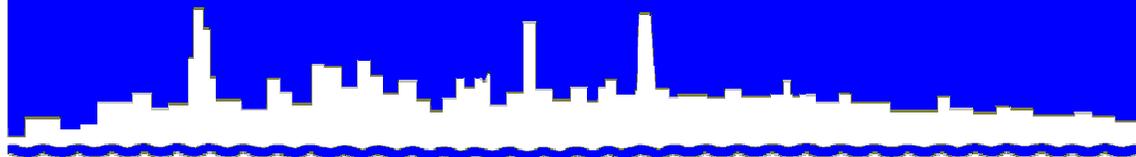


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

*MONITORING AND RESEARCH
DEPARTMENT*

REPORT NO. 15-24

TUNNEL AND RESERVOIR PLAN

GLORIA ALITTO MAJEWSKI

CHICAGOLAND UNDERFLOW PLAN RESERVOIR

WATER QUALITY MONITORING WELLS

ANNUAL GROUNDWATER MONITORING REPORT

FOR 2014

July 2015

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

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June 29, 2015

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

Dear Ms. Willhite:

Subject: Tunnel and Reservoir Plan, Gloria Alitto Majewski Chicagoland
Underflow Plan Reservoir Water Quality Monitoring Wells, Annual
Groundwater Monitoring Report for 2014

Attached are three copies of "Tunnel and Reservoir Plan, Gloria Alitto Majewski
Chicagoland Underflow Plan Reservoir Water Quality Monitoring Wells, Annual Groundwater
Monitoring Report for 2014."

Very truly yours,

Thomas C. Granato, Ph.D., BCES
Director
Monitoring and Research

TCG:PL:cm

Attachment

cc/att: Ms. Sally K. Swanson (USEPA Region 5 - WC15J) - (2)

Dr. Zhang

Dr. Cox

Dr. Hundal

Dr. Lindo

cc: Mr. St. Pierre

Ms. Sharma

Mr. Cohen

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**TUNNEL AND RESERVOIR PLAN
GLORIA ALITTO MAJEWSKI
CHICAGOLAND UNDERFLOW PLAN RESERVOIR
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ANNUAL DATA FOR MONITORING WELLS

Introduction

Four monitoring wells, QK-1 through QK-4, are located on the perimeter of the Gloria Alitto Majewski Chicagoland Underflow Plan Reservoir. Well QK-1 is positioned at the northwest corner of the reservoir, with QK-2, -3, and -4 at the northeast, southeast, and southwest corners, respectively (Figure 1). In addition, there are nine privately owned water supply wells, WX1 through WX 9, which are located within 1,000 ft of the reservoir. The four monitoring wells are sampled quarterly (Illinois Environmental Protection Agency [IEPA] memorandum dated October 14, 1997). Groundwater elevations are measured during each sampling event. There are no observation wells associated with this site.

According to IEPA requirements, sampling and analysis will also be performed on a weekly basis for at least six weeks, following a rain event in which the reservoir is used to store combined sewer overflow from the Tunnel and Reservoir Plan system. There were no major fill events at this site during 2014. Following the replacement of a faulty pump in well QK-1 on 3/29/2013, the well functioned for a short period of time but started malfunctioning due to excessive silt accumulation. Major repairs were performed on wells at this site during May through August 2014. The pumps in wells QK-1, -3, and -4 were removed to clear silt accumulation. These wells were thoroughly flushed, and pumps were re-installed.

Summary of Data

Monitoring Wells. The analytical data for groundwater sampled during 2014 from monitoring wells QK-1 through QK-4 are presented in Table 1. Physical characteristics, such as elevation, groundwater temperature, and estimated time of recharge for each well between initial drawdown and sampling, are also included.

Following major repairs and flushing, all wells were decontaminated, using the United States Environmental Protection Agency's standard operating procedure of applying 15 percent hypochlorite solution. Decontamination was performed during June 30 – August 14, 2014. All wells are now clean and functional.

Table 2 lists the overall descriptive statistics for groundwater data of monitoring wells QK-1 through -4 for the year 2014. Based on the water level elevations of these wells (Table 1), there were no significant fluctuations during the year.

TABLE 1: ANALYSIS OF GROUNDWATER FROM MONITORING WELLS QK-1 THROUGH QK-4 IN THE GLORIA ALITTO MAJEWSKI CHICAGOLAND UNDERFLOW PLAN OF THE TUNNEL AND RESERVOIR PLAN SAMPLED DURING 2014

Well ¹	Date Sampled	pH	EC ²	TDS ²	TOC ²	Cl ⁻	SO ₄ ²⁻	NH ₃ -N	Hardness	Fecal Coliform	Temp	Water Elevation ³	Recharge Time
			mS/m	----- mg/L -----					CFU/100 mL	°C	ft	hr	
QK-1	02/25/14	7.0	99	1,148	1	38	579	<0.10	665	<1	9.1	4.3	<4
QK-1	08/14/14	NAR ⁴	NAR	NAR	NAR	58	NAR	NAR	NAR	<1	12.9	7.3	<4
QK-1	08/20/14	7.6	96	1,092	1	94	308	0.55	505	<1	14.8	8.3	<4
QK-1	10/07/14	7.3	120	1,288	1	26	515	<0.10	762	<1	12.5	-0.7	<4
QK-1	12/03/14	7.4	110	1,320	<1	24	724	<0.10	744	<1	10.4	5.3	<4
QK-2	03/26/14	7.7	77	898	1	<10	528	<0.10	436	<1	9.3	-4.0	<4
QK-2	08/14/14	NAR	NAR	NAR	NAR	<10	NAR	NAR	NAR	<1	15.8	-3.0	<4
QK-2	08/20/14	8.0	94	1,018	1	24	405	<0.10	389	<1	21.4	-5.0	<4
QK-2	10/07/14	8.1	87	884	1	<10	436	<0.10	480	<1	13.5	-8.0	<4
QK-3	03/26/14	7.3	55	1,488	1	19	914	<0.10	812	<1	10.5	-9.5	<4
QK-3	06/30/14	NAR	NAR	NAR	NAR	19	NAR	NAR	NAR	<1	8.9	-8.5	<4
QK-3	07/16/14	NAR	NAR	NAR	NAR	24	NAR	NAR	NAR	50	13.7	-6.5	<4
QK-3	08/13/14	NAR	NAR	NAR	NAR	24	NAR	NAR	NAR	26	15.3	-3.5	<4
QK-3	08/20/14	7.6	59	1,360	2	23	578	0.36	584	10	17.8	-9.5	<4
QK-3	10/07/14	7.7	104	1,126	1	20	576	0.39	620	1	12.6	-15	<4
QK-3	12/03/14	7.5	56	1,188	1	18	674	0.25	633	<1	11.4	-11	<4
QK-4	03/26/14	7.4	87	960	1	52	434	0.53	534	<1	9.7	8.9	<4
QK-4	07/16/14	NAR	NAR	NAR	NAR	53	NAR	NAR	NAR	<1	14.3	11	<4

3

TABLE 1 (Continued): ANALYSIS OF GROUNDWATER FROM MONITORING WELLS QK-1 THROUGH QK-4 IN THE GLORIA ALITTO MAJEWSKI CHICAGOLAND UNDERFLOW PLAN OF THE TUNNEL AND RESERVOIR PLAN SAMPLED DURING 2014

Well ¹	Date Sampled	pH	EC ²	TDS ²	TOC ²	Cl ⁻	SO ₄ ²⁻	NH ₃ -N	Hardness	Fecal Coliform	Temp	Water Elevation ³	Recharge Time
			mS/m	----- mg/L -----					CFU/100 mL	°C	ft	hr	
QK-4	08/14/14	NAR	NAR	NAR	NAR	44	NAR	NAR	NAR	<1	12.5	14	<4
QK-4	08/20/14	7.5	96	1,090	1	67	359	0.62	492	<1	14.1	5.9	<4
QK-4	10/07/14	7.6	94	864	1	88	272	0.65	509	<1	12.4	3.9	<4
QK-4	12/03/14	7.5	89	880	1	90	331	0.61	508	<1	10.9	21	<4

¹Pump in Well QK-1 replaced in July 2014; QK-3 and -4 flushed and desilted; not required for QK-2. Original pumps replaced.

²EC = electrical conductivity; TDS = total dissolved solids; TOC = total dissolved organic carbon.

³Relative to Chicago city datum (579.48 ft above mean sea level) at intersection of Madison and State Streets.

⁴No additional analyses required; pre- and post-decontamination samples (6/30, 7/16, 8/13, and 8/14/14) tested for Cl and FC only.

TABLE 2: DESCRIPTIVE STATISTICS FOR GROUNDWATER DATA OF MONITORING WELLS QK-1 THROUGH QK-4 IN THE GLORIA ALITTO MAJEWSKI CHICAGOLAND UNDERFLOW PLAN OF THE TUNNEL AND RESERVOIR PLAN DURING 2014

Well ¹	Statistic	pH	EC ²	TDS ²	TOC ²	Cl ⁻	SO ₄ ²⁻	NH ₃ -N	Hardness	Fecal Coliform ³
			mS/m	----- mg/L -----					CFU/100 mL	
QK-1	Minimum	7.0	96	1,092	<1	24	308	<0.10	505	<1
	Mean	7.4	105	1,212	1	48	532	0.21	638	<1
	Maximum	7.6	120	1,320	1	94	724	0.55	744	<1
	Std. Dev.	0.2	9	109	0.2	29	173	0.23	122	NA ⁴
	Median	7.4	103	1,218	1	38	547	0.10	665	<1
	Coeff. of Var. (%)	3.1	9	9	17	61	33	110	19	NA
QK-2	Minimum	7.7	77	884	1	<10	405	<0.10	389	<1
	Mean	8.0	90	933	1	14	456	<0.10	413	<1
	Maximum	8.1	104	1,018	1	24	528	<0.10	436	<1
	Std. Dev.	0.2	11	74	0.0	7	64	0.00	33	NA
	Median	8.1	91	898	1	10	436	<0.10	413	<1
	Coeff. of Var. (%)	2.2	12	8	0.0	52	14	0.00	8	NA
QK-3	Minimum	7.0	55	1,126	1	18	576	<0.10	584	<1
	Mean	7.5	87	1,291	1	21	685	0.28	676	4
	Maximum	8.0	120	1,488	2	24	914	0.39	812	50
	Std. Dev.	0.3	29	165	0.6	3	159	0.13	120	NA
	Median	7.6	104	1,274	1	20	626	0.31	633	1
	Coeff. of Var. (%)	4.4	33	13	43	12	23	48	18	NA

TABLE 2 (Continued): DESCRIPTIVE STATISTICS FOR GROUNDWATER DATA OF MONITORING WELLS QK-1 THROUGH QK-4 IN THE GLORIA ALITTO MAJEWSKI CHICAGOLAND UNDERFLOW PLAN OF THE TUNNEL AND RESERVOIR PLAN DURING 2014

Well ¹	Statistic	pH	EC ²	TDS ²	TOC ²	Cl ⁻	SO ₄ ²⁻	NH ₃ -N	Hardness	Fecal Coliform ³
			mS/m	----- mg/L -----						CFU/100 mL
QK-4	Minimum	7.4	87	864	<1	44	272	0.53	492	<1
	Mean	7.5	92	949	1	66	349	0.60	511	2
	Maximum	7.6	97	1,090	1	90	434	0.65	534	37
	Std. Dev.	0.1	4	103	0.1	20	67	0.05	21	NA
	Median	7.5	92	920	1	60	345	0.62	508	1
	Coeff. of Var. (%)	1.0	5	11	5	30	19	9	4	NA

¹All wells repaired, serviced, and decontaminated during 2014.

²EC = electrical conductivity; TDS = total dissolved solids; TOC = total dissolved organic carbon.

³Geometric mean calculated.

⁴Not applicable for Fecal Coliform data.