

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 26-22

***TUNNEL AND RESERVOIR PLAN
CALUMET 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
2520 W. Iles Ave.
P. O. Box 19276
Springfield, IL 62794-9276

Dear Ms. Logan-Pugh:

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

The report entitled "Tunnel and Reservoir Plan Calumet 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
CALUMET 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
CTS	Calumet Tunnel System
District	Metropolitan Water Reclamation District of Greater Chicago
EC	electrical conductivity
FC	fecal coliform
IEPA	Illinois Environmental Protection Agency
L	liter
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 Calumet Tunnel System (CTS) is located beneath the Calumet River, Little Calumet River, Grand Calumet River, and the Calumet Sag Channel. All groundwater monitoring and observation wells are located along the length of the CTS. Four monitoring wells (QC-1, QC-2, QC-2-1, and QC-2-2) and 11 observation wells (OC-1 through OC-11) are located along the tunnel between Crawford Avenue and the Calumet Water Reclamation Plant. Seventeen monitoring wells (QC-3 through QC-19) are located between 140th Street and Indiana Avenue, nine monitoring wells (QC-20 through QC-28) along Torrence Avenue, and nine monitoring wells (QC-29 through QC-37) along the Little Calumet River (Figures 1 and 2). The tunnel system shown west of well QC-1 (Figure 1) is an interceptor sewer that drains to the Tunnel and Reservoir Plan (TARP) system.

The monitoring wells are sampled based on the modified groundwater monitoring program for the Metropolitan Water Reclamation District of Greater Chicago (District's) TARP system as briefly described below.

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 from 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, three CTS fill event-based monitoring wells (QC-2, QC-4, and QC-17) 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 during the period 1995–2013. The criterion that triggers fill event sampling is that the water level in the Thornton Composite Reservoir (TCR), which receives water from the CTS, reaches -280 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 first week of 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 28 wells associated with the CTS, referred to as annual monitoring wells, are sampled once per year. These wells had FC detected in less than 10 percent of samples during the period 1995–2013.

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

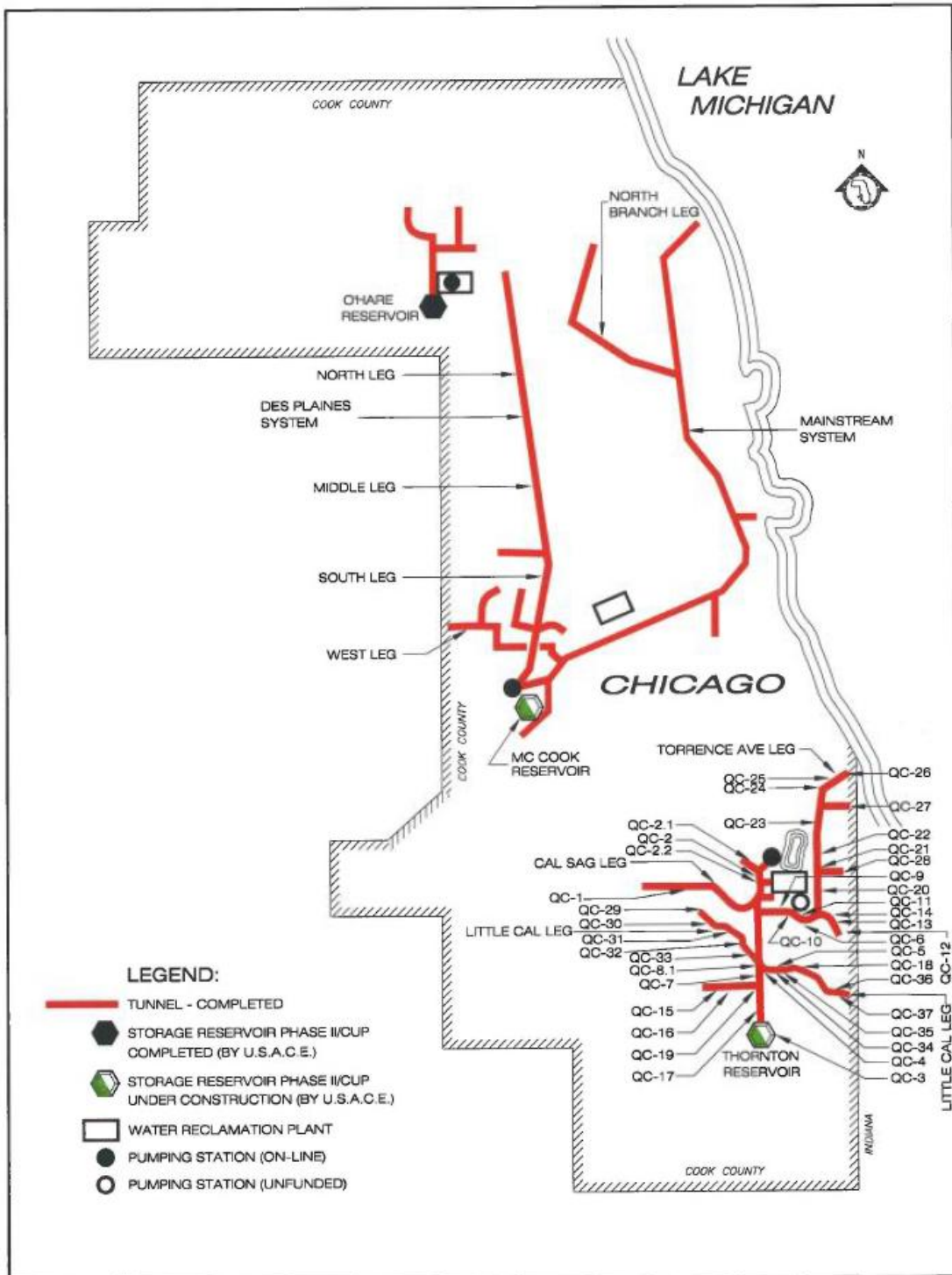
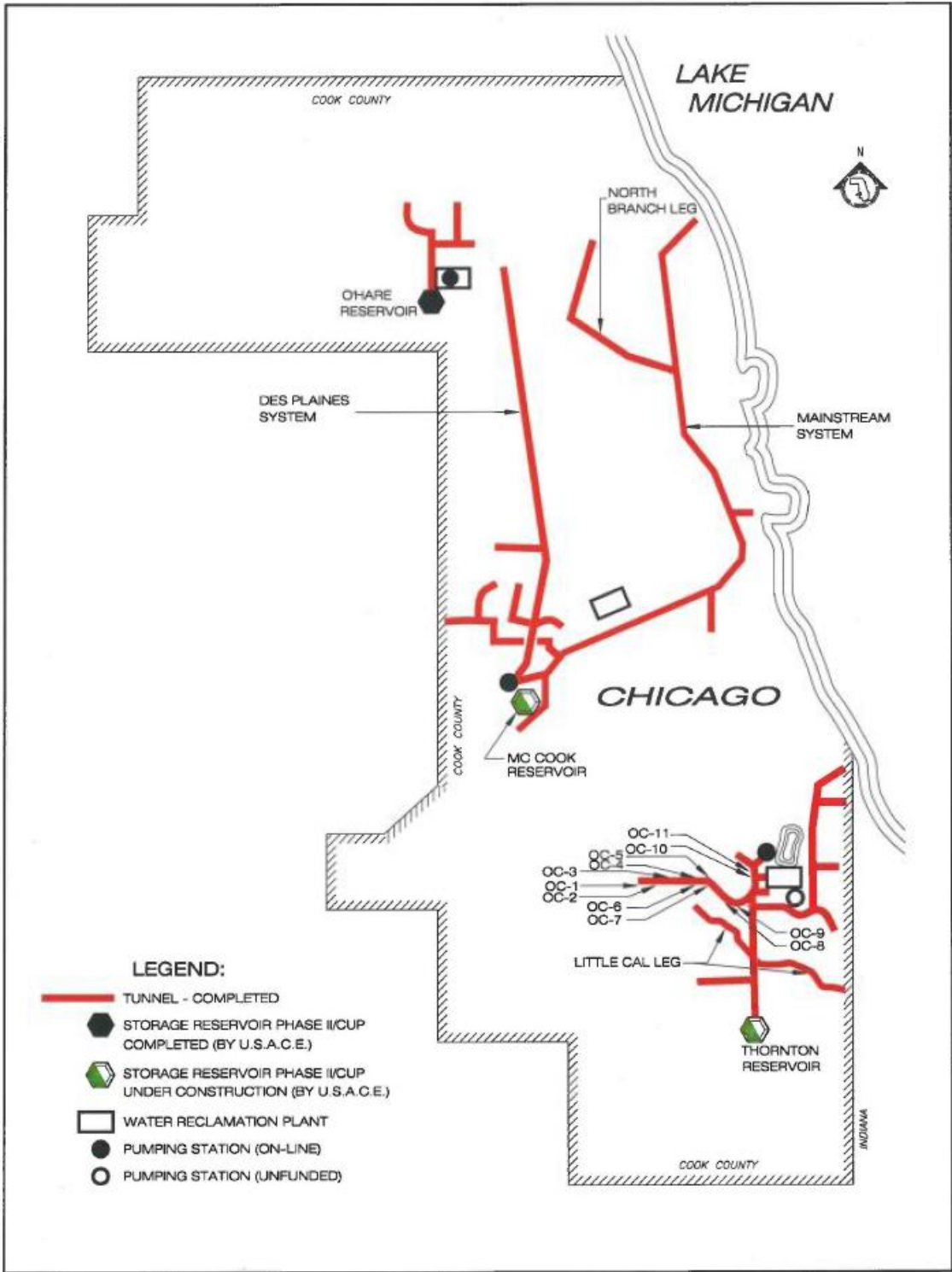


FIGURE 2: MAP OF OBSERVATION WELLS IN THE CALUMET TUNNEL SYSTEM



Eight of the monitoring wells (QC-1, QC-3, QC-8, QC-32, QC-33, QC-34, QC-36, and QC-37) were abandoned previously with the approval of the IEPA. Therefore, the monitoring requirement for this group of wells has been discontinued under the modified groundwater monitoring program.

Groundwater elevations in the monitoring wells are measured at each sampling event. The elevations in the observation wells are measured twice per month.

Summary of Data

Monitoring Wells. For the first half of the year, monitoring wells QC- 2, QC- 4, and QC- 17 were sampled on April 7, 2025, following the first fill event at the TCR (April 3 – 12, 2025). For the second half of the year, the three monitoring wells were sampled on August 22, following the second fill event at the TCR (August 18 – 28, 2025).

The groundwater analytical data and physical parameters for fill event-based monitoring wells QC-2, QC-4, and QC-17 are presented in Table 1. During the two monitored fill events, FC was undetected at all three wells.

The analytical data for groundwater from the wells sampled once per year are presented in Table 2. Fecal coliforms were undetectable (<1 colony forming unit [CFU]/100 mL) in all sampled annual wells, except for well QC-31 sampled on August 18, 2025.

Observation Wells. Groundwater elevations were measured for observation wells OC-1 through OC-11 twice per month. Groundwater elevations were calculated relative to 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 CALUMET TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN DURING 2025¹

Well	Sample Date	pH	EC mS/m	<u>TDS</u>	<u>TOC</u>	<u>Cl⁻</u>	<u>SO₄²⁻</u>	<u>NH₃-N</u>	<u>Hardness</u>	Temp. °C	Water Elevation ² feet	Fecal Coliform CFU/100 mL	Recharge Time hours
				-----mg/L-----									
QC-2	04/07/25	8.1	43	324	<5.0	21	26	<0.3	72	11.8	-314	<1	<48
	08/22/25	8.1	52	—	—	—	—	—	—	14.6	-296	<1	<48
QC-4	04/07/25	8.4	54	416	<5.0	8	16	<0.3	28	12.3	-310	<1	<48
	08/22/25	8.6	54	—	—	—	—	—	—	13.5	-228	<1	<48
QC-17	04/07/25	7.8	61	486	<5.0	9	169	<0.3	150	12.5	-174	<1	<48
	08/22/25	8.1	61	—	—	—	—	—	—	13.1	-170	<1	<48

¹Chemistry parameters need to be analyzed for first fill event only.

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

TABLE 2: ANALYSIS OF CHEMICAL AND PHYSICAL PARAMETERS AND FECAL COLIFORM IN GROUNDWATER
SAMPLED FROM ANNUAL MONITORING WELLS IN THE CALUMET 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
QC-2-1	07/03/25	8.1	79	544	7.0	34	11	0.46	57	13.4	-298	<1
QC-2-2	07/03/25	8.5	48	316	<5.0	12	19	<0.30	36	14.0	-292	<1
QC-5	03/05/25	8.5	69	520	<5.0	50	9	<0.30	10	12.8	-216	<1
QC-6	03/05/25	8.4	58	450	<5.0	17	4	<0.30	15	13.4	-205	<1
QC-7	03/05/25	8.3	50	388	<5.0	11	<1.0	<0.30	11	12.5	-144	<1
QC-9	07/03/25	8.1	42	310	<5.0	9	36	0.46	59	13.6	-254	<1
QC-10	03/20/25	8.2	48	366	<5.0	32	<1.0	<0.30	12	13.6	-190	<1
QC-11	03/20/25	8.4	38	296	<5.0	22	<1.0	<0.30	20	14.9	-191	<1
QC-12	07/03/25	8.7	89	716	<5.0	33	185	<0.30	93	15.3	-227	<1
QC-13	09/04/25	8.3	47	400	<5.0	40	2	<0.30	31	15.5	-232	<1
QC-14	04/30/25	7.4	108	666	<5.0	153	<1.0	<0.30	164	15.4	-205	<1
QC-15	04/30/25	8.4	41	290	<5.0	12	<1.0	<0.30	12	13.4	-199	<1
QC-16	05/01/25	8.2	73	470	<5.0	22	76	<0.30	61	13.6	-192	<1
QC-18	05/01/25	8.7	50	364	<5.0	8	29	<0.30	7	12.7	-194	<1
QC-19	09/18/25	8.7	56	476	<5.0	10	130	<0.30	94	12.8	-141	<1
QC-20	09/18/25	8.3	36	278	<5.0	19	3	<0.30	23	13.4	-244	<1
QC-21	09/18/25	8.7	45	372	<5.0	17	20	0.34	30	13.2	-238	<1
QC-22	10/30/25	8.3	28	210	<5.0	15	6	<0.30	31	12.3	-235	<1
QC-23	10/30/25	9.0	38	314	<5.0	22	2	<0.30	5	12.4	-221	<1
QC-24	10/30/25	8.3	27	216	<5.0	29	<1.0	<0.30	14	13.1	-222	<1
QC-25	10/30/25	8.0	36	280	<5.0	14	54	<0.30	87	13.4	-220	<1
QC-26	12/04/25	9.1	34	262	<5.0	13	2	<0.30	10	12.8	-214	<1
QC-27	01/30/25	8.3	39	240	<5.0	33	<1.0	<0.30	24	13.2	-186	<1
QC-28	01/30/25	8.7	39	758	<5.0	144	165	1.10	346	13.2	-225	<1

TABLE 2 (Continued): ANALYSIS OF CHEMICAL AND PHYSICAL PARAMETERS AND FECAL COLIFORM IN GROUNDWATER SAMPLED FROM ANNUAL MONITORING WELLS IN THE CALUMET 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
QC-29	01/30/25	7.4	140	274	<5.0	12	<1.0	<0.30	17	12.0	-45	<1
QC-30	08/18/25	8.2	69	506	<5.0	35	123	0.50	89	13.0	-111	<1
QC-31	08/18/25	7.9	70	506	<5.0	18	175	0.93	222	14.1	-35	2
QC-35	08/18/25	8.5	120	860	<5.0	32	14	<0.30	18	16.2	-151	<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 IN THE CALUMET TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN MEASURED DURING 2025

Date	Observation Well No.											
	OC-1	OC-2	OC-3	OC-4	OC-5	OC-6	OC-7	OC-8	OC-8.1	OC-9	OC-10	OC-11
	-----Elevation (feet) ¹ -----											
01/05/25	-40	-22	-152	-149	-147	-71	-209	-176	-212	-219	-226	-214
01/24/25	-40	-22	-152	-149	-147	-71	-209	-178	-213	-219	-226	-214
02/06/25	-40	-22	-152	-149	-147	-71	-209	-178	-213	-220	-226	-214
02/16/25	-40	-22	-152	-149	-147	-71	-210	-178	-213	-219	-227	-214
03/01/25	-39	-23	-152	-145	-146	-70	-209	-177	-212	-219	-226	-214
03/20/25	-39	-23	-155	-148	-146	-68	-209	-177	-212	-220	-226	-214
04/10/25	-39	-21	-152	-149	-148	-67	NA ²	-180	-213	-216	-226	-210
04/19/25	-39	-21	-152	-148	-146	-70	-209	-177	-209	-217	-226	-213
05/03/25	-39	-21	-152	-148	-147	-71	-209	-178	-212	-219	-226	-214
05/24/25	-40	-21	-151	-148	-146	-60	-209	-178	-212	-219	-224	-213
06/07/25	-40	-22	-152	-148	-147	-71	-209	-178	-219	-217	-223	-213
06/17/25	-40	-22	-152	-148	-146	-71	-209	-178	-212	-219	-226	-213
07/05/25	-40	-22	-152	-148	-147	-71	-209	-178	-212	-220	-226	-213
07/19/25	-41	-22	-152	-148	-147	-69	-210	-179	-213	-218	-226	-213
08/16/25	-41	-23	-152	-149	-147	-71	-210	-178	-213	-215	-226	-213
08/30/25	-40	-23	-152	-148	-147	-69	-210	-178	-213	-215	-226	-213
09/11/25	-40	-22	-153	-148	-147	-72	-209	-180	-212	-216	-226	-213
09/27/25	-41	-23	-153	-148	-147	-72	-210	-176	-212	-219	-226	-213
10/11/25	-41	-23	-153	-149	-147	-72	-210	-181	-213	-218	-226	-213
10/25/25	-41	-23	-156	-148	-147	-66	-210	-180	-212	-220	-226	-213
11/08/25	-41	-23	-152	-148	-147	-71	-209	-180	-212	-220	-226	-213
11/26/25	-41	-23	-153	-148	-147	-72	-210	-180	-213	-220	-226	-213
12/06/25	-40	-23	-153	-149	-148	-70	-207	-181	-213	-219	-226	-213
12/18/25	-40	-22	-152	-148	-147	-69	-209	-180	-212	-221	-226	-213

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

²No measurement was reported due to measurement error.

FIGURE 3: MINIMUM, MEAN, AND MAXIMUM WATER ELEVATION FOR OBSERVATION WELLS OC-1 THROUGH OC-11 IN THE CALUMET TUNNEL SYSTEM OF THE TUNNEL AND RESERVOIR PLAN MEASURED DURING 2025

