

Letter of Transmittal

Attention:	Mr. Tauren Beggs Hydrogeologist, WDNR 2984 Shawano Ave Green Bay, WI 54313	Date:	06/02/23
Project reference:	Former Newton Pit BRRTS No. 02-36-000268	Project number:	60135471

We are sending you the following:

Number of originals:	Number of copies:	Description:
One	Zero	2023 Area Wide VOC Five Year Potable Well Monitoring Sampling Plan

Mr. Beggs,

One copy of the 2023 Area Wide VOC Five Year Potable Well Monitoring Sampling Plan for the Former Town of Newton Gravel Pit, Manitowoc Wisconsin is attached.

Please let me know if you have any questions.

Thank you.



David Henderson, P.E.
Senior Project Manager
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Cc: Eric Nycz, Interim City Attorney, City of Manitowoc
Dan Koski, Director of Public Infrastructure, City of Manitowoc

June 2, 2023

Mr. Tauren Beggs
Hydrogeologist
Wisconsin Department of Natural
Resources
2984 Shawano Avenue
Green Bay, WI 54313-6727

**Subject: 2023 Area Wide VOC Five Year Potable Well Sampling Plan
Former Town of Newton Gravel Pit
3130 Hecker Road, Manitowoc, Wisconsin
WDNR BRRTS No. 02-36-000268
AECOM Project No. 60135471 (82518)**

Dear Mr. Beggs,

On behalf of the City of Manitowoc (City), AECOM Technical Services, Inc. (AECOM) is submitting an updated (i.e., 2023) area wide volatile organic compound (VOC) five year potable well sampling work plan for ongoing monitoring of private potable wells near the Former Town of Newton Gravel Pit (Site). The purpose of the monitoring is to continue the evaluation of the extent of cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride (VC) as contaminants of concern (COCs) over the course of the next five years beginning in May 2023.

These sampling efforts are in response to requests from the Wisconsin Department of Natural Resources (WDNR).

Presented below are background information, a proposed sampling schedule, sampling methods, reporting, and a summary of ongoing activities related to the potable well sampling.

Background Information

Regular monitoring has been ongoing since November 2013, when VOCs were discovered in private potable wells near the Former Town of Newton Gravel Pit. Previous potable well sampling plans include:

- the initial 2014 *Potable Well Monitoring Work Plan*¹, the
- 2015 to 2016 *Semi-Annual Potable Well Monitoring Work Plan*², the
- 2017, *Five Year Potable Well Monitoring Work Plan*³, the
- 2022, *VOC Expanded Downgradient Potable Well Sampling Work Plan*⁴, and
- the 2021, *Area Wide VOC Five Year Potable Well Sampling Work Plan*⁵.

The sampling schedules presented in these work plans have been updated periodically due to sampling results.

¹ Potable Well Monitoring Work Plan, BRRTS No. 02-36-000268, AECOM, April 10, 2014.

² 2015 to 2016 Semi-Annual Potable Well Monitoring Work Plan, BRRTS No. 02-36-000268, AECOM, September 22, 2015.

³ *Five Year Potable Well Monitoring Work Plan, Former Town of Newton Gravel Pit*, AECOM, May 8, 2017

⁴ *VOC Expanded Downgradient Potable Well Sampling Work Plan, Former Town of Newton Gravel Pit*, AECOM, August 5, 2019

⁵ *Area Wide VOC Five Year Potable Well Sampling Work Plan, Former Town of Newton Gravel Pit, 3130 Hecker Road, Manitowoc, Wisconsin*, AECOM, April 16, 2021

In the fall of 2022, the City looped a watermain south along 15th, 19th and 26th Streets between Viebahn Street and Lissa Lane/Jenny Road and extended a watermain south on County Road CR to Thunder Ridge Road and Blackhawk Court.

The 2023 Area Wide VOC Five Year Potable Well Sampling Plan presented below has been updated to reflect the installation of the City's watermain to provide city water to 69 addresses that were previously served by approximately 60 private potable wells. With the connection of homeowners to city water, monitoring of the associated potable wells is no longer necessary. A listing of the addresses connected to city water is provided as part of Table 1, attached.

Potable Well Sampling Zones & Sampling Schedule

For the 2023 Area Wide VOC Five Year Sampling Plan the potable well sampling zones are categorized as follows:

- Target Zone Wells
- Target Zone Sentinel Wells
- Sentinel Zone 3-Year Wells
- Sentinel Zone 5-Year Wells
- Replacement Wells
- Historically Sampled Wells
- Former Potable Wells Now Connected to City Water

A detailed description of each sampling zone, the proposed zone specific sampling schedule, and an explanation of the proposed changes as compared to the last sampling plan are presented below. This information is also summarized on Table 1 and presented on Figure 1.

Target Zone Wells – color code symbol: ● ●

Target Zone Wells are wells with detectable VOC COCs. Wells identified with a blue circle have VOC COC detects below NR 140 enforcement standards (ES). Wells identified with a red circle have VOC COC detects, typically VC, above respective NR 140 ESs. These wells will be sampled on a semi-annual basis for five years. Currently, this includes a total of 9 wells.

The location 2717 CTH CR (4141 Viebahn St.) shows two color code symbols on this property. One is a former potable well that has been retained as a non-potable monitoring well location and we have retained the pink color code symbol for the well to indicate that it's impacted with COCs. The other color code symbol indicates that the resident has been connected to the city water supply.

Target Zone Sentinel Wells – color code symbol: ●

These wells are located within the Target Zone but they do not have detectable VOC COCs. The wells will be sampled on an annual basis. Currently, this includes a total of 49 wells.

Included within the Target Zone Sentinel Wells are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the Target Zone will continue to be contacted by the City and will be sampled when the owners or well users respond.

Sentinel Zone 3-Year Wells – color code symbol: ●

Sentinel Zone 3-Year Wells will be sampled on a rotating schedule where each well will be sampled once every three years on a rotation basis, typically based on its last sampling date. Currently, this includes a total of 30 wells.

Included within the 3-Year Sentinel Zone are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the 3-Year Sentinel Zone will continue to be contacted by the city and will be sampled when the owners or well users respond.

Sentinel Zone 5-Year Wells – color code symbol: ●

Sentinel Zone 5-Year Wells will be sampled on a rotating schedule where each well will be sampled once every five years based on its last sampling date. Currently, this includes a total of 32 wells.

Included within the 5-Year Sentinel Zone are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the 5-Year Sentinel Zone will continue to be contacted by the city and will be sampled when the owners or well users respond.

Replacement Wells – color code symbol: ●

Replacement Wells sampled to date have not had detections of VOC COCs. Therefore, existing replacement wells will be sampled once every five years, typically based on the last sampling date.

The sampling schedule for newly installed Replacement Wells will be as follows; initial sample within one week of installation, second sample at approximately one month post-installation, and a third sample approximately two months post-installation to confirm the new well is not impacted by VOC COCs. The well will then be sampled every five years.

With the recent watermain work there are currently eight replacement wells as follows:

- 3023 CTH CR
- 3120 CTH CR
- 3403 CTH CR
- 3504 CTH CR
- 3303 Hecker Rd
- 3515 Hecker Rd
- 3518 Hecker Rd
- 3609 Hecker Rd

Historically Sampled Wells – color code symbol: ▲

These potable wells previously included wells located up-gradient or side-gradient from the VOC groundwater plume. With the addition of the expanded sampling area wells to the work plan, the historically sampled wells now also include down-gradient wells outside our area of interest. Initial sampling results indicate that the wells have no detections of VOC COCs associated with Newton Pit project. These wells will not be sampled during the five year sample plan period.

Never Been Sampled Wells – color code symbol: ●

These potable wells have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. They include wells within the Target Zone, 3-Year and 5-Year Sentinel Zones, and wells outside our area of interest. The unsampled wells within the Target Zone, 3-Year and 5-Year Sentinel Zones will continue to be contacted by the city and will be sampled when the owners or well users respond.

Former Potable Wells Now Connected to City Water – color code symbol: ○

To date, a total of 78 individual addresses have been connected to city water. This represents 69 potable wells that no longer require sampling.

Re-Classifying Sampling Zones

If future sampling results indicate that a well is impacted by VOC COCs, the data will be used to reclassify the well's sampling zone. The sampling frequency of the newly impacted well will be adjusted to match the reclassified sampling zone schedule. If the potable well owner/location is supplied with city water the location will be removed from the sampling schedule and the related potable well will be abandoned in accordance with NR 141 requirements.

Sampling Methodology

Potable well owners will be notified by the City that their well is scheduled to be sampled. The City will then work with AECOM and the owners to schedule an appointment for AECOM field technicians to sample the well.

Samples will be collected following purging from a cold water tap or spigot as near to the well as possible, preferably prior to any storage/pressure tanks or physical/chemical treatment system that might be present. The system will be purged for at least 10 minutes immediately prior to sampling. Samples for VOCs will be collected in 40-ml glass vials with Teflon septa. The vials will be filled to the top, leaving no headspace or bubbles and quickly capped. While filling sample containers, water flow will be reduced to a low level to minimize sample disturbance. The samples will be placed on ice in a cooler and transported to the laboratory. The samples will be accompanied with a chain of custody form.

Potable well water samples for quality control will also be collected. The quality control samples will include field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. The quality control samples will be determined by AECOM field personnel. Laboratory provided trip blanks will accompany the sample containers to evaluate the potential for analytical artifacts associated with container handling in the field and laboratory.

Water samples will be submitted to a Wisconsin Administrative Code (WAC) Chapter NR 149 certified laboratory for analyses of VOCs (EPA Method SW 8260B). The groundwater analytical results will be compared to the WAC Ch. NR 140.10, Table 1, Public Health Groundwater Quality Standards.

Reporting

Reporting of laboratory analytical results will be made to the City, WDNR, and individual potable well owners in general accordance with NR 716.14 *Sample Results Notification Requirements*.

A semi-annual potable well sampling letter report will be submitted to the WDNR. The letter report will include a written summary of the sampling event(s), summarized laboratory results in tabular form, a figure showing the results, and copies of laboratory reports.

Well owner reporting of analytical results will include a cover letter explaining the results with an attached copy of the laboratory report. The WDNR will be copied on the well owner reporting.

Response Actions

Locations with potable wells that have VOC compounds above NR 140 ES limits will receive bottled water provided by the City while alternatives are reviewed for providing a long-term solution for safe clean drinking water.

At this time, we are proceeding with scheduling the May/June 2023 sampling event. If you have any questions regarding the work plan, please contact Dave Henderson at 414.944.6190 or dave.henderson@aecom.com.

Sincerely,

AECOM Technical Services, Inc.



David Henderson, P.E.
Senior Project Manager
dave.henderson@aecom.com

Cc: Eric Nycz, Interim City Attorney, City of Manitowoc
Dan Koski, Director of Public Infrastructure, City of Manitowoc

Attachments: Table 1, 2023 Summary of the Area Wide VOC Five-Year Potable Well Sampling Plan
Figure 1, 2023 Area Wide VOC Five-Year Potable Well Sampling Locations

Tables



TABLE 1
SUMMARY OF 2023 VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2023		2024		2025		2026		2027	
			May	October	May	October	May	October	May	October	May	October
Target Zone Wells (semi-annual sampling)												
2406, 2414 and 2512 Birch Rd (Shared Well)	●	Nov 2022	1	1	1	1	1	1	1	1	1	1
2501 Nelson Lane	●	Jun 2022	1	1	1	1	1	1	1	1	1	1
3027 Orchard Ln	●	Nov 2022	1	1	1	1	1	1	1	1	1	1
3327 Hecker Rd	●	Nov 2022	1	1	1	1	1	1	1	1	1	1
3461(3417) Hecker Rd	●	Jun 2022	1	1	1	1	1	1	1	1	1	1
3702 Hecker Rd	●	Nov 2022	1	1	1	1	1	1	1	1	1	1
4024 CTH CR	●	Jun 2022	1	1	1	1	1	1	1	1	1	1
4159 Silver Creek Rd	●	Jun 2022	1	1	1	1	1	1	1	1	1	1
Target Zone Sentinel Wells (Annual sampling)												
1512 and 1514 Lone Oak LN (Duplex)	●	Jun 2022	1		1		1		1		1	
1521 LONE OAK LN	●	Jun 2022	1		1		1		1		1	
1703 LONE OAK LN	●	Jun 2022	1		1		1		1		1	
1704 LISSA LN	●	Jun 2022	1		1		1		1		1	
1710 LISSA LN	●	Jun 2022	1		1		1		1		1	
1817 VIEBAHN ST	●	Not Sampled Yet	1		1		1		1		1	
1821 VIEBAHN ST	●	Not Sampled Yet	1		1		1		1		1	
2327 BIRCH RD	●	Not Sampled Yet	1		1		1		1		1	
2407 ELM RD	●	Jun 2022	1		1		1		1		1	
2408 Elm Road	●	June 2021	1		1		1		1		1	
2417 Elm Road	●	Jun 2022	1		1		1		1		1	
2507 NELSON LN	●	Nov 2019	1		1		1		1		1	
2508 NELSON LN	●	Not Sampled Yet	1		1		1		1		1	
2514 Elm Road	●	June 2021	1		1		1		1		1	
2515 NELSON LN	●	Not Sampled Yet	1		1		1		1		1	
2611 VIEBAHN	●	Not Sampled Yet	1		1		1		1		1	
2733 S 19TH ST	●	Jun 2022	1		1		1		1		1	
2803 ORCHARD	●	Not Sampled Yet	1		1		1		1		1	
2811 S 15TH ST	●	Jun 2022	1		1		1		1		1	
2815 S 15TH ST	●	May 2021	1		1		1		1		1	
2833 S 19TH ST	●	Jun 2022	1		1		1		1		1	
2911 CTH CR	●	Jun 2022	1		1		1		1		1	
2915 S 26TH St	●	Jun 2022	1		1		1		1		1	
3021 S 26TH ST	●	Jun 2022	1		1		1		1		1	
3113 S 15TH ST	●	Jun 2022	1		1		1		1		1	
3202 S 19TH ST	●	Jun 2022	1		1		1		1		1	
3203 S 26TH St	●	Jun 2022	1		1		1		1		1	
3205 LONE OAK LN	●	Jun 2022	1		1		1		1		1	
3210 S 19TH ST	●	Jun 2022	1		1		1		1		1	
3212 S 26TH ST	●	Not Sampled Yet	1		1		1		1		1	
3224 CTH CR	●	Jun 2022	1		1		1		1		1	
3304 S 15TH ST	●	Jun 2022	1		1		1		1		1	
3304 S 19TH ST	●	Jun 2022	1		1		1		1		1	
3305 S 15TH ST	●	Jun 2022	1		1		1		1		1	
3307 S 19TH ST	●	Jun 2022	1		1		1		1		1	
3310 S 19TH ST	●	Jun 2022	1		1		1		1		1	
3312 CTH CR	●	Jun 2022	1		1		1		1		1	
3315 and 3327 CIMMARON CT (Shared Well)	●	Jun 2022	1		1		1		1		1	
3320 Hecker Rd	●	Jun 2022	1		1		1		1		1	
3322 CTH CR	●	Jun 2022	1		1		1		1		1	
3406 CIMARRON CT and 2328 Jenny Rd (Shared Well)	●	Jun 2022	1		1		1		1		1	
3412 CTH CR	●	Jun 2022	1		1		1		1		1	
3422 CTH CR	●	Jun 2022	1		1		1		1		1	
3523 CTH CR	●	June 2021	1		1		1		1		1	
3533 CTH CR	●	Jun 2022	1		1		1		1		1	
3611 CTH CR	●	Jun 2022	1		1		1		1		1	
3626 CTH CR/3626 CTH CR #B	●	May 2021	1		1		1		1		1	
3627 CTH CR	●	Jun 2022	1		1		1		1		1	
3825 Viebahn St	●	Jun 2022	1		1		1		1		1	



TABLE 1
SUMMARY OF 2023 VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2023		2024		2025		2026		2027	
			May	October	May	October	May	October	May	October	May	October
Sentinel Zone 3-Year Wells (sample every 3rd year)												
1617 LISSA LN	●	May 2021			1						1	
1701 LISSA LN	●	Oct 2020	1						1		May 2029	
1709 LISSA LN	●	Nov 2019					1				May 2028	
1718 JENNY RD	●	Nov 2019	1						1		May 2029	
1804 JENNY RD	●	Jun 2022					1				May 2028	
1805 LISSA LN	●	Nov 2019	1						1		May 2029	
2403 JENNY RD	●	Jun 2022					1				May 2028	
2716 CTH CR	●	May 2020	1						1		May 2029	
3118 S 10TH ST	●	Nov 2022					1				May 2028	
3128 Orchard Ln	●	May 2021			1						1	
3315 S 19TH ST	●	Jun 2022					1				May 2028	
3318 Orchard Ln	●	Oct 2016			1						1	
3319 JENNY RD	●	Nov 2019	1						1		May 2029	
3319 S 19TH ST	●	Nov 2019	1						1		May 2029	
3321 JENNY RD	●	Nov 2019	1						1		May 2029	
3323 S 26TH ST	●	Nov 2019					1				May 2028	
3326 S 15TH ST	●	May 2021			1						1	
3407 S 26TH ST	●	Nov 2019	1						1		May 2029	
3425/3427 Cimarron CT (Duplex) and 3509/3511 Cimarron CT (Duplex) (Shared well)	●	Oct 2020	1						1		May 2029	
3430 and 3508 CIMARRON CT (Shared Well)	●	Jun 2022					1				May 2028	
3625 Hecker Rd	●	Jun 2022					1				May 2028	
3812 Silver Creek Rd	●	Jan 2016			1						1	
3818 SILVER CREEK RD	●	May 2021			1						1	
3902 Silver Creek Rd	●	Jun 2022					1				May 2028	
3904 CTH CR	●	May 2017					1				May 2028	
4004 Silver Creek Rd	●	May 2021			1						1	
4101 CTH CR	●	June 2021			1						1	
4141 Viebahn St. / 2717 CTH CR (non-Potable Well & City water)	○ ●	May 2020	1						1		May 2029	
4156 Silver Creek Rd	●	March 2016					1				May 2028	
4236 Silver Creek Rd/4220 Silver Creek Rd/4212 Silver Creek Rd (3 properties share Well)	●	May 2017					1				May 2028	
4314 Silver Creek Rd	●	May 2021			1						1	
Sentinel Zone 5-Year Wells (sample every 5th year)												
1801 JENNY RD	●	Nov 2019			1						May 2029	
1807 JENNY RD	●	June 2021							1		May 2031	
2505 JENNY RD	●	June 2021							1		May 2031	
2706 CTH CR	●	Oct 2016	1								May 2028	
3121 Hecker Rd	●	Jun 2022									1	
3405 S 15TH ST	●	Oct 2020					1				May 2030	
3408 S 15TH ST	●	Nov 2019			1						May 2029	
3415 S 15TH ST	●	Nov 2019			1						May 2029	
3420 Orchard Ln	●	Jun 2022									1	
3421 S 15TH ST	●	Dec 2019			1						May 2029	
3429 S 19TH ST	●	Dec 2019			1						May 2029	
3503 S 19TH ST	●	Nov 2019			1						May 2029	
3505 S 26TH ST	●	Nov 2019			1						May 2029	
3510 S 26TH ST	●	Nov 2019			1						May 2029	
3511 S 19TH ST	●	Dec 2019			1						May 2029	
3517 S 26TH ST	●	May 2021							1		May 2031	
3518 SILVER CREEK RD	●	Dec 2019			1						May 2029	
3521/3523 Cimarron CT (Duplex) and 3537/3539 Cimarron CT (Duplex) (Shared Well)	●	Not Sampled Yet	1								May 2028	
3524 Orchard Ln	●	Jun 2022									1	
3526 S 26TH ST	●	Nov 2019			1						May 2029	
3529 S 26TH ST	●	Nov 2019			1						May 2029	
3538 CIMARRON CT	●	Not Sampled Yet	1								May 2028	
3616 SILVER CREEK RD	●	Not Sampled Yet	1								May 2028	
3627 Hecker Rd	●	May 2017	1								May 2028	
3710 Silver Creek Rd	●	May 2017	1								May 2028	
3720 Hecker Rd	●	Jun 2022									1	
3780 Silver Creek Rd	●	May 2017	1								May 2028	
3802 Silver Creek Rd	●	May 2017	1								May 2028	
4114 CTH CR	●	Nov 2022									1	
4125 CTH CR	●	May 2017	1								May 2028	



TABLE 1
SUMMARY OF 2023 VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2023		2024		2025		2026		2027	
			May	October	May	October	May	October	May	October	May	October
4219 Viebahn St	●	Jun 2022										1
4315 Silver Creek Rd	●	May 2017	1									May 2028
Replacement Wells (sample every 5th year)												
3023 CTH CR	●	Oct 2016	1									May 2028
3120 CTH CR	●	Nov 2021							1			May 2030
3403 CTH CR	●	Nov 2022										1
3504 CTH CR	●	Nov 2021							1			May 2030
3303 Hecker Rd	●	May 2020					1					May 2030
3515 Hecker Rd	●	May 2020					1					May 2030
3518 Hecker Rd	●	May 2020					1					May 2030
3609 Hecker Rd	●	May 2020					1					May 2030
Historically Sampled Wells												
1108 CREEK TRL	▲	Nov 2019										
1110 LAKE LN	▲	Nov 2019										
1125 SILVER CREEK RD	▲	Nov 2019										
1202 SILVER CREEK RD	▲	Nov 2019										
1207 CREEK TRL	▲	Nov 2019										
1219 SILVER CREEK RD	▲	Nov 2019										
1315 SILVER CREEK RD	▲	Nov 2019										
1404 and 1412 SILVER CREEK RD (Shared Well)	▲	Nov 2019										
1423 SILVER CREEK RD	▲	Nov 2019										
1428 SILVER CREEK RD	▲	Nov 2019										
1507 SILVER CREEK RD	▲	Nov 2019										
1602 SILVER CREEK RD	▲	Nov 2019										
1702 SILVER CREEK RD	▲	Nov 2019										
1703 SILVER CREEK RD	▲	Nov 2019										
1716 SILVER CREEK RD	▲	March 2020										
1717 SILVER CREEK RD	▲	Nov 2019										
1805 SILVER CREEK RD	▲	Feb 2020										
1811 SILVER CREEK RD	▲	Nov 2019										
1822 SILVER CREEK RD	▲	Nov 2019										
1906 SILVER CREEK RD	▲	Nov 2019										
1909 SILVER CREEK RD	▲	Nov 2019										
2218 SILVER CREEK RD	▲	Nov 2019										
2224 SILVER CREEK RD	▲	Nov 2019										
2304 SILVER CREEK RD	▲	Nov 2019										
2312 SILVER CREEK RD	▲	Nov 2019										
2402 SILVER CREEK RD	▲	Nov 2019										
2408 SILVER CREEK RD	▲	Nov 2019										
2608 SILVER CREEK RD	▲	June 2020										
2706 SILVER CREEK RD	▲	Nov 2019										
2881 CTH CR	▲	Well Out of Service										
2918 SILVER CREEK RD	▲	Nov 2019										
2925 Fricke Dr.	▲	Feb 2013										
3107 Fricke Dr	▲	Dec 2013										
3114 Hecker Rd	▲	May 2020										
3116 SILVER CREEK RD	▲	Dec 2019										
3222 SILVER CREEK RD	▲	Nov 2019										
3302 SILVER CREEK RD	▲	Nov 2019										
3316 SILVER CREEK RD	▲	Nov 2019										
3406 SILVER CREEK RD	▲	Nov 2019										
3413 S 10TH ST	▲	Nov 2019										
3424 SILVER CREEK RD	▲	Nov 2019										
3523 Orchard Ln	▲	May 2014										
3533 S 10TH ST	▲	Dec 2019										
3602 S 19TH ST	▲	Dec 2019										
3603 10TH ST	▲	Nov 2019										
3604 SILVER CREEK RD	▲	Dec 2019										
3609 M and M Ln	▲	Dec 2013										
3610 Gass Lake	▲	Feb 2013										
3612 S 19TH ST	▲	Dec 2019										
3615 S 15TH ST	▲	Nov 2019										
3615 S 26TH ST	▲	Nov 2019										
3616 S 10TH ST	▲	Feb 2020										
3627 S 15TH ST	▲	Dec 2019										
3627 S 26TH ST	▲	Nov 2019										
3632 S 10TH ST	▲	Dec 2019										
3708 S 15TH ST	▲	Nov 2019										
3709 S 15TH ST	▲	Nov 2019										

Wells are typically non-detected wells that can be upgradient, sidegradient or downgradient wells. Some of the downgradient wells may be added if sentinel wells indicate sampling.



TABLE 1
SUMMARY OF 2023 VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2023		2024		2025		2026		2027	
			May	October	May	October	May	October	May	October	May	October
3712 S 15TH ST	▲	Dec 2019										
3712 S 10TH ST	▲	Feb 2020										
3717 S 15TH ST	▲	Nov 2019										
3717 M and M Ln	▲	Feb 2013										
3719 S 26TH ST	▲	June 2020										
3720 S 26TH ST	▲	Nov 2019										
3722 S 15TH ST	▲	Nov 2019										
3723 S 19TH ST	▲	Nov 2019										
3727 S 15TH ST	▲	Dec 2019										
3804 S 15TH ST	▲	Dec 2019										
3805 S 15TH ST	▲	Nov 2019										
3809 S 19TH ST	▲	Nov 2019										
3813 S 15TH ST	▲	Nov 2019										
3819 S 15TH ST	▲	Dec 2019										
3821 S 19TH ST	▲	Nov 2019										
3835 S 10TH ST	▲	Nov 2019										
3840 M and M Ln	▲	Feb 2013										
3917 S 18TH ST	▲	Nov 2019										
3917 S 21ST ST	▲	Nov 2019										
3933 S 18TH ST	▲	Nov 2019										
4002 S 21ST ST	▲	Dec 2019										
4007 S 18TH ST	▲	Nov 2019										
4008 S 18TH ST	▲	Nov 2019										
4017 S 26TH ST	▲	Nov 2019										
4018 S 21ST ST	▲	Nov 2019										
4019 S 10TH ST	▲	Nov 2019										
4030 S 21ST ST	▲	Nov 2019										
4031 S 18TH ST	▲	Dec 2019										
4120 S 21ST ST	▲	Nov 2019										
4132 S 26TH ST	▲	Nov 2019										
4181 S 21ST ST	▲	Nov 2022										
4201 S 26TH ST	▲	Nov 2019										
4215 S 10TH ST	▲	Nov 2019										
4218 S 10TH ST	▲	Dec 2019										
4219 S 10TH ST	▲	Nov 2019										
4229 S 10TH ST	▲	Nov 2019										
4309 S 10TH ST	▲	Dec 2019										
4316 S 10TH ST	▲	Nov 2019										
4317 S 10TH ST	▲	Nov 2019										
4325 S 10TH ST	▲	Nov 2019										
4403 S 10TH ST	▲	Dec 2019										
4410 S 10TH ST	▲	Nov 2019										
4412/4416/4422/4426/4430/4432/4434/4440 S 10TH ST (Shared Well)	▲	Nov 2019										
4513 S 10TH ST	▲	Nov 2019										
4609 Silver Creek Rd	▲	June 2014										
4620 Silver Creek Rd (two wells)	▲	May 2014										
4752 Silver Creek Rd	▲	June 2014										
4808 Silver Creek Rd	▲	May 2014										
5107 Viebahn St	▲	Dec 2013										
5202 Silver Creek Rd	▲	Dec 2013										
Former Potable Wells Now Connected to City Water												
1511 and 1513 Lone Oak LN (Condo)	○ ²	Jun 2022										
2201 Elm Road	○ ²	Jun 2022										
2322 ELM RD	○ ²	Jun 2022										
2732 S 15TH ST	○ ²	Jun 2022										
2734(2804) CTH CR	○ ¹	Oct 2015										
2805 S 19TH ST	○ ²	Jun 2022										
2806 S 15TH ST	○ ²	Jun 2022										
2812 S 15TH ST	○ ²	Jun 2022										
2820 S 15TH ST	○ ²	Jun 2022										
2821 S 19TH ST	○ ²	Jun 2022										
2823 S 15TH ST	○ ²	Jun 2022										
2824, 2828, 2904 S 19TH ST (Shared Well)	○ ²	Jun 2022										
2826 S 15TH ST	○ ²	Jun 2022										
2827 S 15TH ST	○ ²	Jun 2022										

Wells are typically non-detected wells that can be upgradient, sidegradient or downgradient wells. Some of the downgradient wells may be added if sentinel wells indicate sampling.

City Water Provided - No Potable Well Sampling Required

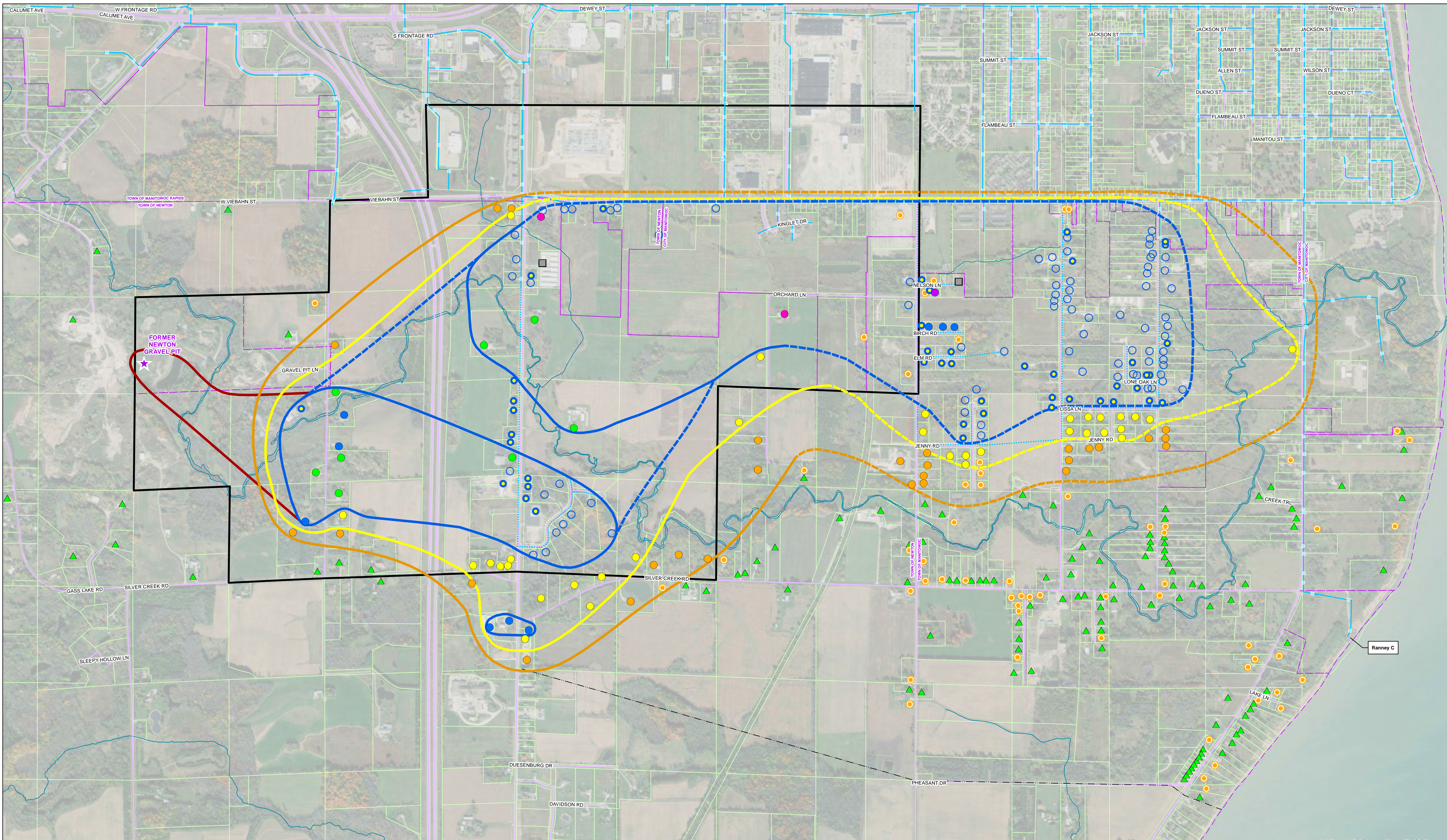


TABLE 1
SUMMARY OF 2023 VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2023		2024		2025		2026		2027		
			May	October	May	October	May	October	May	October	May	October	
2832 and 2904 CTH CR (Shared Well)	○ ²	Oct 2019											
2834 S 15TH ST	○ ²	Jun 2022											
2908 S 15TH ST	○ ²	Jun 2022											
2911 S 15TH ST	○ ²	Jun 2022											
2912 S 15TH ST	○ ²	Jun 2022											
2916 CTH CR	○ ¹	Oct 2015											
2917 CTH CR	○ ¹	Oct 2015											
2917 S 19TH ST	○ ²	Jun 2022											
2918 S 19TH ST	○ ²	Jun 2022											
2918 S 26TH St	○ ²	May 2019											
2929 S 19TH ST	○ ²	Jun 2022											
2930 S 19TH ST	○ ²	June 2021											
3003 S 19TH ST	○ ²	Jun 2022											
3006 and 3008 19th ST (Condo)	○ ²	Jun 2022											
3008 S 26TH St	○ ²	Jun 2022											
3011 S 19TH ST	○ ²	Jun 2022											
3019 S 15TH ST	○ ²	Nov 2021											
3019 S 19TH ST	○ ²	Jun 2022											
3020 S 15TH ST	○ ²	Jun 2022											
3027 S 15TH ST	○ ²	Jun 2022											
3028 S 15TH ST	○ ²	Jun 2022											
3107 S 15TH ST	○ ²	Jun 2022											
3109 S 19TH ST	○ ²	Nov 2021											
3123 S 19TH ST	○ ²	Jun 2022											
3125 LONE OAK LN	○ ²	Jun 2022											
3126 S 15TH ST	○ ²	Jun 2022											
3127 S 15TH ST	○ ²	Jun 2022											
3131 S 15TH ST and 3201 S 15TH ST (Shared Well)	○ ²	Jun 2022											
3202 S 15TH ST	○ ²	Jun 2022											
3205 S 19TH ST	○ ²	Jun 2022											
3206 LONE OAK LN	○ ²	Jun 2022											
3207 and 1520 Lone Oak LN (Condo)	○ ²	Jun 2022											
3208 LONE OAK LN	○ ²	Jun 2022											
3209 S 15TH ST and 3217 S 15TH ST (Shared Well)	○ ²	Jun 2022											
3225 S 26TH ST	○ ²	Jun 2022											
3301 S 15th St	○ ²	Jun 2022											
3318 and 3328 CIMARRON CT (Shared Well)	○ ²	Jun 2022											
3401, 3403 and 3413 CIMARRON CT (Shared Well)	○ ²	Jun 2022											
3617(3621) Viebahn St	○ ¹	March 2016											
3618 CTH CR	○ ²	Jun 2022											
3701 Viebahn St	○ ¹	Oct 2015											
3815 Viebahn St	○ ¹	Oct 2015											
3817 Viebahn St	○ ²	Jun 2022											
3911 Black Hawk Ct	○ ²	Jun 2022											
3921 Black Hawk Ct	○ ²	Nov 2021											
4002 Thunder Ridge Rd	○ ²	Oct 2016											
4005 Thunder Ridge Rd	○ ²	May 2017											
4010 Thunder Ridge Rd	○ ²	May 2017											
4025 Viebahn St	○ ¹	Oct 2015											
4027 Thunder Ridge Rd	○ ²	Jun 2022											
4101 Thunder Ridge Rd	○ ²	Jun 2022											
4101 Viebahn St	○ ¹	Oct 2015											
4111 Thunder Ridge Rd	○ ²	Jun 2022											
4127 Thunder Ridge Rd	○ ²	Jun 2022											
4141 Viebahn St. / 2717 CTH CR (non-Potable Well & City water)	○ ¹	May 2020											
Note: ¹ =2016/17 city water ² =2022/23 city water			Wells Sampled Per Event	78	8	78	8	73	8	72	8	60	8

City Water Provided - No Potable Well Sampling Required

Figures



- Legend**
- Target Zone Well - Vinyl Chloride ES Exceedance
 - Target Zone Well - VOC PAL Exceedance
 - Target Zone Well - VOC Detection
 - Target Zone Well on City Water
 - Target Zone Sentinel Wells, No Detects or Not Sampled
 - Sentinel Zone Well - 3 Year, No Detects or Not Sampled
 - Sentinel Zone Well - 5 Year, No Detects or Not Sampled
 - Replacement Well Within Target Zone, With No Detects
 - ▲ Historically Sampled Wells, With No Detects
 - Never Been Sampled
 - ★ Site Location
 - Well Out Of Service
 - Expanded Sampling Limits
 - Target Zone
 - Inferred Target Zone
 - 3 Year Sentinel Zone
 - Inferred 3 Year Sentinel Zone
 - 5 Year Sentinel Zone
 - Inferred 5 Year Sentinel Zone
 - Former Gravel Pit Zone
 - Utility Water Line
 - Proposed Utility Water Line
 - DNR Special Well Casing Depth Area
 - Streams
 - Municipality Boundaries
 - Parcels

0 300 600 1,200 Feet

AECOM
Milwaukee Office
1555 River Center Dr
Milwaukee WI

AECOM

FORMER NEWTON GRAVEL PIT

2023 Area Wide VOC Five Year Potable Well Sampling Locations

Project No. 60135471

Date: April 2023

FIGURE 1

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community