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REPORT ON

PRE-OPERATIONAL GROUNDWATER MONITORING PROGRAM

WELL SITE NO. 7

VILLAGE OF WINCHESTER WATER SUPPLY SYSTEM EXPANSION PROJECT

Submitted to:

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1.0 INTRODUCTION

This document has been prepared to summarize the results of the 1995 and 1996 pre-operational groundwater monitoring programs. The scope of the monitoring programs was originally described in Section 3.0 of Golder Associates (1996).

The objectives of the pre-operational monitoring programs were to:

- determine seasonal groundwater level variations and flow characteristics, and
- characterize baseline groundwater quality conditions

prior to the commissioning of the water supply system expansion for the Village of Winchester.

The Village of Winchester Well Site No. 7 is located on Lot 15, Concession IX in the Township of Winchester, Ontario (see Key Plan, Figure 1). A site plan and overview of the study area, including the locations of all of the monitoring wells included in the pre-operational monitoring programs and the locations of the production wells (i.e., wells 7A, 7B and 7C) are shown on Figure 2 .

2.0 PROCEDURES

In the 1995 pre-operational monitoring program, water level measurements were generally obtained on a monthly basis. Groundwater sampling for analysis occurred in May and September of 1995. Table 1 shows a summary of sampling dates and locations, and the chemical, physical, and microbiological parameters measured in the field and in the laboratory.

Water level measurements were made quarterly in 1996 and sampling occurred in May and October. A summary of sampling dates and locations, and the chemical, physical, and microbiological parameters measured in the field and in the laboratory during the 1996 pre-operational monitoring program can be found in Table 1.

All monitors included in the sampling program were developed through the removal of at least three standing volumes of water using the dedicated sampling devices. Sampling of groundwater was performed immediately after well development.

The dedicated sampling devices consisted of a length of flexible low density polyethylene (LDPE) tubing and a Model D-25 foot valve manufactured by Waterra Pumps Ltd. of Toronto, Ontario.

The temperature, conductivity and pH of the groundwater samples were measured in the field at the time of sample collection. The field conductivity measurements were obtained using a Myron L Conductivity Meter Model EP which was calibrated in the field prior to use. The pH meter was also calibrated in the field prior to use. All samples were placed in coolers with ice packs until they were delivered in person by Golder Associates personnel to the private analytical laboratory.

The groundwater samples were collected, prepared and preserved in the field as follows:

- one plastic bottle, field filtered to 0.45 microns and preserved to pH<2 with nitric acid for analysis of sodium, potassium and total phosphorus.

- one plastic bottle, unfiltered and unpreserved for analysis of chloride and nitrate.

- one amber glass vial with Teflon septum, unfiltered and unpreserved with no headspace for analysis of BTEX (benzene, toluene, ethylbenzene, xylenes).

- one amber glass bottle, unfiltered and unpreserved for analysis of atrazine

- two sterile plastic bottles, unfiltered and preserved with sodium thiosulphate for bacteriological analysis of faecal coliforms, total coliforms, faecal streptococcus, background bacteria and *Escherichia coli*.

All laboratory chemical and physical analyses on groundwater samples were performed by Accutest Laboratories Ltd. in Nepean, Ontario.

3.0 DISCUSSION

3.1 Groundwater Levels

All of the groundwater levels measured during the 1995 and 1996 pre-operational monitoring programs are provided in Table 2. The groundwater elevations in Table 2 were calculated using the elevation data presented in Table 3. These groundwater elevations are represented graphically on Figures 3, 4, 5, and 6.

Figure 3 shows groundwater level fluctuations in the vicinity of the Village of Winchester well site located on Lot 15, Concession IX in the Township of Winchester. The screens of these monitoring wells are located in the core of the Morewood esker in unconfined fine sand to sand and gravel deposits. The trend depicted in this figure shows typical seasonal variations with groundwater levels rising throughout the spring months and declining slightly in the late summer to early fall.

Figure 4 shows groundwater level fluctuations in other monitoring wells located in the core of the Morewood esker to the south of the Village of Winchester well site (with the exception of 94-7 which is on the road allowance directly north of the well site). The screens of these wells are all in unconfined sand and gravel. The trend depicted in Figure 4 is similar to that in Figure 3. The spike in well WESA 16 in May of 1996 is interpreted to reflect measurement error.

Figure 5 depicts groundwater level variations in various other geological formations in the vicinity of the Morewood esker. Wells 94-8A and 94-9A are located in a confined (overlain by clay) silty sand deposit to the west of the core of the esker, while 94-8B and 94-9B are in the overlying silty clay layer in the same area. Well 94-10 is located in a confined glacial till unit to the east of the core of the Morewood esker. Well 94-12 is located northwest of the Village of Winchester well site in a sand and gravel portion of the Morewood esker that is overlain by a thin silty clay layer. Similar trends to Figure 3 are again seen in Figure 5 with a significantly lower piezometric surface in 94-12, 94-9A and 94-9B.

Figure 6 represents the groundwater levels in the new 96-Series monitoring wells. Wells 96-20, 96-21 and 96-22 are located in the Morewood esker to the north of the Village of Winchester well site in unconfined fine sand to sand and gravel. Monitoring well 96-19 is located within the esker to the south of the Village of Winchester well site, in confined fine sand. Trends in these wells are

difficult to comment on at this time due to the limited amount of data, but would appear consistent with the trends on Figures 3, 4 and 5.

3.2 Flow Directions

Based on the groundwater elevation data available to date, the general direction of groundwater flow within the Morewood esker is to the north, following the long axis of the esker as illustrated on Figure 2. As would be expected in permeable coarse grained deposits, the variation in groundwater elevations between different wells within the Morewood esker is very small and the resulting horizontal hydraulic gradient is quite low, around 10^{-4}.

A component of groundwater flow exists in a southerly direction in the south portion of the esker, forming a groundwater divide approximately 500 metres north of County Road 3 (see Figure 2). This condition is likely a result of the topographic high spot that is present in this area between County Road 3 and Thompson Road.

3.3 Groundwater Quality

The results from the analyses performed on the groundwater samples collected during the 1995 and 1996 pre-operational monitoring programs are tabulated in Appendix A. The Ontario Drinking Water Objectives (ODWO) are also included on these data sheets. The following provides a summary of what was found:

- The groundwater quality in the monitoring wells was consistent over time based on the data available.

- Atrazine was not detected in any of the groundwater samples.

- BTEX (benzene, toluene, ethylbenzene, xylenes) were not detected in any of the groundwater samples submitted for organic analyses.

- Elevated nitrate levels were reported in monitoring well 94-4 (5.73 mg/L) in May of 1995, but not during the other four sampling sessions.

- Elevated nitrate levels (3.9 to 9.5 mg/L) were reported in monitoring well 94-6. These persistently elevated nitrate levels are interpreted to be related to the close proximity of this well to agricultural activities.

- Elevated total phosphorus levels were reported from the May 1996 monitoring session in monitoring wells 94-5 (4.54 mg/L), 94-11 (8.59 mg/L), 96-19 (1.47 mg/L), 96-20 (0.86 mg/L), 96-21 (5.34 mg/L) and 96-22 (1.66 mg/L). These elevated concentrations did not persist in previous and/or subsequent analyses, during which total phosphorous was at 0.01 to 0.06 mg/L.

- Groundwater quality in the Groves private well was consistent over time.

- Groundwater quality in the Lafleur private well was consistent over time, but bacteriological quality was quite variable.

GOLDER ASSOCIATES LTD.

for

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REFERENCES

Golder Associates Ltd., 1996. Application for Permit to Take Water, Village of Winchester Water Supply Project, [OCWA Project No. 41-0379-02]: Golder Associates Report No. 951-2878-1, January 1996.

Ministry of the Environment and Energy, 1994. Ontario Drinking Water Objectives, Revised 1994: Ontario Ministry of the Environment and Energy, 68 p.

TABLE 1

SUMMARY OF 1995 & 1996 PRE-OPERATIONAL
GROUNDWATER MONITORING PROGRAMS

1.0 WATER LEVEL MONITORING COMPONENT

1.1 Monitoring Sessions

1995

January	August
February	September
March	October
April	November
May	December

1996

May	October
July	November

1.2 Monitoring Locations

1995

1994 Series Monitoring Wells (94-1 to 94-12)
Monitoring Well WESA 16

1996

1994 Series Monitoring Wells (94-1 to 94-12)
Monitoring Well WESA 16
1996 Series Monitoring Wells (96-19 to 96-22)

Note: Deviations from the above programs are indicated as notes on Table 2.

2.0 WATER QUALITY MONITORING COMPONENT

2.1 Monitoring Sessions

1995

May
September

1996

May
October

TABLE 1 (continued)

2.2 Monitoring Locations

1995

Monitoring Wells 94-1, 94-2, 94-3, 94-4, 94-5, 94-6, 94-7 (May only)

1996

Monitoring Wells 94-5 and 94-11
1996 Series Monitoring Wells (96-19 to 96-22)
Groves and Lafleur Private Water Supply Wells

2.3 Field Measured Physical Parameters

Temperature
Conductivity
pH

2.4 Laboratory Measured Chemical Parameters

Chloride	Benzene *
Nitrate (as N)	Toluene *
Sodium	Ethylbenzene *
Potassium †	Xylenes *
Total Phosphorus †	Atrazine **

Notes:

† Not measured in May/95 at locations 94-1, 94-2, 94-3, 94-4, 94-5, 94-6

* Measured only at 94-4, 94-5, and 94-7 in the 1995 program. (Measured at all locations in the 1996 program)

** Measured only at 94-3, 94-4, and 94-6 in the 1995 program. (Measured at all locations in the 1996 program)

2.5 Laboratory Measured Microbiological Parameters ***

Faecal Coliforms
Total Coliforms
Faecal Streptococcus
Background colony counts on the total coliform membrane filters
Escherichia coli

Note:

*** Only measured in the Groves and Lafleur wells during the 1996 monitoring program. (Not measured in 1995)

TABLE 2
Water Level Data

	11/30/94		12/16/94		1/18/95		2/17/95	
	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)
94-1	1.56	74.70	1.45	74.81	1.20	75.06	1.12	75.14
94-2	1.47	74.72	1.36	74.83	1.11	75.08	1.04	75.15
94-3	1.52	74.72	1.41	74.83	1.25	74.99	1.09	75.15
94-4	2.80	74.72	2.69	74.83	2.43	75.09	2.36	75.16
94-5	1.49	74.74	1.39	74.84	1.13	75.10	1.04	75.19
94-6	7.90	74.89	7.81	74.98	7.59	75.20	7.44	75.35
94-7	5.85	74.71	5.74	74.82	5.49	75.07	5.41	75.15
94-8A	0.39	74.26	0.30	74.35	0.05	74.60	frozen	frozen
94-8B	0.79	73.86	0.87	73.78	0.45	74.20	frozen	frozen
94-9A	0.80	72.28	0.62	72.46	0.43	72.65	0.68	72.40
94-9B	0.84	72.24	0.87	72.21	0.38	72.70	0.97	72.11
94-10	0.80	75.79	0.69	75.90	0.44	76.15	0.78	75.81
94-11	7.73	74.89	7.64	74.98	7.43	75.19	7.26	75.36
94-12	7.67	71.91	n/a	n/a	7.72	71.86	7.60	71.98
WESA16	3.84	74.66	3.70	74.80	3.42	75.08	n/a	n/a
96-19	NC	NC	NC	NC	NC	NC	NC	NC
96-20	NC	NC	NC	NC	NC	NC	NC	NC
96-21	NC	NC	NC	NC	NC	NC	NC	NC
96-22	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
All elevations are relative to Geodetic datum.
BGS = "Below Ground Surface".
NC = Monitoring Well had not yet been constructed.
n/a = Monitor was either inaccessible at time of monitoring, or could not be located.
Negative depth values indicate that groundwater level was *above* ground surface.

TABLE 2
Water Level Data

	3/15/95		4/13/95		5/15/95		8/17/95	
	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)
94-1	0.97	75.29	0.83	75.43	0.79	75.47	0.66	75.60
94-2	0.90	75.29	0.76	75.43	0.71	75.48	0.58	75.61
94-3	0.96	75.28	0.80	75.44	0.75	75.49	0.58	75.66
94-4	2.21	75.31	2.07	75.45	2.03	75.49	1.91	75.61
94-5	0.89	75.34	0.75	75.48	0.70	75.53	0.61	75.62
94-6	7.33	75.46	7.16	75.63	7.10	75.69	7.12	75.67
94-7	5.26	75.30	5.12	75.44	5.07	75.49	n/a	n/a
94-8A	frozen	frozen	0.35	74.30	n/a	n/a	n/a	n/a
94-8B	frozen	frozen	0.10	74.55	n/a	n/a	n/a	n/a
94-9A	0.48	72.60	0.35	72.73	0.49	72.59	0.58	72.50
94-9B	frozen	frozen	0.68	72.40	0.80	72.28	0.92	72.16
94-10	n/a	n/a	0.12	76.47	0.22	76.37	0.47	76.12
94-11	7.16	75.46	6.98	75.64	6.92	75.70	6.97	75.65
94-12	7.64	71.94	7.51	72.07	7.51	72.07	7.46	72.12
WESA16	3.57	74.93	3.39	75.11	3.34	75.16	3.09	75.41
96-19	NC	NC	NC	NC	NC	NC	NC	NC
96-20	NC	NC	NC	NC	NC	NC	NC	NC
96-21	NC	NC	NC	NC	NC	NC	NC	NC
96-22	NC	NC	NC	NC	NC	NC	NC	NC

TABLE 2
Water Level Data

	9/19/95		10/14/95		11/10/95		12/20/95	
	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)
94-1	0.94	75.32	0.81	75.45	0.66	75.60	0.57	75.69
94-2	0.86	75.33	0.74	75.45	0.59	75.60	0.49	75.70
94-3	0.88	75.36	0.74	75.50	0.61	75.63	n/a	n/a
94-4	2.18	75.34	2.06	75.46	1.90	75.62	1.81	75.71
94-5	0.87	75.36	0.76	75.47	0.59	75.64	0.49	75.74
94-6	7.35	75.44	7.26	75.53	7.03	75.76	6.92	75.87
94-7	n/a	n/a	5.09	75.47	4.94	75.62	4.85	75.71
94-8A	n/a	n/a	flowing	flowing	flowing	flowing	flowing	flowing
94-8B	n/a	n/a	flowing	flowing	flowing	flowing	flowing	flowing
94-9A	0.90	72.18	0.47	72.61	0.43	72.65	0.46	72.62
94-9B	1.24	71.84	0.83	72.25	0.81	72.27	0.86	72.22
94-10	1.08	75.51	0.28	76.31	0.10	76.49	0.17	76.42
94-11	7.20	75.42	7.13	75.49	6.87	75.75	6.76	75.86
94-12	7.50	72.08	7.51	72.07	7.40	72.18	7.26	72.32
WESA16	3.56	74.94	3.15	75.35	2.94	75.56	3.00	75.50
96-19	NC	NC	NC	NC	NC	NC	NC	NC
96-20	NC	NC	NC	NC	NC	NC	NC	NC
96-21	NC	NC	NC	NC	NC	NC	NC	NC
96-22	NC	NC	NC	NC	NC	NC	NC	NC

TABLE 2
Water Level Data

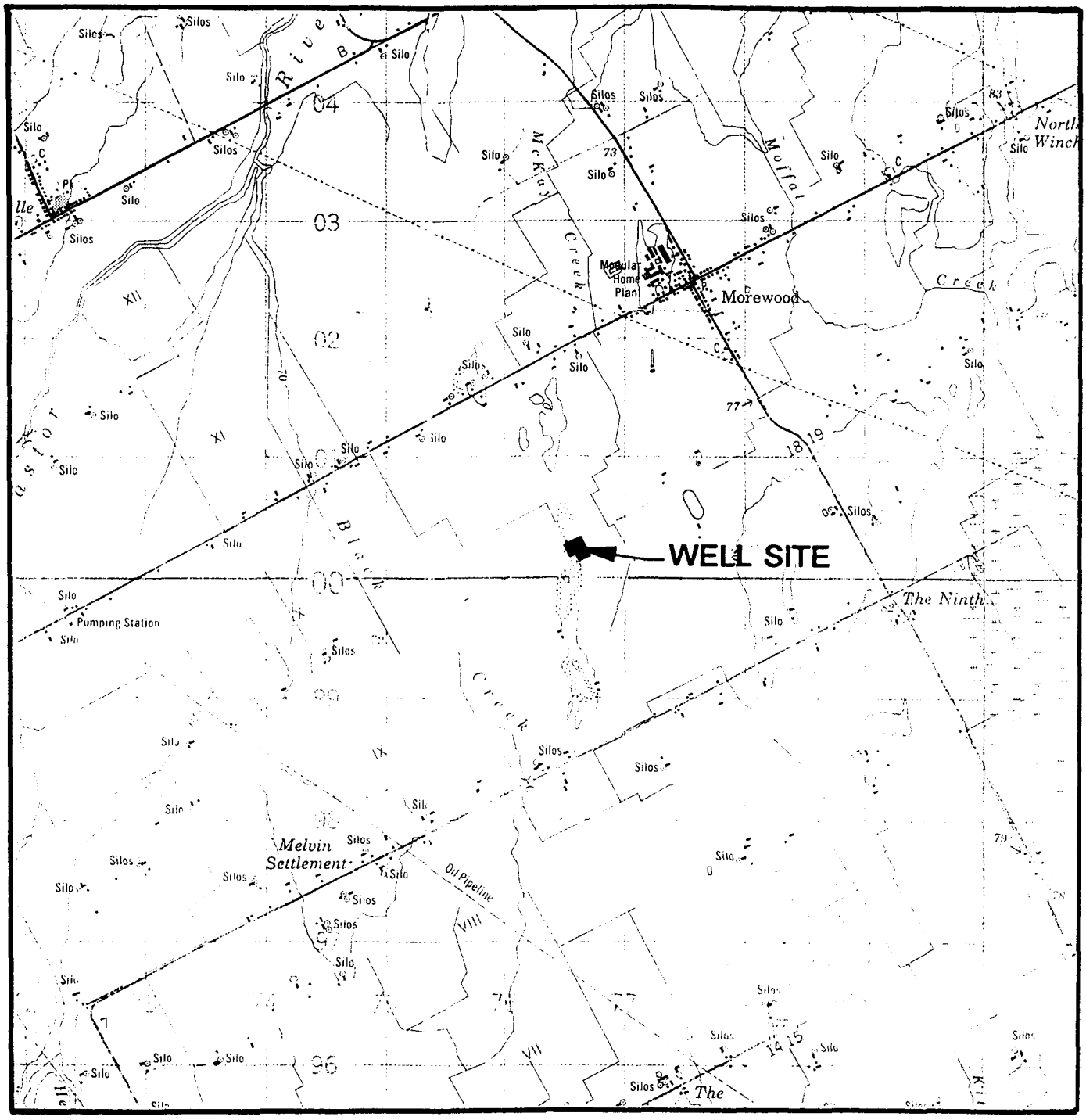
	5/9/96		7/10/96		10/10/96		11/5/96	
	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)	Depth (BGS) (metres)	Elevation (metres)
94-1	0.21	76.05	0.68	75.58	0.74	75.52	0.64	75.62
94-2	0.14	76.05	0.60	75.59	n/a	n/a	destroyed	destroyed
94-3	0.11	76.13	0.58	75.66	0.61	75.63	0.53	75.71
94-4	1.40	76.12	1.86	75.66	1.92	75.60	1.82	75.70
94-5	0.10	76.13	0.57	75.66	0.63	75.60	0.54	75.69
94-6	6.48	76.31	6.97	75.82	7.05	75.74	6.94	75.85
94-7	4.44	76.12	n/a	n/a	n/a	n/a	destroyed	destroyed
94-8A	flowing	flowing	flowing	flowing	flowing	flowing	flowing	flowing
94-8B	flowing	flowing	flowing	flowing	flowing	flowing	flowing	flowing
94-9A	0.38	72.70	0.54	72.54	0.48	72.60	0.46	72.62
94-9B	0.74	72.34	0.88	72.20	0.80	72.28	0.81	72.27
94-10	0.12	76.47	0.70	75.89	0.61	75.98	0.17	76.42
94-11	6.29	76.33	n/a	n/a	6.88	75.74	6.77	75.85
94-12	6.63	72.95	6.85	72.73	7.14	72.44	7.17	72.41
WESA16	0.74	77.76	3.25	75.25	3.09	75.41	3.00	75.50
96-19	-0.44	76.95	-0.05	76.56	-0.01	76.52	-0.17	76.68
96-20	3.39	75.95	3.81	75.53	3.87	75.47	3.78	75.56
96-21	5.82	75.79	6.20	75.41	6.27	75.34	6.19	75.42
96-22	5.90	75.60	6.34	75.16	6.53	74.97	6.46	75.04

TABLE 3
Elevation Data

Well Location	Ground Surface Elevation (metres)	Groundwater Measurement Datum	
		Top of Casing Elevation (metres)	Stickup (metres)
94-1	76.26	77.31	1.05
94-2	76.19	77.18	0.99
94-3	76.24	77.25	1.01
94-4	77.52	78.60	1.08
94-5	76.23	77.16	0.93
94-6	82.79	83.55	0.76
94-7	80.56	80.47	-0.09
94-8A	74.65	74.63	-0.02
94-8B	74.65	74.64	-0.01
94-9A	73.08	73.08	0.00
94-9B	73.08	73.08	0.00
94-10	76.59	76.77	0.18
94-11	82.62	82.52	-0.10
94-12	79.58	79.51	-0.07
WESA16	78.50	78.50	0.00
96-19	76.51	77.69	1.18
96-20	79.34	80.09	0.75
96-21	81.61	82.56	0.95
96-22	81.50	82.34	0.84

KEY PLAN

FIGURE 1



SCALE 1 : 50, 000

SPECIAL NOTE
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT

Date Nov. 7, 1996
Project 951-2878-3

Golder Associates

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FIGURE 3

Groundwater Elevations in Vicinity of the Village of Winchester Well Site

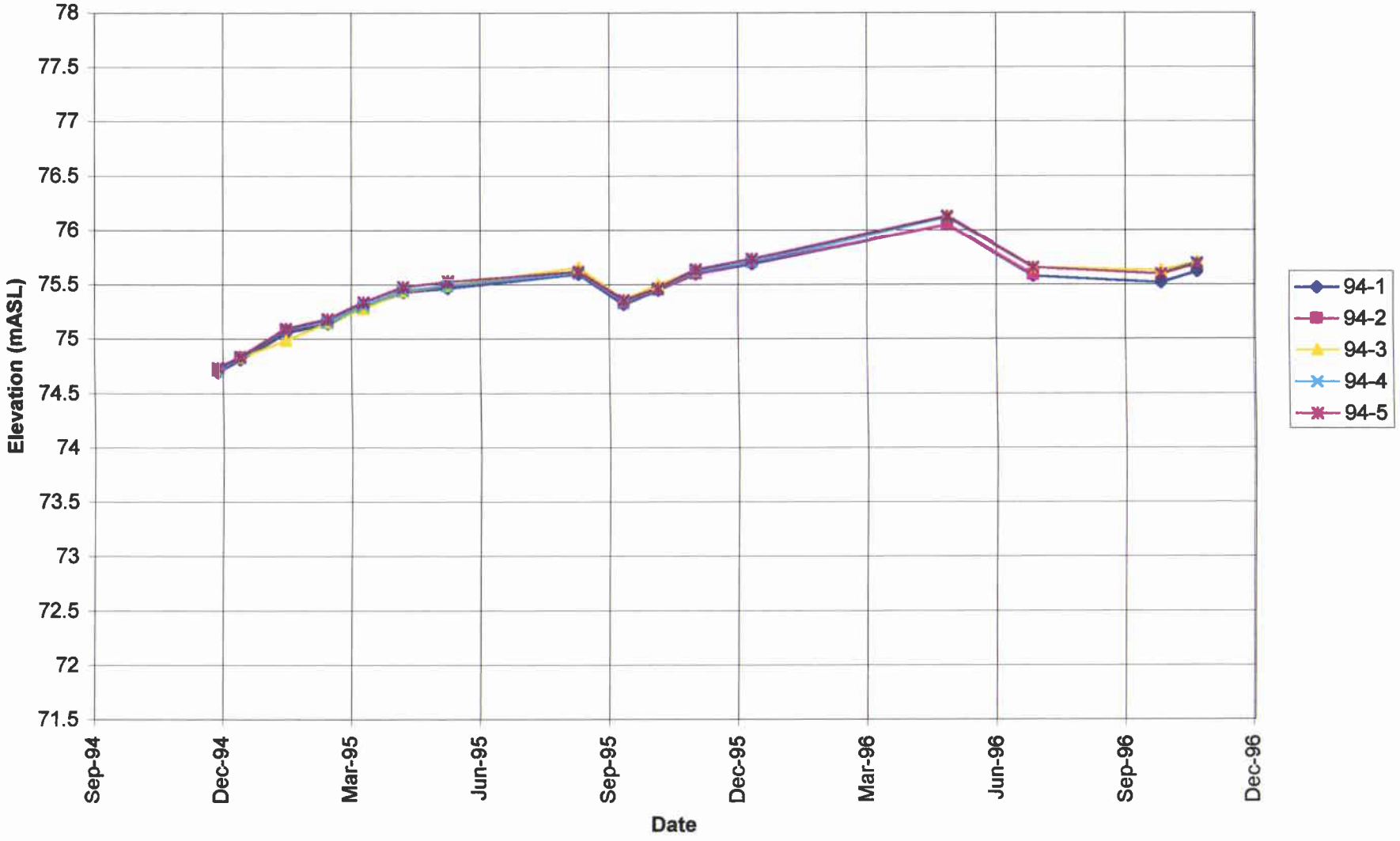

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FIGURE 4

Groundwater Elevations in Morewood Esker

FIGURE 5

Groundwater Elevations in Various Geological Formations

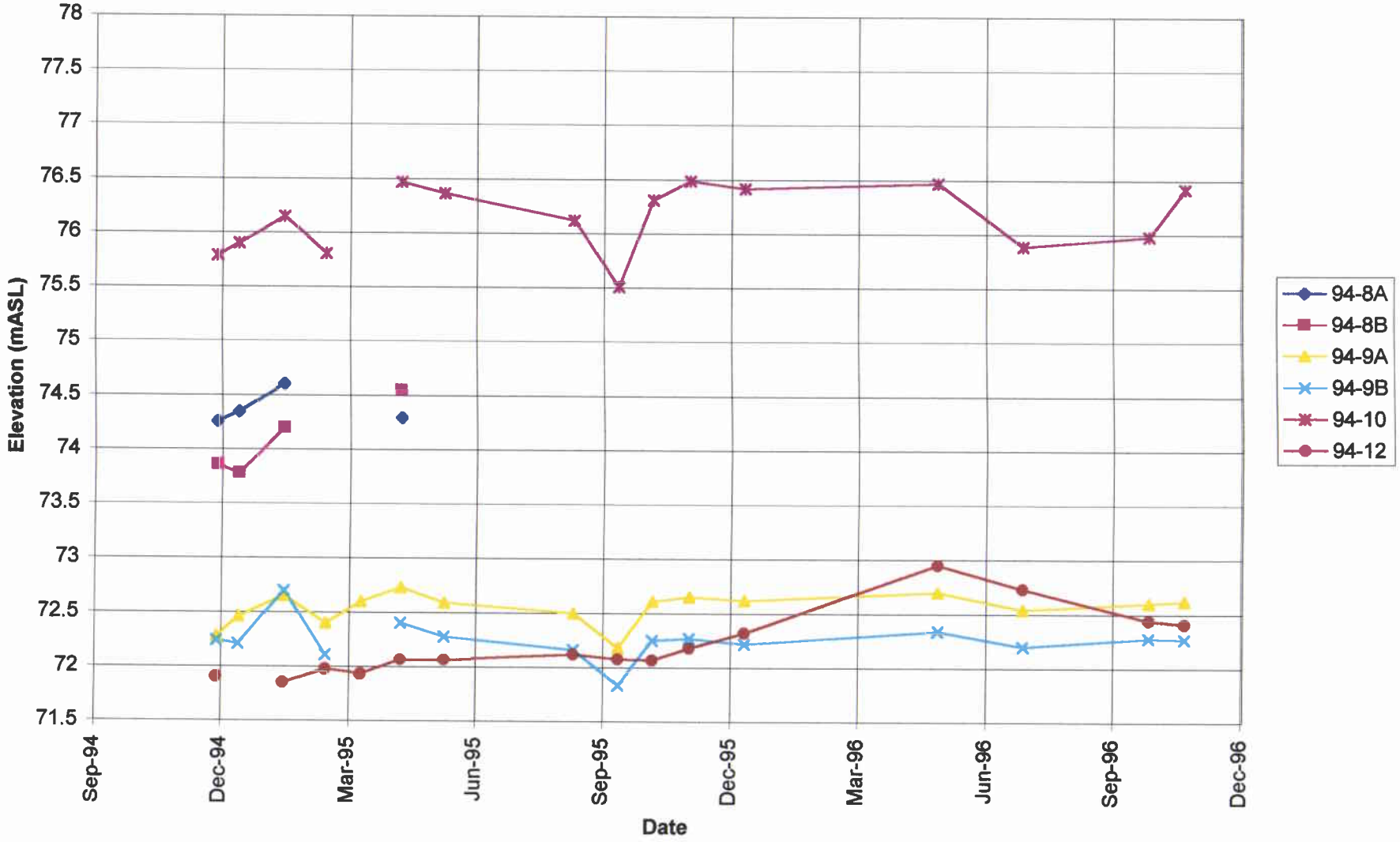

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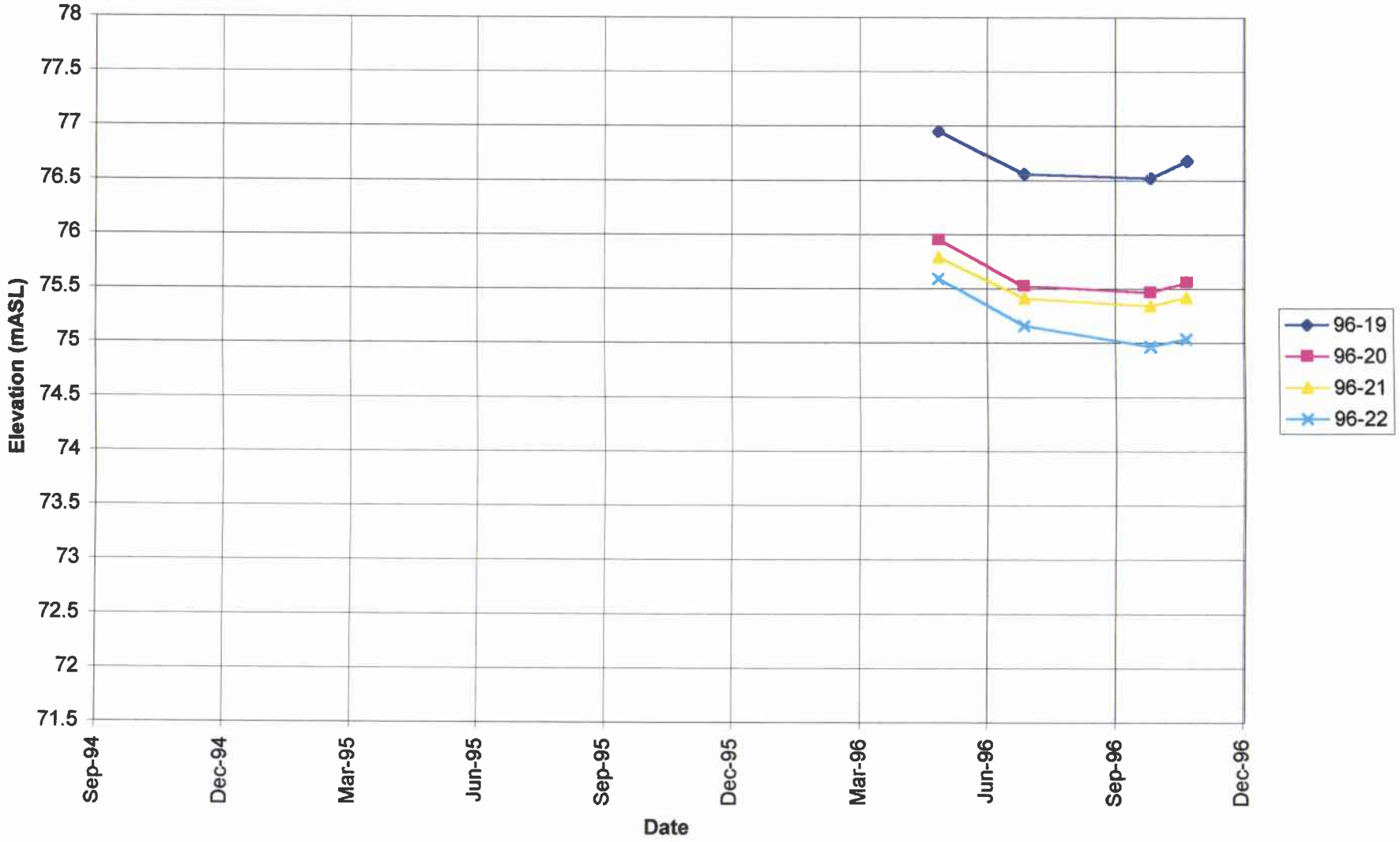
FIGURE 6

Groundwater Elevations in 96-Series Monitoring Wells



APPENDIX A

REPORT OF MONITORING RESULTS

LIST OF ABBREVIATIONS

The abbreviations commonly employed on the "Chemical and Physical Analyses Data Sheets", on the figures, in the tables and in the text of the report as related to the water quality monitoring programs are as follows:

ODWO	Ontario Drinking Water Objective (Ministry of the Environment and Energy, 1994)
N	nitrogen
P	phosphorus
$CaCO_3$	calcium carbonate
C	degrees Celsius
microS/cm	microsiemens per centimetre
NTU	Nephelometric Turbidity Unit
TCU	True Colour Unit
mL	millilitre
mg/L	milligrams per litre
ppm	parts per million
COND.	conductivity
DIS. OXYGEN	dissolved oxygen
TKN	total kjeldahl nitrogen
BOD	biochemical oxygen demand
COD	chemical oxygen demand
DOC	dissolved organic carbon
EC	*Escherichia coli*
TOC	total organic carbon
TS	total solids
TSS	total suspended solids
TDS	total dissolved solids
TC	total coliform
FC	faecal coliform
FS	faecal streptococcus
BKGD	background
*	See Ministry of Environment and Energy (1994) for narrative guideline

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 94-1 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995
Parameter	ODWO					
CHLORIDE	250.0				13.0	13.0
NITRATE (as N)	10.00	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
SODIUM	200				4.00	4.00
POTASSIUM						2.00
PHOSPHORUS(total)						0.02
TEMPERATURE (C)	15.0				8.0	14.0
COND. (microS/cm)					380	415
PH (pH units)	6.5-8.5				7.2	8.3

NOTE: All values are reported in mg/L unless otherwise noted

Sample Source: 94-2 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995
Parameter	ODWO					
CHLORIDE	250.0				8.0	7.0
NITRATE (as N)	10.00	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
SODIUM	200				7.00	8.00
POTASSIUM						3.00
PHOSPHORUS(total)						0.04
TEMPERATURE (C)	15.0				8.0	13.5
COND. (microS/cm)					290	330
PH (pH units)	6.5-8.5				7.2	8.3

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 94-3 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995
Parameter	ODWO					
CHLORIDE	250.0				12.0	10.0
NITRATE (as N)	10.00	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
SODIUM	200				5.00	4.00
POTASSIUM						1.00
PHOSPHORUS(total)						0.02
TEMPERATURE (C)	15.0				8.5	14.0
COND. (microS/cm)					630	720
PH (pH units)	6.5-8.5				7.0	8.2
ATRAZINE	0.005				< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

Sample Source: 94-4 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995
Parameter	ODWO					
CHLORIDE	250.0				6.0	4.0
NITRATE (as N)	10.00	0.400	0.380	0.320	5.730	0.950
SODIUM	200				4.00	3.00
POTASSIUM						3.00
PHOSPHORUS(total)						0.01
TEMPERATURE (C)	15.0				8.5	12.0
COND. (microS/cm)					340	350
PH (pH units)	6.5-8.5				7.0	8.3
BENZENE	0.005				< 0.0005	< 0.0005
TOLUENE	0.024				< 0.0005	< 0.0005
ETHYLBENZENE	0.0024				< 0.0005	< 0.0005
XYLENES	0.30				< 0.0010	< 0.0010
ATRAZINE	0.005				< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

Sample Source: 94-5 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995	May 9,1996	Oct 10,1996
Parameter	ODWO							
CHLORIDE	250.0				12.0	11.0	9.0	9.0
NITRATE (as N)	10.00	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
SODIUM	200				7.00	6.00	7.00	13.00
POTASSIUM						2.00	2.00	2.00
PHOSPHORUS(total)						0.06	4.54	0.02
TEMPERATURE (C)	15.0				8.5	12.0	8.5	8.0
COND. (microS/cm)					350	405	360	445
PH (pH units)	6.5-8.5				7.1	8.4	7.9	7.7
BENZENE	0.005				< 0.0005	< 0.0005	< 0.0005	< 0.0005
TOLUENE	0.024				< 0.0005	< 0.0005	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024				< 0.0005	< 0.0005	< 0.0005	< 0.0005
XYLENES	0.30				< 0.0010	< 0.0010	< 0.0010	< 0.0010
ATRAZINE	0.005						< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

Sample Source: 94-6 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995
Parameter	ODWO					
CHLORIDE	250.0				9.0	9.0
NITRATE (as N)	10.00	3.900	7.600	9.000	9.500	7.890
SODIUM	200				4.00	4.00
POTASSIUM						1.00
PHOSPHORUS(total)						0.01
TEMPERATURE (C)	15.0				8.5	13.0
COND. (microS/cm)					430	440
PH (pH units)	6.5-8.5				6.9	8.1
ATRAZINE	0.005				< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 94-7 Sheet:1-1

Date Sampled		Oct 18,1994	Oct 26,1994	Nov 3,1994	May 15,1995	Sep 19,1995	
Parameter	ODWO						
CHLORIDE	250.0				8.0	NS	
NITRATE (as N)	10.00	< 0.100	0.270	0.270	0.120		
SODIUM	200				7.00		
TEMPERATURE (C)	15.0				8.5		
COND. (microS/cm)					360		
PH (pH units)	6.5-8.5				7.1		
BENZENE	0.005				< 0.0005		
TOLUENE	0.024				< 0.0005		
ETHYLBENZENE	0.0024				< 0.0005		
XYLENES	0.30				< 0.0010		

NOTE: All values are reported in mg/L unless otherwise noted

Sample Source: 94-11 Sheet:1-1

Date Sampled		May 9,1996	Oct 10,1996
Parameter	ODWO		
CHLORIDE	250.0	7.0	5.0
NITRATE (as N)	10.00	< 0.100	< 0.100
SODIUM	200	3.00	8.00
POTASSIUM		2.00	2.00
PHOSPHORUS(total)		8.59	0.02
TEMPERATURE (C)	15.0	9.4	7.0
COND. (microS/cm)		360	447
PH (pH units)	6.5-8.5	8.0	7.6
BENZENE	0.005	< 0.0005	< 0.0005
TOLUENE	0.024	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024	< 0.0005	< 0.0005
XYLENES	0.30	< 0.0010	< 0.0010
ATRAZINE	0.005	< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 96-19 Sheet:1-1

Date Sampled		May 9,1996	Oct 10,1996
Parameter	ODWO		
CHLORIDE	250.0	8.0	8.0
NITRATE (as N)	10.00	< 0.100	< 0.100
SODIUM	200	3.00	8.00
POTASSIUM		1.00	1.00
PHOSPHORUS(total)		1.47	0.02
TEMPERATURE (C)	15.0	8.3	9.0
COND. (microS/cm)		370	437
PH (pH units)	6.5-8.5	7.8	7.7
BENZENE	0.005	< 0.0005	< 0.0005
TOLUENE	0.024	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024	< 0.0005	< 0.0005
XYLENES	0.30	< 0.0010	< 0.0010
ATRAZINE	0.005	< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 96-20 Sheet:1-1

Date Sampled		May 10,1996	Oct 10,1996
Parameter	ODWO		
CHLORIDE	250.0	13.0	13.0
NITRATE (as N)	10.00	1.650	0.410
SODIUM	200	2.00	6.00
POTASSIUM		2.00	2.00
PHOSPHORUS(total)		0.86	0.01
TEMPERATURE (C)	15.0	8.3	6.5
COND. (microS/cm)		410	465
PH (pH units)	6.5-8.5	7.9	7.7
BENZENE	0.005	< 0.0005	< 0.0005
TOLUENE	0.024	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024	< 0.0005	< 0.0005
XYLENES	0.30	< 0.0010	< 0.0010
ATRAZINE	0.005	< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 96-21 Sheet:1-1

Date Sampled		May 10,1996	Oct 10,1996
Parameter	ODWO		
CHLORIDE	250.0	10.0	10.0
NITRATE (as N)	10.00	0.310	1.230
SODIUM	200	7.00	10.00
POTASSIUM		4.00	4.00
PHOSPHORUS(total)		5.34	0.01
TEMPERATURE (C)	15.0	9.7	7.0
COND. (microS/cm)		440	667
PH (pH units)	6.5-8.5	7.9	7.8
BENZENE	0.005	< 0.0005	< 0.0005
TOLUENE	0.024	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024	< 0.0005	< 0.0005
XYLENES	0.30	< 0.0010	< 0.0010
ATRAZINE	0.005	< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: 96-22 Sheet:1-1

Date Sampled		May 10,1996	Oct 10,1996
Parameter	ODWO		
CHLORIDE	250.0	6.0	5.0
NITRATE (as N)	10.00	0.420	1.160
SODIUM	200	4.00	7.00
POTASSIUM		2.00	1.00
PHOSPHORUS(total)		1.66	0.02
TEMPERATURE (C)	15.0	9.4	7.5
COND. (microS/cm)		440	496
PH (pH units)	6.5-8.5	7.9	7.7
BENZENE	0.005	< 0.0005	< 0.0005
TOLUENE	0.024	< 0.0005	< 0.0005
ETHYLBENZENE	0.0024	< 0.0005	< 0.0005
XYLENES	0.30	< 0.0010	< 0.0010
ATRAZINE	0.005	< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: GROVES Sheet:1-1

Date Sampled		Sep 19,1994	May 9,1996	Oct 10,1996
Parameter	ODWO			
CHLORIDE	250.0	8.0	11.0	11.0
FLUORIDE	1.5	0.140		
NITRITE (as N)	1.00	< 0.100		
NITRATE (as N)	10.00	< 0.100	< 0.100	< 0.100
SULPHATE	500.00	52.00		
CALCIUM		64.00		
MAGNESIUM		16.00		
SODIUM	200	8.00	12.00	14.00
POTASSIUM		2.00	3.00	3.00
IRON	0.300	0.180		
MANGANESE	0.050	0.0400		
PHOSPHORUS(total)			< 0.01	< 0.01
HARDNESS (CaCO3)	80-100	226		
ALKALINITY(CaCO3)	30-500	177		
TEMPERATURE (C)	15.0	12.5	10.2	9.5
COND. (microS/cm)		480	440	542
PH (pH units)	6.5-8.5	8.0	8.2	7.8
TKN		0.13		
AMMONIA (as N)		0.13		
PHENOLS		< 0.0020		
TURBIDITY (NTU)	1/5	3.90		
COLOUR (TCU)	5.00	< 2.00		
TOC		0.40		
TDS	500	280		
FC (per 100 mL)	0	0	0	0
TC (per 100 mL)	5	0	0	< 2
FS (per 100 mL)		0	0	< 2
BKGD (per mL)	500	300	0	8
HYDROGEN SULPHIDE	0.05	0.010		
TANNIN & LIGNIN		< 0.10		
E.coli(per 100mL)	0	0	0	0
BENZENE	0.005		< 0.0005	< 0.0005
TOLUENE	0.024		< 0.0005	< 0.0005
ETHYLBENZENE	0.0024		< 0.0005	< 0.0005
XYLENES	0.30		< 0.0010	< 0.0010
ATRAZINE	0.005		< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted

WINCHESTER WATER PROJECT - REPORT OF MONITORING RESULTS 951-2878

Sample Source: LAFLEUR Sheet:1-1

Date Sampled		Sep 19,1994	May 10,1996	Oct 10,1996
Parameter	ODWO			
CHLORIDE	250.0	13.0	16.0	17.0
FLUORIDE	1.5	< 0.100		
NITRITE (as N)	1.00	< 0.100		
NITRATE (as N)	10.00	1.460	0.620	0.710
SULPHATE	500.00	87.00		
CALCIUM		78.00		
MAGNESIUM		19.00		
SODIUM	200	6.00	12.00	12.00
POTASSIUM		1.00	2.00	2.00
IRON	0.300	0.020		
MANGANESE	0.050	0.0300		
PHOSPHORUS(total)			< 0.01	0.03
HARDNESS (CaCO3)	80-100	273		
ALKALINITY(CaCO3)	30-500	192		
TEMPERATURE (C)	15.0	16.0	10.5	12.0
COND. (microS/cm)		590	525	598
PH (pH units)	6.5-8.5	7.8	7.9	7.5
TKN		0.08		
AMMONIA (as N)		< 0.02		
PHENOLS		< 0.0020		
TURBIDITY (NTU)	1/5	0.30		
COLOUR (TCU)	5.00	< 2.00		
TOC		0.40		
TDS	500	360		
FC (per 100 mL)	0	50	0	17
TC (per 100 mL)	5	300	0	30
FS (per 100 mL)		270	0	10
BKGD (per mL)	500	14	0	468
HYDROGEN SULPHIDE	0.05	< 0.010		
TANNIN & LIGNIN		< 0.10		
E.coli(per 100mL)	0	0	0	16
BENZENE	0.005		< 0.0005	< 0.0005
TOLUENE	0.024		< 0.0005	< 0.0005
ETHYLBENZENE	0.0024		< 0.0005	< 0.0005
XYLENES	0.30		< 0.0010	< 0.0010
ATRAZINE	0.005		< 0.005	< 0.005

NOTE: All values are reported in mg/L unless otherwise noted