

REQUEST FOR PROPOSALS

EGLE DRINKING WATER STATE REVOLVING FUND (DWSRF): DW-7705A 2024 WATER SYSTEM UPGRADES DIVISION A: TYPE I WATER WELL Union Township, Isabella County

Proposals Due:

4:00 P.M., Friday July 19, 2024

Address Proposals to (mail and/or email):

Engineer :

Attention: Jennifer Graham, P.E.
Gourdie-Fraser, Inc.
123 West Front Street
Traverse City, MI 49684
231-946-5874
jennifer@gfa.tc

Scope of Services:

We have been asked by our client, Union Township to solicit proposals from qualified Type 1 well drillers to investigate and evaluate a new groundwater source to meet the growing demands of the community. The Township recently completed initial aquifer investigation at the proposed well site by constructing a 6-inch test well that demonstrated potential to produce 300-600 gpm. The intent of this project is to proceed with next steps of constructing a 12-inch test well including aquifer and water quality analysis capable of producing up to 800 GPM including the installation of one (1) monitoring well. The information contained below are the specific qualifications each well driller must meet in order to provide an accurate proposal.

A preliminary site layout is attached for reference illustrating the approximate proposed well location, access drive and existing monitoring well. In addition, the 6-inch test well investigation report is also attached for reference.

Background Information:

The existing East Side Iron Removal Facility (Isabella Facility) is owned and operated by Union Township and provides municipal water service to the customers within the Township. The facility operates on two (2) 400 gpm and one (1) 700 gpm production wells (Wells #7, #10 and #11) all located at the facility, which provides iron removal treatment utilizing two (2) 750 gpm pressure filters and then distributes water out to system. Well #7, #10 and #11 are all located within the same aquifer.

With limited aquifer capacity at the Isabella Facility, the Township has investigated locations for a new well site to supplement future demand needs of the East Side Pressure District. The proposed well site is a 14-acre township owned parcel located at 5076 South Mission Road, approximately 1.7 miles west of the existing Isabella WTP. It is the intent of this work to demonstrate that a proposed well can be developed at the proposed well site in an aquifer that will be capable of meeting the proposed capacity requirements described previously. The well driller will be responsible to determine the best location and depth of the proposed well that will be able to provide the most flow capacity without impeding any surrounding wells in the area or regional water levels.

Requirements - General:

- This project is funded through the Michigan Clean Water State Revolving Fund Grant (DW-7705A), all state and/or federal funding requirements shall apply.
 - The following waivers apply to this Contract:
 - Certification Regarding Debarment, Suspension & Other Responsibility Matters
 - Davis-Bacon Act Compliance Certification
 - Davis–Bacon Act, as amended (40 U.S.C. 3141–3148) and Contract Work Hours and Safety Standards Act (40 U.S.C. 3701–3708) will be required. In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the U.S. Secretary of Labor.
- All labor and materials shall be installed compliant with Township, DPW, EGLE, EPA and manufacturer's recommendations.
- Contractor shall be responsible for obtaining all local regulatory permits, completing inspections and payment of all associated fees which include but are not limited to plumbing, mechanical, electrical.
- The site can be accessed by an existing temporary access drive, entrance off of E Deerfield Rd. Contractor shall be responsible to perform any additional clearing / drive improvements to accommodate equipment access as needed. Provide a one (1) year full labor and material warranty on all workmanship, material and equipment furnished for this project.
- It is strongly recommended that you make a site visit and perform an evaluation of the existing conditions and proposed scope of work. Coordinate with the DPW for site access:
 - Kim Smith, Public Services Director (989) 772-4600, Ext 224
 - Shawn McBride, Water Operator (989) 621-1361

Terms of Agreement:

General:

- To hold bid open for 90 consecutive calendar days from the bid due date
- To enter into and execute a contract with the Charter Township of Union

Insurance:

- Contractor will have Worker's Compensation Insurance in limits required by state law and Comprehensive General Liability Insurance coverage in force for all of its operations under this contract.
 - Insurance shall list Charter Township of Union and Gourdie Fraser as additional insureds.

Bonds:

- The Contractor shall include in the proposal price the cost to provide the following:
 - Maintenance and Guarantee Bond in the amount of 50% of the proposal amount, guarantying for a period of one (1) year from final acceptance of the project work
 - Letter of Surety, licensed to business in the State of Michigan, stating ability to obtain a Performance Bond, and Labor and Material Bond for 100% of the proposal amount.

Shop Drawings/O&M Submittals:

- Provide four (4) copies of material specification sheets and warranty information to Engineer. Do not proceed until written approval is received.
- Coordinate all work with Engineer

Schedule:

- To be completed by October 1, 2024

- All work must be completed within thirty (30) calendar days from the beginning of removal to final clean up. Delays by inclement weather shall be approved by the Engineer.

Drilling and Aquifer Testing

Test Well Construction

Installation of one (1) test well capable of producing up to 800 GPM and installation of one (1) monitoring well. The contractor shall be responsible for coordinating final location with engineer and DPW. The test well shall be used to verify water quality and aquifer capacity to meet proposed operation conditions for facility. This well shall be converted to a production well upon demonstrating satisfactory aquifer results as coordinated with the Township, Engineer and approved by EGLE.

The well shall be constructed in accordance with the State of Michigan Well Construction Code (Rules to Part 127 of Act 368 of the Public Acts of 1978, as amended). All materials in contact with drinking water shall meet ANSI/NSF approval and shall include the following:

Monitoring Well

- 2-inch Schedule 80 Steel casing and be installed in the following manner:
 - Total depth of the well is to be approximately 100 to 200 feet
 - Total length of casing not to exceed 190 feet +/-
 - The annulus is grouted with neat cement grout from the top of the gravel pack to the surface.
 - The static water level in the well is expected to be roughly 3 feet.
- Stainless steel screen
 - Length to be 10 feet +/-
 - Driller shall be responsible for determining sizing and submit to owner for review prior to installation
- Well seal, cap and vent

Test Well

- 12-inch Schedule 80 Steel casing and be installed in the following manner:
 - Total depth of the well is to be approximately 100 to 200 feet
 - Total length of casing not to exceed 180 feet +/-
 - The annulus is grouted with neat cement grout from the top of the gravel pack to the surface.
 - The static water level in the well is expected to be roughly 3 feet.
- Stainless steel screen
 - Length to be 20 feet +/-.
 - Driller shall be responsible for determining sizing and submit to owner for review prior to installation.
- Well shall be equipped with a means to measure the water level.
- Well seal, cap and vent.

Duties

Well Driller shall be responsible for performing the following, in addition to the work outlined above in the Well Construction section. Testing shall be completed compliant with High-capacity wells are subject to DWEHD policy and procedure ODWMA-399-003, "Aquifer Test Requirements for Public Water Supply Wells," under Act 399:

- Mobilization

- Performance of well construction log and static water including documentation provided to owner in accordance with the state EGLE Well Code.
- Development of well including conducting a well capacity test at various discharge rates to determine available aquifer capacity for a future production and determine potential influence on adjacent and regional water levels (Mount Pleasant City Wells and Wells #8 / #9 are approximately a quarter mile north of the intersection of Mission / Deerfield Road) as required by EGLE.
 - Driller shall be responsible for monitoring static water levels in proposed well and surrounding existing wells with respect to capacity test.
 - DPW and Engineer will assist driller with communication and coordination with existing well owners.
 - Documentation of all testing and water level observations shall be provided to owner
 - Driller shall be responsible for discharging water to acceptable location that will not cause any soil erosion or sedimentation
- Chemical and radiological water quality sampling shall be performed for proposed well in accordance the state EGLE Well Code including documentation of results to owner including a full Unit 36 Scan, Radiological and PFAS samples, and all sampling required by EGLE for new Type I Water Supply Well.
 - All costs incurred with the sampling and testing shall be the drillers' responsibility
- Well driller shall provide site clean-up upon completion of duties including restoration and/or repair.
- Complete Aquifer Test Analysis and report by a professional Geologist per EGLE Aquifer Testing requirements.

Equipment

Driller shall provide all equipment and materials necessary to complete the work outlined above in the Well Construction and Duties to provide for the well installation, development, yield and drawdown testing, disinfection, water quality sampling, mobilization, and clean-up. They shall include, but are not limited to, the following not stated previously:

- Site access including tree clearing and temporary access drive.
- Temporary Pumping and means of operation.
- Temporary Water and Power Supply
- Flow monitoring and water level measuring devices (pressure transducers accurate to 1/100th) with data logging capabilities.
- Piping, valving and appurtenances
- Discharge hose

Services / Materials Not To Be Included:

The proposal shall not include providing and/or installation of the following items:

- Permanent Pumps / Motors
- Site Electrical
- Distribution Piping
- Drop Pipe

Contractors Proposal Form

Bidders are instructed to submit bids for this project on a unit cost basis as stated in the Proposal. All labor, materials and equipment are considered incidental and to be included in total bid price. All work shall be in compliance with specifications and terms identified in the RFP and applicable laws.

No.	Item	Unit	Est. Qty.	Unit Price	Item Cost
1	Mobilization, Max 5%	LS	1		
2	Monitoring Well, 2-inch	LF	200		
3	Test Well, 12-inch	LF	200		
4	Aquifer Analysis	LS	1		
5	Water Quality Analytics	EA	1		
6	Site Cleanup and Restoration	LS	1		
				TOTAL BID	

Bidders Signature

Printed Name:

Business Name:

Address:

Contractor / Well Driller License No.:

Telephone:

Email:

The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any / all bids if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the work as requested.

Charter Township of Union reserves the right to accept or reject any or all proposals.



Proposed Site Plan



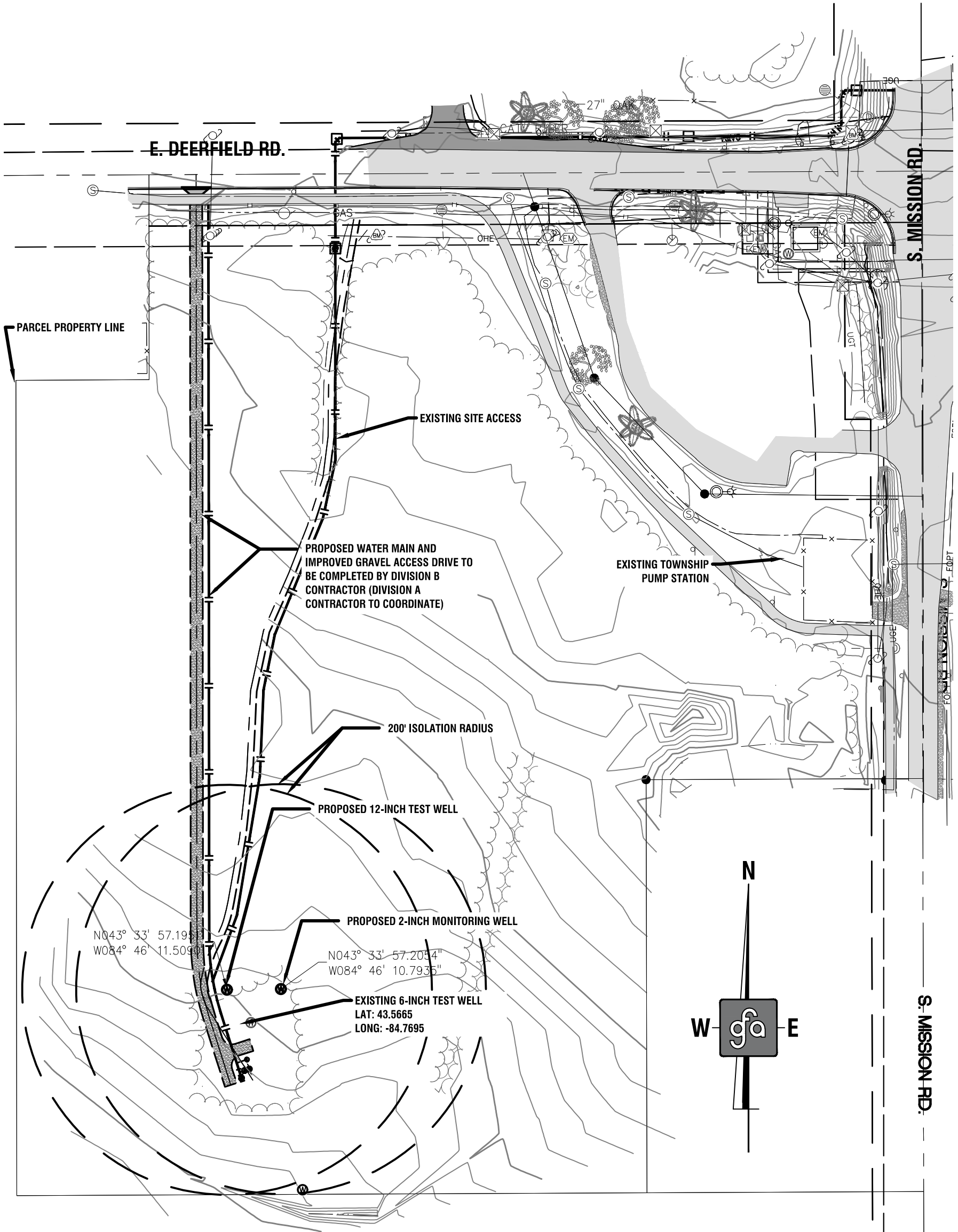
TYPE I TEST PRODUCTION WELL REQUEST PROPOSED WELL SITE PLAN

ENGINEERING
SURVEYING
TESTING & OPERATIONS
123 West Front Street
Traverse City, MI 49684



<http://gfa.lc>
231.946.5874 (p)
231.946.3703 (f)

GRAPHIC SCALE: 1 inch = 100 feet



LEGEND

- PROPOSED TEST WELL
- WATER WELL- RESIDENTIAL, TYPE I AND TYPE II
- 200 FT ISOLATION ZONE
- WELL SITE ACCESS ROAD



Technical Specifications



SECTION 02520 – WATER WELLS AND TESTING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This section encompasses all the work required for water wells including well performance testing. The general scope of the drilling and testing will be as follows;
 1. **Construction of one (1) 2-inch diameter observation wells** at an assumed depth of up to 200 feet. The construction will consist of approximately 2-inch steel casing with up to 10 feet of 2-inch PVC filter packed well screen.
 2. **Construction of one (1) 12-inch diameter production well** at an assumed depth of up to 200 feet. The construction will consist of approximately of steel casing with up to 20 feet of SSWW filter packed well screen.
 3. **Performance testing** consisting of a constant rate well performance test of 24-hours in duration.
 4. **Plumbness and Alignment Testing.**

1.02 REFERENCES:

- A. Groundwater Quality Control - Act 368 of the Public Acts of 1978, Part 127. Water Supply and Sewer Systems
- B. American Water Works Association (AWWA) Section A100 Deep Wells.
- C. AWS D1.1 Structural Welding Code
- D. ASTM specification A589-89a, Standard Specification for Seamless and Welded Carbon Steel water well pipe
- E. ASTM F480 – 14 - Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80
- F. American Petroleum Institute (API) Specification 5L
- G. Part 127 of the Public Health Code Act 368 of 1978, Water Supply and Sewer Systems, and Administrative Rules, which are collectively known as the "Michigan Water Well Construction and Pump Installation Code."
- H. Grouting of Community Water Supply Wells, ODWMA- Public Water Supply Program, ODWMA-399-016

1.03 QUALITY ASSURANCE

- A. Contractor shall provide at least 3 different references of successful well drilling projects of similar nature/size in the State of Michigan for Municipal Type I Systems.
- B. Contractor must have been in the pump and well business for a minimum of ten (10) years and must be a licensed well driller in good standing and current certification with the state of Michigan.
- C. Safety is of the highest importance, therefore all crew members working on site must be OSHA 40 hour trained and current on certification. Documentation must be provided prior to starting any work.

- D. All well construction shall conform to the **Michigan Water Well Construction and Pump Installation Code (Part 127, Act 368, PA 1978 and Administrative Rules)**.
 - E. Materials:
 - 1. Shall bear label, stamp, or other markings of specified testing agency.
 - 2. Comply with NSF 14 for plastic potable-water-service piping. Include marking “NSF-pw” on piping.
 - 3. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.
 - F. Well Testing shall conform to EGLE Policy and Procedure WD-03-003: AQUIFER TEST REQUIREMENTS FOR PUBLIC WATER SUPPLY WELLS
- 1.04 SUBMITTALS:
- A. Well Casing: Mill certificates required, or mill markings shall be clearly visible on all casing sections.
 - B. Well screen: provide sieve analysis and screen selection basis.
 - C. Drilling Logs: 1 set to ENGINEER.
 - D. Well Performance Tests: Report raw data only.
- 1.05 JOB CONDITIONS:
- A. Contamination: Cap well using threaded, flanged or compression seal when unattended. Prevent contamination of existing water system.
 - B. Cleanup: Promptly following well installation. Fill pits and return jobsite to original grade. Ground immediately surrounding casing shall be sloped away from well to prevent surface runoff from ponding around completed well.
- 1.06 SCHEDULES
- A. Details:
 - 1. Site Location Map/Site Map
 - 2. Existing 6-inch well analysis
 - 3. EGLE Test Well approval
- 1.07 GUARANTEE
- A. The Contractor shall provide a guarantee for their work according to the specifications.

PART 2 - PRODUCTS

2.01 CASING (2-inch Observation Well):

- A. Diameter-2-inches, AWWA A100, Section 4.3 Table 3, and ASTM Specification A-589 - heaviest new black steel pipe. Mill stencils shall be clearly visible on all pipe sections.

- B. Joints: Standard solvent weld couplings and fittings.
- C. The casing shall extend from two feet above finished grade to depth of up to 300 feet. Casing shall be placed to provide unobstructed, uniform placement of grout.

CASING (12-inch Test Well):

- A. Conform to AWWA A100, Section 4.3 Table 3, and ASTM Specification A-589 - heaviest new black steel pipe. Mill stencils shall be clearly visible on all pipe sections.
- B. Joints: Standard threaded couplings or standard AWS butt welding. Conform to AWWA C206.
- C. The casing shall extend from two feet above finished grade to depth of up to 300 feet.

2.02 GROUT:

- A. **Neat Cement Grout for all wells.** Proportioning: Conform to AWWA A100, Section 7, and Grouting of Community Water Supply Wells, ODWMA- Public Water Supply Program, ODWMA-399-016

2.03 CENTRALIZERS:

- A. Material: PVC or stainless steel placed at the bottom and top of the screened section, and at every 40 feet of casing from the top of the screened section to the surface.

2.04 SCREEN:

- A. Continuous slot, wire wound design. Johnson Screen Company or equal.
- B. Material: AISI Type, 304 Stainless Steel with threaded, recessed couplings or welded connections.
- C. End fittings: Provided with screen, shall be type 304 stainless steel, threaded or welded.
- D. Screen Fittings: Same material as the screen. Shall be welded or threaded, watertight, and straight.
- E. Screen slot size: Screen shall be designed based upon the results of the grain size analyses.
- F. Length:
 - a. **Monitoring Well:** 10 feet
 - b. **Test Well:** 20 feet but may be field adjusted according to encountered conditions.
- G. Depth Interval: The approximate screen setting will be from 170 to 190 feet below existing grade for Test Well.
- H. Diameter: twelve (12)-inch diameter pipe size for test Well
- I. CONTRACTOR shall ensure that the screen has adequate collapse and tensile strengths.
- J. Centralizers shall be securely attached to the top and bottom of the screen section.
- K. Submit sieve analyses results to ENGINEER for final selection of slot opening.**

2.05 GRAVEL PACK:

- A. Selection: In accordance with screen manufacturer's recommendations based on sieve analyses of the formation, and AWWA A100, Section 6.

2.06 CAP, VENT, & SEAL

- A. Shall be watertight and tightly secured to casing. Vent shall be screened.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install permanent casing plumb enabling discharge column, bowl assembly, and fittings to hang free of contact with permanent casing. Seat and seal permanent casing to prevent infiltration of sand, silt and water.
- B. Pressure Grouting Method: Force grout using the tremie method from the bottom of the casing toward the surface continuously in one operation while keeping tremie pipe submerged in grout at all times during the operation.
- C. Well Development Method: Yield maximum water per foot of available draw down and extract maximum practical quantity of sand from water bearing formation such that water produced under normal operating conditions is free of sand.
- D. After completion, cap well with screwed, flanged, or compression seal cap.
- E. Plugging or abandonment requires review by the ENGINEER.

3.02 TESTING AND INSPECTION:

A. General:

- 1. Complete, develop, clean and arrange with ENGINEER for required inspections and tests.
- 2. Provide all equipment, power, water supply and assistance necessary to conduct the performance tests, including suitable gate valve, orifice, pressure gauge, water sample tap, and at least 200 feet of discharge piping and splash pan.

B. Drillers Log: Provide all information as applicable and in accordance with EGLE Wellogie Water Well and Pump Record Submittals

C. Bore Hole Surveys:

- 1. General: The completed well shall be constructed round, plumb, and true to line as defined in this section of the standard. Test for plumbness and alignment will be required by ENGINEER after completed construction of the well. The well must meet AWWA Standards for plumbness and alignment. Testing shall be performed in accordance with AWWA A100-Appendix D.
- 2. Tolerances: The following tolerances shall be maintained by the CONTRACTOR:
 - a. Plumbness: The maximum allowable horizontal deviation (drift) of the well from the vertical shall not exceed two thirds of the smallest inside diameter of that part of the well being tested per 100 ft of depth.
 - b. Alignment: The alignment must be satisfactory for the successful installation and operation of the permanent pumping equipment such that pump and column hangs freely without contact with permanent casing.

3. Departures from the above tolerances shall be corrected by CONTRACTOR at CONTRACTOR'S expense.

E. Aquifer Testing:

1. Test Procedure:

- a. Water levels readings will be measured by ENGINEER.
- b. Pumping rate will be established by ENGINEER, however, the test pump shall be capable of producing up to 800 gpm.
- c. The pumping duration will be 24 hours with a 24 hour recovery period. The pump shall remain in the production well throughout the recovery period.

3.03.1 ADJUST AND CLEAN:

A. Chlorination:

1. All well disinfection shall be in accordance with AWWA C654 latest edition.
2. Chlorinate immediately following pumping testing work. Chlorine gas will not be permitted on job site.
3. Procedure: prepare and apply chlorine solution to produce chlorine concentration of 100 ppm residual free chlorine in all parts of the well.

B. Fill, stabilize and grade all pits and well spoils.

C. The discharge from all test pumping shall not cause any soil erosion or sedimentation. Location to be coordinated with owner.

D. Contractor shall be responsible for all site cleanup including restoration.

END OF SECTION 02520



DWSRF Certification Forms



**Certification Regarding
Debarment, Suspension, and Other Responsibility Matters**

The prospective participant certifies, to the best of its knowledge and belief, that it and its principals:

- (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in transactions under federal nonprocurement programs by any federal department or agency;
- (2) Have not, within the three year period preceding the proposal, had one or more public transactions (federal, state, or local) terminated for cause or default; and
- (3) Are not presently indicted or otherwise criminally or civilly charged by a government entity (federal, state, or local) and have not, within the three year period preceding the proposal, been convicted of or had a civil judgment rendered against it:
 - (a) For the commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction (federal, state, or local) or a procurement contract under such a public transaction;
 - (b) For the violation of federal or state antitrust statutes, including those proscribing price fixing between competitors, the allocation of customers between competitors, or bid rigging; or
 - (c) For the commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

I understand that a false statement on this certification may be grounds for the rejection of this proposal or the termination of the award. In addition, under 18 U.S.C. §1001, a false statement may result in a fine of up to \$10,000 or imprisonment for up to five years, or both.

Name and Title of Authorized Representative

Name of Participant Agency or Firm

Signature of Authorized Representative

Date

I am unable to certify to the above statement. Attached is my explanation.



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Project Number: _____

Period From: _____ To: _____

Davis-Bacon Act Compliance CERTIFICATION

I certify to the best of my knowledge and belief that the above referenced project:

Complies with Davis-Bacon and Related Acts and U.S. Environmental Protection Agency policy memo dated March 2, 2012, and the Fiscal Year 2012 Consolidated Appropriations Act (P.L. 112-74) and that all laborers and mechanics employed by contractors and subcontractors during the above referenced period were paid wages at rates not less than those listed on the prevailing wage rate contained in the contract documents and that all applicable provisions of the Davis-Bacon and Related Acts have been met.

Name of Loan Recipient

Date

Signature of Authorized Representative

Print Name and Title of Authorized Representative

"General Decision Number: MI20240106 04/19/2024

Superseded General Decision Number: MI20230106

State: Michigan

Construction Type: Building

County: Antrim County in Michigan.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be

adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024
2	03/08/2024
3	03/15/2024
4	04/05/2024
5	04/19/2024

ASBE0047-005 07/01/2023

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 36.62	19.78

BOIL0169-002 01/01/2024

	Rates	Fringes
BOILERMAKER.....	\$ 39.65	35.68

BRMI0009-024 08/01/2023

	Rates	Fringes
BRICKLAYER.....	\$ 34.32	21.69
TILE SETTER.....	\$ 34.32	21.69

CARP0202-002 06/01/2023

	Rates	Fringes
CARPENTER (Drywall Hanger and Form Work).....	\$ 25.61	20.92

CARP1102-005 06/01/2023

	Rates	Fringes
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MILLWRIGHT.....\$ 32.00 26.52

ENGI0324-021 06/01/2023

Rates Fringes

POWER EQUIPMENT OPERATOR:

GROUP 1.....	\$ 45.48	25.25
GROUP 2.....	\$ 42.18	25.25
GROUP 3.....	\$ 39.53	25.25
GROUP 4.....	\$ 37.82	25.25
GROUP 5.....	\$ 31.96	25.25
GROUP 6.....	\$ 29.48	25.25

Crane operator with main boom and jib 300' or longer: \$1.50 per hour above the group 1 rate.

Crane operator with main boom and jib 400' or longer: \$3.00 per hour above the group 1 rate.

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane operator with main boom and jib 400', 300', or 220' or longer.

GROUP 2: Crane operator with main boom and jib 140' or longer; tower crane, gantry crane and whirley derrick

GROUP 3: Crane; Paver; and Scraper; Stiff Leg Derrick

GROUP 4: Fork Truck (over 20' lift)

GROUP 5: Fork Truck (20' lift and under for masonry work)

GROUP 6: Oiler

IRON0025-005 06/01/2022

Rates Fringes

IRONWORKER (REINFORCING).....	\$ 31.43	34.77
IRONWORKER (STRUCTURAL).....	\$ 34.50	38.44

LAB01098-026 07/01/2023

Rates Fringes

LABORER

Mason Tender - Brick;

Mason Tender -

Cement/Concrete; and

Pipelayer.....\$ 19.37 13.45

Sandblaster.....\$ 18.61 12.90

PLUM0085-001 05/04/2023

	Rates	Fringes
PIPEFITTER (Excluding HVAC Pipe & System Installation).....	\$ 38.01	21.73
PIPEFITTER (HVAC Pipe Installation Only).....	\$ 38.01	21.73
PLUMBER (Excluding HVAC Pipe & System Installation).....	\$ 38.01	21.73
PLUMBER (HVAC System Installation Only).....	\$ 38.01	21.73

* SFMI0669-003 01/02/2024

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 41.34	26.80

SHEE0007-003 05/01/2023

	Rates	Fringes
SHEET METAL WORKER (Excluding HVAC Duct & System Installation).....	\$ 31.05	25.07
SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 31.05	25.07

* SUMI2011-031 02/14/2011

	Rates	Fringes
CARPENTER, Excludes Drywall Hanging, and Form Work.....	\$ 18.58	2.06
CEMENT MASON/CONCRETE FINISHER...	\$ 20.75	5.82
ELECTRICIAN.....	\$ 19.12	4.91
GLAZIER.....	\$ 17.19 **	3.83
LABORER: Common or General.....	\$ 13.55 **	3.55
LABORER: Landscape & Irrigation.....	\$ 11.04 **	4.39
OPERATOR: Backhoe/Excavator.....	\$ 24.04	6.03

OPERATOR: Bulldozer.....	\$ 22.46	7.29
OPERATOR: Grader/Blade.....	\$ 24.04	6.03
OPERATOR: Roller.....	\$ 27.47	8.86
OPERATOR: Tractor.....	\$ 19.60	7.31
OPERATOR: Loader.....	\$ 24.04	6.03
PAINTER: Brush Only.....	\$ 16.20 **	2.07
PAINTER: Roller.....	\$ 16.61 **	2.09
PAINTER: Spray.....	\$ 16.37 **	2.08
ROOFER.....	\$ 13.64 **	4.58
TRUCK DRIVER, Includes Dump and Tandem Truck.....	\$ 16.56 **	3.50
TRUCK DRIVER: Flatbed Truck.....	\$ 17.44	4.51

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other

health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and

the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour

National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====
END OF GENERAL DECISION"

"General Decision Number: MI20240157 05/17/2024

Superseded General Decision Number: MI20230157

State: Michigan

Construction Type: Heavy
PIPELINE

Counties: Michigan Statewide.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for

performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	05/03/2024
2	05/17/2024

* ENGI0325-012 05/01/2024

	Rates	Fringes
Power equipment operators - gas distribution and duct installation work:		
GROUP 1.....	\$ 37.98	25.25
GROUP 2.....	\$ 34.75	25.25

SCOPE OF WORK: The construction, installation, treating and reconditioning of pipelines transporting gas vapors within cities, towns, subdivisions, suburban areas, or within private property boundaries, up to and including private meter settings of private industrial, governmental or other premises, more commonly referred to as "distribution work," starting from the first metering station, connection, similar or related facility, of the main or cross country pipeline and including duct installation.

Group 1: Backhoe, crane, grader, mechanic, dozer (D-6 equivalent or larger), side boom (D-4 equivalent or larger), trencher(except service), endloader (2 yd. capacity or greater).

GROUP 2: Dozer (less than D-6 equivalent), endloader (under 2 yd. capacity), side boom (under D-4 capacity), backfiller, pumps (1 or 2 of 6-inch discharge or greater), boom truck (with powered boom), tractor (wheel type other than backhoe or front endloader). Tamper (self-propelled), boom truck (with non-powered boom), concrete saw (20 hp or larger), pumps (2 to 4 under 6-inch discharge), compressor (2 or more or when one is used continuously into the second day) and trencher(service). Oiler, hydraulic pipe pushing machine, grease person and hydrostatic testing operator.

LAB01076-005 04/01/2024

MICHIGAN STATEWIDE

	Rates	Fringes
LABORER (DISTRIBUTION WORK)		
Zone 1.....	\$ 27.16	13.45
Zone 2.....	\$ 25.42	13.45
Zone 3.....	\$ 23.55	13.45
Zone 4.....	\$ 22.92	13.45
Zone 5.....	\$ 22.95	13.45

DISTRIBUTION WORK - The construction, installation, treating and reconditioning of distribution pipelines transporting coal, oil, gas or other similar materials, vapors or liquids, including pipelines within private property boundaries, up to and including the meter settings on residential, commercial, industrial, institutional, private and public structures. All work covering pumping stations and tank farms not covered by the Building Trades Agreement. Other distribution lines with the exception of sewer, water and cable television are included.

Underground Duct Layer Pay: \$.40 per hour above the base pay rate.

- Zone 1 - Macomb, Oakland and Wayne
- Zone 2 - Monroe and Washtenaw
- Zone 3 - Bay, Genesee, Lapeer, Midland, Saginaw, Sanilac, Shiawassee and St. Clair
- Zone 4 - Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and Schoolcraft
- Zone 5 - Remaining Counties in Michigan

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours

they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

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A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the "SA" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in

the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

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- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

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Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

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U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"



EGLE Test Well Approval Letter





GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
BAY CITY DISTRICT OFFICE



PHILLIP D. ROOS
DIRECTOR

June 13, 2024

Kim Smith
Union Township
2010 South Lincoln Road
Mt. Pleasant, MI 48858

WSSN: 06725
County: Isabella

Dear Kim Smith:

SUBJECT: Union Township – Test Well 12 Approval Updated

The Department of Environment, Great Lakes, and Energy (EGLE), Drinking Water and Environmental Health Division (DWEHD) has reviewed the documentation submitted, and completed a site inspection of the proposed test well 12 (TW-12) location on March 13, 2023. During the latest site visit on May 29, 2024, it was determined a follow up site inspection was not needed prior to the installation of the final TW-12. The proposed capacity of the finished well will be at most 800 gallons per minute. Based on the results of the Adverse Resource Impact (ARI) completed by EGLE's Source Water Unit, TW-12 shall not be pumped more than 12 hours per day to qualify for Zone B.

During the site investigation, it was determined TW-12 was able to meet the minimum isolation distance requirements from major sources of contamination. The Township is also the owner of the minimum 200-foot isolation radius around the wellhead. No isolation distance variance will be required for TW-12.

This letter grants drilling approval to conduct TW-12 site investigation work for the Union Township Community Water Supply. TW-12 will be completed at approximately 43.5659, -84.7698. According to a proposal submitted by Gourdie Fraser on May 3, 2024, TW-12 will utilize a 12-inch schedule 80 steel casing that will extend to a depth no greater than 280 feet. TW-12 is slated to be equipped with a wire wound stainless screen extending 20 feet below the casing.

Union Township has already installed a 6-inch PVC monitoring well to test the aquifer for sustainable well flows. A second monitoring well will be installed on site to monitor the drawdown from TW-12 as required by EGLE policy ODWMA-399-003, *Aquifer Test Requirements for Public Water Supply Wells*. Should conditions prove favorable during the testing and construction of TW-12, Union Township will apply for an Act-399 permit to construct the 12-inch production well.

Once the test well has been drilled, the following documentation must be submitted prior to applying for an Act-399 permit:

1. A final site plan showing the exact location of the test well relative to all major and potential sources of contamination. Additionally, the site plan should indicate the 100-year flood elevations relative to the wells.
2. A log of the test well. A pump record must also be included.
3. The results of a 72-hour pump test. According to EGLE standard policy *ODWMA-399-003 Aquifer Test Requirement for Public Water Supply Wells*, a 72-hour pump test must be completed to determine the reliability of the water source. A copy of the forementioned policy is included in this letter. The final permit will not be issued until the results of the required 72-hour pump test are completed and reviewed by this office.
4. Evidence that the annular space between the drill holes and well casings have been properly filled with neat cement grout. This requirement also applies to any observation wells that will remain in the standard isolation area.
5. Chemical monitoring must be done on the water from the proposed test well to help determine if there are similarities between the existing observation wells and the proposed test well, and to determine the potability of the water produced from the new well. A copy of the required chemical monitoring is included with this letter. The final permit will not be issued until the chemical monitoring has been completed and reviewed by this office.
6. Detailed plans and specifications must be submitted for the test well including depth, diameter, pump setting, pump curves, etc. must be collected at the end of the pump test for analysis. Copies of the analytical results along with conclusions and recommendations on the water quality will need to be included in the Report. Information on EGLE's Drinking Water Laboratory and list of other certified laboratories can be viewed at www.michigan.gov/drinkingwater.

This test well approval letter does not approve TW-12 for use as a production well or connection to a community water supply system. Installation of pump equipment and related appurtenances enabling a connection to the water system is prohibited. Before TW-12 can be switched to production, an Act-399 permit must be submitted to the Bay City District Office. A permit can be submitted electronically through the MiEHDWIS portal for Union Township. The permit application, construction specifications, and plans will need to be completed by an engineer registered in the State of Michigan.

This test well approval letter expires in two years of the date of this letter. This letter does not remove the need for other applicable local, state, or federal approvals or permits. If you should have any questions regarding this letter, please contact me by email at mudds@michigan.gov or by using the information below.

Sincerely,



Shane Mudd
District 22 Engineer
Bay City District Office
Drinking Water and Environmental Health
517-388-3582

Enclosure(s):
New Well Chemical Monitoring Requirements
ODWMA-399-003 Aquifer Test Requirement for Public Water Supply Wells

cc:
Shawn McBride, OIC
Central Michigan Health Department

**CHEMICAL MONITORING REQUIREMENTS
FOR NEW COMMUNITY WATER SUPPLY WELLS**

PARTIAL CHEMISTRY

(R, 32)*
Nitrate
Nitrite
Fluoride
Sulfate
Chloride
Sodium

WATER QUALITY PARAMETERS

(CORR, 33)*
Alkalinity
Calcium
Conductivity
Orthophosphate as PO₄ pH
(analyze in field) Temperature
(analyze in field)

GENERAL METALS

(CPM1, 36ME)*
Iron
Manganese
Copper
Zinc

METALS

(CMET2, 36ME)*
Arsenic
Barium
Cadmium
Chromium
Mercury
Antimony
Beryllium
Nickel
Selenium
Thallium

CYANIDE

(CCN, 36CN)*
Cyanide

VOLATILE ORGANICS (VOC)

(CXVO, 36VO)*
Benzene
Carbon Tetrachloride
o-dichlorobenzene
p-dichlorobenzene
1,2-dichloroethane
1,1-dichloroethylene
cis-1,2-dichloroethylene trans-1,2-
dichloroethylene Dichloromethane
(methylene chloride)
1,2-dichloropropane
Ethylbenzene
Monochlorobenzene
Styrene
Tetrachloroethylene
Toluene
1,2,4-trichlorobenzene
1,1,1-trichloroethane
1,1,2-trichloroethane
Trichloroethylene
Xylenes (total)
Vinyl Chloride

SYNTHETIC ORGANICS (SOC)

Pesticides
(CXPT, 36PT)*
Alachlor
Atrazine
Benzo(a)pyrene
Chlordane
Di(2-ethylhexyl) adipate
Di(2-ethylhexyl) phthalate
Endrin
Heptachlor Heptachlor
Epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Lindane
Methoxychlor
Polychlorinated Biphenols
Simazine
Toxaphene

SOC (cont.)

Herbicides
(CXHB, 36HB)*
Dinoseb
Pentachlorophenol
Picloram
2,4-D
2,4,5-TP (Silvex)

Carbamates
(CXL, 36LP)*
Aldicarb
Aldicarb Sulfoxide
Aldicarb Sulfone
Carbofuran
Oxamyl (vydate)

PFAS

(CPFAS, 36PF)*
Perfluorobutanesulfonic Acid (PFBS)
Perfluorohexane Sulfonic Acid (PFHxS)
Perfluorononanoic Acid (PFNA)
Perfluorooctane Sulfonic Acid (PFOS)
Perfluorooctanoic Acid (PFOA)
Perfluorohexanoic Acid (PFHxA)
HFPO-DA


RADIOACTIVITY

Uranium (CU, 36ME)*
Not performed at EGLE Lab:
Gross Alpha
Radium 226
Radium 228

A certified laboratory must perform the above testing.

Michigan Department of Environment, Great Lakes, and Energy (EGLE) Laboratory scans may include other contaminants for which monitoring is not mandated.

* EGLE Lab Test Code and Sample Unit

	OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE POLICY AND PROCEDURE		DEPARTMENT OF ENVIRONMENTAL QUALITY
Original Effective Date: December 1, 1997	Subject: Aquifer Test Requirements for Public Water Supply Wells		Category: <input type="checkbox"/> Internal/Administrative <input type="checkbox"/> External/Noninterpretive <input checked="" type="checkbox"/> External/Interpretive
Revised Date: April 14, 2004	Division/Office and Program Names: ODWMA-Field Operations Section and Environmental Health Section		
Reformatted Date: January 14, 2013	Number: ODWMA-399-003	Page: 1 of 6	

A Department of Environmental Quality (DEQ) Policy and Procedure cannot establish regulatory requirements for parties outside of the DEQ. This document provides direction to DEQ staff regarding the implementation of rules and laws administered by the DEQ. It is merely explanatory; does not affect the rights of, or procedures and practices available to, the public; and does not have the force and effect of law.

INTRODUCTION, PURPOSE, OR ISSUE:

The goal of this policy and procedure is to establish standards for the acquisition of information used in implementing sound groundwater resource management practices. The Office of Drinking Water and Municipal Assistance (ODWMA) has established the following requirements and evaluation criteria for yield tests and hydrogeological assessments on wells serving public water supply systems. The requirements for a yield test are based upon widely accepted practices for conducting an aquifer test for the purpose of estimating potential yields from an aquifer and wells, characterizing the groundwater resource, and managing the groundwater resource.

AUTHORITY:

R 325.10807 (Rule 807), R 325.10809 (Rule 809), R 325.10812 (Rule 812), R 325.10813 (Rule 813), R 325.10814 (Rule 814), and R 325.10830 (Rule 830) of the administrative rules adopted under the Safe Drinking Water Act, 1976 PA 399, as amended, covering the location of wells, isolation area modification, location of wells with respect to major sources of potential contamination, studies of hydrogeological conditions by suppliers of water to Type I and Type IIa public water supplies, studies of suppliers of water of Type IIb and Type III public water supplies, and yield or performance testing requirements.

STAKEHOLDER INVOLVEMENT:

This policy and procedure was vetted before the consulting community through a public meeting in 1995. There were no objections to the policy and procedure. Language was added, such as the requirements for obtaining static water elevations and the determination of the groundwater gradient and direction of flow, at the recommendation of the consulting community.

DEFINITIONS:

High Capacity Well: a well or combination of wells that is or will be equipped with a pump of 70 gallons per minute (gpm) or greater capacity intended to serve a Type I public water supply

OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE
POLICY AND PROCEDURE

Subject: Aquifer Test Requirements for Public Water
Supply Wells

Number: ODWMA-399-003

Page 2 of 6

system, or a Type II or Type III public water supply system with a pump of 70 gpm or greater capacity where the projected water withdrawal is over 100,000 gallons per day average for any 30 consecutive days.

Hydrogeologic Assessment: a study of hydrogeologic conditions, including a yield test, conducted for the purpose of determining an isolation area or assessing the acceptability of a well location.

Low Capacity Well: a well or combination of wells intended to serve a Type I, Type II, or Type III public water supply system that does not meet the definition of high capacity.

Yield Test: a test completed to determine the long-term production capability and/or drawdown of an aquifer or well.

POLICY:

1. Yield Tests for High Capacity Wells: High capacity wells shall be subject to the requirements of this policy and procedure.
2. Yield Tests for Low Capacity Wells: The requirements of this policy and procedure may apply to a low capacity well where deemed necessary by the ODWMA. Yield tests on low capacity wells may be required to fulfill all or a portion of this policy and procedure as deemed necessary by the ODWMA.
3. Hydrogeological Assessments: Yield tests conducted as part of a hydrogeologic assessment, such as those required under R 325.10830 on a Type I, Type II, or Type III well or a Wellhead Protection Area delineation, shall conform to the requirements of this policy and procedure. Waiver of the requirements for a yield test shall be contingent upon the availability of information on the aquifer necessary to completing the assessment using existing sources of information.
4. Replacement of Well Capacity: The requirements of this policy and procedure may be waived where a well intended to serve an existing Type I, Type II, or Type III public water supply is being constructed for the sole purpose of replacing previously existing capacity. Waiver of the requirements shall be contingent upon the availability of existing information that fulfills the requirements and intent of this policy and procedure.

PROCEDURES:

The purpose of an aquifer test is to define aquifer hydraulic characteristics and determine the ability of the aquifer to yield water. Data from an aquifer test shall be subject to a suitable mathematical analysis to predict the effects of continuous pumping with no recharge and determine a safe withdrawal rate from the aquifer. In certain instances, an aquifer test may be required to assess the effects of well interferences, determine if groundwater recharge or barrier boundaries exist, or assess the aquifer's vulnerability to contamination.

OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE
POLICY AND PROCEDURE

Subject: Aquifer Test Requirements for Public Water
Supply Wells

Number: ODWMA-399-003

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Observation Well Requirements – Aquifer tests shall be conducted using a minimum of two observation wells. The observation wells may consist of adjacent wells terminated in the same aquifer and not in service during the aquifer test, or wells constructed for the sole purpose of obtaining drawdown measurements during the aquifer test. Observation wells shall be completed in the same aquifer and screened at or near the depth of the production well. If the production well terminates in the bedrock, the observation wells shall terminate in the same bedrock formation at approximately the same depth and exhibit a similar interval of open borehole. It is recommended observation wells be located at distances from the production well one to five times the thickness of the aquifer and at right angles to each other. The observation wells shall be located at different distances from the production well.

Location Information – Locations for all wells at the well site or used in the aquifer test (production well and observation wells) shall be obtained. Locations shall be obtained using a global positioning system and reported as latitude and longitude in degrees-minutes-seconds or in degrees to an accuracy of 0.00001 of a degree.

Water Well Records – Water well records for all wells at the site shall be entered into Wellogic or copies of the water well records transmitted to the ODWMA for entry into Wellogic. The water well records shall include complete and accurate location information, which at a minimum is to include the latitude and longitude of the well, the township name, township number, range number, section number, and county name where the wells are located. (Note: Transmittal of water well records to the ODWMA does not preclude the responsibility on the part of the water well driller to retain a copy and transmit a copy of the water well record to the local health department and the owner of the well in accordance with the Michigan Water Well Construction and Pump Installation Code, Part 127, Water Supply and Sewer Systems, of the Public Health Code, 1978 PA 368, as amended, and the administrative rules promulgated thereunder).

Static Water Elevations, Groundwater Gradient, and Direction of Flow – Static water elevations shall be obtained in all wells constructed at the well site or utilized in the aquifer test. Static water elevations shall be provided in feet above mean sea level (ft AMSL) with reference to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988. Static water elevations shall be determined by surveying the top-of-casing (ft AMSL), measuring the depth from the top-of-casing to the static water level in the well, and subtracting this depth from the top-of-casing elevation to determine the static water elevation in the wells. All surveyed elevations, depth from the top-of-casing to the static water level, and static water elevations shall be reported to an accuracy of 0.01 feet.

The static water elevations shall be used to determine the groundwater gradient and the direction of groundwater flow. The gradient and direction of groundwater flow shall be determined by "triangulation," at a minimum, on three static water elevations (one from the production well and one each from the two observation wells). Wells may be in such close proximity that obtaining an accurate groundwater gradient and direction of groundwater flow is

OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE
POLICY AND PROCEDURE

Subject: Aquifer Test Requirements for Public Water
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not possible. In such instances the top-of-casing elevation, depth from the top-of-casing to the static water level, and static water elevation shall be provided.

Prior to the Aquifer Test – The collection of background static water levels is required to account for any natural or manmade trends in groundwater level that might impact the outcome of the aquifer test. Before beginning the aquifer test, static water level measurements shall be obtained from the production well and observation wells. Static water level measurements shall be taken at a minimum of one reading every hour for a period of time equal to at least 1/3 of the anticipated length of the aquifer test.

Pumping Rate and Duration – The production well shall be set up and equipped to discharge at or above the desired production rate for the duration of the aquifer test. Provisions shall be made to maintain a constant flow rate from the production well over the course of the aquifer test. Periodic measurement of the flow rate should be made to ensure a constant discharge. Water from the production well shall be discharged in a manner that will not impact water levels in the aquifer or the outcome of the aquifer test. Provisions shall be provided to control or precisely know the time and magnitude of groundwater withdrawals from the aquifer as a result of nearby large capacity wells producing from the same aquifer.

Where a production well is completed in a confined aquifer, the duration of the aquifer test shall be a minimum of 24 hours. Where hydrogeologic data suggests the aquifer is unconfined, the duration of the aquifer test shall be a minimum of 72 hours.

Drawdown and Recovery Measurements – During the aquifer test, drawdown measurements shall be recorded in the production well and observation wells to an accuracy of 0.01 feet. Drawdown measurements shall be made in the production well and observation wells, at a minimum, in accordance with the following schedule:

<u>ELAPSED TIME</u>	<u>MEASUREMENT FREQUENCY</u>
0 to 10 minutes	1 per minute
10 to 20 minutes	Every 2 minutes
20 to 60 minutes	Every 5 minutes
60 to 180 minutes	Every 15 minutes
180 to 360 minutes	Every 30 minutes
360 minutes to completion	Every 60 minutes

Upon completion of pumping, measurements of water level recovery shall be obtained from the production and observation wells for a period of time not less than 1/3 the length of the period of pumping. During recovery, measurements shall be made in accordance with the schedule as noted above for drawdown measurements.

The pretest, time-drawdown, and recovery data that is collected shall be provided in both hard copy and digital form to the ODWMA. Where data has been automatically collected in digital form at a frequency greatly in excess of the aforementioned elapsed time and measurement frequency, the data shall be reduced to a reasonable and manageable size and form prior to submittal of the data to the ODWMA.

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Analysis of Data – At a minimum, the aquifer hydraulic characteristics transmissivity and storage coefficient shall be determined employing the methods of Cooper and Jacob (1946) or Theis (1935). More complex methods of analysis, including but not limited to the following, should be used where appropriate to the area hydrogeology and response of the aquifer to the withdrawal of groundwater:

- Hantush and Jacob, 1955 – leaky-confined conditions
- Hantush, 1960 – leaky-confined conditions
- Neuman, 1972 – unconfined conditions and/or delayed yield
- Neuman, 1974 – unconfined conditions and partial penetration
- Hantush, 1961 – partial penetration
- Ferris, et al., 1962 – the presence of boundaries

The analysis of data shall include a prediction of the effects of 100 days pumping at the maximum pumping rate of the permanent pump. The predictions shall include the following:

- Maximum safe withdrawal rate for the production well.
- Projected drawdown in the production well (corrected for well losses where necessary).
- Projected drawdown throughout the aquifer (i.e., distance-drawdown or plan review).

REFERENCES:

- Cooper, H.H., Jr., and C.E. Jacob, 1946. *A generalized graphical method for evaluating formation constants and summarizing well field history*, Transactions of the American Geophysical Union, Vol. 27, pp. 526-534.
- Ferris, J.G., D.B. Knowles, R.H. Brown, and R.W. Stallman, 1962. *Theory of Aquifer Tests*, Ground-Water Hydraulics, Geological Survey Water-Supply Paper 1536-E, p. 174.
- Hantush, M.S. and C.E. Jacob, 1955. *Non-steady radial flow in an infinite leaky aquifer*, Transactions of the American Geophysical Union, Vol. 36, pp. 95-100.
- Hantush, M.S., 1960. *Modification of the theory of leaky aquifers*, Journal of Geophysical Research, Vol. 65, No. 11, pp. 3713-3725.
- Hantush, M.S., 1961. *Drawdown around a partially penetrating well*, Journal of Hydraulic Division, Proceeding of the American Society of Civil Engineers, Vol. 87(HY4), pp. 83-98.
- Neuman, S.P., 1972. *Theory of flow in unconfined aquifers considering delayed response of the watertable*, Water Resources Research, Vol. 11, pp. 1031-1045.
- Neuman, S.P., 1974. *Effect of partial penetration on flow in unconfined aquifers considering delayed gravity response*, Water Resources Research, Vol. 10, No. 2, pp. 303-312.

OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE
POLICY AND PROCEDURE

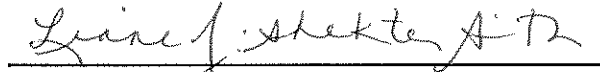
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Theis, C.V., 1935. *The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage*, Transactions of the American Geophysical Union, Vol. 16, pp. 519-524.

OFFICE CHIEF APPROVAL:



Liane J. Shekter Smith, Chief
Office of Drinking Water and Municipal Assistance

1/18/2013
Date



Existing 6-inch Monitoring Well Analysis Report





Ionia, MI / 616.527.0050
Fenton, MI / 810.215.1295

August 29, 2023

Kim Smith, Utilities Director
Charter Township of Union
Mt. Pleasant, MI

**RE: Observation Well Drilling, Construction and APT Analysis- Observation Well 23A,
Union Charter Township, Michigan**

Dear Mrs. Smith:

Peerless-Midwest, Inc. (PMI) was contracted by the Charter Township of Union, Michigan (Union Township) in collaboration with their Township Engineer, Gourdie Fraser (GFA) to construct an observation well (OW 23A); conduct an aquifer performance test (APT); analyze the APT data sets; determine the 100-day maximum safe yield rating potential for a new future well at the proposed site (The Site) in Union Township, Michigan; and construction details of a 6-inch well that will be converted to a monitoring well upon project completion.

The Site is approximately 2 miles south of downtown Mt. Pleasant, Michigan. OW 23A is located approximately 650 feet west of South Mission Road and 810 feet south of East Deerfield Road. The Site is located on the Mount Pleasant USGS 1:24,000 quadrangle in the northeast quarter of Section 34, Union Township (T14N, R4W), Isabella County, Michigan (Figure 1).

Project Need:

The existing East Side Iron Removal Facility (Isabella Facility) is owned and operated by Union Township and provides municipal water service to the customers within the Township. The facility operates on two (2) 400 gpm and one (1) 700 gpm production wells (Wells #7, #10 and #11) all located at the facility, which provides iron removal treatment utilizing two (2) 750 gpm pressure filters and then distributes water out to system. Well #7, #10 and #11 are all located within the same aquifer. Based on the development and testing of the three (3) Isabella Facility Wells #7, #10, and #11 it was determined that the aquifer is capable of producing a rated capacity of 1100 GPM allowing the Township to have the flexibility to use Well #7 simultaneously with one of the other wells (well #11 or #10 - operating lead / lag).

With limited aquifer capacity at the Isabella Facility, the Township began investigating locations for a new well site to supplement future demand needs of the East Side Pressure District. A feasibility study completed by GFA in November 2021 identified several plausible sites of

which they ultimately selected a 14 acre parcel they owned located at 5076 South Mission Road. In 2022 the Township was successful in obtaining a Source Water Protection Grant from Michigan Department of Environment, Great Lakes and Energy (EGLE) Source Water Protection Grant in 2022 to partially fund further exploration of this site. This year the Township solicited a Request for Proposals (RFP) to retain a well driller to proceed with this work. It was the intent of the RFP scope for the selected contractor to construct and develop an observation well and demonstrate that the aquifer would be capable of meeting the proposed capacity requirements of 400 Gallons Per Minute or greater for future use. This well, upon completion of the analysis will be utilized as a monitoring well for a future test production and associated well pump testing, if applicable.

Geologic/ Hydrogeologic Background

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) identifies the primary unconsolidated material at the Site as end moraines of medium-textured till. Till is typically considered poorly sorted (well-graded), unstratified material. These materials are deposited directly by ice, as compared to meltwater deposits, and are often angular in shape. Given the poorly sorted nature of the materials, till deposits often don't have vertically continuous sand and gravel units required for high-capacity well development and thus aren't typically utilized for this application. Wells completed in these materials are often able to meet the needs of domestic users where sand and gravel lenses are present.

Moraines are the landforms formed by the accumulation of till which are deposited as a result of advances/ retreats of glaciers. End moraines, as their name suggests, form at the terminus, or end, of a glacier. When the glacier stops "advancing" and temporarily pauses (is neither "advancing" or "retreating"), till is continuously deposited, and is able to form a ridge or mound at the end of the glacier, before it starts retreating. As explained above, end moraines are not typically associated with high-capacity wells, given the limited vertical thickness of sand and gravel deposits.

EGLE maps identify the consolidated material near the Site as Saginaw Formation. The Saginaw Formation is identified as Pennsylvanian-aged (323-299 million years ago) and is up to 400 feet thick in areas. The Saginaw Formation is also identified as sandstone and is often combined with the underlying Parma Sandstone, where present. The Saginaw Formation is utilized as an aquifer source where prolific unconsolidated materials are not available.

Well Drilling

In July of 2023, one well was constructed (OW 23A using the direct rotary method. At OW 23A, a thick sequence of glacial till was encountered from ground level to 147 feet below ground level (bgl). This sequence was primarily composed of clay with a thin lens of sand from 90 to 110 feet bgl. A continuous sand and gravel formation was then encountered from 147 feet bgl to at least 160 feet bgl, Only glacial till and clay was found below that depth to 300 feet. OW 23A was completed as a 6-inch diameter PVC-cased well. This well has 150 feet of 6-inch diameter PVC casing set from 2 feet above ground level (agl) to 148 feet bgl and 10 feet of 0.030-inch slot 6-inch diameter stainless steel, wire-wrapped screen from 148 feet bgl to 158 feet bgl. The annular space was filled with Type 1L Neat Cement grout from ground level to 147 feet bgl and silica gravel pack from 147 feet bgl to 158 feet bgl. The static water level was recorded as 12.30 feet below top of casing (btoc).

Aquifer Performance Test

An aquifer performance test (APT) was conducted at the Site to determine the aquifer hydraulic parameters and provide information necessary to determine the 100-day safe yield rating of a proposed future twelve-inch production well located near OW 23A. An 8 hour APT was completed at OW 23A on August 1st, 2023. Water levels were recorded within the well during the background, pumping, and recovery periods at one-minute intervals using pressure transducers equipped with data loggers. Water levels within the well were recorded regularly by field technicians during the pumping period. The well location is shown in Figure 2.

Background Period

Background readings were collected within OW 23A for 21 hours before the test began to document natural fluctuations in water levels. Except for valve adjustments immediately prior to the start of the test, the potentiometric surface varied 0.76 feet in OW 23A during the background period. The minor interference was attributed to nearby high-capacity well operations.

Pumping Period

OW 23A was pumped at a rate of 112 gpm for the duration of the 8-hour APT. The water level within OW 23A before starting the pump was 12.30 feet btoc. The water level within OW 23A after 8 hours of pumping was 96.50 feet btoc, resulting in a specific capacity of 1.33 gallons per minute per foot of drawdown (gpm/ft dd). The graphical representation of transducer data sheets, field data sheets, and reduced transducer drawdown data are provided in Attachment B.

Recovery Period

Recovery readings were recorded by pressure transducers equipped with data loggers within OW 23A for 144 hours after the pump was shut down. Water levels in OW 23A recovered to 95% of the drawdown within 37 minutes and 99% of the drawdown within 6 hours of the pump being turned off. The reduced transducer recovery data is provided in Attachment B.

APT Analysis/ Production Well Design

APT Analysis

The drawdown data from OW 23A were analyzed using the analytical modeling software AQTESOLV® (HydroSOLV, 2007). The Dougherty-Babu (1984) method for a confined aquifer was used for analysis of drawdown data to calculate the transmissivity (**T**) and storativity (**S**). The Theis (1935) method was used for analysis of recovery data to calculate **T** as well. The average **T** is calculated to be 828.8 square feet per day (ft²/day) and the average **S** is calculated to be 8.54×10^{-5} (unitless). Assuming an aquifer thickness of 13 feet, the average calculated hydraulic conductivity (**K**) is calculated to be 63.754 feet per day (ft/day) and the specific storage (**Ss**) is calculated to be 6.57×10^{-6} per foot (ft⁻¹). These results are summarized below in Table 1. Copies of the graphical analyses are provided in Attachment C. The aquifer responds confined to pumping, which will prevent the downward migration of contaminants.

TABLE 1 Well OW 23A Aquifer Performance Test Analysis Results

Wells	Analysis Method	Transmissivity (ft ² /day)	Hydraulic Conductivity (ft/day)	Storativity (dimensionless)	Specific Storage (ft ⁻¹)
OW 23A	Dougherty-Babu (1984)	919.3	70.715	8.54 x 10 ⁻⁵	6.57 x 10 ⁻⁶
OW 23A Recovery	Theis (1935) Recovery	738.3	56.792	-	-
Average		828.8	63.754	8.54 x 10⁻⁵	6.57 x 10⁻⁶

Safe Yield Analysis

A safe yield is generally determined by extrapolating well performance based on the average hydraulic parameter values and well efficiency results for 100 days of continuous pumping with no recharge to the aquifer. PMI extrapolated data from the 6" well to predict performance for a proposed future 12" production well at the same site location and depth. The 100-day safe yield production rate for this new 12-inch diameter production well (referred to as Well 12 for this report) was calculated using the AQTESOLV® Forward Solution method which is a predicting tool that estimates the drawdown observed in a well using specified pumping rate and hydraulic parameter values as inputs into the appropriate analytical solution. Proposed Well 12 is assumed to be constructed at the same depth with the same lithology as the six-inch well and have the same hydraulic parameters. This forward solution does not take into account any potential interference to any existing production wells in the well field if they were to be ran simultaneously.

Using the AQTESOLV® forward solution, the average hydraulic parameter values summarized in Table 1 were used as input to the Dougherty-Babu (1984) analytical solution and the 100-day safe yield values for Proposed Well 12 was estimated. The forward solution was modeled with Proposed Well 12 pumping at 152 gpm. At this rate, the 100-day predicted drawdown in Proposed Well 12 is 117.82 feet. With an assumed static water level of 12.30 feet btoc at Proposed Well 12, the predicted pumping water level is 130.12 feet. Graphic results with the predicted 100-day drawdown are provided in Attachment D. Based on these calculations, Proposed Well 12 can safely yield 152 gpm for 100 days. Using specific capacity data the well yield is projected to be 175 gpm.

In our experience extrapolating the data from a 6" well to a 12" well, we feel that you can use a multiplier of 2-4 times the transmissivity measured on the small test well due to well losses in the 6" well at high flow rates. Using that data, we estimate you can achieve 300 to 600 gpm out of a properly developed 12" well on this site. There are no guarantees of that quantity. This is the best estimate we can make based upon the data from a single 6" observation well projection.

We recommend based upon the results for the 6" observation well that there is enough data to support further exploring the site and potential further with a 12" test/production well. It is also likely the site could support more than one well, subject to further test drilling and assuming adequate isolation area is available.

Future 12" Well Construction

A sieve analysis was conducted on the interval from 147 to 160 feet below grade. Based on those results, we feel a properly constructed 12" well would have an .080" slot well screen with a

corresponding gravel pack. Thirteen feet of well screen would be used. A graph of the sieve analysis is attached along with a proposed well construction print.

Groundwater Chemistry

Water samples were collected at the time of the testing to evaluate quality compliant with EGLE requirements. The chemistry results are not yet available from the laboratory at the time of this report. We expect those results within two weeks or early September and will be provided upon receipt.

Results and Conclusions

PMI was contracted by Union Township to construct a six-inch well (OW 23A); conduct an APT; analyze the APT data set; and determine the 100-day maximum safe yield rating for a proposed potential future new 12-inch diameter production wells in Union Township, Michigan. The extrapolation was based upon field collected data from a 6-inch well that was constructed onsite. The drawdown data were analyzed using the Dougherty-Babu (1984) method for a confined aquifer. The transmissivity of the aquifer is calculated to be 828.8 ft²/day and the storativity is calculated to be 8.54×10^{-5} . Based upon the results, it is our opinion that this site could support a 12" production well between 300 to 600 gpm with possibility for a second well. The final **allowable final capacity of the proposed future production well will depend on the results of the Adverse Resource Impact (ARI)** as completed by EGLE's Source Water Unit.

EGLE provided a letter of approval in March 2023 supporting the construction of the observation well. However please note the naming convention used in that letter differed as it was referred to as TW12 and is the same well as referred to in this report (OW23A). Please note, the EGLE letter refers to this OW-23A as TW-12 and they are in fact one in the same.

The calculations presented within this report are based upon the current understanding of the aquifer properties at the Site. If future investigations at the Site are conducted, further evaluation of the aquifer is recommended (i.e. additional APTs) to verify the aquifer hydraulic parameters are consistent with the findings of this report. If the aquifer parameters vary at the Site, the safe yield analysis and resulting recommended pump setting should be re-evaluated.

* * *

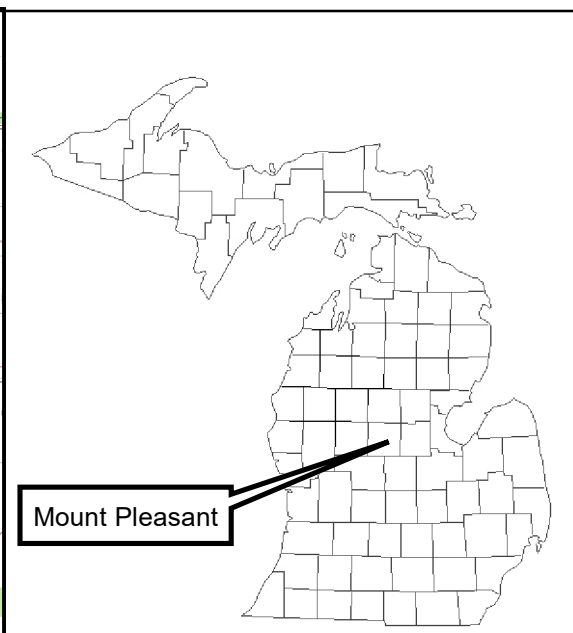
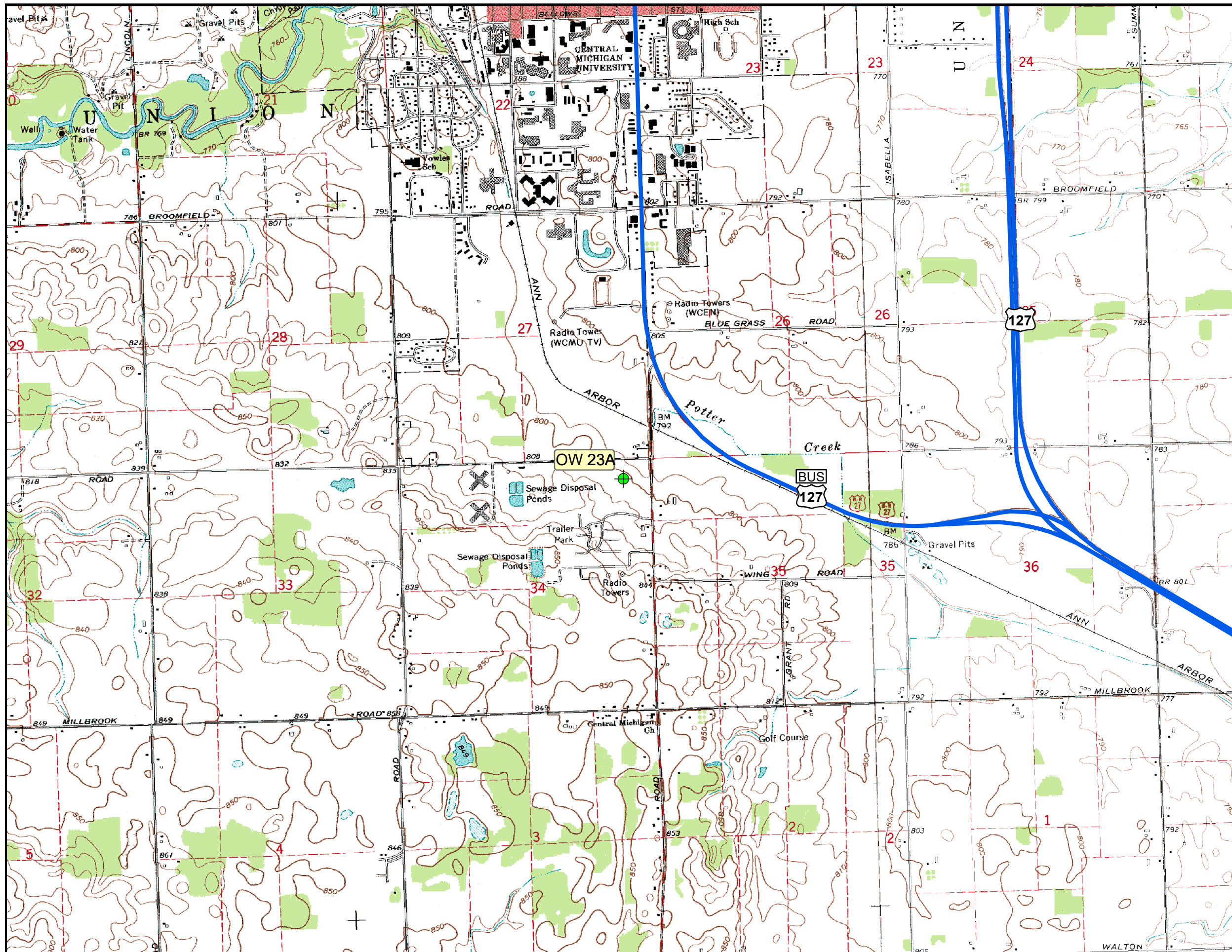
We appreciate the opportunity to provide Union Township with professional hydrogeologic services and look forward to our continued relationship. Should you have any questions or if you would like to discuss this report further, please contact us at your convenience.

Sincerely,

PEERLESS-MIDWEST, INC.



Bob Masters, M.S. -Project Manager/Hydrogeologist

FIGURES



Mount Pleasant

Legend

-  Test Well
-  Major Road



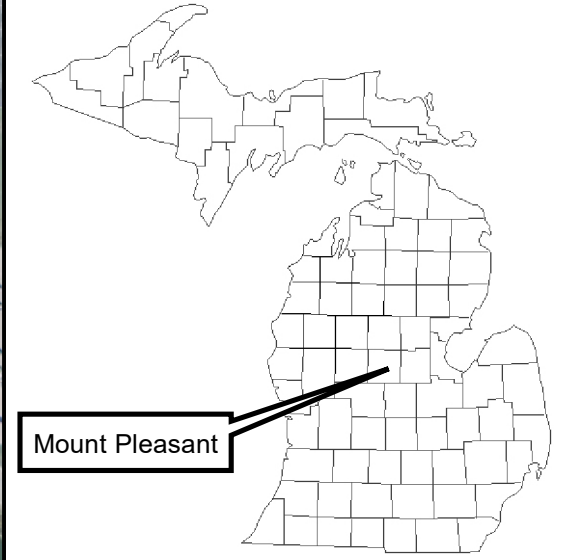
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LOCATION MAP

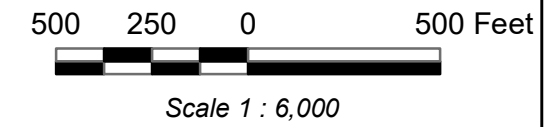
Union Township OW 23A APT Analysis
 SO: 58844 | Drawn by: KNS | Date: 08/23/23





Legend

-  Test Well
-  Major Road



SITE DETAIL MAP

Union Township OW 23A APT Analysis

SO: 58844 Drawn by: KNS Date: 08/23/23



Attachment A

Well Logs



MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 of 1978 PA 368, as amended.

TAX NUMBER		Failure to comply is a misdemeanor.			PERMIT NUMBER																			
LATITUDE <u>43.5668</u>		LONGITUDE <u>84.7695</u>		COUNTY <u>Isabella</u>		TOWNSHIP <u>Union</u>																		
DISTANCE & DIRECTION FROM ROAD INTERSECTION <u>S of Deerfield W of S. Mission</u>		WELL STREET ADDRESS, CITY/ZIP		WSSN <u>06725</u>	SOURCE ID/ WELL NO.	SECTION <u>14</u> TOWN NO. <u>14N</u> RANGE NO. <u>4W</u>																		
DRILLING METHOD <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Cable Tool <input type="checkbox"/> Hollow Rod <input type="checkbox"/> Jetted <input type="checkbox"/> Auger/Bored <input type="checkbox"/> Other <input type="checkbox"/> Rotary w/Casing Hammer <input type="checkbox"/> Cable Tool w/Casing Hammer		WELL USE <input type="checkbox"/> Household <input type="checkbox"/> Type I Public <input type="checkbox"/> Heat Pump-Supply <input type="checkbox"/> Irrigation <input type="checkbox"/> Type II Public <input type="checkbox"/> Heat Pump-Return <input type="checkbox"/> Industrial <input type="checkbox"/> Type III Public <input type="checkbox"/> Other <input type="checkbox"/> Test Well		WELL OWNER NAME <u>Union Twp</u> ADDRESS <u>2010 S Lincoln</u> CITY/ZIP <u>Mt Pleasant</u> Owner Address Same As Well Address? <input type="checkbox"/> Yes <input type="checkbox"/> No																				
WELL DEPTH <u>158</u> 320 ft.		DATE COMPLETED <u>07/11/23</u>		PUMP <input checked="" type="checkbox"/> Not Installed <input type="checkbox"/> Pump Installation Only Manufacturer _____ Pump Type <input type="checkbox"/> Submersible <input type="checkbox"/> Jet <input type="checkbox"/> Other _____ Model Number _____ HP _____ Volts _____ Pump Capacity _____ G.P.M. <input type="checkbox"/> Drawdown Seal Installed Length of Drop Pipe _____ ft. Diameter of Drop Pipe _____ in.																				
CASING Type <input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Steel-Black <input type="checkbox"/> Steel-Galvanized <input type="checkbox"/> Other _____ Diameter <u>6</u> in. to <u>148</u> ft. depth <u>21</u> SDR Height Above Grade <u>1</u> ft. Fittings <input type="checkbox"/> Drive Shoe <input type="checkbox"/> Shale Packer		WELL TYPE <input checked="" type="checkbox"/> New <input type="checkbox"/> Replacement <input type="checkbox"/> Dry Hole <input type="checkbox"/> Boring (Uncased) <input type="checkbox"/> Deepening		PRESSURE TANK <input checked="" type="checkbox"/> Not Installed <input type="checkbox"/> Buried <input type="checkbox"/> Diaphragm/Bladder <input type="checkbox"/> Galvanized Manufacturer _____ Model _____ Total Tank Capacity _____ gal. <input type="checkbox"/> Pressure Relief Valve Installed																				
BOREHOLE Diameter <u>10</u> in. to <u>158</u> ft. depth		STATIC WATER LEVEL <u>12</u> ft. Below Grade <input type="checkbox"/> Flowing Flow Rate Before Control _____ G.P.M.		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Formation Description</th> <th>Thickness of Stratum</th> <th>Depth to Bottom of Stratum</th> </tr> </thead> <tbody> <tr> <td><u>brown clay</u></td> <td><u>10</u></td> <td><u>10</u></td> </tr> <tr> <td><u>gray clay</u></td> <td><u>80</u></td> <td><u>90</u></td> </tr> <tr> <td><u>gray sand</u></td> <td><u>20</u></td> <td><u>110</u></td> </tr> <tr> <td><u>gray clay</u></td> <td><u>37</u></td> <td><u>147</u></td> </tr> <tr> <td><u>gray sand + gravel</u></td> <td><u>23</u></td> <td><u>160</u></td> </tr> </tbody> </table>			Formation Description	Thickness of Stratum	Depth to Bottom of Stratum	<u>brown clay</u>	<u>10</u>	<u>10</u>	<u>gray clay</u>	<u>80</u>	<u>90</u>	<u>gray sand</u>	<u>20</u>	<u>110</u>	<u>gray clay</u>	<u>37</u>	<u>147</u>	<u>gray sand + gravel</u>	<u>23</u>	<u>160</u>
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<u>gray sand + gravel</u>	<u>23</u>	<u>160</u>																						
WELL YIELD TEST Pumping Level <u>158</u> ft. after <u>1</u> hrs. pumping at <u>300</u> G.P.M. <input type="checkbox"/> Air <input type="checkbox"/> Bailer <input type="checkbox"/> Plunger <input type="checkbox"/> Test Pump		SCREEN <input type="checkbox"/> Not Installed <input checked="" type="checkbox"/> Filter-Packed Diameter <u>6</u> in. MATERIAL <input checked="" type="checkbox"/> Stainless Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other Slot <u>30</u> Length <u>10</u> ft. From <u>148</u> ft. To <u>158</u> ft. Slot _____ Length _____ ft. From _____ ft. To _____ ft.		USE SECOND SHEET IF NECESSARY																				
INSTALLATION FITTINGS <input type="checkbox"/> Telescoped <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Neoprene Packer <input type="checkbox"/> Bremer Check BLANK <input type="checkbox"/> Above _____ ft. Other _____		WELL GROUTED From <u>0</u> ft. To <u>147</u> ft. <input type="checkbox"/> Bentonite Slurry <input type="checkbox"/> Bentonite Dry Granular <input checked="" type="checkbox"/> Neat Cement <input type="checkbox"/> Neat Cement with Bentonite <input type="checkbox"/> Concrete No. of Bags <u>26</u>		DRILLING MACHINE OPERATOR <input type="checkbox"/> Employee <input type="checkbox"/> Subcontractor Name <u>Mason Rosenberg</u>																				
ADDITIVE METHOD <input type="checkbox"/> Lost Circulation Material <input type="checkbox"/> Accelerator <input type="checkbox"/> Retarder <input type="checkbox"/> Grout pipe outside casing <input type="checkbox"/> Driven dry grout <input type="checkbox"/> Grout pipe inside casing <input type="checkbox"/> Displacement plug		WELLHEAD COMPLETION <input type="checkbox"/> Pitless Adapter <input checked="" type="checkbox"/> 12 in. Above Grade <input type="checkbox"/> Basement Offset <input type="checkbox"/> Well House		PUMP INSTALLER (If different from drilling machine operator.) Name _____																				
NEAREST SOURCE OF POSSIBLE CONTAMINATION Type <u>None</u> Distance _____ ft. Direction _____ Type _____ Distance _____ ft. Direction _____		ABANDONED WELL PLUGGED <input type="checkbox"/> Yes <input type="checkbox"/> No Latitude _____ Longitude _____ Casing Diameter _____ in. Depth _____ ft.		WATER WELL CONTRACTOR'S CERTIFICATION: This well and/or pump installation was performed under my registration. <u>Taper Well Drilling</u> <u>2227</u> Registered Business Name _____ Registration No. _____ Address <u>7300 Millett</u> City/State/Zip <u>Cansing MI</u> Signature of Registered Contractor <u>[Signature]</u> Date <u>7/11/23</u>																				
PLUGGING MATERIAL <input type="checkbox"/> Neat Cement <input type="checkbox"/> Bentonite Slurry <input type="checkbox"/> Cement/ Bentonite Slurry <input type="checkbox"/> Concrete Grout <input type="checkbox"/> Bentonite Chips No. of Bags _____ Casing Removed? <input type="checkbox"/> Yes <input type="checkbox"/> No		REMARKS <u>drilled for Peerless Midwest</u>		ATTENTION WELL OWNER: FILE WITH DEED																				



MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 of 1978 PA 368, as amended.

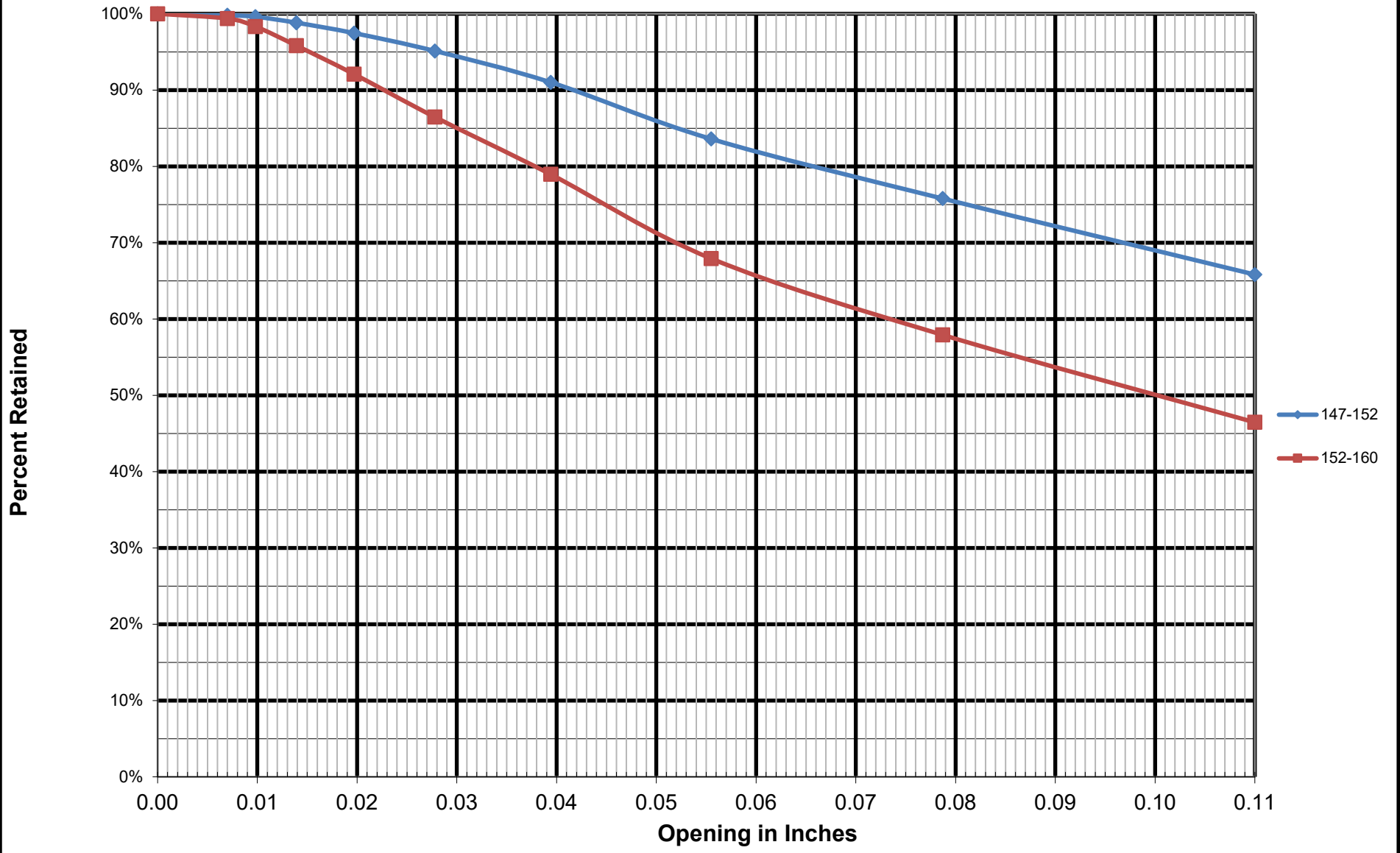
Failure to comply is a misdemeanor.

TAX NUMBER		PERMIT NUMBER		
LATITUDE 43.5665	LONGITUDE 84.7695	COUNTY Isabella	TOWNSHIP Union	
DISTANCE & DIRECTION FROM ROAD INTERSECTION S of Deerfield W. of S Mission		WELL STREET ADDRESS, CITY/ZIP	WSSN	SOURCE ID/WELL NO.
				SECTION 14 TOWN NO. 14N RANGE NO. 4W
DRILLING METHOD <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Cable Tool <input type="checkbox"/> Hollow Rod <input type="checkbox"/> Jetted <input type="checkbox"/> Auger/Bored <input type="checkbox"/> Other <input type="checkbox"/> Rotary w/Casing Hammer <input type="checkbox"/> Cable Tool w/Casing Hammer		WELL USE <input type="checkbox"/> Household <input type="checkbox"/> Type I Public <input type="checkbox"/> Heat Pump-Supply <input type="checkbox"/> Irrigation <input type="checkbox"/> Type II Public <input type="checkbox"/> Heat Pump-Return <input type="checkbox"/> Industrial <input type="checkbox"/> Type III Public <input checked="" type="checkbox"/> Other test boring <input type="checkbox"/> Test Well	WELL OWNER NAME Union Twp ADDRESS 2010 S. Lincoln CITY/ZIP Mt Pleasant Owner Address Same As Well Address? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
WELL DEPTH 300 ft.	DATE COMPLETED 07/11/23	WELL TYPE <input checked="" type="checkbox"/> New <input type="checkbox"/> Replacement <input type="checkbox"/> Dry Hole <input type="checkbox"/> Boring (Uncased) <input type="checkbox"/> Deepening	PUMP <input checked="" type="checkbox"/> Not Installed <input type="checkbox"/> Pump Installation Only Manufacturer _____ Pump Type <input type="checkbox"/> Submersible <input type="checkbox"/> Jet <input type="checkbox"/> Other _____ Model Number _____ HP _____ Volts _____ Pump Capacity _____ G.P.M. <input type="checkbox"/> Drawdown Seal Installed Length of Drop Pipe _____ ft. Diameter of Drop Pipe _____ in.	
CASING Type <input type="checkbox"/> Plastic <input type="checkbox"/> Steel-Black <input type="checkbox"/> Steel-Galvanized <input type="checkbox"/> Other _____ Joint <input type="checkbox"/> Glued <input type="checkbox"/> Spline <input type="checkbox"/> Welded <input type="checkbox"/> Threaded Diameter _____ in. to _____ ft. depth _____ SDR Height Above Grade _____ ft. Fittings <input type="checkbox"/> Drive Shoe <input type="checkbox"/> Shale Packer	PRESSURE TANK <input checked="" type="checkbox"/> Not Installed <input type="checkbox"/> Buried <input type="checkbox"/> Diaphragm/Bladder <input type="checkbox"/> Galvanized Manufacturer _____ Model _____ Total Tank Capacity _____ gal. <input type="checkbox"/> Pressure Relief Valve Installed		Formation Description	
BOREHOLE Diameter 5.518 in. to 300 ft. depth	STATIC WATER LEVEL _____ ft. Below Grade <input type="checkbox"/> Flowing Flow Rate Before Control _____ G.P.M.		Thickness of Stratum	
WELL YIELD TEST Pumping Level _____ ft. after _____ hrs. pumping at _____ G.P.M. <input type="checkbox"/> Air <input type="checkbox"/> Bailer <input type="checkbox"/> Plunger <input type="checkbox"/> Test Pump	SCREEN <input type="checkbox"/> Not Installed <input type="checkbox"/> Filter-Packed Diameter _____ in.		Depth to Bottom of Stratum	
MATERIAL <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Plastic <input type="checkbox"/> Other _____ Slot _____ Length _____ ft. From _____ ft. To _____ ft. Slot _____ Length _____ ft. From _____ ft. To _____ ft.	INSTALLATION <input type="checkbox"/> Telescoped <input type="checkbox"/> Attached FITTINGS <input type="checkbox"/> Neoprene Packer <input type="checkbox"/> Bremer Check BLANK <input type="checkbox"/> Above <input type="checkbox"/> Other _____		brown clay 10 10 gray clay 80 90 gray sand 20 110 gray clay 37 147 gray sand + gravel 23 160 gray clay 30 190 gray clay + strips of sand 20 210 gray clay 90 300	
WELL GROUTED <input checked="" type="checkbox"/> Bentonite Slurry <input type="checkbox"/> Bentonite Dry Granular <input type="checkbox"/> Neat Cement <input type="checkbox"/> Neat Cement with Bentonite <input type="checkbox"/> Concrete No. of Bags 15	ADDITIVE <input type="checkbox"/> Lost Circulation Material <input type="checkbox"/> Accelerator <input type="checkbox"/> Retarder METHOD <input type="checkbox"/> Grout pipe outside casing <input type="checkbox"/> Driven dry grout <input type="checkbox"/> Grout pipe inside casing <input type="checkbox"/> Displacement plug		USE SECOND SHEET IF NECESSARY	
WELLHEAD COMPLETION <input type="checkbox"/> Pitless Adapter <input type="checkbox"/> 12 in. Above Grade <input type="checkbox"/> Basement Offset <input type="checkbox"/> Well House	NEAREST SOURCE OF POSSIBLE CONTAMINATION Type None Distance _____ ft. Direction _____ Type _____ Distance _____ ft. Direction _____		DRILLING MACHINE OPERATOR <input checked="" type="checkbox"/> Employee <input type="checkbox"/> Subcontractor Name Mason Rosenberry	
ABANDONED WELL PLUGGED <input type="checkbox"/> Yes <input type="checkbox"/> No Latitude _____ Longitude _____ Casing Diameter _____ in. Depth _____ ft.	PLUGGING MATERIAL <input type="checkbox"/> Neat Cement <input type="checkbox"/> Bentonite Slurry <input type="checkbox"/> Cement/ Bentonite Slurry <input type="checkbox"/> Concrete Grout <input type="checkbox"/> Bentonite Chips No. of Bags _____ Casing Removed? <input type="checkbox"/> Yes <input type="checkbox"/> No		PUMP INSTALLER (If different from drilling machine operator.) Name _____	
REMARKS drilled for Peerless Midwest test boring for samples. Grouted shut. No casing installed	ATTENTION WELL OWNER: FILE WITH DEPT. OF ENVIRONMENT		WATER WELL CONTRACTOR'S CERTIFICATION: This well and/or pump installation was performed under my registration. Der Well Drilling 2227 Registered Business Name _____ Registration No. _____ Address 7300 Mellett Hwy City/State/Zip Union Michigan Signature of Registered Contractor McPhee Date 7/11/23	

Attachment B

**Drawdown Graph, Field Data Sheets,
and Condensed Transducer Data Sheets**

Charter Township of Union - Mount Pleasant, MI OB-23A Sieve Analysis



Location	Customer	Job #
Well ID	Tare Weight	Date
interval		
start weight		
0.110		
0.0937		
0.0787		
0.0661		
0.0555		
0.0469		
0.0394		
0.0331		
0.0278		
0.0234		
0.0197		
0.0165		
0.0139		
0.0117		
0.0098		
0.0083		
0.007		
0.0059		
0.0049		
0.0041		
0.0035		
0.0029		
0.0023		
bottom pan		

interval		
start weight		
0.110		
0.0937		
0.0787		
0.0661		
0.0555		
0.0469		
0.0394		
0.0331		
0.0278		
0.0234		
0.0197		
0.0165		
0.0139		
0.0117		
0.0098		
0.0083		
0.007		
0.0059		
0.0049		
0.0041		
0.0035		
0.0029		
0.0023		
bottom pan		

PEERLESS-MIDWEST, INC.

Charter Township of Union - Mount Pleasant, MI OB-23A 147-152 ft

	Inches Opening	mm Opening	Weight Retained (g)	ACC Weight Retained	ACC % Retained
	0.11		337	337	65.8%
	0.0787		51	388	75.8%
	0.0555		40	428	83.6%
	0.0394		38	466	91.0%
	0.0278		21	487	95.1%
	0.0197		12	499	97.5%
	0.0139		7	506	98.8%
	0.0098		4	510	99.6%
	0.007		1	511	99.8%
	0		1	512	100.0%
Weight of sample =	512 grams				

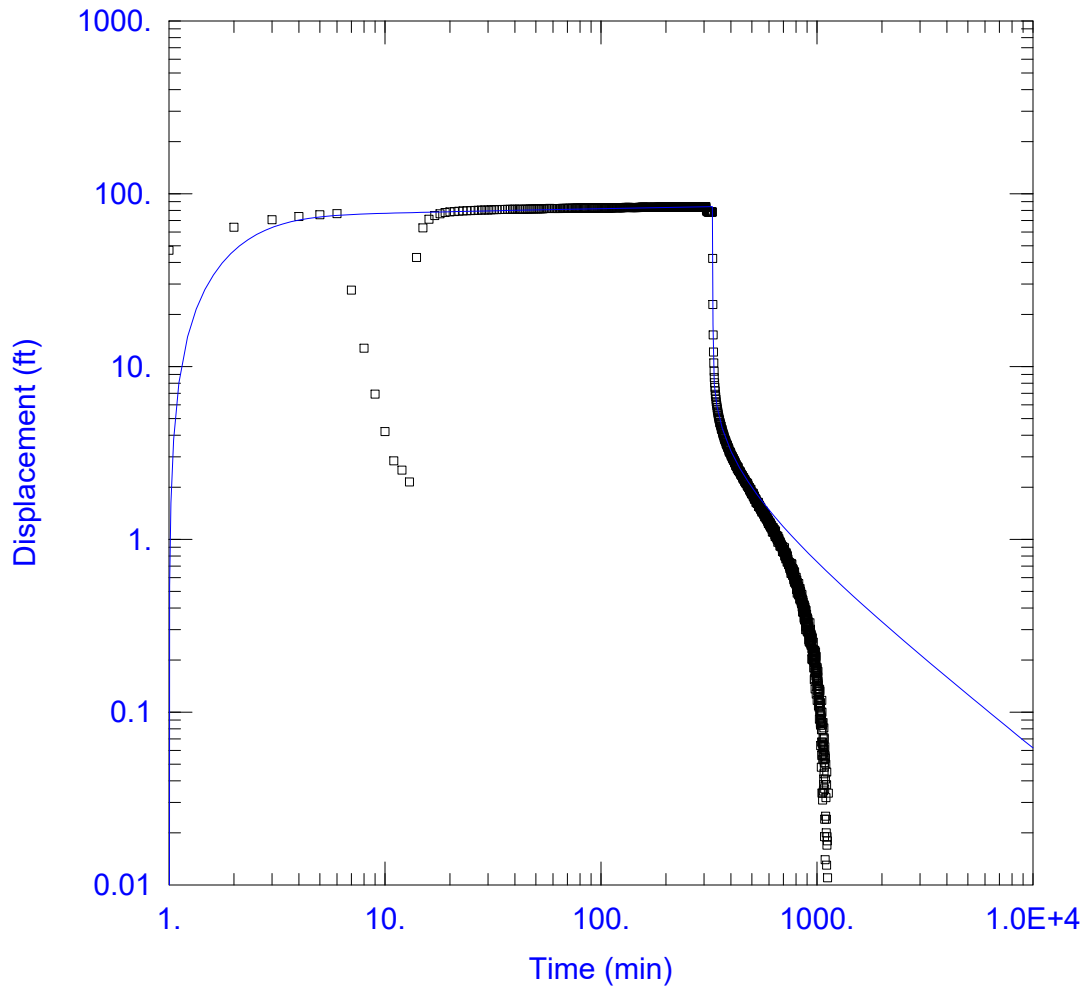
PEERLESS-MIDWEST, INC.

Charter Township of Union - Mount Pleasant, MI OB-23A 152-160 ft

	Inches Opening	mm Opening	Weight Retained (g)	ACC Weight Retained	ACC % Retained
	0.11		223	223	46.5%
	0.0787		55	278	57.9%
	0.0555		48	326	67.9%
	0.0394		53	379	79.0%
	0.0278		36	415	86.5%
	0.0197		27	442	92.1%
	0.0139		18	460	95.8%
	0.0098		12	472	98.3%
	0.007		5	477	99.4%
	0		3	480	100.0%
Weight of sample =	480 grams				

Attachment C

Aqtesolv Analysis Graphs



OW 23A APT

Data Set: T:\...\58844_UnionTwp_OW23A_DoughertyBabu.aqt
 Date: 08/16/23 Time: 13:24:10

PROJECT INFORMATION

Company: Peerless Midwest
 Client: Union Township, MI
 Project: 58844
 Location: Mt. Pleasant, MI
 Test Well: OW 23A
 Test Date: 8/1/23

AQUIFER DATA

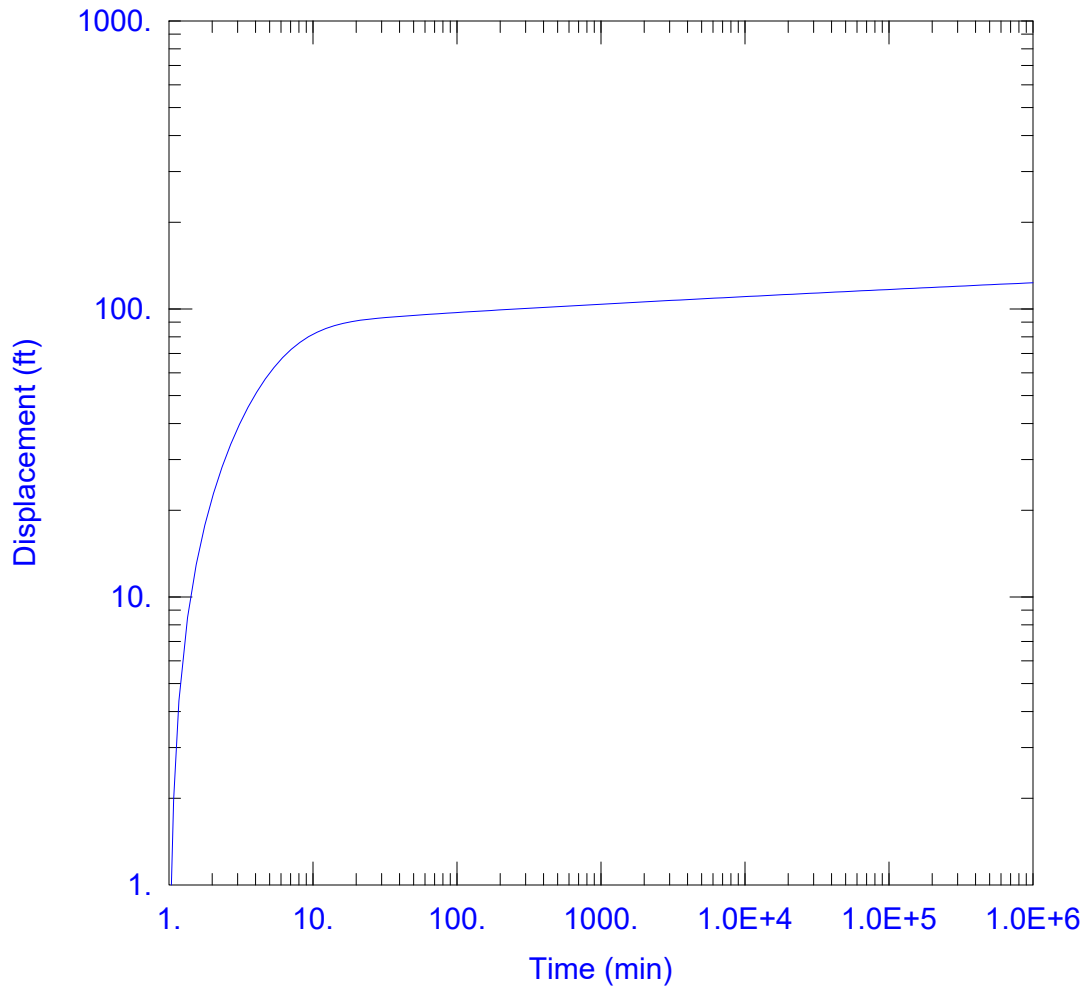
Saturated Thickness: 13. ft Anisotropy Ratio (Kz/Kr): 0.03055

WELL DATA

Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
OW 23A	0	0	□ OW 23A	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Dougherty-Babu
 T = 919.3 ft²/day S = 8.536E-5
 Kz/Kr = 0.03055 Sw = 9.525
 r(w) = 0.25 ft r(c) = 0.25 ft



OW 23A APT

Data Set: T:\...\58844_UnionTwp_OW23A_DoughertyBabu_Fwd.aqt
 Date: 08/16/23 Time: 13:15:26

PROJECT INFORMATION

Company: Peerless Midwest
 Client: Union Township, MI
 Project: 58844
 Location: Mt. Pleasant, MI
 Test Well: OW 23A
 Test Date: 8/1/23

AQUIFER DATA

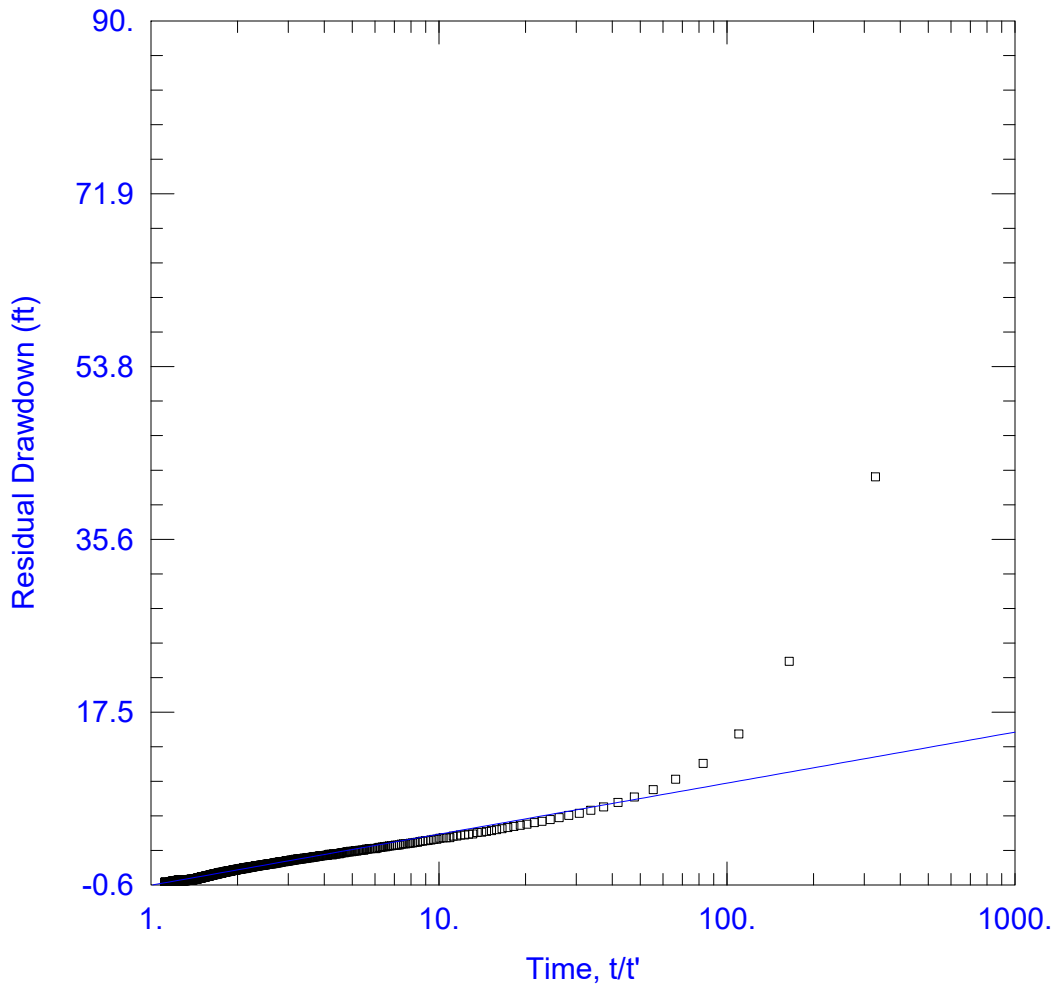
Saturated Thickness: 13. ft Anisotropy Ratio (Kz/Kr): 0.03055

WELL DATA

Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
Proposed Well 12	0	0	□ Proposed Well 12	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Dougherty-Babu
 T = 828.8 ft²/day S = 8.536E-5
 Kz/Kr = 0.03055 Sw = 9.525
 r(w) = 0.5 ft r(c) = 0.5 ft



OW 23A APT

Data Set: T:\...\58844_UnionTwp_OW23A_DoughertyBabu_Rec.aqt
 Date: 08/16/23 Time: 13:16:09

PROJECT INFORMATION

Company: Peerless Midwest
 Client: Union Township, MI
 Project: 58844
 Location: Mt. Pleasant, MI
 Test Well: OW 23A
 Test Date: 8/1/23

AQUIFER DATA

Saturated Thickness: 13. ft Anisotropy Ratio (Kz/Kr): 0.03055

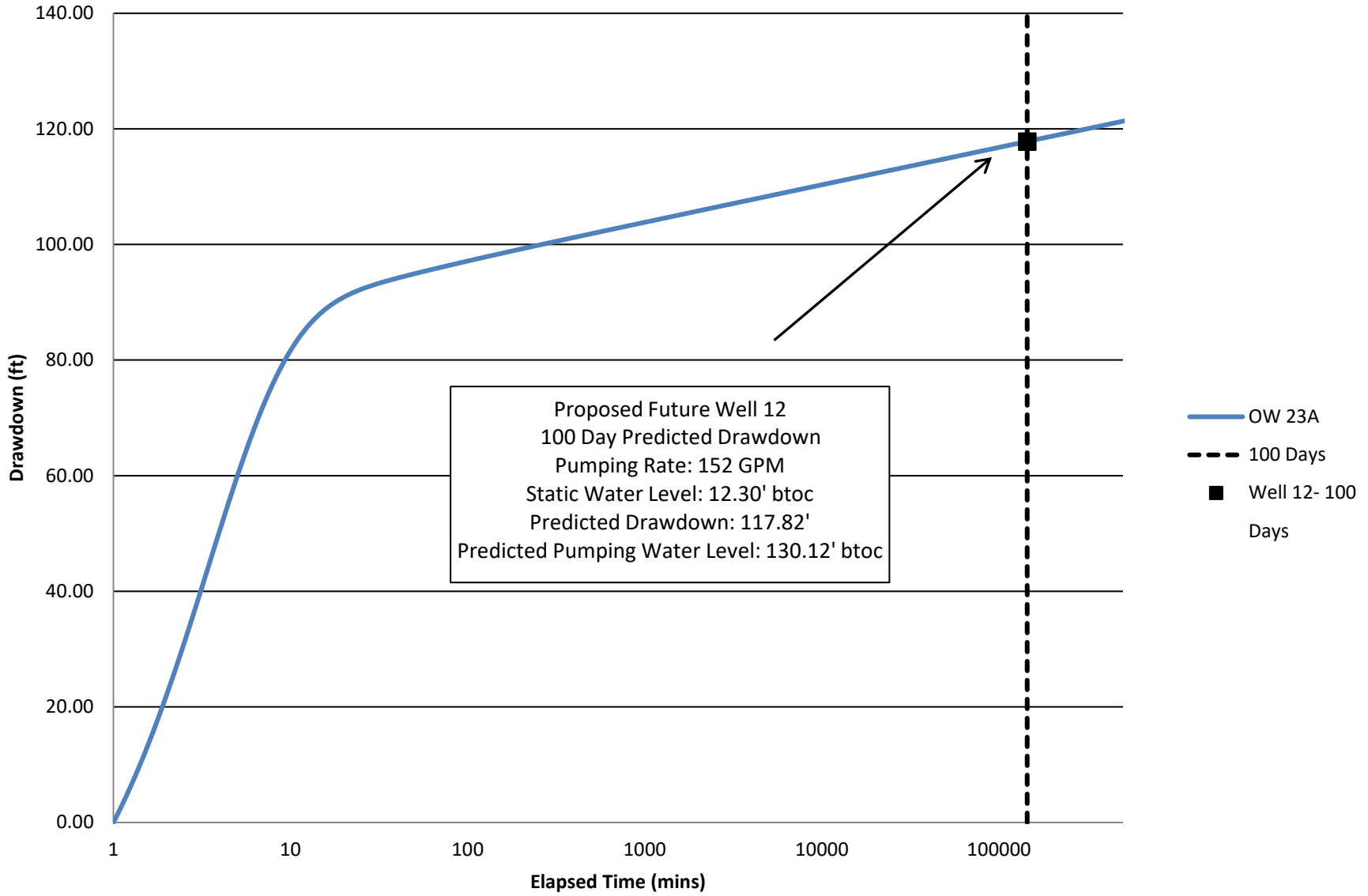
WELL DATA

Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
OW 23A	0	0	□ OW 23A	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)
 T = 738.3 ft²/day S/S' = 1.313

100 Day Predicted Drawdown Union Township, MI- Proposed Future Well 12



Attachment D

Forward Solution Graphs

Attachment E

**Groundwater Quality Table
Groundwater Quality Lab Reports**

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673



231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

September 05, 2023

Katelynn Shail
Peerless Midwest Inc.
55860 Russell Industrial Parkway
Mishawaka, IN 46545

Phone: (574) 252-4142

Fax: *

RE: Trace Project 23H0087
Client Project Union Charter Twp.

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at dhilleary@trace-labs.com.

Sincerely,

A handwritten signature in black ink that reads "Drew Hilleary".

Drew Hilleary
Project Manager
Enclosures

STATE OF MICHIGAN LABORATORY ID: 8001

The Reg level for all analytes with the exception of Lead and Copper is the MCL, for Lead and Copper it is the AL.

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Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673



231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SAMPLE SUMMARY

Trace Project ID: 23H0087
Client Project ID: Union Charter Twp.

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
23H0087-01	OW23A	Drinking Water	PV	08/01/23 15:15	08/02/23 09:30

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

The Reg level for all analytes with the exception of Lead and Copper is the MCL, for Lead and Copper it is the AL.

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AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

MS	Matrix Spike
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL/AL	Maximum Contamination Limits / Action Levels as set by the Federal Safe Drinking Water Act
Not Detected	Indicates that the compound was not detected at the RDL
TNTC	Too Numerous To Count

Results that are reported in bold or red have equalled or exceeded the MCL/AL.

DATA QUALIFIERS

Trace ID: 23H0087-01

Analysis: EPA 170.1

Temperature Note SITE : The analysis was performed on site at the time of sampling.

Analysis: SM 4500 S2D-11

Sulfide Note 229 : The MS and MSD recoveries were out of control. The RPD between the MS and MSD was also out of control. The result for this analyte, in the non-spiked version of the sample, must be considered estimated.

Sulfide Note 404 : The reporting limit was raised due to a dilution required because of matrix interference.

Analysis: SM 4500-H+ B-11

pH Note pH : The pH was analyzed at 10:23

Trace ID: T139476-DUP1

Analysis: SM 4500-H+ B-11

pH Note pHa : The pH was analyzed at 10:24

Trace ID: T139675-MSD1

Analysis: SM 4500 S2D-11

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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Sulfide

Note 229 : The MS and MSD recoveries were out of control. The RPD between the MS and MSD was also out of control. The result for this analyte, in the non-spiked version of the sample, must be considered estimated.

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL
METALS, TOTAL									
Analysis Method: EPA 200.7 Rev. 4.4									
<i>Batch: T139726</i>									
Calcium	72	1.0	mg/L	8/8/23 9:49	ckd	8/8/23 19:51	ckd	N	No MCL
Iron	* 0.83	0.10	mg/L	8/8/23 9:49	ckd	8/8/23 19:51	ckd	N	0.30
Magnesium	27	1.0	mg/L	8/8/23 9:49	ckd	8/8/23 19:51	ckd	N	No MCL
Sodium	16	1.0	mg/L	8/8/23 9:49	ckd	8/8/23 19:51	ckd	N	No MCL
Analysis Method: EPA 200.8 Rev. 5.4									
<i>Batch: T139776</i>									
Antimony	Not Detected	0.0020	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.0060
Arsenic	Not Detected	0.0010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.010
Barium	0.052	0.0050	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	2.0
Beryllium	Not Detected	0.0010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.0040
Cadmium	Not Detected	0.0020	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.0050
Chromium	Not Detected	0.010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.10
Copper	Not Detected	0.025	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	1.3
Lead	Not Detected	0.0010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.015
Manganese	0.035	0.020	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.050
Nickel	Not Detected	0.010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	No MCL
Selenium	Not Detected	0.0020	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.050
Thallium	Not Detected	0.00050	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	0.0020
Zinc	0.011	0.010	mg/L	8/9/23 8:36	acs	8/9/23 14:34	acs	N	5.0
Analysis Method: EPA 245.1 Rev. 3.0									
<i>Batch: T139664</i>									
Mercury	Not Detected	0.00020	mg/L	8/8/23 11:00	fs	8/8/23 14:55	ckd	N	0.0020
METALS, TOTAL									
Analysis Method: SM 2340 B-11									
<i>Batch: [CALC]</i>									
Hardness as CaCO3	290	2.5	mg/L	8/8/23 9:49		8/8/23 19:51	ckd	N	No MCL

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID:	23H0087-01	Date Collected:	08/01/23 15:15
Sample Point Description:	CT23A	Date Received:	08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL
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METALS, TOTAL

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

The Reg level for all analytes with the exception of Lead and Copper is the MCL, for Lead and Copper it is the AL.

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL	
VOLATILE ORGANIC COMPOUNDS BY GC-MS										
Analysis Method: EPA 524.2										
<i>Batch: T139486</i>										
Dichlorodifluoromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Chloromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Vinyl chloride	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	2.0
Bromomethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Chloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Trichlorofluoromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,1-Dichloroethene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	7.0
Methyl-tert-butyl ether	Not Detected	1.0	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Methylene chloride	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
trans-1,2-Dichloroethene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	100
1,1-Dichloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
2-Butanone	Not Detected	1.0	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
cis-1,2-Dichloroethene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	70
2,2-Dichloropropane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Bromochloromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Tetrahydrofuran	Not Detected	5.0	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Chloroform	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	80
1,1,1-Trichloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	200
1,1-Dichloropropene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Carbon tetrachloride	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
Benzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
1,2-Dichloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
Trichloroethene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
1,2-Dichloropropane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
Dibromomethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Bromodichloromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	80
cis-1,3-Dichloropropene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
4-Methyl-2-pentanone	Not Detected	1.0	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Toluene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	1000

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL	
VOLATILE ORGANIC COMPOUNDS BY GC-MS										
trans-1,3-Dichloropropene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,1,2-Trichloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
1,3-Dichloropropane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Tetrachloroethene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	5.0
Dibromochloromethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	80
1,2-Dibromoethane (EDB)	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Chlorobenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	100
1,1,1,2-Tetrachloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Ethylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	700
m,p-Xylene	Not Detected	1.0	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	10000
o-Xylene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	10000
Xylenes, total	Not Detected	1.5	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	10000
Styrene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	100
Bromoform	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	80
Isopropylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,1,2,2-Tetrachloroethane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,2,3-Trichloropropane	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
Bromobenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
n-Propylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
2-Chlorotoluene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,3,5-Trimethylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
4-Chlorotoluene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
t-Butyl Benzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,2,4-Trimethylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
sec-Butylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
p-Isopropyltoluene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,3-Dichlorobenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,4-Dichlorobenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	75
n-Butylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL
1,2,3-Trimethylbenzene	Not Detected	0.50	ug/L	8/3/23	8:00	kl	8/3/23 12:59	kl	N	No MCL

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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Trace Analytical Laboratories, Inc.
 2241 Black Creek Road
 Muskegon, MI 49444-2673



231-773-5998 Phone
 888-979-4469 Fax
 www.trace-labs.com

ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL
VOLATILE ORGANIC COMPOUNDS BY GC-MS									
1,2-Dichlorobenzene	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	600
1,2-Dibromo-3-chloropropane	Not Detected	1.0	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	No MCL
Hexachloroethane	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	No MCL
1,2,4-Trichlorobenzene	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	70
Hexachlorobutadiene	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	No MCL
Naphthalene	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	No MCL
1,2,3-Trichlorobenzene	Not Detected	0.50	ug/L	8/3/23 8:00	kl	8/3/23 12:59	kl	N	No MCL
Surrogates:									
4-Bromofluorobenzene	114 %	46-147		8/3/23 8:00	kl	8/3/23 12:59	kl	N	
1,2-Dichlorobenzene-d4	116 %	52-135		8/3/23 8:00	kl	8/3/23 12:59	kl	N	

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY									
Analysis Method: EPA 120.1									
<i>Batch: T139519</i>									
Specific Conductance (EC) (µmho/cm at 25.0 C)	600	1.0	umhos/cm	8/3/23 13:14	lc	8/3/23 14:22	lc	N	No MCL
Analysis Method: EPA 170.1									
<i>Batch: T139491</i>									
Temperature	10.2		°C	8/3/23 9:05	dh	8/3/23 9:06	dh	SITE, N	No MCL
Analysis Method: EPA 300.0 Rev. 2.1									
<i>Batch: T139402</i>									
Fluoride	0.53	0.15	mg/L	8/1/23 17:46	jh	8/2/23 13:19	jh	N	4.0
Chloride	1.0	1.0	mg/L	8/1/23 17:46	jh	8/2/23 13:19	jh	N	250
Nitrate as N	Not Detected	0.10	mg/L	8/1/23 17:46	jh	8/2/23 13:19	jh	N	10
Nitrite as N	Not Detected	0.10	mg/L	8/1/23 17:46	jh	8/2/23 13:19	jh	N	1.0
Sulfate as SO4	22	3.0	mg/L	8/1/23 17:46	jh	8/2/23 13:19	jh	N	250
Analysis Method: EPA 350.1 Rev. 2.0									
<i>Batch: T139756</i>									
Ammonia as N	0.35	0.010	mg/L	8/8/23 10:30	jlh	8/8/23 11:58	jlh	N	No MCL
Analysis Method: EPA OIA 1677									
<i>Batch: T139562</i>									
Cyanide (Free)	Not Detected	0.0050	mg/L	8/4/23 11:07	mr	8/4/23 13:07	mr	N	0.20
Analysis Method: SM 2320 B-11									
<i>Batch: T139719</i>									
Bicarbonate Alkalinity as CaCO3 at pH 4.5	300	10	mg/L	8/8/23 11:09	aeo	8/8/23 15:13	aeo	N	No MCL
Total Alkalinity as CaCO3 at pH 4.5	300	10	mg/L	8/8/23 11:09	aeo	8/8/23 15:13	aeo	N	No MCL
Analysis Method: SM 2540 C-15									
<i>Batch: T139628</i>									
Total Dissolved Solids	360	20	mg/L	8/7/23 10:06	mr	8/7/23 13:05	mr	N	500

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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ANALYTICAL RESULTS

Sample Location: Union Charter Twp.

Trace ID: 23H0087-01 Date Collected: 08/01/23 15:15
 Sample Point Description: CT23A Date Received: 08/02/23 09:30

PARAMETERS	RESULTS	RDL	UNITS	PREPARED	BY	ANALYZED	BY	NOTES	MCL
WET CHEMISTRY									
Analysis Method: SM 4500 S2D-11									
<i>Batch: T139675</i>									
Sulfide	Not Detected	10	mg/L	8/7/23 14:59	jlh	8/7/23 15:44	jlh	229, 404, N	No MCL
Analysis Method: SM 4500-H+ B-11									
<i>Batch: T139476</i>									
pH	7.28		pH Units	8/1/23 15:15	bsv	8/2/23 10:23	nc	pH	No MCL
Analysis Method: SM4500-CO2 B									
<i>Batch: T140088</i>									
Carbon dioxide	35	0.10	mg/L	8/15/23 11:44	lc	8/15/23 11:45	lc	N	No MCL

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

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August 16, 2023

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

RE: 23H0087

Order No.: 2308381

Dear Mr. Jon Mink:

[Guide to Reading Lab Result](#)

Prein&Newhof Laboratory received 1 sample(s) on 8/4/2023 on your behalf. Your test results are provided in your Prein&Newhof Laboratory analytical report. Please carefully review your analytical report, noting the following.

- You can be assured that the sample results meet the Safe Drinking Water Criteria as no analyte tested exceeds the EPA Maximum Contaminant Level unless indicated by an " * " in the "Qual" column.
- You can be assured that all samples were received and analyzed within required holding times unless noted by a "H" in the "Qual" column.
- You can be assured that all quality control data is within laboratory-defined or method-specified acceptance limits unless defined by the addition of an attached Case Narrative document.
- When testing for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA results include both branched and linear isotopes. We extract a Method Blank and analyze it with the preparation batch. Method Blank analytes are within the Reporting Limit (RL).

We use EPA Approved Methods for all regulated parameters. EPA Lab #: MI000014

We are certified by the State of Michigan for Drinking Water Analysis for: Coliform Bacteria, Metals, Cyanide, Minerals, Anions, Volatile Organics, THM's, Haloacetic Acids, and PFAS.
Michigan Lab ID#: 0020

To learn more about interpreting your Drinking Water Test Results and reading your Lab Report, follow the link above to view our "Guide to Reading Lab Results". If you have any concerns about your test results or need additional help, please call: 616-364-7600 or email me: sbylsma@preinnewhof.com.

Thank you for trusting Prein&Newhof with your testing needs.

Sincerely,



Steve Bylsma
Laboratory Manager

CLIENT: Trace Analytical Laboratories, Inc.
Project: 23H0087
Lab ID: 2308381-01
Client Sample ID: 23H0087-01
Location:

Collection Date: 8/1/2023 3:15:00 PM
Received Date: 8/4/2023 12:40:00 PM
Matrix: DRINKING WATER
Sampled By: PV

Analyses	Result	RL	Qual	Units	MCL	Date Analyzed
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PFAS, DRINKING WATER

EPA 537.1

Analyst: JS

PFBS	< 2.0	2.0		ng/L	420	8/16/2023 7:26:00 AM
PFHxA	< 2.0	2.0		ng/L	400000	8/16/2023 7:26:00 AM
HFPO-DA	< 2.0	2.0		ng/L	370	8/16/2023 7:26:00 AM
PFHxS	< 2.0	2.0		ng/L	51	8/16/2023 7:26:00 AM
PFHpA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
ADONA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFOA	< 2.0	2.0		ng/L	8.0	8/16/2023 7:26:00 AM
PFOS	< 2.0	2.0		ng/L	16	8/16/2023 7:26:00 AM
PFNA	< 2.0	2.0		ng/L	6.0	8/16/2023 7:26:00 AM
9CI-PF3ONS	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFDA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
NMeFOSAA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
NEtFOSAA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFUnA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
11CI-PF3OUdS	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFDaA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFTTrDA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
PFTA	< 2.0	2.0		ng/L		8/16/2023 7:26:00 AM
Surr: d5-N-EtFOSSA	90.6	70 - 130		%Rec		8/16/2023 7:26:00 AM
Surr: M3HFPO-DA	100	70 - 130		%Rec		8/16/2023 7:26:00 AM
Surr: MPFDA	99.0	70 - 130		%Rec		8/16/2023 7:26:00 AM
Surr: MPFHxA	98.7	70 - 130		%Rec		8/16/2023 7:26:00 AM

Qualifiers: < Not Detected at the Reporting Limit
 MCL Maximum Contaminant Level
 RL Reporting Limit

H Holding times for preparation or analysis exceeded
 PL Permit Limit
 S Spike Recovery outside accepted recovery limits

WO#: 2308381

8/16/2023

Client: Trace Analytical Laboratories, Inc.

Project: 23H0087

TestCode: PFAS-DW

Sample ID: MB-R2-5818	SampType: MBLK	TestCode: PFAS-DW	Units: ng/L	Prep Date: 8/4/2023	RunNo: 34164						
Client ID: PBW	Batch ID: 5818	TestNo: EPA 537.1		Analysis Date: 8/9/2023	SeqNo: 669586						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
PFBS	< 1.8	1.8									
PFHxA	< 1.8	1.8									
HFPO-DA	< 1.8	1.8									
PFHxS	< 1.8	1.8									
PFHpA	< 1.8	1.8									
ADONA	< 1.8	1.8									
PFOA	< 1.8	1.8									
PFOS	< 1.8	1.8									
PFNA	< 1.8	1.8									
9CI-PF3ONS	< 1.8	1.8									
PFDA	< 1.8	1.8									
NMeFOSAA	< 1.8	1.8									
NEtFOSAA	< 1.8	1.8									
PFUnA	< 1.8	1.8									
11CI-PF3OUdS	< 1.8	1.8									
PFDoA	< 1.8	1.8									
PFTTrDA	< 1.8	1.8									
PFTA	< 1.8	1.8									
Surr: d5-N-EtFOSSA	240		320.0		76.5	70	130				
Surr: M3HFPO-DA	250		200.0		127	70	130				
Surr: MPFDA	70		80.00		88.1	70	130				
Surr: MPFHxA	75		80.00		93.6	70	130				

Qualifiers: < Not Detected at the Reporting Limit
PL Permit Limit

H Holding times for preparation or analysis exceeded
RL Reporting Limit

MCL Maximum Contaminant Level
S Spike Recovery outside accepted recovery limits

Original
Page 3 of 8

WO#: 2308381

8/16/2023

Client: Trace Analytical Laboratories, Inc.

Project: 23H0087

TestCode: PFAS-DW

Sample ID: LCS-MID-5818 A	SampType: LCS-MID	TestCode: PFAS-DW	Units: ng/L	Prep Date: 8/4/2023	RunNo: 34164						
Client ID: BatchQC	Batch ID: 5818	TestNo: EPA 537.1	Analysis Date: 8/9/2023	SeqNo: 669587							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
PFBS	89	1.8	80.00	0	111	70	130				
PFHxA	89	1.8	80.00	0	111	70	130				
HFPO-DA	120	1.8	80.00	0	154	70	130				S
PFHxS	92	1.8	80.00	0	115	70	130				
PFHpA	110	1.8	80.00	0	132	70	130				S
ADONA	92	1.8	80.00	0	115	70	130				
PFOA	91	1.8	80.00	0	113	70	130				
PFOS	92	1.8	80.00	0	115	70	130				
PFNA	90	1.8	80.00	0	112	70	130				
9CI-PF3ONS	93	1.8	80.00	0	116	70	130				
PFDA	86	1.8	80.00	0	108	70	130				
NMeFOSAA	92	1.8	80.00	0	115	70	130				
NEtFOSAA	88	1.8	80.00	0	110	70	130				
PFUnA	83	1.8	80.00	0	104	70	130				
11CI-PF3OUdS	90	1.8	80.00	0	112	70	130				
PFDoA	77	1.8	80.00	0	96.2	70	130				
PFTTrDA	65	1.8	80.00	0	80.9	70	130				
PFTA	66	1.8	80.00	0	82.6	70	130				
Surr: d5-N-EtFOSSA	310		320.0		95.4	70	130				
Surr: M3HFPO-DA	260		200.0		129	70	130				
Surr: MPFDA	75		80.00		94.1	70	130				
Surr: MPFHxA	82		80.00		102	70	130				

Qualifiers: < Not Detected at the Reporting Limit
PL Permit Limit

H Holding times for preparation or analysis exceeded
RL Reporting Limit

MCL Maximum Contaminant Level
S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: 2308381

8/16/2023

Client: Trace Analytical Laboratories, Inc.

Project: 23H0087

TestCode: PFAS-DW

Sample ID: 2308038-04ADUP	SampType: DUP	TestCode: PFAS-DW	Units: ng/L	Prep Date: 8/4/2023	RunNo: 34164						
Client ID: BatchQC	Batch ID: 5818	TestNo: EPA 537.1	Analysis Date: 8/9/2023	SeqNo: 669858							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
PFBS	< 1.6	1.6						0	0	30	
PFHxA	< 1.6	1.6						0	0	30	
HFPO-DA	< 1.6	1.6						0	0	30	
PFHxS	< 1.6	1.6						0	0	30	
PFHpA	< 1.6	1.6						0	0	30	
ADONA	< 1.6	1.6						0	0	30	
PFOA	< 1.6	1.6						0	0	30	
PFOS	< 1.6	1.6						0	0	30	
PFNA	< 1.6	1.6						0	0	30	
9CI-PF3ONS	< 1.6	1.6						0	0	30	
PFDA	< 1.6	1.6						0	0	30	
NMeFOSAA	< 1.6	1.6						0	0	30	
NEtFOSAA	< 1.6	1.6						0	0	30	
PFUnA	< 1.6	1.6						0	0	30	
11CI-PF3OUdS	< 1.6	1.6						0	0	30	
PFDoA	< 1.6	1.6						0	0	30	
PFTTrDA	< 1.6	1.6						0	0	30	
PFTA	< 1.6	1.6						0	0	30	
Surr: d5-N-EtFOSSA	260		290.9		88.8	70	130		0	0	
Surr: M3HFPO-DA	160		181.8		89.1	70	130		0	0	
Surr: MPFDA	60		72.73		82.2	70	130		0	0	
Surr: MPFHxA	63		72.73		86.9	70	130		0	0	

Qualifiers: < Not Detected at the Reporting Limit
PL Permit Limit

H Holding times for preparation or analysis exceeded
RL Reporting Limit

MCL Maximum Contaminant Level
S Spike Recovery outside accepted recovery limits

WO#: 2308381

8/16/2023

Client: Trace Analytical Laboratories, Inc.

Project: 23H0087

TestCode: PFAS-DW

Sample ID: 2307173-07AMS	SampType: MS-HIGH	TestCode: PFAS-DW	Units: ng/L	Prep Date: 8/4/2023	RunNo: 34164						
Client ID: BatchQC	Batch ID: 5818	TestNo: EPA 537.1		Analysis Date: 8/9/2023	SeqNo: 669863						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
PFBS	180	1.6	185.2	0	97.2	70	130				
PFHxA	150	1.6	185.2	0	83.0	70	130				
HFPO-DA	170	1.6	185.2	0	89.7	70	130				
PFHxS	180	1.6	185.2	0	97.1	70	130				
PFHpA	160	1.6	185.2	0	87.7	70	130				
ADONA	170	1.6	185.2	0	89.1	70	130				
PFOA	180	1.6	185.2	0	96.3	70	130				
PFOS	180	1.6	185.2	0	95.2	70	130				
PFNA	160	1.6	185.2	0	86.8	70	130				
9CI-PF3ONS	180	1.6	185.2	0	95.3	70	130				
PFDA	160	1.6	185.2	0	87.8	70	130				
NMeFOSAA	150	1.6	185.2	0	83.5	70	130				
NEtFOSAA	140	1.6	185.2	0	76.6	70	130				
PfUnA	220	1.6	185.2	0	117	70	130				
11CI-PF3OUdS	170	1.6	185.2	0	92.9	70	130				
PFDoA	270	1.6	185.2	0	144	70	130				S
PFTTrDA	210	1.6	185.2	0	112	70	130				
PFTA	170	1.6	185.2	0	90.0	70	130				
Surr: d5-N-EtFOSSA	160		296.3		55.6	70	130				S
Surr: M3HFPO-DA	150		185.2		82.4	70	130				
Surr: MPFDA	61		74.07		82.5	70	130				
Surr: MPFHxA	62		74.07		83.8	70	130				

Qualifiers: < Not Detected at the Reporting Limit
PL Permit Limit

H Holding times for preparation or analysis exceeded
RL Reporting Limit

MCL Maximum Contaminant Level
S Spike Recovery outside accepted recovery limits

WO#: 2308381

8/16/2023

Client: Trace Analytical Laboratories, Inc.

Project: 23H0087

TestCode: PFAS-DW

Sample ID: LCS-high-5841 A	SampType: LCS-HIGH	TestCode: PFAS-DW	Units: %Rec	Prep Date: 8/14/2023	RunNo: 34274						
Client ID: BatchQC	Batch ID: 5841	TestNo: EPA 537.1		Analysis Date: 8/16/2023	SeqNo: 672419						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: d5-N-EtFOSSA	230		320.0		70.4	70	130				
Surr: M3HFPO-DA	190		200.0		93.6	70	130				
Surr: MPFDA	77		80.00		96.8	70	130				
Surr: MPFHxA	75		80.00		93.9	70	130				

Qualifiers: < Not Detected at the Reporting Limit
 PL Permit Limit

H Holding times for preparation or analysis exceeded
 RL Reporting Limit

MCL Maximum Contaminant Level
 S Spike Recovery outside accepted recovery limits

Original
 Page 7 of 8

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673



231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SUBCONTRACT ORDER

23H0087

SENDING LABORATORY:

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444
Phone: 231.773.5998

RECEIVING LABORATORY:

Prein and Newhof
3260 Evergreen Drive NE
Grand Rapids, MI 49525
Phone :(616) 364-7600

8381-1

Project Manager: Drew Hilleary

Note Our New Email address: TraceSubOut@trace-labs.com

PO # 23H0087

Matrix: Drinking Water Sampled: 08/01/23 15:15 TAT: Standard

Sample ID: CT23A 23H0087-01

Sampled By: PV

Analysis Needed:

PFAS Drinking Water- EGLE List with Field Blank

	8/2/23	APB	8/14/23 12:40P	at
Released By	Date	Received By	Date	

Released By	Date	Received By	Date
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ANALYTICAL REPORT

PREPARED FOR

Attn: Jon Mink
Trace Analytical Laboratories
2241 Black Creek Road
Muskegon, Michigan 49444

Generated 9/5/2023 10:48:22 AM

JOB DESCRIPTION

23H0087

JOB NUMBER

810-72398-1

Eurofins Eaton Analytical South Bend

Job Notes

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Authorization



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Authorized for release by
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Definitions/Glossary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Job ID: 810-72398-1

Laboratory: Eurofins Eaton Analytical South Bend

Narrative

Job Narrative 810-72398-1

Receipt

The sample was received on 8/3/2023 9:45 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.6°C

GC/MS Semi VOA

Method 525.2_PREC: The low level laboratory control sample (LLCS) associated with sample 810-72398-1, for preparation batch 810-68357 and analytical batch 810-68473 recovered outside control limits (50-150%) for the following analytes: Heptachlor (163%) and Heptachlor epoxide (153%). These analytes were biased high in the LLCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Gas Flow Proportional Counter

Method 900.0: Gross Alpha and Gross Beta batch 623627Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.23H0087-01 CT23A (810-72398-1), (LCS 160-623627/2-A), (MB 160-623627/1-A), (280-179974-C-1-A), (280-179974-C-1-D DU) and (280-179974-C-1-B MS)

Method 903.0: Radium 226 batch 623455Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.23H0087-01 CT23A (810-72398-1), (LCS 160-623455/2-A), (MB 160-623455/1-A), (310-261947-C-6-A), (310-261947-C-6-B MS) and (310-261947-C-6-C MSD)

Method 904.0: Radium-228 batch 623456The LCS recovered at (130%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (63-150%) per method requirements. The LCS passes, no further action is required (LCS 160-623456/2-A)

Method 904.0: Radium 228 batch 623456Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.23H0087-01 CT23A (810-72398-1), (LCS 160-623456/2-A), (MB 160-623456/1-A), (310-261947-C-6-D), (310-261947-C-6-E MS) and (310-261947-C-6-F MSD)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Rad

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Client Sample ID: 23H0087-01 CT23A

Lab Sample ID: 810-72398-1

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

This Detection Summary does not include radiochemical test results.

Eurofins Eaton Analytical South Bend

Client Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Client Sample ID: 23H0087-01 CT23A

Lab Sample ID: 810-72398-1

Date Collected: 08/01/23 15:15

Matrix: Drinking Water

Date Received: 08/03/23 09:45

Method: EPA 525.2 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor epoxide	<0.011	*+	0.011	ug/L		08/04/23 07:09	08/06/23 00:16	1
Di(2-ethylhexyl)adipate	<0.65		0.65	ug/L		08/04/23 07:09	08/06/23 00:16	1
Di (2-ethylhexyl)phthalate	<0.65		0.65	ug/L		08/04/23 07:09	08/06/23 00:16	1
Hexachlorobenzene	<0.11		0.11	ug/L		08/04/23 07:09	08/06/23 00:16	1
Simazine	<0.076		0.076	ug/L		08/04/23 07:09	08/06/23 00:16	1
Alachlor	<0.11		0.11	ug/L		08/04/23 07:09	08/06/23 00:16	1
Atrazine	<0.11		0.11	ug/L		08/04/23 07:09	08/06/23 00:16	1
Benzo[a]pyrene	<0.022		0.022	ug/L		08/04/23 07:09	08/06/23 00:16	1
gamma-BHC (Lindane)	<0.022		0.022	ug/L		08/04/23 07:09	08/06/23 00:16	1
Endrin	<0.011		0.011	ug/L		08/04/23 07:09	08/06/23 00:16	1
Methoxychlor	<0.11		0.11	ug/L		08/04/23 07:09	08/06/23 00:16	1
Heptachlor	<0.011	*+	0.011	ug/L		08/04/23 07:09	08/06/23 00:16	1
Hexachlorocyclopentadiene	<0.11		0.11	ug/L		08/04/23 07:09	08/06/23 00:16	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
2-Nitro-m-xylene	97		70 - 130			08/04/23 07:09	08/06/23 00:16	1
Perylene-d12	102		70 - 130			08/04/23 07:09	08/06/23 00:16	1
Triphenylphosphate	112		70 - 130			08/04/23 07:09	08/06/23 00:16	1

Method: EPA 505 - Organochlorine Pesticides/PCBs (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	<0.080		0.080	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1221	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1232	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1242	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1248	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1254	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
PCB-1260	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
Chlordane (technical)	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1
Toxaphene	<0.50		0.50	ug/L		08/08/23 09:15	08/09/23 02:22	1
Total PCBs as DCB (Qualitative)	<0.10		0.10	ug/L		08/08/23 09:15	08/09/23 02:22	1

Method: EPA 515.3 - Herbicides (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	<0.50		0.50	ug/L		08/11/23 07:32	08/15/23 04:16	1
2,4,5-TP (Silvex)	<0.10		0.10	ug/L		08/11/23 07:32	08/15/23 04:16	1
2,4-D	<0.10		0.10	ug/L		08/11/23 07:32	08/15/23 04:16	1
Acifluorfen	<1.0		1.0	ug/L		08/11/23 07:32	08/15/23 04:16	1
Bentazon	<0.50		0.50	ug/L		08/11/23 07:32	08/15/23 04:16	1
DCPA (acid degradates)	<0.50		0.50	ug/L		08/11/23 07:32	08/15/23 04:16	1
Dalapon	<1.0		1.0	ug/L		08/11/23 07:32	08/15/23 04:16	1
Dicamba	<0.10		0.10	ug/L		08/11/23 07:32	08/15/23 04:16	1
Dinoseb	<0.10		0.10	ug/L		08/11/23 07:32	08/15/23 04:16	1
Pentachlorophenol	<0.040		0.040	ug/L		08/11/23 07:32	08/15/23 04:16	1
Picloram	<0.10		0.10	ug/L		08/11/23 07:32	08/15/23 04:16	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
2,4-Dichlorophenylacetic acid	101		70 - 130			08/11/23 07:32	08/15/23 04:16	1

Client Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Client Sample ID: 23H0087-01 CT23A

Lab Sample ID: 810-72398-1

Date Collected: 08/01/23 15:15

Matrix: Drinking Water

Date Received: 08/03/23 09:45

Method: EPA 531.2 - Carbamate Pesticides (HPLC) - Dissolved

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Aldicarb	<0.50		0.50	ug/L			08/09/23 18:16	1
Aldicarb sulfone	<0.70		0.70	ug/L			08/09/23 18:16	1
Aldicarb sulfoxide	<0.50		0.50	ug/L			08/09/23 18:16	1
Baygon (Propoxur)	<0.50		0.50	ug/L			08/09/23 18:16	1
Carbaryl	<0.50		0.50	ug/L			08/09/23 18:16	1
Carbofuran	<0.90		0.90	ug/L			08/09/23 18:16	1
3-Hydroxycarbofuran	<0.50		0.50	ug/L			08/09/23 18:16	1
Methiocarb	<1.0		1.0	ug/L			08/09/23 18:16	1
Methomyl	<0.50		0.50	ug/L			08/09/23 18:16	1
Oxamyl	<1.0		1.0	ug/L			08/09/23 18:16	1

Method: EPA 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	3.00		2.22	2.24	3.00	2.10	pCi/L	08/10/23 07:35	08/11/23 21:44	1

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.259		0.120	0.122	1.00	0.148	pCi/L	08/09/23 09:52	08/31/23 12:13	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Ba Carrier	86.3		30 - 110					08/09/23 09:52	08/31/23 12:13	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.441	U	0.394	0.396	1.00	0.624	pCi/L	08/09/23 10:11	08/22/23 15:01	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Ba Carrier	86.3		30 - 110					08/09/23 10:11	08/22/23 15:01	1
Y Carrier	80.4		30 - 110					08/09/23 10:11	08/22/23 15:01	1

Method: TAL-STL Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.701		0.412	0.414	5.00	0.624	pCi/L		09/05/23 11:40	1

Surrogate Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 525.2 - Semivolatile Organic Compounds (GC/MS)

Matrix: Drinking Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		2NMX (70-130)	PRY (70-130)	TPP (70-130)
810-72398-1	23H0087-01 CT23A	97	102	112
LCS 810-68357/2-A	Lab Control Sample	103	106	108
LLCS 810-68357/3-A	Lab Control Sample	102	105	114
MB 810-68357/1-A	Method Blank	100	103	106

Surrogate Legend

2NMX = 2-Nitro-m-xylene
PRY = Perylene-d12
TPP = Triphenylphosphate

Method: 515.3 - Herbicides (GC)

Matrix: Drinking Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)
		DCPAA2 (70-130)
810-72398-1	23H0087-01 CT23A	101
LLCS 810-68950/2-B	Lab Control Sample	101
MB 810-69283/1-B	Method Blank	101

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Tracer/Carrier Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Drinking Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
810-72398-1	23H0087-01 CT23A	86.3	
LCS 160-623455/2-A	Lab Control Sample	79.9	
MB 160-623455/1-A	Method Blank	86.5	

Tracer/Carrier Legend
Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Drinking Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
810-72398-1	23H0087-01 CT23A	86.3	80.4
LCS 160-623456/2-A	Lab Control Sample	79.9	78.9
MB 160-623456/1-A	Method Blank	86.5	78.9

Tracer/Carrier Legend
Ba = Ba Carrier
Y = Y Carrier

QC Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 525.2 - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 810-68357/1-A
Matrix: Drinking Water
Analysis Batch: 68473

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 68357

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Heptachlor epoxide	<0.010		0.010	ug/L		08/04/23 07:09	08/05/23 13:57	1
Di(2-ethylhexyl)adipate	<0.60		0.60	ug/L		08/04/23 07:09	08/05/23 13:57	1
Di (2-ethylhexyl)phthalate	<0.60		0.60	ug/L		08/04/23 07:09	08/05/23 13:57	1
Hexachlorobenzene	<0.10		0.10	ug/L		08/04/23 07:09	08/05/23 13:57	1
Simazine	<0.070		0.070	ug/L		08/04/23 07:09	08/05/23 13:57	1
Alachlor	<0.10		0.10	ug/L		08/04/23 07:09	08/05/23 13:57	1
Atrazine	<0.10		0.10	ug/L		08/04/23 07:09	08/05/23 13:57	1
Benzo[a]pyrene	<0.020		0.020	ug/L		08/04/23 07:09	08/05/23 13:57	1
gamma-BHC (Lindane)	<0.020		0.020	ug/L		08/04/23 07:09	08/05/23 13:57	1
Endrin	<0.010		0.010	ug/L		08/04/23 07:09	08/05/23 13:57	1
Methoxychlor	<0.10		0.10	ug/L		08/04/23 07:09	08/05/23 13:57	1
Heptachlor	<0.010		0.010	ug/L		08/04/23 07:09	08/05/23 13:57	1
Hexachlorocyclopentadiene	<0.10		0.10	ug/L		08/04/23 07:09	08/05/23 13:57	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2-Nitro-m-xylene	100		70 - 130	08/04/23 07:09	08/05/23 13:57	1
Perylene-d12	103		70 - 130	08/04/23 07:09	08/05/23 13:57	1
Triphenylphosphate	106		70 - 130	08/04/23 07:09	08/05/23 13:57	1

Lab Sample ID: LCS 810-68357/2-A
Matrix: Drinking Water
Analysis Batch: 68473

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68357

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Heptachlor epoxide	1.99	2.41		ug/L		121	70 - 130
Di(2-ethylhexyl)adipate	1.99	2.13		ug/L		107	70 - 130
Di (2-ethylhexyl)phthalate	1.99	2.15		ug/L		108	70 - 130
Hexachlorobenzene	1.99	2.43		ug/L		123	70 - 130
Simazine	1.99	2.12		ug/L		107	70 - 130
gamma-BHC (Lindane)	1.99	2.40		ug/L		121	70 - 130
Endrin	1.99	2.48		ug/L		125	70 - 130
Methoxychlor	1.99	2.34		ug/L		118	70 - 130
Heptachlor	1.99	2.42		ug/L		122	70 - 130
Hexachlorocyclopentadiene	1.99	2.33		ug/L		117	70 - 130

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
2-Nitro-m-xylene	103		70 - 130
Perylene-d12	106		70 - 130
Triphenylphosphate	108		70 - 130

Lab Sample ID: LLCS 810-68357/3-A
Matrix: Drinking Water
Analysis Batch: 68473

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68357

Analyte	Spike Added	LLCS	LLCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Heptachlor epoxide	0.00978	0.0149	*+	ug/L		153	50 - 150
Di(2-ethylhexyl)adipate	0.587	0.643		ug/L		110	50 - 150
Di (2-ethylhexyl)phthalate	0.587	0.651		ug/L		111	50 - 150

Eurofins Eaton Analytical South Bend

QC Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 525.2 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LLCS 810-68357/3-A
Matrix: Drinking Water
Analysis Batch: 68473

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68357

Analyte	Spike Added	LLCS	LLCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Hexachlorobenzene	0.0978	0.107		ug/L		109	50 - 150
Simazine	0.0685	0.0570	J	ug/L		83	50 - 150
gamma-BHC (Lindane)	0.0196	0.0204		ug/L		104	50 - 150
Endrin	0.00978	0.0143		ug/L		147	50 - 150
Methoxychlor	0.0978	0.0750	J	ug/L		77	50 - 150
Heptachlor	0.00978	0.0160	*+	ug/L		163	50 - 150
Hexachlorocyclopentadiene	0.0978	0.104		ug/L		107	50 - 150
LLCS LLCS							
Surrogate	%Recovery	Qualifier	Limits				
2-Nitro-m-xylene	102		70 - 130				
Perylene-d12	105		70 - 130				
Triphenylphosphate	114		70 - 130				

Method: 505 - Organochlorine Pesticides/PCBs (GC)

Lab Sample ID: MB 810-68718/1-A
Matrix: Drinking Water
Analysis Batch: 68785

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 68718

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
PCB-1016	<0.080		0.080	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1221	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1232	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1242	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1248	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1254	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
PCB-1260	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
Chlordane (technical)	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1
Toxaphene	<0.50		0.50	ug/L		08/08/23 09:11	08/08/23 21:35	1
Total PCBs as DCB (Qualitative)	<0.10		0.10	ug/L		08/08/23 09:11	08/08/23 21:35	1

Lab Sample ID: LLCS 810-68718/2-A
Matrix: Drinking Water
Analysis Batch: 68785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68718

Analyte	Spike Added	LLCS	LLCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Chlordane (technical)	0.100	0.0750	J	ug/L		75	50 - 150

Lab Sample ID: LLCS 810-68718/3-A
Matrix: Drinking Water
Analysis Batch: 68785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68718

Analyte	Spike Added	LLCS	LLCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Toxaphene	0.500	0.745		ug/L		149	50 - 150

QC Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 515.3 - Herbicides (GC)

Lab Sample ID: LLCS 810-68950/2-B
Matrix: Drinking Water
Analysis Batch: 69510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 68950

Analyte	Spike Added	LLCS		Unit	D	%Rec	%Rec Limits	
		Result	Qualifier					
2,4,5-TP (Silvex)	0.100	0.110		ug/L		110	48 - 148	
2,4-D	0.200	0.164		ug/L		82	24 - 138	
Dinoseb	0.200	0.220		ug/L		110	39 - 141	
Pentachlorophenol	0.0400	0.0229	J	ug/L		57	30 - 171	
Picloram	0.100	<0.10		ug/L		25	24 - 150	

Surrogate	LLCS		Limits
	%Recovery	Qualifier	
2,4-Dichlorophenylacetic acid	101		70 - 130

Lab Sample ID: MB 810-69283/1-B
Matrix: Drinking Water
Analysis Batch: 69510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 69283

Analyte	MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
2,4,5-T	<0.50		0.50	ug/L		08/11/23 07:32	08/14/23 15:38	1
2,4,5-TP (Silvex)	<0.10		0.10	ug/L		08/11/23 07:32	08/14/23 15:38	1
2,4-D	<0.10		0.10	ug/L		08/11/23 07:32	08/14/23 15:38	1
Acifluorfen	<1.0		1.0	ug/L		08/11/23 07:32	08/14/23 15:38	1
Bentazon	<0.50		0.50	ug/L		08/11/23 07:32	08/14/23 15:38	1
DCPA (acid degradates)	<0.50		0.50	ug/L		08/11/23 07:32	08/14/23 15:38	1
Dalapon	<1.0		1.0	ug/L		08/11/23 07:32	08/14/23 15:38	1
Dicamba	<0.10		0.10	ug/L		08/11/23 07:32	08/14/23 15:38	1
Dinoseb	<0.10		0.10	ug/L		08/11/23 07:32	08/14/23 15:38	1
Pentachlorophenol	<0.040		0.040	ug/L		08/11/23 07:32	08/14/23 15:38	1
Picloram	<0.10		0.10	ug/L		08/11/23 07:32	08/14/23 15:38	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2,4-Dichlorophenylacetic acid	101		70 - 130	08/11/23 07:32	08/14/23 15:38	1

Method: 531.2 - Carbamate Pesticides (HPLC)

Lab Sample ID: MBL 810-68725/1-A
Matrix: Drinking Water
Analysis Batch: 68948

Client Sample ID: Method Blank
Prep Type: Dissolved

Analyte	MBL		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Aldicarb	<0.20		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Aldicarb sulfone	<0.20		0.70	ug/L		08/09/23 15:09	08/09/23 15:09	1
Aldicarb sulfoxide	<0.20		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Baygon (Propoxur)	<0.20		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Carbaryl	<0.20		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Carbofuran	<0.30		0.90	ug/L		08/09/23 15:09	08/09/23 15:09	1
3-Hydroxycarbofuran	<0.20		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Methiocarb	<0.40		1.0	ug/L		08/09/23 15:09	08/09/23 15:09	1
Methomyl	<0.30		0.50	ug/L		08/09/23 15:09	08/09/23 15:09	1
Oxamyl	<0.30		1.0	ug/L		08/09/23 15:09	08/09/23 15:09	1

QC Sample Results

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-623627/1-A
Matrix: Drinking Water
Analysis Batch: 623916

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 623627

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Gross Alpha	0.7990	U	0.686 (2σ+/-)	0.692 (2σ+/-)	3.00	1.07	pCi/L	08/10/23 07:35	08/11/23 20:30	1

Lab Sample ID: LCS 160-623627/2-A
Matrix: Drinking Water
Analysis Batch: 623932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 623627

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Gross Alpha	49.6	62.15		9.22 (2σ+/-)	3.00	2.76	pCi/L	125	70 - 130

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-623455/1-A
Matrix: Drinking Water
Analysis Batch: 626304

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 623455

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-226	0.0000	U	0.0740 (2σ+/-)	0.0740 (2σ+/-)	1.00	0.147	pCi/L	08/09/23 09:52	08/31/23 12:12	1
Carrier	%Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.5		30 - 110					08/09/23 09:52	08/31/23 12:12	1

Lab Sample ID: LCS 160-623455/2-A
Matrix: Drinking Water
Analysis Batch: 626304

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 623455

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.25		1.09 (2σ+/-)	1.00	0.116	pCi/L	90	90 - 110
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	79.9		30 - 110						

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-623456/1-A
Matrix: Drinking Water
Analysis Batch: 625104

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 623456

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-228	0.4438	U	0.365 (2σ+/-)	0.368 (2σ+/-)	1.00	0.567	pCi/L	08/09/23 10:11	08/22/23 15:01	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.5		30 - 110					08/09/23 10:11	08/22/23 15:01	1
Y Carrier	78.9		30 - 110					08/09/23 10:11	08/22/23 15:01	1

Eurofins Eaton Analytical South Bend

QC Sample Results

Client: Trace Analytical Laboratories
 Project/Site: 23H0087

Job ID: 810-72398-1

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-623456/2-A
Matrix: Drinking Water
Analysis Batch: 625104

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 623456

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	7.94	10.35		1.45	1.00	0.596	pCi/L	130	80 - 120
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	79.9		30 - 110						
Y Carrier	78.9		30 - 110						

- 1
- 2
- 3
- 4
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- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

QC Association Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

GC/MS Semi VOA

Prep Batch: 68357

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	525.2	
MB 810-68357/1-A	Method Blank	Total/NA	Drinking Water	525.2	
LCS 810-68357/2-A	Lab Control Sample	Total/NA	Drinking Water	525.2	
LLCS 810-68357/3-A	Lab Control Sample	Total/NA	Drinking Water	525.2	

Analysis Batch: 68473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	525.2	68357
MB 810-68357/1-A	Method Blank	Total/NA	Drinking Water	525.2	68357
LCS 810-68357/2-A	Lab Control Sample	Total/NA	Drinking Water	525.2	68357
LLCS 810-68357/3-A	Lab Control Sample	Total/NA	Drinking Water	525.2	68357

GC Semi VOA

Prep Batch: 68718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	505	
MB 810-68718/1-A	Method Blank	Total/NA	Drinking Water	505	
LLCS 810-68718/2-A	Lab Control Sample	Total/NA	Drinking Water	505	
LLCS 810-68718/3-A	Lab Control Sample	Total/NA	Drinking Water	505	

Analysis Batch: 68785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	505	68718
MB 810-68718/1-A	Method Blank	Total/NA	Drinking Water	505	68718
LLCS 810-68718/2-A	Lab Control Sample	Total/NA	Drinking Water	505	68718
LLCS 810-68718/3-A	Lab Control Sample	Total/NA	Drinking Water	505	68718

Prep Batch: 68950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LLCS 810-68950/2-B	Lab Control Sample	Total/NA	Drinking Water	515.3	

Cleanup Batch: 68972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LLCS 810-68950/2-B	Lab Control Sample	Total/NA	Drinking Water	Aliquot	68950

Prep Batch: 69283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	515.3	
MB 810-69283/1-B	Method Blank	Total/NA	Drinking Water	515.3	

Cleanup Batch: 69305

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	Aliquot	69283
MB 810-69283/1-B	Method Blank	Total/NA	Drinking Water	Aliquot	69283

Analysis Batch: 69510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	515.3	69305
MB 810-69283/1-B	Method Blank	Total/NA	Drinking Water	515.3	69305
LLCS 810-68950/2-B	Lab Control Sample	Total/NA	Drinking Water	515.3	68972

QC Association Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

HPLC/IC

Filtration Batch: 68725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Dissolved	Drinking Water	Filtration	
MBL 810-68725/1-A	Method Blank	Dissolved	Drinking Water	Filtration	

Analysis Batch: 68948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Dissolved	Drinking Water	531.2	68725
MBL 810-68725/1-A	Method Blank	Dissolved	Drinking Water	531.2	68725

Rad

Prep Batch: 623455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	PrecSep-21	
MB 160-623455/1-A	Method Blank	Total/NA	Drinking Water	PrecSep-21	
LCS 160-623455/2-A	Lab Control Sample	Total/NA	Drinking Water	PrecSep-21	

Prep Batch: 623456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	PrecSep_0	
MB 160-623456/1-A	Method Blank	Total/NA	Drinking Water	PrecSep_0	
LCS 160-623456/2-A	Lab Control Sample	Total/NA	Drinking Water	PrecSep_0	

Prep Batch: 623627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
810-72398-1	23H0087-01 CT23A	Total/NA	Drinking Water	Evaporation	
MB 160-623627/1-A	Method Blank	Total/NA	Drinking Water	Evaporation	
LCS 160-623627/2-A	Lab Control Sample	Total/NA	Drinking Water	Evaporation	

Lab Chronicle

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Client Sample ID: 23H0087-01 CT23A

Lab Sample ID: 810-72398-1

Date Collected: 08/01/23 15:15

Matrix: Drinking Water

Date Received: 08/03/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	525.2			68357	MR	EA SB	08/04/23 07:09
Total/NA	Analysis	525.2		1	68473	TD	EA SB	08/06/23 00:16
Total/NA	Prep	505			68718	KB	EA SB	08/08/23 09:15 - 08/08/23 16:11 ¹
Total/NA	Analysis	505		1	68785	JV	EA SB	08/09/23 02:22
Total/NA	Prep	515.3			69283	GL	EA SB	08/11/23 07:32
Total/NA	Cleanup	Aliquot			69305	GL	EA SB	08/11/23 10:07
Total/NA	Analysis	515.3		1	69510	CM	EA SB	08/15/23 04:16
Dissolved	Filtration	Filtration			68725	HB	EA SB	08/08/23 10:17
Dissolved	Analysis	531.2		1	68948	RS	EA SB	08/09/23 18:16
Total/NA	Prep	Evaporation			623627	MST	EET SL	08/10/23 07:35
Total/NA	Analysis	900.0		1	623931	FLC	EET SL	08/11/23 21:44
Total/NA	Prep	PrecSep-21			623455	KAC	EET SL	08/09/23 09:52
Total/NA	Analysis	903.0		1	626304	FLC	EET SL	08/31/23 12:13
Total/NA	Prep	PrecSep_0			623456	KAC	EET SL	08/09/23 10:11
Total/NA	Analysis	904.0		1	625104	FLC	EET SL	08/22/23 15:01
Total/NA	Analysis	Ra226_Ra228 Pos		1	626554	EMH	EET SL	09/05/23 11:40

¹ This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EA SB = Eurofins Eaton Analytical South Bend, 110 S Hill Street, South Bend, IN 46617, TEL (574)233-4777

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Laboratory: Eurofins Eaton Analytical South Bend

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Michigan	State	9926	06-30-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
505	505	Drinking Water	Total PCBs as DCB (Qualitative)
515.3	515.3	Drinking Water	2,4,5-T
515.3	515.3	Drinking Water	Acifluorfen
515.3	515.3	Drinking Water	Bentazon
515.3	515.3	Drinking Water	DCPA (acid degradates)
531.2		Drinking Water	Baygon (Propoxur)
531.2		Drinking Water	Methiocarb

Laboratory: Eurofins St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
Iowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-24
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-24
Massachusetts	State	M-MO054	06-30-24
MI - RadChem Recognition	State	9005	06-30-24
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-24
New Jersey	NELAP	MO002	06-30-24
New Mexico	State	MO00054	06-30-24
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-24
North Dakota	State	R-207	06-30-24
Oregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-23 *
Texas	NELAP	T104704193	07-31-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

Job ID: 810-72398-1

Laboratory: Eurofins St. Louis (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-23 *
Virginia	NELAP	10310	06-15-25
West Virginia DEP	State	381	10-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.



Method Summary

Client: Trace Analytical Laboratories
 Project/Site: 23H0087

Job ID: 810-72398-1

Method	Method Description	Protocol	Laboratory
525.2	Semivolatile Organic Compounds (GC/MS)	EPA	EA SB
505	Organochlorine Pesticides/PCBs (GC)	EPA	EA SB
515.3	Herbicides (GC)	EPA	EA SB
531.2	Carbamate Pesticides (HPLC)	EPA	EA SB
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	EET SL
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
Pos			
505	Extraction, Organochlorine Pesticides/PCBs	EPA	EA SB
515.3	Extraction of Chlorinated Acids	EPA-DW	EA SB
525.2	Extraction of Semivolatile Compounds	EPA	EA SB
Aliquot	Preparation, Extract aliquot	None	EA SB
Evaporation	Preparation, Evaporation	None	EET SL
Filtration	Sample Filtration	None	EA SB
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

- EPA = US Environmental Protection Agency
- EPA-DW = "Methods For The Determination Of Organic Compounds In Drinking Water", EPA/600/4-88/039, December 1988 And Its Supplements.
- None = None
- TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

- EA SB = Eurofins Eaton Analytical South Bend, 110 S Hill Street, South Bend, IN 46617, TEL (574)233-4777
- EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: Trace Analytical Laboratories
Project/Site: 23H0087

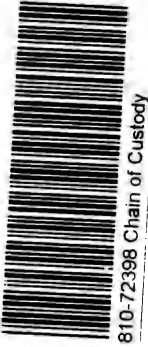
Job ID: 810-72398-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
810-72398-1	23H0087-01 CT23A	Drinking Water	08/01/23 15:15	08/03/23 09:45

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

South Bend, IN
 110 S Hill Street
 South Bend, IN 46617
 Phone (574) 233-4777 Phone (574) 233-8207

Chain of Custody Record



Client Information		Sampler: Lab PM: Fullmer, Karen		Carrier Tracking	
Client Contact: Jon Mink		E-Mail: karen.fullmer@eurofinsat.com		State of Origin:	
Company: Trace Analytical Laboratories		PWSID:		Analysis Requested	
Address: 2241 Black Creek Road		Due Date Requested:		Analysis Requested	
City: Muskegon		TAT Requested (days):		Analysis Requested	
State, Zip: MI, 49444		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Analysis Requested	
Phone: 231-773-5998(Tel)		PO #: 23H0087		Analysis Requested	
Email: jmink@trace-labs.com		WO #: 23H0087		Analysis Requested	
Project Name: EGLE SOCs		Project #: 23H0087		Analysis Requested	
Site:		SSOW#:		Analysis Requested	
Sample Identification		Sample Date		Sample Time	
23H0087-01 CT23A		8/1/23		15:15	
Matrix (Water, Sediment, Organics, etc.)		Sample Type (C=Comp, G=grab)		Matrix	
Drinking Water		G		Drinking Water	
Possible Hazard Identification		Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological <input type="checkbox"/>		Sample Instructions/Note:	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/>		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		EPA 505 - PCB, Toxaphene & Chlordane EPA 515.3 - Chlorinated Acids Extended EPA 525.2 - Semivolatiles EPA 531.2 - Carbamate Pesticides Radium 226/228 Gross Alpha	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:		Special Instructions/Note:	
Empty Kit Relinquished by: _____		Date/Time: 8/2/23 17:00		Date/Time: _____	
Relinquished by: Natalie Cooper		Date/Time: _____		Date/Time: _____	
Relinquished by: _____		Date/Time: _____		Date/Time: _____	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) and Other Remarks:	





Client Information (Sub Contract Lab) Client Contact: _____ Shipping/Receiving: _____ Company: TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, _____ City: _____ Earth City: _____ State Zip: MO, 63045 Phone: 314-298-8566 (Tel) 314-298-8757 (Fax) Email: _____ Project Name: 23H0087 Site: _____			Sampler: _____ Phone: _____ Due Date Requested: 9/6/2023 TAT Requested (days): _____	Lab PM: Karen E-Mail: Karen.Fullmer@et.eurofins.com Accreditations Required (See note): State - Michigan	Carrier Tracking No(s): _____ State of Origin: Michigan Page: Page 1 of 1 Job #: 810-72398-1	COC No.: 810-28786-1 Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anchor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2CO3 Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)
Analysis Requested Field Filtered Sample (Yes or No) _____ Perform MS/MSD (Yes or No) _____			900.0/Evaporation EPA 900.0 - Gross Alpha (St. Louis) 903.0/PrecSep_21 EPA 903.0 - Radium 226 (St. Louis) 904.0/PrecSep_0 EPA 904.0 - Radium 228 (St. Louis) Ra226_228GFPC_P/ Combined Ra226 & Ra228 Calc (St. Louis)			
Sample Identification - Client ID (Lab ID) 23H0087-01 CT23A (810-72398-1)	Sample Date 8/1/23	Sample Time 15:15 Eastern	Sample Type (C=Comp, G=Grab) G	Matrix (Wet, S, O, A, H) Drinking Water	Total Number of Containers 5	
Special Instructions/Note: SDWA - RL must be met, extend count time to meet RL. If RL is not met, contact PM to						

Note: Since laboratory accreditations are subject to change, Eurofins Eaton Analytical, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/retest/matrix being analyzed, the samples must be shipped back to the Eurofins Eaton Analytical, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Eaton Analytical, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Eaton Analytical, LLC.

Possible Hazard Identification
 Unconfirmed
 Deliverables Requested: I, II, III, IV, Other (Specify) _____
 Primary Deliverable Rank: 2
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: Penny Bohling Date/Time: 8/1/23 1:00 Company: EEA
 Relinquished by: _____ Date/Time: _____ Company: _____

Custody Seals Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No Cooler Temperature(s) °C and Other Remarks: _____

Method of Shipment: _____
 Received by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____ Company: _____

Chain of Custody Record



Environment Testing



Client Information (Sub Contract Lab) Shipping/Receiving TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, City: Earth City State, Zip: MO, 63045 Phone: 314-298-8566(Tel) 314-298-8757(Fax) Email: Project Name: 23H0087 Site:		Lab PM: Fullimer, Karen E-Mail: Karen.Fullimer@et.eurofins.com Accreditations Required (See note): State - Michigan		Carrier Tracking No(s): 810-28766.1 Page: Page 1 of 1 Job #: 810-72398-1	
Due Date Requested: 9/6/2023 TAT Requested (days):		Analysis Requested			
PO #: WO # Project #: 81000263 SSOW#:		900/EVaporation EPA 900.0 - Gross Alpha (St. Louis) X 903.0/PrecSep_21 EPA 903.0 - Radium 226 (St. Louis) X 904.0/PrecSep_0 EPA 904.0 - Radium 228 (St. Louis) X Ra226, 228GFP_C_P/ Combined Ra226 & Ra228 Calc (St. Louis) X		Perform MS/MSD (Yes or No) X Field Filtered Sample (Yes or No) X Total Number of Containers: 5	
Sample Identification - Client ID (Lab ID) 23H0087-01 CT23A (810-72398-1)		Sample Date: 8/1/23	Sample Time: 15:15 Eastern	Sample Type (C=Comp, G=grab):	Matrix (W=water, S=solid, O=water/oi, BT=Tissue, AA=): Drinking Water
Note: Since laboratory accreditations are subject to change, Eurofins Eaton Analytical, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the Eurofins Eaton Analytical, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Eaton Analytical, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Eaton Analytical, LLC.					
Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2 Empty Kit Relinquished by: _____ Date: _____ Relinquished by: <i>Peggy Dehlylight</i> Date/Time: 08/07/23 11:00 Relinquished by: FED EX Date/Time: _____ Relinquished by: _____ Date/Time: _____ Custody Seals Intact: _____ Custody Seal No.: _____ Δ Yes Δ No					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:					
Method of Shipment: _____ Received by: _____ Date/Time: _____ Received by: <i>Suma Worthington</i> Date/Time: AUG 08 2023 Received by: _____ Date/Time: _____ Cooler Temperature(s) °C and Other Remarks:					



Login Sample Receipt Checklist

Client: Trace Analytical Laboratories

Job Number: 810-72398-1

Login Number: 72398

List Source: Eurofins Eaton Analytical South Bend

List Number: 1

Creator: Blackburn, Kelly

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Samples do not require splitting or compositing.	True	
Container provided by EEA	True	

Login Sample Receipt Checklist

Client: Trace Analytical Laboratories

Job Number: 810-72398-1

Login Number: 72398

List Number: 2

Creator: Pinette, Meadow L

List Source: Eurofins St. Louis

List Creation: 08/08/23 02:01 PM

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Trace Analytical Laboratories, Inc.
 2241 Black Creek Road
 Muskegon, MI 49444-2673



231-773-5998 Phone
 888-979-4469 Fax
 www.trace-labs.com



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CHAIN-OF-CUSTODY RECORD

Page _____ of _____

Report Results To:

Bill To:

Trace Use:

Company Name: Peetless Midwest	PO #:
Report To:	Contact Name: Tia
Mailing Address: 505 Apple Tree Dr.	Billing Address (if different): 55860 Russell Industrial Parkway
City, State, Zip Code: Ionia, MI 48846	City, State, Zip Code: Mishawaka, IN 46545
Office Phone: 574-252-4142	Cell Phone:
Phone Number: 574-254-9650	Billing Email Address: accountspayable@peetlessmidwest.com

Logged By: <i>WP</i>
Checked By: <i>SR</i>
Soil Vials Preserved (circle if applicable): MeOH Low Level Lab
Sampling Time:

Turnaround Requirements:

- Standard: 5-10 Days
- 3 Day*
- 1 Day*

Matrix Key:

- S = Soil / Solid
- W = Water
- SL = Sludge
- OI = Oil
- WI = Wipes
- LW = Liquid Waste
- A = Air
- D = Drinking Water

*Results provided end of business day, requires prior approval.

Analysis Requested

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y/N)	Matrix	Number of Containers	Preservation							Total Alk, Conductance	Ammonia, CO2 Bundle	Free CN, Type 1 Metals	Partial Chem	VOC	Gross Alpha, Rad 226/228	SOC - EGLE List	PFAS	Low Level Sulfide	Remarks	Possible Health Hazards?
							Cool	HCl	HNO3	H2SO4	NaOH	Other												
1	08/01	3:15 PM	CF 23A		D	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Field pH = 7.3 Field Temp = 50.3	

Project Name: *Dwight Charles Topf*

Sampled By: *Priscilla Westbrook*

Please Sign

Released By	Received By	Date	Time	Released By	Received By	Date	Time
<i>[Signature]</i>	<i>[Signature]</i>	08/02/23	9:30 AM				

Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at www.trace-labs.com/downloads.

Form 70-2-1

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

The Reg level for all analytes with the exception of Lead and Copper is the MCL, for Lead and Copper it is the AL.

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23H0087
 Peerless Midwest Inc.
 Project Manager: Drew Hilleary

Sample Log In Checklist

Date: 8/2/23	Original Observation	Corrected Temperature	IR-9 (CF: -0.4°C)	IR-10 (CF: +0.2°C)	IR-12 (CF: -0.4°C)	SR1 (CF: -0.2°C)	SR2 (CF: -0.1°C)	Temp Blank	Client Sample
Time: 9:30									
Logged by: NC									
Package Description: Cooler									
Package Temp °C	0.8	0.4							
Representative Sample Temp °C	2.0	1.9							

Sample Receipt

Yes No

Received on ice or other coolant

Ice still present upon receipt

Custody seals present

Trace Courier Client Drop-off

Yes No Custody seals intact (if applicable)

UPS Fed Ex US Mail Other

Sample Condition

Yes No N/A

All sample containers arrived unbroken and labeled

Sufficient sample to run requested analyses

Correct chemical preservative added to samples

Samples preserved at Trace

Chemical preservation verified, check EMD pH test strip used (if applicable)

pH 0-2.5 (Lot: HC201854) pH 11.0-13.0 (Lot: HC022540) Other

Air bubbles absent from VOAs

Chain of Custody (COC)

Yes No

All bottle labels agree with COC

COC filled out properly

COC signed by client

Notes:

CERTIFICATE OF ANALYSIS

STATE OF MICHIGAN LABORATORY ID: 8001

The Reg level for all analytes with the exception of Lead and Copper is the MCL, for Lead and Copper it is the AL.

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