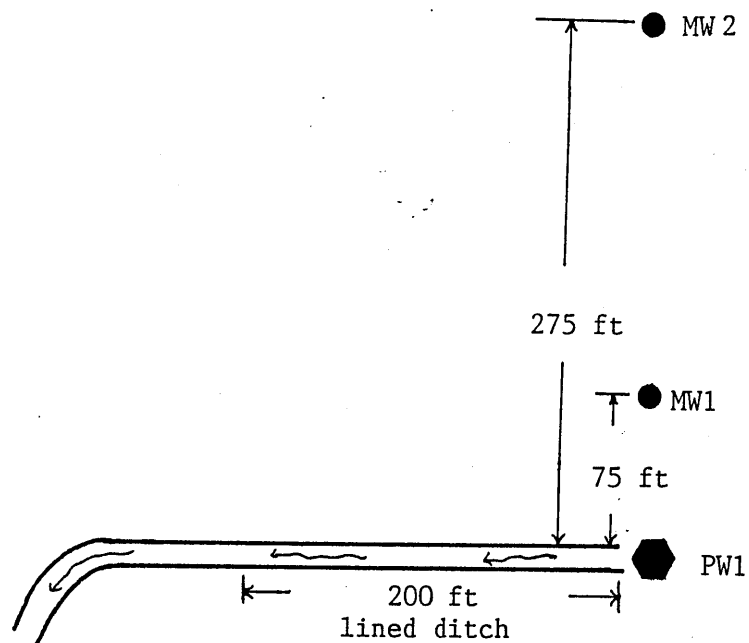


TABLE 1  
COLLIER ENTERPRISES  
WELL DESCRIPTIONS

WELL #	PW1	MW1	MW2
DIAMETER	12"	4"	4"
TOTAL DEPTH	165'	84'	150'
CASED DEPTH	40'	42'	100'
SCREENED INTERVAL	40'-80' 100'-150'	42'-84'	100'-150'



SCALE: 1" = 100'  
DATE: July 1986

*Murray-Milleson Inc.*

Figure 4: Test Site Set-up

Figure 6: Log-Log Plot of Observed Drawdowns of MW1

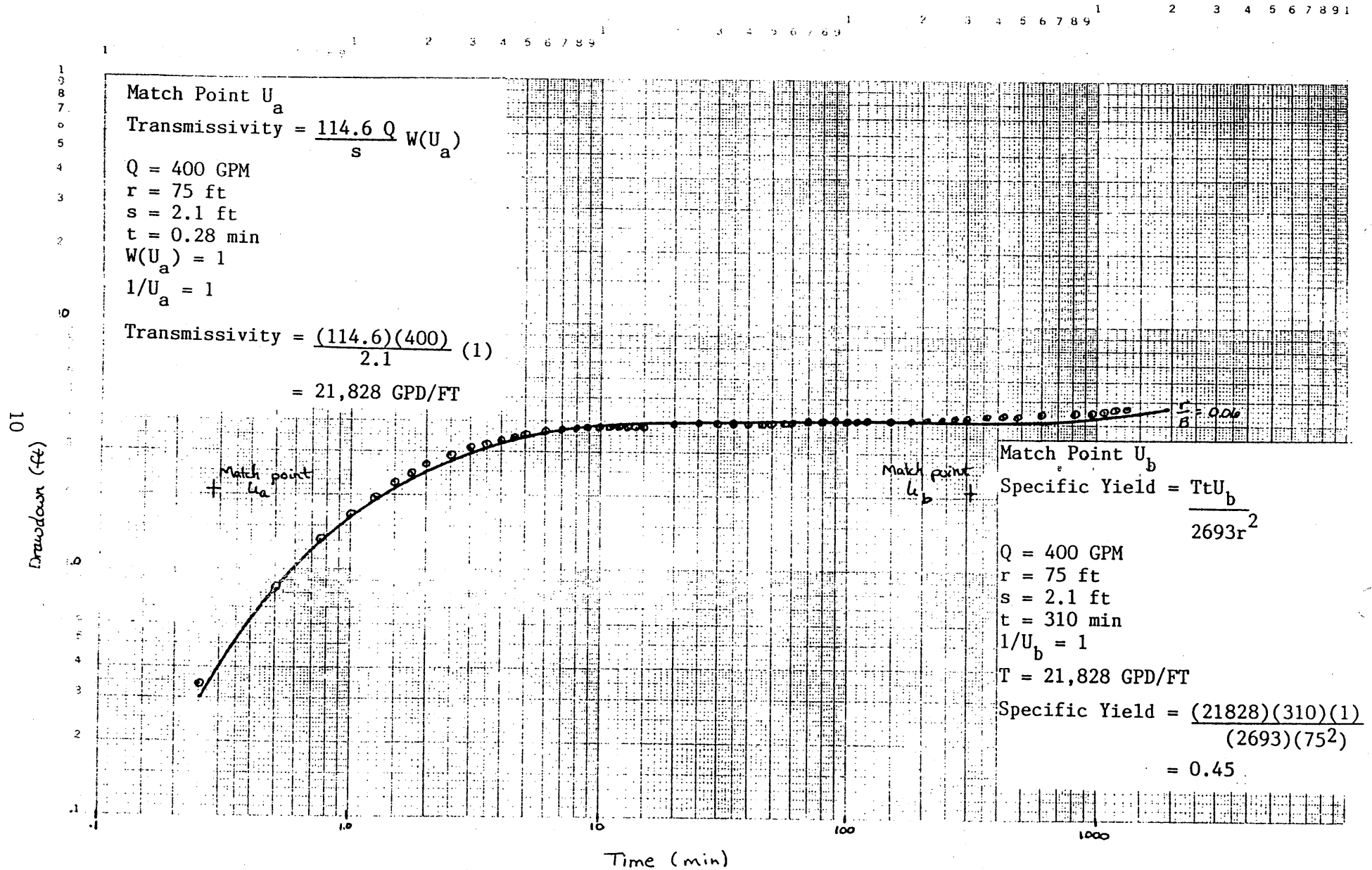


Figure 7: Log-Log Plot of Observed Drawdowns of MW2

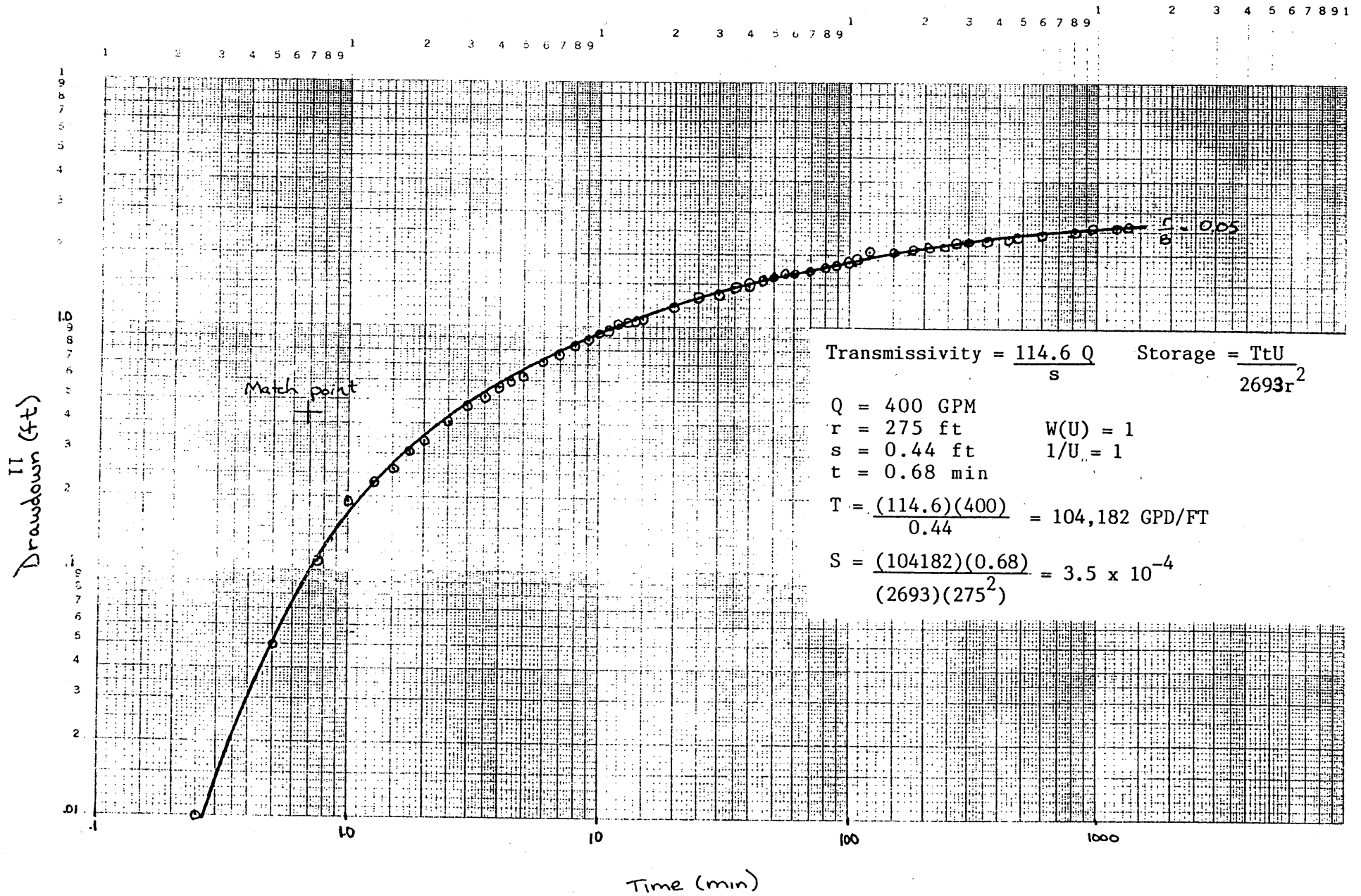


table or unconfined aquifer. Apparently the first clayey sand layer does not contain sufficient clay to act as a confining bed. The second clay layer, however, is a confining bed, because MW2 responded as a leaky aquifer.

A summary of the aquifer characteristics, as calculated from this test, for the water table aquifer is presented in Table 2 and for the Lower Tamiami Aquifer in Table 3. Also presented in Table 3 are the calculations used to determine the leakage from the confining bed.

Because of the concerns of potential impacts on wetlands from pumpage, the water table aquifer is not recommended for large withdrawals for irrigation. The aquifer characteristics calculated from this test indicate that drawdowns of over a foot would extend 700 to 1000 feet from the pumped well, pumping 405,000 gpd for 30 days, Figure 10.

To determine the well spacing of the wellfield, the projected drawdown from one well was modeled using the calculated parameters for the Lower Tamiami Aquifer. The model used is a steady-state model with the following input parameters:

Transmissivity	104,182 gpd/ft
Leakance	0.004 gpd/ft <sup>3</sup>
Pumping	405,000 gpd
Zero rainfall.	

As shown in Figure 11, the one-foot drawdown is 1500 feet from the pumped well. Assuming that the aquifer will respond similarly to the tested well, the wells should be spaced 1500 - 2000 feet apart. This spacing will minimize well interference, therefore increasing well efficiency.

TABLE 2  
SUMMARY OF AQUIFER CHARACTERISTICS DETERMINED FROM TESTS  
FOR THE WATER TABLE AQUIFER

	<u>Transmissivity</u>	<u>Specific Yield</u>
Step Drawdown Test	35,200 GPD/FT	-
Aquifer Performance Test	21,828 GPD/FT	0.45 (dimensionless)

TABLE 3

SUMMARY OF AQUIFER CHARACTERISTICS DETERMINED FROM TESTS  
FOR THE TAMIAMI AQUIFER

	<u>Transmissivity</u>	<u>Storage</u>	<u>Leakance</u>
Step Drawdown Test	35,200 GPD/FT	-	-
Aquifer Performance Test	104,182 GPD/FT	$3.5 \times 10^{-4}$	** $4.0 \times 10^{-3}$ GPD/FT <sup>3</sup>

\*\* Estimated using the following equation:  $L = \frac{K'}{b'}$  where:  $K'$  = Hydraulic Conductivity of the Confining bed, GPD/FT<sup>2</sup>

$b'$  = Thickness of Confining Bed, FT

Average  $K'$  for sandy clay is about 0.1 GPD/FT<sup>2</sup> (Driscoll, 1986).  
 $b' = 25$  FT

$$L = \frac{0.1 \text{ GPD/FT}^2}{25 \text{ FT}} \\ = 4.0 \times 10^{-3} \text{ GPD/FT}^3$$

OR

Using Hantush-Jacob equations:  $K' = \frac{Tb'(r/B)^2}{r^2}$

$$= \frac{(104182 \text{ GPD/FT})(25 \text{ FT})(0.05^2)}{(275 \text{ FT})^2}$$

$$= 8.6 \times 10^{-2} \text{ GPD/FT}^2$$

$$L = \frac{0.086 \text{ GPD/FT}^2}{25 \text{ FT}} \\ = 3.4 \times 10^{-3} \text{ GPD/FT}^3$$

## CONCLUSIONS

The results of the study indicates that production well 1 is open to both the water table aquifer and the Lower Tamiami Aquifer. The aquifer characteristics are as follows:

### Water Table Aquifer

Transmissivity	21,828 gpd/ft
Specific yield	0.45

### Lower Tamiami Aquifer

Transmissivity	104,182 gpd/ft
Storage coefficient	0.00035
Leakance	0.004 gpd/ft <sup>3</sup>

The Lower Tamiami Aquifer responds as a semi-confined or leaky aquifer. The water table aquifer responds as an unconfined aquifer.

## RECOMMENDATIONS

Based on the results of this study the following recommendations are made:

1. The production well spacing should be 1500 - 2000 feet apart to reduce well interference. Figure 12 shows recommended well locations based on this spacing. Only a few wells have been relocated from the original plan.
2. The wells should be constructed so that withdrawals are not made from the water table aquifer, to avoid potential impacts on surface wetlands. Withdrawals should come from the Lower Tamiami Aquifer. This aquifer in this area appears to be between 100 to 200 feet below land surface.
3. The balance of the wells in the area west of the railroad tracks should be constructed to the specifications outlined in Table 4. Be advised that these specifications are only general guidelines. As the geology of the area varies, slightly different construction specifications will be required.
4. Production well 1 should not be pumped at a rate higher than 500 gpm. The drawdown in the well casing is extensive, and should be minimized, if possible.
5. The southern six wells should be limited to a discharge rate of between 450 and 550 gpm, in order to minimize the potential drawdown impacts on the surrounding area, including the City of Immokalee wellfield.



## AQUIFER PERFORMANCE TEST FORM

NAME: Collier Enterprises  
PROJECT NAME:

DATE OF TEST: 7/12/86  
LOCATION: S34 T46S R29E

DISTANCE FROM PUMPED WELL: 75 FEET WEATHER CONDITIONS: Clear  
PUMPING RATE: 400 GPM  
WELL #: MW1 STATIC W L (FT BELOW TOC) 4.46

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
0.25	4.8	0.34
0.50	5.3	0.84
0.75	5.77	1.31
1.00	6.14	1.68
1.25	6.43	1.97
1.50	6.69	2.23
1.75	6.92	2.46
2.00	7.15	2.69
2.50	7.38	2.92
3.00	7.59	3.13
3.50	7.72	3.26
4.00	7.83	3.37
4.50	7.92	3.46
5	7.99	3.53
6	8.08	3.62
7	8.17	3.71
8	8.22	3.76
9	8.25	3.79
10	8.27	3.81
11	8.28	3.82
12	8.29	3.83
13	8.29	3.83
14	8.29	3.83
15	8.29	3.83

PROJECT: Collier Ent.

DATE: 7/12/86

WELL#: MW1

TIME  
(IN MINUTES)WATER LEVEL  
FROM TOCDRAWDOWN  
IN FEET

20	8.38	3.92
25	8.42	3.96
30	8.43	3.97
35	8.43	3.97
40	8.43	3.97
45	8.43	3.97
50	8.43	3.97
55	8.45	3.99
60	8.48	4.02
70	8.52	4.06
80	8.53	4.07
90	8.56	4.1
100	8.57	4.11
110	8.6	4.14
120	8.6	4.14
150	8.61	4.15
180	8.62	4.16
210	8.64	4.18
240	8.65	4.19
270	8.67	4.21
300	8.67	4.21
360	8.75	4.29
420	8.79	4.33
480	8.81	4.35
540		
600	8.87	4.41
660		

PROJECT: Collier Ent.

DATE: 7/12/86

WELL#: MW1

TIME  
(IN MINUTES)

WATER LEVEL  
FROM TOC

DRAWDOWN  
IN FEET

720

780

810

8.92

4.46

900

960

8.98

4.52

1020

1080

9.05

4.59

1140

1200

9.1

4.64

1320

9.18

4.72

1380

9.19

4.73

1620

1860

2100

2340

2580

2820

3060

3300

3540

3780

4020

# AQUIFER PERFORMANCE TEST FORM

NAME: Collier Enterprises  
PROJECT NAME:

DATE OF TEST: 7/12/86  
LOCATION: S34 T46S R29E

DISTANCE FROM PUMPED WELL: 75 FEET WEATHER CONDITIONS: Clear  
PUMPING RATE: 400 GPM  
WELL #: MW1 STATIC W L (FT BELOW TOC): 9.19

TIME (IN MINUTES)	WATER LEVEL FROM TOC	RECOVERY IN FEET
0.25	8.97	0.22
0.50	8.61	0.58
0.75	8.14	1.05
1.00	7.73	1.46
1.25	7.41	1.78
1.50	7.3	1.89
1.75	7.02	2.17
2.00	6.82	2.37
2.50	6.58	2.61
3.00	6.35	2.84
3.50	6.24	2.95
4.00	6.11	3.08
4.50	6.03	3.16
5	5.96	3.23
6	5.86	3.33
7	5.8	3.39
8	5.75	3.44
9	5.7	3.49
10	5.67	3.52
11	5.65	3.54
12	5.63	3.56
13	5.61	3.58
14	5.59	3.6
15	5.58	3.61

PROJECT: Collier Ent.

DATE: 7/12/86

WELL#: MW1

TIME (IN MINUTES)	WATER LEVEL FROM TOC	RECOVERY IN FEET
20	5.54	3.65
25	5.51	3.68
30	5.49	3.7
35	5.47	3.72
40	5.45	3.74
45	5.45	3.74
50	5.43	3.76
55	5.41	3.78
60	5.41	3.78
70		
80		
90		
100		
110		
120		
150		
180		
210		
240		
270		
300		
360		
420		
480		
540		
600		
660		

## AQUIFER PERFORMANCE TEST FORM

NAME: Collier Enterprises  
PROJECT NAME:

DATE OF TEST: 7/12/86  
LOCATION: S27 T46S R29E

DISTANCE FROM PUMPED WELL: 275 FEET WEATHER CONDITIONS: Clear  
PUMPING RATE: 400 GPM  
WELL #: MW2 STATIC W L (FT BELOW TOC) 7.44

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
0.25	7.44	0
0.50	7.49	0.05
0.75	7.55	0.11
1.00	7.63	0.19
1.25	7.67	0.23
1.50	7.7	0.26
1.75	7.75	0.31
2.00	7.78	0.34
2.50	7.85	0.41
3.00	7.91	0.47
3.50	7.95	0.51
4.00	8	0.56
4.50	8.04	0.6
5	8.07	0.63
6	8.16	0.72
7	8.22	0.78
8	8.28	0.84
9	8.33	0.89
10	8.37	0.93
11	8.41	0.97
12	8.45	1.01
13	8.48	1.04
14	8.51	1.07
15	8.53	1.09

PROJECT: Collier Ent.

DATE: 7/12/86

WELL#: MW2

TIME (IN MINUTES)	WATER LEVEL FROM TOC	DRAWDOWN IN FEET
20	8.65	1.21
25	8.75	1.31
30	8.83	1.39
35	8.89	1.45
40	8.94	1.5
45	9	1.56
50	9.04	1.6
55	9.07	1.63
60	9.09	1.65
70	9.17	1.73
80	9.22	1.78
90	9.27	1.83
100	9.31	1.87
110	9.35	1.91
120	9.49	2.05
150	9.49	2.05
180	9.53	2.09
210	9.6	2.16
240	9.63	2.19
270	9.67	2.23
300	9.71	2.27
360	9.75	2.31
420	9.8	2.36
480	9.83	2.39
540		
600	9.88	2.44
660		

PROJECT: Collier Ent.

DATE: 7/12/86

WELL#: MW2

TIME  
(IN MINUTES)

WATER LEVEL  
FROM TOC

DRAWDOWN  
IN FEET

720

780

810

9.93

2.49

900

960

9.96

2.52

1020

1080

9.99

2.55

1140

1200

10.01

2.57

1320

10.03

2.59

1680

1920

2160

2400

2640

2880

3120

3360

3600

3840

4080

4320