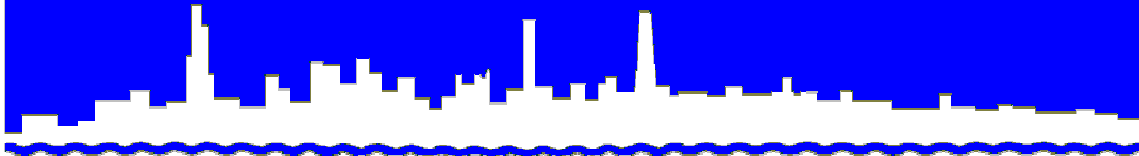


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 07-46

TUNNEL AND RESERVOIR PLAN

UPPER DES PLAINES TUNNEL SYSTEM

2006 ANNUAL GROUNDWATER MONITORING REPORT

July 2007

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July 27, 2007

Ms. Marcia Willhite, Chief
Bureau of Water
Illinois Environmental Protection Agency
P. O. Box 19276
Springfield, IL 62794-9276

Dear Ms. Willhite:

Subject: Tunnel and Reservoir Plan, Upper Des Plaines Tunnel System, 2006 Annual Groundwater Monitoring Report

Enclosed are three copies of "Tunnel and Reservoir Plan, Upper Des Plaines Tunnel System, 2006 Annual Groundwater Monitoring Report."

Very truly yours,

Louis Kollias
Director
Research and Development

LK:JSJ:lmf

Enclosures

cc w/enc: Ms. Sally K. Swanson (USEPA Region V—WC15J) (2)

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TUNNEL AND RESERVOIR PLAN
UPPER DES PLAINES TUNNEL SYSTEM
2006 ANNUAL GROUNDWATER MONITORING REPORT

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INTRODUCTION

This report contains data for the year 2006 for the TARP Upper Des Plaines System. This system consists of two sub-systems, Upper Des Plaines 20 and 21. Upper Des Plaines 20 contains six water quality monitoring wells, MW-1 through MW-6, while Upper Des Plaines 21 contains three water quality wells, MW-7 through MW-9. These nine water quality monitoring wells are sampled six times per year with the exception of MW-1 which is sampled three times per year (IEPA memo July 9, 2004). Water levels were monitored once every two weeks as required.

Monitoring Data

Appendix AI contains a location map of nine water quality monitoring wells, MW-1 through MW-6 for the Upper Des Plaines 20 System, and MW-7 through MW-9 for the Upper Des Plaines 21 System.

Table AII-1 in Appendix AII contains groundwater elevation data for the year 2006 for monitoring wells MW-1 through MW-6 for the Upper Des Plaines 20 System, and Table AII-2 contains groundwater elevation data for the same period for monitoring wells MW-7 through MW-9 for the Upper Des Plaines 21 Tunnel System.

Tables AIII-1 and AIII-2 in Appendix AIII contain water quality data for Upper Des Plaines 20. Tables AIII-3 and AIII-4 in Appendix AIII contain water quality data for Upper Des Plaines 21 monitoring wells.

All of the wells in the Upper Des Plaines System were visited for the required number of samples. However, in one instance the well could not be sampled. Water quality well MW-2 could not be sampled on February 15, 2006 because the well pump was inoperable.

Summary of Data

Monitoring Wells Water Level Elevation Data. In Figure 1, the 2006 groundwater level elevation data for monitoring wells MW-1 through MW-6 of the Upper Des Plaines 20 Tunnel System have been plotted. In this figure, mean, minimum, and maximum water level elevations of all six monitoring wells are plotted to show the fluctuations in the water level elevations during 2006.

Similarly, in Figure 2, the 2006 groundwater elevation data for monitoring wells MW-7 through MW-9 of the Upper Des Plaines 21 Tunnel System have been plotted. Also, mean, minimum, and maximum water level elevations of all three monitoring wells are plotted to show the fluctuations in the water level elevation during 2006.

Water Quality Monitoring Wells Data. Table 1 contains summary statistics of the water quality parameters for the year 2006 for the Upper Des Plaines 20 Tunnel System, and Table 2 contains summary statistics of the water quality parameters for the same period for the Upper Des

Plaines 21 Tunnel System. The summary statistics are computed from the water quality data collected in 2006 from Upper Des Plaines water quality wells MW-1 through MW-6 (Upper Des Plaines 20), and MW-7 through MW-9 (Upper Des Plaines 21). The summary statistics include minimum, mean, maximum, standard deviation (Std. Dev.), median, and coefficient of variation (Coeff. Var.) of the values of all nine water quality parameters analyzed for 2006. The nine water quality parameters are: chloride (Cl), conductivity (Cond.), fecal coliform (FC), hardness as CaCO₃ (Hard.), ammonia as NH₄⁺-N, pH, sulfate (SO₄), total dissolved solids (TDS), and total organic carbon (TOC).

TABLE 1: SUMMARY STATISTICS FOR 2006 WATER QUALITY DATA FOR THE MONITORING WELLS IN UPPER DES PLAINES 20 TUNNEL SYSTEM: WELLS MW-1 THROUGH MW-6

Parameter		Well Number					
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Cl, mg/L	Minimum	32	31	11	44	121	36
	Mean	37	34	14	50	257	38
	Maximum	42	42	17	59	424	40
	Std. Dev.	5	5	2	5	118	2
	Median	36	34	14	49	260	38
	Coeff. Var.	14	13	15	11	46	4
Cond., µmhos/cm	Minimum	422	356	451	493	480	442
	Mean	787	544	802	1025	1182	760
	Maximum	1001	1063	1100	1347	1702	1077
	Std. Dev.	318	296	259	283	481	266
	Median	938	451	901	1091	1248	804
	Coeff. Var.	40	54	32	28	41	35
FC, ¹ cfu/100 mL	Minimum	1	1	1	1	1	1
	Geo. Mean	1	1	1	1	1	3
	Maximum	1	2	1	1	2	480
	Geo. Std. Dev.	0	0.45	0	0	0.41	12
	Median	1	1	1	1	1	1
	Coeff. Var.	0	39	0	0	118	352
Hard., as CaCO ₃ , mg/L	Minimum	432	445	418	520	202	337
	Mean	438	456	437	538	259	371
	Maximum	444	471	459	559	313	388
	Std. Dev.	6	10	15	14	51	18
	Median	437	452	434	538	260	377
	Coeff. Var.	1	2	3	3	20	5
NH ₄ ⁺ -N, ² mg/L	Minimum	0.25	0.45	0.25	0.02	0.02	0.41
	Mean	0.25	0.48	0.29	0.07	0.04	0.45
	Maximum	0.26	0.51	0.36	0.11	0.12	0.47
	Std. Dev.	0.01	0.03	0.04	0.03	0.04	0.02
	Median	0.25	0.49	0.27	0.07	0.02	0.46
	Coeff. Var.	2.28	5.37	14.17	47.12	96.50	5.46

TABLE 1 (Continued): SUMMARY STATISTICS FOR 2006 WATER QUALITY DATA FOR THE MONITORING WELLS IN UPPER DES PLAINES 20 TUNNEL SYSTEM: WELLS MW-1 THROUGH MW-6

Parameter		Well Number					
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
pH	Minimum	6.8	7.4	7.0	7.0	7.0	7.5
	Mean	7.5	7.6	7.7	7.5	7.7	7.8
	Maximum	7.8	7.8	8.2	8.0	8.3	8.3
	Std. Dev.	0.6	0.2	0.4	0.4	0.6	0.3
	Median	7.8	7.7	7.8	7.6	7.7	7.7
	Coeff. Var.	7.7	2.2	5.4	4.6	7.3	3.7
SO ₄ , mg/L	Minimum	355	408	425	371	206	229
	Mean	376	426	467	404	255	307
	Maximum	403	469	588	509	378	347
	Std. Dev.	25	25	61	53	65	42
	Median	369	421	445	384	235	315
	Coeff. Var.	7	6	13	13	26	14
TDS, mg/L	Minimum	786	870	756	820	686	622
	Mean	812	910	809	903	984	721
	Maximum	858	970	866	968	1248	784
	Std. Dev.	40	37	44	58	230	57
	Median	792	902	806	913	1007	740
	Coeff. Var.	5	4	5	6	23	8
TOC, mg/L	Minimum	0.6	0.6	0.6	0.6	0.9	0.8
	Mean	0.6	0.7	0.7	0.7	1.3	1.0
	Maximum	0.7	0.8	0.9	0.8	2.3	1.4
	Std. Dev.	0.1	0.1	0.1	0.1	0.5	0.3
	Median	0.6	0.7	0.7	0.7	1.2	0.9
	Coeff. Var.	9.1	11.6	15.6	14.4	39.2	25.3

¹For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

²For purposes of statistical evaluation, NH₄⁺-N values less than 0.02 (the detection limit) were set equal to 0.02.

TABLE 2: SUMMARY STATISTICS FOR 2006 WATER QUALITY DATA FOR THE MONITORING WELLS IN UPPER DES PLAINES 21 TUNNEL SYSTEM: WELLS MW-7 THROUGH MW-9

Parameter	Well Number			
	MW-7	MW-8	MW-9	
Cl, mg/L	Minimum	34	36	29
	Mean	35	41	32
	Maximum	37	45	34
	Std. Dev.	1	3	2
	Median	35	41	33
	Coeff. Var.	3	8	6
Cond., µmhos/cm	Minimum	452	455	489
	Mean	597	835	854
	Maximum	1147	1027	1040
	Std. Dev.	270	209	191
	Median	492	874	887
	Coeff. Var.	45	25	22
FC, ¹ cfu/100 mL	Minimum	1	1	1
	Geo. Mean	1	2	1
	Maximum	1	46	5
	Geo. Std. Dev.	0	5	2
	Median	1	1	1
	Coeff. Var.	0	252	148
Hard., as CaCO ₃ , mg/L	Minimum	502	343	333
	Mean	518	385	372
	Maximum	533	427	398
	Std. Dev.	10	27	27
	Median	519	384	381
	Coeff. Var.	2	7	7
NH ₄ ⁺ -N, ² mg/L	Minimum	0.39	0.02	0.06
	Mean	0.51	0.05	0.28
	Maximum	0.84	0.17	0.48
	Std. Dev.	0.17	0.06	0.14
	Median	0.46	0.02	0.30
	Coeff. Var.	32.83	120.00	48.13

TABLE 2 (Continued): SUMMARY STATISTICS FOR 2006 WATER QUALITY DATA FOR THE MONITORING WELLS IN UPPER DES PLAINES 21 TUNNEL SYSTEM: WELLS MW-7 THROUGH MW-9

Parameter	Well Number			
	MW-7	MW-8	MW-9	
pH	Minimum	7.2	6.9	6.9
	Mean	7.6	7.9	7.7
	Maximum	7.8	8.4	7.9
	Std. Dev.	0.2	0.6	0.4
	Median	7.6	8.1	7.8
	Coeff. Var.	2.7	7.0	5.0
SO ₄ , mg/L	Minimum	32	25	301
	Mean	329	283	342
	Maximum	418	379	400
	Std. Dev.	151	130	36
	Median	401	331	337
	Coeff. Var.	46	46	11
TDS, mg/L	Minimum	454	728	690
	Mean	871	764	756
	Maximum	990	834	802
	Std. Dev.	206	40	50
	Median	943	754	774
	Coeff. Var.	24	5	7
TOC, mg/L	Minimum	0.5	0.7	0.7
	Mean	0.6	0.8	0.8
	Maximum	1.0	0.8	0.9
	Std. Dev.	0.2	0.1	0.1
	Median	0.6	0.8	0.8
	Coeff. Var.	29.4	7.3	11.2

¹For purposes of statistical evaluation, fecal coliform values less than 1 were set equal to 1.

²For purposes of statistical evaluation, NH₄⁺-N values less than 0.02 (the detection limit) were set equal to 0.02.

FIGURE 1: 2006 MINIMUM, MEAN, AND MAXIMUM WATER LEVEL ELEVATIONS FOR THE UPPER DES PLAINES 20 TUNNEL SYSTEM MONITORING WELLS

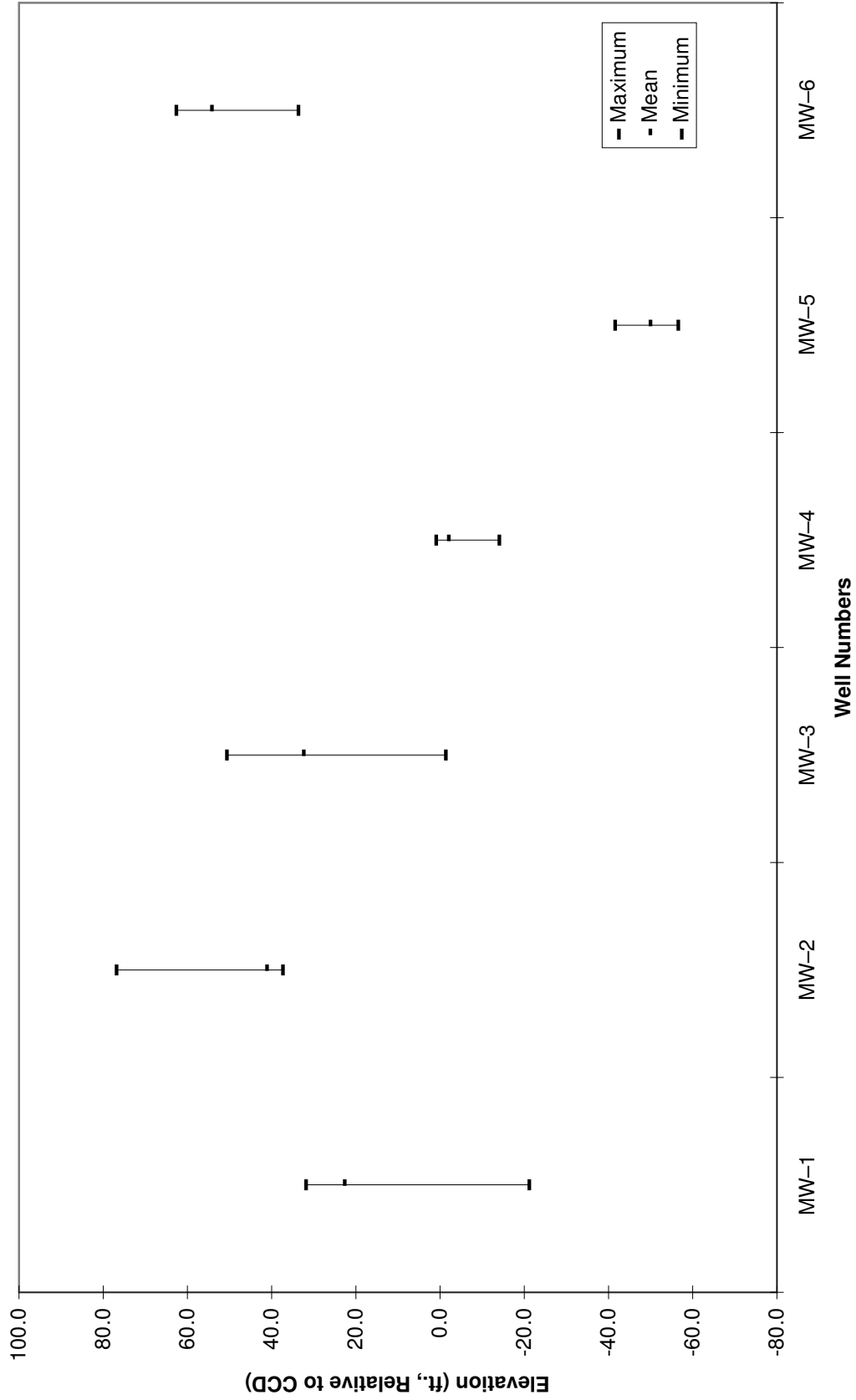
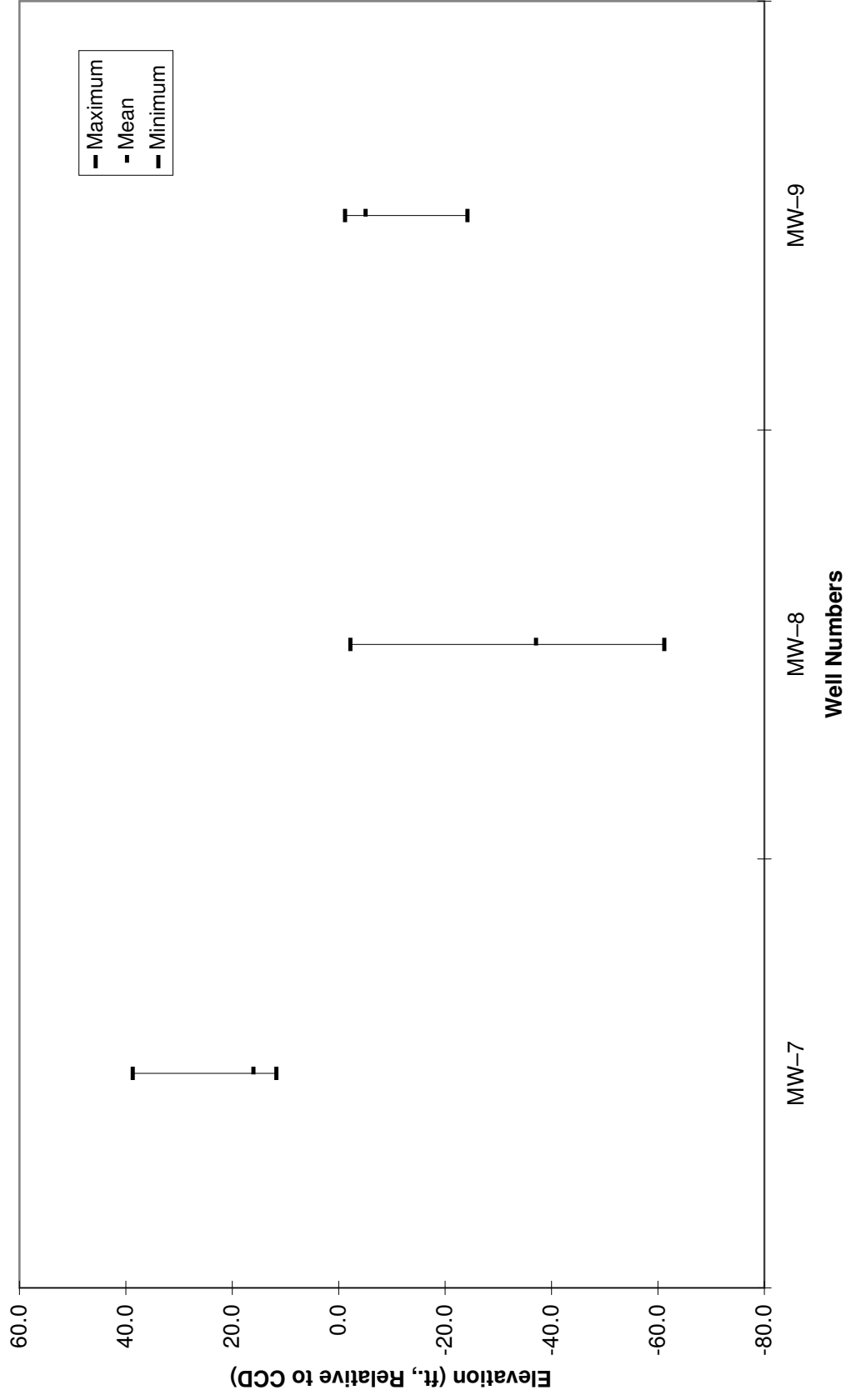


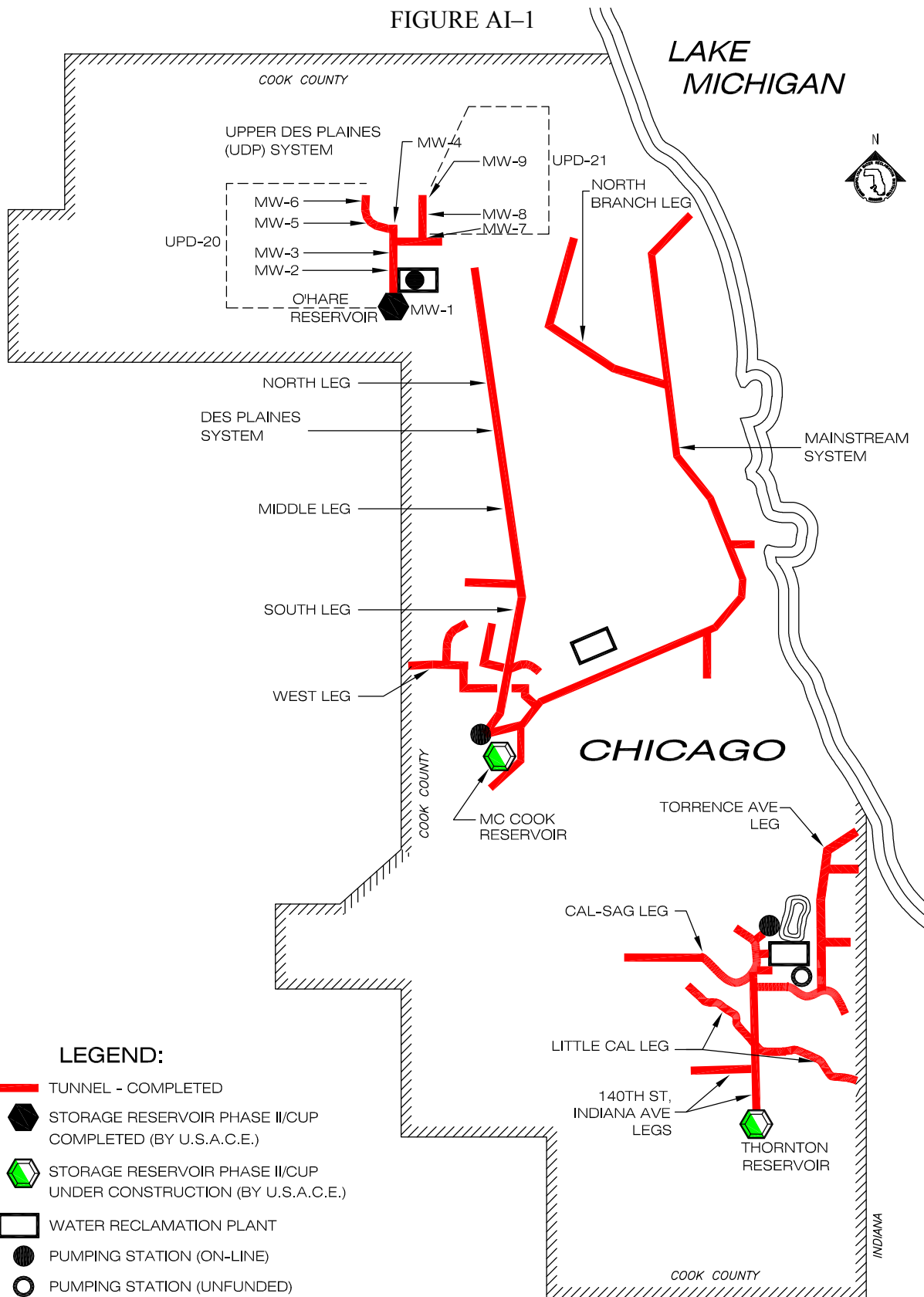
FIGURE 2: 2006 MINIMUM, MEAN, AND MAXIMUM WATER LEVEL ELEVATIONS FOR THE UPPER DES PLAINES 21 TUNNEL SYSTEM MONITORING WELLS



APPENDIX AI

LOCATION MAP OF GROUNDWATER QUALITY MONITORING WELLS
MW-1 THROUGH MW-6 (UPPER DES PLAINES 20), AND
MW-7 THROUGH MW-9 (UPPER DES PLAINES 21)
IN THE UPPER DES PLAINES TUNNEL SYSTEM

FIGURE AI-1



**UPPER DES PLAINES TUNNEL SYSTEM
LOCATION MAP OF GROUNDWATER
QUALITY MONITORING WELLS**

METROPOLITAN WATER RECLAMATION
DISTRICT OF GREATER CHICAGO

APPENDIX AII

2006 GROUNDWATER LEVEL ELEVATION DATA
FOR MONITORING WELLS MW-1 THROUGH MW-6 (UPPER DES PLAINES 20),
AND MW-7 THROUGH MW-9 (UPPER DES PLAINES 21)
IN THE UPPER DES PLAINES TUNNEL SYSTEM

TABLE AII-1: 2006 GROUNDWATER LEVEL ELEVATION* DATA FOR MONITORING WELLS MW-1 THROUGH MW-6 IN THE UPPER DES PLAINES 20 TUNNEL SYSTEM

Date	Monitoring Well					
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
	feet					
1/6/06	28.8	37.8	35.6	-2.1	-47.6	57.6
1/20/06	31.8	41.8	38.6	-3.1	-51.6	61.6
2/3/06	29.8	76.8	34.6	-4.1	-52.6	54.6
2/24/06	26.8	39.8	50.6	-2.1	-50.6	57.6
3/3/06	29.8	38.8	35.6	-2.1	-47.6	54.6
3/17/06	-11.2	41.8	35.6	-0.1	-52.6	62.6
3/31/06	27.8	38.8	37.6	-4.1	-46.6	56.6
4/14/06	27.8	41.8	37.6	-14.1	-56.6	33.6
4/28/06	27.8	46.8	37.6	-1.1	-49.6	41.6
5/12/06	28.8	39.8	35.6	-1.1	-50.6	33.6
5/26/06	28.8	38.8	36.6	-0.1	-49.6	58.6
6/9/06	25.8	39.8	35.6	-2.1	-48.6	57.6
6/23/06	24.8	37.8	35.6	-2.1	-49.6	53.6
7/3/06	27.8	38.8	35.6	-2.1	-54.6	54.6
7/21/06	-18.2	37.3	35.6	-2.1	-51.6	54.6
8/4/06	27.8	38.8	35.6	-1.1	-54.6	54.6
8/18/06	25.8	41.8	35.6	-1.1	-49.6	51.6
9/1/06	27.8	38.8	1.6	-0.1	-46.6	56.6
9/15/06	-21.2	41.8	-1.4	-3.1	-51.6	52.6
9/22/06	28.8	37.8	2.6	0.9	-52.6	55.6
10/13/06	29.8	37.8	34.6	0.9	-50.6	56.6
10/27/06	27.8	37.8	36.6	-2.1	-41.6	57.6
11/3/06	26.8	37.8	35.6	-2.1	-41.6	58.6
11/23/06	27.8	41.8	34.6	-0.1	-47.6	58.6
12/8/06	**	38.8	**	-2.1	**	**
12/19/06	27.8	38.8	35.6	-2.1	-53.6	58.6
Minimum	-21.2	37.3	-1.4	-14.1	-56.6	33.6
Mean	22.6	41.1	32.4	-2.1	-50.0	54.2
Maximum	31.8	76.8	50.6	0.9	-41.6	62.6

*Relative to Chicago City Datum.

**Unable to sample because well was covered with ice.

TABLE AII-2: 2006 GROUNDWATER LEVEL ELEVATION* DATA FOR MONITORING WELLS MW-7 THROUGH MW-9 IN THE UPPER DES PLAINES 21 TUNNEL SYSTEM

Date	Monitoring Well		
	MW-7	MW-8	MW-9
	feet		
1/6/06	12.7	-50.2	-5.2
1/20/06	23.7	-41.2	-4.2
2/3/06	11.7	-33.2	-6.2
2/24/06	14.7	-58.2	-6.2
3/3/06	13.7	-47.2	-3.2
3/17/06	21.7	-55.2	-5.2
3/31/06	13.7	-49.2	-7.2
4/14/06	18.7	-61.2	-5.2
4/28/06	15.7	-23.2	-5.2
5/12/06	15.7	-37.2	-3.2
5/26/06	14.7	-31.2	-3.2
6/9/06	14.2	-2.2	-4.2
6/23/06	13.7	-3.2	-5.2
7/3/06	14.7	-2.7	-4.7
7/21/06	13.7	-61.2	-7.2
8/4/06	15.7	-52.2	-5.2
8/18/06	14.7	-39.2	-3.2
9/1/06	16.7	-28.2	-1.2
9/15/06	15.7	-46.2	-24.2
9/22/06	11.7	-56.2	-1.2
10/13/06	13.7	-32.2	-3.2
10/27/06	14.7	-30.2	-2.2
11/3/06	13.7	-28.2	-3.2
11/23/06	13.7	-43.2	-4.2
12/8/06	38.7	**	**
12/19/06	14.7	-15.2	-3.2
Minimum	11.7	-61.2	-24.2
Mean	16.0	-37.1	-5.1
Maximum	38.7	-2.2	-1.2

*Relative to Chicago City Datum.

**Unable to sample because well was covered with ice.

APPENDIX AIII

2006 GROUNDWATER QUALITY DATA
FOR MONITORING WELLS MW-1 THROUGH MW-6 (UPPER DES PLAINES 20),
AND MW-7 THROUGH MW-9 (UPPER DES PLAINES 21)
IN THE UPPER DES PLAINES TUNNEL SYSTEM

TABLE AIII-1: 2006 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS MW-1 THROUGH MW-6 IN THE UPPER DES PLAINES 20 TUNNEL SYSTEM

Well	Date of Sampling	pH ¹	Cond. ¹ µmhos/cm	Temp. °C	Hard. as CaCO ₃ mg/L	NH ₄ ⁺ -N mg/L	Cl mg/L
MW-1	2/23/06	6.8	1001	14	432	0.25	32
MW-1	3/16/06	7.8	938	14	444	0.26	42
MW-1	4/6/06	7.8	422	14	437	0.25	36
MW-2	2/15/06			Well could not be sampled			
MW-2	4/25/06	7.8	1063	14	451	0.51	42
MW-2	6/28/06	7.7	356	14	463	0.46	31
MW-2	7/12/06	7.4	489	14	471	0.50	34
MW-2	9/7/06	7.7	451	14	452	0.49	31
MW-2	10/12/06	7.5	360	12	445	0.45	34
MW-3	2/9/06	7.7	451	13	431	0.30	14
MW-3	3/22/06	7.9	890	14	448	0.36	13
MW-3	4/13/06	7.0	514	15	459	0.26	12
MW-3	6/29/06	7.6	1100	16	436	0.27	14
MW-3	10/19/06	8.2	948	14	418	0.25	17
MW-3	11/30/06	8.0	911	14	429	0.27	11
MW-4	2/9/06	7.3	493	13	530	0.11	49
MW-4	3/22/06	7.5	1030	14	545	<0.02	59
MW-4	4/13/06	7.0	1100	14	559	0.07	48
MW-4	6/29/06	7.7	1347	15	520	0.09	54
MW-4	10/19/06	8.0	1098	13	533	0.06	47
MW-4	11/30/06	7.7	1084	13	542	0.05	44
MW-5	2/9/06	7.2	815	13	295	<0.02	424
MW-5	3/22/06	7.3	1600	13	306	<0.02	343
MW-5	4/13/06	7.0	1442	15	313	<0.02	233
MW-5	6/29/06	8.1	1702	16	211	<0.02	287
MW-5	11/30/06	8.3	1054	14	202	0.05	121
MW-5	12/14/06	8.1	480	14	225	0.12	136
MW-6	1/11/06	7.5	838	13	367	0.46	39
MW-6	6/14/06	7.8	1077	14	382	0.47	37
MW-6	7/26/06	8.3	770	14	388	0.45	38

TABLE AIII-1 (Continued): 2006 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS MW-1 THROUGH MW-6 IN THE UPPER DES PLAINES 20 TUNNEL SYSTEM

Well	Date of Sampling	pH ¹	Cond. ¹ µmhos/cm	Temp. °C	Hard. as CaCO ₃ mg/L	NH ₄ ⁺ -N mg/L	Cl mg/L
MW-6	8/30/06	7.6	442	15	382	0.41	40
MW-6	10/4/06	7.8	983	14	337	0.42	36
MW-6	11/21/06	7.6	450	12	372	0.46	36

¹Unfiltered samples, all others were filtered through 0.45 µm membrane.

TABLE AIII-2: 2006 SULFATE, TOTAL ORGANIC CARBON,
TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND
RECHARGE DATA FOR WATER QUALITY MONITORING WELLS
MW-1 THROUGH MW-6 IN THE UPPER DES PLAINES 20 TUNNEL SYSTEM

Well	Date of Sampling	SO ₄ mg/L	TOC mg/L	TDS mg/L	FC ¹ cfu/100 mL	Water Elevation ² Feet	Recharge ³ Hours
MW-1	2/23/06	403	0.7	858	<1	10	<48
MW-1	3/16/06	355	0.6	792	<1	12	<48
MW-1	4/6/06	369	0.6	786	<1	8	<48
MW-2	2/15/06			Well could not be sampled			
MW-2	4/25/06	408	0.7	970	<1	40	<48
MW-2	6/28/06	422	0.6	900	<1	38	<48
MW-2	7/12/06	421	0.8	908	<1	37	<48
MW-2	9/7/06	409	0.7	902	<1	38	<48
MW-2	10/12/06	469	0.8	870	2	38	<48
MW-3	2/9/06	588	0.9	768	<1	36	<48
MW-3	3/22/06	429	0.6	866	<1	37	<48
MW-3	4/13/06	425	0.7	756	<1	37	<48
MW-3	6/29/06	443	0.6	812	<1	36	<48
MW-3	10/19/06	446	0.7	854	<1	37	<48
MW-3	11/30/06	471	0.7	800	<1	37	<48
MW-4	2/9/06	509	0.8	820	<1	-5	<48
MW-4	3/22/06	371	0.8	968	<1	-6	<48
MW-4	4/13/06	378	0.6	910	<1	-9	<48
MW-4	6/29/06	375	0.7	954	<1	-6	<48
MW-4	10/19/06	389	0.6	916	<1	5	<48
MW-4	11/30/06	402	0.6	850	<1	-5	<48
MW-5	2/9/06	378	1.3	1248	<1	-57	<48
MW-5	3/22/06	256	0.9	1208	<1	-55	<48
MW-5	4/13/06	267	1.1	1008	<1	-57	<48
MW-5	6/29/06	206	1.2	1006	2	-53	<48
MW-5	11/30/06	210	2.3	686	<1	-55	<48
MW-5	12/14/06	214	1.0	748	<1	-53	<48
MW-6	1/11/06	315	0.8	732	<1	59	<4
MW-6	6/14/06	300	0.8	622	<1	55	<4
MW-6	7/26/06	338	0.8	748	<1	58	<4

TABLE AIII-2 (Continued): 2006 SULFATE, TOTAL ORGANIC CARBON, TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND RECHARGE DATA FOR WATER QUALITY MONITORING WELLS MW-1 THROUGH MW-6 IN THE UPPER DES PLAINES 20 TUNNEL SYSTEM

Well	Date of Sampling	SO ₄ mg/L	TOC mg/L	TDS mg/L	FC ¹ cfu/100 mL	Water Elevation ² Feet	Recharge ³ Hours
MW-6	8/30/06	347	0.3	784	<1	56	<4
MW-6	10/4/06	229	1.2	692	480	57	<4
MW-6	11/21/06	315	1.4	750	8	58	<48

¹Unfiltered samples, all others were filtered through 0.45 µm membrane.

²Water level elevations are relative to Chicago City Datum.

³Refers to elapsed time after initial drawdown before the well recovered sufficiently for sampling.

TABLE AIII-3: 2006 pH, CONDUCTIVITY, TEMPERATURE, HARDNESS, AMMONIA NITROGEN, AND CHLORIDE DATA FOR WATER QUALITY MONITORING WELLS MW-7 THROUGH MW-9 IN THE UPPER DES PLAINES 21 TUNNEL SYSTEM

Well	Date of Sampling	pH ¹	Cond. ¹ µmhos/cm	Temp. °C	Hard. as CaCO ₃ mg/L	NH ₄ ⁺ -N mg/L	Cl mg/L
MW-7	2/15/06	7.2	452	14	518	0.84	34
MW-7	4/25/06	7.6	1147	14	522	0.46	37
MW-7	6/28/06	7.6	478	15	520	0.42	35
MW-7	7/12/06	7.7	481	16	533	0.45	36
MW-7	9/7/06	7.8	522	15	515	0.48	34
MW-7	10/12/06	7.6	502	13	502	0.39	35
MW-8	2/23/06	6.9	1027	13	395	<0.02	39
MW-8	3/16/06	8.4	821	14	343	<0.02	45
MW-8	4/6/06	8.1	785	14	389	0.05	42
MW-8	6/29/06	7.5	455	15	375	<0.02	39
MW-8	7/20/06	8.1	927	16	379	<0.02	42
MW-8	9/14/06	8.1	995	15	427	0.17	36
MW-9	2/23/06	6.9	1040	14	395	0.31	32
MW-9	3/16/06	7.9	878	14	344	0.06	33
MW-9	4/6/06	7.8	896	14	398	0.29	34
MW-9	7/20/06	7.7	489	15	388	0.31	34
MW-9	9/14/06	7.9	965	15	374	0.48	32
MW-9	12/14/06	7.8	853	14	333	0.24	29

¹Unfiltered samples, all others were filtered through 0.45 µm membrane.

TABLE AIII-4: 2006 SULFATE, TOTAL ORGANIC CARBON,
TOTAL DISSOLVED SOLIDS, FECAL COLIFORM, WATER ELEVATION, AND
RECHARGE DATA FOR WATER QUALITY MONITORING WELLS
MW-7 THROUGH MW-9 IN THE UPPER DES PLAINES 21 TUNNEL SYSTEM

Well	Date of Sampling	SO ₄ mg/L	TOC mg/L	TDS mg/L	FC ¹ cfu/100 mL	Water Elevation ² Feet	Recharge ³ Hours
MW-7	2/15/06	310	0.6	934	<1	14	<4
MW-7	4/25/06	395	0.5	990	<1	14	<4
MW-7	6/28/06	407	0.4	454	<1	14	<4
MW-7	7/12/06	418	0.5	980	<1	14	<4
MW-7	9/7/06	409	0.6	952	<1	14	<4
MW-7	10/12/06	32	0.6	918	<1	15	<4
MW-8	2/23/06	379	0.8	782	<1	-56	<48
MW-8	3/16/06	317	0.7	728	<1	-59	<48
MW-8	4/6/06	345	0.8	764	<1	-59	<48
MW-8	6/29/06	345	0.7	744	<1	-51	<48
MW-8	7/20/06	288	0.8	732	1	-59	<48
MW-8	9/14/06	25	0.7	834	46	-54	<48
MW-9	2/23/06	400	0.8	802	<1	-5	<48
MW-9	3/16/06	315	0.7	690	<1	-4	<48
MW-9	4/6/06	352	0.8	768	<1	-3	<48
MW-9	7/20/06	360	0.9	780	5	-2	<48
MW-9	9/14/06	322	0.7	798	<1	-2	<48
MW-9	12/14/06	301	0.9	698	<1	-1	<48

¹Unfiltered samples, all others were filtered through 0.45 µm membrane.

²Water level elevations are relative to Chicago City Datum.

³Refers to elapsed time after initial drawdown before the well recovered sufficiently for sampling.