

HYDROGEOLOGIC STUDY

FOR

ALBAN-GOULD

February, 1987

by

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HYDROGEOLOGIC STUDY

FOR

ALBAN-GOULD

INTRODUCTION

Purpose and Scope

The purpose of this study is to address the concerns of South Florida Water Management District Staff about the availability of water for irrigation from the Water Table aquifer.

The scope of this study is to determine the aquifer characteristics of the proposed source aquifer by analyzing data from an Aquifer Performance Test (APT). The study presented here discusses the local geology, hydrogeology, APT results, and impact analysis of the projected drawdowns from the proposed water withdrawals.

SITE DESCRIPTION

Description of Area

The total site, consisting of approximately 640 acres, is located in Glades County, four miles west of LaBelle, in Section 28, Township 42S, Range 28E (Figure 1). The site is undisturbed pine-flatwoods except for the northwest quarter of the site which was cleared many years ago. The land is presently being used for cattle grazing.

Geology

The geology of this area has not been described in the literature in any detail. To date, there has been little work done in the area, except for work done by the United States Geological Survey along the Caloosahatchee River. Any other work in the area has been done in conjunction with the permitting process of South Florida Water Management District.

A general lithologic description of the project site was constructed using the cuttings collected during the installation of the test wells. A general description is depicted in Figure 2 as a lithologic column with the written description for each well provided in the Appendix.

The geology at the project site consists of about eight (8) feet of the Pamlico formation overlying 10-12 feet of the Caloosahatchee marl, which overlies the Tamiami formation. The

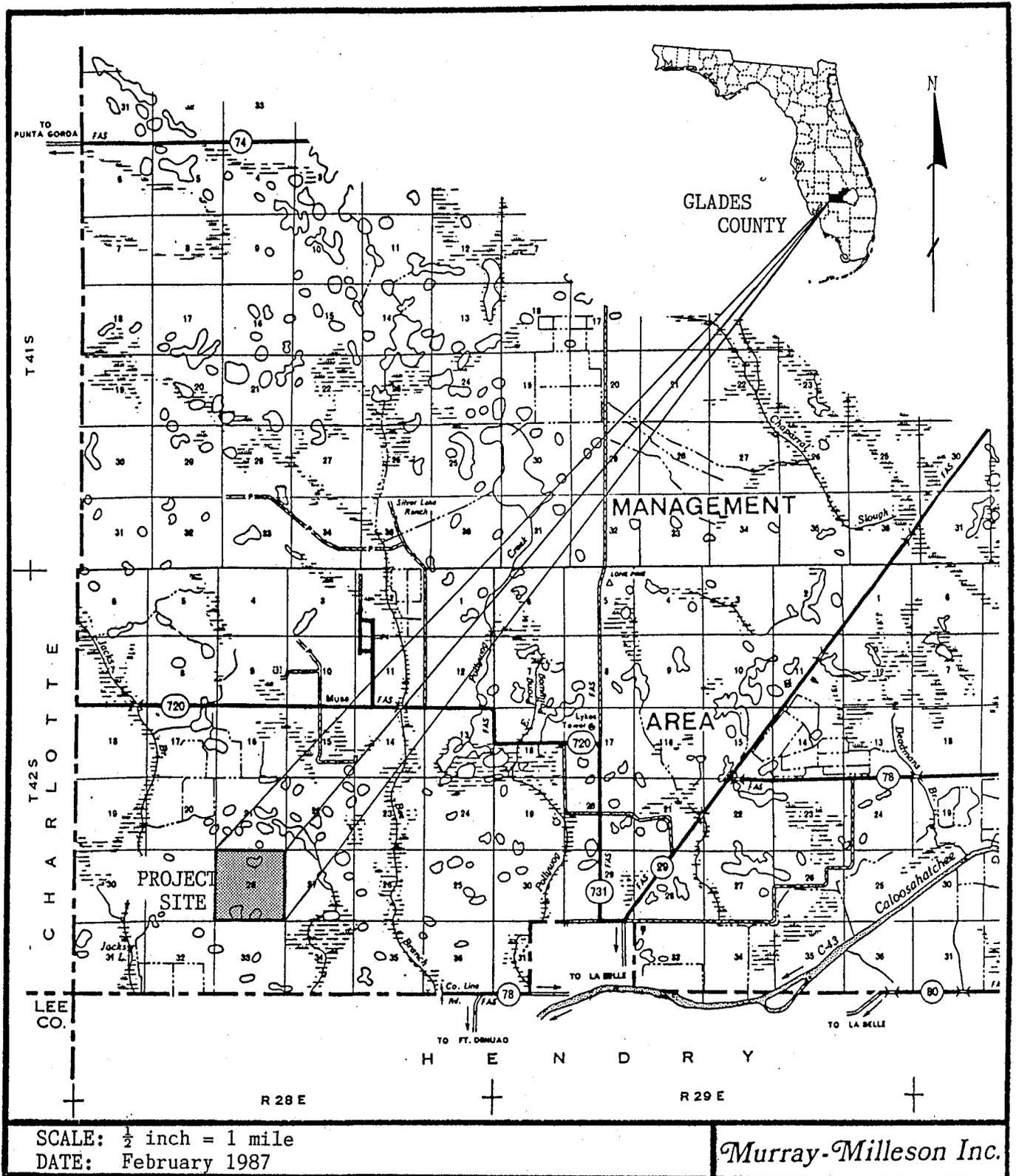
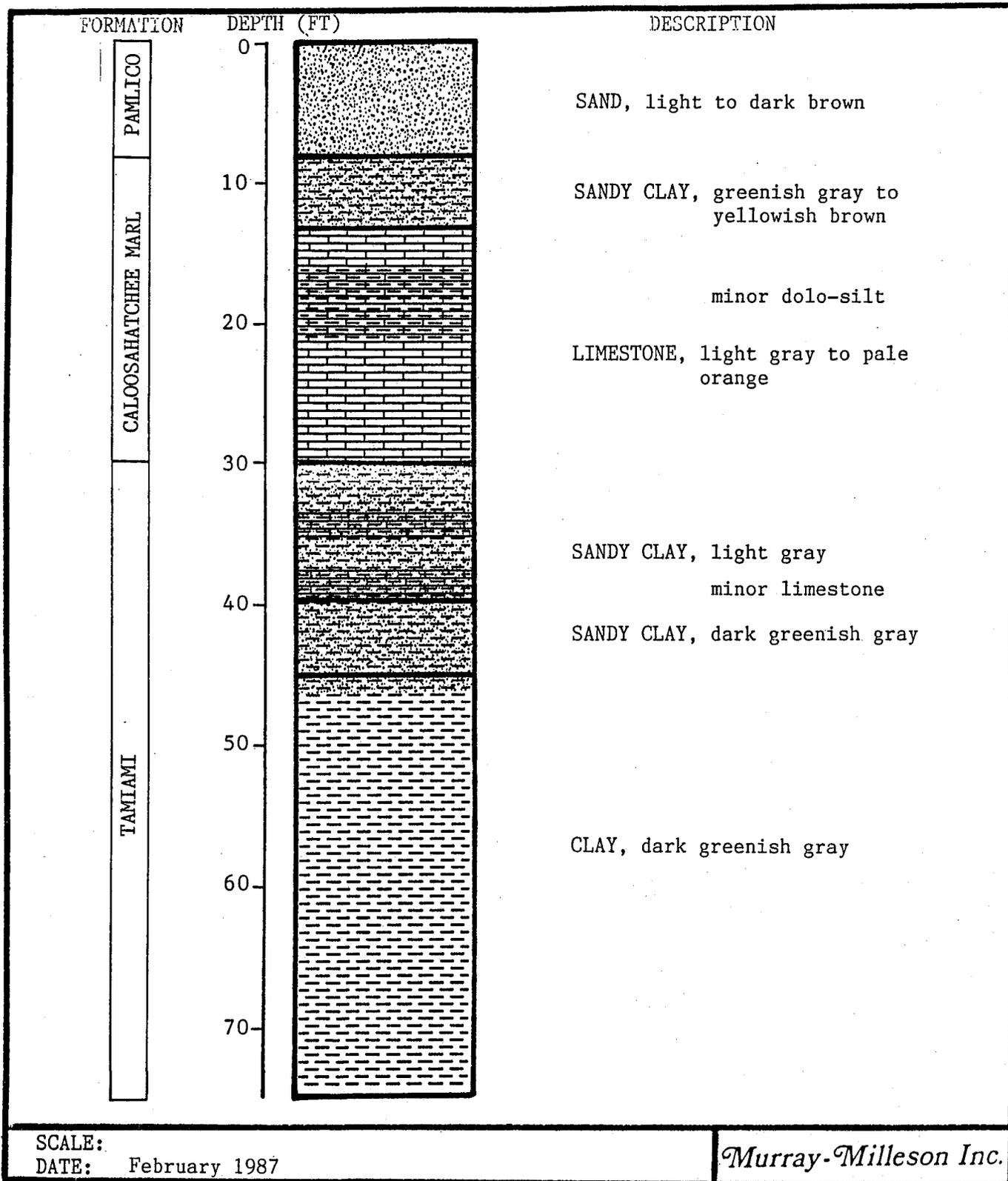


Figure 1: Location Map of Alban-Gould S28/T42S/R28E



SCALE:
DATE: February 1987

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Figure 2: Lithologic Column

Pamlico formation consists of light gray to brown quartz sands with a minor muck deposit about 3-5 feet below land surface. The Pamlico sands lie unconformably on the Caloosahatchee marl.

The Caloosahatchee marl consists of light colored sandy and silty marl with abundant pelecypod and gastropod megafossils, and hard solution riddled marine limestone. Some of the sediments are stained yellow-brown from the presence of limonite and iron. The Caloosahatchee marl lies unconformably on the Tamiami formation.

The Tamiami formation was subjected to considerable erosion before being inundated by the Caloosahatchee sea. The erosional surface is irregular with hills and valleys, which were filled with Caloosahatchee deposits. The Tamiami formation consists of two beds: an upper, with light colored clay, argillaceous marl, and sand, and; a lower, with dark greenish gray to olive green clay and arenaceous clay. The beds are slightly to moderately phosphatic.

Using the on-site lithologic description and information from other work done for the District at Six L's Farm and Rainbow Ranch, a lithologic cross-section was constructed. The location of each data point used is depicted in Figure 3. Because of the variability of the geology between these data points, a "best guess" correlation was made between the units and is shown in Figure 4.

The geologic changes between Six L's Farm and Alban-Gould are most significant below 30 feet. The thick clay unit of the Tamiami formation encountered below 30 feet at Alban-Gould thins and becomes sandier north to Six L's Farm, and continues to thin becoming even sandier east to Rainbow Ranch. This clay unit acts as a semi-confining to confining unit from the water bearing formations above and below. Because the wells at the project site do not penetrate all of the Tamiami formation, its thickness on-site is unknown.

Hydrogeology

As indicated in the section above, there is very little available information about the geology and the hydrogeology of this area. Information from existing SFWMD Consumptive Use Permits indicates that there generally is a Water Table or Shallow aquifer, a confining zone, the Tamiami/Sandstone aquifer, another confining zone, then the Hawthorn aquifer system (presented here in descending order). Wells in the area have been identified as withdrawing from the Water Table or Shallow aquifer (depth about 40 to 50 feet) and the Tamiami/Sandstone aquifer (depth about 85 to 165 feet).

Because of water quality and quantity considerations, most of the water used for both domestic and agricultural purposes in this area is withdrawn from the Tamiami/Sandstone aquifer. Since the

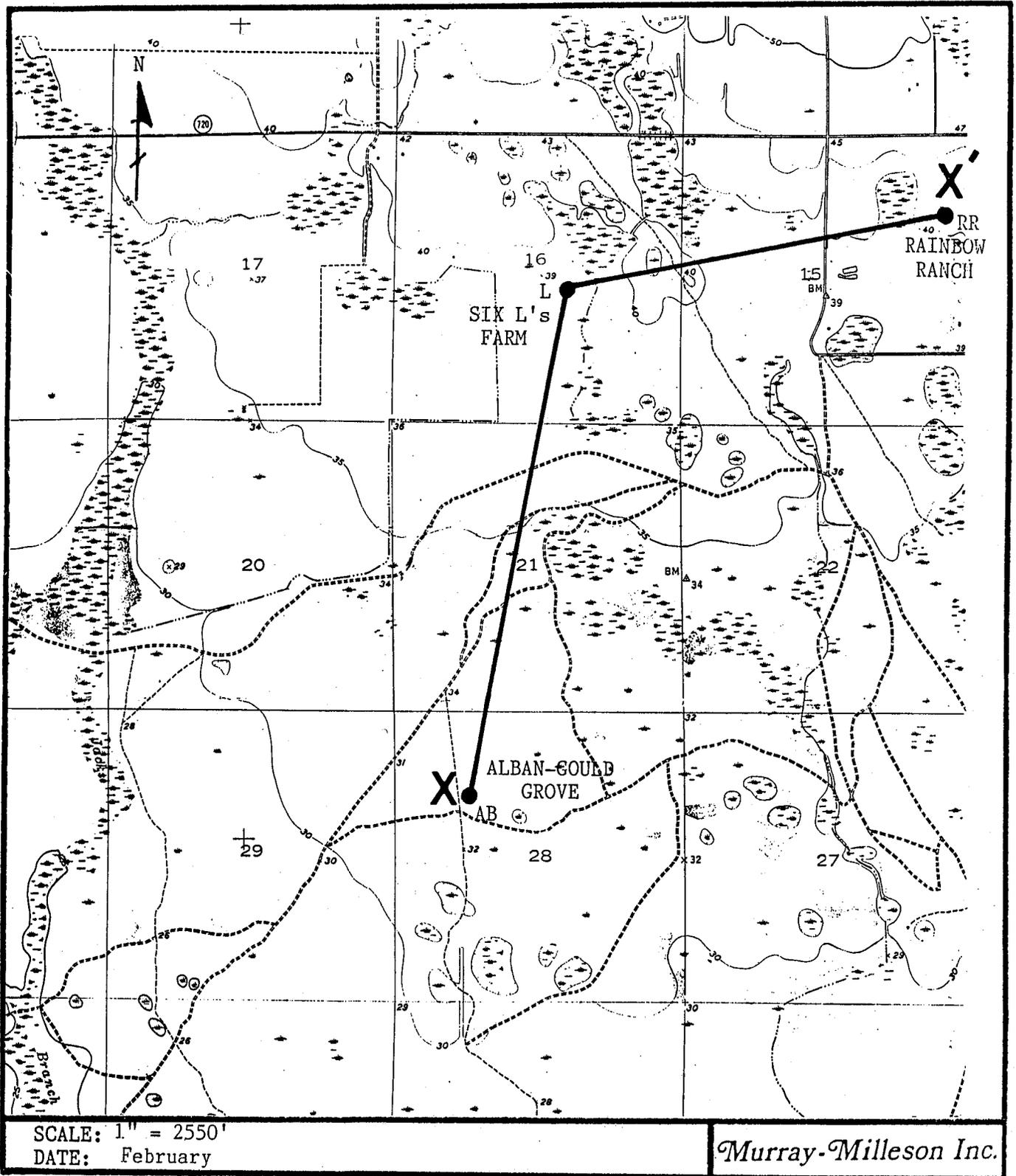


Figure 3: Location Map of Lithologic Cross-section

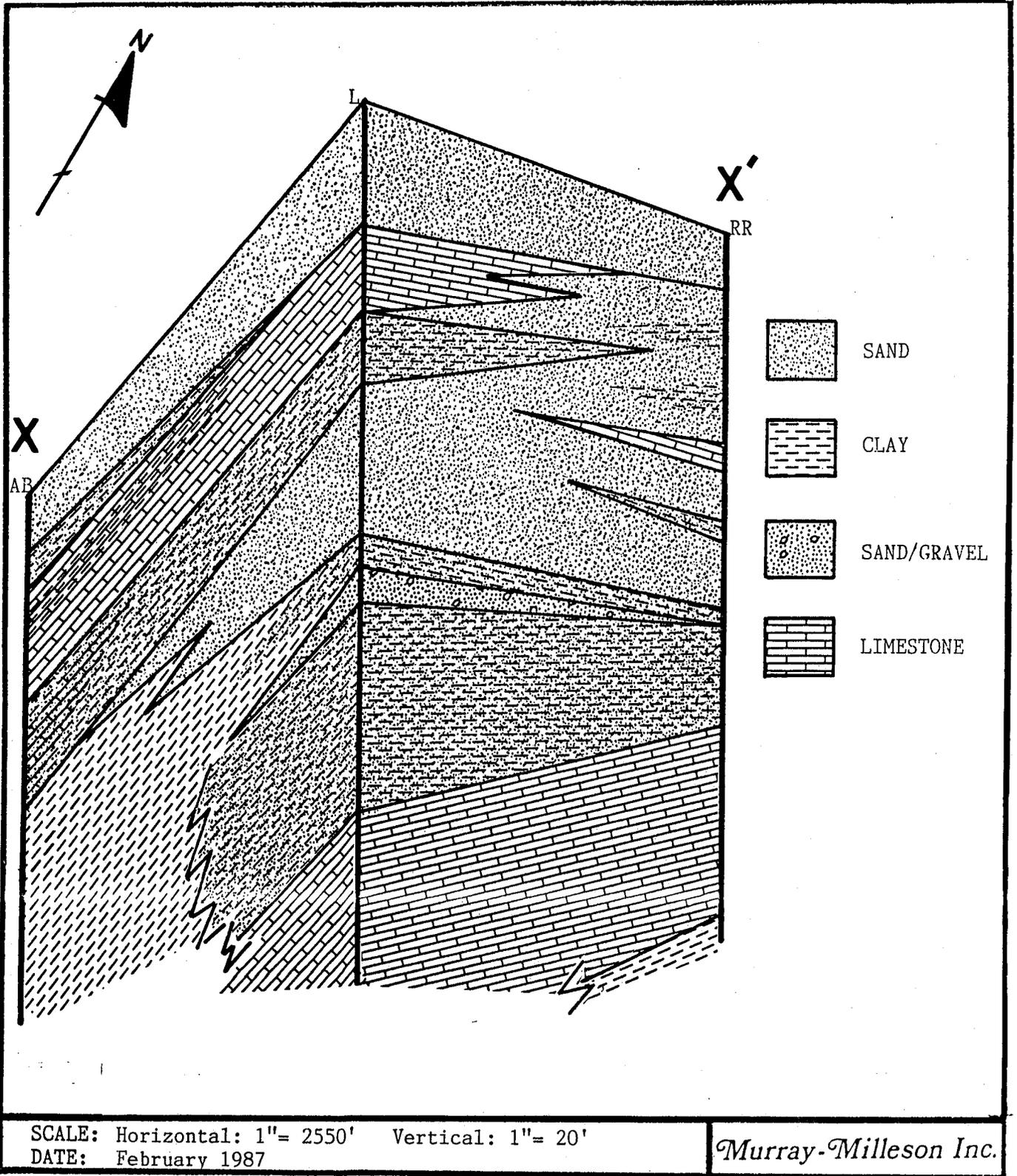


Figure 4: Lithologic Cross-section

Water Table aquifer is not heavily used, there is a void of hydrogeologic data.

METHOD OF STUDY

Well Descriptions

One 12-inch production well (TPW), one 4-inch and two 2-inch observation wells (OB#1, OB#2, OB#3) were constructed for this study. The locations of the wells are depicted in Figure 5 and the pertinent construction details described in Table 1. All the wells were constructed using the rotary method and were developed by airlifting.

Observation well 3 was drilled into the sediments below the production zone in order to obtain additional geologic information of the site. The well was originally drilled to a depth of 75 feet, however, cave-ins from the above sediments rendered a final depth of 45 feet.

Aquifer Performance Test

Before the APT (during the drilling phase), water levels in the Water Table aquifer were at and above land surface due to an unusually wet January. Water level fluctuations occurred during rainfall events. Because of equipment failure, continuous background water level data was not collected. From observing the water levels above ground level, the APT was started only after it appeared that the aquifer had stabilized after the last rainfall event.

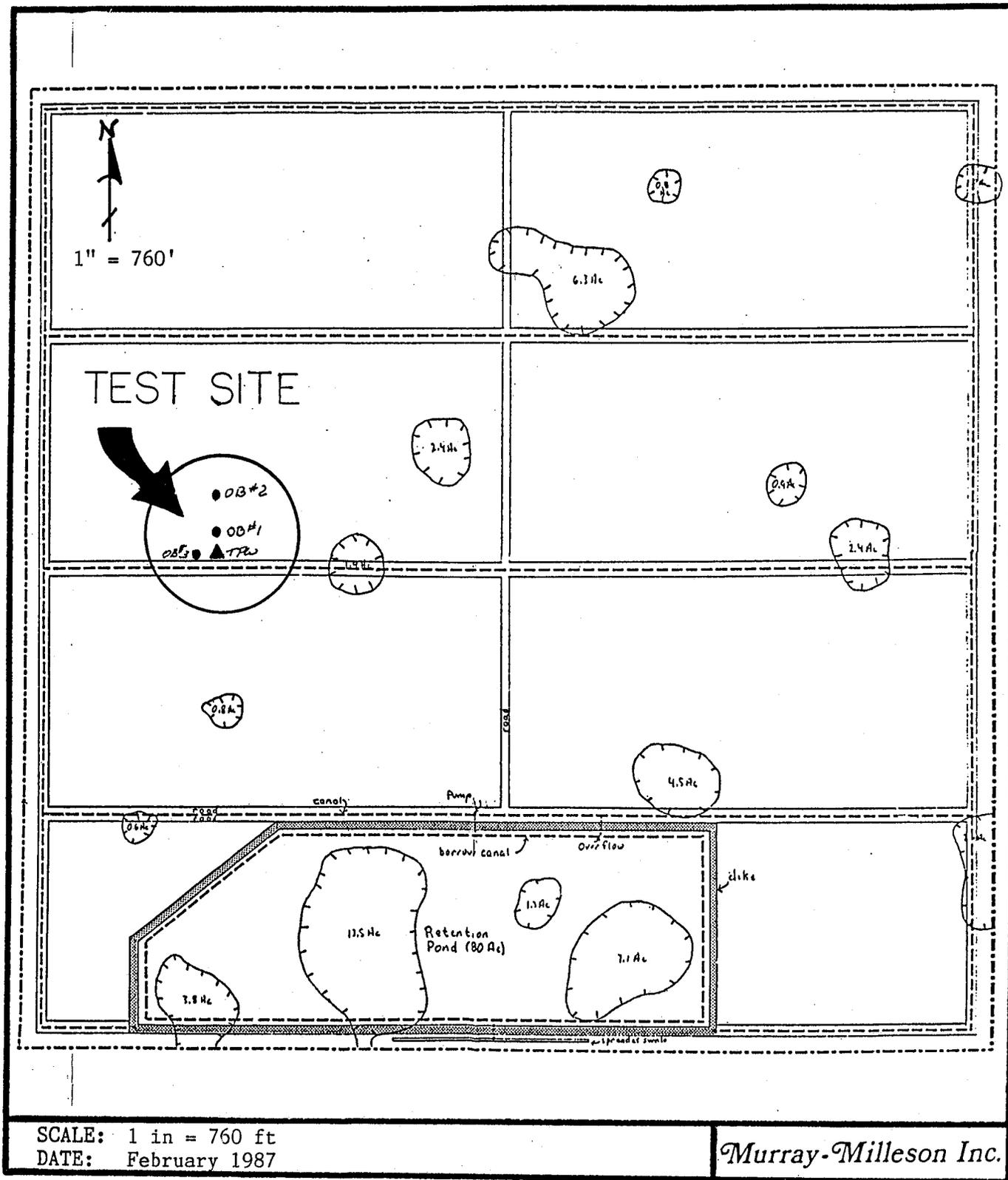
The APT was started on January 20, 1987 and continued for 64 hours. The test production well (TPW) was pumped at a continuous discharge of 180 gallons per minute (gpm) for the duration of the test. The test data has been corrected for a minor rainfall event that occurred 44 hours into the test.

A portable 5-horsepower centrifugal pump with 30 feet of intake pipe was used to pump the well. The discharge rate was monitored at the end of the discharge pipe by using a 4-inch by 3-inch orifice and a plastic manometer tube. The discharge was routed away from the site through a lined ditch as shown in Figure 6. Water levels were measured in the three observation wells using an electric tape. Water levels in the pumped well dropped below the well casing and caused what is referred to as "cascading water" in the borehole. Upon visual inspection with a flashlight of the pumping well, water could be seen flowing out of the sides of the borehole (limestone) and down the hole. Because of this phenomenon, accurate water level readings could not be measured. The test was terminated just before another rainfall event, consequently, recovery data was not obtainable. All of the test results are tabulated and included in the Appendix.

Table 1

WELL CONSTRUCTION DETAILS

WELL NO.	TPW	OB #1	OB #2	OB #3
DIAMETER	12"	2"	4"	2"
CASED DEPTH	13'	11'	12'	13'
TOTAL DEPTH	32'	27'	27'	45'



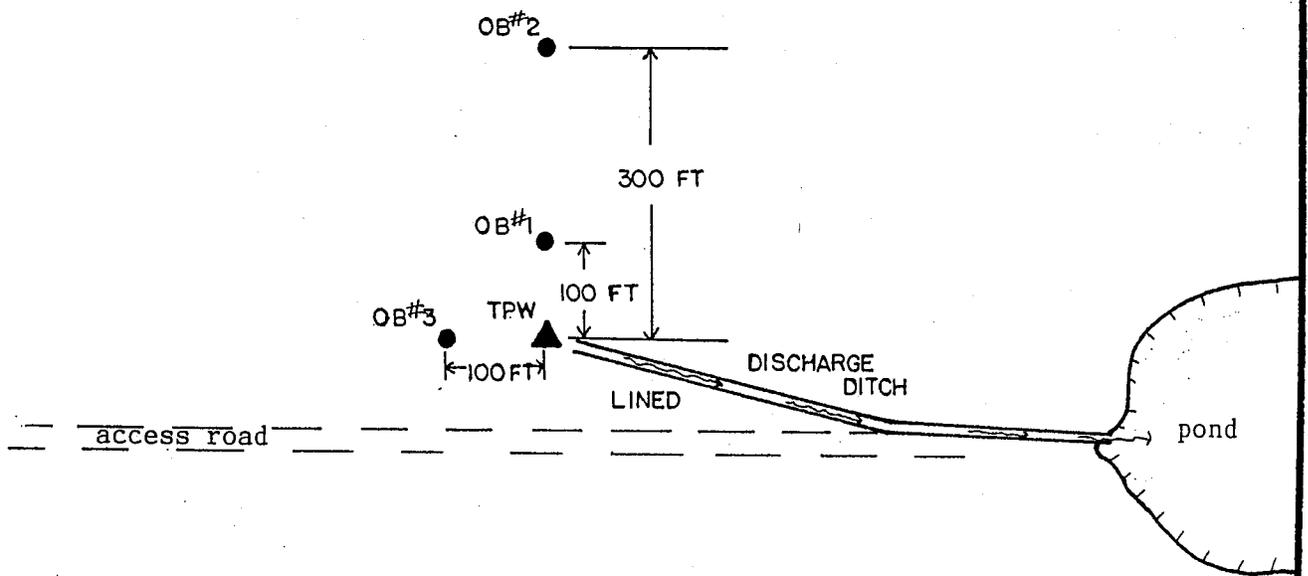
SCALE: 1 in = 760 ft
 DATE: February 1987

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Figure 5: Location Map of Test Site



1" = 200'



SCALE: 1 in = 200 ft
DATE: February 1987

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Figure 6: Test Set-up

Step-drawdown Test

A step-drawdown test was performed on the test production well by pumping at three different rates: 110 gpm, 135 gpm, and 165 gpm. The same pumping and discharge set-up was used for the step-drawdown test as for the aquifer performance test.

DISCUSSION OF STUDY RESULTS

Step-drawdown Test

The step-drawdown test data was analyzed and a specific capacity for each discharge rate was calculated. The results of the test include the following:

Step	Rate	Drawdown	Specific Capacity
#1	110 gpm	5.36 feet	20.5 gpm/ft
#2	135 gpm	7.27 feet	18.6 gpm/ft
#3	165 gpm	9.72 feet	16.6 gpm/ft

A graph was constructed plotting discharge (Q) versus specific discharge (s/Q, where s=drawdown). From this graph the amount of drawdown observed in the well due to well losses, such as friction, can be calculated (Figure 7). The well losses averaged around 4 feet.

Aquifer Performance Test

To properly assess the effects of pumping an unconfined or "water table" aquifer, it is necessary to determine two hydraulic coefficients: transmissivity and specific yield. Transmissivity is defined as the amount of water that can be transmitted through an aquifer, usually expressed as gallons per day per foot (gpd/ft). Specific yield (Sy) is the volume of water that an unconfined aquifer releases from storage per unit surface area of aquifer per unit of decline in the water table, a dimensionless number.

These two coefficients are determined by analyzing data collected from an aquifer performance test. For this project, an aquifer test was started on January 20, 1987 and was terminated after 64 hours of pumping.

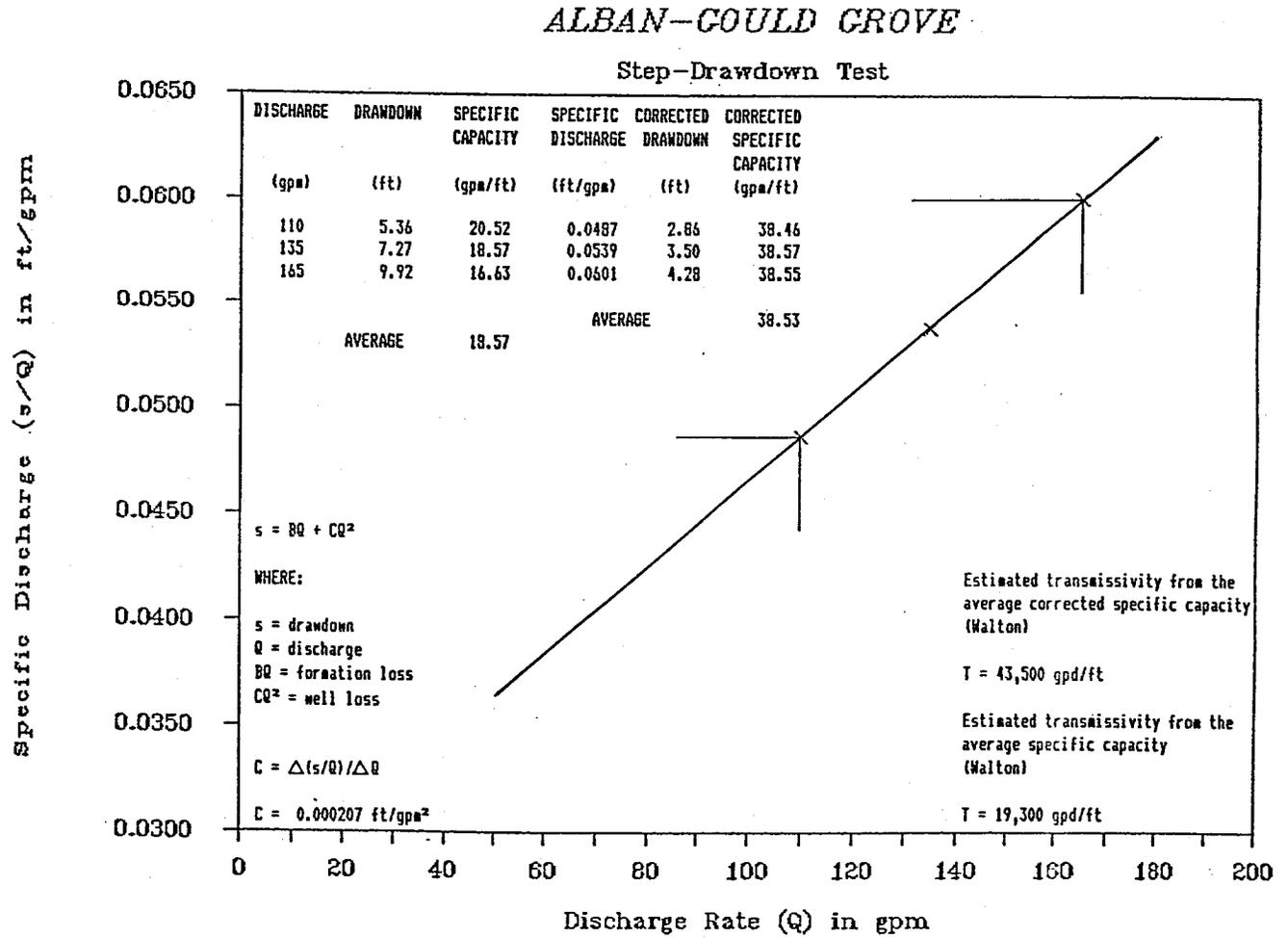
The test data was analyzed using the following non-equilibrium or Theis equations (Neuman, 1975):

$$T = \frac{114.6Q}{s} W(u_w, u_b, r/B) \quad Sy = \frac{Itu_w}{2693r^2}$$

where

T = transmissivity, gpd/ft
Q = pumping rate, gpm

Figure 7: Graph of Step-drawdown Data



s = drawdown, ft
 r = distance of observation well from pumped well, ft
 t = time, min
 S_y = specific yield, dimensionless
 $W(u_m, u_b, r/B)$ = well function for the water table:
 u_m is applicable for small values of time
 u_b is applicable for large values of time

The above equations assume the aquifer to be homogeneous, anisotropic, infinite in areal extent, of constant thickness, the production and observation wells having no storage capacity, and the wells fully penetrating the aquifer.

The test data for each observation well was plotted on log-log graph paper. These curves were then matched to Type A and Type B curves (Walton, 1984). The Type A curves are used to match the early drawdown data and the Type B curves the late drawdown data. The plotted test data are presented in Figures 8 through 10, with the calculations for the aquifer characteristics shown on each graph. Also, a summary of the calculated values is presented in Table 2. An average value for each characteristic was determined with the following results:

Transmissivity = 16,073 gpd/ft
 Specific yield = 0.09

Water Quality

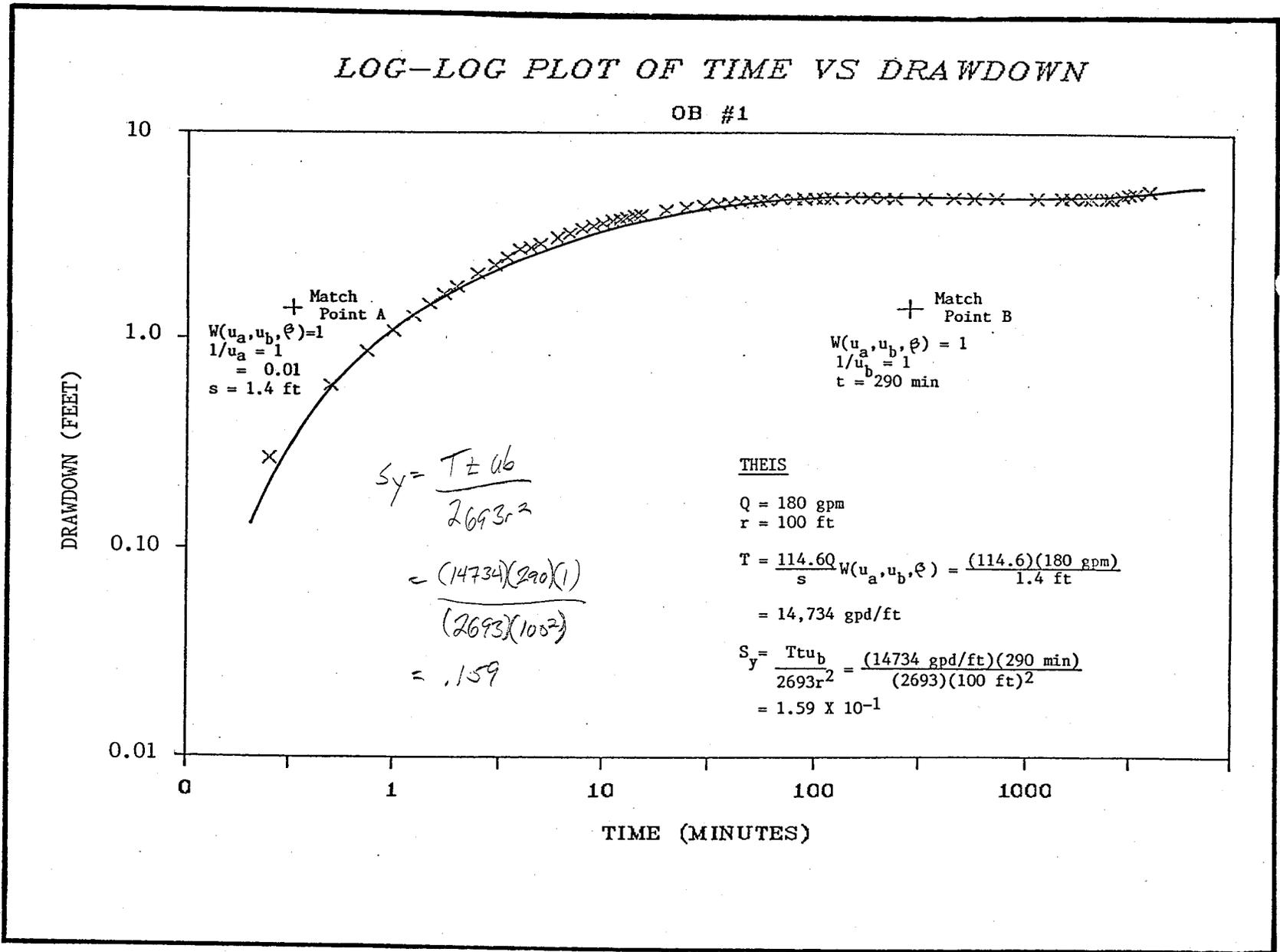
Water samples were taken from the pumped well during the step-drawdown test and the aquifer performance test. The parameters analyzed remained constant throughout both tests. The results of the water quality analysis are as follows:

Chloride concentrations	100 mg/l
Specific conductance	480 micromhos/cm
Total iron	10 mg/l
pH	6.5 - 7

IMPACT ANALYSIS

As discussed earlier, when the test well was pumped at a rate of 180 gpm, water cascaded down the borehole. If pumped at a higher rate of 200 gpm, the cascading caused the pump to lose suction and discontinue pumping. To meet the needs of this project, numerous low volume wells would need to be installed. In addition to this situation, the color of the water being discharged from the well was very rusty, indicating the presence of ferric iron (total iron concentration is 10 mg/l). Any soluble ferrous iron present in the water will oxidize to form insoluble ferric iron when exposed to the air. Because ferric iron is insoluble and the feasibility that iron bacteria is

Figure 8: Log-log Plot of Observed Drawdowns for OB #1



LOG-LOG PLOT OF TIME VS DRAWDOWN

OB #2

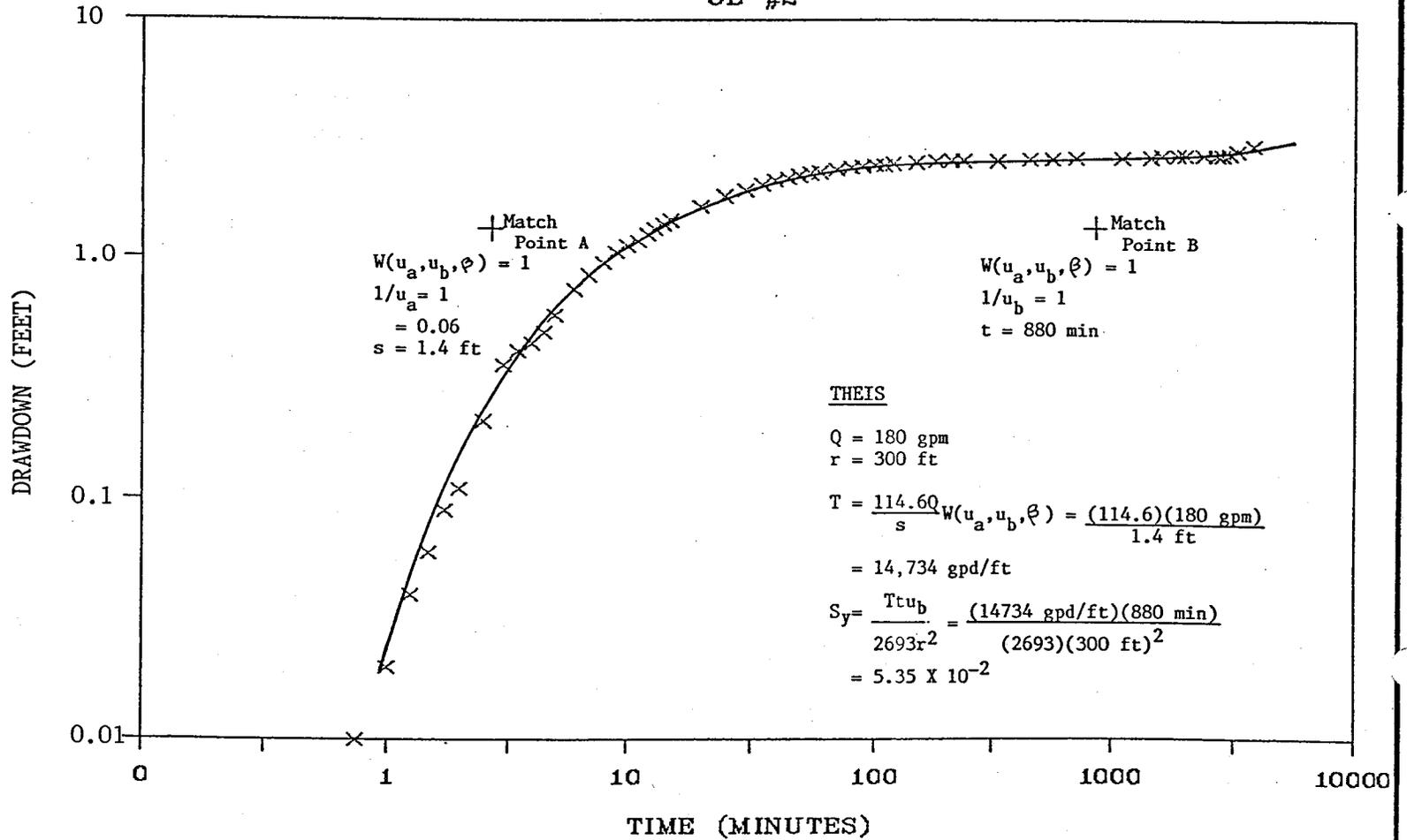


Figure 9: Log-log Plot of Observed Drawdowns for OB #2

LOG-LOG PLOT OF TIME VS DRAWDOWN

OB #3

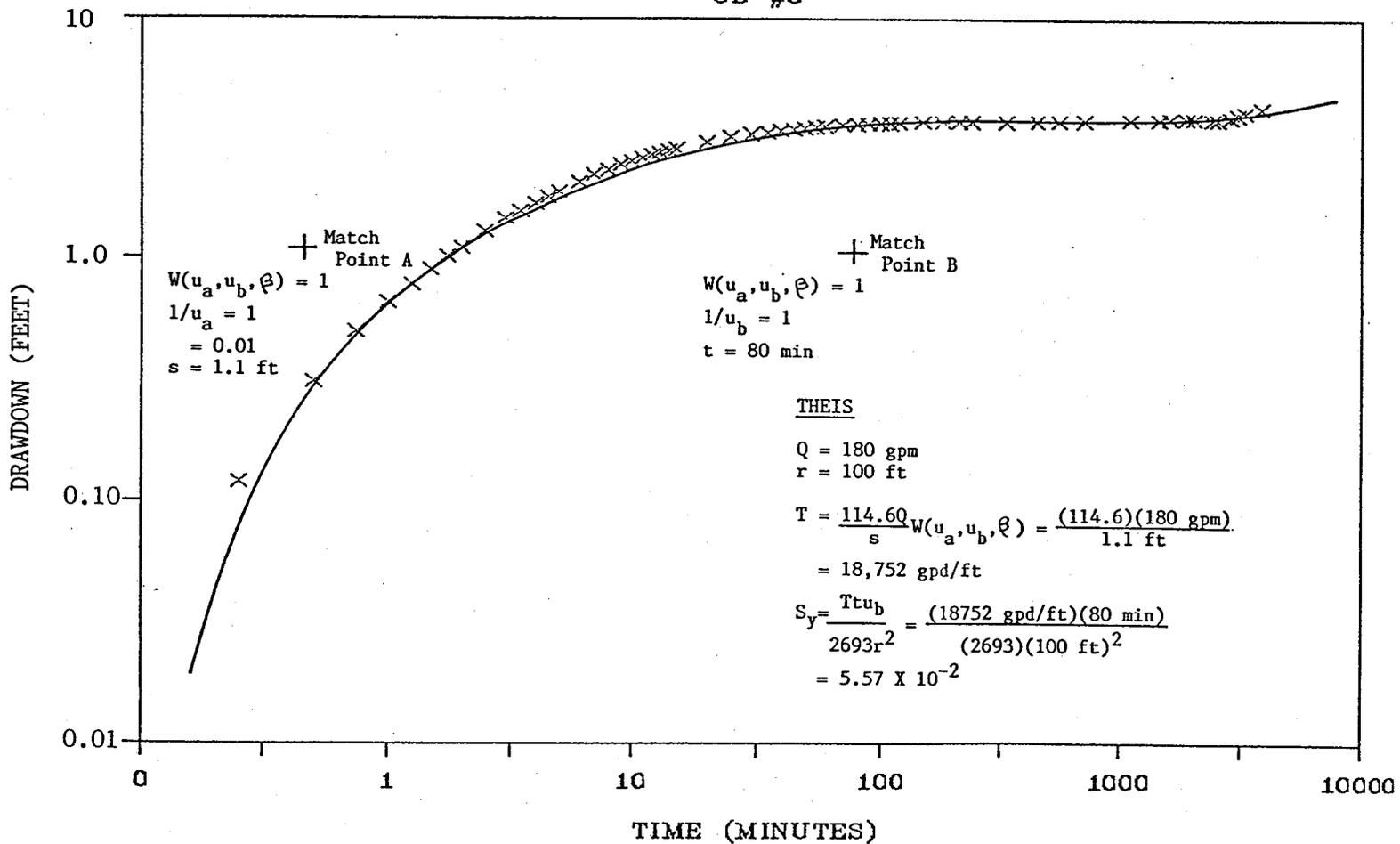


Figure 10: Log-Log Plot of Observed Drawdowns for OB #3

Table 2

Summary of Calculated Aquifer Characteristics

	Transmissivity	Specific Yield
OB #1	14,734 gpd/ft	0.1590
OB #2	14,734 gpd/ft	0.0535
OB #3	18,752 gpd/ft	0.0557
Average	16,073 gpd/ft	0.0900

present, crusts would form in the irrigation system pipes and tubing causing clogging of drip emitter or micro-jet holes plus numerous other problems. The only feasible method of treating the water and achieving acceptable iron levels before distribution into the irrigation system, is to allow the ferric iron to precipitate and settle to the bottom of a lake. If wells are installed, the water would have to be pumped into a lake or holding pond before use. Since the production zone is very shallow, 15 to 30 feet below land surface, it would be more economical to create several lakes to a depth of at least 20 feet below land surface, and pump from the lakes rather than install numerous wells that would have to be pumped into a lake before use.

Projected water level declines in the aquifer from lake withdrawals can be assessed by assuming the withdrawals are from wells and using a Theis computer model to project the extent of the drawdowns. This approach was used with the following input parameters for the model: transmissivity of 16,073 gpd/ft, specific yield of 0.09, no rainfall, pumping 1.0 mgd from two wells.

Because the project will be developed in phases, a withdrawal rate of 1.0 mgd was used to estimate the effects of pumpage on the aquifer. The results of the modeling effort project the drawdowns to be minimal, as presented in Figure 11. These projected drawdowns will not adversely impact other legal existing users or any environmental features.

CONCLUSIONS

The project site was investigated to determine the availability of water from the Water Table aquifer for irrigation purposes. From the analysis of the test data, the following is concluded:

1. Adequate water is available from the Water Table aquifer for the irrigation needs of this project.
2. The aquifer characteristics determined for the Water Table aquifer at this site are a transmissivity of 16,073 gpd/ft and a specific yield of 0.09.
3. Withdrawals of 1.0 mgd, assuming no rainfall, will not adversely impact legal existing uses or any environmental features.
4. The water in the Water Table aquifer has a very high concentration of iron, both in the ferric and ferrous state.
5. Withdrawals from wells completed into the Water Table aquifer would have to be limited to approximately 200 gpm to produce efficiently.

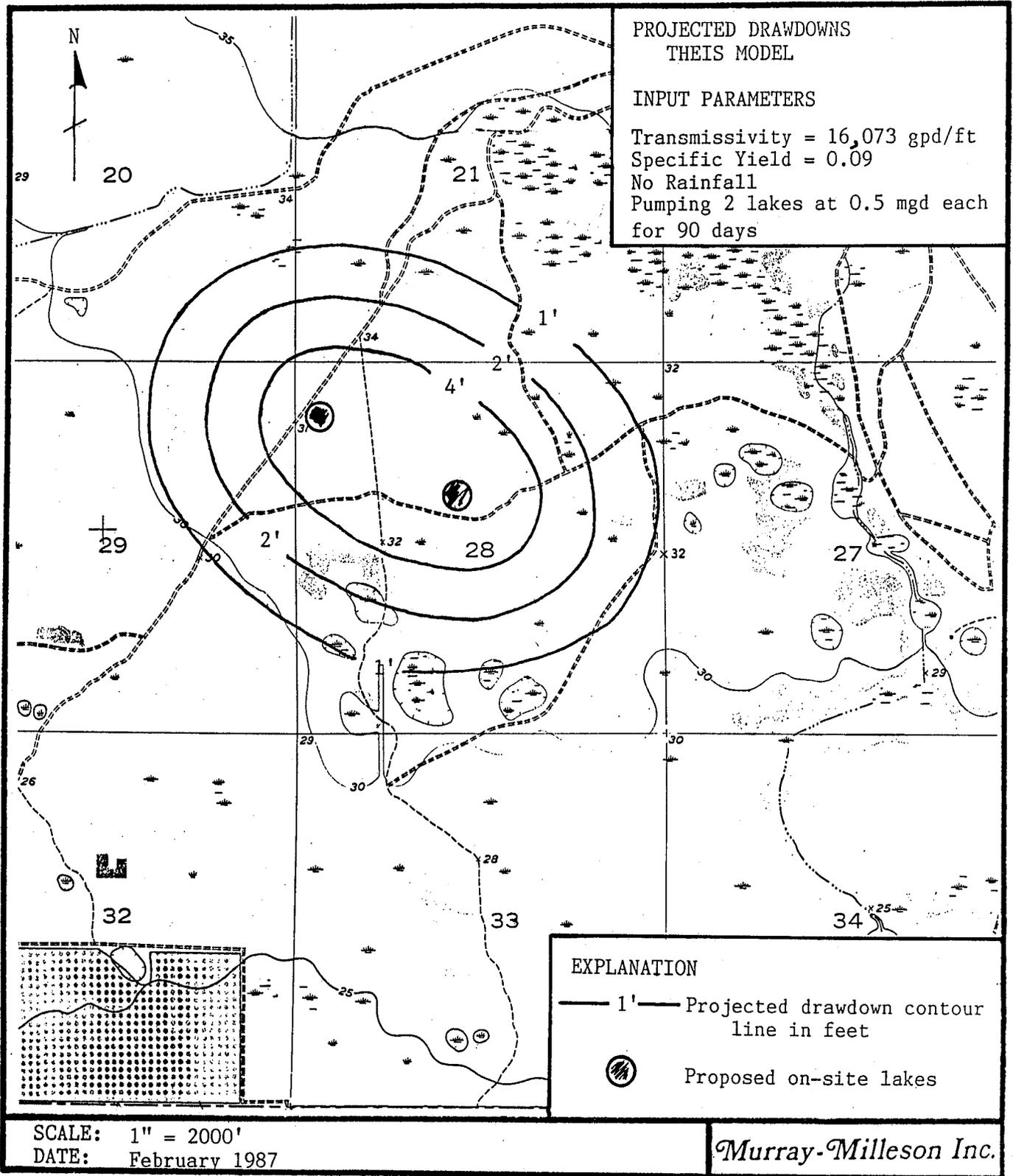


Figure 11: Projected Drawdowns in the Water Table Aquifer
 Withdrawing 1.0 MGD from On-site Lakes

BIBLIOGRAPHY

DuBar, J. R., 1958, Stratigraphy and Paleontology of the Late Neogene Strata of the Caloosahatchee River Area of Southern Florida, Florida Geological Survey Bulletin No. 40.

Neuman, S. P., 1975, Analysis of pumping test data from anisotropic unconfined aquifers considering delayed gravity response, Water Resources Research, Vol. 11, No. 2.

Walton, W. C., 1984, Practical Aspects of Groundwater Modeling, National Water Well Association.

APPENDIX

LITHOLOGIC DESCRIPTION

ALBAN-GOULD

TEST PRODUCTION WELL

DEPTH	DESCRIPTION
0-3'	Sand, light brown, fine to coarse grained, subangular
3-7'	Sand, dark brown to dark rust, silt to very fine grained, subangular to subrounded
7-8'	Sand, light brownish gray, silt to fine grained, subangular to subrounded; minor clay
8-13'	Sandy clay, light greenish gray to dark yellowish brown
13-14'	Sandy limestone, white, friable
14-30'	Fossiliferous limestone, white to very pale orange; minor dolomite-silt; pelecypods and gastropods
30-38'	Sandy clay, light gray; limestone
38-40'	Sandy clay, olive gray; minor phosphate
40-42'	Clay, dark greenish gray; minor very fine sand

LITHOLOGIC DESCRIPTION

ALBAN-GOULD

OBSERVATION WELL #1

DEPTH	DESCRIPTION
0-3'	Sand, light brown, fine to coarse grained, subangular
3-5'	Sand, dark brown, silt to very fine grained, subangular to subrounded
5-6'	Sand, light brownish gray, silt to fine grained, subangular to subrounded; minor clay
6-10'	Sandy clay, light greenish gray to dark yellowish brown
10-12'	Sandy limestone, white, friable
12-29'	Fossiliferous limestone, white to very pale orange; minor dolomite-silt; pelecypods and gastropods
29-38'	Sandy clay, light gray; limestone
38-40'	Sandy clay, olive gray; minor phosphate
40-42'	Clay, dark greenish gray; minor very fine sand

LITHOLOGIC DESCRIPTION

ALBAN-GOULD

OBSERVATION WELL #2

DEPTH	DESCRIPTION
0-3'	Sand, light brown, fine to coarse grained, subangular
3-5'	Sand, dark brown, silt to very fine grained, subangular to subrounded
5-6'	Sand, light brownish gray, silt to fine grained, subangular to subrounded; minor clay
6-10'	Sandy clay, light greenish gray to dark yellowish brown
10-12'	Sandy limestone, white, friable
12-30'	Fossiliferous limestone, white to very pale orange; minor dolomite-silt; pelecypods and gastropods
30-38'	Sandy clay, light gray; limestone
38-40'	Sandy clay, olive gray; minor phosphate
40-42'	Clay, dark greenish gray; minor very fine sand

LITHOLOGIC DESCRIPTION

ALBAN-GOULD

OBSERVATION WELL #3

DEPTH	DESCRIPTION
0-3'	Sand, light brown, fine to coarse grained, subangular
3-5'	Sand, dark brown, silt to very fine grained, subangular to subrounded
5-8'	Sand, light brownish gray, silt to fine grained, subangular to subrounded; minor clay
8-13'	Sandy clay, light greenish gray to dark yellowish brown
13-14'	Sandy limestone, white, friable
14-30'	Fossiliferous limestone, white to very pale orange; minor dolo-silt; pelecypods and gastropods
30-40'	Sandy clay, light gray; limestone
40-45'	Sandy clay, olive gray
45-60'	Clay, dark greenish gray; minor very fine sand
60-75'	Clay, dark greenish gray

STEP DRAWDOWN TEST

PERMIT #: APPLICATION #:
 PROJECT NAME: Alban-Gould Grove LOCATION: S 28 T 42 R 28
 TEST DATE: 1/23/87 TEST OPERATOR: G. Milleson
 WEATHER CONDITIONS: cloudy
 PUMP HORSE POWER: 5 H.P. DISCHARGE DIAMETER (IN): 3
 FLOW METER TYPE: orifice/manometer

STATIC WATER LEVEL (FT BELOW TOC) 2.28

DISCHARGE RATE (GPM)	TIME (MIN)	DEPTH FROM TOC TO WATER (FT)	DRAWDOWN (FT)	CHLORIDE CONC. (MG/L)	CONDUCTIVITY (MICROMHOS/CM)
110	3	6.66	4.38		
	6	6.98	4.70		
	9	7.16	4.88		
	12	7.30	5.02		
	15	7.40	5.12		
	18	7.48	5.20		
	22	7.56	5.28		
	24	7.60	5.32		
	27	7.64	5.36		
135	30	9.20	6.92		
	33	9.40	7.12		
	36	9.50	7.22		
	39	9.55	7.27		
165	42	11.40	9.12		
	45	11.50	9.22		
	48	11.90	9.62		
	51	12.10	9.82		
	54	12.20	9.92		

AQUIFER PERFORMANCE TEST FORM

NAME: Alban-Gould Grove
 PROJECT NAME:

DATE OF TEST: 1/20/87
 LOCATION: S 28 T 42 R 28

DISTANCE FROM PUMPED WELL: 100 FEET WEATHER CONDITIONS: clear
 PUMPING RATE: 180 GPM

WELL #: OB #1 STATIC W L (FT BELOW TOC) 3.13

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
0.25	3.40	0.27
0.50	3.73	0.60
0.75	4.00	0.87
1.00	4.23	1.10
1.25	4.43	1.30
1.50	4.63	1.50
1.75	4.81	1.68
2.00	4.98	1.83
2.50	5.23	2.10
3.00	5.44	2.31
3.50	5.63	2.50
4.00	5.89	2.76
4.50	5.93	2.80
5.00	6.05	2.92
6.00	6.26	3.13
7.00	6.43	3.30
8.00	6.58	3.45
9.00	6.70	3.57
10.00	6.80	3.67
11.00	6.90	3.77
12.00	6.98	3.85
13.00	7.06	3.93
14.00	7.11	3.98
15.00	7.17	4.04

PROJECT: Alban-Gould

DATE: 1/20/87

WELL#: OB #1

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

20.00	7.38	4.25
25.00	7.52	4.39
30.00	7.62	4.49
35.00	7.70	4.57
40.00	7.76	4.63
45.00	7.81	4.68
50.00	7.84	4.71
55.00	7.86	4.73
60.00	7.89	4.76
70.00	7.93	4.80
80.00	7.96	4.83
90.00	7.97	4.84
100.00	7.98	4.85
110.00	8.00	4.87
120.00	8.02	4.89
150.00	8.04	4.91
180.00	8.06	4.93
210.00	8.07	4.94
240.00	8.03	4.90
330.00	8.03	4.90
450.00	8.04	4.91
570.00	8.03	4.90
720.00	8.04	4.91
1110.00	8.02	4.89
1470.00	8.02	4.89
1620.00	8.04	4.91
1890.00	8.03	4.90

PROJECT: Alban-Gould DATE: 1/20/87

WELL#: OB #1

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

2040.00	8.02	4.89
2430.00	8.02	4.89
2550.00	8.02	4.89
2880.00	8.17	5.04
3060.00	8.26	5.13
3330.00	8.33	5.20
3840.00	8.45	5.32

AQUIFER PERFORMANCE TEST FORM

NAME: Alban-Gould Grove
 PROJECT NAME:

DATE OF TEST: 1/20/87
 LOCATION: S 28 T 42 R 28

DISTANCE FROM PUMPED WELL: 300 FEET WEATHER CONDITIONS: clear
 PUMPING RATE: 180 GPM
 WELL #: OB #2 STATIC W L (FT BELOW TOC) 2.84

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
0.25	2.84	0
0.50	2.84	0
0.75	2.85	0.01
1.00	2.86	0.02
1.25	2.88	0.04
1.50	2.90	0.06
1.75	2.93	0.09
2.00	2.95	0.11
2.50	3.05	0.21
3.00	3.20	0.36
3.50	3.25	0.41
4.00	3.28	0.44
4.50	3.33	0.49
5	3.42	0.58
6	3.58	0.74
7	3.69	0.85
8	3.80	0.96
9	3.90	1.06
10	3.98	1.14
11	4.03	1.19
12	4.12	1.28
13	4.19	1.35
14	4.25	1.41
15	4.30	1.46

PROJECT: Alban-Gould

DATE: 1/20/87

WELL#: OB #2

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

20	4.52	1.68
25	4.69	1.85
30	4.80	1.96
35	4.90	2.06
40	4.99	2.15
45	5.04	2.2
50	5.09	2.25
55	5.14	2.3
60	5.16	2.32
70	5.22	2.38
80	5.27	2.43
90	5.29	2.45
100	5.32	2.48
110	5.33	2.49
120	5.36	2.52
150	5.39	2.55
180	5.42	2.58
210	5.44	2.6
240	5.44	2.6
330	5.44	2.6
450	5.48	2.64
570	5.48	2.64
720	5.50	2.66
1110	5.51	2.67
1470	5.52	2.68
1620	5.57	2.73
1890	5.58	2.74

PROJECT: Alban-Gould

DATE: 1/20/87

WELL#: OB #2

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

2040

5.58

2.74

2430

5.58

2.74

2700

5.58

2.74

2880

5.58

2.74

3060

5.60

2.76

3330

5.68

2.84

3840

5.83

2.99

AQUIFER PERFORMANCE TEST FORM

NAME: Alban-Gould Grove
 PROJECT NAME:

DATE OF TEST: 1/20/87
 LOCATION: S 28 T 42 R 28

DISTANCE FROM PUMPED WELL: 100 FEET WEATHER CONDITIONS: clear

PUMPING RATE: 180 GPM

WELL #: OB #3 STATIC W L (FT BELOW TOC) 3.16

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
0.25	3.28	0.12
0.50	3.47	0.31
0.75	3.66	0.50
1.00	3.82	0.66
1.25	3.94	0.78
1.50	4.06	0.90
1.75	4.18	1.02
2.00	4.27	1.11
2.50	4.46	1.30
3.00	4.64	1.48
3.50	4.75	1.59
4.00	4.88	1.72
4.50	4.98	1.82
5.00	5.08	1.92
6.00	5.26	2.10
7.00	5.42	2.26
8.00	5.52	2.36
9.00	5.64	2.48
10.00	5.72	2.56
11.00	5.80	2.64
12.00	5.88	2.72
13.00	5.94	2.78
14.00	6.00	2.84
15.00	6.05	2.89

PROJECT: Alban-Gould DATE: 1/20/87

WELL#: OB #3

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

20.00	6.25	3.09
25.00	6.40	3.24
30.00	6.49	3.33
35.00	6.56	3.40
40.00	6.63	3.47
45.00	6.66	3.50
50.00	6.70	3.54
55.00	6.73	3.57
60.00	6.75	3.59
70.00	6.79	3.63
80.00	6.82	3.66
90.00	6.84	3.68
100.00	6.86	3.70
110.00	6.87	3.71
120.00	6.88	3.72
150.00	6.91	3.75
180.00	6.92	3.76
210.00	6.94	3.78
240.00	6.94	3.78
330.00	6.94	3.78
450.00	6.97	3.81
570.00	6.96	3.80
720.00	6.98	3.82
1110.00	6.99	3.83
1470.00	7.00	3.84
1620.00	7.02	3.86
1890.00	7.02	3.86

PROJECT: Alban-Gould

DATE: 1/20/87

WELL#: OB #3

TIME
(IN MINUTES)

WATER LEVEL
FROM TOC

DRAWDOWN
IN FEET

2040.00

7.02

3.86

2430.00

7.01

3.85

2550.00

7.01

3.85

2880.00

7.08

3.92

3060.00

7.18

4.02

3330.00

7.28

4.12

3840.00

7.45

4.29