745. 7. The well was cased with 26-in. pipe from the surface to 109 ft. 4 in. and with 20-in. pipe from the surface to 672 ft. (cemented in). A 24-in. liner was set from 541 to 585 ft. and a 14-in. liner was set from 962 to 1067 ft., below which the hole was finished 13 1/4 in. in diameter to the bottom.

The pumping equipment consists of 650 ft. of 8-in. column pipe; 12-in., 11-stage Byron Jackson submersible pump, No. 363204, rated at 1000 gpm. at 640 ft. T.D.H.; 650 ft. of air line; 250-hp. electric motor.

On Aug. 4, 1960 water was pumped for 3 hr. at a rate of 530 gpm. with a drawdown of 38 ft. from a nonpumping water level of 400 ft. below the top of flange (1.1 ft. above land surface).

There are 1755 services, all metered, and 100% of the population served. Pumpage for the city supply is reported (1958) to average 590,000 gpd.

Summary sample study log of WELL NO. 4 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, black, clayey	5	5
Till, yellow buff, brown, clayey, sandy	5	10
Clay, buff to yellow buff, pebbly	5	15
Sand, clayey, very fine to medium	5	20
Till, gray, buff to brown, very pebbly	75	95
Gravel, clayey	5	100
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, buff, gray to white, very fine to fine, lower 15 feet slightly argillaceous, red speckled	75	175
Alexandrian Series		
Dolomite, silty, gray, white and buff, very fine to medium, lower 40 feet cherty	100	275
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, very silty, white to grayish buff; little shale	20	295
Shale, slightly dolomitic, buff to gray, weak, pyritic	80	375
Galena Formation		
Dolomite, slightly silty, grayish white to buff, fine to medium, little porous at base; little shale at base	125	500
Decorah Formation		
Dolomite, white, buff to brown, medium to coarse, slightly porous, little black and red speckled, few shale partings	40	540
Platteville Formation		
Dolomite, calcareous, white, buff to grayish white, fine to coarse, porous to compact, shaly partings; limestone, dolomitic, fine to medium, shaly partings	145	685
Glenwood Formation		
Sandstone, slightly calcareous, silty, very fine to coarse, incoherent	40	725
St. Peter Formation		
Sandstone, slightly silty, white, fine to medium, little coarse, incoherent; dolomite, shale and shale in lower 95 feet	360	1085
CAMBRIAN SYSTEM		
Trempealeau Formation		
Dolomite, calcareous, buff to pinkish buff, little white, fine to medium, little shale and siltstone	70	1155
Franconia Formation		
Sandstone, silty, glauconitic, white to greenish white, fine to coarse, incoherent; shale, sandy, greenish gray to buff, tough to brittle	65	1220
Ironton-Galesville Formations		
Sandstone, little slightly dolomitic, slightly silty, fine to medium, little coarse, incoherent; dolomite sandy, silty, buff, white, brown, fine to medium	205	1425
Eau Claire Formation		
Shale, slightly sandy, slightly glauconitic, green, buff to gray, weak to tough	40	1465

LABORATORY NO. 146374

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.3		Fluoride	F	0.6	
				Boron	B	0.2	
				Chloride	Cl	6.	.17
				Alkalinity (as	$CaCO_3$)	300.	6.00
Turbidity		0		Hardness (as	$CaCO_3$)	388.	7.76
Color		0					
Odor		0					
Temp. (reported)		51.3°F		Total Dissolved Minerals		425.	

The public water supply for the village of Western Springs (10, 838) is described in Bulletin 40 and includes Wells No. 1 and 2.

Since publication of Bulletin 40, new pumping equipment has been installed in WELL NO. 1 consisting of 160 ft. of 8-in. column pipe; 12-in., 6-stage Layne turbine pump, No. 6137, rated at 500 gpm. at 135 ft. T.D.H.; 20 ft. of 6-in. suction pipe; 40-hp. General Electric motor. An air line was installed but is reported as defective.

WELL NO. 2 is now equipped with 160 ft. of 7-in. column pipe; 12-in., 6-stage Layne turbine pump, No. 26532, rated at 500 gpm. at 135 ft. T.D.H.; 10 ft. of 6-in. suction pipe;160 ft. of air line; 40-hp. General Electric motor.

On July 7, 1958, during pumping at 500 gpm., the drawdown was 27 ft. from a nonpumping water level of 91 ft.

WELL NO. 3 was completed in Feb. 1956 to a depth of 1600 ft. by J. P. Miller Artesian Well Co., Brookfield, and located at Wolf Road and Johnson Ave. about 200 ft. west of Well No. 2, or approximately 2200 ft. N. and 200 ft. E. of the S. W. corner of Section 5, T38N, R12E. The ground surface elevation at the well is 678.

The well was cased with 28-in. pipe from the surface to 59 ft. and with 20-in. pipe from the surface to 554 ft. The annulus outside the 20-in. casing was filled with cement. An 18-in. liner was set between 1103 and 1203 ft. and a 16-in. inner liner from 1096 to 1336 ft., below which the hole was finished at 15 in. in diameter. Ten shots (total 3237 lb.) of 100% nitrogel were exploded between 1528 and 1425 ft.

During the drilling operation water levels in the well were observed as shown in Table A.

A production test was conducted by the Driller on Feb. 10-11, 1956. For test purposes the pumping equipment consisted of 550 ft. of 8-in. column pipe; 9 l/16-in., 11-stage Peerless test turbine; 200-hp. Westinghouse electric motor. After 30 hr. pumping at a rate of 1000 gpm., the drawdown was 115 ft, from a static level of 440 ft. below the top of the casing.

TABLE A

Depth of Drilling ft.	Depth to Water ft.	
215	105	
666	400	
1275	410	
1382	410	
1504	412	
1600	410	(before shooting)
1600	439	(after shooting)

The permanent pumping equipment installed in Aug. 1956 consisted of 650 ft. of 8-in. column pipe; 16-in., 12-stage Layne turbine pump, No. 34112, rated at 900 gpm. at 856 ft. T.D.H.; 10 ft. of 8-in. suction pipe; 300-hp. U S electric motor.

On Aug. 1, 1956, after 7 hr. pumping at 1100 gpm., the drawdown was 127 ft. from a nonpumping water level of 465 ft., and on Aug. 9, 1956 the nonpumping water level was 462 ft. Both readings were by air line measurements.

On July 6, 1958 the well had been backfilled to 1256 ft. and the pump lowered to 760 ft. On Aug. 12, 1958, during pumping at 1000 gpm., the drawdown was 100 ft. from a nonpumping water level of 515 ft. A mineral analysis of a sample (Lab. No. 142088) collected Dec. 10, 1957, after 3 hr. pumping at a rate of 800 gpm., showed the water in Well No. 3 to have a hardness of 23.4 gr. per gal., total dissolved minerals of 664 ppm., and an iron content of 0. 2 ppm. The reported temperature of 54. 4°F indicated that the water might not be all Galesville water.

In May 1957 it was reported that Well No. 3 furnished most of the municipal water supply.

In 1956 pumpage for Western Springs averaged 827,000 gpd.

2 - Western Springs

LABORATORY NO. 142088

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.2		Silica	SiO_2	8.2	
Manganese	Mn	Tr.		Fluoride	F	0.7	
Calcium	Ca	97.6	4.88	Boron	B	0.4	
Magnesium	Mg	38.7	3.18	Chloride	Cl	30.	.85
Ammonium	NH_4	0.8	.04	Nitrate	NO_3	0.1	Tr.
Sodium	Na	74.	3.21	Sulfate	SO_4	213.7	4.45
				Alkalinity (as	$CaCO_3$)	296.	5.92
Turbidity		2		Hardness (as	$CaCO_3$)	403.	8.06
Color		0					
Odor		0					
Temp. (reported)		54.4°F		Total Dissolved Minerals		664.	

WESTFIELD
Clark County
April 30, 1959

Three wells are in service for the public water supply of the village of Westfield (636) and a new well needs pumping equipment installed.

WELL NO. 1, described in Bulletin 40, has been retired from service.

WELL NO. 2, described in Bulletin 40, has a low water level and is used intermittently.

In Aug. 1952 the east drilled well in the bottom of Well No. 2 was cleaned out by E. C. Baker and Sons, Sigel, to a depth of 70 ft. in an effort to improve the rate of flow into the dug portion of the well. Before the cleaning, the well had filled up to a depth of 49 ft. After cleaning, a production test proved that the improvement in flow was negligible.

WELL NO. 3, described in Bulletin 40, is in 24-hr, daily service.

A 6-in. Test Well No. 1-52 was drilled in Aug. 1952 to a depth of 82 ft. by E. C. Baker and Sons and located west of old Well No. 2. The yield was small and on request of the Driller, the test well was acidized on Sept. 8 and 10 under the supervision of the State Geological Survey. The acidizing, reportedly, caused an enlargement of the hole in the bottom producing formation but no increase in yield. This indicated that the capacity of the artesian system was limited and neither shooting, acidizing, or any other well treatment would likely increase it.

Apparently the well, even though low in yield, was accepted by the village and reconstructed as Well No. 4.

WELL NO. 4 was completed in Oct. 1952 to a depth of 82 ft. by E. C. Baker and Sons and locatedat the site of Test Well No. 1-52 about 300 ft. west of Well No. 2, or approximately 2180 ft. S. and 300 ft. W. of the N. E. corner of Section 30, TUN, R14W. The ground surface elevation at the well is 700. The well was cased with 6 5/8-in. od. pipe from approximately 5 l/2 ft. above the ground surface to a depth of 52 ft. A 24-in. steel pipe was set around the casing extending from 7 ft. above the ground surface to several feet below the ground surface. A 6-in. envelope of concrete was placed around the steel pipe housing from 6 ft. above the ground surface to a point 10 ft. below the ground surface. Because the well site was subject to high waters from a creek (40 ft. to the south of the well) an earth berm was constructed around the well.

The pumping equipment includes a Red Jacket submersible pump, rated at 20 gpm. against 120 ft. T.D.H. Power is furnished by a 1-hp. electric motor.

In Dec. 1953 it was reported to have been pumped at a rate of 8 gpm. almost continuously for 24 hr. daily.

WELL NO. 5 was completed in Nov. 1957 to a depth of 50 ft. by J. P. Miller Artesian Well Co., Brookfield, and located about 1 mile northeast of Well No. 4, or approximately 2340 ft. N. and 700 ft. E. of the S. W. corner of Section 20. The ground surface elevation at the well is 695. The well was cased with 10-in. pipe to 40 ft. followed by 10 ft. of 10-in. screen.

Sample study summary log of WELL NO. 5 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, sandy, silty, dark brown, noncalcareous	5	5
Gravel, light gray, fine to medium, clean; sand, coarse, light gray, slightly calcareous, clean	5	10
Gravel, silty, light gray to greenish gray, granular very dirty, calcareous	5	15
Sand, silty, brownish buff, fine to coarse, poorly sorted, very dirty, calcareous	15	30
Sand, silty, very fine to medium, well sorted, dirty, calcareous	13	43
Gravel, light gray to brown, fine clean, calcareous	4	47
Sand, silty, buff, very fine, dirty, calcareous	8	55

A production test was conducted on Nov. 27, 1957 by representatives of the Driller, the

State Water Survey, and the Consulting Engineer, G. E. DeJong. For test purposes a 12-stage Peerless test turbine pump was powered by a 4-cylinder Red Seal gas engine. After 24 hr. pumping at rates gradually decelerated from 100 to 50 gpm., the drawdown was 33 ft. from a static water level of 3 ft. below the top of the casing (3 ft. above ground level).

A partial chemical analysis of a sample (Lab. No. 145154) collected Nov. 27, 1957, after 8 hr. pumping at a rate of 809 gpm., showed the water in Well No. 5 to have a hardness of 26.1 gr. per gal., total dissolved minerals of 451 ppm., an iron content of 4.7 ppm., and a turbidity of 69 ppm.

The pumping equipment had not been installed as of this report.

Pumpage for the village in July 1958 averaged 18, 000 gpd.

LABORATORY NO. 145154

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	4.7		Fluoride	F	0.4	
				Chloride	Cl	5.	.14
				Nitrate	NO_3	2.3	.37
				Alkalinity (as	$CaCO_3$)	446.	8.92
Turbidity		69		Hardness (as	$CaCO_3$)	404.	8.08
Color		5					
Odor		0					
Temp. (reported)		55°F		Total Dissolved Minerals		451.	

Three wells are in service for the public water supply of the village of Westmont (5997).

WELL NO. 1, described in Bulletin 40, has been abandoned.

WELL NO. 2 is described in Bulletin 40. In Aug. 1957 the 118-ft. air line was reported to be defective. In May 1959 the nonpumping water level was reported to be 152 ft. and the drawdown was 4 ft.

WELL NO. 3, described in Bulletin 40, was equipped in May 1957 with 180 ft. of 5-in. column pipe; 8-in., 9-stage Layne turbine pump (No. 36892), 6 ft. 2 in. long; 10 ft. of 6-in. suction pipe; 180 ft. of air line; 25-hp. U S electric motor.

In May 1959 the nonpumping water level was reportedly 133 ft. and the drawdown was 13 ft.

WELL NO. 4 was completed in Jan. 1958 to a depth of 313 ft. by Layne-Western Co., Aurora, and located about 1/2 mile north of Well No. 3, or approximately 2425 ft. S. and 465 ft. E. of the N. W. corner of Section 10, T38N, R11E. The elevation of the ground surface at the well is 757.

The well was cased with 12-in. steel pipe with welded joints from 2 ft. above the surface to 151 ft. The hole was finished 12 in. in diameter from the bottom of the casing to the bottom of the hole at 313 ft. The top 15 ft. of the casing was cemented in. Upon completion of the well, the Driller reported that, after 11 hr. pumping at a rate of 259 gpm., the drawdown was 27 ft. from a static water level of 128 ft.

The permanent pumping equipment includes a Layne turbine pump, rated at 270 gpm. with power from a 20-hp. electric motor.

A mineral analysis of a sample (Lab. No. 145601) collected Jan. 25, 1958 showed the water in Well No. 4 to have a hardness of 26. 2 gr. per gal., total dissolved minerals of 628 ppm., an iron content of 29 ppm., and a turbidity of 2500 ppm.

Pumpage for 1957 averaged 320, 000 gpd.

LABORATORY NO. 145601

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	29.		Silica	SiO_2	20.8	
Manganese	Mn	0.7		Fluoride	F	0.4	
Calcium	Ca	129.0	6.45	Boron	B	0.3	
Magnesium	Mg	30.4	2.50	Chloride	Cl	3.	.08
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	2.8	.05
Sodium	Na	47.	2.04	Sulfate	SO_4	177.1	3.69
				Alkalinity (as	$CaCO_3$)	360.	7.20
Turbidity		2500		Hardness (as	$CaCO_3$)	448.	8.95
Color		0					
Odor		0		Total Dissolved Minerals		628.	

Four wells are in service for the public water supply of the city of Wheaton (24,312). When Old Well No. 1 was abandoned, new numbering was given to the wells.

OLD WELL NO. 1, described in Bulletin 40 as abandoned, has been filled and capped. All sign of the well has been obliterated.

WELL NO. 1 was described in Bulletin 40 as Well No. 2. In Apr. 1958 the nonpumping water level was 47 ft. and the drawdown, during pumping, was 50 ft.

WELL NO. 2 was described in Bulletin 40 as Well No. 3. In Apr. 1958 the nonpumping water level was 54 ft. and the drawdown was 20 ft.

WELL NO. 3 was described in Bulletin 40 as Well No. 4. In Apr. 1958 the nonpumping water level was 55 ft. and the drawdown was 42 ft.

WELL NO. 4 was completed in 1954 to a depth of 341 ft. by Layne-Western Co., Aurora, and located about 1/4 mile north and l/2 mile east of Well No. 3, near the corner of Country Side Drive and Irving Park Road, or approximately 1775 ft. S. and 1150 ft. W. of the N. E. corner of Section 9, T39N, R10E. The elevation of the ground surface at the well is 750. The well was cased with 20-in. pipe from the surface to 105 ft., below which the hole was finished 19 in. in diameter to the bottom at 341 ft. A production test was conducted on Oct. 27-28, 1954 by representatives of the Driller and the State Water Survey. After 15 hr. pumping at a rate of 799 gpm., the drawdown was 53 ft. from a nonpumping water level of 45 ft. (air line readings). Three and one-half hr. after pumping was stopped, the water level had recovered to 51 ft.

The permanent pumping equipment consists of 220 ft. of 8-in. column pipe; 12-in., 6-stage Layne turbine pump, No. 34613, rated at 700 gpm. at 384 ft. T.D.H.; 10 ft. of 8-in. suction pipe; 220 ft. of air line; 100-hp. Westinghouse electric motor.

Analysis of a sample (Lab. No. 150615) collected Sept. 16, 1959 showed the water in Well No. 4 to have a hardness of 25.6 gr. per gal., total dissolved minerals of 528 ppm., and an iron content of 1.1 ppm.

Nonpumping water levels for the Wheaton wells are shown in Table A.

Pumpage for the city wells in July, Aug. Sept., and Oct. of 1957 averaged 1. 77 mgd.

TABLE A

Nonpumping Water Levels

	WELL NO. 1		WELL NO. 2		WELL NO. 3		WELL NO. 4		
Year	Ft. to Water	M. S. L.	Ft. to Water	M. S. L.	Ft. to Water	M. S. L.	Ft. to Water	M. S. L.	Remarks
1917*	26*	717*							
1930			32	707					
1946	47	702	37	702	44	701			All off
1947	52	697							No. 2 on
1954					46	699	45	705	
							50	700	
1956	66	683	53	686	54	691			
			59	680					
	74	675			56	689			
1957	33	716**	46	693	50	695			
	37	712**							
	53	696			58	687			
	83	666							

* Old Well No. 1 (abandoned 1930)
** No. 2 on

LABORATORY NO. 150615

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.1		Silica	SiO_2	13.5	
Manganese	Mn	0.1		Fluoride	F	0.2	
Calcium	Ca	102.9	5.15	Boron	B	0.1	
Magnesium	Mg	43.7	3.59	Chloride	Cl	14.	.39
Ammonium	NH_4	0.0	.00	Nitrate	NO_3	0.6	.01
Sodium	Na	20.	.85	Sulfate	SO_4	164.8	3.43
				Alkalinity (as	$CaCO_3$)	288.	5.76
Turbidity		5		Hardness (as	$CaCO_3$)	437.	8.74
Color		0					
Odor		0					
Temp. (reported)		51.6°F		Total Dissolved Minerals		528.	

Water for the Wheaton Farms (unincorporated-est. 350) community is obtained from one well.

WELL NO. 1, described in Bulletin 40, is now equipped with a Byron Jackson turbine pump, set at 110 ft. and rated at 50 gpm. against 160 ft. T.D.H. The power for pumping is furnished by a 5-hp. U S electric motor.

Since a 2-ft. section of casing has been welded on the top of the old one, the casing now extends 2 ft. above the floor of the 7 ft. by 7 ft. concrete pit, which is 5 ft. deep.

On Oct. 30, 1956 the nonpumping water level was reportedly 75 ft., and the drawdown during pumping was 15 ft.

There were 96 services in 1957, all metered, and all but two homes were served.

Pumpage for 1958 averaged 11, 367 gpd.

WHEELING
Cook County
December 22, 1958

Since publication of Bulletin 40, two additional wells have been constructed for the village of Wheeling (7169). Water for the village is obtained from three wells.

WELL NO. 1, described in Bulletin 40 as located in Section 12, T42N, R12E, is actually at R11E. The pumping equipment in Well No. 1 now consists of 80 ft. of 5-in. column pipe; 8-in., 9-stage Aurora turbine pump, No. 30159, rated at 200 gpm. at 200 ft. T.D.H.; 20 ft. of 5-in. suction pipe; 15-hp. U S electric motor; 80 ft. of air line.

Well No. 1 is in daily service. On Oct. 14, 1958 the nonpumping water level was 43.2 ft. Water from Well No. 1 is pumped directly into the mains.

WELL NO. 2 was completed in 1955 to a depth of 245 ft. by J. P. Miller Artesian Well Co., Brookfield, and located in Dunhurst Heights Subdivision at the intersection of S. Wayne and E. Wayne St., about 1 1/4 miles southwest of Wheeling Well No. 1, or approximately 2300 ft. S. and 400 ft. W. of the N. E. corner of Section 10, T42N, R11E. This well was originally owned by Herzog Construction Co. for the Dunhurst Heights Subdivision but was subsequently taken over by the village and designated Village Well No. 2. The elevation of the ground surface at the well is 646. The well was cased with 16-in. pipe to a depth of 104 ft., below which the hole was finished 16 in. in diameter to the bottom.

Correlated driller's log of Wheeling WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	104	104
SILURIAN SYSTEM		
White limestone	21	125
Gray limestone	43	168
Brown limestone	52	220
Break (shelly) to 245 feet dark cherty limestone	5	225

A production test was conducted on July 14, 1955 by representatives of the Drilling Contractor and the State Water Survey. A Peerless turbine pump was used for test purposes. After 12 hr. pumping at a rate of 135 gpm., the drawdown was 130 ft. from a nonpumping water level of 20 ft. below the top of the casing.

A partial analysis of a sample (Lab. No. 138149) collected on July 14, 1955, after 12 hr. pumping, showed the water to have a hardness of 9 ppm., total dissolved minerals of 356 ppm., and an iron content of 0. 3 ppm.

A few days later the well was acidized with 4000 gal. after which a second production test was conducted on July 23 by the Driller. After 7 1/2 hr. pumping at a rate of 174 gpm., the drawdown was 110 ft. from a nonpumping water level of 40 ft. The pumping test equipment consisted of 155 ft. of 6-in. column pipe; 10-in., 5-stage Peerless turbine test pump driven from a Buda engine; 155 ft. of air line.

A partial analysis of a sample (Lab. No. 138282) collected July 27, 1955 showed the water in Well No. 2 to have a hardness of 71.1 gr. per gal., total dissolved minerals of 2280 ppm., and an iron content of 19 ppm.

When the sample (Lab. No. 138282) was collected on July 27, the pump had been operated for 4 hr. at a rate of 145 gpm. The drawdown was 78 ft. from a nonpumping water level of 50 ft. below the top of the casing.

Subsequently, the permanent pump assembly was installed as follows: 200 ft. of 5-in. column pipe; 8-in., 8-stage Peerless turbine pump, No. 115361, rated at 170 gpm. against 175 ft. T.D.H.; 20 ft. of 5-i line; 15-hp. U S electric motor.

A partial analysis of a sample (Lab. No. 148229) collected Nov. 17, 1958 showed the water in Well No. 2 to have a hardness of 18. 2 gr. per gal., total dissolved minerals of 538 ppm., and an iron content of 0. 3 ppm.

Well No. 2 supplies the western part of Wheeling, about 60% of the population. Water from Well No. 2 is pumped into a 300, 000-gal. impounding reservoir.

WELL NO. 3 was completed in June 1956 to a depth of 1370 ft. by J. P. Miller Artesian Well Co. and located at the corner of Sunset and Manchester in Meadowbrook Subdivision, about 3/8 mile east of Well No. 2, or approximately 2400 ft. S. and 1700 ft. E. of the N. W. corner

of Section 11. The elevation of the ground surface at the well is 645. The hole and casing record is shown in Table A.

TABLE- A

Hole Record

19 1/4-in. from 0 to 489 ft.
15 l/4-in. from 489 to 1178 ft.
12-in. from 1178 to 1355 ft.

Casing Record

20-in. from 0 to 88 ft.
16-in. from 0 to 489 ft.
The annulus outside the 16-in. casing was cemented in.
Three charges of 30 lb. each were exploded as follows:
No. 1 between 1302 and 1315 ft.
No. 2 between 1279 and 1292 ft.
No. 3 between 1261 and 1274 ft.

A production test was conducted on June 29, 1956 by representatives of the Drilling Contractor and the State Water Survey. The pumping test equipment included a 14-in., 7-stage Peerless turbine pump driven by a 200-hp. Westinghouse motor. A 450-ft. air line was installed for measuring water levels.

During the test, water levels were measured by air line and gage in a well 1000 ft. distant from Well No. 3. After 22 1/2 hr. pumping at a rate of 1033 gpm., the drawdown was 133 ft. from a nonpumping water level of 252 ft. below the top of the casing.

During the 22 l/2 hr. pumping in Well No. 3, the water level in the observation well lowered from 261 to 275 ft.

The permanent pumping equipment consists of 500 ft. of 8-in. column pipe; 12-in., 10-stage Peerless turbine pump, No. 118105, rated at 770 gpm. at 500 ft. T.D.H.; 20 ft. of 8-in. suction pipe; 500 ft. of air line; 150-hp. U S electric motor.

A partial analysis of a sample (Lab. No. 146531) collected May 5, 1958, after 20 min. pumping, showed the water in Well No. 3 to have a hardness of 17. 5 gr. per gal., total dissolved minerals of 390 ppm., and an iron content of 0. 3 ppm.

The static water level was 354 ft. on Oct. 14, 1958.

Water from Well No. 3 has not been used for the public supply since the well was put into operation. The pressure is too high to pump directly into the mains. Pumpage from Well No. 3 must be discharged into storage which will probably not be available for at least a year.

Well No. 3 is intended to supply about 40% of the population.

For the first 15 days of June 1958, pumpage from Well No. 2 averaged 203, 000 gpd. and pumpage from Well No. 1 averaged 171, 000 gpd. Total pumpage for the village averaged 374,000 gpd.

LABORATORY NO. 148229

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 3		Fluoride	F	0. 5	
				Boron	B	0. 6	
				Chloride	Cl	10.	. 28
				Alkalinity (as	$CaCO_3$)	212.	4. 24
Turbidity		2		Hardness (as	$CaCO_3$)	312.	6. 24
Color		0					
Odor		0					
Temp. (reported)		50. 9°F		Total Dissolved Minerals		538.	

Sample study summary log of WELL NO. 3 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Drift"	88	88
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, silty, white to gray, little orange at base, very fine, crystalline	97	185
Alexandrian Series		
Kankakee Formation		
Dolomite, slightly silty, white to buff, very fine, crystalline (no sample 230-240)	65	250
Edgewood Formation		
Dolomite, very silty, gray to buff, very fine, crystalline	25	275
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Formation		
Dolomite, very silty, slightly sandy, gray to greenish gray, very fine, crystalline; little shale, dolomitic, greenish gray, weak	85	360
Shale, dolomitic, slightly sandy, greenish gray, brittle to weak; little dolomite, silty, gray, very fine, crystalline	80	440
Mohawkian Series		
Galena Formation		
Dolomite, silty, buff, very fine to medium, crystalline	165	605
Decorah Formation		
Dolomite, silty, buff, little gray, fine to medium, crystalline, slightly porous	30	635
Platteville Formation		
Dolomite, silty, buff to gray, mottled, very fine to fine, crystalline, sandy at base	122	757
Glenwood Formation		
Sandstone, silty, slightly dolomitic, white, fine to coarse, rounded to subrounded, slightly frosted, incoherent to friable	48	805
Chazy Series		
St. Peter Sandstone		
Sandstone, silty, white, fine to medium, rounded to sub-rounded, frosted, incoherent	270	1075
Sandstone, silty, very cherty, very fine to coarse, rounded, frosted, incoherent	26	1101
CAMBRIAN SYSTEM		
St. Croixan Series		
Franconia Formation		
Sandstone, very silty, very cherty, glauconitic, dolomitic, buff, red and green, little white, very fine to medium, rounded to subangular, incoherent to compact; little shale and dolomite	54	1155
Ironton-Galesville Sandstones		
Sandstone, silty, dolomitic to slightly dolomitic, white, medium to very coarse, little fine to very fine, slightly frosted, incoherent to compact; little dolomite, glauconitic in upper 70 feet	147	1302
Eau Claire Formation		
Shale, micaceous, greenish gray, brittle to weak; little dolomite and sandstone	68	1370

WILDWOOD SUBDIVISION
Lake County
April 20, 1959

Water for the public supply of Wildwood Subdivision (est. 1800) on Gages Lake is obtained from three wells. The subdivision lies north and east of the intersection of Routes 20 and 45. The system is operated by the John Rule Lake County Water Co.

Prior to 1950, Henry Boysen, Libertyville, drilled about 12 wells in this area. Seven of the wells were finished in sand and gravel and produced at least 150 gpm. Wells No. 1 and 3 were drilled as a result.

WELL NO. 1 was completed to a depth of 145 ft. in Apr. 1950 by Henry Boysen and located approximately 470 ft. S. and 700 ft. E. of the N. W. corner of Section 31, T45N, RUE. The ground surface elevation at the well is 814. The well was cased with 6-in. pipe to 134 ft. followed by 11 ft. of 6-in. Cook red brass screen.

The pumping equipment consists of 110 ft. of 3 l/2-in. column pipe; 5 5/8-in., 18-stage Cook turbine pump, No. 11845, rated at 50 gpm.; 10 ft. of 3 l/2-in. suction pipe; 110 ft. of air line; 5-hp. U S electric motor.

In Mar. 1952 the well reportedly supplied about 30 gpm.

WELL NO. 2 was completed to a depth of 1311 ft. in July 1951 (deepened in 1952 to 1570 ft. and in 1959 to 1845 ft.) by Henry Boysen and located about 1/4 mile north of Well No. 1, or approximately 600 ft. N. and 75 ft. E. of the S. W. corner of Section 29. The ground surface elevation at the well is 790. The well was cased with 14-in. pipe from the surface to 183 ft. and with 10-in. pipe from the surface to 583 ft., below which the hole was finished 10 in. in diameter to the bottom. The 10-in. casing was cemented in.

In July 1951 a production test was conducted by the Driller, using a vertical turbine pump set at 320 ft. After 2 hr. pumping at a rate of 141 gpm., the drawdown was 105 ft. from a static water level of 216 ft. below the surface. In July 1953 the nonpumping water level was 240 ft. below the surface.

The pumping equipment, installed in July 1951, consists of a Pomona turbine pump, No. SR1112, rated at 300 gpm. and connected to a 40-hp. Westinghouse electric motor.

A mineral analysis of a sample (Lab. No. 125913) collected July 18, 1951, after 2 hr. pumping at a rate of 141 gpm., showed the water in Well No. 2 to have a hardness of 16. 3 gr. per gal., total dissolved minerals of 360 ppm., and an iron content of 2 ppm.

After the well was deepened in May 1952 from 1311 ft. to 1570 ft., a production test was conductedbyHenryBoysen. After 6 1/2 hr. pumping at a rate of 297 gpm., the drawdown was 136 ft, from a nonpumping water level of 207 ft. below the surface.

The McCullough Tool Co. reportedly logged and shot the well in Jan. 1959 at four levels. Two hundred fifty shots were set off at two per ft. as follows: 1790-1760 ft.; 1734-1714 ft.; 1684-1674 ft.; 1480-1415 ft.

In Mar. 1959 the depth of the well was 1845 ft. and the nonpumping water level was reportedly 247 ft. below the surface. A partial chemical analysis of a sample (Lab. No. 149006) collected after 7 hr. pumping at a rate of 590 gpm., showed the water in Well No. 2 to have a hardness of 16. 3 gr. per gal., total dissolved minerals of 325 ppm., and an iron content of 0. 8 ppm.

WELL NO. 3 was completed to a depth of 173 ft. in 1952 by Henry Boysen and located near the south end of John Mogg Road West, about 1/2 mile east of Well No. 1, or approximately 600 ft. S. and 2326 ft. W. of the N. E. corner of Section 31. The ground surface elevation at the well is 827. The lower 30 ft. of the hole penetrated clean gravel. The well was cased with 6-in. pipe from the surface to 160 ft. followed by 13 ft. of 6-in. screen. The upper 6 1/2 ft. of the screen has No. 14 slot openings and the lower 6 1/2 ft. has No. 18 slot openings. On Mar. 1, 1952, during pumping at a rate of 162 gpm., the drawdown was 7 1/2 ft. from a static water level of 97 ft. below the surface.

The permanent pump assembly installed in Nov. 1952, consists of 150 ft. of 4-in. column pipe; 6-in., (?)-stage Cook turbine pump, No. C272377LAW; 150 ft. of air line; 20-hp. U S electric motor.

On Dec. 20, 1953 the Driller reported pumping at a rate of 201 gpm. with a drawdown of 6 ft. from a static water level of 108 ft. below the pump base.

A partial chemical analysis of a sample (Lab. No. 148237) collected Nov. 20, 1958 showed the water in Well No. 3 to have a hardness of 8. 9 gr. per gal., total dissolved minerals of 301 ppm., and an iron content of 0.1 ppm.

In 1955 there were 508 services, 250 of which were metered. Pumpage is estimated to average 120, 000 gpd.

LABORATORY NO. 148237

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 1		Fluoride	F	0. 9	
				Boron	B	0. 2	
				Chloride	Cl	5.	.14
				Nitrate	NO_3	1. 5	.02
				Alkalinity (as	$CaCO_3$)	128.	2. 56
Turbidity		1		Hardness (as	$CaCO_3$)	152.	3. 04
Color		0					
Odor		0					
Temp. (reported)		51. 7°F		Total Dissolved Minerals		301.	

LABORATORY NO. 149006

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0. 8		Fluoride	F	0. 5	
Manganese	Mn	0. 1		Chloride	Cl	7.	.20
				Nitrate	NO_3	0. 2	Tr.
				Alkalinity (as	$CaCO_3$)	264.	5. 28
Turbidity		6		Hardness (as	$CaCO_3$)	281.	5. 62
Color		0					
Odor		0		Total Dissolved Minerals		325.	

Summary sample study log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Till, silty, gray, light brown, gravelly near base	212	212
SILURIAN SYSTEM		
Dolomite, white, light brown, little pink, green, fine to medium; little shale	158	370
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Shale, reddish to greenish gray and light gray, weak; some dolomite, light to dark gray, fine to medium	205	575
Galena-Platteville Formations		
Dolomite, little sandy, yellowish brown to light gray, medium to coarse, little fine	290	865
Glenwood Formation		
Sandstone, silty, partly dolomitic, mostly fine to coarse, white; little dolomite, sandy, white to pale green, fine	60	925
St. Peter Formation		
Sandstone, little silty, mostly white, very fine to medium, some coarse; shale, red and green, weak, and chert at base	145	1070
CAMBRIAN SYSTEM		
Trempealeau Formation		
Shale, sandy, red, gray, green, weak; dolomite, gray, green, fine to medium; sandstone, glauconitic, dolomitic, reddish to yellowish brown, fine to medium	30	1100
Franconia Formation		
Shale, partly sandy, reddish, greenish, weak; sandstone, silty, glauconitic, very fine, fine to coarse, incoherent, reddish gray	60	1160
Ironton-Galesville Formations		
Sandstone, partly dolomitic, white to pink, very fine to medium, some coarse to very coarse, mostly incoherent	130	1290
Eau Claire Formation		
Shale, partly sandy, slightly glauconitic, slightly dolomitic, greenish gray to gray, little buff, weak	130	1420
Sandstone, silty, dolomitic, white to light buff, very fine to coarse, little sooty; little shale and dolomite	85	1505
Dolomite, sandy, very silty, buff to gray, very fine to fine, crystalline; little sandstone	65	1570
Sandstone, slightly dolomitic, slightly glauconitic, silty, gray to white, little sooty, fine to medium, little coarse to very coarse, incoherent to compact, rounded to subrounded, little subangular	230	1800
Mt. Simon Formation (?)		
Sandstone, silty, white to gray, medium to coarse, little very fine to fine, some very coarse and granules, rounded to subangular, little very sooty, little dolomite, glauconite; little shale, buff to gray, brittle, micaceous	45	1845 T. D.

WILLISVILLE
Perry County
March 3, 1958

Two wells are in service for the public supply of the village of Willisville (532).

WELL NO. 1 is described in Bulletin 40.

WELL NO. 2 was completed in 1955 to a depth of 555 ft. by L. W. Gwin Drilling Co., Percy, and located in the southwest part of town, approximately 1300 ft. S. and 100 ft. E. of the N. W. corner of Section 30, T6S, R4W. The ground surface elevation at the well is 500. The well was cased with 8-in. pipe to 278 ft. (cemented in), below which the hole was finished 8 in, in diameter. Sandstone was reportedly penetrated at 276 ft.

A production test was conducted on July 13, 1954 by representatives of the Driller and the State Water Survey. The air line was inoperable. However, the nonpumping water level was approximately 160 ft. and the pump performance curve showed a water level of 240 ft. during pumping at a rate of 90 ft.

The permanent pump is a Jacuzzi submersible set at 294 ft. and rated at 100 gpm. A 10-hp. electric motor is installed.

A mineral analysis of a sample (Lab. No. 145895) collected Mar. 3, 1958 showed the water in Well No. 2 to have a hardness of 12. 9 gr. per gal., total dissolved minerals of 313 ppm., and an iron content of 0. 4 ppm.

Reportedly, about 98% of the population is served through 220 services, all metered. Pumpage is estimated to average 35,000 gpd.

LABORATORY NO. 145895

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.4		Silica	SiO_2	11.0	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	59.4	2.97	Boron	B	0.1	
Magnesium	Mg	17.4	1.43	Chloride	Cl	19.	.54
Ammonium	NH_4	0.5	.03	Nitrate	NO_3	0.2	.00
Sodium	Na	40.	1.75	Sulfate	SO_4	7.6	.16
				Alkalinity (as	$CaCO_3$)	274.	5.48
Turbidity		Tr.		Hardness (as	$CaCO_3$)	220.	4.40
Color		0					
Odor		H_2S (at well)					
Temp. (reported)		62°F		Total Dissolved Minerals		313.	

WILLOWICK ESTATES
Cook County
September 9, 1960

A public water supply was installed in 1959 for Willowick Estates, a subdivision owned by Sherry Builders and located near Oak Forest. The subdivision, when completed, is to be a part of Oak Forest.

WELL NO. 1 was completed to a depth of 455 ft. in Aug. 1959 by Wehling Well Works, Beecher, and located 700 ft. N. and 1375 ft. E. of the S. W. corner of Section 22, T36N, R13E. The elevation of the ground surface at the well is 660. The well was cased with 16-in. od. pipe from the surface to 84 ft., below which the hole was finished 15 in. in diameter to the bottom. The top of the limestone was penetrated at 45 ft. depth below the surface.

A production test was conducted on July 27, 1959, after which the pump was removed and four applications of 55 gal. each of HC1 (total 220 gal.) were poured into the well through a 2-in. pipe, 100 ft. in length. After each application the well wall was "scratched" and the well was surged and baled. After the acid treatment a larger pump assembly and engine were installed on Aug. 14 consisting of 347 ft. of 6-in. column pipe; 12-in., 15-stage American Well Works turbine pump; 347 ft. of air line; 150-hp. LeRoi engine.

On Aug. 5, 1959, after 1 l/2 hr. pumping at a rate of 350 gpm., the drawdown was 113 ft. from a nonpumping water level of 32 ft.

A mineral analysis of a sample (Lab. No. 151277) collected from Well No. 1 showed the water to have a hardness of 29. 8 gr. per gal., total dissolved minerals of 669 ppm., and an iron content of 1. 4 ppm.

Pumpage for the subdivision is not known as no records are yet available. The number of services is not known.

LABORATORY NO. 151277

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.4		Silica	SiO_2	17.3	
Manganese	Mn	0.1		Fluoride	F	0.5	
Calcium	Ca	117.0	5.85	Boron	B	0.5	
Magnesium	Mg	52.8	4.35	Chloride	C1	2.	.06
Ammonium	NH_4	0.6	.03	Nitrate	NO_3	0.4	.01
Sodium	Na	37.	1.63	Sulfate	SO_4	224.6	4.67
				Alkalinity (as	$CaCO_3$)	356.	7.12
Turbidity		32		Hardness (as	$CaCO_3$)	510.	10.20
Color		0					
Odor		0		Total Dissolved Minerals		669.	

WINCHESTER
Scott County
January 28, 1957

Four wells are in service for the city of Winchester (1657).

WELL NO. 1, described in Bulletin 40, was abandoned in 1949.

WELLS NO. 2 and 3, described in Bulletin 40, are in service.

WELL NO. 4 was completed in Oct. 1949 to a depth of 47 ft. by Hayes and Sims, Champaign, and located at the site of Test Hole No. 1-49, about l/2 mile southwest of Well No. 3, or approximately 1320 ft. S. and 2000 ft. W. of the N. E. corner of Section 5, T13N, R12W. The elevation of the ground surface at the well is 463. 3. The well was cased with 16-in. pipe to 37 ft. 7 in. and with 8-in. id. pipe from 1 1/2 ft. above to 36 ft. 3 in. below the ground level, followed by an 8-in. Johnson Everdur screen, 11 ft. long, and with No. 60 slot openings. The annulus between the casings and between the screen and the wall of the hole was gravel packed.

A production test was conducted on Oct. 27, 1949 by representatives of the Driller, the State Water Survey, and Crawford, Murphy, and Tilly, Consulting Engineers. An air line, 29.5 ft. long, was installed from the top of the casing for measuring water levels. After 7 hr. pumping at 165 gpm., the drawdown was 18. 3 ft. from a static water level of 9. 5 ft. The pump was then operated for 30 min. at 225 gpm. when the water was drawn down to 29. 5 ft., the bottom of the air line. Forty-five min. after the pump was stopped, the water level had recovered to 12. 5 ft.

During the test, water levels were observed in two 2-in. test holes located (Test Hole No. 1) at 117.9 ft. south of the pumped well and (Test Hole No. 2) at 334. 8 ft. south of the pumped well.

When the test was concluded the water level in Test Hole No. 1 had lowered 9. 2 ft. from a static level of 6. 8 ft. below the top of the 2-in. casing (elev. 464).

In Test Hole No. 2 the water level had lowered 5.1 ft. from a static level of 9.6 ft. below the top of the 2-in. casing (elev. 466. 5).

After the well was accepted the top of the casing was extended above high water level in a nearby creek (elev. 472. 5). The well was equipped with 30 ft. of 4-in. column pipe; 5 5/8-in., 3-stage Aurora turbine pump (No. 46721), 6 ft. 2 1/4 in. long, rated at 125 gpm. at 122 ft. T.D.H.; 13 5/8-in. length of strainer; 35 ft. of air line; 7 1/2-hp. electric motor.

WELL NO. 5 was completed in Nov. 1949 to a depth of 50 ft. by Hayes and Sims and located about 270 ft. south of Well No. 4, or approximately 1590 ft. S. and 2000 ft. W. of the N. E. corner of Section 5. The well was cased with 16-in. od. pipe from the surface to 41 ft. 5 in. and an 8-in. id. pipe was set from 1 ft. above to 39 ft. 10 in. below ground level, followed by a 10 ft. length of Johnson Everdur screen having No. 60 slot openings. The annulus between the casings and between the screen and the wall of the hole was packed with select gravel.

A production test was conducted on Nov. 9, 1949 by representatives of the Driller, the State Water Survey, and the Consulting Engineers. After 8 hr. pumping at 100 gpm., the drawdown was 25 ft. from a nonpumping water level of 9. 3 ft. (An air line was installed at a length of 37 ft. below the top of the casing.) Two and one-half hr. after pumping was stopped, the water level in Well No. 4 had returned to 11 ft.

Water levels were observed, during the test, in the same two test holes as used in the test of Well No. 4. Test Hole No. 1 was 152.1 ft. north of the pumped well (No. 4) and Test Hole No. 2 was 64. 8 ft. north of the pumped well. When pumping in Well No. 5 was stopped, the water level in Test Hole No. 1 had lowered to 11. 5 ft. from a static level of 6. 6 ft. below the top of the 2-in. casing (elev. 464). Two and one-half hr. later the water level had returned to 8 ft.

When pumping in Well No. 5 was stopped, the water level in Test Hole No. 2 had lowered to 15. 6 ft. from a static level of 9. 7 ft. below the top of the 2-in. casing (elev. 466. 5). Two and one-half hr. later the water level had raised to 11 ft.

Well No. 5 is equipped with 40 ft. of 4-in. column pipe; 5 5/8-in., 8-stage Aurora turbine pump (No. 46722), 4 ft. 1 l/4 in. long, and rated at 90 gpm. at 100 ft. T.D.H.; 13 5/8 in. of strainer; 40 ft. of air line; 5-hp. electric motor.

After the well was accepted the casing was extended upwards, similar to Well No. 4, and the top of the air line at the top of the casing was at elevation 472. 5.

Pumpage in Jan. 1957 was reported to average 95,000 gpd.

WINDSOR
Shelby County
January 13, 1958

Four wells are in service for the city of Windsor (1021).

WELL NO. 1 was described in Bulletin 40 as being drilled in 1934 to a depth of 100 ft. 10 in. at the site of Test Well No. 6. The well was out of service for several years, but was returned to service in 1957 after being equipped with a new Jacuzzi turbine pump, rated at 60 gpm.

WELL NO. 2 was completed in Feb. 1949 to a depth of 131 ft. 5 in. by Hayes and Sims, Champaign, and located 10 ft. south of Test Well No. 11, described in Bulletin 40. Well No. 2 is located in town near the corner of Virginia and Pine St., or approximately 1550 ft. N. and 2325 ft. E. of the S. W. corner of Section 36, T12N, R6E. The ground surface elevation at the well is 708. The well was cased with 12-in. id. pipe from 2 ft. above to 119 ft. 9 1/2 in. followed by 10 ft. 11 in. of 11 l/4-in. od. Johnson Everdur screen having No. 25 slot openings.

A production test was conducted on Feb. 22, 1949 by representatives of the Driller, the State Water Survey, and Wilson and Anderson, Consulting Engineers. After 7 hr. pumping at 33. 5 gpm., the drawdown was 87 ft. from a nonpumping water level of 30. 6 ft. below the top of the casing. One hr. after the pump was stopped, the water level had recovered to 54. 5 ft.

The pump presently installed in Well No. 2 is a Jacuzzi turbine with a capacity of 18-20 gpm.

WELL NO. 3 was completed in 1951 to a depth of 99 ft. 9 in. by E. C. Baker and Sons, Sigel, and located about 30 ft. west of Well No. 1, or approximately 75 ft. S. and 1285 ft. E. of the N. W. corner of Section 12, T11N, R5E. The ground surface elevation at the well is 720. The well was cased with 7 l/2-in. od. pipe from 2 ft. above to 93 ft. 5 in. below the surface followed by 6 ft. 2 in. of slotted pipe screen (l/8-in. slots).

The permanent pump is a Red Jacket submersible rated at 40 gpm. against 180 ft. T.D.H., with power from a 3-hp. electric motor.

A mineral analysis of a sample (Lab. No. 145470) collected Jan. 10, 1958 showed the water in Well No. 3 to have a hardness of 20 gr. per gal., total dissolved minerals of 446 ppm., and an iron content of 6 ppm.

WELL NO. 4 was completed in May 1952 to a depth of 99 ft. 9 in. by E. C. Baker and Sons and located about 150 ft. west of Well No. 1, or approximately 50 ft. S. and 1150 ft. E. of the N. W. corner of Section 12. The well was cased with 7 l/2-in. od. pipe from 2 ft. above to 89 ft. 2 in. below ground level followed by a 6-ft. section of slotted pipe (l/8-in. slots).

The permanent pump assembly is similar to the installation in Well No. 3.

In 1957 there were 375 services, all but 26 metered. Pumpage was estimated in 1957 to average 91, 800 gpd.

LABORATORY NO. 145470

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	6.0		Silica	SiO_2	17.8	
Manganese	Mn	0.0		Fluoride	F	0.7	
Calcium	Ca	72.5	3.63	Boron	B	0.5	
Magnesium	Mg	39.5	3.25	Chloride	Cl	5.	.14
Ammonium	NH_4	8.2	.45	Nitrate	NO_3	5.5	.09
Sodium	Na	35.	1.54	Sulfate	SO_4	0.0	.00
				Alkalinity (as	$CaCO_3$)	432.	8.64
Turbidity		20		Hardness (as	$CaCO_3$)	344.	6.88
Color		15					
Odor		0					
Temp. (reported)		56°F		Total Dissolved Minerals		446.	

WINFIELD
DuPage County
September 9, 1960

Water for the public supply of Winfield (1575) is obtained from two wells.

WELL NO. 1, described in Bulletin 40, is now equipped with a Layne turbine pump, rated at 150 gpm. at 75-psi. discharge pressure, directly connected to a 15-hp. U S electric motor,

WELL NO. 2 was completed in Mar. 1957 to a depth of 335 ft. by Layne-Western Co., Aurora, and located at the corner of Williams and Lincoln, about 3/4 mile south of Well No. 1, or approximately 1400 ft. N. and 1600 ft. E. of the S. W. corner of Section 13, T39N, R9E. The elevation of the ground surface at the well is 778.

The well is cased with 12-in. steel pipe to 133 ft., below which the hole was finished 12 in. in diameter.

The Driller reported a pumping test was conducted on Mar. 16, 1957. A 10-in., 7-stage Layne test pump was installed with a 6-in. column pipe and 235 ft. of air line; a Chrysler engine furnished the power. After 8 hr. pumping at a rate of 523 gpm., the drawdown was 1 ft. from a static water level of 85 ft. below the top of the casing (1. 5 ft. above ground level).

The permanent pumping equipment, installed in the summer of 1957, includes 135 ft. of 8-in. column pipe; 10-in., 4-stage Byron Jackson turbine pump, No. 346589, rated at 800 gpm. at 100 ft. T.D.H.; 10 ft. of 8-in. suction pipe; 135 ft. of air line; 30-hp. U S electric motor.

On Oct. 17, 1958, during pumping at 400 gpm. for 3 hr., the drawdown was 5 ft. from a nonpumping water level of 85 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 148010) collected Oct. 17, 1958, after 3 hr. pumping at 400 gpm., showed the water in Well No. 2 to have a hardness of 27. 2 gr. per gal., total dissolved minerals of 580 ppm., and an iron content of 0. 5 ppm.

Pumpage in 1958 was reported to average 75,000 gpd.

Sample study summary log of WELL NO. 2 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
"Black dirt"	1	1
"Brown clay"	14	15
"Gray clay"	15	30
"Coarse gravel"	30	60
"Coarse sand"	15	75
"Till, gray, silty, sandy, gravelly"	25	100
Gravel, fine to coarse, granular, clean	10	110
Till, brownish gray, sandy, gravelly	20	130
SILURIAN SYSTEM		
Niagaran-Alexandrian Series		
Dolomite, buff, light pink, greenish gray, fine to medium compact	113	243
ORDOVICIAN SYSTEM		
Maquoketa Formation		
Dolomite, buff, pale pink, compact; little shale, light green, gray to dark gray, streaks	82	325
Shale, dark gray, brown, tough to brittle	10	335

LABORATORY NO. 148010

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	17.0	
Manganese	Mn	0.0		Fluoride	F	0.3	
Calcium	Ca	98.0	4.90	Boron	B	0.1	
Magnesium	Mg	53.8	4.42	Chloride	Cl	7.	.20
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.4	.02
Sodium	Na	16.	.70	Sulfate	SO_4	157.6	3.28
				Alkalinity (as	$CaCO_3$)	326.	6.52
Turbidity		0		Hardness (as	$CaCO_3$)	466.	9.32
Color		0					
Odor		Slight	H_2S (at well)				
Temp. (reported)		51.0°F		Total Dissolved Minerals		580.	

WHEATON PARK MANOR

The public water supply of the Wheaton Park Manor Subdivision has been reportedly-taken over by the village of Winfield.

WELL NO. 1, located at the northeast corner of Williams and Madison St., is now abandoned. The well was drilled about 1924 to a reported depth of 180 ft. and cased with 6-in. pipe to an unknown depth.

WELL NO. 2 was completed about Aug. 1955 to a depth of 263 ft. by N. H. Geltz, Aurora, and located about 35 ft. east of Well No. 1. The well is being maintained as a stand-by unit.

WINTHROP HARBOR
Lake County
January 28, 1960

Since July 1959 the village of Winthrop Harbor (3848) has purchased its public water supply from Lake County Public Water District. Prior to 1959, five wells had been constructed for the village supply and at the time of connecting to the Public Water District, WELLS NO. 1, 2 and 3, all described in Bulletin 40, had been abandoned.

WELL NO. 4 was completed to a depth of 138 ft. in 1948 and located at Sixth and College, about 2 blocks north of the water tank in the northwest portion of the village, or approximately 650 ft. S. and 300 ft. W. of the N. E. corner of Section 9, T46N, R12E. The ground surface elevation at the well is 650. The well was cased with 8-in. pipe from 2 ft. above the pump house floor to he bottom of the well.

The pumping equipment consists of an American Well Works turbine pump, rated at 150 gpm. against 200 ft. T.D.H. connected to a 10-hp. U S electric motor.

Well No. 4 has been maintained for emergency use since July 1959 when the village began purchasing water from the Water District.

WELL NO. 5 was completed about 1953 to a depth of 130 ft. by Ausherman and Clark, Zion, and located close to the lake shore about 1/2 mile southeast of Well No. 4, or approximately 2000 ft. N. and 2000 ft. E. of the S. W. corner of Section 10. The ground surface elevation at the well is 600. The well was cased with 8-in. pipe to rock at 95 ft., below which the hole was finished at 6 in. in diameter to the bottom at 130 ft.

When the well was completed, water was pumped at a rate of 250 gpm. with a drawdown of 50 ft. from a static water level of 10 ft. below the top of the casing.

The pumping equipment includes 85 ft. of 5-in. column pipe; 8-in., 4-stage Byron Jackson submersible pump, rated at 160 gpm. against 160 ft. T.D.H.; 85 ft. of air line; 15-hp. electric motor.

A partial analysis of a sample (Lab. No. 148586) collected in Jan. 1958, while pumping at a rate of 250 gpm., showed the water in Well No. 5 to have a hardness of 7 gr. per gal., total dissolved minerals of 235 ppm., and an iron content of 0.1 ppm.

In July 1958, when Winthrop Harbor was using water from two wells, pumpage averaged 150, 000 gpd. In the last six months of 1959 after the wells had been retired, the village was purchasing 158, 000 gpd. from the Lake County Public Water District.

LABORATORY NO. 148586

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Fluoride	F	0.5	
				Boron	B	0.3	
				Chloride	Cl	8.	.23
				Alkalinity (as	$CaCO_3$)	152.	3.04
Turbidity		0		Hardness (as	$CaCO_3$)	110.	2.20
Color		0					
Odor		0		Total Dissolved Minerals		235.	

WOODED SHORES SUBDIVISION
McHenry County
October 28, 1958

One well is in service for the public water supply of the Wooded Shores Subdivision (est. 300). The well and system, formerly owned by Mr. G. W. Wickline, is now owned by Mr. T. P. Mathews, Realtor, Wonder Lake. The subdivision is located on the eastern shore of Wonder Lake.

WELL NO. 1 was completed in 1934 to a depth of 87 ft. by Art Wertz, Antioch, and located approximately 1150 ft. N. and 900 ft. E. of the S. W. corner of Section 18, T45N, R8E. The ground surface elevationat the well is 820. The well was cased with 6-in. pipe.

The pumping equipment, installed new in 1958, consists of 30 ft. of 2 l/2-.in. column pipe; Sta-Rite submersible pump, rated at 60 gpm.; 5-hp. electric motor.

On Oct. 28, 1958, during pumping at a rate of 60 gpm., the drawdown was 6 ft. from a non-pumping water level of 4 ft. below the top of the casing.

A partial chemical analysis of a sample (Lab. No. 148175) collected Oct. 28, 1958, after pumping began, showed the water in Well No. 1 to have a hardness of 28. 8 gr. per gal., total dissolved minerals of 521 ppm., and a trace of iron.

There are 85 services, none of which is metered. Pumpage is estimated to average 18,000 gpd.

LABORATORY NO. 148175

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	Tr.		Fluoride	F	0.1	
				Boron	B	0.0	
				Chloride	Cl	11.	.31
				Alkalinity (as	$CaCO_3$)	402.	8.04
Turbidity		2		Hardness (as	$CaCO_3$)	490.	9.80
Color		0					
Odor		0					
Temp. (reported)		51.3°F		Total Dissolved Minerals		521.	

Seven wells are in service for the public water supply of the city of Wood River (11, 694).

WELLS NO. 1 to 8 inclusive and WELLS NO. 11 and 13, as described in Bulletin 40, have been abandoned.

WELL NO. 9, described in Bulletin 40, is in service. A partial chemical analysis of a sample (Lab. No. 136978) collected Feb. 9, 1955 showed the water in Well No. 9 to have a hardness of 20. 8 gr. per gal., total dissolved minerals of 370 ppm., and an iron content of 0.4 ppm.

WELL NO. 10, described in Bulletin 40, is in service.

WELL NO. 12, described in Bulletin 40, is in service. A mineral analysis of a sample (Lab. No. 148792) collected Feb. 6, 1959 showed the water in Well No. 12 to have a hardness of 27 gr. per gal., total dissolved minerals of 556 ppm., and an iron content of 1 ppm.

WELL NO. 13 was abandoned in 1959. A mineral analysis of a sample (Lab. No. 148793) collected Feb. 9, 1959 showed the water in Well No. 13 to have a hardness of 26. 3 gr. per gal., total dissolved minerals of 544 ppm., and an iron content of 0. 4 ppm.

WELL NO. 14 was completed to a depth of 112 ft. in May 1952 by Harold Watson, East St. Louis, and located approximately 3140 ft. N. and 1080 ft. E. of the S. W. corner of Section 26, T5N, R9W. The elevation of the ground surface at the well is 440. Well No. 14 is reportedly identical with Well No. 13.

A partial chemical analysis of a sample (Lab. No. 143395) collected May 17, 1957, after 1 hr. pumping (the pump had not been operated for 1 yr.), showed the water in Well No. 14 to have a hardness of 25. 2 gr. per gal., total dissolved minerals of 530 ppm., and an iron content of 1. 3 ppm.

WELL NO. 15 was completed to a depth of 110 ft. in Apr. 1956 by Luhr Brothers, Columbia, and located approximately 1350 ft. S. and 570 ft. E. of the N. W. corner of Section 26. The elevation of the ground surface at the well is 440. The hole was drilled to a diameter of 32 in. from top to bottom and cased with 16-in. steel pipe, the bottom 40. 8 ft. being slotted pipe (l/4-in. slots). An envelope of gravel was packed outside the casing and screen.

A production test was conducted by the Driller on Apr. 24, 1956. After 3/4 hr. pumping at a rate of 925 gpm., the drawdown was 6 ft. from a static water level of 58 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 142941) collected Mar. 22, 1957 showed the water in Well No. 15 to have a hardness of 23.4 gr. per gal., total dissolved minerals of 516 ppm., and an iron content of 0. 3 ppm.

The pumping equipment consists of 90 ft. of 8-in. column pipe; 11-in., 6-stage Pomona turbine pump, No. AM4232, rated at 800 gpm.; 10 ft. of 6-in. suction pipe; 87. 3 ft. of air line; 75-hp. General Electric motor. Well No. 15 is in service.

WELL NO. 16 was completed to a depth of 112.2 ft. in June 1957 by Luhr Brothers and located 1280 ft. S. and 760 ft. E. of the N. W. corner of Section 26. The elevation of the ground surface at the well is 445. The hole was drilled 32 in. in diameter from top to bottom and cased with 72. 2 ft. of 16-in. pipe followed by 40 ft. of slotted (l/4-in. by 3-in.) pipe screen. The gravel envelope was packed between the casing, screen, and wall of the hole.

The pumping equipment consists of 80 ft. of column pipe; Pomona turbine pump, 5 ft. in length; 75-hp. General Electric motor.

On May 15, 1958, after 10 min. pumping at a rate of 820 gpm., the drawdown was 6. 5 ft. from a nonpumping water level of 63. 5 ft. below the ground surface.

A mineral analysis of a sample (Lab. No. 146646) collected May 15, 1958, after 10 min. pumping at a rate of 820 gpm., showed the water in Well No. 16 to have a hardness of 27.7 gr. per gal., total dissolved minerals of 626 ppm., and an iron content of 1.1 ppm. Well No. 16 is in service.

WELL NO. 17 was completed to a depth of 113 ft. in Feb. 1959 by Luhr Brothers and was located 20 ft. west of Well No. 13, or approximately 1300 ft. S. and 880 ft. E. of the N. W. corner of Section 26. The ground elevation at

the well is 440. The well was cased with 74.4 ft. of 16-in. pipe (from 1. 4 ft. above ground level) followed by 40 ft. of double-slotted 16-in. screen. The annulus outside the casing and screen was packed with Meramec gravel.

The pumping equipment consists of 80 ft. of 8-in. column pipe; Pomona turbine pump, 5. 8 ft. long; 13.2 ft. of 6-in. suction pipe; air line (unreported length); 40-hp. Westinghouse electric motor.

On Feb. 5, 1960, after 10 min. pumping at 725 gpm., the drawdown was 6.7 ft. from a nonpumping water level of 62. 2 ft. below the top of the casing.

Pumpage in 1957 reportedly averaged 700,000 gpd.

LABORATORY NO. 146646

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1. 1		Silica	SiO_2	23. 0	
Manganese	Mn	0. 5		Fluoride	F	0. 1	
Calcium	Ca	122. 3	6. 12	Boron	B	0. 0	
Magnesium	Mg	40. 6	3. 34	Chloride	Cl	11.	. 31
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	2. 0	. 03
Sodium	Na	39.	1. 70	Sulfate	SO_4	176. 4	3. 67
				Alkalinity (as	$CaCO_3$)	308.	6. 16
Turbidity		6		Hardness (as	$CaCO_3$)	473.	9. 46
Color		0					
Odor		0					
Temp. (reported)		58. 2°F		Total Dissolved Minerals		626.	

Two wells are in service for the public water supply of the village of Worden (1060).

WELL NO. 1, described in Bulletin 40, was tested for capacity on Apr. 14, 1955 by representatives of the Calhoun Drilling Co., the State Water Survey, Village officials, and Abraham Engineering Co., Consulting Engineers. After 24 hr. pumping at 40 gpm., the drawdown was 14.1 ft. from a static water level at the top of the 8-in. casing 1 ft. below ground level. One hr. after the pump was stopped, the water level had recovered to 3. 3 ft. below the top of the casing. The nonpumping water level at the start of the test was reportedly 5 ft. higher than in Sept. and Oct. 1947.

Well No. 1 was equipped with a Johnston turbine pump connected to a 5-hp. General Electric induction motor. An air line was installed.

About 75% of the village supply is provided by Well No. 1.

Owing to need for an economical supplemental supply, village officials searched for a new source nearer town. Five test wells were drilled in 1954-55 on the Siever farm in the N. W. 1/4 of Section 35, T6N, R7W, about l/2 mile southwest of Worden and about 1 1/2 miles nearer town than Well No. 1. Test Well No. 5 was drilled in May 1955 to a depth of 178 ft. by Carl Wilson Drilling Co. and Friederich Construction Co., both of Mascoutah. Test Well No. 5 was located approximately 1800 ft. S. and 25 ft. E. of the N. W. corner of Section 35, T6N, R7W. The test well was cased with 179 ft. of 8-in. pipe with the bottom 12 ft. being slotted and exposed to a sand and gravel formation. Gravel was packed around the 8-in. pipe up to about 50 ft.

A production test was conducted May 9-10, 1955 by representatives of the Driller, the State Water Survey, Village officials, and C. W. Abraham, Consulting Engineer. After 19 hr. pumping at a rate of 30 gpm., the drawdown was 53. 5 ft. from a static water level of 56 ft. Two and one-half hr. after the pump was stopped, the water level had recovered to 75. 7 ft.

WELL NO. 2 was completed in 1955 or 1956 at the site of Test Well No. 5 and equipped with a Johnston turbine pump, No. JL8608, rated at 25 gpm. at 130 ft. T.D.H. with the bottom of the pump set at 176 ft.; a 3-hp. General Electric motor was installed.

A mineral analysis of a sample (Lab. No. 152183) collected Apr. 23, 1960, after 15 min. pumping at 80 gpm., showed the water in Well No. 2 to have a hardness of 9.3 gr. per gal., total dissolved minerals of 715 ppm., and an iron content of 0. 9 ppm.

There are 295 services, all of which are metered, and 100% of the population is served.

Pumpage for July 1959 and Mar. 1960 averaged 44,000 gpd.

LABORATORY NO. 152183

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.9		Silica	SiO_2	7.9	
Manganese	Mn	Tr.		Fluoride	F	0.5	
Calcium	Ca	36.4	1.82	Boron	B	0.1	
Magnesium	Mg	17.0	1.40	Chloride	Cl	90.	2.54
Ammonium	NH_4	2.4	.13	Nitrate	NO_3	0.1	Tr.
Sodium	Na	207.	8.98	Sulfate	SO_4	70.8	1.47
				Alkalinity (as	$CaCO_3$)	416.	8.32
Turbidity		4		Hardness (as	$CaCO_3$)	161.	3.22
Color		55					
Odor		0					
Temp. (reported)		58°F		Total Dissolved Minerals		715.	

YORK CENTER
DuPage County
July 3, 1958

A public water supply was installed in 1947 for York Center, a community cooperative subdivision located about 1 mile south of Lombard.

WELL NO. 1 was completed in Oct. 1947 to a depth of 235 ft. by J. P. Miller Artesian Well Co., Brookfield, and located near the intersection of Roosevelt Road and Myers St., or approximately 700 ft. S. and 350 ft. W. of the N. E. corner of Section 20, T39N, R11E. The elevation of the ground surface at the well is 7 15. The well was cased with 10-in. pipe to limestone at 95. 5 ft., below which the hole was finished 10 in. in diameter. The top of the casing was left 2 ft. 10 in. above ground level.

Correlated driller's log of York Center WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Drift	95	95
SILURIAN SYSTEM		
Niagaran Series		
Limestone	140	235

A production test was conducted on Oct. 16, 1947 by representatives of the Driller. After 5 hr. pumping at rates of 123 to 195 gpm., the drawdown was 35 ft. from a static water level of 66 ft. below the top of the casing.

The permanent pump assembly includes 120 ft. of 4-in. column pipe; 6 l/2-in., 12-stage Peerless turbine pump, rated at 180 gpm. at 90 ft. T.D.H. and 6 ft. 9 1/8 in. long; 10 ft. of 4-in. suction pipe; 120 ft. of air line; 15-hp. U S electric motor.

On July 3, 1958, during pumping at 185 gpm., the drawdown was 20 ft. from a nonpumping water level of 40 ft. below the pump base. A mineral analysis of a sample (Lab. No. 146496) collected Apr. 26, 1958 showed the water in Well No. 1 to have a hardness of 27 gr. per gal., total dissolved minerals of 572 ppm., and an iron content of 1. 9 ppm. Reportedly, a considerable amount of the water was from the unconsolidated material above the bedrock.

There are approximately 62 services for the entire subdivision.

Pumpage in 1957 totaled 6 mg. and averaged 16, 500 gpd.

LABORATORY NO. 146496

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	1.9		Silica	SiO_2	16.7	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	105.0	5.25	Boron	B	0.1	
Magnesium	Mg	48.4	3.98	Chloride	Cl	15.	.42
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	1.6	.03
Sodium	Na	14.	.62	Sulfate	SO_4	132.7	2.76
				Alkalinity (as	$CaCO_3$)	332.	6.64
Turbidity		9		Hardness (as	$CaCO_3$)	462.	9.23
Color		0					
Odor		M		Total Dissolved Minerals		572.	

YORKVILLE
Kendall County
March 10, 1958

Two wells are in service for the public water supply of the village of Yorkville (1568). The original supply from springs is maintained for emergency.

WELL NO. 1, described in Bulletin 40 as the well drilled in 1923, was equipped in Oct. 1951 with a new 12-stage Aurora turbine pump, rated at 100 gpm. An air line was installed 120 ft. long to the top of the bowls. The old 7 1/2-hp. electric motor was reinstalled.

Summary sample study log of WELL NO. 1 furnished by the State Geological Survey

Strata	Thickness ft.	Bottom ft.
PLEISTOCENE SERIES		
Soil, brown; till, yellow	5	5
Sand and gravel, yellow, iron stained, partly dirty	15	20
Gravel, buff, dirty, with buff clay	20	40
Till, yellow, gravelly	5	45
Till, gray, gravelly	40	85
		T. D.

The pump was pulled and rebuilt in June 1953.

WELL NO. 2 was completed in May 1954 to a depth of 42 ft. by Layne-Western Co., Aurora, and located at the site of Test Hole No. 2-54 near the southeast corner of the spring reservoir, or approximately 2000 ft. N. and 1500 ft. E. of the S. W. corner of Section 4, T36N, R7E. The ground surface elevation at the well is 670. The well was double cased 38 in. by 12 in. and gravel packed with 12-in. pipe from 3 ft. above the ground surface to 18 ft. below; with 12-in. No. 5 stainless steel Layne shutter screen from 18 to 28 ft.; with 12-in. pipe from 28 to 37 ft.; and with 12-in. No. 5 stainless steel Layne shutter screen from 37 to 42 ft. A 38-in. od. No. 3 gage "Armco" iron casing was set from 2. 5 ft. above to 1. 75 ft. below the surface and the bore hole was finished 38 in. in diameter from top to bottom. The annulus between the 12-in. and 38-in. casings was packed with l/4 in. by 3/8 in. gravel.

A production test was conducted May 24-25, 1954 by representatives of the Driller, the State Water Survey, and Walter E. Deuchler Co., Consulting Engineers. After 16 hr. pumping at a rate of 203 gpm., the drawdown was 17. 9 ft. from a static water level of 2. 63 ft. below the top of the 12-in. casing (3 ft. above ground level). Ten min. after the pump was stopped, the water level had recovered to 6. 4 ft.

A 12 in. by 36 in. gravel pack well, 32 ft. deep including 10 ft. of screen, located 34 ft. west of the pumped well, was used for observing water levels during the test. At the end of the test the water level in the observation well had lowered 14. 4 ft. from a static level of 1. 3 ft. below the surface. Ten min. after the end of the test, the water level had risen 7. 7 ft.

A partial chemical analysis of a sample (Lab. No. 134922) collected May 25, 1954, after 16 hr. pumping at a rate of 203 gpm., showed the water in Test Hole No. 2-54 to have a hardness of 24. 6 gr. per gal., total dissolved minerals of 530 ppm., and an iron content of 0.7 ppm.

The permanent pumping equipment in Well No. 2, finished at the site of Test Hole No. 2-54, consists of 30 ft. of 6-in. column pipe; 8-in., 4-stage Layne turbine pump (No. 27881), 3 ft. 8 in. in length; 7 ft. of 6-in. suction pipe; 32 ft. of air line; 10-hp. U S electric motor.

On Mar. 10, 1958, after 5 min. pumping at a rate of 165 gpm., the drawdown in Well No. 2 was 3 ft. from a nonpumping water level of 21 ft. below the pump base.

A mineral analysis of a sample (Lab. No. 145958) collected Mar. 10, 1958, after 5 min. pumping at a rate of 165 gpm., showed the water in Well No. 2 to have a hardness of 24.2 gr. per gal., total dissolved minerals of 488 ppm., and an iron content of 0.1 ppm.

Nonpumping water levels for Well No. 2 are shown in Table A.

TABLE A

Date	Nonpumping water level ft.
1956	
July	19
Aug.	22
Sept.	23
Oct.	28
1957	
July	18

Pumpage for the first 6 mo. of 1957 averaged 90,000 gpd.

2 - Yorkville

LABORATORY NO. 145958

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.1		Silica	SiO_2	11.2	
Manganese	Mn	0.0		Fluoride	F	0.1	
Calcium	Ca	91.5	4.58	Boron	B	0.0	
Magnesium	Mg	45.5	3.74	Chloride	Cl	13.	.37
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	10.7	.17
Sodium	Na	1.	.05	Sulfate	SO_4	124.2	2.59
				Alkalinity (as	$CaCO_3$)	262.	5.24
Turbidity		0		Hardness (as	$CaCO_3$)	416.	8.32
Color		0					
Odor		0					
Temp. (reported)		47.0°F		Total Dissolved Minerals		488.	

ZION
Lake County
January 28, 1960

Since 1957 the city of Zion (11,941) has obtained its water supply from the Lake County Public Water District. Two of the city wells are maintained for stand-by use and the third well has been filled in and capped.

WELL NO. 1 is described in Bulletin 40. In Mar. 1954 a 10-in. liner was set from 307 to 376 ft. In Aug. 1955 nine new sections of column pipe were added making 370 ft. of column pipe; 32 ft. of suction pipe; 325 ft. of air line. In Sept. 1958 the pumping equipment included a Layne turbine pump and 60-hp. U S electric motor.

Static water levels in Well No. 1 are shown in Table A.

WELL NO. 2, described in Bulletin 40, is now maintained for stand-by use.

WELL NO. 3, described in Bulletin 40, was filled in and capped early in 1958 by J. P. Miller Artesian Well Co., Brookfield.

During 1959 the city purchased an average of 570, 000 gpd. from the Water District.

TABLE A

Jan. 19, 1954 - static water level - 140 ft.
Aug. 16, 1955 - static water level - 160 ft.
Sept. 30, 1958 - static water level - 132 ft.

The static water level for Sept. 1958 was measured after the well had been put on stand-by basis.

ZURICH HEIGHTS SANITARY DISTRICT
Lake County
February 10, 1959

A public water supply was installed in 1932 for the Zurich Heights Subdivision, now known as the Zurich Heights Sanitary District (est. 350), located outside the west corporate limits of the village of Lake Zurich.

WELL NO. 1 was completed for Zurich Heights Subdivision about 1932 to a depth of 298 ft. by Otto Radke, Grays Lake, and located on Golf Road between Ravinia Ave. and Country Club Road at the extreme east end of the subdivision about 150 ft. west of U. S. Highway No. 12. The well was cased with 6-in. pipe to 298 ft. below ground level. The casing terminated in the bottom of a pit 6 ft. 5 in. below ground level. The pumping equipment included a 17-gpm. Deming plunger pump connected to a 3-hp. Wagner electric motor.

In 1956 this well was reportedly rehabilitatedand restored to service by the Zurich Heights Sanitary District, consisting of residents in the Zurich Heights Subdivision.

A well was reportedly drilled for the Zurich Heights Sanitary District in 1947 to a depth of 276 ft. by Henry Boysen, Libertyville, and located 1425 ft. N. and 2250 ft. E. of the S. W. corner of Section 18, T43N, R10E. The well was deepened by Henry Boysen in 1951 to a depth of 300 ft. and cased with 6-in. pipe which terminated in the bottom of a pit 3 ft. below ground level.

The pumping equipment includes 160 ft. of 3-in. column pipe; Byron Jackson submersible pump rated at 100 gpm.; 160 ft. of air line; 10-hp. electric motor.

On June 5, 1958 the nonpumping water level was 128 ft.

A mineral analysis of a sample (Lab. No. 146914) collected June 5, 1958 from a tap in the storage tank showed the water in the well to have a hardness of 43 gr. per gal., total dissolved minerals of 1378 ppm., and an iron content of 0. 5 ppm.

There are 98 services, allmetered. Pumpage is estimated to average 20,000 gpd.

LABORATORY NO. 146914

		ppm.	epm.			ppm.	epm.
Iron (total)	Fe	0.5		Silica	SiO_2	16.4	
Manganese	Mn	Tr.		Fluoride	F	0.3	
Calcium	Ca	142.4	7.12	Boron	B	0.5	
Magnesium	Mg	93.1	7.66	Chloride	Cl	18.	.51
Ammonium	NH_4	Tr.	Tr.	Nitrate	NO_3	3.5	.06
Sodium	Na	129.	5.62	Sulfate	SO_4	872.4	18.15
				Alkalinity (as	$CaCO_3$)	84.	1.68
Turbidity		3		Hardness (as	$CaCO_3$)	739.	14.78
Color		0					
Odor		0					
Temp. (reported)		53.2°F		Total Dissolved Minerals		1378.	