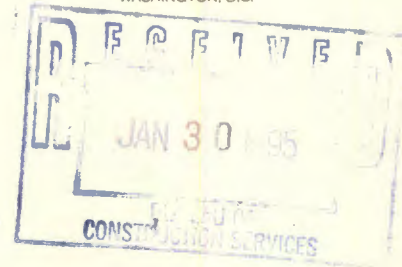


January 27, 1995

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Mr. David J. Chiusano, Project Manager
Bureau of Western Remedial Action
Division of Hazardous Waste Remediation
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010



**RE: NYSDEC STANDBY CONTRACT - W/A D002340-30
NORTH FRANKLIN STREET SITE RD/RA (SITE ID #8-49-002)
DRAFT PRE-DESIGN INVESTIGATION REPORT**

Dear Mr. Chiusano:

URS is pleased to submit this Draft Pre-Design Investigation Report incorporating the results of the site-wide groundwater monitoring and aquifer pump test.

As always, please contact us if you have any questions or comments.

Very truly yours,

URS CONSULTANTS, INC.

Dharmarajan R. Iyer, Ph.D.
Project Manager

Enc.

cc: Mr. D. Napier - NYSDOH
Mr. J. Gorton - URS
File: 35388.00 C-1



REMEDIAL DESIGN / REMEDIAL ACTION DRAFT DESIGN FIELD INVESTIGATION REPORT

WORK ASSIGNMENT NO. D002340-30

N. FRANKLIN STREET
WATKINS GLEN (V)

SITE NO. 8-49-002
SCHUYLER (C), NY



Prepared for:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York

Langdon Marsh, Commissioner

DIVISION OF HAZARDOUS WASTE REMEDIATION

Michael J. O'Toole, Jr., P.E. - Director

URS Consultants, Inc.

282 Delaware Avenue

Buffalo, New York 14202

January 1995

DRAFT REPORT
REMEDIAL DESIGN/REMEDIAL ACTION
PREDESIGN FIELD INVESTIGATION
AT THE
NORTH FRANKLIN STREET SITE
WATKINS GLEN (V), SCHUYLER (C), NEW YORK
SITE NUMBER 8-49-002

PREPARED FOR:

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION
WORK ASSIGNMENT D002340-30

JANUARY 1995

PREPARED BY:

URS CONSULTANTS, INC.
282 DELAWARE AVENUE
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- Appendix A-2 Water Level Measurements for Sitewide Sampling and Pumping Test
- Appendix B Well Boring Logs
- Appendix C Well Installation Reports
- Appendix D-1 Aquifer Pumping Test Data
- Appendix D-2 Data Plots
- Appendix D-3 Analytical Plots
- Appendix D-4 Validation of Results
- Appendix E Pumping Well (MW-20S) Design Calculation
- Appendix F Modifications to FS-Based Estimates Following Pump Test
- Appendix G Monitoring Well Purging Reports

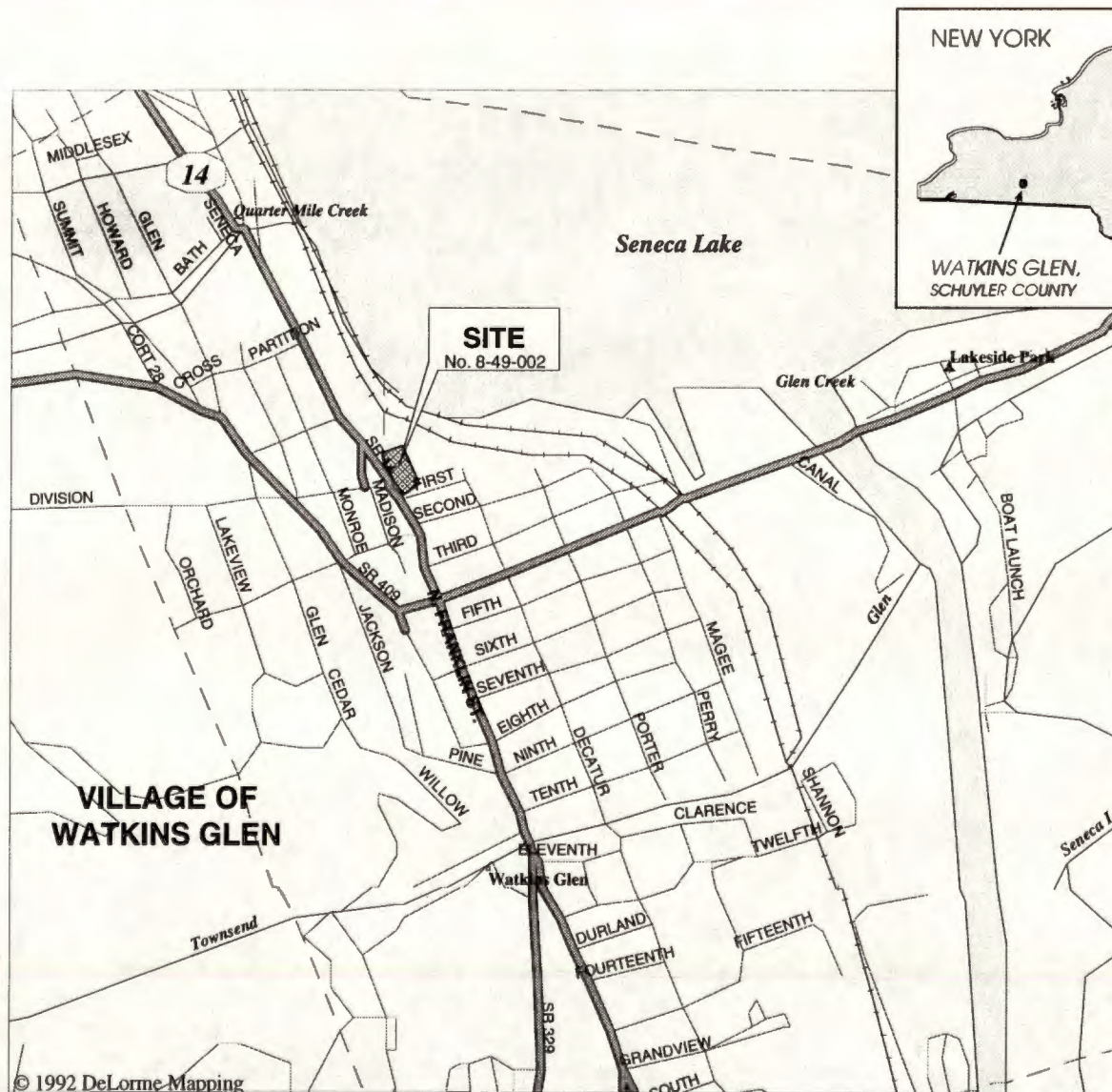
1.0 INTRODUCTION

The North Franklin Street Site is located in the Village of Watkins Glen, Schuyler County, New York (Figure 1-1). The disposal of perchloroethylene, a common dry cleaning solvent, in a storm sewer and on the ground surface adjacent to a former dry cleaning operation has contaminated soils and groundwater at the site. The Remedial Investigation/Feasibility Study (RI/FS), completed by URS in November 1992, identified the presence of site contaminants at concentrations requiring remediation and presented alternatives for remedial action. A Record of Decision (ROD) which documents the selected remedial measure was issued by the New York State Department of Environmental Conservation (NYSDEC) in January 1994.

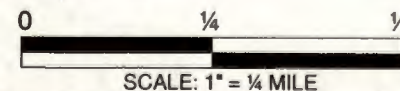
During the RI/FS, four separate areas within the project study area were identified for discussion purposes. These areas, which were defined as the dry cleaner area (DC), the Seneca Market-northeast area (SM), the SCIDA property (SCIDA), and site background areas (BG), are shown on Figure 1-2.

Soils and groundwater at the DC area are contaminated with relatively the highest levels of chlorinated hydrocarbons. A separate chlorinated hydrocarbon groundwater plume, attributable to contaminant transport through the storm sewer system, is also present in the northern portion of the SM area. Contamination at the SCIDA property, which is primarily attributable to past fuel spills at the site, has been referred to NYSDEC's Division of Spill Response.

This pre-design field investigation was conducted in support of the groundwater treatment system specified in the ROD. The purpose of the investigation is to acquire groundwater quality data on a site-wide basis to characterize current site conditions, and to acquire aquifer flow data required to design the groundwater treatment system. The field investigation consisted of environmental sampling of site groundwater and an aquifer pumping test. This report documents the results of these investigations.

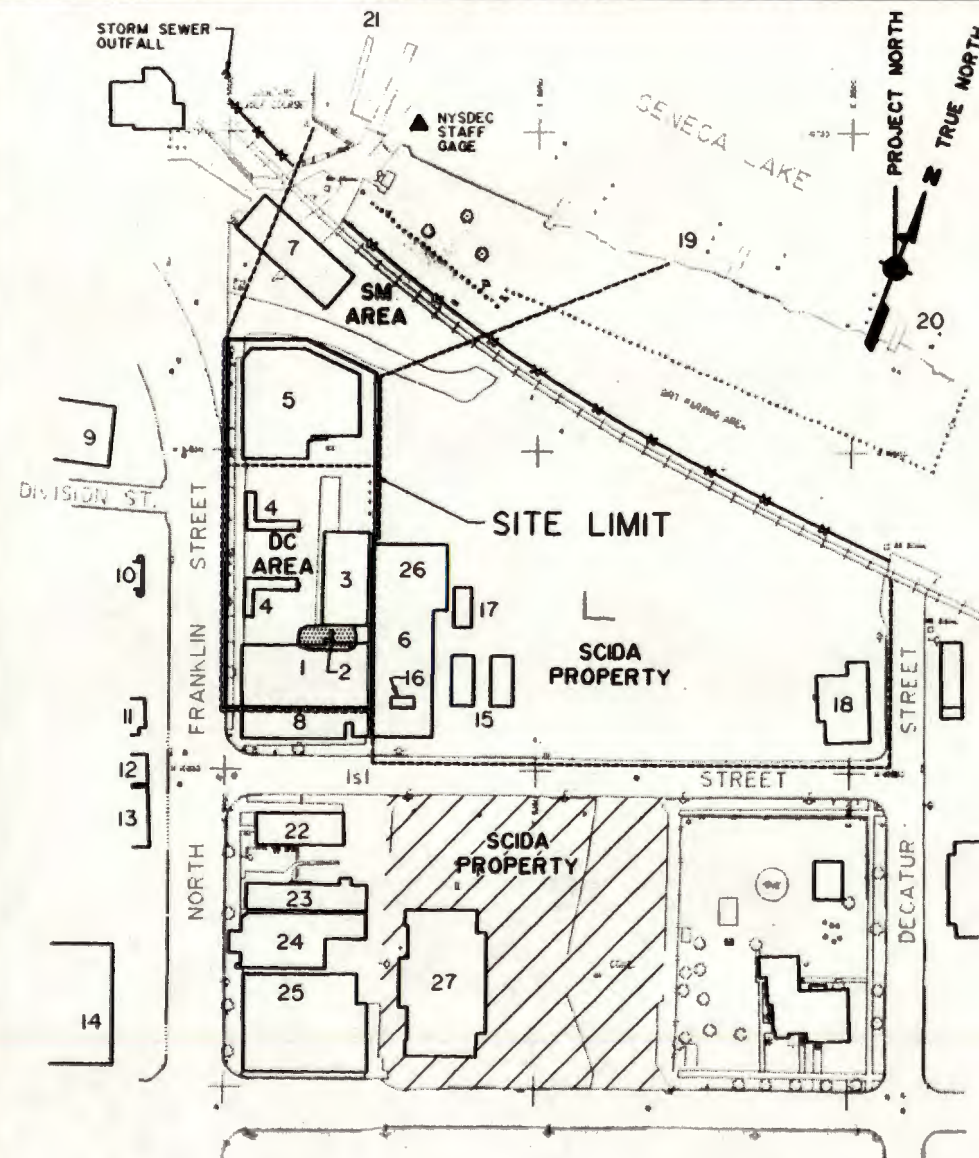


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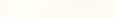
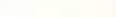
SITE LOCATION MAP

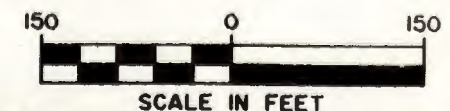
FIGURE 1-1

**FEATURE IDENTIFICATION**

1. ANTIQUE SHOP (FORMER DRY CLEANER)
2. CATCH BASIN
3. AUTO MUSEUM
4. BENCHES
5. SENECA MARKET (OLD FOUNDRY)
6. BUS GARAGE
7. FORMER TRAIN DEPOT (VACANT)
8. V.F.W. SHOP
9. VACANT GAS STATION
10. TEXACO GAS STATION
11. TEXACO SERVICE
12. ABANDONED SALT WELL
13. REAL ESTATE OFFICE
14. GEO CLIFFORD CAR DEALER
15. UST's (4,000 GALLONS EACH, REMOVED)
16. WASTE OIL UST (250 GALLON, REMOVED)
17. DIESEL OIL UST (11,000 GALLON, REMOVED)
18. FORMER ASPHALT COMPANY, ABANDONED
19. BOATING DOCK
20. 4" STORMWATER OUTFALL
21. STORMWATER OUTFALLS (2 LARGE, 1 SMALL)
22. ATTORNEYS AT LAW AND
5 LAKE DEVELOPMENT CORP.
23. MEMORIAL HOUSE
24. RESTAURANT
25. ANTIQUE SHOP
26. MEMORIAL STONE GARAGE
27. GUTHRIE MEDICAL CLINIC

LEGEND

-  DRY CLEANING SOLUTION DISPOSAL AREA
-  AREA BOUNDARIES (FROM TEXT)
-  DC - DRY CLEANER AREA
-  SM - SENECA MARKET - NORTHEAST AREA
-  SCIDA - SCHUYLER COUNTY INDUSTRIAL DEVELOPMENT ASSOCIATION
-  SITE LIMITS (NYSDEC # 8-49-002)
-  CHAIN LINK FENCE



2.0 SCOPE OF PREDESIGN FIELD INVESTIGATION

2.1 Environmental Sampling

Environmental sampling in support of this investigation consisted of a round of site-wide groundwater monitoring well sampling and daily groundwater sampling during the aquifer pumping test. All environmental samples were collected in laboratory-provided sample containers and shipped, under chain of custody control, to Inchcape Testing Services in Colchester, Vermont. All laboratory analyses were performed following the latest NYSDEC Analytical Services Protocol (ASP). The data generated during this investigation were reviewed by URS before acceptance. Sample results and the results of the URS data review are presented in Section 3 of this report and in Appendix A.

2.1.1 Site-wide Groundwater Sampling

Site-wide groundwater samples were collected in November 1994 at nineteen (19) of the site monitoring wells and analyzed for Target Compound List (TCL) volatile organic compounds (VOCs). Five (5) of those samples were also analyzed for Target Analyte List (TAL) metals. Table 2-1 summarizes all environmental sampling and analyses which were conducted during the predesign investigation. The results from the site-wide groundwater samples are discussed in Section 3.1.

Prior to monitoring well sampling, a minimum of 3 well volumes of water were recovered (purged) from each well to ensure the removal of water held in casing storage. This water was purged using a peristaltic pump with dedicated polyethelene tubing, drummed, and placed in the site drum storage area. The site-wide groundwater samples were collected using dedicated polyethylene disposable bailers.

2.1.2 Pumping Test Sampling

Daily groundwater samples were collected at the influent and effluent from the groundwater treatment system (i.e. a shallow tray air-stripper and cartridge filter) used for the

**TABLE 2-1
ENVIRONMENTAL SAMPLES AND ANALYSIS**

Sample ID	Analysis				Comments
	VOC	Metals	Iron	TSS	
MW-5S, MW-8S, MW-10S, MW-11S, MW-20S	X	X			Site-wide Groundwater Samples
MW-1S, MW-2S, MW-3S, MW-4S, MW-7S, MW-12S, MW-13S, MW-16S, MW-18S, MW-19S, MW-5D, MW-8D, MW-10D, MW-11D	X				Site-wide Groundwater Samples
MW-20S-01 IN	X	X		X	Pumping Test Day 1 Influent
MW-20S-01 EF	X	X		X	Pumping Test Day 1 Effluent
MW-20S-02 IN	X		X	X	Pumping Test Day 2 Influent
MW-20S-02 EF	X		X	X	Pumping Test Day 2 Effluent
MW-20S-03 IN	X		X	X	Pumping Test Day 3 Influent
MW-20S-03 EF	X		X	X	Pumping Test Day 3 Effluent

VOC - Volatile Organic Compounds

TSS - Total Suspended Solids

pumping test. The samples were obtained at sampling ports which were purged of standing water prior to the collection of each sample. The samples were analyzed for VOCs, Total Suspended Solids (TSS), and metals (or iron only) as indicated on Table 2-1. The results of the pumping test samples are discussed in Section 3.2.

2.2 Aquifer Testing

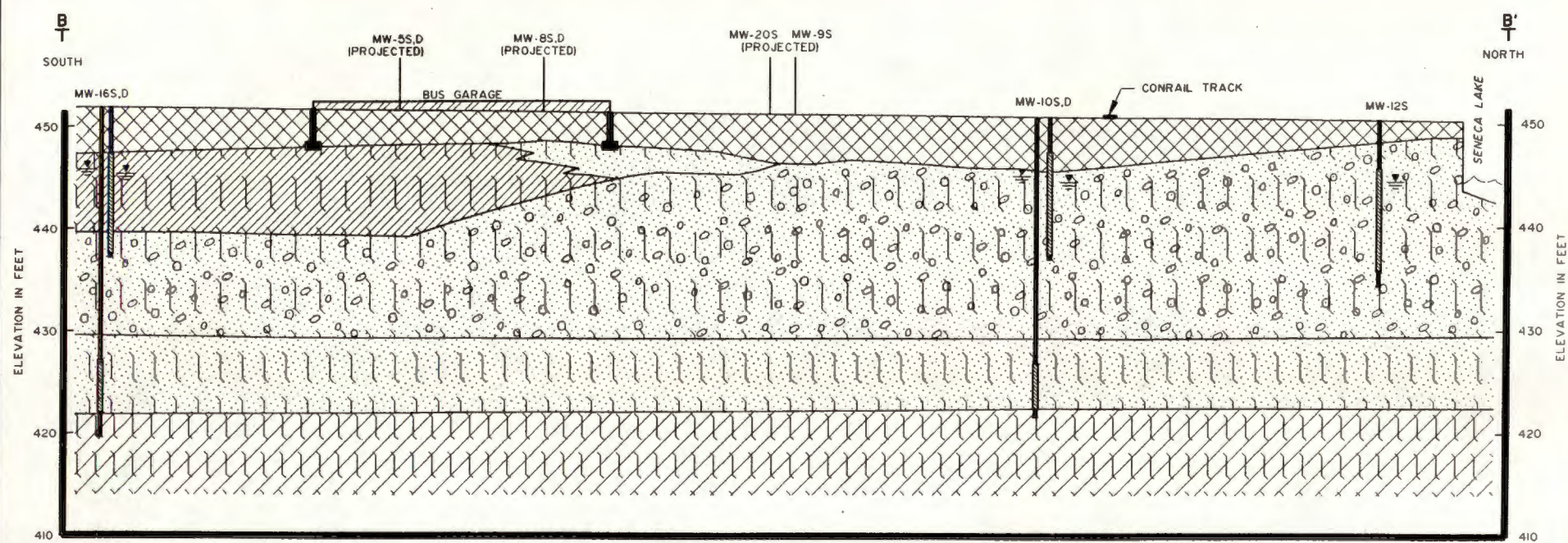
The aquifer testing program included a step-drawdown test conducted on January 3, 1995 and a 72-hour pumping test conducted between January 4 and January 7, 1995. Groundwater extracted during the aquifer test was treated on site using a portable air stripper and metals filter cartridges. The water was then discharged, with NYSDEC approval, into the village storm sewer system.

In order to monitor groundwater elevations close to the pumping well, 4 observation wells (OW-1, OW-2, OW-3 and OW-4) were installed in December 1994. These wells were constructed with 10-foot lengths of 2-inch PVC screen which were set to a depth of 18 feet. The observation wells were completed with 2-inch PVC riser and flush-mount protective casings. Boring logs and well construction details are included in Appendices B and C, respectively. The observation wells were surged and purged using hand bailers prior to the start of the 72-hour pumping test. Approximately 8 to 10 gallons of water was removed from each observation well and staged at the site drum containment area in a steel 55-gallon drum.

2.2.1 Site Geology

The site geology is discussed in detail in the Final RI Report (URS, August 1993) and described briefly herein. Five soil units which were identified during the RI are shown on Figure 2-1. These units comprise, from top to bottom, fill, upper clayey silt/silty sand, silty sand and gravel, silty sand/sandy silt and lower clayey silt. The shallow sand and gravel aquifer is overlain in places, by one to two feet of clayey or silty sand (which correlates with the upper clayey silt unit to the south). The silty sand is absent, however, at OW-2 (where it was apparently replaced with fill) and at MW-9S (where the unit apparently pinches out). The shallow sand and gravel aquifer which contains variable quantities of silt, appears to become

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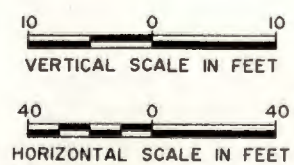
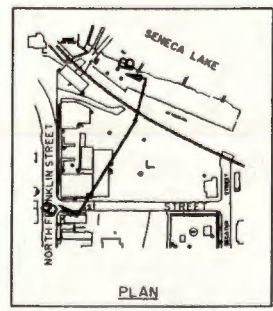
LEGEND

MW-6S — MONITORING WELL NUMBER
— WATER TABLE (12/18/92)
— SCREENED INTERVAL OF MONITORING WELL
— BOTTOM OF BORING (WIDTH NOT TO SCALE)
S - SHALLOW OVERBURDEN WELL
D - DEEP OVERBURDEN WELL
— GARAGE FOOTING (WIDTH NOT TO SCALE)

LEGEND

— FILL (SM/GM/SW/GW)
— UPPER CLAYEY SILT (MH/ML)
— SILTY SAND AND GRAVEL (SM/GM/SP/GP)
— SILTY SAND/SANDY SILT (SM/ML)
— LOWER CLAYEY SILT (MH/ML)

NOTES:
1. VERTICAL DATUM BASED ON DATUM AT SAILORS MONUMENT (SEE TEXT)
2. GEOLOGIC CONDITIONS SHOWN ARE REPRESENTATIVE OF CONDITIONS ENCOUNTERED AT EACH BORING LOCATION TO THE DEPTH DRILLED. EXTRAPOLATIONS BETWEEN BORINGS HAVE BEEN INTERPRETED USING STANDARD ACCEPTED GEOLOGIC PRACTICES AND PRINCIPLES. ACTUAL CONDITIONS MAY VARY BETWEEN BORINGS FROM THOSE SHOWN.



more coarse from west to east across the pumping test observation well area (see boring logs for MW-7S, MW-20S and MW-9S included in Appendix B). The base of the silty sand and gravel unit was found at depths ranging from 18 to 23 feet across the study area.

2.2.2 Step-Drawdown Test

A step-drawdown test was conducted in order to determine an appropriate pumping rate for the 72-hour constant rate test. The test entailed pumping well MW-20S at incremental rates and monitoring the drawdown in that well associated with each pumping rate. The step-drawdown test results are discussed in Section 4.1.

2.2.3 Aquifer Pumping Test

Following the step-drawdown test, a 72-hour constant rate pumping test was initiated at MW-20S. Groundwater levels were monitored in each of the 4 newly installed observation wells (OW-1 through OW-4), the pumping well (MW-20S), and existing site monitoring wells (MW-9S and MW-2S) using pressure transducers connected to a Northeast Instruments 8-channel data logger supplied at the test site by NYSDEC. Additional water level measurements were collected periodically (at approximately 1-hour intervals) during the test using an electronic water level indicator. The results of the aquifer pumping test are discussed in Section 4.2.

3.0 GROUNDWATER SAMPLING RESULTS

3.1 Site-wide Sampling Results

Site-wide groundwater sample results are summarized in Table 3-1. Raw data from the groundwater analysis and groundwater elevation measurements are included in Appendix A. Figure 3-1 shows the locations of the site monitoring wells. Elevated concentrations of tetrachloroethane and its breakdown products were observed at wells MW-3S (4,463 ppb total chlorinated hydrocarbons), MW-5S (4,610 ppb total chlorinated hydrocarbons), and MW-5D (2,912 ppb total chlorinated hydrocarbons) in close proximity to the former dry cleaner. Lower chlorinated hydrocarbon concentrations also persist in the Seneca Market Area north of the dry cleaner along the trend of the storm sewer in which solvents had been disposed. Tetrachloroethane contamination, which is not attributable to the site, was observed at background well location MW-19S.

Fuel related compounds benzene, toluene, ethylbenzene and xylene (BTEX compounds) were detected at MW-8S (979 ppb total) and MW-18S (258 ppb total) on the SCIDA property. Benzene was also detected at MW-7S at a concentration of 2 ppb.

A limited number of wells (5) were analyzed for metals. The highest concentrations for several metals, including antimony, chromium, iron and nickel were observed in close proximity to the railroad at wells MW-10S and MW-11S. Notably elevated concentrations of manganese and potassium were observed at wells MW-8S and MW-5S.

3.2 Pumping Test Sampling Results

Groundwater samples were collected from the pumping test well (MW-20S) on a daily basis during the 72-hour aquifer test in order to determine the quality of influent and effluent water at the groundwater treatment system and ensure compliance with the discharge requirements. Table 3-2 summarizes the results of pumping test groundwater sampling.

TABLE 3-1
VOLATILES AND METALS DETECTED IN GROUNDWATER WELLS

SAMPLE-ID		SCG	MW-16S			MW-19S		
SAMPLE LOCATION			BG			BG		
DATE COLLECTED			1/93	4/93	11/94	1/93	4/93	11/94
PARAMETER	TYPE							
Chloromethane	VOC	5						
Vinyl Chloride	VOC	2						
Methylene Chloride	VOC	5	R			R		
Acetone	VOC	50	R	R			R	
Carbon Disulfide	VOC	50						
1,2-Dichloroethene (Total)	VOC	5						
2-Butanone	VOC	50						
Trichloroethene	VOC	5						
Benzene	VOC	0.7		R			R	
Bromoform	VOC	50						
4-Methyl-2-Pentanone	VOC	50						
2-Hexanone	VOC	50						
Tetrachloroethene	VOC	5				18	R	16
1,1,2,2-Tetrachloroethane	VOC	5						
1,1,1-Trichloroethane	VOC	5						
Toluene	VOC	5						
Chlorobenzene	VOC	5						
Ethylbenzene	VOC	5						
Styrene	VOC	5						
Total Xylenes	VOC	5					2	
Barium	MCP	1000	108	NA	NA	60	NA	NA
Cadmium	MCP	10		4.8 B	NA		NA	NA
Chromium	MCP	50	103	121	NA	7.2	NA	NA
Iron	MCP	300	2820	NA	NA	3120	NA	NA
Lead	MCP	15	8.4	7.9	NA	2.3	NA	NA
Magnesium	MCP	35000	19000	NA	NA	16100	NA	NA
Manganese	MCP	300	2060	NA	NA	82.5	NA	NA
Selenium	MCP	10		NA	NA		NA	NA
Sodium	MCP	20000	209000	NA	NA	91700	NA	NA

All results reported in µg/L (ppb).

Note - only metals with SCG
exceedances are included.

MCP - Metals, Cyanide, Phenol

NA - Not analyzed

- Shading indicates SCG exceedance

BG - Background Wells

DC - Dry Cleaner Area

SM - Seneca Market - NE Area

SCIDA - SCIDA Property

TABLE 3-1
VOLATILES AND METALS DETECTED IN GROUNDWATER WELLS

SAMPLE-ID		SCG	MW-3S			MW-4S			MW-5S			MW-5D			MW-7S		
SAMPLE LOCATION			DC			DC			DC			DC			DC		
DATE COLLECTED			1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94
PARAMETER	TYPE																
Chloromethane	VOC	5															
Vinyl Chloride	VOC	2	38		190				300	91 J	480						
Methylene Chloride	VOC	5	R			R			R			R			R	R	
Acetone	VOC	50	R	R		R			R			R		67	R		
Carbon Disulfide	VOC	50															
1,2-Dichloroethene (Total)	VOC	5	770	87	4000	16	22	10	2900	1500	2900	15		37		3	
2-Butanone	VOC	50															
Trichloroethene	VOC	5	190	20	180	14	12	8	1100	350	260	110	110	180			
Benzene	VOC	0.7		R			R								6	R	2
Bromoform	VOC	50															
4-Methyl-2-Pentanone	VOC	50													20		
2-Hexanone	VOC	50															
Tetrachloroethene	VOC	5	88	8	93	200	160	120	3500	1600	970	2700	1800	2700			
1,1,2,2-Tetrachloroethane	VOC	5															
1,1,1-Trichloroethane	VOC	5															
Toluene	VOC	5															
Chlorobenzene	VOC	5															
Ethylbenzene	VOC	5														6	
Styrene	VOC	5															
Total Xylenes	VOC	5														2	
Barium	MCP	1000	228	NA	NA	201	NA	NA	242	NA	480	1140	NA	NA	147	NA	NA
Cadmium	MCP	10		NA	NA		NA	NA		NA			NA	NA			NA
Chromium	MCP	50		NA	NA		NA	NA		NA	52.2		NA	NA	6.6	6.1	NA
Iron	MCP	300	3730	NA	NA	1270	NA	NA	7290	NA	5190	1470	NA	NA	2800	NA	NA
Lead	MCP	15	3.9	NA	NA		NA	NA	3.9	NA			NA	NA	R	1.5	NA
Magnesium	MCP	35000	14400	NA	NA	18400	NA	NA	19200	NA	19000	38700	NA	NA	12100	NA	NA
Manganese	MCP	300	3280	NA	NA	4850	NA	NA	3030	NA	3230	2940	NA	NA	1780	NA	NA
Selenium	MCP	10		NA	NA		NA	NA		NA			NA	NA		NA	NA
Sodium	MCP	20000	163000	NA	NA	718000	NA	NA	208000	NA	123000	2283000	NA	NA	269000	NA	NA

All results reported in µg/L (ppb).

Note - only metals with SCG exceedances are included.

MCP - Metals, Cyanide, Phenol

R - Data rejected

NA - Not analyzed

- Shading indicates SCG exceedance

BG - Background Wells

DC - Dry Cleaner Area

SM - Seneca Market - NE Area

SCIDA - SCIDA Property

TABLE 3-1
VOLATILES AND METALS DETECTED IN GROUNDWATER WELLS

SAMPLE-ID		SCG	MW-1S			MW-2S			MW-11S			MW-11D			MW-12S			MW-20S		
SAMPLE LOCATION			SM			SM			SM			SM			SM			SM		
DATE COLLECTED			1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94
PARAMETER	TYPE																			
Chloromethane	VOC	5																NA		
Vinyl Chloride	VOC	2									2							NA		
Methylene Chloride	VOC	5	R			R			R	NR		R	R		R	R		NA		
Acetone	VOC	50	R			26			R	NR		R	R	R	13	R		NA	R	
Carbon Disulfide	VOC	50																NA		
1,2-Dichloroethene (Total)	VOC	5	43	40	28		10		28	NR	38		1					NA	19	3
2-Butanone	VOC	50																NA		
Trichloroethene	VOC	5	22	26	8				15	NR	15		1					NA	11	2
Benzene	VOC	0.7								NR			R			R		NA	R	
Bromoform	VOC	50																NA		
4-Methyl-2-Pentanone	VOC	50	9	360			15											NA		
2-Hexanone	VOC	50																NA		
Tetrachloroethene	VOC	5	410		94				310	NR	210		14					NA	220	10
1,1,2,2-Tetrachloroethane	VOC	5																NA		
1,1,1-Trichloroethane	VOC	5																NA		
Toluene	VOC	5																NA		
Chlorobenzene	VOC	5																NA		
Ethylbenzene	VOC	5																NA		
Styrene	VOC	5																NA		
Total Xylenes	VOC	5																NA		
Barium	MCP	1000	126	NA	NA	85	NA	NA	93	NA	153	1730	NA	NA	63	NA	NA	NA	NA	126
Cadmium	MCP	10		NA	NA		NA	NA	55.7			5.4	4.1	NA		4	NA	NA	3.7	
Chromium	MCP	50		NA	NA		NA	NA	20.4	345	4940			NA	60	59.6	NA	NA		148
Iron	MCP	300	191	NA	NA	352	NA	NA	482	NA	30700	1460	NA	NA	1970	NA	NA	NA	NA	5580
Lead	MCP	15		NA	NA		NA	NA	2.3	4.6		R	7.3	NA	R	1.6	NA	NA		1.9
Magnesium	MCP	35000	18500	NA	NA	15600	NA	NA	19100	NA	20100	59200	NA	NA	17200	NA	NA	NA	NA	28300
Manganese	MCP	300	612	NA	NA	1010	NA	NA	56.5	NA	205	3130	NA	NA	136	NA	NA	NA	NA	523
Selenium	MCP	10		NA	NA		NA	NA		NA	5.2		NA	NA		NA	NA	NA	NA	5.7
Sodium	MCP	20000	227000	NA	NA	15900	NA	NA	227000	NA	271000	3189000	NA	NA	118000	NA	NA	NA	NA	40300

All results reported in µg/L (ppb).

Note - only metals with SCG
exceedances are included.

MCP - Metals, Cyanide, Phenol

R - Data rejected

NA - Not analyzed

NR - Not reported (See Section 3.3)

- Shading indicates SCG exceedance

BG - Background Wells

DC - Dry Cleaner Area

SM - Seneca Market - NE Area

SCIDA - SCIDA Property

**TABLE 3-1
VOLATILES AND METALS DETECTED IN GROUNDWATER WELLS**

SAMPLE-ID		SCG	MW-8S			MW-8D			MW-10S			MW-10D			MW-13S			MW-18S		
SAMPLE LOCATION			SCIDA			SCIDA			SCIDA			SCIDA			SCIDA			SCIDA		
DATE COLLECTED			1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94	1/93	4/93	11/94
PARAMETER	TYPE																			
Chloromethane	VOC	5										2								
Vinyl Chloride	VOC	2																		
Methylene Chloride	VOC	5	R			R			R	R		R	NR		R			R		
Acetone	VOC	50		R			R		20	R	20	14	NR			R			R	
Carbon Disulfide	VOC	50					0.4													
1,2-Dichloroethene (Total)	VOC	5										5	NR							
2-Butanone	VOC	50	63							10										
Trichloroethene	VOC	5					1					2	NR							
Benzene	VOC	0.7	42	R	47		R			R		1	NR			R		9	16	8
Bromoform	VOC	50																		
4-Methyl-2-Pentanone	VOC	50								3										
2-Hexanone	VOC	50	72																	
Tetrachloroethene	VOC	5					2		6	R	5	3	NR							
1,1,2,2-Tetrachloroethane	VOC	5		2			2			4										
1,1,1-Trichloroethane	VOC	5					0.7													
Toluene	VOC	5	7	2	5		1			0.8									1	
Chlorobenzene	VOC	5																		
Ethylbenzene	VOC	5	86		37		1											4		10
Styrene	VOC	5					0.8			0.6										
Total Xylenes	VOC	5	810	200	890		3			2								570	210	240
Barium	MCP	1000	1520	NA	421	253	NA	NA	75	NA	131	801	NA	NA	113	NA	NA	116	NA	NA
Cadmium	MCP	10		NA	0.64		NA	NA		4.3			3.7	NA		NA	NA		NA	NA
Chromium	MCP	50		NA	606		NA	NA	12.7	203	6870		NA			NA	NA		NA	NA
Iron	MCP	300	12300	NA	13200	1580	NA	NA	2210	NA	38000	2110	NA	NA	3750	NA	NA	9450	NA	NA
Lead	MCP	15		NA	9.5	13.2	NA	NA	1.7	15.1	2.9		2.9	NA	1.6	NA	NA	1.8	NA	NA
Magnesium	MCP	35000	91000	NA	31300	26700	NA	NA	17700	NA	19500	59300	NA	NA	18200	NA	NA	15400	NA	NA
Manganese	MCP	300	2690	NA	28000	8540	NA	NA	61.8	NA	160	1350	NA	NA	5130	NA	NA	2590	NA	NA
Selenium	MCP	10	15.4	NA			NA	NA		NA	5.8		NA	NA		NA	NA		NA	NA
Sodium	MCP	20000	10332000	NA	240000	183000	NA	NA	133000	NA	167000	1469000	NA	NA	133000	NA	NA	82800	NA	NA

All results reported in µg/L (ppb).

Note - only metals with SCG
exceedances are included.

MCP - Metals, Cyanide, Phenol

R - Data rejected

NA - Not analyzed

NR - Not reported (See Section 3.3)

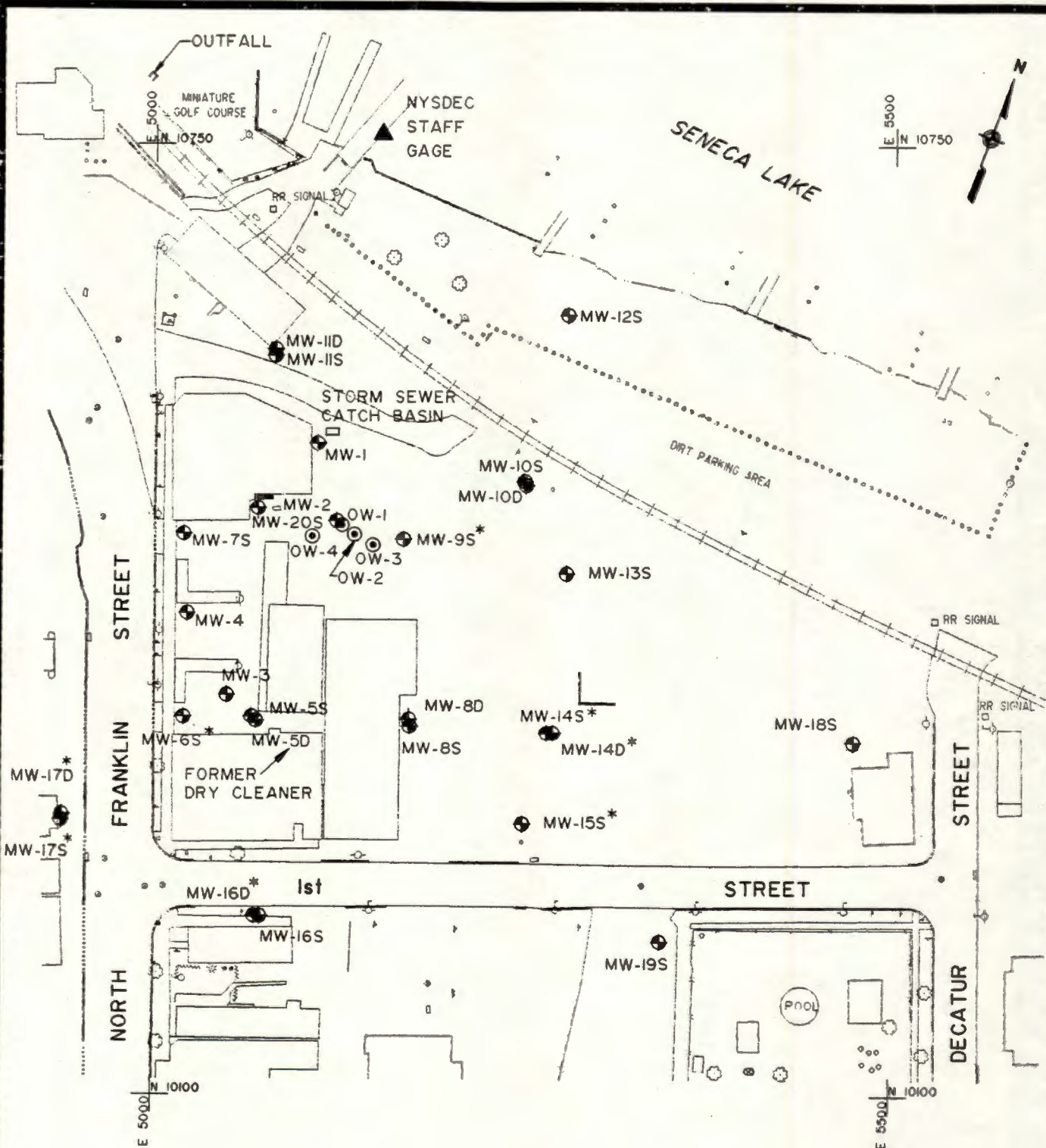
- Shading indicates SCG exceedance

BG - Background Wells

DC - Dry Cleaner Area

SM - Seneca Market - NE Area

SCIDA - SCIDA Property



LEGEND

- MONITORING WELL
- ⊗ OBSERVATION WELL
- * WELL NOT SAMPLED FOR PREDESIGN INVESTIGATION

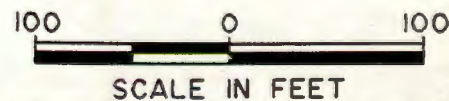


Table 3-2
Pumping Test Analytical Results

Parameters	Units	Discharge Limitations	Date: 1/4/95		Date: 1/5/95		Date: 1/6/95	
			Influent	Effluent	Influent	Effluent	Influent	Effluent
Flow	GPM	Monitor	10	10	15	15	12	12
Vinyl Chloride	µg/L	10	ND	ND	2	ND	1	ND
1,2-(cis)-Dichloroethylene	µg/L	10	32	ND	31	ND	29	ND
1,2-(trans)-Dichloroethylene	µg/L	10	ND	ND	1	ND	1	ND
Trichloroethylene	µg/L	10	ND	ND	12	ND	11	ND
Tetrachloroethylene	µg/L	10	200	ND	190	ND	170	ND
Toluene	µg/L	10	ND	ND	ND	ND	ND	ND
Benzene	µg/L	10	ND	ND	ND	ND	ND	ND
Ethylbenzene	µg/L	10	ND	ND	ND	ND	ND	ND
Xylene, Total	µg/L	10	ND	ND	ND	ND	ND	ND
Cadmium, Total	µg/L	60	ND	ND	NA	NA	NA	NA
Chromium, Total	µg/L	500	ND	ND	NA	NA	NA	NA
Iron, Total	µg/L	4000	53	141	86.2	108	68.9	85.5
Lead, Total	µg/L	20	8.3	10.9	NA	NA	NA	NA
TSS	mg/L	--	1.4	1.2	8.1	3.4	1.2	1.3

Note: (1) - All samples were analyzed for TCL VOCs. Only detected compounds and BTEX compounds are included in summary table.

(2) - Discharge limitations were set by the NYSDEC Division of Water specifically for this site during the pump test (memorandum dated 11/30/94).

ND - Analyte not detected. The instrument detection limits for all parameters are less than the discharge limitations.

Influent - Pretreatment Groundwater.

Effluent - Treated Groundwater Discharged To Storm Sewers.

The influent samples collected at MW-20S contained chlorinated hydrocarbon contaminants at concentrations which were similar to concentrations observed during the RI. Detected compounds in the influent groundwater include vinyl chloride (maximum of 2 ppb), 1,2-dichloroethylene (maximum of 32 ppb-total), trichloroethylene (maximum of 12 ppb), and tetrachloroethylene (maximum of 200 ppb). VOC compounds were undetected in the effluent samples indicating that the airstripper was effectively treating the groundwater prior to its discharge.

All TAL metals were analyzed for in the pumping well sample from the first day of the pumping test. Subsequent samples were analyzed for iron only. In all cases the effluent metals concentrations were well below their corresponding discharge criteria.

3.3 Comparison of Results to Previous Investigations

Table 3-1 includes two rounds of RI sampling results from 1993 in addition to the November 1994 site-wide groundwater sampling results. During the RI, anomalous second round (April 1993) results were observed at MW-10D and MW-11S and it appeared that the results for these two samples may have been inverted. Because no conclusive evidence existed for such an error at either the analytical laboratory or in URS' field and chain-of-custody records, the results were presented in the RI as reported by the laboratory. Based on the acquisition of additional reliable groundwater quality data gathered during this Predesign Investigation, the results of the April 1993 samples at MW-10D and MW-11S are no longer reported.

The two background (BG) wells which were sampled show persisting tetrachloroethane contamination at MW-19S. As noted in the RI report, this condition is not believed to be associated with the North Franklin Street site.

Chlorinated hydrocarbon concentrations in groundwater at the drycleaner area (DC) were generally similar to the RI results. Notable increases in vinyl chloride and 1,2-dichloroethene concentrations were observed at MW-3S. Vinyl chloride concentration also increased at MW-5S while tetrachloroethane and trichloroethene were lower than the previous monitoring results.

These data suggest continuing degradation of the tetrachloroethane disposed in the drycleaner area. Metals results from MW-5S were consistent with the RI results.

Sampling results from wells in the Seneca Market-northeast area (SM) suggest a slight decrease since the RI in chlorinated hydrocarbon concentrations, particularly at MW-20S. As previously noted, the chlorinated hydrocarbons at MW-20S increased to levels similar to the RI sample during the course of the pumping test. Metals concentrations at MW-11S were significantly higher than during the RI; however, much of this increase is attributable to the high turbidity of the 1994 sample (> 500 NTU). This increased turbidity may be the result of colloidal materials observed in the well or silt penetration into the well.

Sampling results from the SCIDA property wells indicate continuing BTEX contamination at wells MW-8S and MW-18S with concentrations similar to the RI samples. Groundwater at the SCIDA property appears relatively free of chlorinated hydrocarbon contamination, except for low levels of tetrachloroethane observed at MW-10S.

3.4 Data Validation

Twenty (20) groundwater samples, and two volatile trip blanks were analyzed by Inchcape Testing Services as a part of the site-wide monitoring event. The groundwater samples were analyzed for volatile organic compounds and an additional analysis for metals was completed on five of the groundwater samples. Groundwater samples for the pumping test included 8 samples analyzed for VOCs and TSS, 2 samples analyzed for metals, and 6 samples analyzed for iron. The deliverable data packages for all sampling consisted of analytical results and quality control data.

The data was validated against the appropriate methods and the deliverables were reviewed for completeness in accordance with the Project Management Work Plan. As a result of the limited data audit, the data therein is usable as reported.

4.0 AQUIFER TESTING RESULTS

4.1 Step-Drawdown Test Results

The step-drawdown test was conducted with incremental pumping rates of 3 gallons-per-minute (gpm), 6 gpm, 10 gpm and 15 gpm. The drawdown measured in well MW-20S at the end of each step is reported in Table 4-1. During the fourth step (i.e. at 15 gpm) the well began producing highly turbid water and pumped to dryness (water level below the well pump intake) approximately 14 minutes into the step. The maximum available drawdown in the well was approximately 13 feet based on a water table elevation of 444.2 feet and the pumping well bottom elevation of 431 feet. The pump flow rate was reduced to 13 gpm, but the well pumped to dryness again. The pumping rate was then reduced to 10 gpm and the well was pumped for an additional 50 minutes. Based on the results of the step-drawdown test an initial pump rate of 10 gpm was selected for the 72-hour aquifer pumping test.

The step-drawdown test results suggest a poor well efficiency at MW-20S. The apparent well inefficiency could be attributable to numerous factors. The pumping well screen is surrounded by a relatively thin gravel filter pack (on the order of one inch). An even thicker filter pack would result in lower flow velocities at the filter pack/aquifer interface and reduce the entrainment of fine grained sediments into the filter pack and well. The well inefficiency may also be attributable to dewatering of the screen as the well is pumping. This practice is generally discouraged and could result in unpredictable and seemingly anomalous well behavior.

4.2 72-Hour Aquifer Pumping Test Results

The 72-hour aquifer pumping test was initiated at a rate of 10 gpm on January 4, 1995. As pumping progressed for several hours, the drawdown in MW-20S (the pumping well) was observed to stabilize at approximately 1.7 feet. This drawdown was significantly less than observed during the step-drawdown test. URS and NYSDEC concluded that the pumping well had been further developed during the step-drawdown

TABLE 4-1
SUMMARY OF STEP-DRAWDOWN TEST RESULTS

Step #	Pumping Rate (GPM)	Step Duration (MIN)	Final Drawdown (FT)	Comments
1	3	34	0.7	Drawdown stabilized after ~6 min.
2	6	30	1.63	Drawdown stabilized after ~3 min.
3	10	68	3.63	Drawdown stabilized after ~20 min.
4	15	14	~13	Well pumped dry approximately 14 min. into step
4A	10	50	5.37	Reduced rate to 13 GPM but well went dry again

test and was capable of sustaining a yield greater than 10 gpm. Therefore, approximately 8.5 hours into the test, the pumping rate was increased to 15 gpm. The 15 gpm rate was maintained for approximately 26 hours at which time the well pumped to near-dryness and the pumping rate was reduced to 12 gpm for the remainder of the test.

Air quality was monitored during the pumping test for organic vapors and vinyl chloride using a photoionization detector and Draeger tubes, respectively. Air monitoring took place both inside and outside of the trailer which housed the air stripper. Organic vapors and vinyl chloride were not detected during the course of the pumping test.

4.2.1 Test Data Processing

Drawdown data were collected during the pump test by measuring water levels electronically using NYSDEC's data logger with pressure transducers and manually using a water level indicator. The data logger, however, lost power during the recovery stage of the test resulting in a loss of data from the latter portion of the pumping test. Pressure transducer water level readings were recovered from only the first 500 minutes (8.3 hours) of the aquifer pumping test. Two additional pressure transducer readings were recorded in the field notebook from approximately 16 hours and 20 hours into the test. Figure 4-1 shows the array of wells which were monitored during the aquifer test. The pumping rate was monitored at approximately one hour intervals by timing the totalizing flow meter on the pump discharge line.

The drawdown data were analyzed using the PC ISOAQX program to estimate aquifer parameters. This is a multi-model analysis package, with graphics capabilities, that services numerous groundwater flow applications. The program utilizes mathematical minimization (in the least-square error sense) to fit time/drawdown data to user-specified hydrologic models and thus derive the aquifer parameters of hydraulic conductivity and specific yield or storativity. The ISOAQX program mathematically fits test data to appropriate type curves, displaying the curve-matching results to the user to ensure



STORM SEWER
CATCH BASIN

CATCH BASIN
MW-2

MW-20S

OW-1

OW-4

OW-2

OW-3

MW-9S

LEGEND



MONITORING WELL



OBSERVATION WELL

NOTE: OBSERVATION WELL LOCATIONS WERE NOT
SURVEYED. MEASURED DISTANCES FROM PUMPING
WELL AS FOLLOWS:

OW-1, 5 FT.

OW-2, 30 FT.

OW-2, 16 FT.

OW4, 20 FT.

20 0 20
SCALE IN FEET

acceptability. The aquifer testing data and time-drawdown plots (and matching type-curves) are included in Appendix D.

The time-drawdown data points plotted for each monitoring well show some scattering around a discernable drawdown trend. The data taken manually using the water level indicator (tabulated in Appendix D-1) were even more scattered with no discernable trend and, therefore, are not reported on the time-drawdown plots. The data scatter may be attributable to minor fluctuations in the pumping rate (below the sensitivity of the flow meter), barometric pressure changes, and, to a greater extent, measurement error in the manual water level indicator readings.

The pressure transducer data from the first portion (~ 8 hours) of the test were considered most reliable and were therefore used in the calculation of aquifer parameters. The aquifer parameters thus obtained were then used with the ISOAQX program and compare them with the two sets of pressure transducer readings recorded at 16 and 20 hours. This procedure served as a verification of the aquifer parameters calculated from the first 8 hours of test data.

4.2.2 Test Analysis

The aquifer test data were initially analyzed using both unconfined and confined aquifer hydrologic models for comparison. The time-drawdown curves generated with the pumping test data matched well with the gravity drainage (water-table aquifer) type curves. Because field drilling observations of only a thin layer (<2 ft) of silty/clayey sand sediments lying above the shallow sand and gravel aquifer in the vicinity of pumping well, the interpretation of unconfined flow conditions appears reasonable.

The PC ISOAQX program fits test time-drawdown data to type curves. The program can automatically apply aquifer dewatering, partial penetration, and multiple pumping rate corrections to calculate the hydraulic conductivity and specific yield of the aquifer at each of the observation wells. The hydraulic conductivity is multiplied by the

aquifer thickness to calculate the corresponding aquifer transmissivity. The Boulton-Gambolati gravity-drainage model was used to analyze the test data.

The calculated aquifer parameters at each of the observation wells are summarized in Table 4-2. Transmissivities ranged from 2,400 ft²/day (at MW-2S) to 13,800 ft²/day (at MW-9S). The median transmissivity was 11,325 ft²/day and the geometric mean transmissivity was 8,250 ft²/day. Wells MW-2S and OW-1 had transmissivities which deviated significantly from the mean and median. This deviation is likely attributable to inhomogeneity in the aquifer sediments. A distinct trend for eastward increasing hydraulic conductivity was evident in the results. This trend is consistent with drilling observations of coarser aquifer sediments at MW-9S.

Most of the observation wells (except OW-1) had specific yield results which fell in the range of 0.4% to 2%. These results are more typical of the finer-grained sediments which overlie the sand and gravel aquifer and may indicate that any dewatering of the aquifer occurred in the overlying fine sediments rather than in the sand and gravel unit. Well OW-1 had a calculated specific yield of 21%. This well also had the greatest observed drawdown and the result is more indicative of the specific yield associated with the sand and gravel aquifer.

4.2.3 Validation of Test Results

As previously noted, the test interpretation and estimation of parameter values utilized the recovered data from the early portion of the test. Using the values of hydraulic conductivity and specific yield generated above, the type curves were extrapolated deeper into the test and plotted with the two sets of pressure transducer data which were recorded 16 and 20 hours into the test. The curves and additional data are shown in Appendix D-4.

The curve slopes steepen in response to the pumping rate increase from 10 to 15 gpm which occurred approximately 10 hours into the test. Data from wells OW-1 and MW-9S plot extremely close to the type curves and data from wells OW-2, OW-3 and

TABLE 4-2
SUMMARY OF AQUIFER TEST RESULTS

Well ID	Hydraulic Conductivity (ft/day)	Specific Yield	Transmissivity* (ft ² /day)
OW-1	380	21 %	5,700
OW-2	710	2 %	10,650
OW-3	800	1 %	12,000
OW-4	870	0.6 %	13,050
MW-9S	920	0.4 %	13,800
MW-2S	160	4 %	2,400

* Aquifer Thickness is 15 feet at Testing Site.

OW-4 plot slightly above, but reasonably close to the type curves. These data points confirm the estimates of the aquifer parameters (Table 4-2) calculated from the early portion of the time-drawdown data.

5.0 RECOMMENDED GROUNDWATER EXTRACTION PLAN

The aquifer pumping test indicates that the sand and gravel unit is more permeable than predicted by the slug test results from the RI. Hydraulic conductivities calculated from the slug tests ranged from 10 to 300 feet/day, while calculations utilizing the pump test data resulted in conductivities ranging from 200 to 1,000 ft/day. Hydraulic conductivities from slug test data are typically within one to two orders of magnitude of actual values. Because of the higher hydraulic conductivity observed during the pumping test, the 5 gpm extraction wells originally considered in the feasibility study will have an insufficient radius of influence to capture the contaminated groundwater plume. The groundwater extraction system was re-evaluated and modified based on the results of this investigation. The details of the design analysis are included in Appendix F and summarized below.

Using the refined values of aquifer flow parameters determined from the aquifer pumping test, groundwater potentiometric surfaces were simulated using groundwater extraction rates of 50 gpm and 75 gpm. Figure 1 in Appendix F indicates that a 50 gpm rate (25 gpm at each plume) could capture the entire contaminant plume at the dry cleaner area and nearly all of the plume at the Seneca Market area. In consideration of the marginal contaminant levels in the northeastern portion of the Seneca Market area plume (see results for MW-10S), the 50 gpm rate should be adequate.

Because the pumping test results suggest that well yields significantly greater than 15 gpm may not be attainable, up to two wells may be required at each of the two plumes to attain a 50 gpm design flow rate. The proposed locations for the additional wells are presented on the drawings in Appendix F. Pumping from four wells, instead of two, would result in a similar capture zone and likely reduce the quantity of uncontaminated water being processed through the treatment system.

APPENDIX A-1

ANALYTICAL RESULTS

TABLE A-1
NORTH FRANKLIN STREET PREDESIGN INVESTIGATION
GROUNDWATER WELL ANALYTICAL RESULTS

SAMPLE-ID		SCG VALUE	MW-1S	MW-2S	MW-3S	MW-4S	MW-5S	MW-7S	MW-8S	MW-10S
DATE COLLECTED			11/22/94	11/22/94	11/22/94	11/22/94	11/22/94	11/22/94	11/22/94	11/21/94
PARAMETER	TYPE									
Chloromethane	VOC	5								
Bromomethane	VOC	5								
Vinyl Chloride	VOC	2			190 J		480			
Chloroethane	VOC	5								
Methylene Chloride	VOC	5								
Acetone	VOC	50								
Carbon Disulfide	VOC	50								
1,1-Dichloroethene	VOC	5								
1,1-Dichloroethane	VOC	5								
1,2-Dichloroethene (Total)	VOC	5	28		4000	10	2900			
Chloroform	VOC	7								
1,2-Dichloroethane	VOC	5								
2-Butanone	VOC	50								
1,1,1-Trichloroethane	VOC	5								
Carbon Tetrachloride	VOC	5								
Vinyl Acetate	VOC	50								
Bromodichloromethane	VOC	50								
1,2-Dichloropropane	VOC	5								
cis-1,3-Dichloropropene	VOC	5								
Trichloroethene	VOC	5	8 J		180 J	8 J	260			
Dibromochloromethane	VOC	50								
1,1,2-Trichloroethane	VOC	5								
Benzene	VOC	0.7						2 J	47	
trans-1,3-Dichloropropene	VOC	5								
Bromoform	VOC	50								
4-Methyl-2-Pentanone	VOC	50								
2-Hexanone	VOC	50								
Tetrachloroethene	VOC	5	94		93 J	120	970			5 J
1,1,2,2-Tetrachloroethane	VOC	5								
Toluene	VOC	5							5 J	
Chlorobenzene	VOC	5								
Ethylbenzene	VOC	5							37	
Styrene	VOC	5								
Total Xylenes	VOC	5							890	

All results reported in µg/L (ppb).

Only detected results are reported.

J - Indicates the result is less than the sample quantitation limit but greater than zero.

TABLE A-1
NORTH FRANKLIN STREET PREDESIGN INVESTIGATION
GROUNDWATER WELL ANALYTICAL RESULTS

SAMPLE-ID		SCG VALUE	MW-11S	MW-12S	MW-13S	MW-16S	MW-18S	MW-19S	MW-20S
DATE COLLECTED			11/22/94	11/21/94	11/21/94	11/22/94	11/21/94	11/21/94	11/21/94
PARAMETER	TYPE								
Chloromethane	voc	5							
Bromomethane	voc	5							
Vinyl Chloride	voc	2	2 J						
Chloroethane	voc	5							
Methylene Chloride	voc	5							
Acetone	voc	50							
Carbon Disulfide	voc	50							
1,1-Dichloroethene	voc	5							
1,1-Dichloroethane	voc	5							
1,2-Dichloroethene (Total)	voc	5	38						3 J
Chloroform	voc	7							
1,2-Dichloroethane	voc	5							
2-Butanone	voc	50							
1,1,1-Trichloroethane	voc	5							
Carbon Tetrachloride	voc	5							
Vinyl Acetate	voc	50							
Bromodichloromethane	voc	50							
1,2-Dichloropropane	voc	5							
cis-1,3-Dichloropropene	voc	5							
Trichloroethene	voc	5	15						2 J
Dibromochloromethane	voc	50							
1,1,2-Trichloroethane	voc	5							
Benzene	voc	0.7					8 J		
trans-1,3-Dichloropropene	voc	5							
Bromoform	voc	50							
4-Methyl-2-Pentanone	voc	50							
2-Hexanone	voc	50							
Tetrachloroethene	voc	5	210					16	10
1,1,2,2-Tetrachloroethane	voc	5							
Toluene	voc	5							
Chlorobenzene	voc	5							
Ethylbenzene	voc	5					10 J		
Styrene	voc	5							
Total Xylenes	voc	5					240		

All results reported in $\mu\text{g/L}$ (ppb).

Only detected results are reported.

J - Indicates the result is less than the sample quantitation limit but greater than zero.

TABLE A-1
NORTH FRANKLIN STREET PREDESIGN INVESTIGATION
GROUNDWATER WELL ANALYTICAL RESULTS

SAMPLE-ID		SCG VALUE	MW-5D	MW-8D	MW-10D	MW-11D	TB-1	TB-2
DATE COLLECTED			11/22/94	11/22/94	11/21/94	11/22/94	11/21/94	11/22/94
PARAMETER	TYPE							
Chloromethane	VOC	5						
Bromomethane	VOC	5						
Vinyl Chloride	VOC	2						
Chloroethane	VOC	5						
Methylene Chloride	VOC	5						
Acetone	VOC	50	67 J					
Carbon Disulfide	VOC	50						
1,1-Dichloroethene	VOC	5						
1,1-Dichloroethane	VOC	5						
1,2-Dichloroethene (Total)	VOC	5	37 J					
Chloroform	VOC	7						
1,2-Dichloroethane	VOC	5						
2-Butanone	VOC	50						
1,1,1-Trichloroethane	VOC	5						
Carbon Tetrachloride	VOC	5						
Vinyl Acetate	VOC	50						
Bromodichloromethane	VOC	50						
1,2-Dichloropropane	VOC	5						
cis-1,3-Dichloropropene	VOC	5						
Trichloroethene	VOC	5	180					
Dibromochloromethane	VOC	50						
1,1,2-Trichloroethane	VOC	5						
Benzene	VOC	0.7						
trans-1,3-Dichloropropene	VOC	5						
Bromoform	VOC	50						
4-Methyl-2-Pentanone	VOC	50						
2-Hexanone	VOC	50						
Tetrachloroethene	VOC	5	2700					
1,1,2,2-Tetrachloroethane	VOC	5						
Toluene	VOC	5						
Chlorobenzene	VOC	5						
Ethylbenzene	VOC	5						
Styrene	VOC	5						
Total Xylenes	VOC	5						

All results reported in $\mu\text{g/L}$ (ppb).

Only detected results are reported.

J - Indicates the result is less than the sample quantitation limit but greater than zero.

B - Less than quantitation limit but greater than or equal to instrument detection limit.

TABLE A-1
NORTH FRANKLIN STREET PREDESIGN INVESTIGATION
GROUNDWATER WELL ANALYTICAL RESULTS

SAMPLE-ID		SCG VALUE	MW-5S	MW-8S	MW-10S	MW-11S	MW-20S
DATE COLLECTED			11/22/94	11/22/94	11/21/94	11/22/94	11/21/94
PARAMETER	TYPE						
Aluminum	MCP		106 B*	3110 *	1430 *	27.5 *	1840 *
Antimony	MCP	3		10 B	109	79.1	3.2 B
Arsenic	MCP	25	4.8 BN	8.0 BN			
Barium	MCP	1000	480	421	131	153	126
Beryllium	MCP	3					
Cadmium	MCP	10		0.64 B			
Calcium	MCP		94100	178000	86100	94600	151000
Chromium	MCP	50	52.2	606	6870	4940	148
Cobalt	MCP		1.7 B	3.1 B	9.6 B	4.0 B	2.5 B
Copper	MCP	200	5.1 B	34.6	126	28.0	7.1 B
Iron	MCP	300	5190	13200	38000	30700	5580
Lead	MCP	15		9.5	2.9 B		1.9 B
Magnesium	MCP	35000	19000	31300	19500	20100	28300
Manganese	MCP	300	3230	28000	160	205	523
Mercury	MCP	2					
Nickel	MCP		34.6 B	27.9 B	495	126	41.9
Potassium	MCP		24000 E	25000 E	9760 E	10800 E	8910 E
Selenium	MCP	10			5.8	5.2	5.7
Silver	MCP	50					
Sodium	MCP	20000	123000 E	240000 E	167000 E	271000 E	40300 E
Thallium	MCP	4					
Vanadium	MCP		1.4 B	7.8 B	29.7 B	20.9 B	3.8 B
Zinc	MCP	300	2.9 B	33.7	25.5	9.4 B	21.7

All results reported in $\mu\text{g/L}$ (ppb)
unless otherwise reported.
Only detected results are reported.

MCP - Metals, Cyanide, Phenol

E - Estimated because of interference.
B - Less than quantitation limit but greater than instrument detection limit.
* - Duplicate analysis not within control limits.
N - Spiked sample recovery not within control limits.
R - Rejected due to poor CRDL recovery.

APPENDIX A-2

**WATER LEVEL MEASUREMENTS FOR
SITEWIDE
SAMPLING AND PUMPING TEST**

TABLE 3-4
GROUNDWATER AND SURFACE WATER ELEVATIONS

WELL ID	GROUND ELEVATION (ft)	RISER ELEVATION (ft)	GROUNDWATER ELEVATION							SITE- SAMP	PUMP- TES
			DATE								
			12/18/92	1/18/93	1/25/93	1/29/93	4/2/93	4/13/93	7/21/93	11/21/94 11/22/94	1/3/95
MW-1	450.93	450.64	444.89	444.80	444.58	444.46	446.24	447.59	445.09	444.24	444.04
MW-2	451.13	450.98	445.09	445.00	444.77	444.64	446.42	447.66	445.29	444.49	444.17
MW-3	451.43	450.71	444.84	444.75	---	444.39	446.28	447.47	444.89	444.10	443.93
MW-4	450.76	450.17	---	445.15	444.88	444.77	445.37	447.77	445.25	445.23	444.29
MW-5S	451.62	451.37	445.12	445.09	444.86	444.75	446.52	447.84	445.28	444.47	444.30
MW-5D	451.62	451.35	445.37	445.03	443.45	444.11	444.90	446.34	445.74	444.64	--
MW-6S	450.95	450.56	446.83	445.01	443.60	444.28	447.78	447.96	447.23	447.11	--
MW-7S	450.68	450.31	444.89	444.88	444.68	444.55	446.31	447.66	445.16	444.32	444.10
MW-8S	451.19	453.44	445.11	445.03	444.81	444.92	446.46	447.78	445.25	444.43	444.24
MW-8D	451.29	453.24	445.20	444.81	444.57	444.69	446.38	447.69	445.19	444.62	--
MW-9S	451.53	454.12	445.12	444.94	444.71	444.78	446.35	447.71	445.19	444.87	444.17
MW-10S	451.81	451.45	444.45	444.77	444.55	444.43	446.23	447.56	445.08	444.14	444.04
MW-10D	451.86	451.38	445.04	444.87	444.57	444.60	446.25	447.53	445.03	444.23	--
MW-11S	451.00	450.59	444.83	444.76	444.54	444.55	446.24	447.60	445.11	444.18	444.03
MW-11D	450.92	450.64	445.00	444.72	444.44	444.38	446.12	447.57	444.99	444.23	--
MW-12S	450.59	450.32	444.60	444.45	444.22	444.34	446.03	447.36	444.92	443.68	443.74
MW-13S	452.15	454.67	445.05	444.87	444.63	444.61	446.23	447.60	445.09	444.35	444.04
MW-14S	451.52	453.72	445.13	445.05	444.82	444.72	446.43	447.80	445.26	444.45	444.25
MW-14D	451.64	453.91	445.14	445.03	444.78	444.79	446.46	447.83	445.26	444.39	--
MW-15S	450.69	452.83	445.23	445.10	444.85	444.85	446.58	447.82	445.25	444.50	444.30
MW-16S	451.82	451.73	445.25	445.21	444.99	445.19	446.56	447.94	445.35	444.70	--
MW-16D	451.77	451.45	445.61	445.51	445.11	445.51	446.72	448.13	445.74	445.22	--
MW-17S	451.85	451.34	445.10	445.29	445.06	445.30	446.54	448.02	445.73	445.55	--
MW-17D	451.73	451.09	445.09	445.62	445.39	445.53	447.01	448.42	445.62	445.12	--
MW-18S	451.26	453.78	445.10	444.98	444.72	444.86	446.39	447.72	445.18	444.37	--
MW-19S	451.60	451.41	445.21	445.16	444.91	445.11	446.49	447.88	445.32	444.56	--
MW-20S	451.02	453.94	---	---	---	---	446.39	447.69	445.18	444.37	444.10
NYSDEC STAFF GAGE		449.57	444.51	444.31	445.15	445.07	445.99	447.35	444.89	--	443.64

APPENDIX B

WELL BORING LOGS

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO.

OW-1

PROJECT: NORTH FRANKLIN STREET, WATKINS GLEN, NY

CLIENT: NYS DEPT. OF ENVIRONMENTAL CONSERVATION

BORING CONTRACTOR: AMERICAN AUGER & DITCHING

SHEET NO. 1 OF 1

JOB NO.: 0535388.00

BORING LOCATION: 5 FT SE OF MW-205

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

SPLIT
SCREEN

2"

140#

30"

DATE STARTED: 11/30/94

DATE FINISHED: 11/30/94

DRILLER: ROCKY RAYE

GEOLOGIST: ANDRE LAPRES

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				COLOR	CONSISTENCY HARDNESS	DESCRIPTION		CLASS USCS	REMARKS	H N u
		NO.	TYPE	BLOWS PER 6"				RECOVERY ROD %	MATERIAL DESCRIPTION			
							BROWN	MEDIUM DENSE TO LOOSE	GRAVELLY SILTY FINE TO MEDIUM SAND. SOME BRICK FRAGMENTS.		DRILL CUTTINGS LOGGED 0'-3' MOIST. FILL.	
5		1	SS	4 8	4 8	60						0.0
		2	SS	4 3	5 3	50	GRAY	LOOSE	CLAYEY FINE SAND. TRACE ORGANIC MATERIAL.	SC	MOIST WET	0.0
		3	SS	3 3	3 5	30			GRAVELLY SILTY MEDIUM TO FINE SAND.	SM		0.0
10												
		4	SS	3 10	4 11	50	BROWN	MEDIUM DENSE				0.0
15												
		5	SS	8 6	8 6	50						0.0
20									BORING TERMINATED AT 18.0"			
25												
30												
35												

COMMENTS

BORING ADVANCED WITH INGERSOLL - RAND T2W DRILL RIG & 4.25" ID AUGER.
2" PVC OBSERVATION WELL INSTALLED WITH 10 FT SCREEN TO 17.5 FT BGS.

PROJECT NO.

0535388.00

BORING NO.

OW-1

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. OW-2

PROJECT: NORTH FRANKLIN STREET, WATKINS GLEN, NY

SHEET NO. 1 OF 1

CLIENT: NYS DEPT. OF ENVIRONMENTAL CONSERVATION

JOB NO. : 0535388.00

BORING CONTRACTOR: AMERICAN AUGER & DITCHING

BORING LOCATION: 15 FT SE OF MW-205

GROUND WATER:

GROUND ELEVATION:

DATE TIME LEV TYPE

TYPE

CAS.

SAMP

CORE

TUBE

DATE STARTED: 12/1/94

DATE FINISHED: 12/1/94

DRILLER: ROCKY BAYE

GEOLOGIST: ANDRE LAPRES

REVIEWED BY:

* POCKET PENETROMETER READING

DEPTH FT	STRATA	SAMPLE					COLOR	CONSISTENCY HARDNESS	DESCRIPTION		REMARKS	H N W
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %				MATERIAL DESCRIPTION	CLASS USCS		
5							Brown	Loose	GRAVELLY SAND. SOME BRICK & WOOD FRAGMENTS. CONCRETE & ROCK 2'-5'		DRILL CUTTINGS, LOGGED 0-5' MOIST. FILL.	
		1	SS	8 3	5 1	10					WET	0.0
				WDH		50						0.0
10		2	SS	8 3	3 8	20	Gray	Loose	GRAVELLY SILTY MEDIUM TO FINE SAND.	SM	Moist	0.0
		3	SS	32 17	18 8	50					WET	0.0
15												
		4	SS	17 11	13 8	60	Brown	MEDIUM DENSE				0.0
20									BORING TERMINATED AT 18.0'			
25												
30												
35												

COMMENTS

BORING ADVANCED WITH INGERSOLL - RANS T2W DRILL RIG & 4.25" ID AUGER.
2" PVC OBSERVATION WELL INSTALLED WITH 10 FT SCREEN TO 18.0 FT BGS

PROJECT NO.

0535388.00

BORING NO.

OW-2

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO.

OW-3

PROJECT: NORTH FRANKLIN STREET, WATKINS GLEN, NY

SHEET NO. 1 OF 1

CLIENT: NYS DEPT OF ENVIRONMENTAL CONSERVATION

JOB NO.: 0535388.00

BORING CONTRACTOR: AMERICAN AUGER & DITCHING

BORING LOCATION: 30 FT SE OF MW-20S

GROUND WATER:

GROUND ELEVATION:

DATE	TIME	LEV	TYPE	TYPE	CAS.	SAMP	CORE	TUBE
				DIA.		SPIT 2"		
				WT.		140#		
				FALL		30"		
* POCKET PENETROMETER READING								

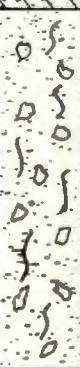
DATE STARTED: 12/1/94

DATE FINISHED: 12/1/94

DRILLER: ROCKY BAYE

GEOLOGIST: ANDRE LAPRES

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE					DESCRIPTION				REMARKS	
		NO.	TYPE	BLOWS PER 6"		RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
							BROWN	MEDIUM DENSE	GRAVELLY SILTY SAND. SOME BRICK FRAGMENTS.		DRILL CUTTINGS LOGGED 0'-3' MOIST. FILL.	
5		1	SS	8 12	10 30	60						
		2	SS	8 10	10 3	60						
		3	SS	3 6	3 7	20	GRAY	MEDIUM STIFF	CLAYEY FINE SAND.	SC	MOIST WET	0.0
10									GRAVELLY SILTY MEDIUM TO FINE SAND	SM		0.0
		4	SS	12 10	12 12	50	BROWN	MEDIUM DENSE				0.0
15		5	SS	7 4	5 4	50		LOOSE				0.0
20									BORING TERMINATED AT 18.0'			
25												
30												
35												

COMMENTS BORING ADVANCED WITH INGERSOLL-RAND T2W DRILL RIG & 4.25" I.D. AUGER.
2" PVC OBSERVATION WELL INSTALLED WITH 10 FT SCREEN TO 18.0 FT BGS

PROJECT NO.

0535388.00

BORING NO.

OW-3

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. OW-4

PROJECT: NORTH FRANKLIN STREET, WATKINS GLEN, NY

SHEET NO. 1 OF 1

CLIENT: NYS DEPT OF ENVIRONMENTAL CONSERVATION

JOB NO.: 0535388.00

BORING CONTRACTOR: AMERICAN AUGER & DITCHING

BORING LOCATION: 20 FT SW OF MW-205

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

SPLIT
POON

2"

140#

30"

DATE STARTED: 12/2/94

DATE FINISHED: 12/2/94

DRILLER: ROCKY BAYE

GEOLOGIST: ANDRE LAPRES

REVIEWED BY:

* POCKET PENETROMETER READING

DEPTH FT	STRATA	SAMPLE				RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	DESCRIPTION		CLASS USCS	REMARKS
		NO.	TYPE	BLOWS PER 6"					MATERIAL DESCRIPTION			
							BROWN	MEDIUM DENSE	GRAVELLY SILTY SAND.			DRILL CUTTINGS LOGGED 0-3' MOIST. FILL.
5		1	SS	4	8	20						0.0
				7	6							0.6
		2	SS	5	2	20						
				2	4							
		3	SS	4	2	20						WET
				2	5							0.5
10							GRAY		GRAVELLY SILTY MEDIUM TO FINE SAND.			WET
		4	SS	2	7	40						0.5
				6	6							
15												
		5	SS	6	7	50						0.0
				6	6							
20									BORING TERMINATED AT 18.0'			
25												
30												
35												

COMMENTS BORING ADVANCED WITH INGERSOLL-RAND T2W DRILL RX & 4.25" ID AUGER
2" PVC OBSERVATION WELL INSTALLED WITH 10 FT SCREEN TO 18.0 FT BGS

PROJECT NO.

0535388.00

BORING NO.

OW-4

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO.

MW-7S

PROJECT: N. Franklin St.

SHEET NO. 1 OF 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 35244.00

BORING CONTRACTOR: Buffalo Drilling Company

BORING LOCATION: 10484.75724N 5020.02346E

GROUNDWATER:

CAS. SAMP. CORE TUBE

GROUND ELEVATION: 450.68'

DATE TIME LEV TYPE TYPE SS (split-spoon)

DATE STARTED: 12/16/92

12/18/92 444.89 in monitoring well DIA. 2"

DATE FINISHED: 12/16/92

WT. 140#

DRILLER: Mike Saeli

FALL 30"

GEOLOGIST: Joe Pettorino

* POCKET PENETROMETER READING

REVIEWED BY: Duane Lenhardt

DEPTH FT	STRATA	SAMPLE					DESCRIPTION				REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY /PID (ppm)	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
	XXXXX			9	24						
	XXXXX	1	SS	15	20	50%/#	Black &	Dense	Fill - sand and gravel with trace silt	SW/ GW	o ~3" Asphalt o HNu broke down o Oily Texture o Moist
	XXXXX			9	14		Dark	Very Dense			
4	XXXXX	2	SS	37	22	40%/#	Brown				
5	.~.~.			4	5		Gray	Stiff	Clayey Silt - trace sand	ML/ CL	
6	.~.~.	3	SS	6	8	60%/#					o Low Plasticity
	.o.o.o.o			8	10		Gray	Medium Dense	Gravelly sand - some silt; trace clay	SM	o Wet
	.o.o.o.o.	4	SS	11	17	50%/#					o w/Shale Fragments
	.~.~.			5	7						o Coarse-Fine Sands
10	.o.o.o.o	5	SS	7	7	30%/#					
	.o.o.o.o.			3	2		Brownish	Loose to medium dense			
	.~.~.	6	SS	2	2	70%/#	Gray				
	.o.o.o.o			1	3						o Few Thin Peat Beds
	.o.o.o.o.	7	SS	4	3	70%/#					o 1/2" orange clay seam
15	.~.~.			4	5				-Stratified sand and gravel	SM/ GM	o Fine subrounded gravel
	.o.o.o.o	8	SS	6	7	40%/#					
17	.o.o.o.o.										
20									Borehole completed at 17'		
25											
30											
35											

COMMENTS

Boring advanced with 6 1/4" hollow-stem augers; Diedrich D-50 Drill Rig. Installed monitoring well MW-7S in bore hole.

(see well construction log)

- No PID readings due to instrument malfunction.

* - Environmental sample from 2-4'

PROJECT NO.

35244.00

BORING NO.

MW-7S

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO.

MW-9S

PROJECT: N. Franklin St.

SHEET NO. 1 OF 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 35244.10.30000

BORING CONTRACTOR: Buffalo Drilling Company

BORING LOCATION: 10481.12111N 5168.32933E

GROUNDWATER:

CAS. SAMP. CORE TUBE

GROUND ELEVATION: 451.53'

DATE TIME LEV TYPE

TYPE

SS (split spoon)

DATE STARTED: 12/13/92

12/18/92 445.12 in monitoring well

DIA.

2"

DATE FINISHED: 12/13/92

WT.

140#

DRILLER: Larry Schroeder

FALL

30"

GEOLOGIST: Mindar Hsieh

* POCKET PENETROMETER READING

REVIEWED BY: Duane Lenhardt

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY PID(ppm) ¹	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
	XXXX	1	SS	23	24	Brown/ Yellow	Dense to Very Dense	FILL - silty sand, some gravel, trace clay	SM/ SW	o HNu: no detection o 0-6" Wet o Difficult Augering 1.5-6' o Spoon Refusal 4-6'	
	XXXX			20	15						80%/0
	XXXX	2	SS	12	50/1"						15%/0
	XXXX										
5	XXXX	3	SS	50/1"		0					
6	XXXX										
	.0~.0~	4	SS	8	9	Gray	Medium Dense to Dense	GRAVELLY SAND - trace silt and clay	SM	o Medium-Coarse Sand o Coarse Fragments up to 1½" o Mixed Lithology	
	.0~.0~			17	15						50%/0
	.0~.0~	5	SS	7	8						40%/0
10	.0~.0~			10	7						
	.0~.0~	6	SS	12	22	40%/0					
	.0~.0~			13	14						
	.0~.0~	7	SS	5	11	20%/0					
	.0~.0~			6	6						
15	.0~.0~	8	SS	7	6	20%/0					
16	.0~.0~			5	5						
								Borehole completed at 16.0'.			
20											
25											
30											
35											

COMMENTS

Boring advanced with 6 1/4" hollow stem augers; CME 55 Drill Rig. Installed monitoring well MW-9S at this location.

(see well construction log)

¹ - Screening of soil core.

* - Environmental sample from 0-4'.

PROJECT NO.

35244.10.30000

BORING NO.

MW-9S

TEST BORING LOG

BORING NO.

MW-20S

PROJECT: N. Franklin St.

SHEET NO. 1 OF 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. :	35244.00
-----------	----------

BORING CONTRACTOR: Buffalo Drilling Company

BORING LOCATION:

GROUNDWATER:

CAS.	SAMP.	CORE	TUBE
------	-------	------	------

GROUND ELEVATION: 451.02'

DATE	TIME	LEV	TYPE
------	------	-----	------

TYPE

SS

(split-spoon)

DATE STARTED:	3/29/93
---------------	---------

12/18/92	445.21	in monitoring well
----------	--------	--------------------

DIA.

55	
2 ^m	

--	--	--

DATE FINISHED:	3/29/93
----------------	---------

WT

140#

DRILLER:	Wally Greiner
----------	---------------

--	--	--	--

WINTER	1941
FALL	1940

140#	
30"	

DRILLER:	Wally Gremel
GEOLOGIST:	Bob Kruezer

FALL
* ROCK

30

TABLE 1

REVIEWED BY:

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE					DESCRIPTION				REMARKS
		NO.	TYPE	BLOWS PER 6"		RECOVERY	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	
						PID(ppm)					
	XXXX			9	16		Brown & Gray	DENSE	FILL - sand and gravel some silt wood & brick frag	SM/ GM	o Moist
	XXXX	1	SS	27	73	35%/0					
	XXXX			3	8						
4.3	XXXX	2*	SS	11	10	40%/0					
5	XXXX			5	2						o Wet
	/~/~/	3	SS	2	2	55%/0	Gray	Loose	FINE SAND AND SILT trace clay	ML/ SM	
6.5	/~/~/			3	4						
	/~/~/	4	SS	8	2	35%/0					
	.0~.0~			7	10		Brown & Gray	Medium Dense	SAND AND GRAVEL tr. to some silt	SM/ GM	o Med Sand to Fine gravel
10	.0~.0~	5	SS	12	15	50%/0					
	.0~.0~			3	12						
	.0~.0~	6	SS	18	15	40%/0					
	.0~.0~			1	3						
	.0~.0~	7	SS	3	10	50%/0					
15	.0~.0~			5	7						
	.0~.0~	8	SS	12	20	45%/0					
	.0~.0~			WH	WH						
	.0~.0~	9	SS	2	5	25%/0					
	.0~.0~			10	21						
20	.0~.0~	10	SS	33	43	100%/0		Very Dense			
	.0~.0~			14	23						
	.0~.0~	11	SS	49	53	100%/0					
									Borehole completed at 22'		
25											
30											
35											

COMMENTS

Boring advanced with 6 1/4" hollow-stem augers; Dieldrich D-50 Drill Rig. Installed monitoring well MW-20S in borehole.

(see well construction log for details).

1 - Screening of soil core.

- - Environmental sample taken @ 3-4'.

PROJECT NO.

35244.00

BORING NO.

MW-20S

APPENDIX C

WELL INSTALLATION REPORTS

DRILLING SUMMARY

Geologist:

ANDRE LAPRES

Drilling Company:

AMERICAN AUGER

Driller:

Rocky Baye

Date:

11/30/94

GEOLOGIC LOG

depth(ft.)	lithology
0.0-6.0	FILL
6.0-7.0	CLAYEY FINE SAND
7.0-18.0	GRAVELLY SILTY MEDIUM TO FINE SAND

DEPTH

* Elevation

* Elevation

Protective casing and lockable cap

Ground Level

AUGERHOLE

10 inch dia.

18 feet length

WELL RISER

2 inch dia.

7.5 feet length

WELL SCREEN

2 inch dia.

10 feet length

5.0

7.0

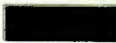
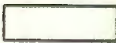
7.5

17.5

18.0

* NOTES:

WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	SEAL MATERIAL
Surface: 8 INCH FLUSH MOUNT	Type: SCH 40 PVC	Seal #1 Type: 3/8" HOLE PLUG
Monitor:	Slot Size: .010 INCH	Setting: BENTONITE 5.0 - 7.0 FT
Seal #2 Type:		Setting:
FILTER MATERIAL	ROCK CORING	LEGEND
Type: #0 SAND	Cored Interval:	 Cement/Bentonite Grout
Setting: 7.0 - 18.0 FT	Core Diameter:	 Bentonite Seal
	Reamed Diameter:	 Silica Sandpack
Client: NYSDEC	Project: NORTH FRANKLIN ST.	Project No.: 0535388.00
URS Consultants, Inc.	Monitoring Well Construction Details	Well Number: OW-1

DRILLING SUMMARY

Geologist:

ANDRE LAPRES

Drilling Company:

AMERICAN ANGER

Driller:

Rocky Baye

Date:

12/1/94

GEOLOGIC LOG

depth(ft.)	lithology
0.0-8.0	FILL
8.0-18.0	GRAVELLY SILTY MEDIUM TO FINE SAND

D
E
P
T
H

* Elevation

* Elevation

Protective casing and lockable cap

Ground Level

AUGERHOLE

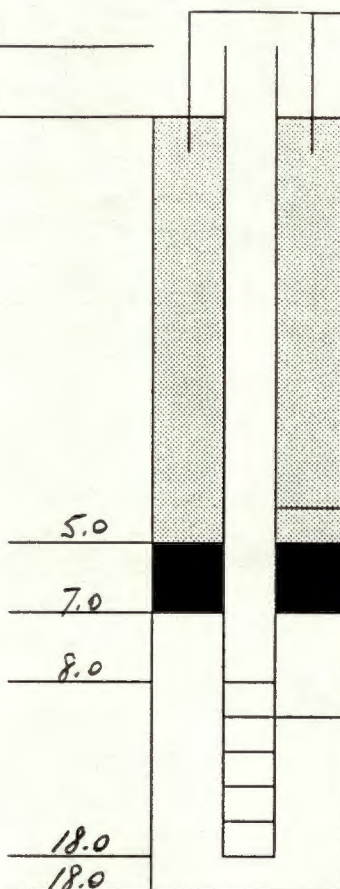
10 inch dia.
18 feet length

WELL RISER

2 inch dia.
8 feet length

WELL SCREEN

2 inch dia.
10 feet length



* NOTES:

WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	SEAL MATERIAL
Surface: 8 INCH FLUSH MOUNT	Type: SCH 40 PVC	Seal #1 Type: 3/8" HOLEPLUG Setting: BENTONITE 5.0-7.0 FT
Monitor:	Slot Size: .010 INCH	Seal #2 Type: Setting:
FILTER MATERIAL	ROCK CORING	LEGEND
Type: #0 SAND	Cored Interval:	Cement/Bentonite Grout
Setting: 7.0-18.0 FT	Core Diameter:	Bentonite Seal
	Reamed Diameter:	Silica Sandpack
Client: NYSDEC	Project: NORTH FRANKLIN ST.	Project No.: 0535388.00
URS Consultants, Inc.	Monitoring Well Construction Details	Well Number: OW-2

DRILLING SUMMARY

Geologist:

ANDRE LAPRES.

Drilling Company:

AMERICAN AUGER

Driller:

ROCKY BAYE

Date:

12/1/94

GEOLOGIC LOG

depth(ft.)	lithology
0.0-6.8	FILL
6.8-7.5	CLAYEY FINE SAND
7.5-18.0	GRAVELLY SILTY MEDIUM TO FINE SAND

D
E
P
T
H

* Elevation

* Elevation

Protective casing and lockable cap

Ground Level

AUGERHOLE

10 inch dia.

18 feet length

WELL RISER

2 inch dia.

8 feet length

WELL SCREEN

2 inch dia.

10 feet length

* NOTES:

WELL DESIGN

CASING MATERIAL

Surface: 8 INCH FLUSH MOUNT

Monitor:

SCREEN MATERIAL

Type: SCH 40 PVC

Slot Size: .010 INCH

SEAL MATERIAL

Seal #1 Type: 3/8" HOLE PLUG

Setting: BENTONITE
5.0-7.0 FT

Seal #2 Type:

Setting:

FILTER MATERIAL

Type: #0 SAND

Setting: 7.0-18.0 FT

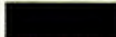
ROCK CORING

Cored Interval:

Core Diameter:

Reamed Diameter:

LEGEND

	Cement/Bentonite Grout
	Bentonite Seal
	Silica Sandpack

Client: NYSDEC

URS
Consultants, Inc.

Project: NORTH FRANKLIN ST.

Monitoring Well
Construction Details

Project No.: 0535388.00

Well Number: OW-3

DRILLING SUMMARY

Geologist:

ANDRE LAPRES

Drilling Company:

AMERICAN ANGER

Driller:

ROCKY BAYE

Date:

12/2/94

GEOLOGIC LOG

depth(ft.)	lithology
0.0-8.0	FILL
8.0-18.0	GRAVELLY SILTY MEDIUM TO FINE SAND

* Elevation

* Elevation

Protective casing and lockable cap

Ground Level

AUGERHOLE

10 inch dia.
18 feet length

D
E
P
T
H

WELL RISER

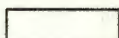
2 inch dia.
8 feet length

WELL SCREEN

2 inch dia.
10 feet length

* NOTES:

WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	SEAL MATERIAL
Surface: 8 INCH FLUSH MOUNT	Type: SCH 40 PVC	Seal #1 Type: 3/8" HOLE PLUG Setting: BENTONITE 5.0-7.0 FT
Monitor:	Slot Size: .010 INCH	Seal #2 Type: Setting:
FILTER MATERIAL	ROCK CORING	LEGEND
Type: #0 SAND	Cored Interval:	 Cement/Bentonite Grout
Setting: 7.0-18.0 FT	Core Diameter:	 Bentonite Seal
	Reamed Diameter:	 Silica Sandpack
Client: NYSDEC	Project: NORTH FRANKLIN ST	Project No.: 0535388.00
URS Consultants, Inc.	Monitoring Well Construction Details	Well Number: DW-4

DRILLING SUMMARY

Geologist:
Steve Frank
Drilling Company:
Buffalo Drilling Co.
Driller:
Larry Schroeder
Date:
12/15/92

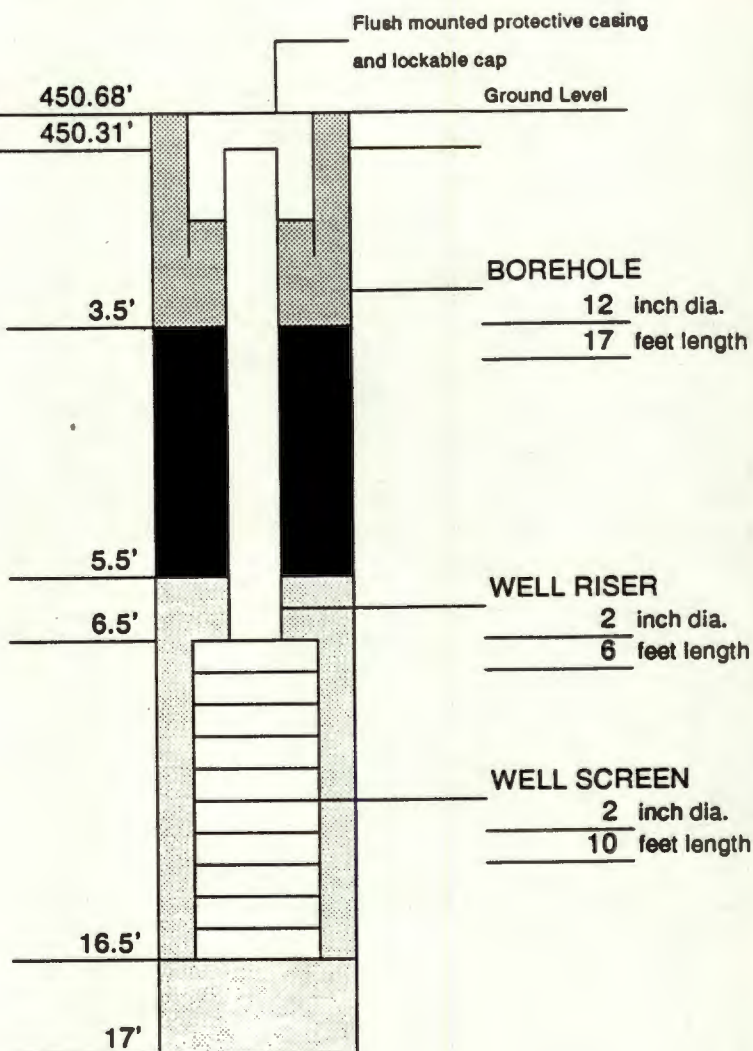
GEOLOGIC LOG

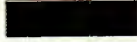
depth(ft.)	lithology
0-4	Fill
4-6	Clayey Silt
6-17	Sand and Gravel

WELL DESIGN

D
E
P
T
H

Elevation 450.68'
Elevation 450.31'



CASING MATERIAL		SCREEN MATERIAL	SEAL MATERIAL
Surface:	Steel	Type: Stainless Steel	Seal #1 Type: Bentonite Pellets Setting: 3.5-5.5'
Monitor:	Stainless Steel	Slot Size: 0.010 inch prepacked with 00 Quartz Sand	Seal #2 Type: Setting:
BACKFILL MATERIAL		FILTER MATERIAL	LEGEND
Type:	none	Type: 00 Quartz Sand	 Cement/Bentonite Grout
Setting:	none	Setting: 5.5-17'	 Bentonite Seal
			 Sandpack
Client:	NYSDEC	Project: N. Franklin St.	Project Number: 35244.00
URS Consultants Inc.		Monitoring Well Construction Details	Well Number: MW-7S

DRILLING SUMMARY

Geologist:

Mindar Hsieh

Drilling Company:

Buffalo Drilling Co.

Driller:

Larry Schroeder

Date:

12/13/92

GEOLOGIC LOG

depth(ft.)	lithology
0-6	Fill
6-16	Sand and Gravel

WELL DESIGN

CASING MATERIAL

Surface: Steel

Monitor: Stainless Steel

SCREEN MATERIAL

Type: Stainless Steel

Slot Size: 0.010 inch prepacked with 00 Quartz Sand

SEAL MATERIAL

Seal #1 Type Bentonite Pellets
Setting: 2-4'

Seal #2 Type:
Setting:

BACKFILL MATERIAL

Type: none

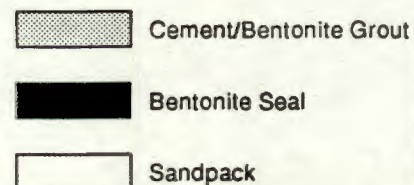
Setting: none

FILTER MATERIAL

Type: #2 Q Rok

Slot Size: 4-15'

LEGEND



Client: NYSDEC

Project: N. Franklin St.

Project No. 35244.00

URS
Consultants Inc.

Monitoring Well
Construction Details

Well Number:
MW-9S

D
E
P
T
H

Elevation 454.12'

Elevation 451.53'

Protective casing and lockable cap

Ground Level

BOREHOLE

12 inch dia.

15 feet length

2'

4'

4.5'

WELL RISER

2 inch dia.

7 feet length

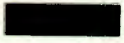
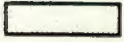
WELL SCREEN

2 inch dia.

10 feet length

14.5'

15'

DRILLING SUMMARY Geologist: Bob Kreuzer Drilling Company: Buffalo Drilling Co. Driller: Larry Schroeder Date: 3/29/93		Elevation 453.94' Protective casing and lockable cap Elevation 451.02' Ground Level BOREHOLE 12 inch dia. 20 feet length 2.5' 4' 5' 20' 20' WELL RISER 4 inch dia. 7.7 feet length WELL SCREEN 4 inch dia. 15 feet length									
GEOLOGIC LOG <table border="1"> <thead> <tr> <th>depth(ft.)</th> <th>lithology</th> </tr> </thead> <tbody> <tr> <td>0-4</td> <td>Fill</td> </tr> <tr> <td>4-5</td> <td>Sand & Silt</td> </tr> <tr> <td>5-20</td> <td>Sand and Gravel</td> </tr> </tbody> </table>		depth(ft.)	lithology	0-4	Fill	4-5	Sand & Silt	5-20	Sand and Gravel	D E P T H	
depth(ft.)	lithology										
0-4	Fill										
4-5	Sand & Silt										
5-20	Sand and Gravel										
WELL DESIGN											
CASING MATERIAL Surface: Steel Monitor: Stainless Steel		SCREEN MATERIAL Type: Stainless Steel Continuous Slot Slot Size: 0.030 inch									
SEAL MATERIAL Seal #1 Type: Bentonite Pellets Setting: 2-4 Seal #2 Type: Setting:											
BACKFILL MATERIAL Type: none Setting: none		FILTER MATERIAL Type: #1 Quartz Sand Setting: 4-20'									
		LEGEND  Cement/Bentonite Grout  Bentonite Seal  Sandpack									
Client: NYSDEC		Project N. Franklin St.									
Project Number: 35244.00											
URS Consultants Inc.		Monitoring Well Construction Details									
Well Number: MW-20S											

APPENDIX D-1

AQUIFER PUMPING TEST DATA

INPUT DATA

ISOAQX (C) v3.00 --- FILE owl.dt

Test No 1: r = 5.00 ft Q = 10.00 gpm M = 15.0 ft

N. Franlin St., observation well OW - 1

Time(min.)--Drawdown(ft) input data for test No 1					
(	0.6322,	0.092)	(	0.6653,	0.066)
(	0.7373,	0.092)	(	0.7646,	0.088)
(	0.8323,	0.084)	(	0.8654,	0.090)
(	0.9374,	0.090)	(	0.9648,	0.084)
(	1.0872,	0.092)	(	1.1635,	0.085)
(	1.3450,	0.082)	(	1.4213,	0.071)
(	1.5869,	0.085)	(	1.6790,	0.095)
(	1.8331,	0.075)	(	1.9224,	0.090)
(	2.0923,	0.084)	(	2.1686,	0.098)
(	2.3314,	0.092)	(	2.4350,	0.091)
(	2.5906,	0.074)	(	2.6669,	0.094)
(	2.8469,	0.084)	(	2.9246,	0.100)
(	3.2486,	0.077)	(	3.4992,	0.095)
(	3.9989,	0.085)	(	4.2480,	0.100)
(	4.7491,	0.092)	(	4.9982,	0.082)
(	5.4979,	0.103)	(	5.7485,	0.088)
(	6.2482,	0.081)	(	6.4987,	0.098)
(	6.9984,	0.104)	(	7.2490,	0.105)
(	7.7486,	0.105)	(	7.9992,	0.103)
(	8.4989,	0.091)	(	8.7480,	0.101)
(	9.4982,	0.107)	(	11.4898,	0.105)
(	11.6453,	0.100)	(	11.7374,	0.085)
(	12.4992,	0.087)	(	12.9989,	0.111)
(	13.9982,	0.090)	(	14.4979,	0.090)
(	15.4987,	0.091)	(	15.9984,	0.090)
(	16.9992,	0.100)	(	17.4989,	0.118)
(	18.4982,	0.111)	(	18.9979,	0.104)
(	19.9987,	0.110)	(	20.4984,	0.113)
(	21.9989,	0.120)	(	22.9982,	0.103)
(	24.9984,	0.117)	(	25.9992,	0.104)
(	27.9979,	0.126)	(	28.9987,	0.123)
(	30.9989,	0.123)	(	31.9982,	0.118)
(	33.9984,	0.130)	(	34.9992,	0.110)
(	36.9979,	0.104)	(	37.9987,	0.120)
(	39.9989,	0.110)	(	40.9982,	0.121)
(	42.9984,	0.120)	(	43.9992,	0.126)
(	47.9981,	0.140)	(	50.9990,	0.139)
(	56.9981,	0.140)	(	59.9990,	0.141)
(	65.9981,	0.120)	(	68.9990,	0.127)
(	74.9981,	0.137)	(	77.9990,	0.139)
(	83.9981,	0.129)	(	86.9990,	0.137)
(	92.9981,	0.149)	(	95.9990,	0.149)
(	101.9981,	0.146)	(	104.9990,	0.160)
(	110.9981,	0.143)	(	113.9990,	0.154)
(	119.9995,	0.154)	(	124.9992,	0.167)
(	134.9986,	0.169)	(	139.9982,	0.162)
(	149.9990,	0.144)	(	154.9987,	0.169)
(	164.9981,	0.167)	(	169.9992,	0.166)
(	179.9986,	0.160)	(	184.9982,	0.154)
(	194.9990,	0.167)	(	199.9987,	0.170)
(	209.9981,	0.153)	(	214.9992,	0.147)
(	224.9986,	0.159)	(	229.9982,	0.147)
(	240.0005,	0.169)	(	254.9981,	0.173)
(	284.9991,	0.152)	(	299.9981,	0.156)
(	329.9991,	0.188)	(	344.9981,	0.167)
(			(	359.9986,	0.189)

(374.9991, 0.176) (389.9981, 0.193) (404.9986, 0.206)
(419.9991, 0.198)

ISOAQX (C) v3.00 --- FILE owl.dt
test # comb: 1

unbiased GR-DRN PART-PENETRATION "B" CURVE MODEL:
full analysis: all active data points used
using closure tolerance setting = 1.00E-03
root mean squared error (ft) = 9.59E-03
hydraulic conductivity (ft/day) = 378.80
vertical hyd cond (ft/day) = 72.89
specific yield (dimensionless) = 2.21E-01
aqth: 15.00/TP: 0.00/BP: 13.00/TO: 1.00/BO: 11.00

INPUT DATA

ISOAQX (C) v3.00 --- FILE ow2.dt (modified)

Test No 2: r = 16.00 ft Q = 10.00 gpm M = 15.0 ft

N. Franklin St. Aquifer Test, Observation Well OW - 2

Time(min.)	Drawdown(ft)	Time(min.)	Drawdown(ft)	Time(min.)	Drawdown(ft)
(0.6322, 0.044)	(0.6653, 0.034)	(0.6984, 0.046)			
(0.7373, 0.040)	(0.7646, 0.051)	(0.7992, 0.036)			
(0.8323, 0.050)	(0.8654, 0.037)	(0.8986, 0.051)			
(0.9374, 0.050)	(0.9648, 0.050)	(0.9979, 0.031)			
(1.0872, 0.046)	(1.1635, 0.053)	(1.2514, 0.027)			
(1.3450, 0.051)	(1.4213, 0.033)	(1.4990, 0.028)			
(1.5869, 0.054)	(1.6790, 0.040)	(1.7568, 0.051)			
(1.8331, 0.046)	(1.9224, 0.056)	(2.0131, 0.034)			
(2.0923, 0.054)	(2.1686, 0.056)	(2.2450, 0.028)			
(2.3314, 0.033)	(2.4350, 0.056)	(2.5114, 0.034)			
(2.5906, 0.033)	(2.6669, 0.057)	(2.7706, 0.037)			
(2.8469, 0.053)	(2.9246, 0.051)	(3.0024, 0.040)			
(3.2486, 0.041)	(3.4992, 0.034)	(3.7483, 0.059)			
(3.9989, 0.030)	(4.2480, 0.041)	(4.4986, 0.038)			
(4.7491, 0.060)	(4.9982, 0.053)	(5.2488, 0.047)			
(5.4979, 0.057)	(5.7485, 0.031)	(5.9990, 0.047)			
(6.2482, 0.047)	(6.4987, 0.063)	(6.7478, 0.059)			
(6.9984, 0.060)	(7.2490, 0.054)	(7.4981, 0.044)			
(7.7486, 0.038)	(7.9992, 0.050)	(8.2483, 0.059)			
(8.4989, 0.062)	(8.7480, 0.066)	(9.0000, 0.064)			
(9.4982, 0.046)	(11.4898, 0.044)	(11.5675, 0.041)			
(11.6453, 0.069)	(11.7374, 0.050)	(11.9981, 0.036)			
(12.4992, 0.051)	(12.9989, 0.060)	(13.4986, 0.053)			
(13.9982, 0.054)	(14.4979, 0.046)	(14.9990, 0.062)			
(15.4987, 0.056)	(15.9984, 0.053)	(16.4981, 0.073)			
(16.9992, 0.067)	(17.4989, 0.062)	(17.9986, 0.075)			
(18.4982, 0.077)	(18.9979, 0.044)	(19.4990, 0.046)			
(19.9987, 0.076)	(20.4984, 0.051)	(20.9995, 0.049)			
(21.9989, 0.079)	(22.9982, 0.073)	(23.9990, 0.059)			
(24.9984, 0.057)	(25.9992, 0.050)	(26.9986, 0.053)			
(27.9979, 0.083)	(28.9987, 0.082)	(29.9981, 0.066)			
(30.9989, 0.062)	(31.9982, 0.056)	(32.9990, 0.083)			
(33.9984, 0.083)	(34.9992, 0.057)	(35.9986, 0.072)			
(36.9979, 0.066)	(37.9987, 0.086)	(38.9981, 0.066)			
(39.9989, 0.077)	(40.9982, 0.086)	(41.9990, 0.088)			
(42.9984, 0.057)	(43.9992, 0.090)	(45.0000, 0.062)			
(47.9981, 0.085)	(50.9990, 0.079)	(53.9986, 0.079)			
(56.9981, 0.095)	(59.9990, 0.086)	(62.9986, 0.064)			
(65.9981, 0.082)	(68.9990, 0.067)	(71.9986, 0.096)			
(74.9981, 0.073)	(77.9990, 0.072)	(80.9986, 0.080)			
(83.9981, 0.083)	(86.9990, 0.101)	(89.9986, 0.106)			
(92.9981, 0.082)	(95.9990, 0.080)	(98.9986, 0.109)			
(101.9981, 0.077)	(104.9990, 0.106)	(107.9986, 0.089)			
(110.9981, 0.079)	(113.9990, 0.109)	(116.9986, 0.095)			
(119.9995, 0.111)	(124.9992, 0.109)	(129.9989, 0.112)			
(134.9986, 0.098)	(139.9982, 0.088)	(144.9979, 0.092)			
(149.9990, 0.073)	(154.9987, 0.105)	(159.9984, 0.108)			
(164.9981, 0.096)	(169.9992, 0.085)	(174.9989, 0.090)			
(179.9986, 0.108)	(184.9982, 0.077)	(189.9979, 0.108)			
(194.9990, 0.083)	(199.9987, 0.108)	(204.9984, 0.103)			
(209.9981, 0.075)	(214.9992, 0.085)	(219.9989, 0.102)			
(224.9986, 0.077)	(229.9982, 0.079)	(234.9979, 0.108)			
(240.0005, 0.085)	(254.9981, 0.096)	(269.9986, 0.083)			
(284.9991, 0.080)	(299.9981, 0.095)	(314.9986, 0.086)			
(329.9991, 0.114)	(344.9981, 0.095)	(359.9986, 0.096)			

(374.9991, 0.093) (389.9981, 0.127) (404.9986, 0.128)
(419.9991, 0.106)

ISOAQX (C) v3.00 --- FILE ow2.dt
test # comb: 2

unbiased GR-DRN PART-PENETRATION "B" CURVE MODEL:
full analysis: all active data points used
using closure tolerance setting = 1.00E-03
root mean squared error (ft) = 1.16E-02
hydraulic conductivity (ft/day) = 711.56
vertical hyd cond (ft/day) = 18.37
specific yield (dimensionless) = 2.12E-02
aqth: 15.00/TP: 0.00/BP: 13.00/TO: 1.00/BO: 11.00

INPUT DATA

ISOAQX (C) v3.00 --- FILE ow3.dt (modified)

Test No 1: r = 30.00 ft Q = 10.00 gpm M = 15.0 ft

N. Franklin St. Aquifer Test, Observation Well OW - 3

Time(min.)--Drawdown(ft) input data for test No 1

(0.6984, 0.017)	(0.7373, 0.013)	(0.7646, 0.023)
(0.7992, 0.010)	(0.8323, 0.026)	(0.8654, 0.009)
(0.8986, 0.029)	(0.9374, 0.023)	(0.9648, 0.035)
(0.9979, 0.037)	(1.0872, 0.019)	(1.1635, 0.030)
(1.2514, 0.032)	(1.3450, 0.037)	(1.4213, 0.035)
(1.4990, 0.010)	(1.5869, 0.032)	(1.6790, 0.011)
(1.7568, 0.020)	(1.8331, 0.040)	(1.9224, 0.035)
(2.0131, 0.037)	(2.0923, 0.043)	(2.1686, 0.023)
(2.2450, 0.017)	(2.3314, 0.011)	(2.4350, 0.033)
(2.5114, 0.011)	(2.5906, 0.037)	(2.6669, 0.029)
(2.7706, 0.039)	(2.8469, 0.043)	(2.9246, 0.020)
(3.0024, 0.014)	(3.2486, 0.042)	(3.4992, 0.013)
(3.7483, 0.037)	(3.9989, 0.020)	(4.2480, 0.016)
(4.4986, 0.040)	(4.7491, 0.040)	(4.9982, 0.046)
(5.2488, 0.019)	(5.4979, 0.024)	(5.7485, 0.023)
(5.9990, 0.019)	(6.2482, 0.045)	(6.4987, 0.039)
(6.7478, 0.049)	(6.9984, 0.027)	(7.2490, 0.023)
(7.4981, 0.019)	(7.7486, 0.022)	(7.9992, 0.023)
(8.2483, 0.050)	(8.4989, 0.052)	(8.7480, 0.045)
(9.0000, 0.049)	(9.4982, 0.023)	(11.4898, 0.024)
(11.5675, 0.043)	(11.6453, 0.050)	(11.7374, 0.050)
(11.9981, 0.040)	(12.4992, 0.052)	(12.9989, 0.030)
(13.4986, 0.026)	(13.9982, 0.053)	(14.4979, 0.048)
(14.9990, 0.030)	(15.4987, 0.053)	(15.9984, 0.052)
(16.4981, 0.043)	(16.9992, 0.056)	(17.4989, 0.032)
(17.9986, 0.048)	(18.4982, 0.050)	(18.9979, 0.033)
(19.4990, 0.046)	(19.9987, 0.056)	(20.4984, 0.029)
(20.9995, 0.030)	(21.9989, 0.049)	(22.9982, 0.061)
(23.9990, 0.058)	(24.9984, 0.035)	(25.9992, 0.046)
(26.9986, 0.035)	(27.9979, 0.055)	(28.9987, 0.049)
(29.9981, 0.063)	(30.9989, 0.037)	(31.9982, 0.039)
(32.9990, 0.061)	(33.9984, 0.049)	(34.9992, 0.055)
(35.9986, 0.040)	(36.9979, 0.062)	(37.9987, 0.071)
(38.9981, 0.063)	(39.9989, 0.071)	(40.9982, 0.065)
(41.9990, 0.055)	(42.9984, 0.040)	(43.9992, 0.068)
(45.0000, 0.061)	(47.9981, 0.048)	(50.9990, 0.043)
(53.9986, 0.046)	(56.9981, 0.058)	(59.9990, 0.049)
(62.9986, 0.050)	(65.9981, 0.071)	(68.9990, 0.056)
(71.9986, 0.058)	(74.9981, 0.058)	(77.9990, 0.049)
(80.9986, 0.052)	(83.9981, 0.074)	(86.9990, 0.078)
(89.9986, 0.078)	(92.9981, 0.053)	(95.9990, 0.052)
(98.9986, 0.072)	(101.9981, 0.058)	(104.9990, 0.066)
(107.9986, 0.053)	(110.9981, 0.063)	(113.9990, 0.074)
(116.9986, 0.084)	(119.9995, 0.076)	(124.9992, 0.069)
(129.9989, 0.072)	(134.9986, 0.062)	(139.9982, 0.066)
(144.9979, 0.085)	(149.9990, 0.066)	(154.9987, 0.068)
(159.9984, 0.081)	(164.9981, 0.063)	(169.9992, 0.061)
(174.9989, 0.085)	(179.9986, 0.087)	(184.9982, 0.068)
(189.9979, 0.078)	(194.9990, 0.062)	(199.9987, 0.075)
(204.9984, 0.068)	(209.9981, 0.072)	(214.9992, 0.082)
(219.9989, 0.068)	(224.9986, 0.059)	(229.9982, 0.072)
(234.9979, 0.078)	(240.0005, 0.059)	(254.9981, 0.063)
(269.9986, 0.062)	(284.9991, 0.075)	(299.9981, 0.087)
(314.9986, 0.068)	(329.9991, 0.081)	(344.9981, 0.094)
(359.9986, 0.074)	(374.9991, 0.094)	(389.9981, 0.111)

(404.9986, 0.102) (419.9991, 0.089)

test # comb: 1 ISOAQX (C) v3.00 --- FILE ow3.dt

unbiased GR-DRN PART-PENETRATION "B" CURVE MODEL:

full analysis: all active data points used

using closure tolerance setting = 1.00E-03

root mean squared error (ft) = 1.08E-02

hydraulic conductivity (ft/day) = 802.56

vertical hyd cond (ft/day) = 16.65

specific yield (dimensionless) = 1.42E-02

aqth: 15.00/TP: 0.00/BP: 13.00/TO: 1.00/BO: 11.00

INPUT DATA

ISOAQX (C) v3.00 --- FILE ow4.dt (modified)

Test No 1: r = 20.00 ft Q = 10.00 gpm M = 15.0 ft

N. Franklin Aquifer Test, Observation Well OW - 4

Time(min.)--Drawdown(ft) input data for test No 1					
(	0.6322,	0.029)	(	0.6653,	0.052)
(	0.7373,	0.029)	(	0.7646,	0.030)
(	0.8323,	0.032)	(	0.8654,	0.032)
(	0.9374,	0.032)	(	0.9648,	0.036)
(	1.0872,	0.030)	(	1.1635,	0.035)
(	1.3450,	0.042)	(	1.4213,	0.056)
(	1.5869,	0.038)	(	1.6790,	0.035)
(	1.8331,	0.051)	(	1.9224,	0.041)
(	2.0923,	0.048)	(	2.1686,	0.036)
(	2.3314,	0.045)	(	2.4350,	0.039)
(	2.5906,	0.059)	(	2.6669,	0.038)
(	2.8469,	0.051)	(	2.9246,	0.038)
(	3.2486,	0.059)	(	3.4992,	0.048)
(	3.9989,	0.056)	(	4.2480,	0.043)
(	4.7491,	0.046)	(	4.9982,	0.055)
(	5.4979,	0.041)	(	5.7485,	0.061)
(	6.2482,	0.064)	(	6.4987,	0.046)
(	6.9984,	0.042)	(	7.2490,	0.042)
(	7.7486,	0.045)	(	7.9992,	0.042)
(	8.4989,	0.056)	(	8.7480,	0.051)
(	9.4982,	0.054)	(	11.4898,	0.058)
(	11.6453,	0.054)	(	11.7374,	0.069)
(	12.4992,	0.067)	(	12.9989,	0.048)
(	13.9982,	0.069)	(	14.4979,	0.074)
(	15.4987,	0.069)	(	15.9984,	0.069)
(	16.9992,	0.064)	(	17.4989,	0.052)
(	18.4982,	0.056)	(	18.9979,	0.071)
(	19.9987,	0.062)	(	20.4984,	0.062)
(	21.9989,	0.056)	(	22.9982,	0.068)
(	24.9984,	0.068)	(	25.9992,	0.080)
(	27.9979,	0.059)	(	28.9987,	0.058)
(	30.9989,	0.069)	(	31.9982,	0.074)
(	33.9984,	0.058)	(	34.9992,	0.084)
(	36.9979,	0.084)	(	37.9987,	0.072)
(	39.9989,	0.081)	(	40.9982,	0.068)
(	42.9984,	0.077)	(	43.9992,	0.068)
(	47.9981,	0.061)	(	50.9990,	0.062)
(	56.9981,	0.067)	(	59.9990,	0.065)
(	65.9981,	0.087)	(	68.9990,	0.090)
(	74.9981,	0.091)	(	77.9990,	0.088)
(	83.9981,	0.100)	(	86.9990,	0.085)
(	92.9981,	0.090)	(	95.9990,	0.085)
(	101.9981,	0.090)	(	104.9990,	0.074)
(	110.9981,	0.097)	(	113.9990,	0.080)
(	119.9995,	0.080)	(	124.9992,	0.078)
(	134.9986,	0.081)	(	139.9982,	0.095)
(	149.9990,	0.095)	(	154.9987,	0.078)
(	164.9981,	0.081)	(	169.9992,	0.091)
(	179.9986,	0.090)	(	184.9982,	0.098)
(	194.9990,	0.094)	(	199.9987,	0.081)
(	209.9981,	0.098)	(	214.9992,	0.098)
(	224.9986,	0.090)	(	229.9982,	0.106)
(	240.0005,	0.087)	(	254.9981,	0.075)
(	284.9991,	0.097)	(	299.9981,	0.098)
(	329.9991,	0.088)	(	344.9981,	0.114)
(			(	359.9986,	0.124)

(374.9991, 0.116) (389.9981, 0.106) (404.9986, 0.103)
(419.9991, 0.117)

ISOAQX (C) v3.00 --- FILE ow4.dt (modified)
test # comb: 1

unbiased GR-DRN PART-PENETRATION "B" CURVE MODEL:
full analysis: all active data points used
using closure tolerance setting = 1.00E-03
root mean squared error (ft) = 9.28E-03
hydraulic conductivity (ft/day) = 866.51
vertical hyd cond (ft/day) = 11.75
specific yield (dimensionless) = 5.56E-03
aqth: 15.00/TP: 0.00/BP: 13.00/TO: 1.00/BO: 11.00

INPUT DATA

ISOAQX (C) v3.00 --- FILE mw2s.dt

Test No 1: r = 52.00 ft Q = 10.00 gpm M = 15.0 ft

N Franklin St Aquifer Test, Observation Well MW - 2 S

Time(min.)--Drawdown(ft) input data for test No 1	
(0.8654, 0.013)	(0.8986, 0.015)
(0.9648, 0.016)	(0.9979, 0.017)
(1.1635, 0.019)	(1.2514, 0.022)
(1.4213, 0.024)	(1.4990, 0.020)
(1.6790, 0.021)	(1.7568, 0.021)
(1.9224, 0.025)	(2.0131, 0.027)
(2.1686, 0.025)	(2.2450, 0.027)
(2.4350, 0.027)	(2.5114, 0.027)
(2.6669, 0.028)	(2.7706, 0.031)
(2.9246, 0.029)	(3.0024, 0.028)
(3.4992, 0.030)	(3.7483, 0.033)
(4.2480, 0.032)	(4.4986, 0.035)
(4.9982, 0.035)	(5.2488, 0.033)
(5.7485, 0.035)	(5.9990, 0.035)
(6.4987, 0.035)	(6.7478, 0.037)
(7.2490, 0.035)	(7.4981, 0.035)
(7.9992, 0.035)	(8.2483, 0.035)
(8.7480, 0.035)	(9.0000, 0.036)
(11.4898, 0.040)	(11.5675, 0.042)
(11.7374, 0.043)	(11.9981, 0.042)
(12.9989, 0.040)	(13.4986, 0.039)
(14.4979, 0.046)	(14.9990, 0.043)
(15.9984, 0.048)	(16.4981, 0.046)
(17.4989, 0.046)	(17.9986, 0.048)
(18.9979, 0.048)	(19.4990, 0.048)
(20.4984, 0.048)	(20.9995, 0.048)
(22.9982, 0.051)	(23.9990, 0.053)
(25.9992, 0.050)	(26.9986, 0.051)
(28.9987, 0.052)	(29.9981, 0.055)
(31.9982, 0.054)	(32.9990, 0.056)
(34.9992, 0.056)	(35.9986, 0.052)
(37.9987, 0.056)	(38.9981, 0.056)
(40.9982, 0.058)	(41.9990, 0.059)
(43.9992, 0.059)	(45.0000, 0.062)
(50.9990, 0.064)	(53.9986, 0.066)
(59.9990, 0.069)	(62.9986, 0.072)
(68.9990, 0.079)	(71.9986, 0.080)
(77.9990, 0.085)	(80.9986, 0.085)
(86.9990, 0.087)	(89.9986, 0.091)
(95.9990, 0.091)	(98.9986, 0.095)
(104.9990, 0.094)	(107.9986, 0.097)
(113.9990, 0.098)	(116.9986, 0.102)
(124.9992, 0.104)	(129.9989, 0.106)

ISOAQX (C) v3.00 --- FILE mw2s.dt

test # comb: 1

unbiased GRAVITY-DRAINAGE (B-G)	"A/B" CURVE MODEL:
partial analysis:	based on one point in 3
using closure tolerance setting	= 1.00E-03
root mean squared error (ft)	= 2.00E-03
hydraulic conductivity (ft/day)	= 159.04
vertical hyd cond (ft/day)	= 7.66

specific yield (dimensionless)

=

3.83E-02

storativity (dimensionless)

=

1.74E-03

INPUT DATA

ISOAQX (C) v3.00 --- FILE mw9s.dt

Test No 1: r = 50.00 ft Q = 10.00 gpm M = 15.0 ft

N. Franklin St. Aquifer Test, Observation Well MW - 9 S

Time(min.)--Drawdown(ft) input data for test No 1		
(0.7992, 0.015)	(0.8323, 0.017)	(0.8654, 0.017)
(0.8986, 0.018)	(0.9374, 0.019)	(0.9648, 0.019)
(0.9979, 0.018)	(1.0872, 0.019)	(1.1635, 0.019)
(1.2514, 0.019)	(1.3450, 0.019)	(1.4213, 0.020)
(1.4990, 0.018)	(1.5869, 0.019)	(1.6790, 0.019)
(1.7568, 0.019)	(1.8331, 0.021)	(1.9224, 0.022)
(2.0131, 0.022)	(2.0923, 0.023)	(2.1686, 0.023)
(2.2450, 0.021)	(2.3314, 0.021)	(2.4350, 0.022)
(2.5114, 0.020)	(2.5906, 0.022)	(2.6669, 0.022)
(2.7706, 0.023)	(2.8469, 0.024)	(2.9246, 0.023)
(3.0024, 0.024)	(3.2486, 0.025)	(3.4992, 0.024)
(3.7483, 0.025)	(3.9989, 0.024)	(4.2480, 0.025)
(4.4986, 0.025)	(4.7491, 0.025)	(4.9982, 0.026)
(5.2488, 0.026)	(5.4979, 0.027)	(5.7485, 0.027)
(5.9990, 0.027)	(6.2482, 0.027)	(6.4987, 0.027)
(6.7478, 0.028)	(6.9984, 0.029)	(7.2490, 0.027)
(7.4981, 0.028)	(7.7486, 0.027)	(7.9992, 0.027)
(8.2483, 0.030)	(8.4989, 0.030)	(8.7480, 0.031)
(9.0000, 0.032)	(9.4982, 0.032)	(11.4898, 0.032)
(11.5675, 0.032)	(11.6453, 0.033)	(11.7374, 0.032)
(11.9981, 0.031)	(12.4992, 0.031)	(12.9989, 0.031)
(13.4986, 0.030)	(13.9982, 0.032)	(14.4979, 0.032)
(14.9990, 0.031)	(15.4987, 0.032)	(15.9984, 0.031)
(16.4981, 0.034)	(16.9992, 0.035)	(17.4989, 0.035)
(17.9986, 0.036)	(18.4982, 0.038)	(18.9979, 0.035)
(19.4990, 0.036)	(19.9987, 0.038)	(20.4984, 0.035)
(20.9995, 0.034)	(21.9989, 0.038)	(22.9982, 0.038)
(23.9990, 0.039)	(24.9984, 0.040)	(25.9992, 0.040)
(26.9986, 0.037)	(27.9979, 0.040)	(28.9987, 0.038)
(29.9981, 0.043)	(30.9989, 0.043)	(31.9982, 0.039)
(32.9990, 0.039)	(33.9984, 0.040)	(34.9992, 0.046)
(35.9986, 0.039)	(36.9979, 0.040)	(37.9987, 0.049)
(38.9981, 0.043)	(39.9989, 0.046)	(40.9982, 0.040)
(41.9990, 0.037)	(42.9984, 0.038)	(43.9992, 0.049)
(45.0000, 0.045)	(47.9981, 0.045)	(50.9990, 0.041)
(53.9986, 0.043)	(56.9981, 0.046)	(59.9990, 0.045)
(62.9986, 0.054)	(65.9981, 0.053)	(68.9990, 0.056)
(71.9986, 0.061)	(74.9981, 0.062)	(77.9990, 0.050)
(80.9986, 0.059)	(83.9981, 0.056)	(86.9990, 0.056)
(89.9986, 0.058)	(92.9981, 0.058)	(95.9990, 0.056)
(98.9986, 0.057)	(101.9981, 0.056)	(104.9990, 0.058)
(107.9986, 0.058)	(110.9981, 0.057)	(113.9990, 0.058)
(116.9986, 0.058)	(119.9995, 0.058)	(124.9992, 0.062)
(129.9989, 0.061)	(134.9986, 0.059)	(139.9982, 0.065)
(144.9979, 0.058)	(149.9990, 0.052)	(154.9987, 0.058)
(159.9984, 0.058)	(164.9981, 0.063)	(169.9992, 0.061)
(174.9989, 0.057)	(179.9986, 0.061)	(184.9982, 0.060)
(189.9979, 0.060)	(194.9990, 0.062)	(199.9987, 0.061)
(204.9984, 0.061)	(209.9981, 0.059)	(214.9992, 0.057)
(219.9989, 0.058)	(224.9986, 0.058)	(229.9982, 0.064)
(234.9979, 0.061)	(240.0005, 0.058)	(254.9981, 0.059)
(269.9986, 0.058)	(284.9991, 0.056)	(299.9981, 0.059)
(314.9986, 0.059)	(329.9991, 0.066)	(344.9981, 0.066)
(359.9986, 0.067)	(374.9991, 0.069)	(389.9981, 0.075)
(404.9986, 0.077)	(419.9991, 0.077)	

ISOAQX (C) v3.00 --- FILE mw9s.dt
test # comb: 1

unbiased GRAVITY-DRAINAGE (B-G) "A/B" CURVE MODEL:
partial analysis: based on one point in 3
using closure tolerance setting = 1.00E-03
root mean squared error (ft) = 3.35E-03
hydraulic conductivity (ft/day) = 924.31
vertical hyd cond (ft/day) = 3.52
specific yield (dimensionless) = 4.18E-03
storativity (dimensionless) = 1.12E-03

Well MW - 2 S

Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
11	0.03
65	0.02
167	0.06
231	0.04
515	0.07
553	0.08
614	0.11
759	0.1
850	0.12
967	0.15
1082	0.12
1204	0.13
1381	0.15
1468	0.12
1668	0.1
1791	0.16
2156	0.12
2420	0.14
2578	0.14
2714	0.14
2864	0.14
3183	0.15
3428	0.17
3579	0.16
3732	0.16
3901	0.16
4185	0.16
4345	0.11
4468	0.09
4624	0.1

Well MW - 9 S

Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
11	0.01
26	0.03
63	-0.01
169	0.01
233	0.03
516	0.08
551	-0.01
612	0.07
756	0.09
846	0.09
965	0.09
1080	0.11
1201	0.12
1382	0.12
1466	0.12
1656	0.13
1788	0.13
2154	0.13
2415	0.15
2574	0.13
2710	0.15
2861	0.15
3177	0.15
3423	0.15
3574	0.16
3008	0.15
3897	0.17
4182	0.17
4340	0.12
4463	0.11
4621	0.11

Well OW - 1

Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
7	0.02
12	0.02
23	0.03
60	0
160	0.02
223	0.02
356	0
491	0.06
511	0.07
548	0.08
602	0.09
669	0.11
754	0.1
843	0.09
962	0.12
1077	0.15
1198	0.12
1370	0.15
1461	0.13
1663	0.13
1784	0.16
2150	0.12
2408	0.14
2568	0.15
2703	0.17
2857	0.12
3171	0.15
3417	0.16
3567	0.16
3002	0.15
3892	0.16
4178	0.12
4336	0.05
4457	0.05
4603	0.04

Well OW - 2

Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
8	0.08
13	0.08
24	0.09
61	0.04
162	0.08
226	0.1
357	0.06
512	0.14
550	0.12
610	0.14
671	0.15
751	0.16
844	0.17
962	0.18
1078	0.18
1199	0.2
1371	0.37
1462	0.18
1658	0.2
1785	0.2
2151	0.18
2410	0.22
2570	0.21
2705	0.24
2859	0.2
3173	0.22
3419	0.23
3569	0.25
3724	0.23
3894	0.22
4181	0.24
4337	0.17
4459	0.15
4619	0.15

Well OW - 3

Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
9	0.03
25	0.01
62	-0.01
163	0.01
226	0.01
358	0.01
513	0.06
551	0.07
611	0.07
753	0.09
845	0.09
964	0.1
1079	0.11
1200	0.11
1372	0.21
1465	0.12
1657	0.31
1787	0.13
2152	0.13
2412	0.13
2572	0.13
2708	0.14
2860	0.15
3175	0.16
3420	0.15
3571	0.15
3726	0.14
3896	0.17
4179	0.15
4339	0.09
4461	0.09
4620	0.08

Well OW - 4

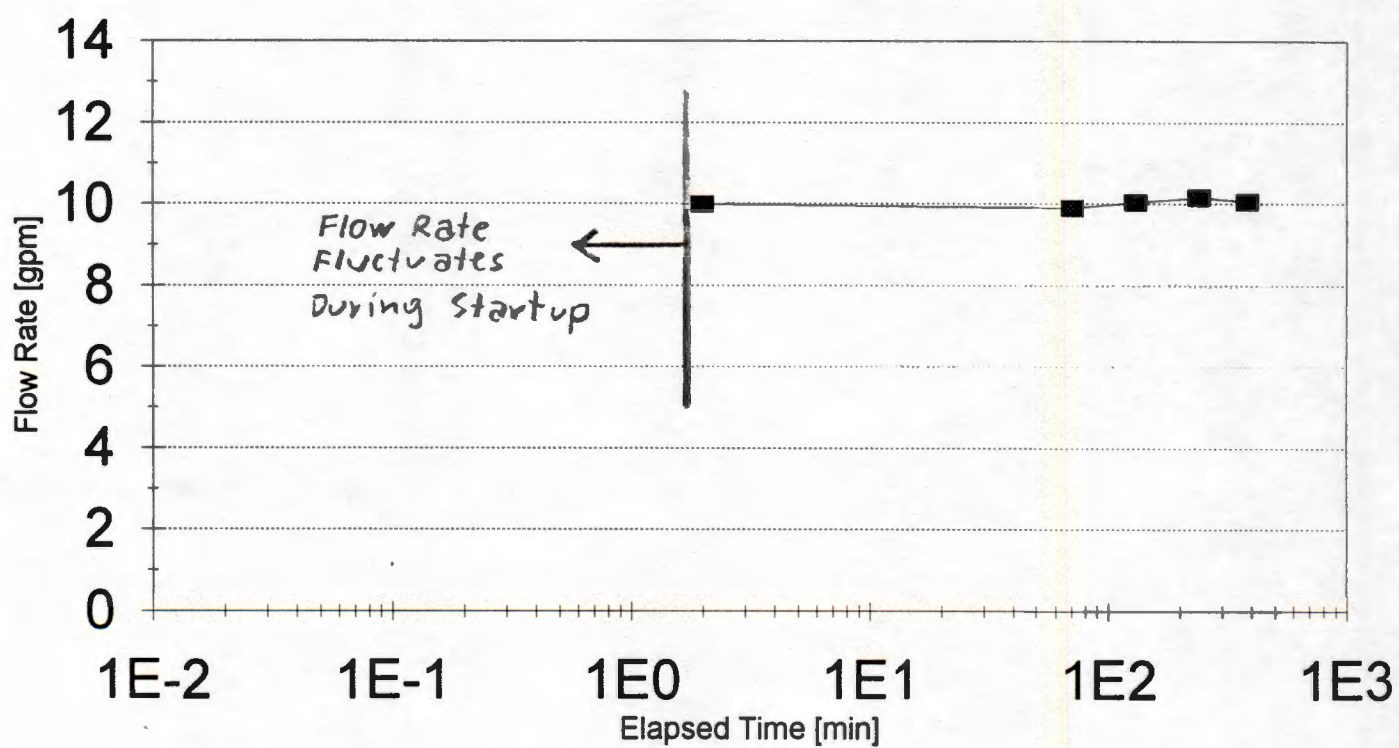
Manual Drawdown Readings During Pump Test

t [min]	s [ft]
0	0
10	0.06
27	0.05
64	0.0001
165	0.04
234	0.06
360	0.04
514	0.1
552	0.08
613	0.1
674	0.11
758	0.13
848	0.13
966	0.13
1081	0.14
1203	0.14
1373	0.22
1467	0.16
1666	0.17
1790	0.17
2155	0.16
2418	0.16
2576	0.19
2712	0.18
2862	0.18
3180	0.19
3425	0.19
3576	0.19
3730	0.18
3899	0.18
4184	0.18
4343	0.13
4466	0.12
4622	0.11

APPENDIX D-2

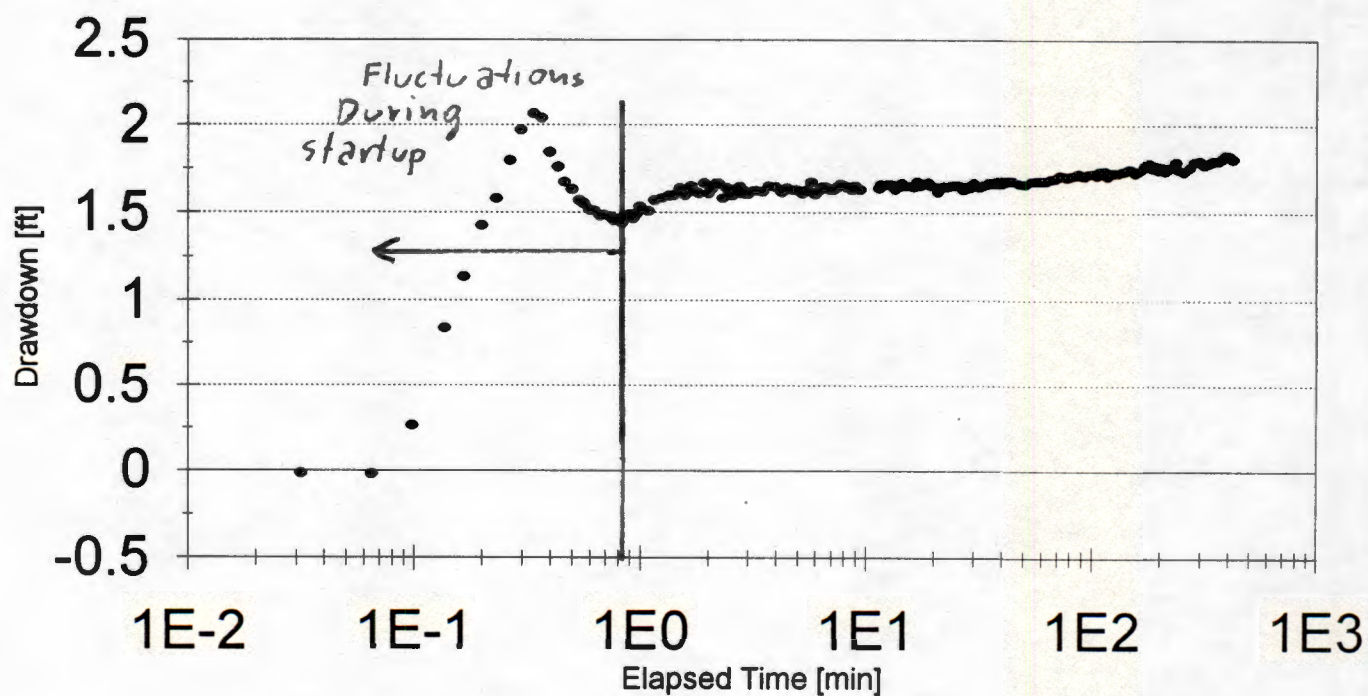
DATA PLOTS

N Franklin St Aquifer Test Extraction Rate



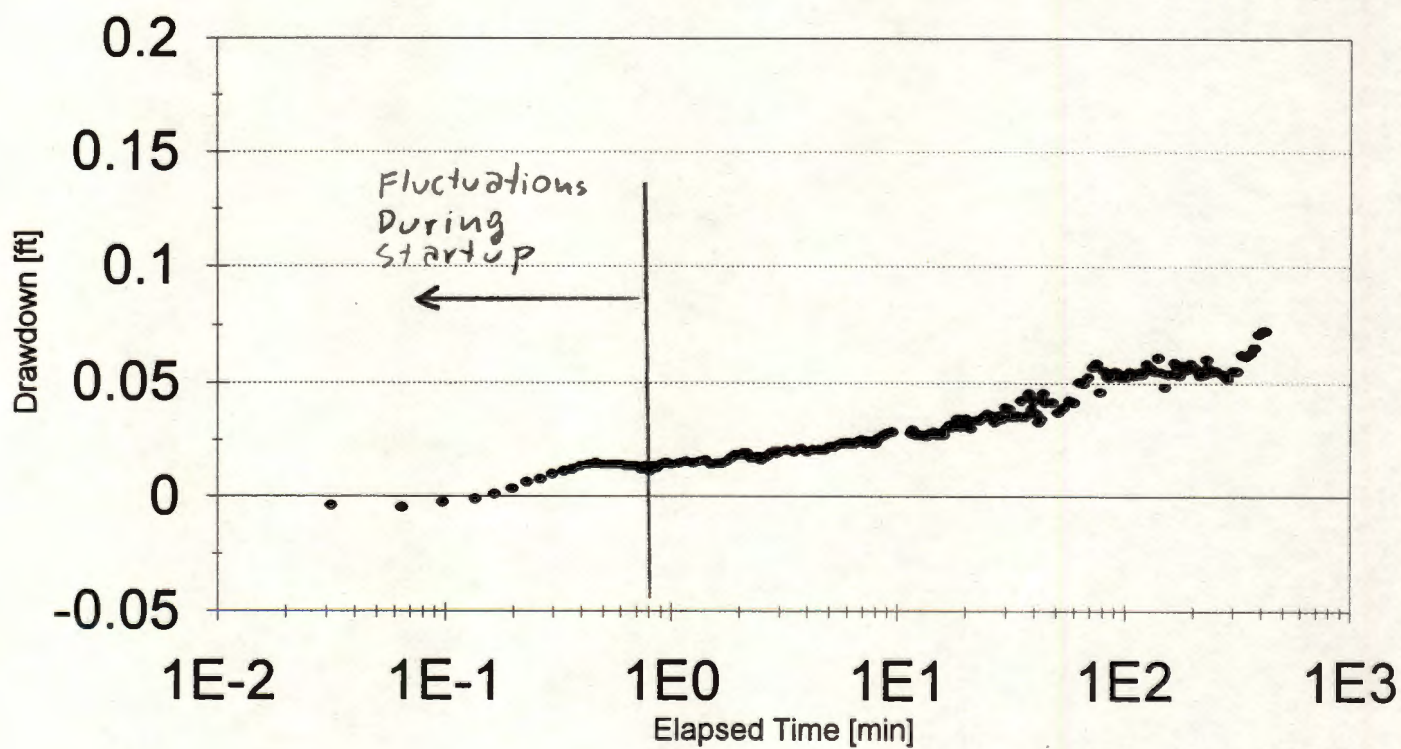
N Franklin St Aquifer Test

Pumping Well MW - 20 S

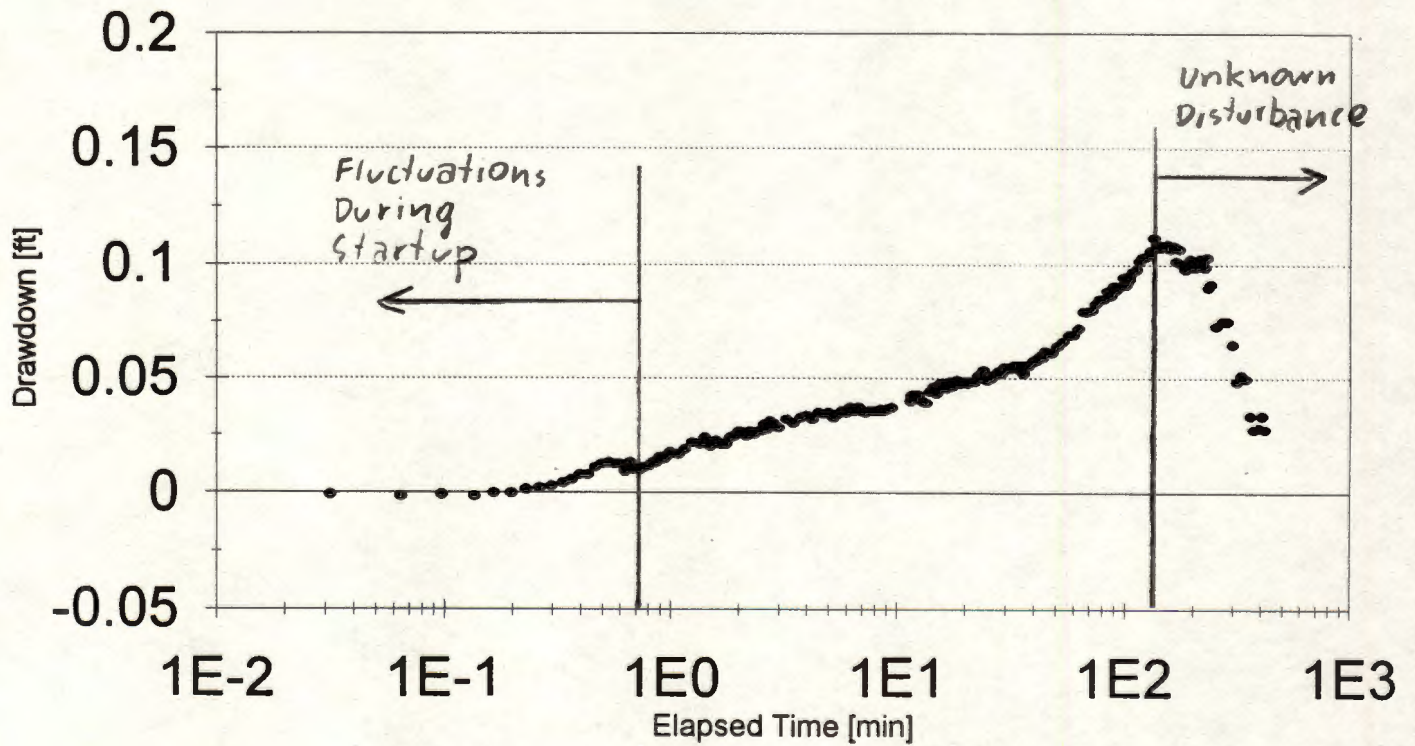


N Franklin St Aquifer Test

Observation Well MW - 9 S

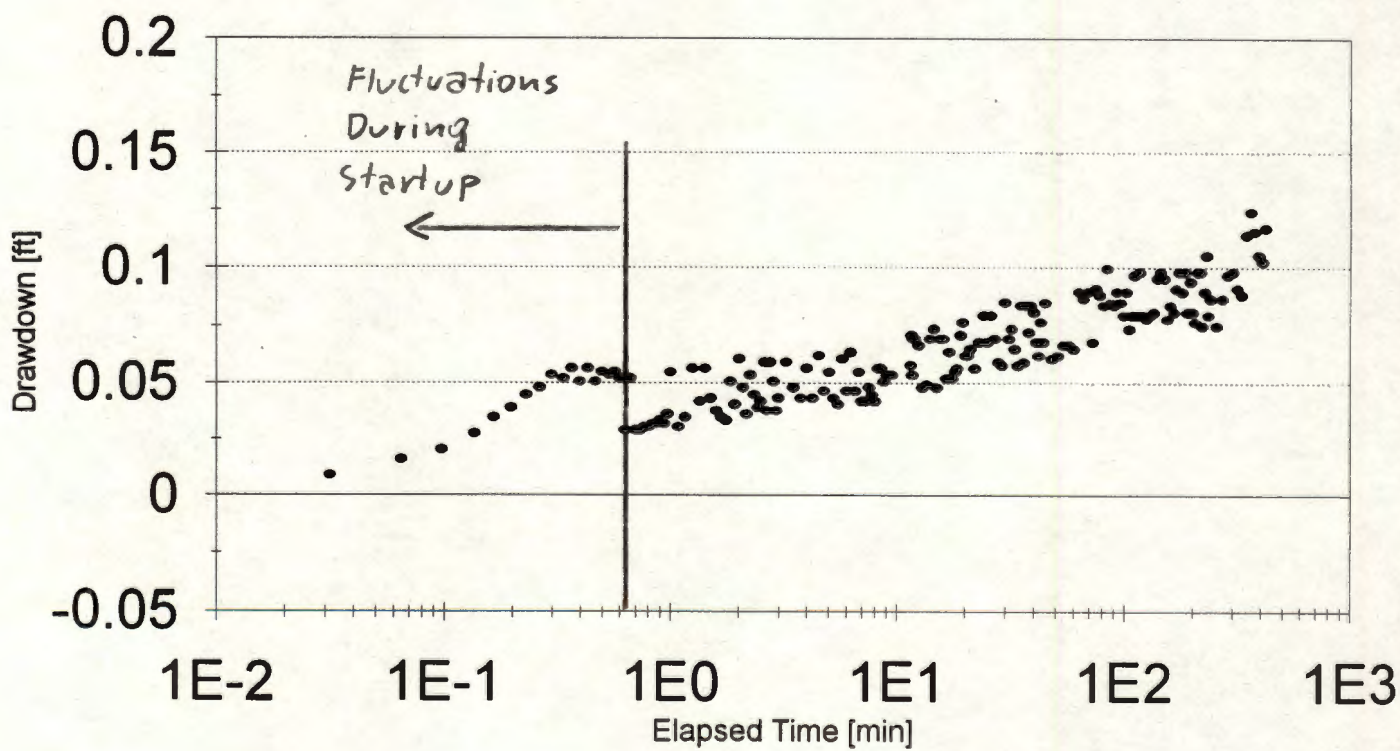


N Franklin St Aquifer Test
Observation Well MW - 2 S



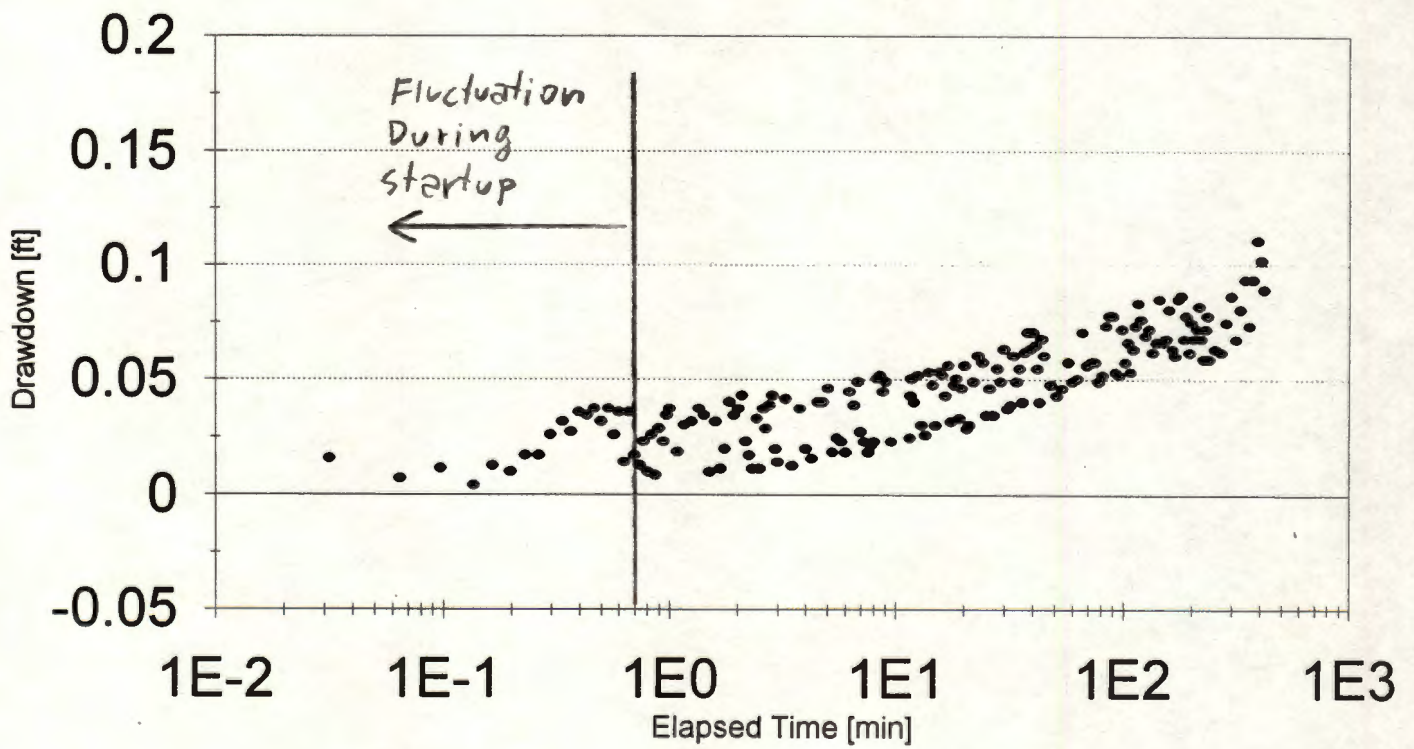
N Franklin St Aquifer Test

Observation Well OW - 4



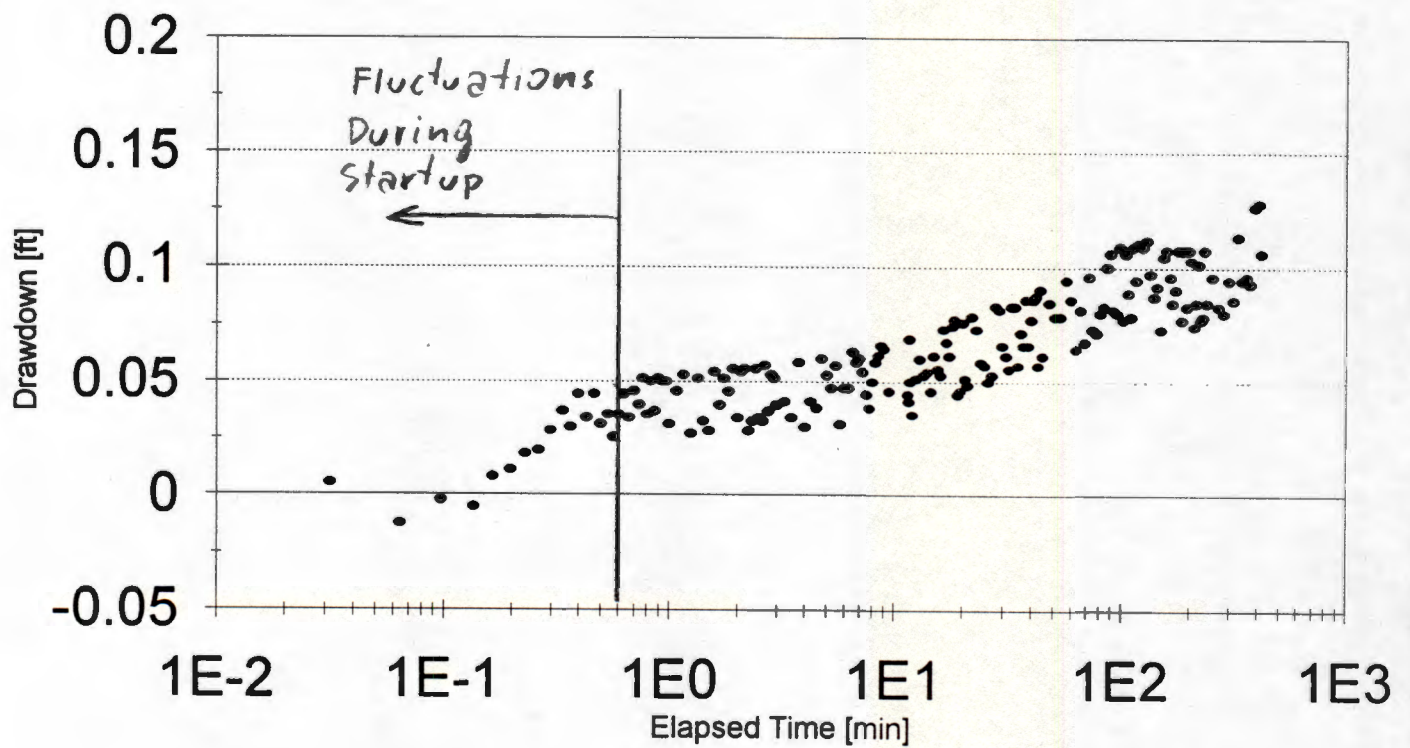
N Franklin St Aquifer Test

Observation Well OW - 3

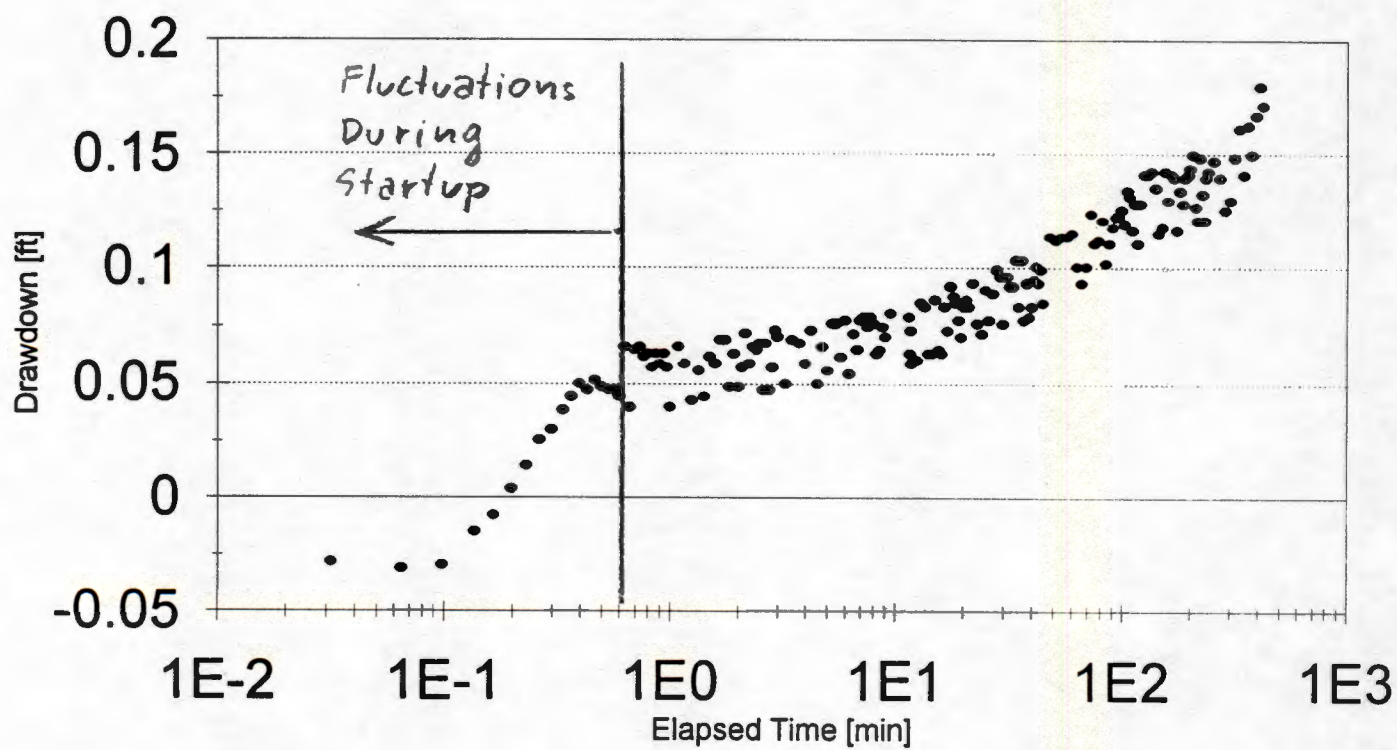


N Franklin St Aquifer Test

Observation Well OW - 2



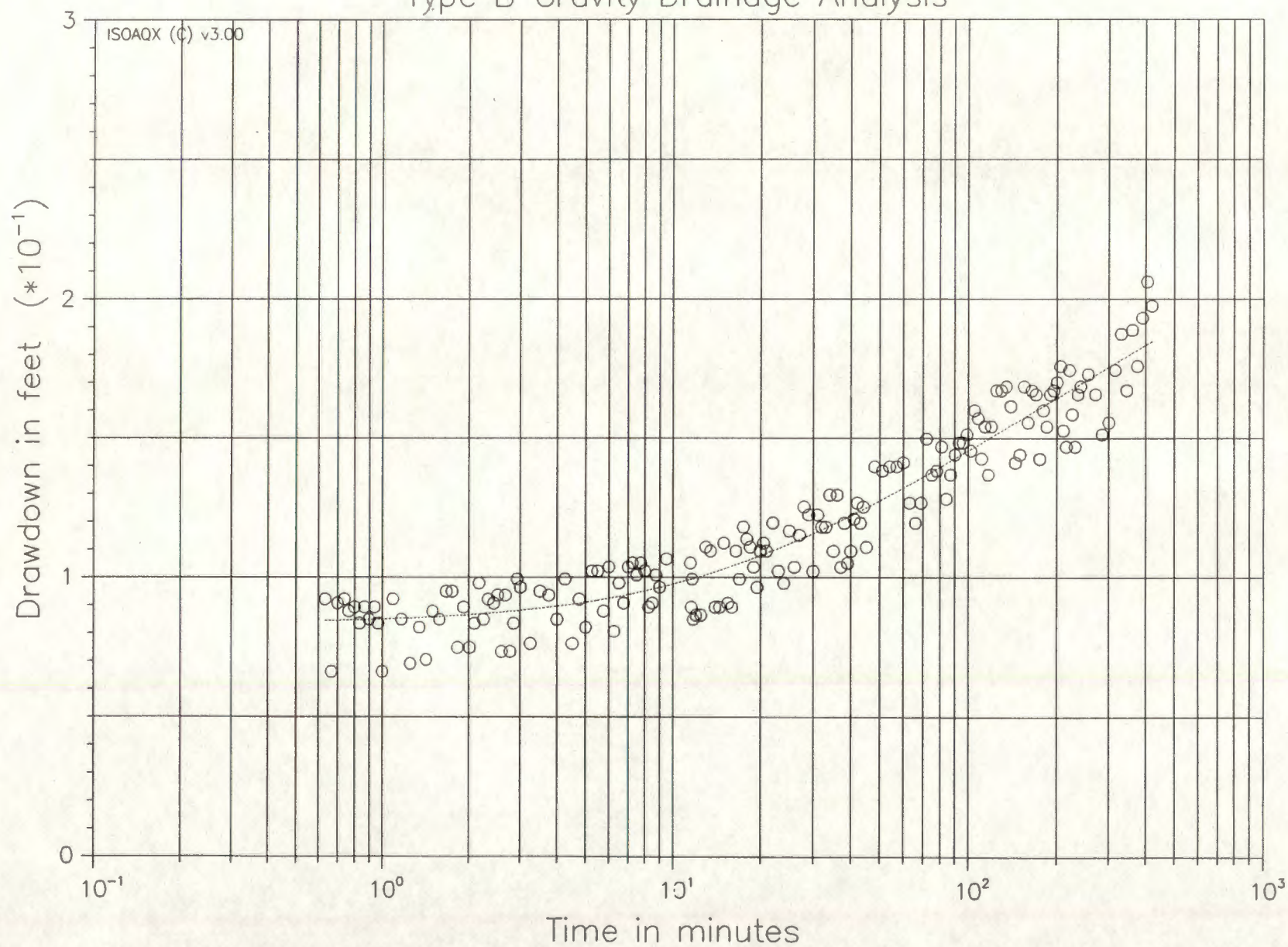
N Franklin St Aquifer Test
Observation Well OW - 1



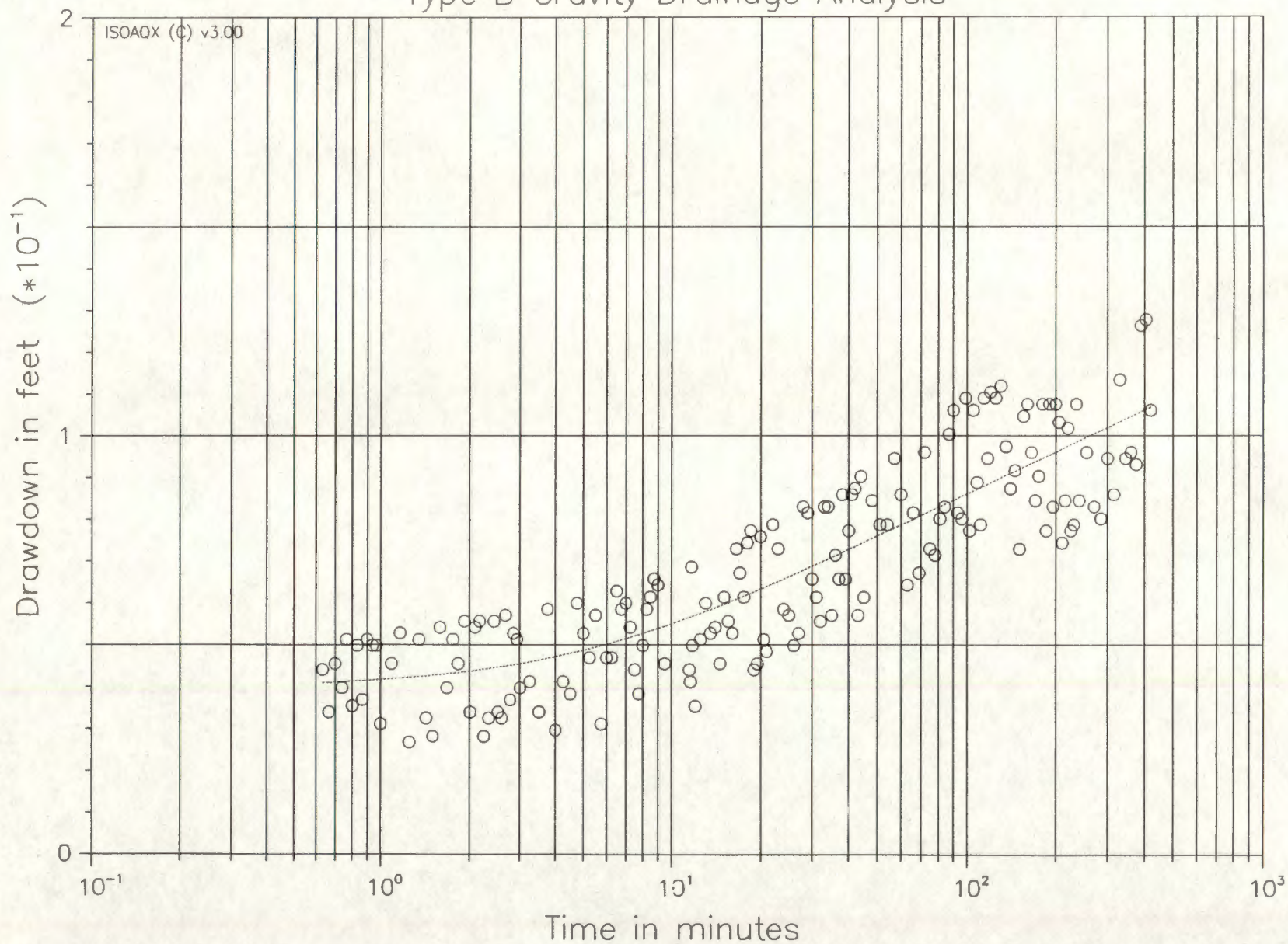
APPENDIX D-3

ANALYTICAL PLOTS

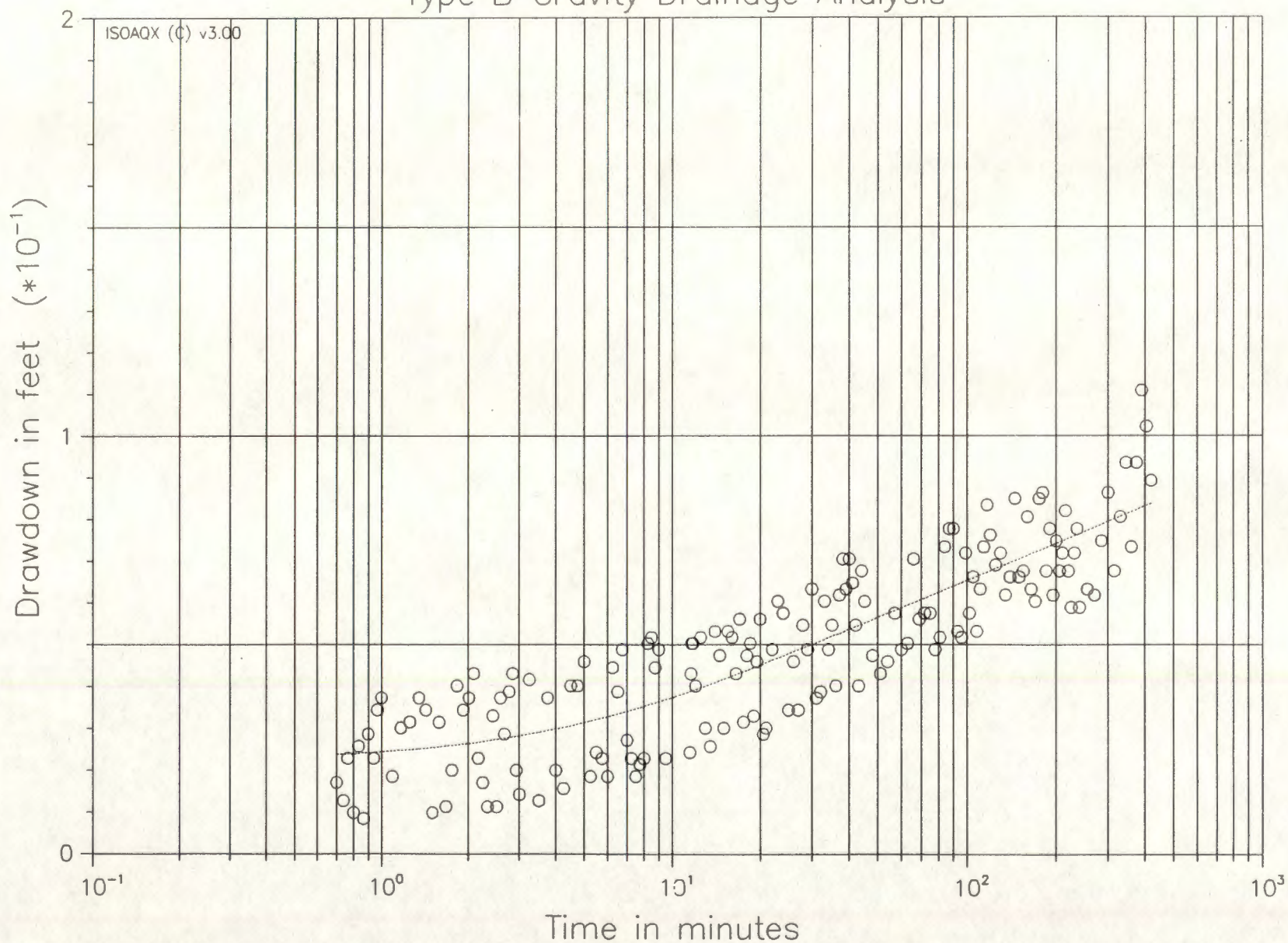
N Franklin St Aquifer Test
Observation Well OW - 1
Type B Gravity Drainage Analysis



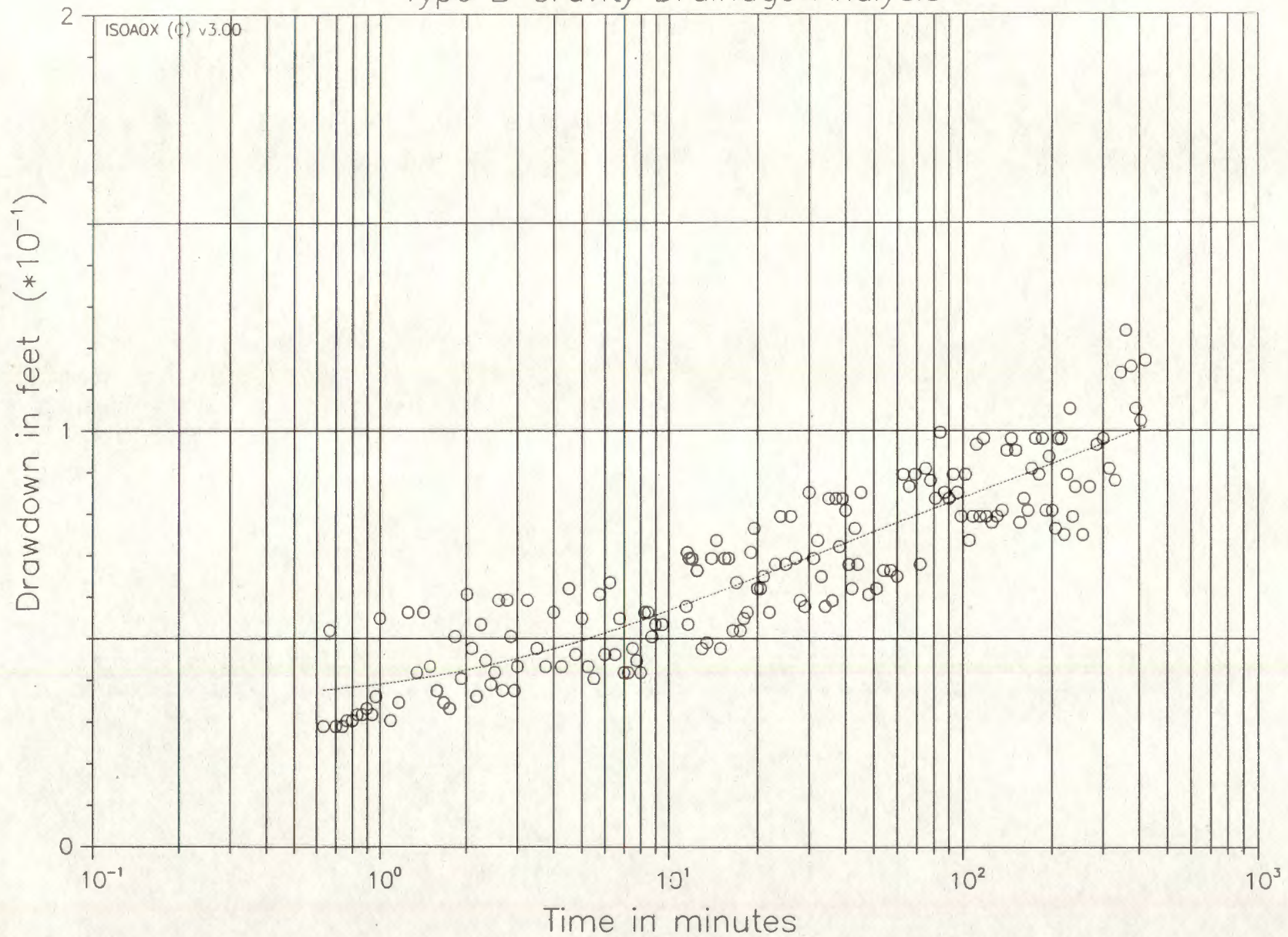
N Franklin St Aquifer Test
Observation Well OW - 2
Type B Gravity Drainage Analysis



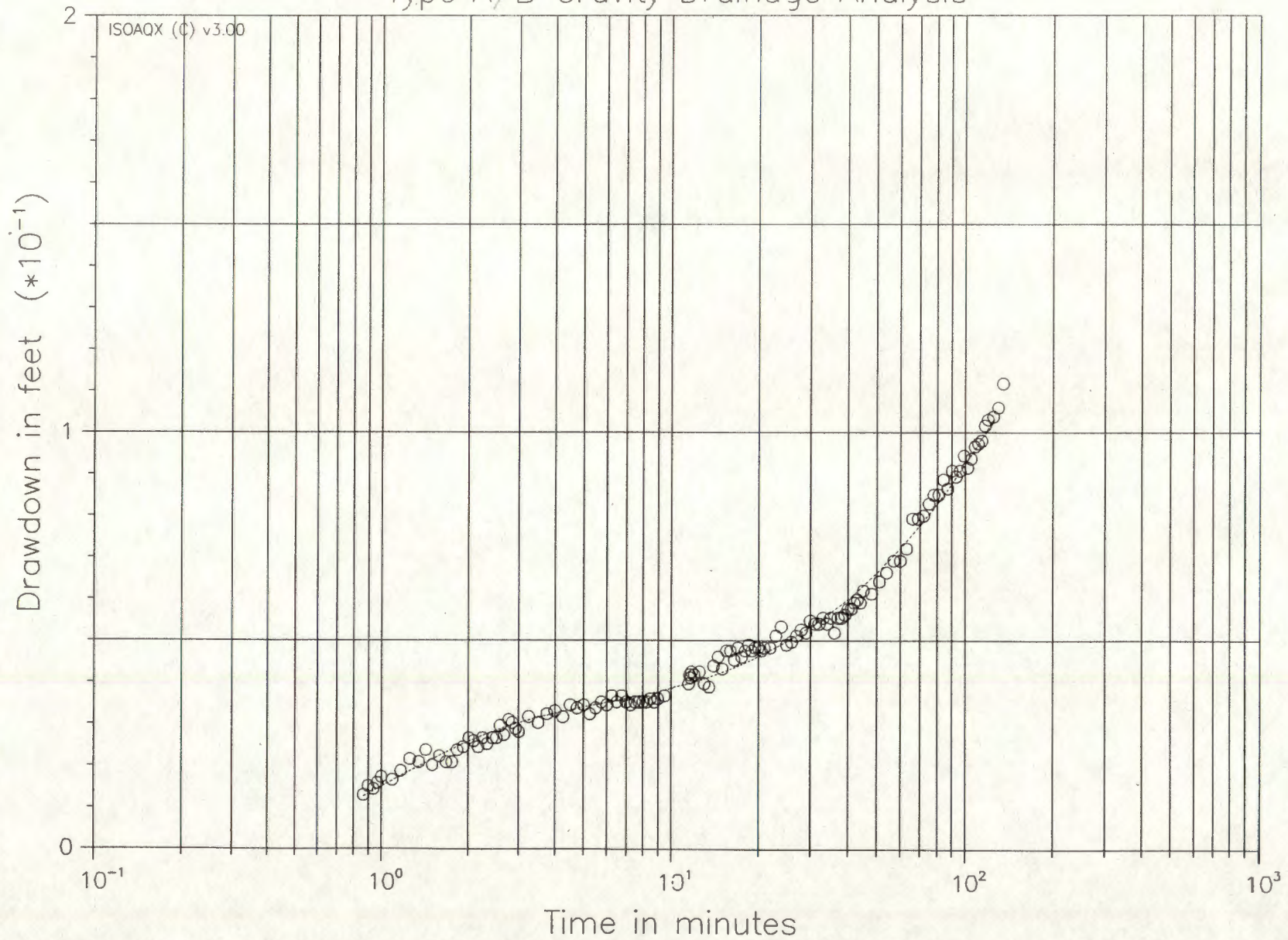
N Franklin St Aquifer Test
Observation Well OW - 3
Type B Gravity Drainage Analysis



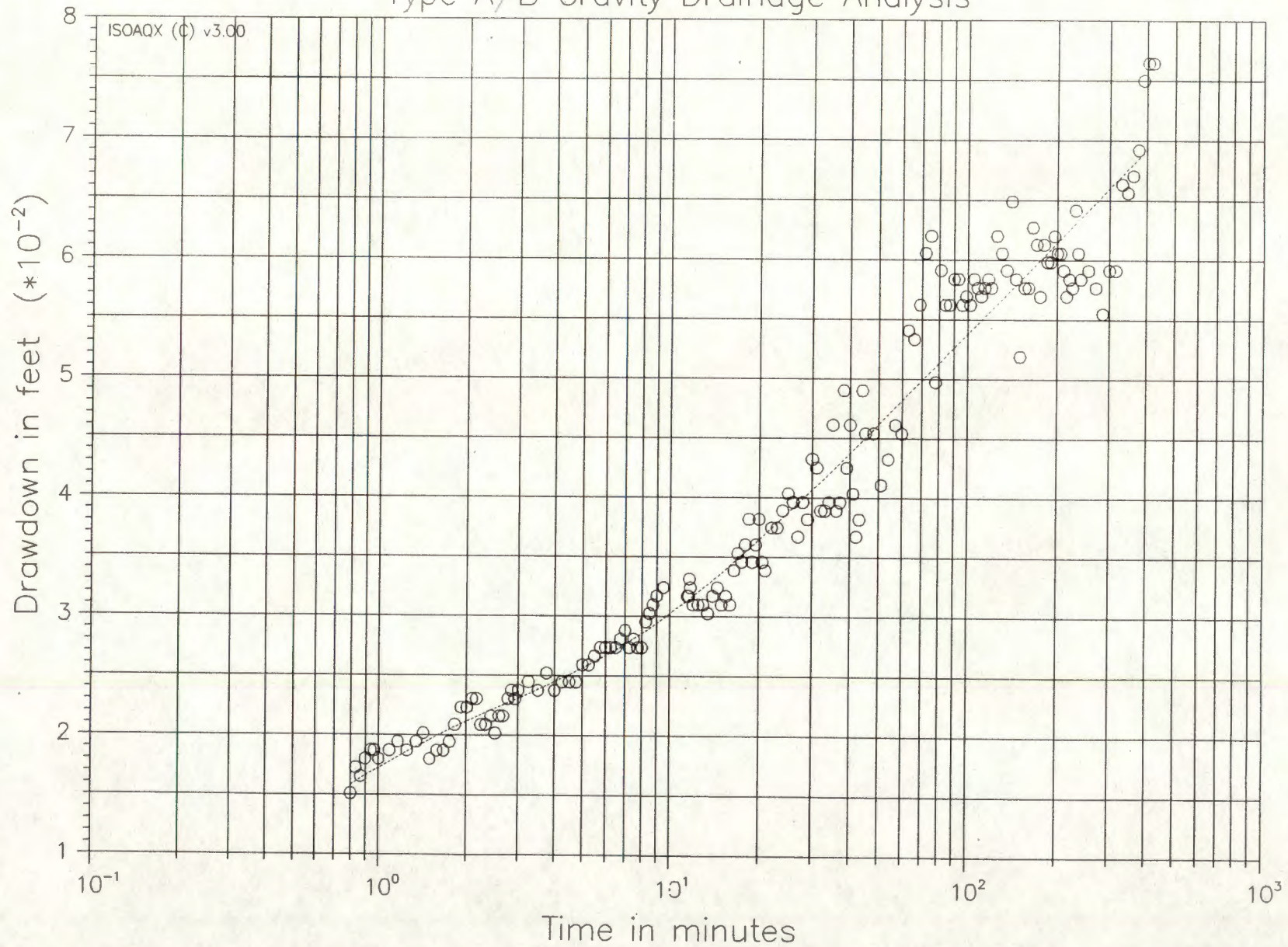
N Franklin St Aquifer Test
Observation Well OW - 4
Type B Gravity Drainage Analysis



N Franklin St Aquifer Test
Observation Well MW - 2 S
Type A/B Gravity Drainage Analysis



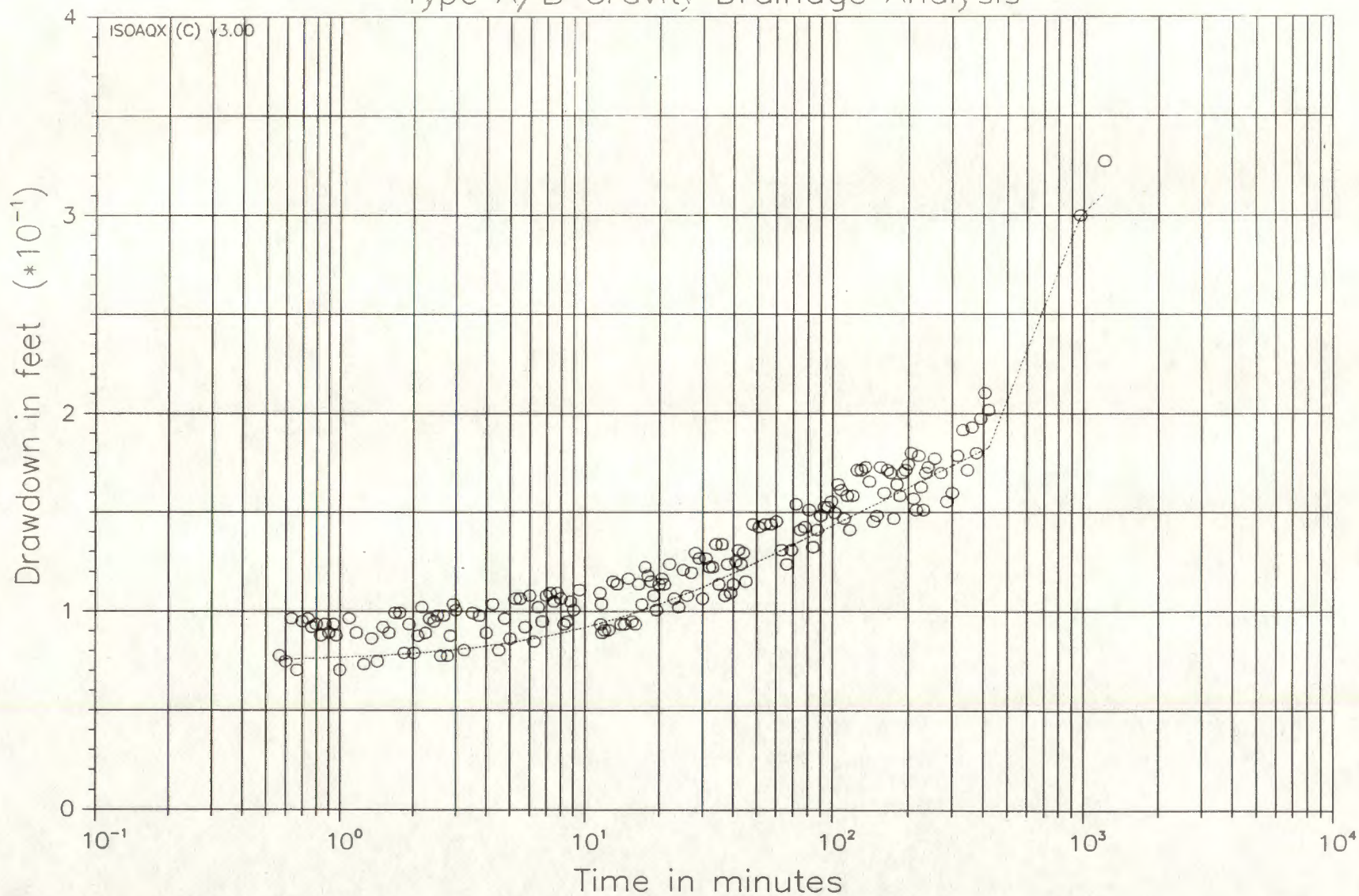
N Franklin St Aquifer Test
Observation Well MW - 9 S
Type A/B Gravity Drainage Analysis



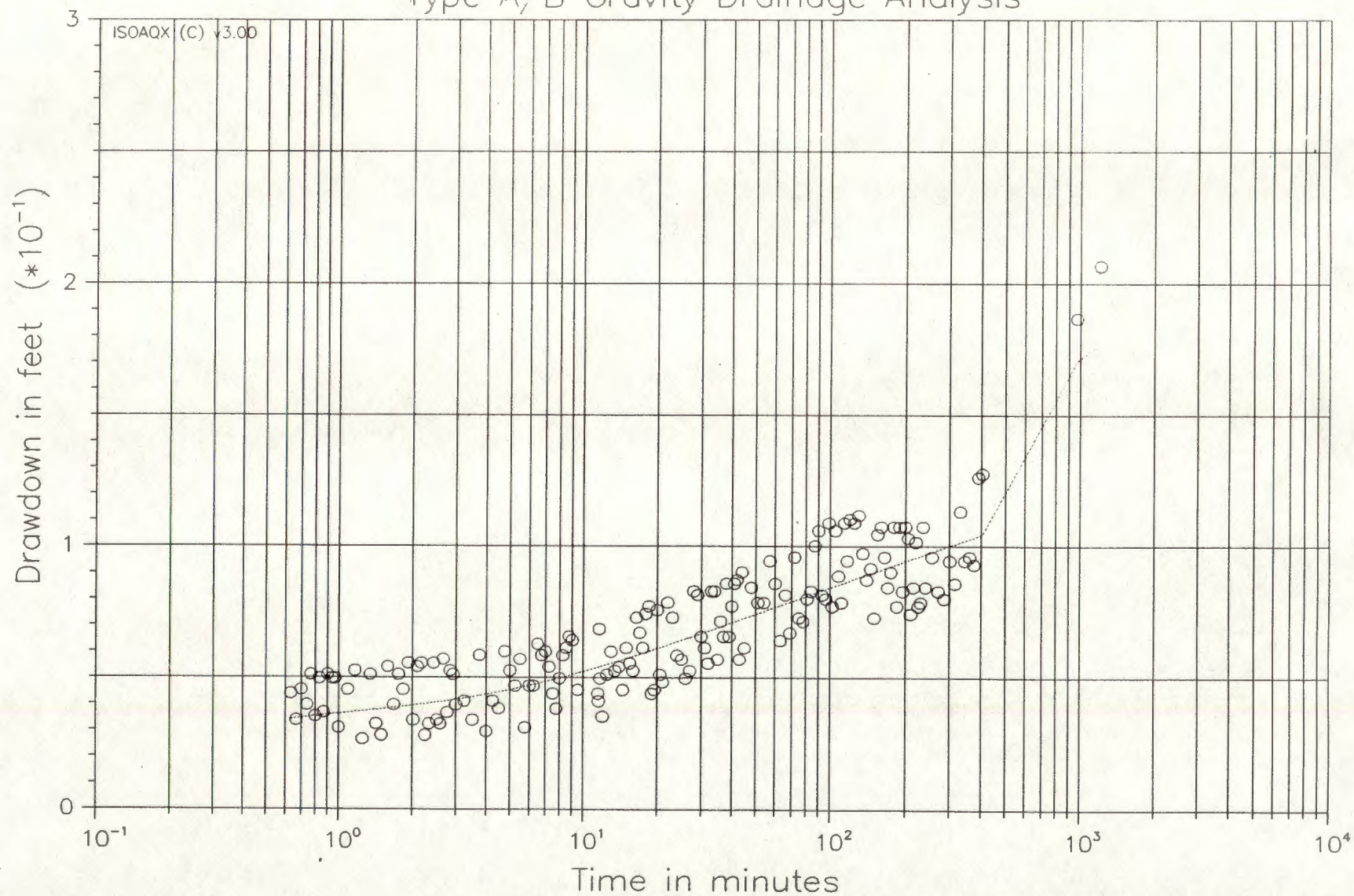
APPENDIX D-4

VALIDATION OF RESULTS

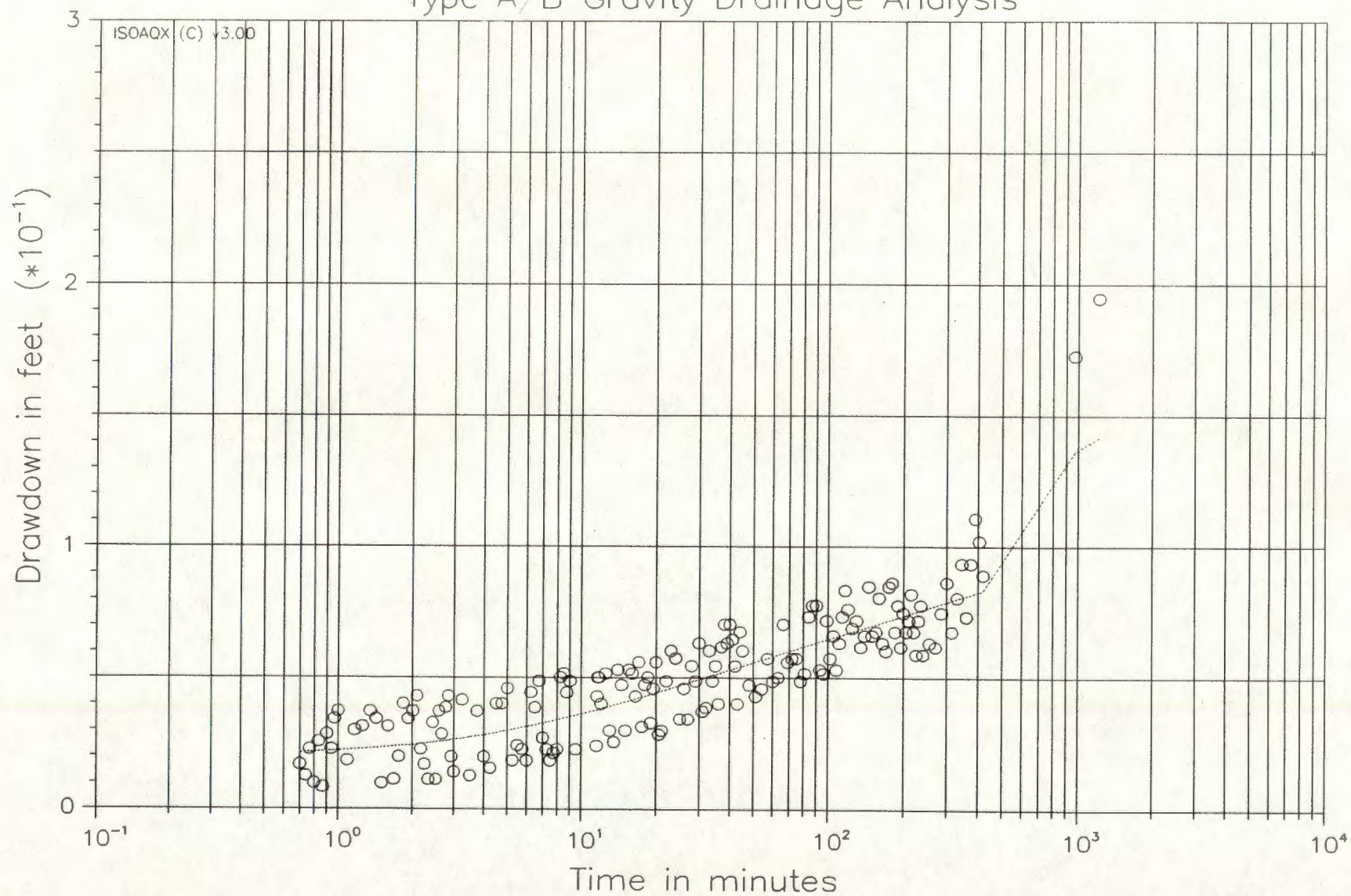
N Franklin St Aquifer Test
Validation of Results: Observation Well OW - 1
Type A/B Gravity Drainage Analysis



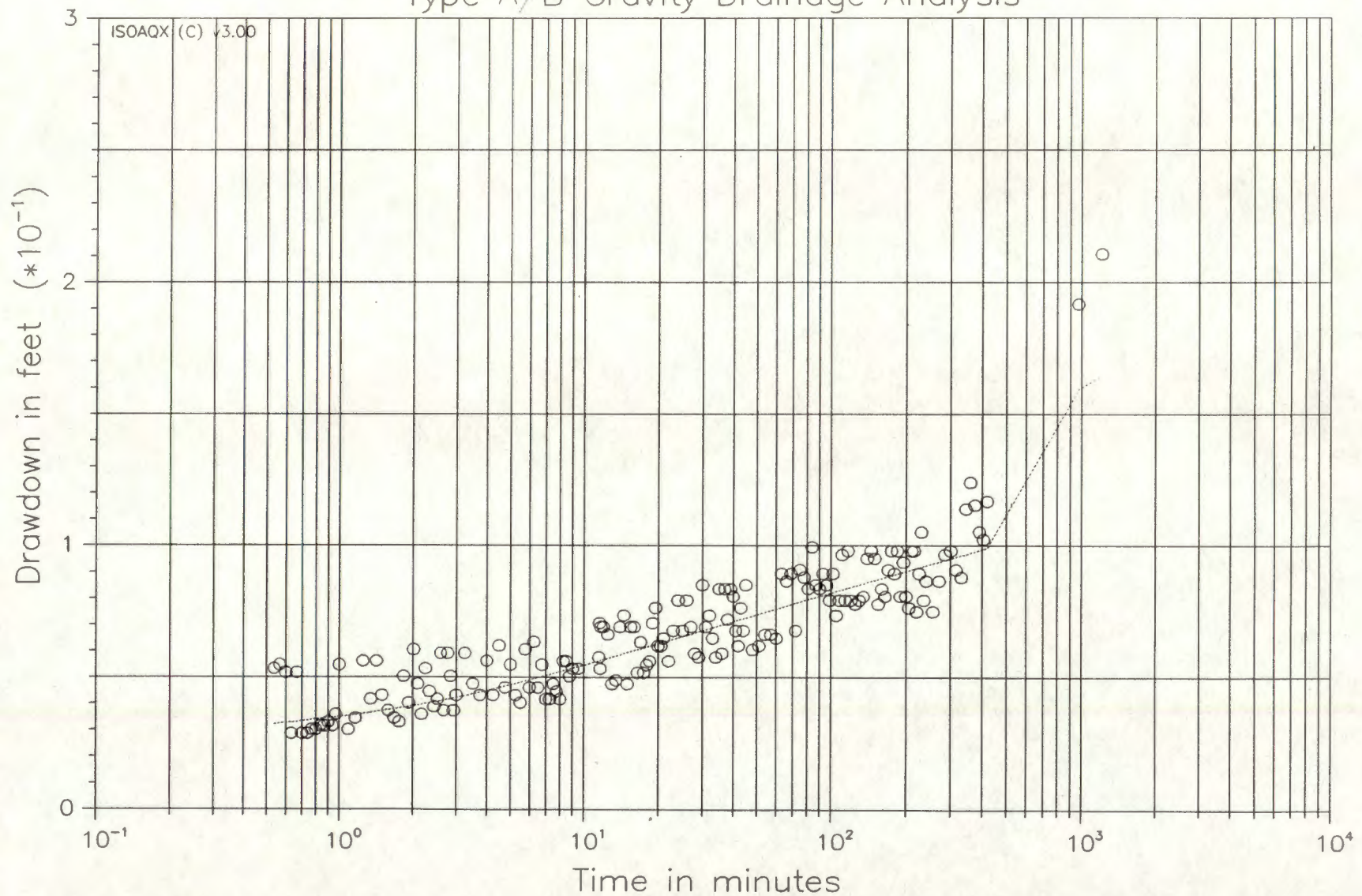
N Franklin St Aquifer Test
Validation of Results: Observation Well OW - 2
Type A/B Gravity Drainage Analysis



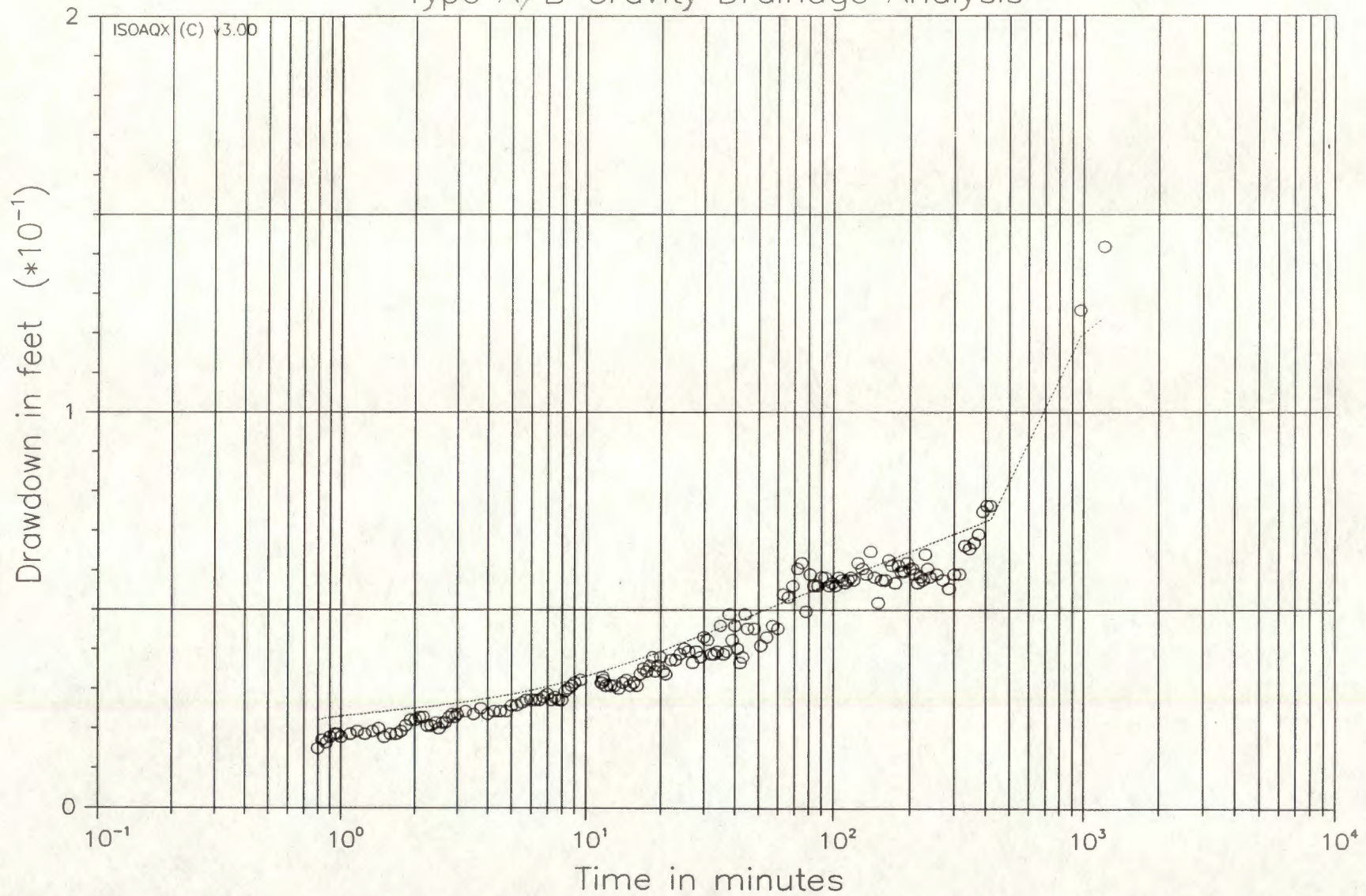
N Franklin St Aquifer Test
Validation of Results: Observation Well OW - 3
Type A/B Gravity Drainage Analysis



N Franklin St Aquifer Test
Validation of Results: Observation Well OW - 4
Type A/B Gravity Drainage Analysis



N Franklin St Aquifer Test
Validation of Results: Observation Well MW - 9 S
Type A/B Gravity Drainage Analysis



APPENDIX E

PUMPING WELL (MW-20S) DESIGN
CALCULATION

Purpose: Design 4-inch well screen and filter pack for potential use as pumping well at N. Franklin St. Site.

Methodology Per "Screen and Filterpack Design" in Groundwater and Wells, 2nd Ed., F.G. Driscoll Ed., 1986 p. 438-443 and 0. 450-451.

1. Choose strata to be screened and construct grain size analysis curves: See Geotechnical Report in RI Appendices samples MW-16D, 14-16', MW-10D, 20-22' and MW-14D, 6-8'
2. Determine 70% retained sediment size:
MW-16D 14-16' = 0.9 mm
MW-10D 20-22' = 0.25 mm
MW-14D 6-8' = 0.18 mm
3. Select grading of the Filter Pack on basis of finest sediments (use MW-14D)
4. Multiply 70% sediment size by factor of 6-10 for formations of nonuniform gradation: (use 6 for conservative estimate)

$$0.18 \text{ mm} \times 6 = 1.08 \text{ mm}$$

5. Use result as 70% retained for well filter pack:
Well Gravel #1 ~ 80% of 1.08 mm grains retained
Well Gravel #0 ~ 12% of 1.08 mm grains retained
Select #1 Gravel for Filter Pack

6. Confirm that Uniformity coefficient (C_u) is less than 2.5 for gravel pack

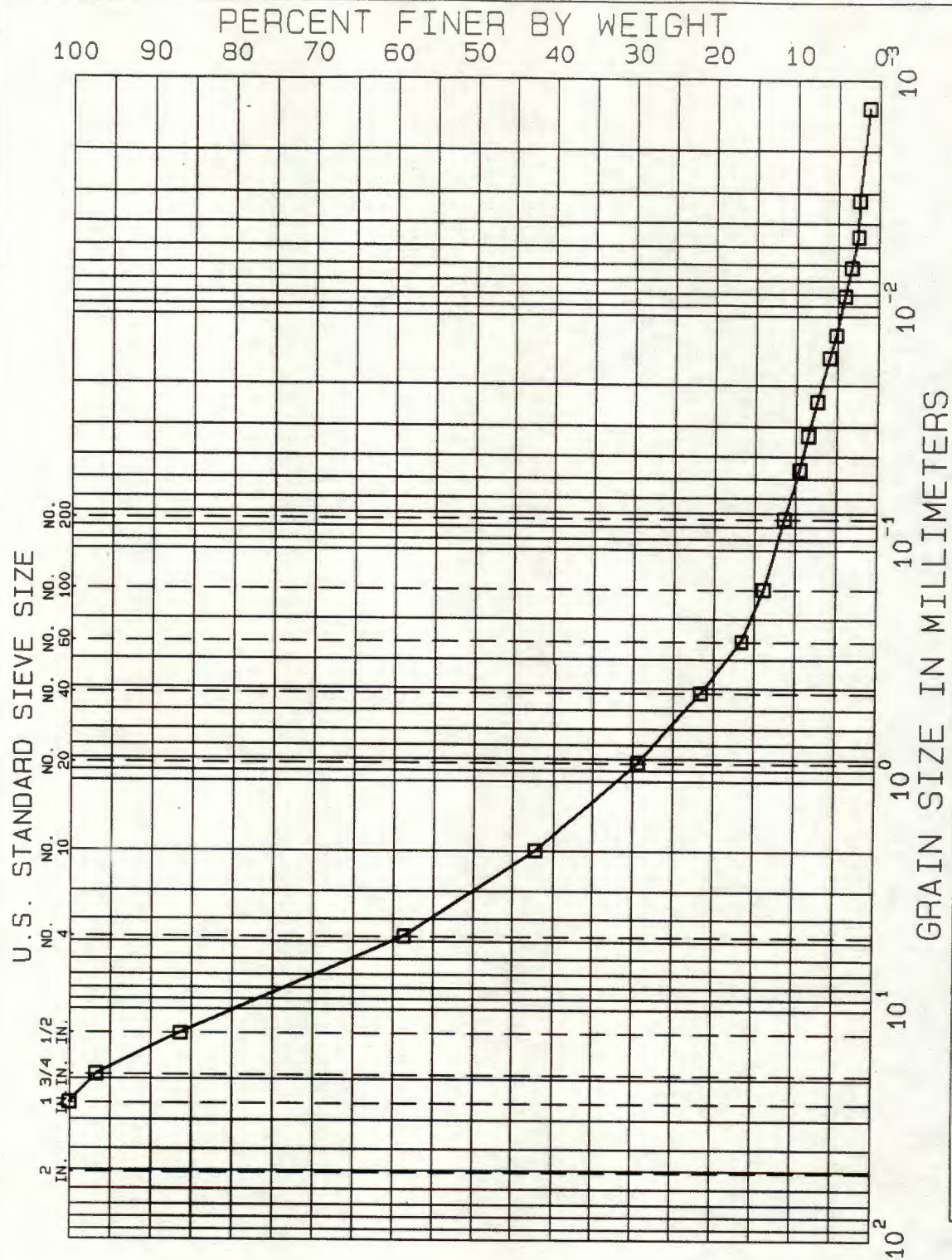
$$C_u = \frac{D_{60}}{D_{10}} = \frac{1.33}{0.93} = 1.4$$

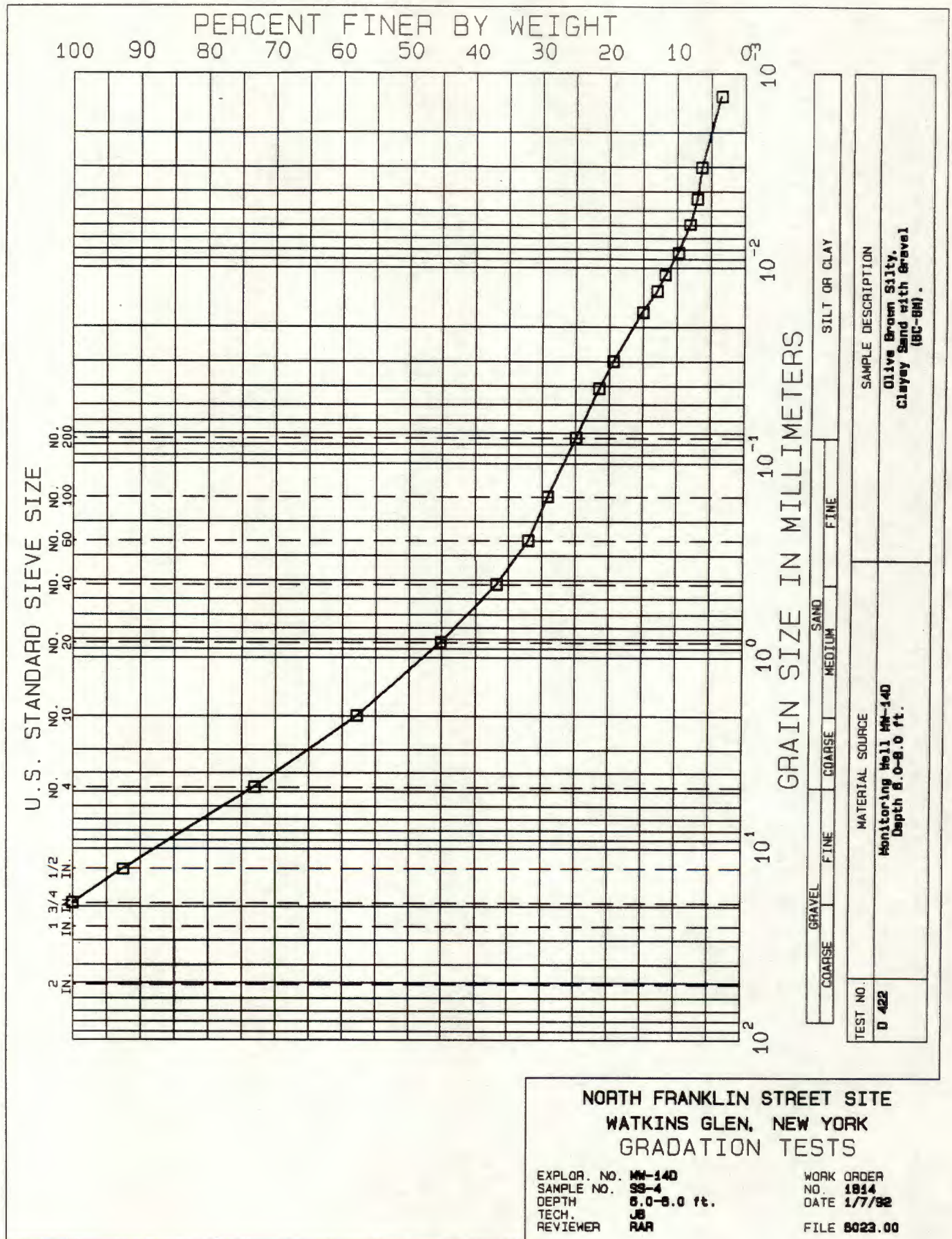
7. Select Screen slot size to retain 90% + of selected filter pack
90% retained size of #1 gravel = 0.93 mm
= 0.0366 inches
Therefore select #30 slot (0.030 inches) screen size

8. Maximum well pumping rate of well with 4" ID 15-foot long #30 slot screen is:
(limiting velocity of 0.1 ft/sec)

$$Q = VA = 0.1 \text{ ft/sec} (\pi) \left(\frac{4 \text{ ft}}{12} \right) (15 \text{ ft}) (18\% \text{ open area of screen})$$

$$Q = 0.28 \text{ ft}^3/\text{sec} = 125 \text{ gpm}$$





Well Gravel Grades

Revised from 1967 and 1971

MM	U.S. SIEVE NO.	00		00N		0		1		2		3		4	
		RET	PASS	RET	PASS	RET	PASS	RET	PASS	RET	PASS	RET	PASS	RET	PASS
1/4															
4.76	4													0	100
3.36	6											0	100.0	.2	99.8
2.36	8									0	100.0	3.0	97.0	28.3	71.7
2.00	10									2.8	97.2	58.8	32.2	62.9	37.1
1.68	12							0	100.0	16.5	83.5	26.1	12.1	4.6	95.4
1.40	14							1.1	98.9	30.6	50.1	7.5	4.6	2.0	97.9
1.17	16					0	100.0	23.4	75.5	32.6	17.5	2.9	1.7		
1.00	18					1.6	98.4	48.1	27.4	13.8	3.9	.5	1.2		
.84	20			0	100.0	22.8	75.5	14.3	13.1	2.4	1.5	.4	.8		
.71	25	0	100.0	1.1	98.9	32.3	43.3	8.9	6.2	1.1	.4	.6	.2		
.59	30	2.3	97.7	49.6	34.0	8.8	6.3								
.50	35	33.8	63.9	27.9	6.1	3.1	3.2								
.42	40	23.3	40.6	3.5	2.6	1.1	2.1								
.35	45	24.8	15.7	1.7	.9	.7	1.5								
.30	50	11.6	4.1	.6	.3	.8	.7								
.25	60														
.20	70														
.15	100														
PAN	4.1			.3		.7		6.2		.4		.2		2.0	

*Custom Blending Available

Product Description

Composition (Wt%)

SiO2	99.40	K2O	0.02
Al2O3	0.13	TiO2	0.02
CaO	0.03	Na2O	0.01
Fe2O3	0.03	MgO	0.01
		L.O.I.	0.21

Hardness on Moh's scale: 6-8

Specific Gravity: 2.65

Acid solubility - .11

1991 Ricol Bros. Sand Co. Inc.

7

APPENDIX F

MODIFICATIONS TO FS-BASED
ESTIMATES
FOLLOWING PUMP TEST

MODIFICATIONS TO FS - BASED ESTIMATES FOLLOWING PUMP TEST

Data from the pump test performed at the site during the week of January 3, 1995 were evaluated to develop revised values for parameters that characterize the hydrologic properties of the aquifer.

1. Hydraulic Conductivity

RI/FS: Hydraulic conductivities obtained from slug tests performed on wells screened in the sand and gravel unit ranged from 10 to 300 ft/d. An average hydraulic conductivity value of 57 ft/d ($2E-2$ cm/s) was used in the FS to estimate groundwater collection rates, loadings to the lake and cleanup durations.

Revised Value Based on Pump Test Data: Results of the recent pump test indicate actual values on the order of 200 to 1,000 ft/d ($7E-2$ to $3.5E-1$ cm/s). Most of the values are on the upper end of this range. Therefore a value of 1000 ft/d may be appropriate for design purposes. Appendix D-3 provides examples from the curve matching procedure.

2. GW Flow Rate and Contaminant Loadings

FS: The calculations for natural flow rate through the site and loadings to Seneca Lake are contained in Appendix B-1 of the FS Report. The data as used in the FS are as follows:

- * width of contaminated area - 300 ft
- * saturated thickness - 15 ft
- * hydraulic gradient - 0.002
- * representative hydraulic conductivity - 57 ft/d
- * average conc. of chlorinated hydrocarbons in GW - $6.1E-5$ g/L

- * average conc. of BTEX compounds in GW - $1.0\text{E-}6$ g/L

Based on the above values, the flow rate through the site and the contaminant loadings to the lake were estimated as:

$$Q = 3 \text{ gpm}$$

$$M_{\text{CIVOA}} = 0.9 \text{ g/day}$$

$$M_{\text{BTEX}} = 0.02 \text{ g/day}$$

* **Revised Estimates:** Using the revised values of hydraulic conductivity obtained from the pump test (i.e. 200 to 1,000 ft/d), the flow rate and loadings were recalculated as follows:

$$Q = 10 \text{ to } 50 \text{ gpm}$$

$$M_{\text{CIVOA}} = 3.1 \text{ to } 15.6 \text{ g/day}$$

$$M_{\text{BTEX}} = 0.06 \text{ to } 0.3 \text{ g/day}$$

3. Remediation Time Frames

FS: Calculations for the time frames to remediate the groundwater through flushing were presented in Appendix C of the FS Report. The following data used:

- * tetrachloroethene had the longest flushing times
 - initial conc. - $2.0\text{E-}1$ mg/L
 - cleanup level - $5\text{E-}3$ mg/L
 - partition coefficient - 277 L/kg
- * bulk density of soil - 1.6 kg/L
- * organic carbon fraction in soil - 0.01

- * porosity of soil - 0.4
- * volume of contaminated groundwater - 360,000 ft³
- * natural flow rate through the site - 500 ft³/d (3 gpm)

Using the above values, the cleanup time for tetrachloroethene was estimated to be:

$$T = 80 \text{ yrs}$$

Revised Estimates: Using the revised values of flow rate through the site of 10 to 50 gpm, the time of cleanup was recalculated as:

$$T = 5 \text{ to } 25 \text{ yrs}$$

4. Sizing of the Extraction System

FS: The requirements of the extraction system were determined in Appendix B-2 of the FS Report. The capture zones were simulated using a MODFLOW model. The selected option consisted of two wells, each located in one of the plumes identified at the site. The wells were extracting 5 gpm each, for the total rate of 10 gpm. They were capturing the groundwater flowing through the site, as well as some water from the lake. The flow rate in excess of the 3 gpm flowing through the site was providing additional flushing. The FS-based extraction model is shown on Figure 3.

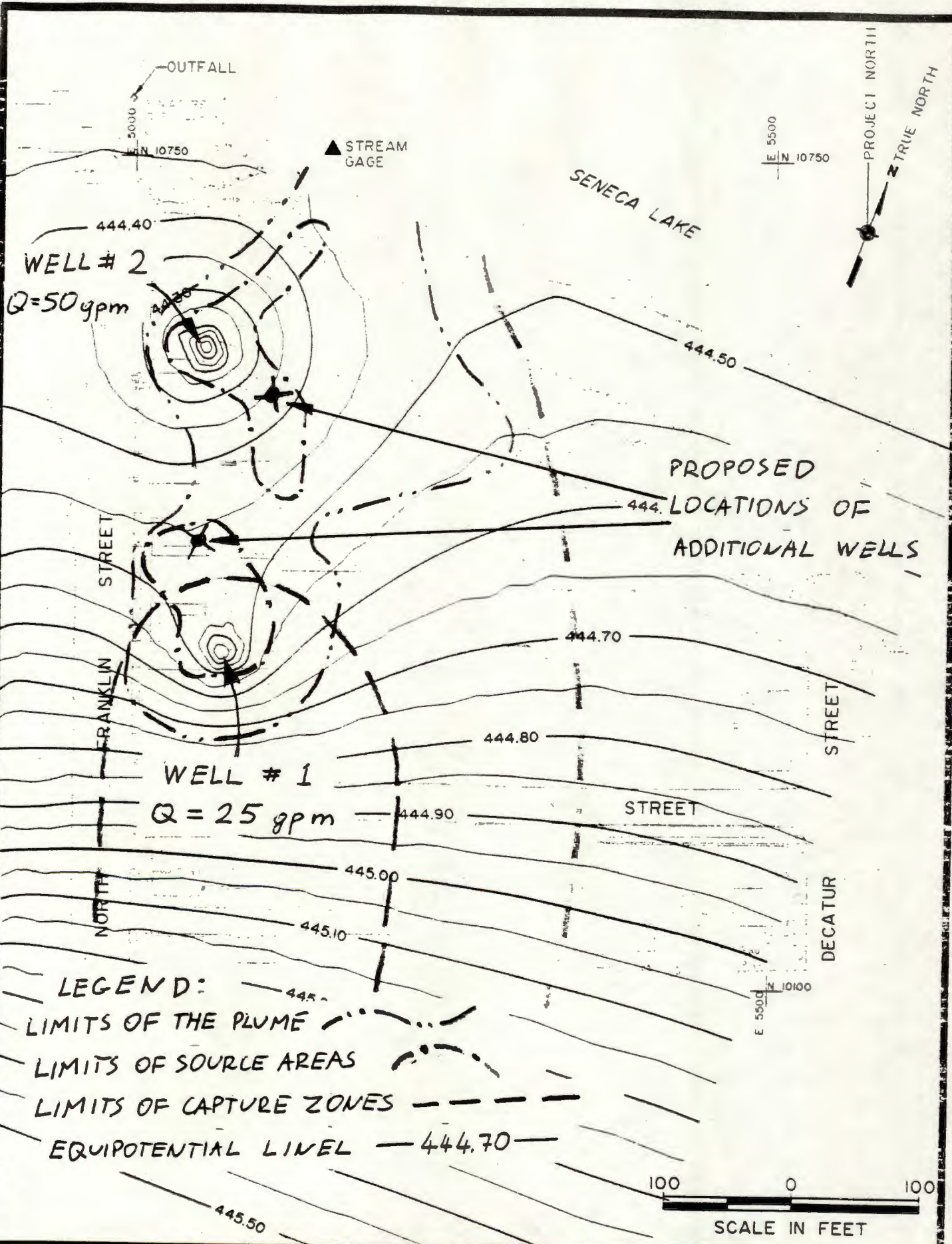
Revised Estimates: The revised GW flow rate through the site is estimated to be 50 gpm assuming a K-value of 1000 ft/d. Assuming that some water from the lake will also be captured by the extraction system, a design flow rate of up to 75 gpm was considered. Figures 1 and 2 show the limits of the capture zones associated with 50 gpm and 75 gpm groundwater treatment systems extraction rates, respectively. The impact of pumping extraction wells was simulated using MODFLOW with the assumption of a single extraction well at each contaminant plume. Because the pumping test results suggest that well yields significantly greater than 12 gpm may not be attainable, proposed locations for additional wells are presented on the drawings. If these additional wells were

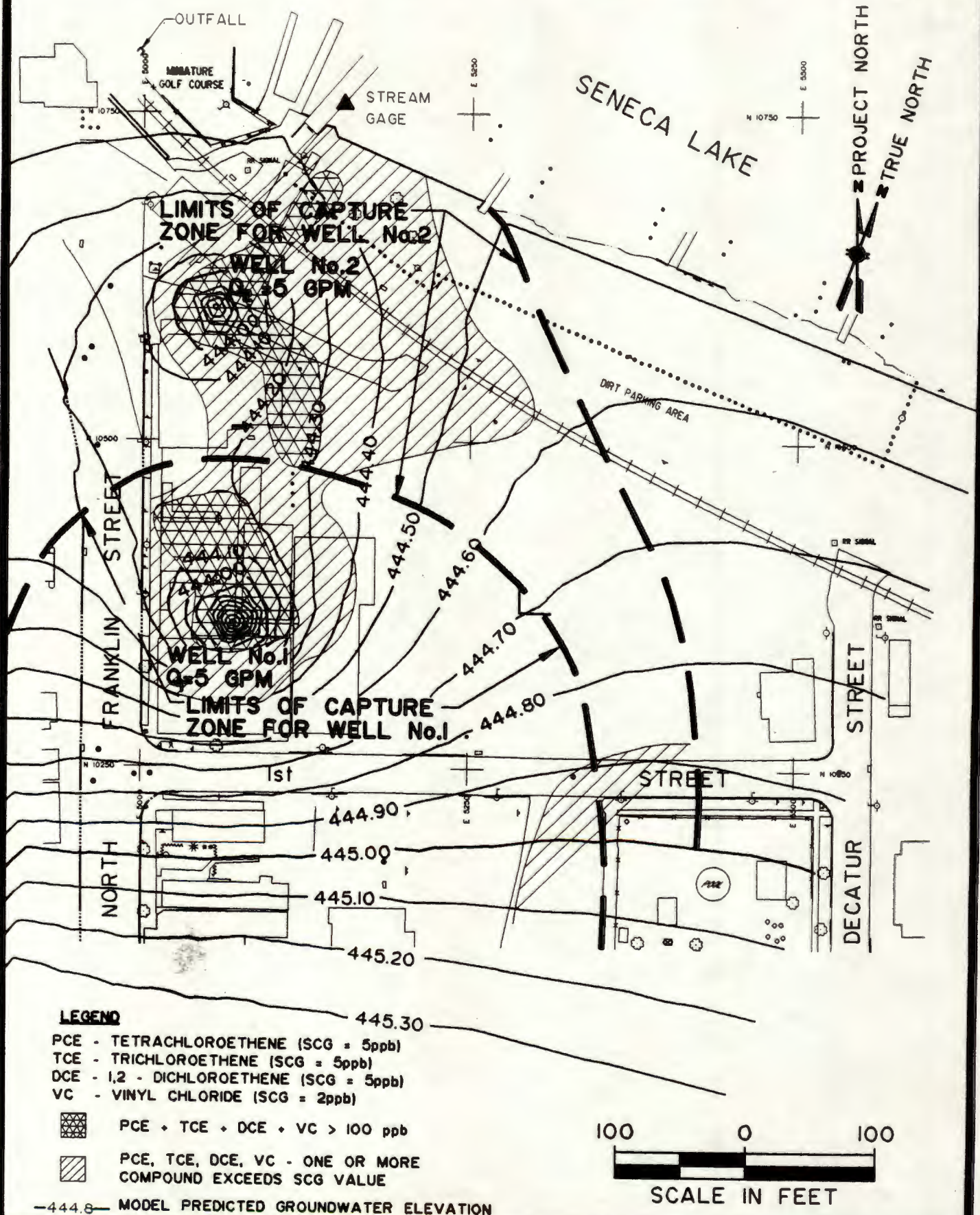
installed, a design rate of 50 gpm could be attained by pumping each well at 12.5 gpm. Pumping of the additional wells would result in a similar capture zone and likely reduce the quantity of relatively "clean" groundwater being processed through the treatment system.

The ultimate number of long-term pumping wells required to capture the plumes are dependant on the efficiency of individual wells. The 4" well utilized during the pump test was able to supply approximately 12 gpm on the long term basis. Its efficiency was estimated to be on the order of 1-10%. Typically, production wells have efficiencies in excess of 25%. Two wells (one at each plume) may be sufficient, if they can achieve efficiencies of 30% or higher. This may be accomplished by increasing the well diameter, size of the gravel pack and slot sizes in the screen. Developing the wells as production wells will also increase efficiency. If the desired efficiencies cannot be accomplished, up to 4 wells (two at each plume) may be required. The cost of a single well has been estimated in the FS as \$13,000. From that, increasing the number of wells by 2 (worst case scenario) would add approximately \$26,000 to the capital cost.



FIGURE 1





APPENDIX G

MONITORING WELL PURGING
REPORTS

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/22/94

WELL NO.:	WELL I.D.	VOL. GAL./FT.
MW-15		
① TOTAL CASING AND SCREEN LENGTH (FT.): <u>12</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.): <u>2</u>	2"	0.17
	3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.) <u>6.4</u>	4"	0.66
	5"	1.04
④ VOLUME OF WATER IN CASING (GAL.) <u>0.95</u>	6"	1.50
	8"	2.60

$$V = 0.0408 (\textcircled{2})^2 \times (\textcircled{1} - \textcircled{3}) = \underline{2.85} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	3		SAMPLE						
pH	7.10	7.00		7.14						
Spec. Cond. (ymho)	1050	1409		935						
Turbidity (NTU)	613	24.1		11.5						
Temperature (°C)	13.7	13.9		13.4						

COMMENTS: Began Gray & turbid...became clear

PROJECT TITLE: North Franklin Street - PFI
 PROJECT NO.: 35388
 STAFF: J. Caruso, C. Rokutanda
 DATE: 11/22/94

WELL NO.:	MW-25	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>12</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>6.49</u>	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>0.94</u>	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{2.82} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	3		SAMPLE						
pH	6.90	6.81		7.01						
Spec. Cond. (umho)	1134	993		668						
Turbidity (NTU)	12.9	2.00		3.67						
Temperature (°C)	14.2	14.6		14.0						

COMMENTS: Clear water

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/22/94

WELL NO.: MW-35

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 12.5

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 6.61

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 1

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{3} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	3		SAMPLE						
pH	7.05	6.87		7.06						
Spec. Cond. (umho)	2040	1570		1850						
Turbidity (NTU)	403	353		21.5						
Temperature (°C)	14.1	14.8		14.3						

COMMENTS: Rust-color turbid water - cleared up

PROJECT TITLE: North Franklin Street - PFI
 PROJECT NO.: 35388
 STAFF: J. Caruso, C. ReKutanda
 DATE: 11/22/94

WELL NO.:	MW-45	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>12</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
		3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>4.94</u>	4"	0.66
		5"	1.04
④ VOLUME OF WATER IN CASING (GAL.)	<u>1.2</u>	6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{3.6} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	4		SAMPLE						
pH	7.18	7.17		7.19						
Spec. Cond. (µmho)	2630	2670		3250						
Turbidity (NTU)	43.9	8.95		4.06						
Temperature (°C)	12.4	14.1		13.7						

COMMENTS: Clear water

PROJECT TITLE: North Franklin Street PFI
 PROJECT NO.: 35338
 STAFF: J. Caruso, C. Rokutanda
 DATE: 11/22/94

WELL NO.:	<u>MW-55</u>	WELL I.D.		VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>15</u>	1"		0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"		0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>6.90</u>	3"		0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>1.38</u>	4"		0.66
		5"		1.04
		6"		1.50
		8"		2.60

$$V = 0.0408 (\textcircled{2})^2 \times (\textcircled{1} - \textcircled{3}) = \underline{4.14} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	5		SAMPLE						
pH	6.59	6.92		6.97						
Spec. Cond. (ymho)	1195	1574		1263						
Turbidity (NTU)	212	14.3		52.6						
Temperature (°C)	12.7	14.4		13.6						

COMMENTS: Slight orange tint

PROJECT TITLE: N. Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutandy

DATE: 11/22/94

WELL NO.:	<u>MW-5D</u>	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>30.0</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>6.71</u>	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>3.96</u>	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{11.88} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	12		SAMPLE							
pH	7.23	6.98		7.06							
Spec. Cond. (µmho)	9060	11500		9970							
Turbidity (NTU)	7.86	7.27		7.17							
Temperature (°C)	13.6	13.4		13.0							

COMMENTS: Few Rust-like particles - clear water

PROJECT TITLE: North Franklin Street - PET

PROJECT NO.: 35388

STAFF: S. Caruso, C. Rakutandor

DATE: 11/22/94

WELL NO.:	MW-7S	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>17</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>5.99</u>	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>1.87</u>	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$$V = 0.0408 (\textcircled{2})^2 \times (\textcircled{1} - \textcircled{3}) = \underline{5.61} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	6		SAMPLE						
pH	7.29	7.29		7.32						
Spec. Cond. (ymho)	1208	1890		1157						
Turbidity (NTU)	84.3	42.1		48.6						
Temperature (°C)	14.6	15.0		14.7						

COMMENTS: Slight yellow-orange tint

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/22/94

WELL NO.: MW-85

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 15

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 9.01

3" 0.38

4" 0.66

5" 1.04

④ VOLUME OF WATER IN CASING (GAL.) 1.02

6" 1.50

8" 2.60

$$V = 0.0408 (2)^2 \times (15 - 9.01) = 3.06 \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	4		SAMPLE						
pH	7.78	7.41		7.04						
Spec. Cond. (umho)	2290	946		1060						
Turbidity (NTU)	71000	12.6		481						
Temperature (°C)	14.4	14.7		13.1						

COMMENTS: Brown turbid water - cleared temporarily

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/22/94

WELL NO.: MW-8D

WELL I.D. VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 30

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 8.62

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 3.63

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (\textcircled{2})^2 \times (\textcircled{1} - \textcircled{3}) = \underline{10.84} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	11		SAME						
pH	12.18	7.60		11.87						
Spec. Cond. (umho)	7490	43400		14310						
Turbidity (NTU)	28.3	6.18		8.5						
Temperature (°C)	13.7	13.6		13.4						

COMMENTS: slight gray tint

PROJECT TITLE: North Franklin Street PFI

PROJECT NO.: 35388

STAFF: S. Caruso, C. Rokutanda

DATE: 11/21/94

WELL NO.: MW-105

WELL I.D. VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 14

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 7.31

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 1.14

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 ((2)^2 \times (14 - 7.31)) = \underline{3.42} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	4		SAMPLE						
pH	7.65	6.79		7.14						
Spec. Cond. (umho)	968	862		1715						
Turbidity (NTU)	>1000	107		914						
Temperature (°C)	14.4	14.6		14.3						

COMMENTS: Rust color tint in water - turbid

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/21/94

WELL NO.: MW-10D

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 29.93

② CASING INTERNAL DIAMETER (in.): 2

③ WATER LEVEL BELOW TOP OF CASING (FT.): 7.15

④ VOLUME OF WATER IN CASING (GAL.): 3.87

1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$$V = 0.0408 (2)^2 \times (1) - (3) = \underline{11.61} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	12		SAMPLE						
pH	7.01	6.87		7.19						
Spec. Cond. (umho)	15610	15900		14510						
Turbidity (NTU)	13.8	90.7		40.6						
Temperature (°C)	14.5	13.7		14.2						

COMMENTS: Clear sample

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: North Franklin Street - PFI
 PROJECT NO.: 35388
 STAFF: J. Caruso, C. Rekutanda
 DATE: 11/22/94

WELL NO.:	MW-115	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>15</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
		3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>6.41</u>	4"	0.66
		5"	1.04
④ VOLUME OF WATER IN CASING (GAL.)	<u>1.46</u>	6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{4.38} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	5		SAMPLE						
pH	7.07	6.91		8.79						
Spec. Cond. (umho)	1760	1053		1142						
Turbidity (NTU)	71000	502		218						
Temperature (°C)	12.6	13.6		13.0						

COMMENTS: Turbid - Rust color

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutada

DATE: 11/22/94

WELL NO.: MW-11D

WELL I.D. VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 28

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 6.41

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 3.67

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (2)^2 \times (1 - 3) = \underline{11.01} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	12		SAMPLE						
pH	12.28	6.80		12.07						
Spec. Cond. (umho)	1470	12680		2690						
Turbidity (NTU)	256	65.2		131						
Temperature (°C)	12.7	13.2		13.2						

COMMENTS: Orange - Yellow tint

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rokutanda

DATE: 11/21/94

WELL NO.: MW-12S

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

① TOTAL CASING AND SCREEN LENGTH (FT.): 15

② CASING INTERNAL DIAMETER (in.): 2

③ WATER LEVEL BELOW TOP OF CASING (FT.) 6.64

④ VOLUME OF WATER IN CASING (GAL.) 1.42

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{4.26} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	5		SAMPLE						
pH	7.33	7.09		7.02						
Spec. Cond. (µmho)	1800	1210		1339						
Turbidity (NTU)	71000	44.9		310						
Temperature (°C)	14.2	14.2		14.1						

COMMENTS: Rust-color, turbid water

PROJECT TITLE: North Franklin Street PFI

PROJECT NO.: 35338

STAFF: J. Caruso, C. Rokutanda

DATE: 11/21/94

WELL NO.: MW-135

WELL I.D. VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 14

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 10.32

3" 0.38

4" 0.66

④ VOLUME OF WATER IN CASING (GAL.) 0.63

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (2)^2 \times (14 - 10.32) = 1.89 \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	2		SAMPLE						
pH	7.11	6.70		6.97						
Spec. Cond. (umho)	1263	1349		1306						
Turbidity (NTU)	>1000	128		90.6						
Temperature (°C)	14.6	14.6		14.6						

COMMENTS: Began purge with Rust-color turbidity,
Cleared to Rust-color tint

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Ceruso, C. Rokutandu

DATE: 11/22/94

WELL NO.: MW-165

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 14.5

1" 0.04

② CASING INTERNAL DIAMETER (in.): 2

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 7.03

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 1.35

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{4.05} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	5		SAMPLE						
pH	7.74	7.45		7.25						
Spec. Cond. (umho)	1880	1581		1924						
Turbidity (NTU)	>1000	32.1		504						
Temperature (°C)	14.9	15.1		13.7						

COMMENTS: Red-orange turbid water

PROJECT TITLE: North Franklin Street - PFI
 PROJECT NO.: 35388
 STAFF: S. Caruso, C. ReKutanda
 DATE: 11/21/94

WELL NO.:	MW-185	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>15</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>2</u>	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>9.41</u>	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>0.95</u>	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{2.85} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	3		SAMPLE						
pH	6.91	6.95		6.96						
Spec. Cond. (µmho)	811	862		871						
Turbidity (NTU)	31.2	2.62		9.32						
Temperature (°C)	15.0	14.9		14.7						

COMMENTS: Clear water

PROJECT TITLE: North Franklin Street - PFI

PROJECT NO.: 35388

STAFF: J. Caruso, C. Rakutanda

DATE: 11/21/94

WELL NO.:	WELL I.D.	VOL. GAL./FT.
MW-195		
① TOTAL CASING AND SCREEN LENGTH (FT.): <u>14.5</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.): <u>2</u>	2"	0.17
	3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.) <u>6.85</u>	4"	0.66
	5"	1.04
④ VOLUME OF WATER IN CASING (GAL.) <u>1.3</u>	6"	1.50
	8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{3.9} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	4		SAMPLE						
pH	7.26	7.00		7.22						
Spec. Cond. (µmho)	923	861		907						
Turbidity (NTU)	71000	597		221						
Temperature (°C)	15.4	16.0		15.4						

COMMENTS: Rust-color water - turbid.

PROJECT TITLE: North Franklin Street - PTI

PROJECT NO.: 35388

STAFF: J. Caruso, Co. Rokutanda

DATE: 11/21/94

WELL NO.:	<u>MW-205</u>	WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	<u>22.07</u>	1"	0.04
② CASING INTERNAL DIAMETER (in.):	<u>4</u>	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	<u>9.57</u>	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	<u>8.25</u>	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{24.75} \text{ GAL. (3 casings)}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	25		SAMPLE						
pH	7.41	7.50		7.44						
Spec. Cond. (umho)	1068	1501		1049						
Turbidity (NTU)	21000	11.5		98.9						
Temperature (°C)	14.8	14.3		14.8						

COMMENTS: Rust-color - turbid, cleared to slightly turbid