

*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***MONITORING AND RESEARCH  
DEPARTMENT***

***REPORT NO. 24-35***

***THORNTON COMPOSITE RESERVOIR  
GROUNDWATER MONITORING REPORT  
SECOND QUARTER 2024***

***August 2024***

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Mr. Michael Brown  
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Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
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Dear Mr. Brown:

Subject: Transmittal of the Report “Thornton Composite Reservoir Groundwater Monitoring Report Second Quarter 2024”

Please find attached the report entitled “Thornton Composite Reservoir Groundwater Monitoring Report Second Quarter 2024” transmitted electronically. The report is prepared for transmittal to the Illinois Environmental Protection Agency (IEPA) in accordance with the Thornton Composite Reservoir Groundwater Monitoring Plan. Also attached is the Excel spreadsheet of the Thornton Composite Reservoir raw data as required by the IEPA.

If you have any questions or would like to have additional information, please contact Mr. Benjamin Morgan at (708) 588-3743 or [MorganB@mwr.org](mailto:MorganB@mwr.org).

Very truly yours,



Albert Cox, Ph.D.  
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AC:BM:lf  
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**THORNTON COMPOSITE RESERVOIR  
GROUNDWATER MONITORING REPORT  
SECOND QUARTER 2024**

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## LIST OF ABBREVIATIONS

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Abbreviation	Definition
Ag	silver
B	boron
Be	beryllium
Ca	calcium
CCD	Chicago City Datum
CFU	colony forming units
Class I	Illinois Administrative Code Title 35 Part 620 Class I
Co	cobalt
Cr	chromium
CSF	combined sewer flow
Cu	copper
District	Metropolitan Water Reclamation District of Greater Chicago
EC	electrical conductivity
FC	fecal coliform
ft	feet
GMP	Groundwater Monitoring Plan
GPS	Groundwater Protection System
L	liter
m	meter
mg	milligram
Mg	magnesium
mL	milliliter
Mn	manganese
mS	millisiemens
N	nitrogen
Se	selenium
TCR	Thornton Composite Reservoir
TDS	total dissolved solids
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
V	vanadium
Zn	zinc

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## **ACKNOWLEDGMENTS**

This report for the Thornton Composite Reservoir (TCR) Groundwater Monitoring was generated by the Monitoring and Research Department. All samples were collected by A3 Environmental Consultants (contractor) under TCR Contract 23-102-11. Analyses were performed by the Analytical Laboratories Division and the Analytical Microbiology Laboratory of the Metropolitan Water Reclamation District of Greater Chicago (District). Special thanks are due to Ms. Laura Franklin for typing and formatting this report.

## **DISCLAIMER**

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the District.



## INTRODUCTION

A Groundwater Protection System (GPS) was constructed for the Thornton Composite Reservoir (TCR) to protect against the exfiltration of combined sewer flow (CSF) into the surrounding dolomite aquifers. The CSF and minimal amounts of stormwater are stored in the reservoir during and after large storm events. To monitor the performance of the GPS, a network of monitoring wells located outside the perimeter of the GPS is being monitored as discussed in the Revised Groundwater Monitoring Plan (GMP) (Black & Veatch, 2016). As explained in the Revised GMP, one sample of reservoir water, one from the Main Quarry Sump, and one from each of the seven wells are collected annually and analyzed for the Illinois Administrative Code Title 35 Part 620 Class I (Class I) groundwater constituents. In addition, following a reservoir fill event or during a routine quarterly event, groundwater is sampled from the seven wells and the Main Quarry Sump and tested for a targeted list of parameters that are more likely to be detected in CSF water.

The monitoring well system consists of one deep well, TB-124, which monitors the underlying Galena Aquifer, and six vertical Westbay multi-level monitoring wells, TB-118, TB-119, TB-120, TB-121, TB-122, and TB-123, which monitor the Silurian dolomite aquifers. As discussed in the Revised GMP, following a reservoir fill event, sampling is required every two weeks while the water in the reservoir remains above an elevation of -280 feet Chicago City Datum (CCD). Groundwater is sampled from each well at the first sample interval port immediately below the reservoir water elevation. Each of the multilevel monitoring wells is capable of monitoring four distinct 20-foot intervals in the Silurian dolomite aquifer.

The locations of the monitoring wells, the quarry sump, the TCR, and the GPS are presented in [Figure 1](#). The Main Quarry Sump is located beyond the south boundary of the GPS and is not a component of the TCR but is an integral part of the Hanson Material Services mining quarry to the south of the TCR. This sump facilitates mining operations by minimizing the water level at the bottom of the quarry. It is possible that the bottom of this sump could extend beyond the lowest depth of the TCR (-297.5 feet CCD). The sump contains mainly groundwater and small quantities of surface runoff, and it is sampled quarterly and during fill events, along with the wells, to evaluate the potential migration of contaminants from the TCR to the sump.

[Table 1](#) lists the characteristics of all wells at the TCR site (well location coordinates, elevations, and depths, and the sampling port interval elevations).

Prior to the TCR becoming operational in November 2015, eight (8) sampling events were conducted on a quarterly basis for two years (May 2012 through March 2014) to provide background data on the existing groundwater quality. In order to evaluate the effectiveness of the grout curtain and the GPS, the Revised GMP (2016) presents the analysis of data for all samples collected during the background monitoring period and provides a baseline for comparison with routine monitoring data. Changes over time in groundwater calcium and magnesium concentrations would also be useful in tracking the occurrence of infiltration/exfiltration. Groundwater analytical data routinely generated for the monitoring wells, reservoir, and sump will also be compared with the Class I Groundwater Standards (Illinois Pollution Control Board, Illinois Environmental Protection Agency, 2013).

FIGURE 1: MONITORING WELL AND MAIN QUARRY SUMP LOCATIONS

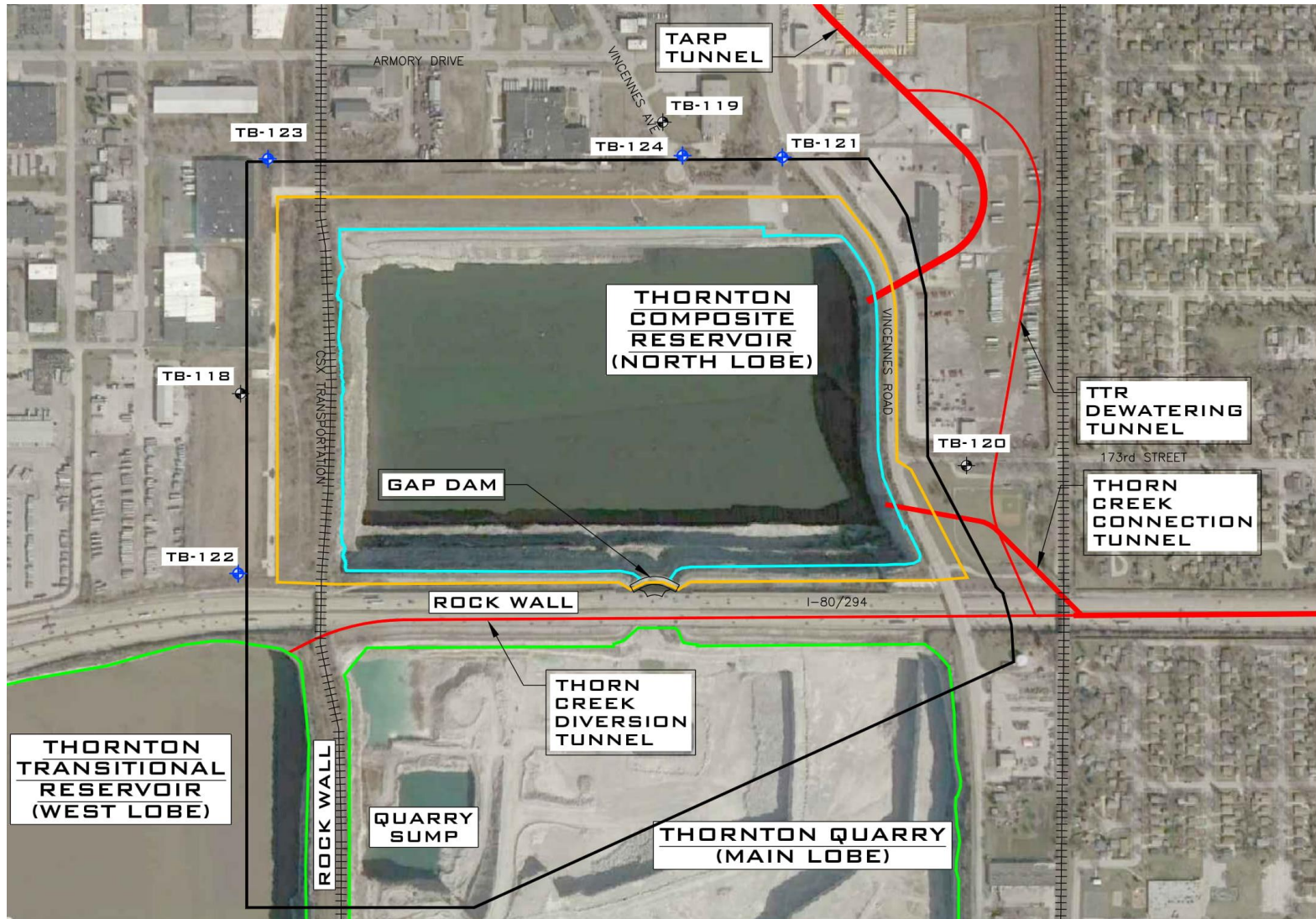


TABLE 1: CHARACTERISTICS OF MONITORING WELLS TB-118 THROUGH TB-124 AT THE THORNTON COMPOSITE RESERVOIR SITE

Well ID	Coordinates <sup>1</sup>		Ground Surface Elevation (ft, CCD <sup>2</sup> )	Top of Riser Elevation (ft, CCD)	Depth of Well (ft)	Sampling Port Interval (ft, CCD)			
	Northing (ft)	Easting (ft)				Interval 1	Interval 2	Interval 3	Interval 4
TB-118	1,791,110.38	693,560.44	38.5	41.5	532	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-119	1,792,316.63	695,509.39	27.9	29.5	529	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-120	1,790,782.31	696,888.93	40.0	42.1	540	-86 to -106	-213 to -233	-284 to -304	-393 to -413
TB-121	1,792,193.10	696,044.98	29.4	30.4	461	-84 to -104	-211 to -231	-282 to -302	-391 to -411
TB-122	1,790,288.61	693,549.38	48.8	51.7	480	-85 to -105	-212 to -232	-283 to -303	-392 to -412
TB-123	1,792,185.60	693,685.69	28.9	31.8	460	-84 to -104	-211 to -231	-282 to -302	-391 to -411
TB-124 <sup>3</sup>	1,792,200.77	695,591.56	29.6	29.2	728			-663 to -698	

<sup>1</sup>Illinois State Plane Coordinate System (NAD 1927).

<sup>2</sup>Chicago City Datum (CCD).

<sup>3</sup>TB-124 is a conventional well screened from -663 to -698 ft CCD. Samples are taken at approximately 650 ft below ground surface.

There were four fill events during the second quarter of 2024 (the fourth through seventh events of 2024). The first fill event of the quarter (Fill Event #4 of the year) began on April 1 and lasted until April 15, requiring two samplings, conducted from April 4 – 8 and April 18 – 23, respectively. The second fill event of the quarter (Fill Event #5 of the year) occurred from April 30 through May 2 and was sampled from May 10 – May 14. The third fill event of the quarter (Fill Event #6 of the year) began on June 7 and lasted through June 21, requiring two samplings. The first sampling started on June 12, was suspended on June 13 due to equipment malfunction, and was resumed and completed on June 18. Before the second biweekly sampling of the third fill event of the quarter could be conducted, the fourth event of the quarter (Fill Event #7 of the year) began on June 23 and lasted through June 24. Sampling for the fourth event of the quarter began on June 27 and was suspended on June 28 due to equipment malfunction. Wells TB-118, TB-120, TB-121, TB-122, and TB-123 were not sampled.

This report presents field activities, observations, and analytical data for surface and groundwater monitoring samples taken at the Main Quarry Sump and at all monitoring wells from April 4 – June 28, 2024.

## FIELD ACTIVITIES

For this report period, fill event samples were collected at the Main Quarry Sump, the deep well, and at sampling port interval 3 of all multilevel wells during the April 4 – 8, April 18 – 23, May 10 – 14, and June 12 – 18, 2024 samplings. For the June 27 – 28, 2024, sampling, fill event samples were collected from the Main Quarry Sump and wells TB-119 and TB-124. Sample collection dates are shown in Table 2.

Using a Hanna Instruments 991301 pH/conductivity/TDS/temperature meter, the pH, electrical conductivity (EC), and temperature of each sample were measured and recorded immediately after collection.

Prior to sampling wells, hydrostatic pressure was measured at Port 3 of each multilevel well or at 650 feet below ground surface in the deep well to calculate the groundwater elevation. Pressure measurements could not be recorded for samples collected on June 27 – 28 due to equipment malfunction. Table 3 lists the elevations at Port 3 of multilevel wells and the calculated groundwater elevations at all wells.

All samples were packed in ice and shipped to the Metropolitan Water Reclamation District of Greater Chicago's (District's) Analytical Laboratories Division for the analysis of selected inorganic constituents (Class I Groundwater Standards) in accordance with the Revised GMP. Additional aliquots were also prepared in the field and shipped in ice to the District's Analytical Microbiology Laboratory for fecal coliform (FC) analysis.

TABLE 2: DEVICES AND CORRESPONDING DATES OF SAMPLING DURING FILL  
EVENT SAMPLING IN APRIL, MAY, AND JUNE 2024

Date of Sampling	Device/Structure Sampled
-----Fill Event #4, Sampling 1 #1-----	
04/04/24	TB-119, TB-120, TB-124, TB-124 Duplicate
04/05/24	TB-121, Main Quarry Sump
04/08/24	TB-118, TB-122, TB-123
-----Fill Event #4, Sampling #2-----	
04/18/24	TB-118, TB-118 Duplicate, TB-122, TB-123
04/19/24	TB-124, Main Quarry Sump
04/23/24	TB-119, TB-120, TB-121
-----Fill Event #5-----	
05/10/24	TB-124, Main Quarry Sump
05/13/24	TB-119, TB-120, TB-120 Duplicate, TB-121
05/14/24	TB-118, TB-122, TB-123
-----Fill Event #6-----	
06/12/24	Main Quarry Sump
06/13/24	TB-119, TB-124 <sup>1</sup>
06/18/24	TB-120, TB-121, TB-124 <sup>1</sup>
06/20/24	TB-118, TB-122, TB-123, TB-123 Duplicate
-----Fill Event #7-----	
06/27/24	TB-124, Main Quarry Sump, Main Quarry Sump Duplicate
06/28/24	TB-119

<sup>1</sup>Due to equipment malfunction, insufficient amount of sample was collected on June 13, 2024, and additional sample was collected from the same well on June 18, 2024.

TABLE 3: SUMMARY OF ELEVATIONS AT SAMPLING PORT 3 OF EACH WELL AND CORRESPONDING GROUNDWATER ELEVATIONS DURING FILL EVENT SAMPLING IN APRIL, MAY, AND JUNE 2024

Sample Date	Well ID	Sampling Port Elevation	Groundwater Elevation
----- (ft CCD <sup>1</sup> ) -----			
----- Fill Event #4, Sampling #1 -----			
04/08/24	TB-118	-289	-80
04/04/24	TB-119	-289	-162
04/04/24	TB-120	-290	-207
04/05/24	TB-121	-288	-167
04/08/24	TB-122	-288	-144
04/08/24	TB-123	-288	-42
04/04/24	TB-124 <sup>2</sup>	NA <sup>3</sup>	-336
----- Fill Event #4, Sampling #2 -----			
04/18/24	TB-118	-289	-77
04/23/24	TB-119	-289	-162
04/23/24	TB-120	-290	-214
04/23/24	TB-121	-288	-167
04/18/24	TB-122	-288	-150
04/18/24	TB-123	-288	-42
04/19/24	TB-124 <sup>2</sup>	NA	-339
----- Fill Event #5 -----			
05/14/24	TB-118	-289	-77
05/13/24	TB-119	-289	-161
05/13/24	TB-120	-290	-214
05/13/24	TB-121	-288	-166
05/14/24	TB-122	-288	-149
05/14/24	TB-123	-288	-43
05/10/24	TB-124 <sup>2</sup>	NA	-345
----- Fill Event #6 -----			
06/20/24	TB-118	-289	-79
06/13/24	TB-119	-289	-190
06/18/24	TB-120	-290	-213
06/18/24	TB-121	-288	-166
06/20/24	TB-122	-288	-152
06/20/24	TB-123	-288	-45
06/18/24	TB-124 <sup>2</sup>	NA	-338

TABLE 3 (Continued): SUMMARY OF ELEVATIONS AT SAMPLING PORT 3 OF EACH WELL AND CORRESPONDING GROUNDWATER ELEVATIONS DURING FILL EVENT SAMPLING IN APRIL, MAY, AND JUNE 2024

Sample Date	Well ID	Sampling Port Elevation	Groundwater Elevation
		----- (ft CCD <sup>1</sup> ) -----	
		----- Fill Event #7 -----	
NC <sup>4</sup>	TB-118	-289	NC
06/28/24	TB-119	-289	NC
NC	TB-120	-290	NC
NC	TB-121	-288	NC
NC	TB-122	-288	NC
NC	TB-123	-288	NC
06/27/24	TB-124 <sup>2</sup>	NA	NC

<sup>1</sup>Chicago City Datum.

<sup>2</sup>TB-124 is a conventional well screened from -663 to -698 ft CCD. Samples were taken at approximately 650 ft below ground surface during the fill event samplings in April, May, and June 2024.

<sup>3</sup>Not applicable.

<sup>4</sup>Not collected due to equipment malfunction.



## ANALYTICAL RESULTS

Table 4 lists the analytical methods used by the laboratory for measured parameters. Analytical results were reviewed to identify any analytes that exceeded the Class I groundwater standards.

The analytical data for all well samples and the Main Quarry Sump sample collected from April 4 – 8 for the first sampling of the fill event in April are presented in Table 5. There were a few exceedances of the Class I groundwater standards, including total dissolved solids (TDS), chloride, sulfate, and boron, as indicated in bold font in Table 5. None of these parameters exceeded the background maxima. Fecal coliform bacteria were detected only in the Main Quarry Sump during this monitoring at 84 colony forming units (CFU)/100 mL (Table 5).

The analytical data for all well samples and the Main Quarry Sump sample collected from April 18 – 23 for the second sampling of the fill event in April are presented in Table 6. There were a few exceedances of the Class I groundwater standards, including TDS, chloride, sulfate, and boron, as indicated in bold font in Table 6. None of these parameters exceeded the background maxima. Fecal coliform bacteria were detected only in the Main Quarry Sump at 5 CFU/100 mL (Table 6).

The analytical data for all well samples and the Main Quarry Sump sample collected from May 10 – 14 for the fill event in May are presented in Table 7. There were a few exceedances of the Class I groundwater standards, including pH (below Class I minimum), TDS, chloride, sulfate, and boron, as indicated in bold font in Table 7. One pH result was below the background minimum. None of the other parameters that exceeded the Class I standards also exceeded the background maxima. Fecal coliform bacteria were detected in TB-118 (2 CFU/100 mL), TB-122 (1 CFU/100 mL), and the Main Quarry Sump at 2 CFU/100 mL (Table 7).

The analytical data for all well samples and the Main Quarry Sump sample collected from June 12 – 18 for the first fill event in June are presented in Table 8. There were a few exceedances of the Class I groundwater standards, including TDS, chloride, sulfate, and boron, as indicated in bold font in Table 8. None of these parameters exceeded the background maxima. Fecal coliform bacteria were detected in TB-119, TB-121, TB-124, and the Main Quarry Sump at 2, 4, 79, and 5 CFU/100 mL, respectively (Table 8).

The analytical data for samples from wells TB-119, TB-124, the Main Quarry Sump, and the Main Quarry Sump duplicate collected from June 27 – 28 for the second fill event in June are presented in Table 9. There were a few exceedances of the Class I groundwater standards, including TDS, chloride, and sulfate, as indicated in bold font in Table 9. None of these parameters exceeded the background maxima. Fecal coliform bacteria were detected in TB-119, TB-124, the Main Quarry Sump, and the Main Quarry Sump duplicate at 2, 27, 4, and 9 CFU/100 mL, respectively (Table 9).

TABLE 4: ANALYTICAL METHODS USED FOR REQUIRED PARAMETERS

Parameters	Analytical Method
Ammonia (as N)	USEPA 350.1
Boron and Target Analyte List metals except calcium, magnesium, and mercury	USEPA 200.8
Chloride, sulfate	USEPA 300.0
Fecal coliform	SM 9222D
Hardness (as calcium and magnesium)	SM 3120B, SM 2340B
Mercury	SM 3112B
Phenols	USEPA 420.4
Total dissolved solids	SM 2540C
Total organic carbon	SM 5310B

TABLE 5: ANALYSIS OF GROUNDWATER SAMPLED FROM MONITORING WELLS TB-118 THROUGH TB-124 AND THE MAIN QUARRY SUMP AT THE THORNTON COMPOSITE RESERVOIR SITE FOR THE FIRST SAMPLING OF THE FILL EVENT IN APRIL 2024

Parameter	Unit	Part 620 Groundwater			Well								
		Standard	Background	Lab RL <sup>1</sup>	TB-118	TB-119	TB-120	TB-121	TB-122	TB-123	TB-124	TB-124-D <sup>2</sup>	Sump
pH		6.5–9.0	6.6–8.4	NL <sup>3</sup>	7.2	7.4	7.3	7.2	7.4	7.2	7.8	7.8	8.2
EC	mS/m	NL	415	NL	175	131	136	210	205	111	300	300	196
TDS	mg/L	1,200	2,960	25	866	588	648	1,104	940	564	<b>1,580</b>	<b>1,662</b>	1,160
TOC	"	NL	1	1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride	"	200	1,230	1	<b>504</b>	95	127	<b>323</b>	<b>289</b>	67	<b>291</b>	<b>291</b>	<b>206</b>
Sulfate	"	400	890	1	200	115	76	181	102	124	<b>634</b>	<b>632</b>	<b>412</b>
Ammonia as N	"	NL	ND <sup>4</sup>	0.30	0.56	0.61	0.48	0.66	0.64	0.68	1.03	1.07	<0.30
Total Phenol	"	0.1	0.06	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fecal Coliform	CFU/100 mL	NL	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	84
Ag	mg/L	0.05	0.003	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
B	"	2	3.8	0.005	0.754	0.963	1.06	1.00	<b>2.37</b>	1.86	1.08	1.06	0.274
Be	"	0.004	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co	"	1	0.035	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.008
Cr	"	0.1	86.4	0.004	0.004	<0.004	0.006	0.005	<0.004	<0.004	<0.004	<0.004	<0.004
Cu	"	0.65	0.004	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mn	"	0.15	0.183	0.002	0.005	0.006	0.004	0.003	0.003	0.002	0.004	0.004	0.004
Se	"	0.05	0.008	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
V	"	0.049	ND	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	"	5	10	0.010	0.048	0.014	<0.010	0.022	0.035	<0.010	0.477	0.681	<0.010
Ca	"	NL	276	0.5	181	92.6	89.2	137	80.2	82.3	91.0	93.9	124
Mg	"	NL	153	0.5	89.1	47.4	44.7	71.8	42.0	44.2	62.3	63.6	96.6

<sup>1</sup>Laboratory reporting limit.

<sup>2</sup>Duplicate sample.

<sup>3</sup>No existing limit.

<sup>4</sup>Not determined.

TABLE 6: ANALYSIS OF GROUNDWATER SAMPLED FROM MONITORING WELLS TB-118 THROUGH TB-124 AND THE MAIN QUARRY SUMP AT THE THORNTON COMPOSITE RESERVOIR SITE FOR THE SECOND SAMPLING OF THE FILL EVENT IN APRIL 2024

Parameter	Unit	Part 620 Groundwater			Well								
		Standard	Background	Lab RL <sup>1</sup>	TB-118	TB-118-D <sup>2</sup>	TB-119	TB-120	TB-121	TB-122	TB-123	TB-124	Sump
pH		6.5–9.0	6.6–8.4	NL <sup>3</sup>	7.1	7.1	7.2	7.2	7.3	7.0	7.3	8.0	7.8
EC	mS/m	NL	415	NL	233	233	115	152	212	225	102	253	186
TDS	mg/L	1,200	2,960	25	<b>1,542</b>	<b>1,604</b>	550	602	866	1,008	608	<b>1,608</b>	1,164
TOC	"	NL	1	1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride	"	200	1,230	1	<b>630</b>	<b>579</b>	96	128	<b>326</b>	<b>297</b>	67	<b>290</b>	<b>212</b>
Sulfate	"	400	890	1	234	214	120	79	182	104	124	<b>646</b>	<b>430</b>
Ammonia as N	"	NL	ND <sup>4</sup>	0.30	0.63	0.51	0.52	0.37	0.64	0.63	0.73	1.07	<0.30
Total Phenol	"	0.1	0.06	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fecal Coliform	CFU/100 mL	NL	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	5
Ag	mg/L	0.05	0.003	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
B	"	2	3.8	0.005	0.679	0.667	0.981	1.04	1.04	<b>2.40</b>	1.77	1.05	0.287
Be	"	0.004	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co	"	1	0.035	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006
Cr	"	0.1	86.4	0.004	<0.004	0.004	<0.004	<0.004	<0.004	<0.004	0.010	<0.004	<0.004
Cu	"	0.65	0.004	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mn	"	0.15	0.183	0.002	0.005	0.006	0.005	0.004	0.003	0.003	0.003	<0.002	0.002
Se	"	0.05	0.008	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
V	"	0.049	ND	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	"	5	10	0.010	<0.010	0.024	0.013	0.019	0.018	<0.010	<0.010	0.592	<0.010
Ca	"	NL	276	0.5	185	193	97.9	90.7	142	79.1	79.6	84.0	125
Mg	"	NL	153	0.5	91.3	92.6	49.8	45.6	73.8	40.3	42.2	64.0	96.8

<sup>1</sup>Laboratory reporting limit.

<sup>2</sup>Duplicate sample.

<sup>3</sup>No existing limit.

<sup>4</sup>Not determined.

TABLE 7: ANALYSIS OF GROUNDWATER SAMPLED FROM MONITORING WELLS TB-118 THROUGH TB-124 AND THE MAIN QUARRY SUMP AT THE THORNTON COMPOSITE RESERVOIR SITE FOR THE FILL EVENT MONITORING IN MAY 2024

Parameter	Unit	Part 620 Groundwater			Well								
		Standard	Background	Lab RL <sup>1</sup>	TB-118	TB-119	TB-120	TB-120-D <sup>2</sup>	TB-121	TB-122	TB-123	TB-124	Sump
pH		6.5–9.0	6.6–8.4	NL <sup>3</sup>	7.1	7.4	7.3	7.3	7.2	7.4	7.4	5.7	7.9
EC	mS/m	NL	415	NL	281	113	119	119	196	190	109	112	164
TDS	mg/L	1,200	2,960	25	<b>1,504</b>	624	652	662	1,102	978	572	<b>1,672</b>	1,164
TOC	"	NL	1	1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride	"	200	1,230	1	<b>544</b>	99	131	129	<b>320</b>	<b>299</b>	67	<b>292</b>	<b>210</b>
Sulfate	"	400	890	1	206	125	79	78	178	105	126	<b>645</b>	<b>436</b>
Ammonia as N	"	NL	ND <sup>4</sup>	0.30	0.49	0.46	0.32	0.37	0.70	0.56	0.63	0.97	<0.30
Total Phenol	"	0.1	0.06	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fecal Coliform	CFU/100 mL	NL	<1	1	2	<1	<1	<1	<1	1	<1	<1	2
Ag	mg/L	0.05	0.003	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
B	"	2	3.8	0.005	0.724	0.969	1.05	1.10	1.07	<b>2.28</b>	1.88	0.672	0.292
Be	"	0.004	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co	"	1	0.035	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006
Cr	"	0.1	86.4	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.008	<0.004
Cu	"	0.65	0.004	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mn	"	0.15	0.183	0.002	0.005	0.005	0.003	0.003	0.003	0.003	0.002	0.002	<0.002
Se	"	0.05	0.008	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
V	"	0.049	ND	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	"	5	10	0.010	0.010	0.041	0.012	0.012	0.014	0.023	0.013	0.570	<0.010
Ca	"	NL	276	0.5	186	91.3	85.5	86.1	135	79.5	80.4	56.0	118
Mg	"	NL	153	0.5	91.5	48.0	43.5	44.7	71.3	41.5	43.5	1.5	95.1

<sup>1</sup>Laboratory reporting limit.

<sup>2</sup>Duplicate sample.

<sup>3</sup>No existing limit.

<sup>4</sup>Not determined.

TABLE 8: ANALYSIS OF GROUNDWATER SAMPLED FROM MONITORING WELLS TB-118 THROUGH TB-124 AND THE MAIN QUARRY SUMP AT THE THORNTON COMPOSITE RESERVOIR SITE FOR THE SAMPLING OF THE FIRST FILL EVENT IN JUNE 2024

Parameter	Unit	Part 620 Groundwater			Well								
		Standard	Background	Lab RL <sup>1</sup>	TB-118	TB-119	TB-120	TB-121	TB-122	TB-123	TB-123-D <sup>2</sup>	TB-124	Sump
pH		6.5–9.0	6.6–8.4	NL <sup>3</sup>	7.1	7.3	7.5	7.0	7.4	7.4	7.4	7.5	8.0
EC	mS/m	NL	415	NL	269	67	133	200	177	109	109	1,062	231
TDS	mg/L	1,200	2,960	25	<b>1,554</b>	486	688	1,154	936	616	596	<b>1,510</b>	<b>1,232</b>
TOC	"	NL	1	1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride	"	200	1,230	1	<b>547</b>	90	126	<b>326</b>	<b>298</b>	67	67	<b>290</b>	<b>206</b>
Sulfate	"	400	890	1	211	110	79	190	108	128	129	<b>660</b>	<b>431</b>
Ammonia as N	"	NL	ND <sup>4</sup>	0.30	0.57	1.69	0.44	0.64	0.65	0.71	0.68	1.03	<0.30
Total Phenol	"	0.1	0.06	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fecal Coliform	CFU/100 mL	NL	<1	1	<1	2	<1	4	<1	<1	<1	79	5
Ag	mg/L	0.05	0.003	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
B	"	2	3.8	0.005	0.734	0.916	1.08	1.05	<b>2.55</b>	1.79	1.76	1.09	0.324
Be	"	0.004	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co	"	1	0.035	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.007
Cr	"	0.1	86.4	0.004	<0.004	0.006	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cu	"	0.65	0.004	0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mn	"	0.15	0.183	0.002	0.004	0.010	0.004	0.003	0.003	0.002	0.002	<0.002	0.002
Se	"	0.05	0.008	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
V	"	0.049	ND	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	"	5	10	0.010	<0.010	0.082	0.029	0.034	0.043	<0.010	<0.010	0.399	0.020
Ca	"	NL	276	0.5	183	92.8	88.6	139	78.4	79.3	78.8	72.4	117
Mg	"	NL	153	0.5	88.8	47.9	45.5	71.9	41.6	42.8	41.9	68.1	97.6

<sup>1</sup>Laboratory reporting limit.

<sup>2</sup>Duplicate sample.

<sup>3</sup>No existing limit.

<sup>4</sup>Not determined.

TABLE 9: ANALYSIS OF GROUNDWATER SAMPLED FROM MONITORING WELLS TB-118 THROUGH TB-124 AND THE MAIN QUARRY SUMP AT THE THORNTON COMPOSITE RESERVOIR SITE FOR THE SECOND FILL EVENT IN JUNE 2024

Parameter	Unit	Part 620 Groundwater			Wells								
		Standard	Background	Lab RL <sup>1</sup>	TB-118	TB-119	TB-120	TB-121	TB-122	TB-123	TB-124	Sump	Sump-D <sup>2</sup>
pH		6.5–9.0	6.6–8.4	NL <sup>3</sup>	NS <sup>4</sup>	7.1	NS	NS	NS	NS	7.8	8.0	8.0
EC	mS/m	NL	415	NL	NS	127	NS	NS	NS	NS	223	192	192
TDS	mg/L	1,200	2,960	25	NS	642	NS	NS	NS	NS	<b>1,552</b>	<b>1,270</b>	1,190
TOC	"	NL	1	1	NS	<5.0	NS	NS	NS	NS	<5.0	<5.0	<5.0
Chloride	"	200	1,230	1	NS	97	NS	NS	NS	NS	<b>285</b>	<b>210</b>	<b>211</b>
Sulfate	"	400	890	1	NS	124	NS	NS	NS	NS	<b>649</b>	<b>446</b>	<b>445</b>
Ammonia as N	"	NL	ND <sup>5</sup>	0.30	NS	0.59	NS	NS	NS	NS	1.12	<0.30	<0.30
Total Phenol	"	0.1	0.06	0.005	NS	<0.005	NS	NS	NS	NS	<0.005	<0.005	<0.005
Fecal Coliform	CFU/100 mL	NL	<1	1	NS	2	NS	NS	NS	NS	27	4	9
Ag	mg/L	0.05	0.003	0.004	NS	<0.004	NS	NS	NS	NS	<0.004	<0.004	<0.004
B	"	2	3.8	0.005	NS	0.968	NS	NS	NS	NS	1.10	0.340	0.330
Be	"	0.004	0.002	0.002	NS	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002
Co	"	1	0.035	0.002	NS	<0.002	NS	NS	NS	NS	<0.002	0.007	0.007
Cr	"	0.1	86.4	0.004	NS	<0.004	NS	NS	NS	NS	<0.004	<0.004	<0.004
Cu	"	0.65	0.004	0.002	NS	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002
Mn	"	0.15	0.183	0.002	NS	0.006	NS	NS	NS	NS	<0.002	0.006	0.006
Se	"	0.05	0.008	0.004	NS	<0.004	NS	NS	NS	NS	<0.004	<0.004	<0.004
V	"	0.049	ND	0.002	NS	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002
Zn	"	5	10	0.010	NS	0.025	NS	NS	NS	NS	0.475	<0.010	<0.010
Ca	"	NL	276	0.5	NS	95.3	NS	NS	NS	NS	72.9	126	121
Mg	"	NL	153	0.5	NS	49.4	NS	NS	NS	NS	70.1	102	98.6

<sup>1</sup>Laboratory reporting limit.

<sup>2</sup>Duplicate sample.

<sup>3</sup>No existing limit.

<sup>4</sup>No samples were collected due to equipment malfunction.

<sup>5</sup>Not determined.

## REFERENCES

- Black & Veatch, 2014, “Background Groundwater Quality Report for Thornton Composite Reservoir,” prepared for the Metropolitan Water Reclamation District of Greater Chicago, July 2014.
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- Illinois Environmental Protection Agency, 2012, 35 Illinois Administrative Code Part 620 Class I Groundwater Standards, 2012.
- Illinois Pollution Control Board, 2013, Illinois Administrative Code Title 35: Environmental Protection, Subtitle F: Potable Water Supplies, Chapter I: Pollution Control Board, Part 620 – Groundwater Quality, October 7, 2013.