

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 26-25

***TUNNEL AND RESERVOIR PLAN
MAINSTREAM TUNNEL SYSTEM ANNUAL GROUNDWATER
MONITORING REPORT FOR 2025***

July 2026



Metropolitan Water Reclamation District of Greater Chicago

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

Dear Ms. Logan-Pugh:

Subject: Tunnel and Reservoir Plan Mainstream Tunnel System Annual Groundwater
Monitoring Report for 2025

The report entitled "Tunnel and Reservoir Plan Mainstream Tunnel System Annual
Groundwater Monitoring Report for 2025" is attached.

Very truly yours,

Albert Cox, Ph.D.
Environmental Monitoring and Research Manager
Monitoring and Research Department

AC:lf
Attachment
cc: Mr. Ryan Bahr (USEPA Region 5 - WC15J)
Ms. A. Zimmer (IEPA)
Mr. E. Podczewinski
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cc w/o att: Mr. E. Staudacher
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**TUNNEL AND RESERVOIR PLAN
MAINSTREAM TUNNEL SYSTEM
ANNUAL GROUNDWATER MONITORING REPORT
FOR 2025**

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LIST OF ABBREVIATIONS

Abbreviation	Definition
°C	degrees Celsius
CCD	Chicago City Datum
CFU	colony forming units
Cl ⁻	chloride
District	Metropolitan Water Reclamation District of Greater Chicago
EC	electrical conductivity
FC	fecal coliform
IEPA	Illinois Environmental Protection Agency
m	meter
mg	milligram
mL	milliliter
mS	millisiemens
NH ₃ -N	ammonia nitrogen
SO ₄ ²⁻	sulfate
TARP	Tunnel and Reservoir Plan
TDS	total dissolved solids
Temp.	temperature
TOC	total organic carbon

ANNUAL DATA FOR MONITORING AND OBSERVATION WELLS

Introduction

The Mainstream Tunnel System is located beneath the North Branch of the Chicago River, the North Shore Channel of the Chicago River, the Chicago River, and the Chicago Sanitary and Ship Canal. The groundwater monitoring and observation wells are located along the length of the Mainstream Tunnel System between Morton Grove and Hodgkins, Illinois (Figures 1 and 2). The monitoring wells are sampled based on the modified groundwater monitoring program for the Metropolitan Water Reclamation District of Greater Chicago's (District's) Tunnel and Reservoir Plan (TARP) as briefly described below. In addition, groundwater elevations of the observation wells are measured monthly.

Modified Groundwater Monitoring Program

In a letter dated May 14, 2021, the Illinois Environmental Protection Agency (IEPA) approved a modified TARP groundwater monitoring program for the District's Calumet, Mainstream, Des Plaines, and Upper Des Plaines tunnel systems effective January 2021. The modification of the TARP groundwater monitoring program was based on the key findings of a three-year fill event-based groundwater monitoring study conducted by the District from 2017 to 2019 which were submitted to the IEPA in a report dated July 30, 2020.

Under the modified monitoring program, nine fill event-based monitoring wells in the Mainstream Tunnel System (QM-61, QM-62, QM-63, QM-64, QM-65, QM-67, QM-68, QM-75, and QM-77) are sampled for two tunnel fill events per year, usually following storm events. Fecal coliforms (FC) in these wells were detected in 10 percent or more of samples collected during the period 1995–2013. The criterion that triggers event sampling is that the level of water in the TARP Mainstream tunnels reaches -150 feet relative to the Chicago City Datum (CCD) at the intersection of State and Madison Streets (579.48 feet above mean sea level). Sampling is conducted during the second week following each fill event. For the first fill event, samples are analyzed for all parameters including pH, temperature (Temp.), electrical conductivity (EC), total dissolved solids (TDS), hardness, ammonia nitrogen (NH₃-N), total organic carbon (TOC), chloride (Cl⁻), sulfate (SO₄²⁻), and FC. For the second fill event, samples are analyzed for FC only. If no fill event occurs by April 30 or October 31, a sampling event is conducted as a substitute for the fill event sampling representing the periods January – June and July – December, respectively.

The other 12 monitoring wells associated with the Mainstream Tunnel System, referred to as annual monitoring wells, are sampled once per year. These wells had FC detected in less than 10 percent of samples during 1995–2013.

In 1994, the termination of monitoring wells QM-51, QM-52, QM-54, QM-55, QM-57, and QM-60 was approved by the IEPA (memorandum dated May 4, 1994). Monitoring well QM-59 has been dry since February 1995 and is no longer monitored. Monitoring wells QM-56 and QM-58 were officially abandoned in the modified program. Monitoring well QM-53 was officially abandoned on November 12, 2024, with the approval of the IEPA. Monitoring of observation well OM-17 was also discontinued with the approval of the IEPA (letter dated December 16, 2011).

FIGURE 1: MAP OF THE MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM

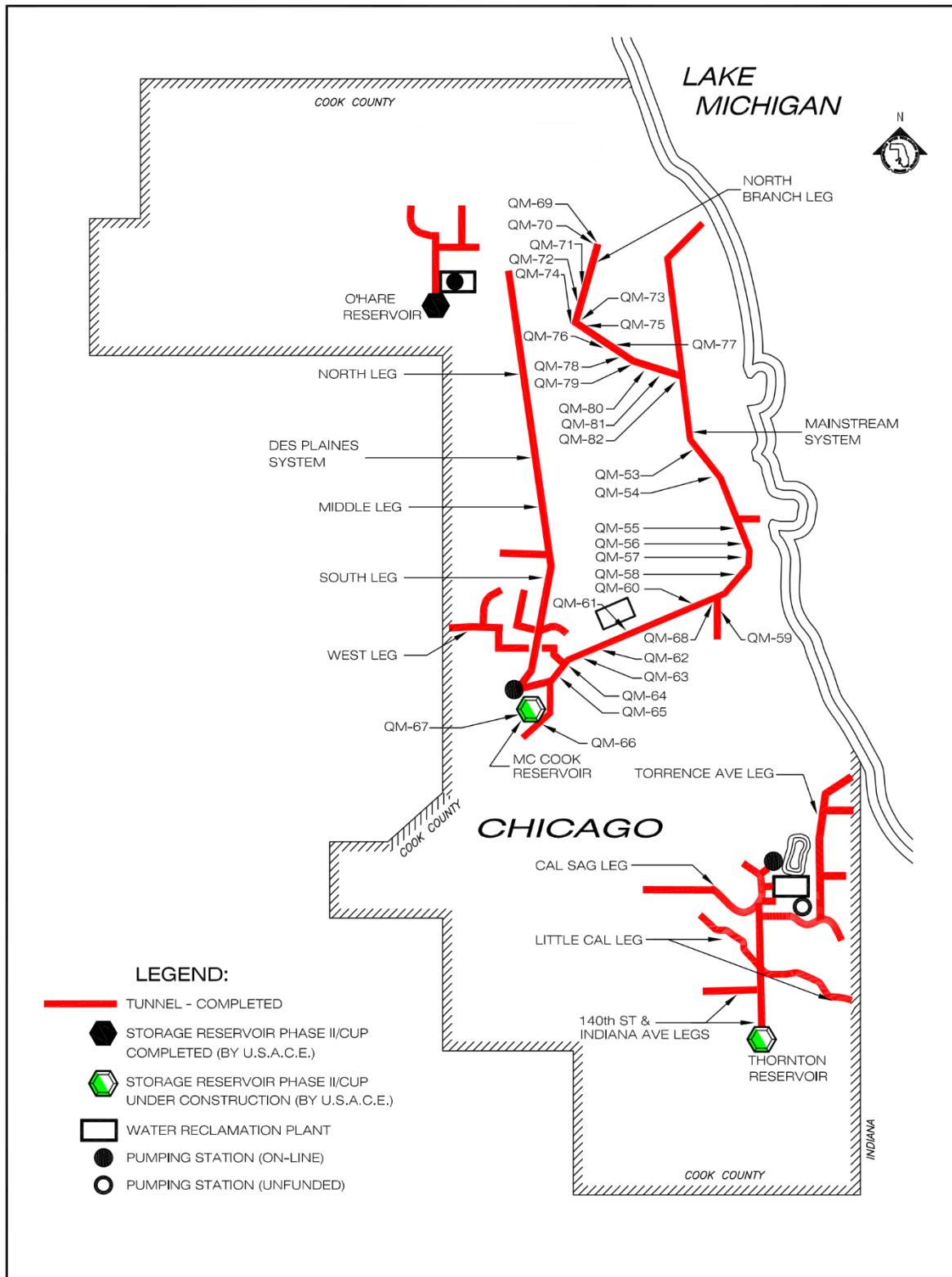
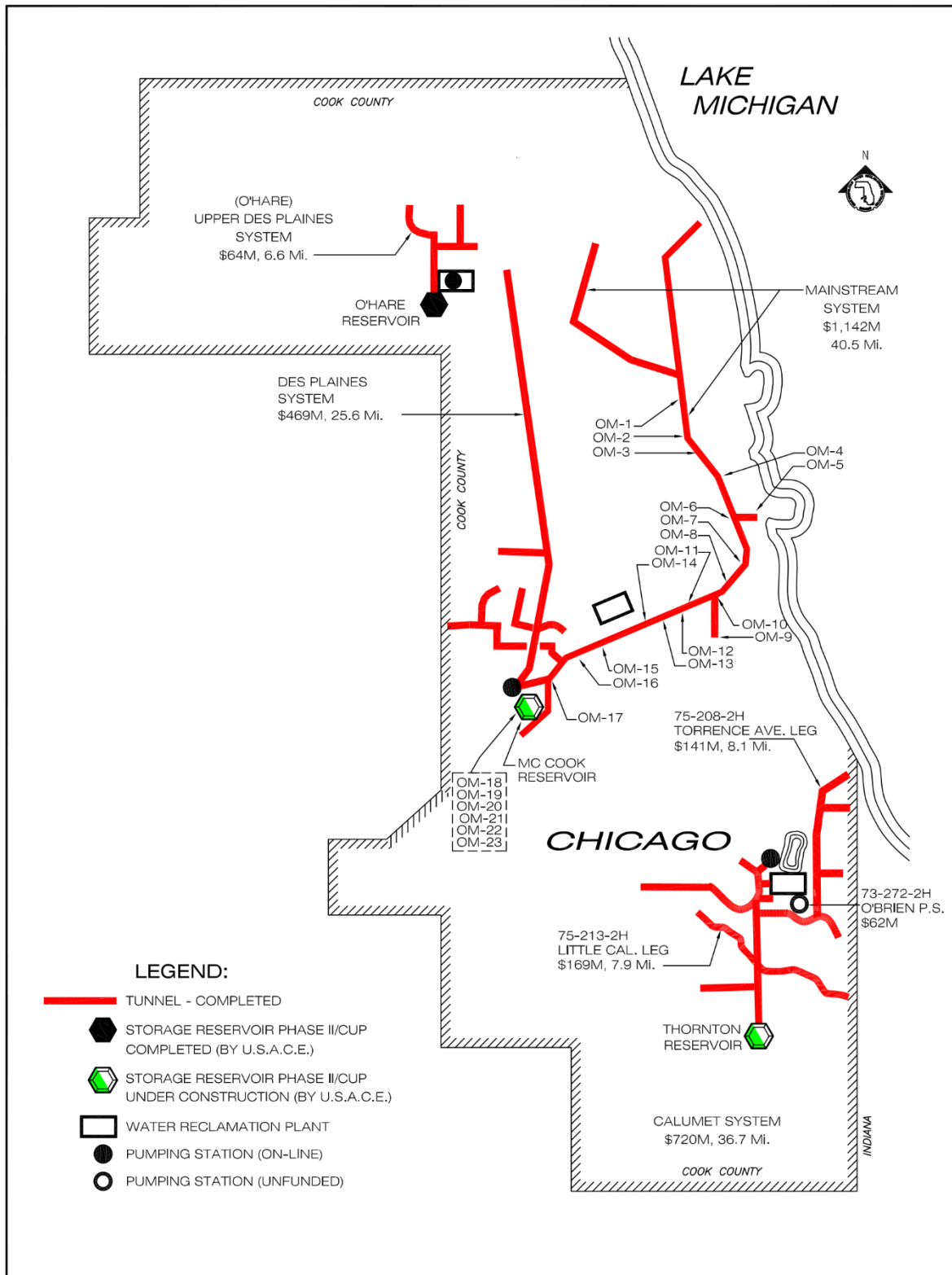


FIGURE 2: MAP OF THE OBSERVATION WELLS IN THE MAINSTREAM TUNNEL SYSTEM



Summary of Monitoring Well Data

Monitoring Wells. During the first half of 2025, there were no Mainstream tunnel fill events. To substitute for the fill event sampling, the fill event-based monitoring wells were sampled during the period from May 15 to June 5, 2025. In the second half of the year, two tunnel fill events occurred on July 12, 2025, and August 13, 2025. Sampling of Mainstream fill event-based monitoring wells was conducted from July 17 to July 23, 2025. Because the May/June and July sampling events occurred close together, an additional sampling for the fill event-based monitoring wells was conducted from November 5 to 25, 2025, for FC testing. Due to a well pump malfunction at monitoring well QM-68, only one sampling was completed for the well on December 9, 2025, after it was repaired.

The groundwater analytical data and physical parameters for fill event-based monitoring wells are presented in Table 1. Fecal coliform was not detected (<1 colony forming units [CFU]/100 mL) in any monitoring wells except wells QM-64 and QM-67 during the first sampling. During the second sampling in July 2025, FC was detected in wells QM-64, QM-65, QM-67, and QM-77. During the third sampling, FC was detected only in wells QM-61, QM-62, and QM-67.

The analytical data for groundwater from the 12 Mainstream wells sampled once per year are presented in Table 2. Fecal coliforms were undetectable (<1 CFU/100 mL) in all annual monitoring wells.

Observation Wells. Groundwater elevations were measured for observation wells OM-1 through OM-23 once per month. Groundwater elevations were calculated relative to the CCD and are presented in Table 3. The minimum, mean, and maximum groundwater elevations for each well during the year are presented in Figure 3.

TABLE 1: ANALYSIS OF CHEMICAL AND PHYSICAL PARAMETERS AND FECAL COLIFORM IN GROUNDWATER SAMPLED FROM FILL EVENT MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN DURING 2025¹

Well	Sample Date	pH	EC mS/m	TDS	TOC	Cl ⁻	SO ₄ ²⁻ mg/L	NH ₃ -N	Hardness	Temp. °C	Water Elevation ² feet	Fecal Coliform CFU/100 mL	Recharge Time hours
QM-61	06/04/25	7.8	42	366	15	54	9	0.4	144	14.1	-148	<1	<4
	07/22/25	7.9	50	352	<5.0	60	13	0.3	126	19.2	-140	<1	<4
	11/05/25	7.9	46	—	—	—	—	—	—	14.0	-146	1	<4
QM-62	05/15/25	7.9	46	328	<5.0	40	10	0.8	127	14.9	-155	<1	<48
	07/24/25	7.7	46	290	<5.0	40	16	0.8	205	15.4	-149	<1	<48
	11/06/25	7.8	47	—	—	—	—	—	—	14.2	-155	2	<48
QM-63	05/15/25	7.7	152	1,438	<5.0	44	736	1.9	701	14.8	-177	<1	<48
	07/24/25	7.6	142	1,316	<5.0	44	702	1.6	713	14.7	-158	<1	<48
	11/06/25	7.7	144	—	—	—	—	—	—	14.1	-167	<1	<48
QM-64	06/04/25	7.6	54	426	—	53	31	1.2	205	14.4	-122	3	<4
	07/22/25	7.6	64	400	<5.0	59	32	1.1	242	14.7	-115	4	<4
	11/05/25	7.5	62	—	—	—	—	—	—	13.8	-122	<1	<4
QM-65	05/15/25	7.4	87	660	<5.0	75	114	3.0	285	14.5	-165	<1	<48
	07/24/25	7.3	88	580	<5.0	75	112	2.9	309	14.6	-151	2	<48
	11/06/25	7.4	96	—	—	—	—	—	—	13.8	-161	<1	<48
QM-67	05/15/25	7.4	106	638	<5.0	145	4	16.2	235	15.3	-174	59	<48
	07/24/25	7.2	104	672	5	154	4	16.1	221	14.8	-157	2,100	<48
	11/06/25	7.4	102	—	—	—	—	—	—	14.3	-160	190	<48

TABLE 1 (Continued): ANALYSIS OF CHEMICAL AND PHYSICAL PARAMETERS AND FECAL COLIFORM IN GROUNDWATER SAMPLED FROM FILL EVENT MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN DURING 2025¹

Well	Sample Date	pH	EC mS/m	TDS	TOC	Cl ⁻	SO ₄ ²⁻ mg/L	NH ₃ -N	Hardness	Temp. °C	Water Elevation ² feet	Fecal Coliform CFU/100 mL	Recharge Time hours
QM-68	05/15/25	NA ³	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<48
	07/24/25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<48
	12/09/25	7.4	62	438	<5.0	94	45	0.54	413	13.1	-109	<1	<48
QM-75	06/05/25	8.2	27	246	<5.0	13	10	<0.30	62	12.7	-67	<1	<48
	07/25/25	8.1	30	226	<5.0	13	10	<0.30	45	13.5	-68	<1	<48
	11/25/25	7.9	28	—	—	—	—	—	—	11.9	-66	<1	<48
QM-77	06/05/25	8.3	178	160	<5.0	10	2	<0.30	43	12.5	-174	<1	<48
	07/25/25	8.2	20	176	<5.0	10	2	<0.30	41	13.4	-174	3	<48
	11/25/25	8.0	19	—	—	—	—	—	—	12.0	-176	<1	<48

¹Chemistry parameters were analyzed for the first two sampling events.

²Relative to the Chicago City Datum at the intersection of State and Madison Streets (579.48 feet above mean sea level).

³Well QM-68 was not functioning during these sampling dates.

TABLE 2: ANALYSIS OF CHEMICAL AND PHYSICAL PARAMETERS AND FECAL COLIFORM IN GROUNDWATER SAMPLED FROM ANNUAL MONITORING WELLS IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN DURING 2025

Well	Sample Date	pH	EC mS/m	TDS	TOC	Cl ⁻	SO ₄ ²⁻ mg/L	NH ₃ -N	Hardness	Temp. °C	Water Elevation ¹ feet	Fecal Coliform CFU/100 mL
QM-69	03/26/25	7.8	37	284	<5.0	37	33	0.8	135	11.0	-19	<1
QM-70	03/26/25	7.9	43	308	<5.0	48	53	0.3	154	11.9	-75	<1
QM-71	03/26/25	8.1	60	416	<5.0	129	63	0.4	177	11.8	-63	<1
QM-72	04/17/25	8.1	51	344	<5.0	123	2	0.3	195	12.2	-70	<1
QM-73	04/17/25	7.9	41	246	<5.0	38	3	<0.30	151	12.4	-163	<1
QM-74	04/17/25	8.2	37	258	<5.0	62	1	<0.30	106	12.2	6	<1
QM-76	08/07/25	8.2	38	298	<5.0	13	60	<0.30	51	14.9	-187	<1
QM-78	08/07/25	8.8	37	300	<5.0	11	44	<0.30	11	12.8	-171	<1
QM-79	12/03/25	8.8	34	248	<5.0	13	23	<0.30	16	11.8	-134	<1
QM-80	12/03/25	8.6	24	174	<5.0	14	2	<0.30	26	12.3	-144	<1
QM-81	10/09/25	8.1	32	294	<5.0	23	9	<0.30	30	13.5	-146	<1
QM-82	10/09/25	8.5	40	286	<5.0	31	9	<0.30	18	13.5	-181	<1

¹Relative to the Chicago City Datum at the intersection of State and Madison Streets (579.48 feet above mean sea level).

TABLE 3: GROUNDWATER ELEVATIONS FOR OBSERVATION WELLS OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN MEASURED DURING 2025

Date	Observation Well No.										
	OM-1	OM-2	OM-3	OM-4	OM-5	OM-6	OM-7	OM-8	OM-9	OM-10	OM-11
	Elevation (feet) ¹										
01/09/25	-36.0	-30.0	-32.7	-67.8	-53.6	-34.4	-49.7	-39.0	-28.2	-20.7	-43.4
02/20/25	-36.6	-36.7	-32.9	-68.1	-53.9	-34.5	NA ²	-39.0	-29.4	-20.2	-43.7
03/19/24	-35.5	-29.4	-32.1	-66.9	-52.9	-33.8	-52.3	-38.0	-28.7	-20.3	-42.4
04/14/25	-35.7	-29.3	-32.1	-66.9	-53.0	-34.4	-52.3	-38.0	-28.6	-20.3	-42.3
05/14/25	-35.4	-39.0	-32.1	-67.0	-49.7	-34.1	-49.2	-38.1	-28.3	-20.4	-42.6
06/23/24	-34.8	-29.1	-32.0	-65.4	-53.2	-34.0	-49.4	-38.2	-28.1	-19.8	-42.7
07/09/25	-35.0	-29.2	-32.2	-66.9	-53.0	-34.1	-49.3	-37.4	-28.1	-20.6	-34.5
08/13/25	-33.6	-29.0	-31.0	-63.3	-52.7	-32.9	-49.0	-37.8	-25.7	-22.1	-39.8
09/11/25	-45.6	-29.3	-32.1	-66.4	-52.5	-34.0	-49.0	-38.0	-27.5	-20.6	-43.8
10/14/25	-36.4	-29.7	-32.7	-67.3	-52.6	-34.6	-49.4	-38.3	-28.2	-21.1	-44.3
11/13/25	-36.0	-29.6	-32.5	-67.3	-52.5	-34.7	-49.3	-38.0	-28.0	-21.0	-44.2
12/15/25	-35.2	-29.6	-32.3	-66.2	-52.4	-34.4	-49.2	-37.9	-28.2	-21.0	-46.6

TABLE 3 (Continued): GROUNDWATER ELEVATIONS FOR OBSERVATION WELLS OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN MEASURED DURING 2025

Date	Observation Well No.										
	OM-12	OM-13	OM-14	OM-15	OM-16	OM-18	OM-19	OM-20	OM-21	OM-22	OM-23
	Elevation (feet) ¹										
01/10/25	-7.4	41.4	-57.7	-145.1	-83.3	-211.0	-84.0	-85.0	-73.3	-71.8	-195.7
02/19/25	-7.9	41.5	-58.5	-146.9	-84.5	-219.7	-88.4	-90.9	-72.6	-74.0	-189.5
03/18/24	-7.7	41.3	-56.7	-145.0	-116.0	-212.2	-84.4	-89.2	-75.3	-72.9	-193.0
04/16/25	-7.9	41.4	-57.2	-144.2	-82.9	-174.5	-82.4	-83.1	-69.5	-70.3	-189.8
05/15/25	-7.3	41.3	-56.8	-144.1	-82.6	-190.1	-82.7	-89.9	-70.6	-60.7	-181.8
06/24/24	-7.6	41.3	-52.6	-137.6	-81.7	-176.8	-83.7	-65.4	-81.3	-161.9	-61.3
07/11/25	-7.5	41.4	-47.0	-124.3	-80.1	-198.7	-83.3	-85.7	-62.3	-62.7	-129.7
08/14/25	-7.1	41.3	-49.1	-119.5	-76.9	-175.6	-81.3	-81.7	-18.1	-60.7	-143.7
09/09/25	-7.4	41.4	-56.9	-135.9	-79.3	-184.0	-80.8	-83.4	-62.6	-190.3	-57.8
10/15/25	-7.6	41.3	-56.9	-141.9	-82.1	-145.3	-84.1	-88.5	-66.6	-62.7	-194.8
11/12/25	-7.4	41.4	-56.9	-143.4	-81.3	-149.0	-83.8	-90.9	-26.1	-67.0	-195.1
12/16/25	-7.3	41.3	-56.4	-144.6	-75.4	-177.8	-84.8	-91.4	-71.6	-69.4	-194.2

¹Relative to the Chicago City Datum at the intersection of State and Madison Streets (579.48 feet above mean sea level).

²Data was not reported due to measurement error.

FIGURE 3: MINIMUM, MEAN, AND MAXIMUM WATER ELEVATION FOR OBSERVATION WELLS OM-1 THROUGH OM-23 IN THE MAINSTREAM TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN MEASURED DURING 2025

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