Disclaimer: This document is a DRAFT document that has not received final approval from the Department of Environment, Great Lakes, and Energy (EGLE). This document was prepared pursuant to a governmental administrative order. The opinions, findings, and conclusions expressed are those of the authors and not those of the EGLE.

ARCADIS

ZF Active Safety US Inc.

PROGRESS REPORT NO. 3

Former Kelsey-Hayes Company Site, Milford, Michigan

Administrative Order for Response Activity, EGLE Docket No. AO-RRD-22-001

July 15, 2022

PROGRESS REPORT NO. 3
FORMER KELSEY-HAYES COMPANY
MILFORD, MICHIGAN
ADMINISTRATIVE ORDER FOR RESPONSE ACTIVITY EGLE
DOCKET NO. AO-RRD-22-001

This progress report has been prepared and is being submitted pursuant to Section XII of the Administrative Order for Response Activity, Docket No. AO-RRD-22-001 (AO) issued by the Department of Environment, Great Lakes, and Energy (EGLE) to ZF Active Safety US Inc. (ZF or Respondent) on March 16, 2022 (effective date), with respect to the former Kelsey-Hayes site in Milford, Michigan (the "Site"). This progress report provides information regarding response activities and other matters related to the AO, that have occurred from June 11, 2022 through July 11, 2022.

Chronological Description of Activities Conducted during the Specified Reporting Period:

- Final design and development of specifications for the Village of Milford (VOM) groundwater treatment system improvements in accordance with Section V of the AO continued during the reporting period. A final design status update meeting with ZF, Arcadis, VOM, EGLE, and Wood (the "Design Group") occurred on June 17, 2022. Meeting minutes from the Design Group meeting on June 17, 2022 are included in Attachment 1
- On June 20, 2022, pursuant to Section V of the AO, ZF submitted the Permit Application for Water Supply Systems pursuant to Act 399 for construction of the treatment system improvements with supporting plans and specifications and design memo to the EGLE Drinking Water and Environmental Health Division, Warren District Office and the VOM. Copies of these documents are included in Attachment 2.
- On June 28, 2022, EGLE sent a letter to ZF titled "Documentation Requirements Related to the Administrative Order for Response Activity" (the "June 28th Letter"), outlining documentation that must be provided with any request for EGLE concurrence regarding data and conclusions related to ZF's additional investigations conducted in accordance with the Monitoring Well Rehabilitation and Vertical Aquifer Profiling Work Plan submitted on April 22, 2022 (the "Work Plan"). A copy of the June 28th Letter is included in Attachment 3.
- Observation Wells OW-16D2 and OW-16D2R1 were sampled on July 11, 2022. The samples were submitted to Fibertec Environmental Services of Holt, Michigan (Fibertec) for expedited analysis of VOCs using United States Environmental Protection Agency (USEPA) Test Method 8260D. Laboratory analytical results of the July 11, 2022 samples were submitted to EGLE and the VOM and are included in Attachment 4. Vinyl chloride was not detected in any of the July 11, 2022 samples.

Results of Sampling and Tests and other Data

- Observation Wells OW-16D2 and OW-16D2R1 were sampled on July 11, 2022. The samples were submitted to Fibertec for expedited analysis of VOCs using USEPA Test Method 8260D. A copy of the laboratory analytical report for the July 11, 2022 samples is included in Attachment 4. Vinyl chloride was not detected in any of the June 8 or July 11, 2022 samples collected from Observation Wells OW-16D2 and OW-16D2R1.Status of Access Issues
- There have been no issues with access during the reporting period.

Scheduled for the Next Reporting Period

- Install an additional, deeper observation well (OW-16D2R2) near OW-16D2 screened at 95 to 100 feet below ground surface on July 20 and 21, 2022. The additional observation well will be screened at the same depth as Observation Well OW-16D2.
- Perform camera survey of OW-16D2 on July 20 or 21, 2022.
- Conduct sampling at Observation Wells OW-16D2R1 and OW-16D2R2 during the month of August 2022, with analysis conducted by Fibertec or Eurofins Canton, Ohio within 10 to 14 days.
- Sample Observation Well OW-16D2 in August 2022.

Other Relevant Information

- No other relevant information was identified during this reporting period.

Attachments

1. Design Group Meeting Minutes
2. Permit Application for Water Supply Systems Pursuant to Act 399 and Supporting Documentation
3. June 28, 2022 Letter From EGLE
4. Laboratory Analytical Report (Observation Wells OW-16D2 and OW-16D2R1)

ATTACHMENT 1

Design Group Meeting Minutes

MEETING MINUTES
June 17, 2022
Design Group Meeting
Village of Milford Drinking Water System
Vinyl Chloride Treatment System
(Discussion Purposes Only)

- Participants (Design Group)
  - Mike Karll, VOM
  - Kevin Wojciechowski, EGLE (RRD)
  - Tiffany Yusko-Kotimko and Nick Swiger, EGLE (DW & EHD)
  - Scott Detwiler, ZF
  - John McInnis, Brad Hitts, and Grant Andrews, Arcadis
  - Rob Dewyre and Jeshua Hansen, Wood (VOM consultant)
  - Ted Erickson, IMEG, (Wood consultant)

- Design Updates
  - Arcadis finalizing plans and specifications and design memo based on comments received from the VOM. Discussed comments with the design group. Arcadis will submit the final set of documents to the VOM on Monday (6/20/2022). Once approved by the VOM, ZF will submit the documents to EGLE on Monday as well pursuant to Paragraph 5.2.c of EGLE Administrative Order AO-RRD-22-001.
  - Kevin (EGLE) verified that the issuance of purchase orders to vendors would count as commencement of construction activities per Paragraph 5.2.d of EGLE Administrative Order AO-RRD-22-001. It was acknowledged that the lead time on equipment would be several months.
  - Arcadis will provide more information in the design memo regarding the intent of the chlorine feed line. Tiffany acknowledged that the 10 States Standards requires the provision of adding chlorine ahead of the treatment system, but the complete installation of the feed line is not required.

ATTACHMENT 2

Permit Application for Water Supply Systems Pursuant to Act 399 and Supporting Documentation

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

PERMIT APPLICATION FOR WATER SUPPLY SYSTEMS

(CONSTRUCTION - ALTERATION - ADDITION OR IMPROVEMENT) AS DESCRIBED HEREIN

Required under the Authority of 1976 PA 399, as amended (Act 399)

This application becomes an Act 399 Permit only when signed and issued by authorized Michigan Department of Environment, Great Lakes, and Energy (EGLE) staff. See instructions below for completion of this application.

1. **Municipality or Organization, Address and WSSN** that will own or control the water facilities to be constructed. This permit is to be issued to: Village of Milford 1100 Atlantic Milford, Michigan 48381 **WSSN**: 04390	Permit Stamp Area (EGLE use only)	
2. **Owner's Contact Person** (provide name for questions): Contact: Mike Karll Title: Director of Public Services Phone: 248-685-3055		
3. **Project Name** (Provide phase number if project is segmented): Groundwater Treatment System Improvements	4. **Project Location** (City, Village, Township): Village of Milford	5. **County** (location of project): Oakland

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR OF THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

cc:

Issued by: _____

Reviewed by: _____

☐ **If this box is marked see attached special conditions**.

Instructions: Complete items 1 through 5 above and 6 through 21 on the following pages of this application. Print or type all information except for signatures. Mail completed application, plans and specifications, and any attachments to the EGLE District Office having jurisdiction in the area of the proposed construction.

Please Note:

a. This **PERMIT** only authorizes the construction, alteration, addition or improvement of the water system described herein and is issued solely under the authority of 1976 PA 399, as amended.
b. The issuance of this **PERMIT** does not authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other EGLE permits, or approvals from other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the date of issuance in accordance with R 325.11306, 1976 PA 399, administrative rules, unless construction has been initiated prior to expiration.
d. Noncompliance with the conditions of this permit and the requirements of the Act constitutes a violation of the Act.
e. Applicant must give notice to public utilities in accordance with 1974 PA 53, (MISS DIG), being Section 460.701 to 460.718 of the Michigan Compiled Laws and comply with each of the requirements of that Act.
f. All earth changing activities must be conducted in accordance with the requirements of the Soil Erosion and Sedimentation Control Act, Part 91, 1994 PA 451, as amended (Act 451).
g. All construction activity impacting wetlands must be conducted in accordance with the Wetland Protection Act, Part 303, 1994 PA 451, as amended.
h. Intentionally providing false information in this application constitutes fraud which is punishable by fine and/or imprisonment.
i. Where applicable for water withdrawals, the issuance of this permit indicates compliance with the requirements of Part 327 of Act 451, Great Lakes Preservation Act.

6. Facilities Description – In the space below provide a detailed description of the proposed project. Applications without adequate facilities descriptions **will be returned**. SEE EXAMPLES BELOW**.** Use additional sheets if needed.

The existing water treatment plant will be modified to include upgraded well pumps and motors at the existing water supply wells (PW-2 and PW-4) and two new air stripping towers to remove vinyl chloride. The two existing vertical turbine well pumps will be upgraded to 40 Hp motors (460 volt, three phase, 60 Hz) and 2 stage 12 inch bowls with a rating of 1,400 gpm at 71 feet TDH. Each air stripping tower will be rated at 1,400 gpm and cable of removing vinyl chloride concentrations at 50 ug/L to < 2 ug/L. Air stripping towers will be 7 feet-6 inches square with a media depth of 14 feet. Media will be 3.5 inch Raschig Tripack (polypropylene). Each air stripping tower will be equipped with a 5 Hp (460 volt, three phase, 60 Hz) forced draft blower with a rating of 5,615 SCFM at 2 inches static pressure. Air to water ratio shall be a minimum of 20 to 1.

EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES – EXAMPLES	
Water Mains	500 feet of 8-inch water main in First Street from Main Street north to State Street. **OR** 250 feet of 12-inch water main in Clark Road from an existing 8-inch main in Third Avenue north to a hydrant.
Booster Stations	A booster station located at the southwest corner of Third Avenue and Main Street, and equipped with two, 15 Hp pumps each rated 150 gpm @ 200 feet TDH. Station includes backup power and all other equipment as required for proper operation.
Elevated Storage Tank	A 300,000 gallon elevated storage tank located in City Park. The proposed tank shall be spherical, all welded construction and supported on a single pedestal. The tank shall be 150 feet in height, 40 feet in diameter with a normal operating range of 130 – 145 feet. The interior coating system shall be ANSI/NSF Standard 61 approved or equivalent. The tank will be equipped with a cathodic protection system, and includes a tank level control system with telemetry.
Chemical Feed	A positive displacement chemical feed pump, rated at 24 gpd @ 110 psi to apply a chlorine solution for Well No. 1. Chlorine is 12.5% NaOCL, ANSI/NSF Standard 60 approved and will be applied at a rate of 1.0 mg/l of actual chlorine.
Water Supply Well	Well No. 3, a 200 foot deep well with 170 feet of 8-inch casing and 30 feet of 8-inch, 10 slot screen. The well will be equipped with a 20 Hp submersible pump and motor rated 200 gpm @ 225 feet TDH, set at 160 feet below land surface.
Treatment Facilities	A 5 million gpd water treatment plant located at the north end of Second Avenue. The facility will include 6 low service pumps, 2 rapid mix basins, 4 flocculation/sedimentation basins, 8 dual media filters, 3 million gallon water storage reservoir and 6 high service pumps. Also included are chemical feed pumps and related appurtenances for the addition of alum, fluoride, phosphate and chlorine.

General Project Information – Complete all boxes below.

7. Design engineer's name, engineering firm, address, phone number, and email address:

Brad Hitts
Arcadis of Michigan, LLC
28550 Cabot Drive, Suite 500
Novi, Michigan 48377
419-213-1623
brad.hitts@arcadis.com

8. Indicate who will provide project construction inspection:
☐Organization listed in Box 1.
☒Engineering firm listed in Box 7.
☐Other - name, address, and phone number listed below.

9. Is a basis of design attached?
☒YES ☐NO

If no, briefly explain why a basis of design is not needed.

10. Are sealed and signed engineering plans attached?
☒YES ☐NO

If no, briefly explain why engineering plans are not needed.

11. Are sealed and signed construction specifications attached?
☒YES ☐NO

If specifications are not attached, they need to be on file at EGLE.

12. Were Recommended Standards for Water Works, Suggested Practice for Water Works, AWWA guidelines, and the requirements of Act 399 and its administrative rules followed?
☒YES ☐NO

If no, explain which deviations were made and why.

13. Are all coatings, chemical additives and construction materials ANSI/NSF or other adequate 3rd party approved?
☒YES ☐NO

If no, describe what coatings, additives or materials did not meet the applicable standard and why.

14. Are all water system facilities being installed in the public right-of-way or a dedicated utility easement? (For projects not located in the public right-of-way, utility easements must be shown on the plans.)
☒YES ☐NO

If no, explain how access will be obtained.

15. Is the project construction activity within a wetland (as defined by Section 324.30301(d)) of Part 303, 1994 PA 451?
☐YES ☒NO

If yes, a wetland permit must be obtained.

16. Is the project construction activity within a 100-year floodplain (as defined by R 323.1311(e)) of Part 31, 1994 PA 451, administrative rules?
☐YES ☒NO The project does not require the disturbance of land.

If yes, a flood plain permit must be obtained.

17. Is the project construction activity within 500 feet of a lake, reservoir, or stream?
☐YES ☒NO The project does not require the disturbance of land.

If yes, a Soil and Erosion Control Permit must be obtained or indicate if the owner listed in box 2 of this application is an Authorized Public Agency (Section 10 of Part 91, 1994 PA 451) ☐Owner is APA.

18. Will the proposed construction activity be part of a project involving the disturbance of five (5) or more acres of land?
☐YES ☒NO

If YES, is this activity regulated by the National Pollutant Discharge Elimination System (NPDES) storm water regulations?

☐YES: NPDES Authorization to discharge storm water from construction activities must be obtained.

☐NO: Describe why activity is not regulated.

Please call 517-241-8993 with questions regarding the applicability of the storm water regulations.

19. Is the project in or adjacent to a site of suspected or known soil or groundwater contamination?
☒YES ☐NO No contaminated soils and/or groundwater will be disturbed during proposed work.

If YES, attach a copy of a plan acceptable to EGLE for handling contaminated soils and/or groundwater disturbed during construction. Contact the local EGLE district office for listings of Michigan sites of environmental contamination.

20. IF YOU ARE A CUSTOMER/WHOLESALE/BULK PURCHASER, COMPLETE THE FOLLOWING
Not Applicable

1. Name and WSSN of source water supply system (seller): _____

2. Does the water service contract require water producer/seller to review and approve customer/wholesale/bulk purchaser water system construction plans?

☐YES ☐NO

If yes to #2, the producer/seller approval letter must be attached when submitted to EGLE.

21. **Owner's Certification** The owner of the proposed facilities or the owner's authorized representative shall complete the owner's certification. It is anticipated that the owner will either be a governmental agency (city, village, township, county, etc.) or a private owner (individual, company, association, etc.) of a Type I public water supply.

OWNER'S CERTIFICATION

I, Mike Karll (print) (name), acting as the Director of Public Services (print) (title/position) for the Village of Milford (print) (entity owning proposed facilities) certify that this project has been reviewed and approved as detailed by the Plans and Specifications submitted under this application, and is in compliance with the requirements of 1976 PA 399, as amended, and its administrative rules.

MKarll
Signature*

06-20-2022
Date

248-685-3055
Phone

*Original signature only, no photocopies will be accepted.

PROJECT BASIS OF DESIGN – FOR WATER MAIN PROJECTS

Not Applicable

PROJECT NAME: _____

For this PROJECT the following information must be provided per Act 399 unless waived by the Department. For projects other than water main installation, or if additional space is needed, attach separate sheet(s) with detailed Basis of Design calculations.

A. A general map of the initial and ultimate service areas
☐Included on engineering plans ☐Attached separately

B. Number of service connections served by this permit application _____

C. Total number of service connections ultimately served by entire project _____

D. Residential Equivalent Units (REUs) served by this permit application _____

E. Total Residential Equivalent Units (REUs) ultimately served by entire project _____

F. Water flow rates for proposed project based on REUs listed in "D' and "E" above

1. Initial design average day flow (mgd) _____
2. Initial design maximum day flow (mgd) _____
3. Total design average day flow (mgd) _____
4. Total design maximum day flow (mgd) _____
5. Required fire flows: (1) _____ gpm for_____hours

G. Actual flows and pressures of existing system at the connection point(s) (2)
_____ gpm at_____psi
_____ gpm at_____psi
_____ gpm at_____psi
_____ gpm at_____psi

H. Estimated minimum flows and pressures within the proposed water main system (3) _____ gpm at_____psi

(1) Every water system must decide what levels of firefighting flows they wish to provide. Fire flow should be appropriate for the area (residential, commercial, industrial) being served by the project. Typical fire flow rates can be obtained from the water supply, local fire dept., ISO or AWWA. The water system must then be designed to be able to provide the required fire flows while maintaining at least 20 psi in all portions of the distribution system.

(2) Flows and pressures at the connection points must be given to determine if the existing water main(s) are able to deliver water to the new service area. These numbers can be obtained from a properly modeled and calibrated distribution system hydraulic analysis or hydrant flow tests performed in the field. If more than one connection is proposed, list as needed.

(3) List what the estimated minimum flows can be expected in the proposed water mains based on estimated water demands, head losses, elevation changes and other factors that may affect flows, such as dead end mains.

Air Stripping Towers

This project will replace the induced draft aerators with packed tower air strippers. The air stripping towers will achieve two primary functions: oxidization of iron and stripping of vinyl chloride (if it becomes present in the future).

Influent water parameters and effluent performance requirements used to the size the towers are as follows:

Influent Water Parameter	Influent Design Value	Effluent Performance Requirement
Total Iron	1.5 mg/l	Oxidized for removal in downstream filtration
Vinyl Chloride	50 ug/l	Less than 2 ug/l
Hardness (as $CaCO_3$)	280 mg/l	-
Sulfate	50 mg/l	-
Total Calcium	110 mg/l	-
Total Sodium	90 mg/l	-

Effluent performance requirements are required to be met at the following flow rates:

- Minimum Flow (700 GPM); both towers operating in parallel with each tower receiving 50% of the plant's rated capacity.
- Design Flow (1400 GPM); one tower out of service; one tower operating at the plant's rated capacity.
- Peak Flow (2100 GPM); one tower out of service; one tower operating at 150% of the plant's rated capacity.

The proposed towers will match the horizontal footprint of the existing aerators (7'-6" square). The height of the new equipment will be greater than the existing at approximately 22'-0" tall. Each tower will be packed with 3.5" diameter Tripack media at 14'-0" depth. Manufacturer calculated removal efficiencies along with a preliminary layout drawing are attached to the end of this memo.

To comply with the Ten State Recommended Standards for Water Works (2018), a tap to provide the ability to feed chlorine upstream of the tower will be provided. The Plant's existing chlorine feed point is located on the filter influent, downstream of the proposed air stripping towers. It is expected that this will continue to be the Plant's normal chlorine application point. A connection point to the Plant's chlorine feed system will be provided as well. To utilize the upstream tap, an exterior segment of temporary piping or hose will be needed to connect the Plant's chlorine feed system to the tap.

Well Pumps

The installation of the air stripping towers will result in a higher pump discharge elevation, as the towers are taller than the existing aerators. This impacts the discharge head on the pumps since they pump to the top of the unit.

The existing pumps have a design point of 1,400 gpm at 59 ft tdh. 2021 testing data shows that the pumps have some wear. They are currently producing approximately 1,400 gpm at about 10-15ft below their curve head rating.

To maintain the same allowance for wear as existing, the design tdh will be increased by the discharge height increase, approximately 12 feet. This results in a design point of 1,400 gpm at 71 ft tdh which is beyond the capability of the existing pumps and motors. As such, new pumps capable of pumping to the higher elevation are proposed. The new pumps will have 40 HP motors. A preliminary cut sheet and curve is included at the end of this memo.

Process Control Description

Well Pumps

1. Equipment
   a. Well Pump No. 2
   b. Well Pump No. 4
2. Overview
   a. Pumps are vertical turbine type and operate in a lead-lag arrangement to deliver well water to the Air Stripping Towers.
3. Control
   a. With the Hand-Off-Auto selector switch on the starter in Hand, the pump shall run.
   b. With the Hand-Off-Auto selector switch in Auto, the pump shall be controlled from the PLC in automatic mode.PLC Auto Mode:
      i. Existing automatic controls shall be maintained. Existing controls include a lead lag configuration based on the iron removal plant clearwell level, and automatic alternation.
      ii. Airflow must be present from in service Blowers (No. 1 and No.2) for a well pump to start.
4. Interlocks
   a. Existing interlocks will be maintained. New Interlocks are as follows:

Interlock	Type	Purpose	Setpoint	Action
Low Airflow Lockout (Differential Pressure Switch)	Software	Pump Shutdown	Tripped	Pump Stop
Airflow Present (Differential Pressure Switch)	Software	Pump Permissive	Tripped	Pump Start

5. Monitoring
   a. Existing monitoring will be maintained.
6. Alarms
   a. Existing alarms will be maintained.

Air Stripping Towers

1. Equipment
   a. Air Stripping Tower No. 1
   b. Air Stripping Tower No. 2
   c. Blower No. 1
   d. Blower No. 2
   e. Raw Water Flowmeter No. 1
   f. Raw Water Flowmeter No. 2
   g. Differential Pressure Switch No. 1 (air)
   h. Differential Pressure Switch No. 2 (air)
   i. Differential Pressure Transmitter No. 1 (air)
   j. Differential Pressure Transmitter No. 2 (air)

2. Process Overview
   a. The Air Stripping Towers receive well water from Well Pumps No. 2 and 4. Water enters at the top of the tower and flows downward by gravity while air from its' Blower enters from the bottom and flows upward. The counter current airflow strips contaminants from the well water. The treated water is discharged into a detention tank below the Tower.
   b. Blower No. 1 is dedicated to Air Stripping Tower No. 1 and Blower No. 2 to Air Stripping Tower No. 2. There is no crossover.
   c. The Blower must be operating and producing the minimum allowable airflow for the Tower it serves to be in service. A differential pressure switch will be used for low airflow lockout. A pitot tube type airflow measuring station will be included in the blower discharge ductwork. This device will create a differential air pressure based on the airflow rate from which the approximate airflow rate can be determined.
   d. The Air Stripping Towers operate in parallel. Normally both towers are in operation but one can be taken out of service and the flow from one well pump routed to it.

3. Control
   a. Air Stripping Tower No.1 and 2
      i. No automatic controls exist.
      ii. A tower may be taken out of service by closing the manually actuated butterfly valve on its dedicated influent pipe.
      iii. Flowmeters (Well Water Flowmeter No. 1 and 2) are provided on the influent to each tower. With both towers operating in parallel, the flow should be equally split based on the influent piping configuration. If not equally split, the manually actuated butterfly valve on the influent to each Tower can be adjusted to achieve an equal split. At least one of the two butterfly valves should always be 100% open. If an unbalance exists, the butterfly valve on the unit receiving a higher flow rate can be throttled slightly to achieve an approximate balance.
   b. Blower No. 1 and 2
      i. With the Hand-Off-Auto selector switch on the starter in Hand, the blower shall run.
      ii. With the Hand-Off-Auto selector switch in Auto, the blower shall be controlled from the PLC in automatic mode.
      iii. PLC Auto Mode: The PLC shall automatically start the blower when either Well Pump No. 2 or Well Pump No. 4 is called to start, and automatically stop the blower when the well pump is shutoff.
   c. Airflow rate from differential pressure transmitter to be displayed on the HMI.
   d. If airflow rate falls to operator adjustable low airflow setpoint, an alarm shall be generated to indicate attention is needed.
   e. If airflow continues to decrease to the low airflow lockout, the well pump and blower shall be shutdown.
4. Interlocks

Interlock	Type	Purpose	Setpoint	Action
Well Pump Start Signal	Software	Start Blower	Tripped	Start Blower
Well Pump Start Signal	Software	Stop Blower	Tripped	Stop Blower

5. Monitoring
   a. In Auto
   b. Running
   c. Airflow Rate (Differential Pressure Transmitter)

6. Alarms
    a. Low Airflow (setpoint from Differential Pressure Transmitter when well pump/blower operating)
    b. Low Airflow Lockout (Differential Pressure Switch when well pump/blower operating)
    c. Motor fault

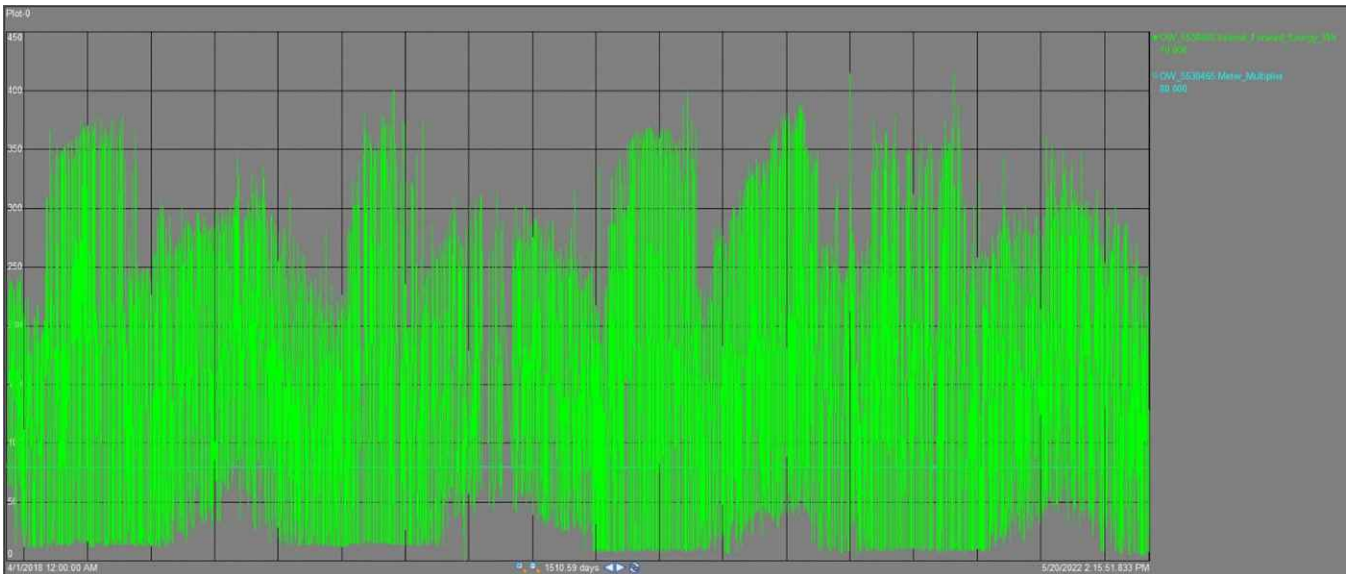
Standby Power

Generator Loading Analysis

The existing 250-kilowatt generator is wired via automatic transfer switch such that the plant can continue to operate during loss of utility power. The replacing of the well pumps and aerator blowers and the resulting effect on the generator's demand load was analysed.

The largest existing motor loads consist of the high service pumps (75HP), well pumps (25HP), and aerator blowers (3HP). The high service pumps are operated by VFDs and are to remain as-is. The well pumps are to be upsized to 40HP motors and will continue to operate on standard full-voltage combination starters. Similarly, the aerator blowers are to be upsized to 5HP motors and will also continue to operate on full-voltage combinations starters.

Utility data was provided that indicates a peak demand at the plant of 128 kilowatts, with readings taken from April 2018 to present. The usage data can be found in the following Figure.



DTE Usage Data for the site at 195 N. Main St., Milford, MI 48381

The total net added load resulting from upsizing the well pumps and aerator blowers is approximately 23 kVA. This steady-state amount and associated starting currents does not result in a significant load increase relative to the available generator capacity based on the actual demand readings.

A supplemental demand calculation was estimated based on a hypothetical "worst-case" scenario. One well pump, two aerator blowers, and two high service pumps were assumed to be operating simultaneously, all at full load. This conservatively simulates the plant running at or above its designed capacity. The calculated loads for this scenario can be found below:

Equipment	Amperage (FLA)
High Service Pump No. 1	87
High Service Pump No. 2	87
Well Pump No. 1 (proposed)	45
Blower No. 1 (proposed)	7.6
Blower No. 2 (proposed)	7.6
TOTAL	**234.2**

With the proposed upsized motors accounted for, these loads would total approximately 234 amps (480V, 3-phase). Assuming the full load amperage of the generator converts to approximately 300 amps, this would result in approximately 66 amps (480V, 3-phase) of available capacity for miscellaneous, smaller building loads (lights, heaters, etc.) to operate simultaneously.

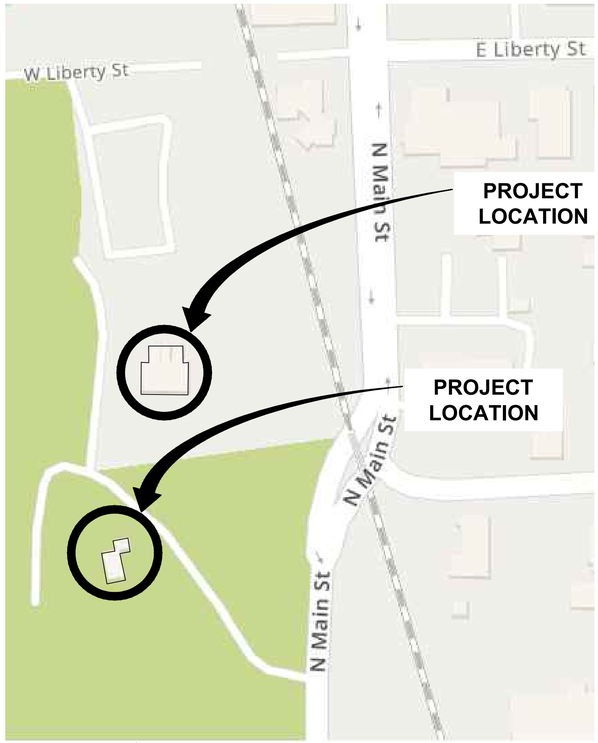
Regulatory Requirements
The Ten State Recommended Standards for Water Works (2018) requires that “dedicated standby power shall be provided so that water may be treated and/or pumped to the distribution system during power outages to meet the average day demand.”

Conclusion
Based on the results of the generator loading analysis and the ability to provide backup power well above the required average daily demand, the existing generator is deemed to remain appropriately sized for the proposed plant upgrades.

VILLAGE OF MILFORD, MI
GROUNDWATER TREATMENT SYSTEM IMPROVEMENTS

ADMINISTRATIVE ORDER FOR RESPONSE ACTIVITY
EGLE DOCKET NO. AO-RRD-22-001

JUNE 2022



TRUE NORTH

LOCATION MAP
NOT TO SCALE

ADDRESS:
159 N MAIN ST.
MILFORD, MI 48381

INDEX OF DRAWINGS:

ARCADIS

ARCADIS

LEGAL ENTITY:
ARCADIS OF MICHIGAN, LLC.

CONSULTANTS

STATE OF MICHIGAN
BRADLEY D. HITTS
ENGINEER
NO. 52980
LICENSED PROFESSIONAL ENGINEER
6/20/22

SEALS

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW, NOT FOR CONSTRUCTION

MILFORD, MI
ZF ACTIVE SAFETY US INC.

VILLLAGE OF MILFORD, MI
GROUND WATER TREATMENT
SYSTEM IMPROVEMENTS

CLIENT PROJ. NO.: 30126485

REVISIONS

NO.	DATE	ISSUED FOR	BY
0	06-20-22	100% DESIGN REVIEW	BOH

PROJECT STATUS:

PROJECT NO.: 30126485
DATE: JUNE 2022
DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE

GENERAL

COVER SHEET

SCALE:
AS SHOWN

0 BAR IS ONE INCH ON UNREDUCED DRAWING

DRAWING NO.:
G-001

SHEET NO.: 1 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\1. GENERAL\G-001.DWG Scale:1:1/2 SavedDate:6/17/2022 Time:13:42 Plot Date: Artz, Kyle; 6/20/2022; 13:00 ; Layout:01

SITE PLAN

SCALE: 1" = 40'

0 20' 40' 80'

TRUE NORTH

ARCADIS

LEGAL ENTITY:
ARCADIS OF MICHIGAN, LLC.

CONSULTANTS

SEALS

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW, NOT FOR CONSTRUCTION

MILFORD, MI

ZF ACTIVE SAFETY US INC.

VILLLAGE OF MILFORD, MI
GROUND WATER TREATMENT SYSTEM IMPROVEMENTS

CLIENT PROJ. NO.: 30126485

REVISIONS

NO.	DATE	ISSUED FOR	BY
0	06-20-22	100% DESIGN REVIEW	BOH

PROJECT STATUS:

PROJECT NO.: 30126485
DATE: JUNE 2022
DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE

GENERAL

SITE PLAN

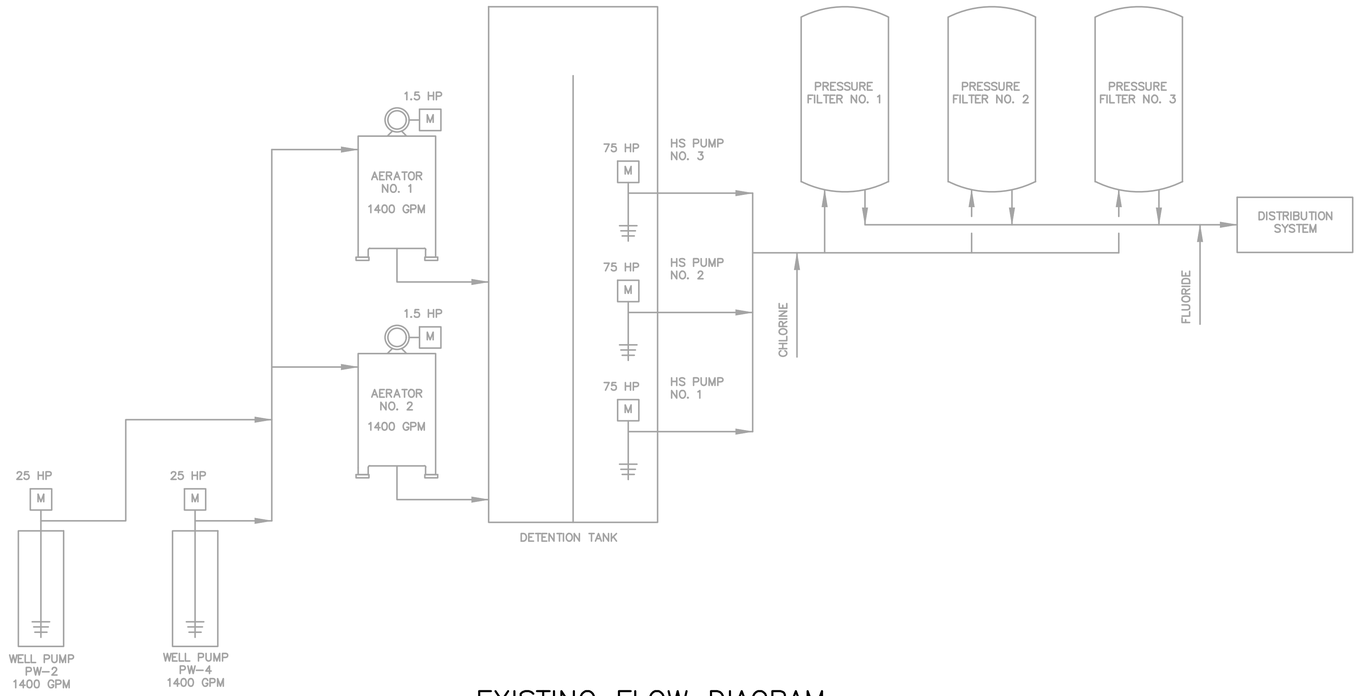
SCALE:
AS SHOWN

0 1
BAR IS ONE INCH ON UNREDUCED DRAWING

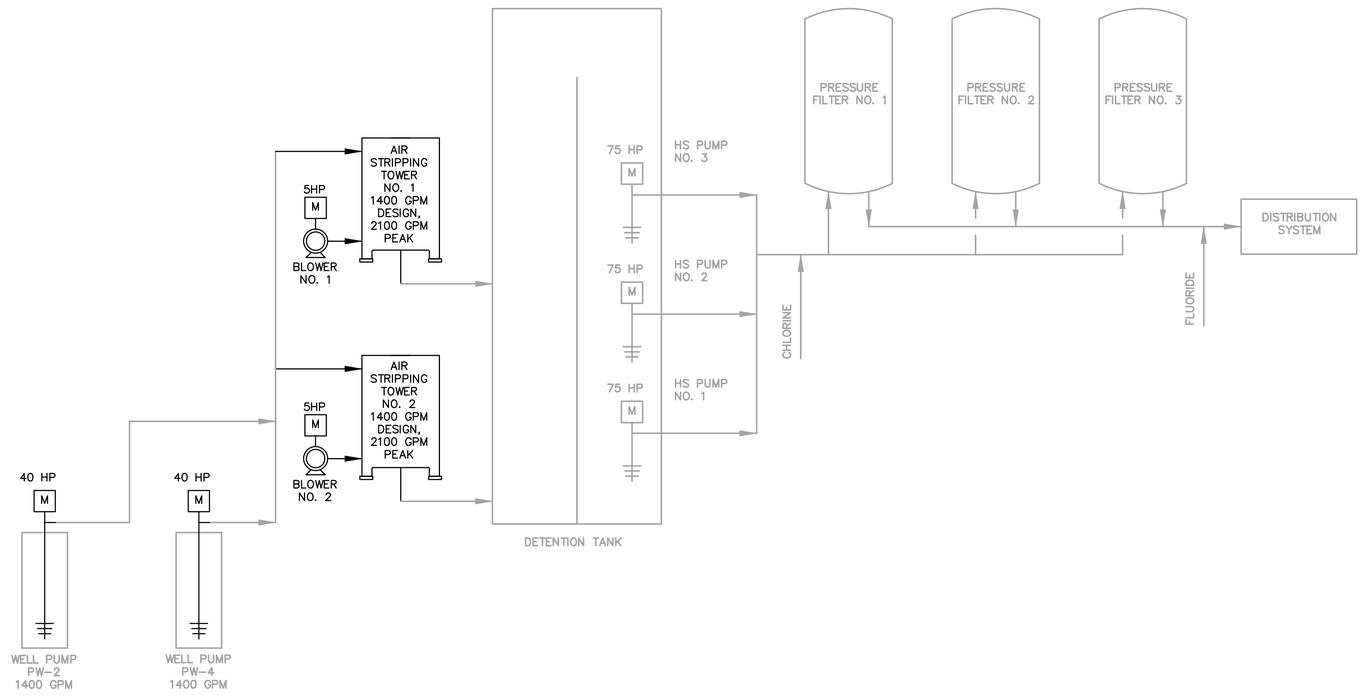
DRAWING NO.:
G-002

SHEET NO.: 2 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\1. GENERAL\G-002.DWG Scale:1:1/2 SavedDate:6/10/2022 Time:14:13 Plot Date: Artz, Kyle; 6/20/2022; 13:00 ; Layout:02



EXISTING FLOW DIAGRAM



PROPOSED FLOW DIAGRAM

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CHECKED BY: X. XXXX

SHEET TITLE
GENERAL

FLOW DIAGRAMS

SCALE: AS SHOWN
0 1 BAR IS ONE INCH ON UNREDUCED DRAWING

DRAWING NO.: G-003
SHEET NO.: 3 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\1. GENERAL\G-003.DWG Scale:1:1/2 SavedDate:6/10/2022 Time:14:13 Plot Date: Artz, Kyle; 6/20/2022; 13:01 ; Layout:03

DEFINITIONS

DEFINED TERMS

A. WHEREVER USED IN THE CONTRACT DOCUMENTS, A TERM WILL HAVE THE MEANING INDICATED IN THE DEFINITIONS BELOW.

1. RESPONDENT: THE ENTITY THAT IS SUBJECT TO ACTION UNDER EGLE ADMINISTRATIVE ORDER AND RESPONSIBLE FOR COORDINATION WITH OWNER AND CONTRACTOR FOR COMPLETION OF THE CONTRACT WORK; ZF ACTIVE SAFETY US INC.
2. OWNER: THE VILLAGE OF MILFORD.
3. CONTRACTOR: THE INDIVIDUAL OR ENTITY WITH WHICH RESPONDENT HAS CONTRACTED FOR PERFORMANCE OF THE WORK.

GENERAL REQUIREMENTS

WORK SEQUENCE

A. THE IRON REMOVAL PLANT IS A 24/7 OPERATING FACILITY AND SHALL REMAIN IN SERVICE AT ALL TIMES.

B. WELL PUMPS SHALL NOT BE TAKEN OUT OF SERVICE PRIOR TO OCTOBER 1, 2022.

C. ONLY ONE WELL PUMP MAY BE TAKEN OUT OF SERVICE AT A TIME.

D. WORK ASSOCIATED WITH THE WELL PUMPS SHALL BE COMPLETED PRIOR TO TAKING AN AERATOR OUT OF SERVICE.

E. ONLY ONE AERATOR MAY BE TAKEN OUT OF SERVICE AT A TIME.

F. ALL WORK SHALL BE COMPLETED PRIOR TO MARCH 15, 2023.

CONTRACTOR'S USE OF SITE

A. CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO 7AM - 5PM, MONDAY THROUGH FRIDAY BUT NO SOONER THAN SUNRISE AND NO LATER THAN SUNSET UNLESS OTHERWISE AUTHORIZED BY OWNER.

B. WEEKEND AND HOLIDAY WORK IS NOT PERMITTED UNLESS OTHERWISE AUTHORIZED BY OWNER. 48 HOURS IS REQUIRED WHEN REQUESTING WEEKEND OR HOLIDAY WORK.

SUBMITTALS

A. SUBMIT FOR REVIEW AND APPROVAL AT MINIMUM:

1. CONSTRUCTION WORK PLAN WITH SCHEDULE AND SEQUENCING.
2. SHOP DRAWINGS
   A. ALL EQUIPMENT AND MATERIAL TO BE UTILIZED.
3. OPERATION AND MAINTENANCE MANUALS FOR THE FOLLOWING ITEMS:
   A. WELL PUMPS
   B. AIR STRIPPING TOWERS AND APPURTENANCES
   C. FLOW METERS
   D. MOTOR STARTERS

B. SHOP DRAWING REQUIREMENTS:

1. SUBMIT DETAIL DRAWINGS SHOWING SIZE AND ARRANGEMENT; DETAILS OF MACHINERY, APPARATUS AND MATERIALS; DIMENSIONAL DRAWINGS, LADDER-TYPE SCHEMATIC DIAGRAMS, CONNECTION DIAGRAMS AND OTHER DATA FOR ALL ELECTRICALLY OPERATED EQUIPMENT, AND ALL COMMUNICATION, INSTRUMENTATION, CONTROL, AND RELATED EQUIPMENT; AND LAYOUT DRAWINGS OF THE COMPLETE ELECTRICAL WORK. DRAWINGS SHALL DESIGNATE THE COMPLETE INSTALLATION AND SHALL BE SUITABLE FOR COORDINATING WORK OF THE VARIOUS TRADES.

C. OPERATIONAL AND MAINTENANCE MANUAL REQUIREMENTS:

1. SUBMIT OPERATION AND MAINTENANCE (O&M) MANUALS FURNISHED BY THE MANUFACTURER. THE MANUAL SHALL CONTAIN RECORD COPIES OF ALL DRAWINGS, INSTALLATION INSTRUCTIONS, START-UP INSTRUCTIONS, SAFETY INSTRUCTIONS, AND ALL INFORMATION REQUIRED FOR THE PROPER OPERATION AND UPKEEP OF ALL ITEMS SUPPLIED.
2. TWO HARD COPIES REQUIRED. ELECTRONIC COPY REQUIRED IN BOOKMARKED PDF FORMAT.

QUALITY CONTROL

A. ANSI/NSF STANDARD 60 OR 61 CERTIFICATION: ALL CHEMICALS, SUBSTANCES, AND MATERIALS ADDED TO OR BROUGHT IN CONTACT WITH WATER IN OR INTENDED TO BE USED IN A PUBLIC WATER SYSTEM OR USED FOR THE PURPOSE OF TREATING, CONDITIONING, ALTERING, OR MODIFYING THE CHARACTERISTICS OF SUCH WATER SHALL BE SHOWN BY EITHER THE MANUFACTURER, DISTRIBUTOR, OR PURVEYOR TO BE NON-TOXIC AND HARMLESS TO HUMANS WHEN USED IN ACCORDANCE WITH THE FORMULATION AND CONCENTRATION AS SPECIFIED BY THE MANUFACTURER, AND SHALL CONFORM WITH AMERICAN NATIONAL STANDARDS INSTITUTE/NATIONAL SANITATION FOUNDATION (ANSI/NSF) STANDARD 60 OR 61. ANY ORGANIZATION CERTIFIED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE MAY CERTIFY IN WRITING THAT A PRODUCT CONFORMS WITH THESE STANDARDS. PRODUCT LABELS SHALL BEAR THE NSF CERTIFICATION MARK.

START-UP

A. NOTIFY OWNER 5 DAYS PRIOR TO START-UP OF EACH ITEM.

B. VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE, AND FOR CONDITIONS WHICH MAY CAUSE DAMAGE.

C. VERIFY TESTS, METER READINGS, AND SPECIFIED ELECTRICAL CHARACTERISTICS AGREE WITH THOSE REQUIRED BY THE EQUIPMENT OR SYSTEM MANUFACTURER.

D. VERIFY THAT WIRING AND SUPPORT COMPONENTS FOR EQUIPMENT ARE COMPLETE AND TESTED.

MANUFACTURERS' START-UP SERVICES

A. FURNISH COMPETENT FACTORY-TRAINED SERVICE REPRESENTATIVES TO SUPERVISE OR INSPECT THE INSTALLATION; TEST, ALIGN, ADJUST AND CALIBRATE THE EQUIPMENT AND SYSTEMS AS NECESSARY; AND INSTRUCT PLANT PERSONNEL IN THEIR OPERATION AND MAINTENANCE (MANUFACTURER'S START-UP SERVICES).

B. NOTIFY OWNER A MINIMUM OF 14 DAYS WITH ADDITIONAL FOLLOW-UP 5 DAYS PRIOR TO THE ARRIVAL OF THE SERVICE REPRESENTATIVES ON THE PROJECT.

C. PRIOR TO LEAVING THE PROJECT AND FOR EACH VISIT, MANUFACTURER'S SERVICE REPRESENTATIVE SHALL COMPLETE A MANUFACTURER'S SERVICE REPRESENTATIVE'S REPORT.

D. MANUFACTURER'S START-UP SERVICES SHALL BE PROVIDED AS REQUIRED UNTIL OPERATION OF THE EQUIPMENT IS SATISFACTORY TO OWNER AT NO ADDITIONAL COST TO RESPONDENT.

DEMOLITION

A. SALVAGE AND OWNERSHIP: UNLESS DIRECTED OTHERWISE BY OWNER, EXISTING EQUIPMENT AND MATERIALS REMOVED AND NOT SHOWN OR SPECIFIED TO BE REUSED IN THE WORK WILL BECOME CONTRACTOR'S PROPERTY.

FINISHES

PAINTING

A. PAINT THE FOLLOWING:

1. NEW RAW WATER PIPING.
2. NEW CHLORINE PIPING.
3. NEW AIR DUCT.
4. NEW BLOWERS.
5. NEW WELL PUMPS (EXPOSED ABOVE GRADE COMPONENTS).

B. PAINT SYSTEMS OF THE SHERWIN-WILLIAMS (SW) COMPANY ARE LISTED. EQUIVALENT SYSTEMS OF OTHER MANUFACTURERS ARE ACCEPTABLE.

C. PAINTING SYSTEM - NEW RAW WATER PIPING:

1. SHOP PRIMER: MACROPOXY HS.
2. FIELD INTERMEDIATE COAT: MACROPOXY HS.
3. FIELD FINISH COAT 1: HI-SOLIDS POLYURETHANE.
4. FIELD FINISH COAT 2: HI-SOLIDS POLYURETHANE.

D. PAINTING SYSTEM - NEW CHLORNE PIPING:

1. PRIME COAT: DTM ACRYLIC PRIMER/FINISH.
2. FINISH COAT: DTM ACRYLIC PRIMER/FINISH.

E. SURFACE PREPARATION: COMPLY WITH MANUFACTURER'S PUBLISHED RECOMMENDATIONS FOR MATERIAL AND SURFACE CONDITION.

F. DRY FILM THICKNESS SHALL BE AS RECOMMENDED IN MANUFACTURER'S PUBLISHED DATA SHEETS.

G. MATCH EXISTING COLORS AS CLOSE AS POSSIBLE WITH MANUFACTURERS STANDARD COLOR SELECTIONS.

PROCESS INTEGRATION

PROCESS PIPE AND FITTINGS

A. RAW WATER. USE DUCTILE IRON PIPE AND FITTINGS AS FOLLOWS:

1. PIPE: AWWA C115 FLANGED JOINT, THICKNESS CLASS 53.
2. FITTINGS: AWWA C110 FLANGED.
3. LINING: BITUMINOUS SEAL COATED CEMENT MORTAR LINING IN ACCORDANCE WITH AWWA C104, NSF-61 CERTIFIED.
4. COATING: FACTORY APPLIED PRIME COAT.
5. JOINTS: CONFORM TO AWWA C110 AWWA C111.
6. GASKETS: MINIMUM 1/8-INCH THICK, RING OR FULL-FACE AS REQUIRED FOR THE PIPE, OF NSF-61 NBR, DESIGNED FOR USE WITH DUCTILE IRON PIPE AND FITTINGS.
7. BOLTS: COMPLY WITH ANSI B18.2.1, ASTM A307, GRADE B.
8. NUTS: COMPLY WITH ANSI B18.2.2, ASTM A563, GRADE A, HEAVY HEX.
9. MANUFACTURERS: AMERICAN CAST IRON PIPE CO., U.S. PIPE AND FOUNDRY CO., MCWANE DUCTILE, OR APPROVED EQUAL.

B. CHLORINE. USE PVC PIPE AND FITTINGS AS FOLLOWS:

1. PIPE: ASTM D1785, CELL CLASSIFICATION 12454, BEARING NSF SEAL, SCHEDULE 80.
2. FITTINGS: SOCKET, ASTM D2467, CELL CLASSIFICATION 12454, BEARING NSF SEAL, SCHEDULE 80.
3. JOINTS: SOLVENT WELDED. USE PRIMER AND SOLVENT CEMENT RECOMMENDED BY PVC PIPE MANUFACTURER FOR THE APPLICATION. FOR PIPING CONTAINING CHLORINE SOLUTION, SOLVENT CEMENT SHALL NOT CONTAIN FUMED SILICA. USE IPS TYPE 724 CEMENT, OR APPROVED EQUAL.

PROCESS VALVES

A. BALL VALVES: SCHEDULE 80, TRUE UNION DESIGN, PVC BODY AND BALL, TEFLON SEAT, VITON SEALS. PROVIDE WITH RELIEF HOLE IN DOWNSTREAM SIDE OF BALLS OR SELF RELIEVING SEATS.

PROCESS SPECIALTIES

A. PROPELLER FLOW METERS: FLANGED TUBE TYPE PROPELLER METER, FABRICATED STEEL BODY WITH STRAIGHTENING VANES, NSF61 FUSION BONDED LINING AND COATING, STAINLESS STEEL METER HEAD, POLYPROPYLENE PROPELLER AND NUT WITH CERAMIC-COATED STAINLESS STEEL PROPELLER SPINDLE, CERAMIC ROTOR BEARINGS, STAINLESS STEEL GEARBOX, STAINLESS STEEL SHAFTS AND BOLTS, AND MAGNETIC DRIVE, ELECTRONIC PULSE RATE TRANSMITTER, DIGITAL RATE INDICATOR AND TOTALIZER REGISTER WITH MINIMUM 25 FEET CABLE FOR REMOTE MOUNTING, 4 TO 20mA DRY CONTACT PULSE OUTPUT FOR FUTURE INTEGRATION WITH PLANT PLC. MANUFACTURERS: MCCROMETER, INC., ML04D; OR APPROVED EQUAL.

B. SLEEVE-TYPE, FLEXIBLE COUPLINGS: AWWA C219, BOLTED, GASKETED SLEEVE-TYPE, STEEL SLEEVE, DUCTILE IRON OR STEEL FOLLOWERS, HIGH STRENGTH LOW ALLOY STEEL NUTS AND BOLTS PER AWWA C111, BUNAN NSF61 GASKETS, NSF61 FUSION BONDED LINING AND COATING, SMITH-BLAIR, INC., 411; BAKER COUPLING COMPANY, INC., SERIES 200; OR APPROVED EQUAL.

C. SERVICE SADDLE: DUCTILE IRON BODY PER ASTM A536, HSLA CARBON STEEL BALE PER AWWA C111/A21.11, BUNAN NSF61 GASKETS, GALVANIZED CARBON STEEL NUTS AND WASHERS, NSF61 FUSION BONDED LINING AND COATING, SMITH-BLAIR, INC., 311; OR APPROVED EQUAL. INSTALL SERVICE SADDLE AS INDICATED AND PROVIDE 3/4"NPT TAP WITH 3/4" NIPPLE AND THREADED CAP AS PROVISONS FOR OPTIONAL CHLORINE INJECTION.

PROCESS PIPING INSTALLATION

A. THOROUGHLY CLEAN ALL PIPING IN A MANNER APPROVED BY OWNER PRIOR TO INSTALLATION.

B. TEMPORARILY PLUG INSTALLED PIPE AT THE END OF EACH DAY OF WORK OR OTHER INTERRUPTION OF PIPE INSTALLATION TO PREVENT ENTRY OF ANIMALS, LIQUIDS, AND PERSONS INTO PIPE, AND ENTRANCE OR INSERTION OF DELETERIOUS MATERIALS INTO PIPE.

C. PRESSURE AND LEAKAGE TESTING:

1. NEW CHLORINE PIPING: PERFORM HYDROSTATIC PRESSURE AND LEAKAGE TEST AT A MINIMUM OF 1.25 TIMES THE MAXIUM NORMAL WORKING PRESSURE. FOLLOW PROCEDURES DESCRIBED IN SECTION 10 OF AWWA STANDARD C605.
2. NEW RAW WATER PIPING: VISUALLLY OBSERVE AND MONITOR FOR LEAKAGE.
3. LOCATE AND REPAIR LEAKS. RETEST UNTIL SEGMENT PASSES.

CLEANING

A. THOROUGHLY CLEAN THE INTERIOR OF ALL PIPING AND AIR STRIPPING TOWERS IN A MANNER APPROVED BY OWNER PRIOR TO INSTALLATION.

DISINFECTION

A. DISINFECT THE FOLLOWING:

1. NEW RAW WATER PIPING
2. NEW CHLORINE PIPING
3. NEW WELL PUMPS
4. NEW AIR STRIPPING TOWER

B. A SUGGESTED PROCEDURE FOR ACCOMPLISHING COMPLETE AND SATISFACTORY DISINFECTION IS SPECIFIED BELOW. OTHER PROCEDURES MAY BE CONSIDERED FOR ACCEPTANCE BY OWNER.

C. FOLLOW AWWA C651 FOR PIPING, AWWA C653 FOR AIR STRIPPING TOWERS, AND AWWA C654 FOR WELLS AND WELL PUMPS.

D. PRIOR TO DISINFECTION, CLEAN PIPING AS SPECIFIED AND FLUSH THOROUGHLY.

E. CONTRACTOR SHALL PROVIDE ALL TEMPORARY PIPING, HOSE, VALVES, APPURTENANCES, AND SERVICES REQUIRED.

F. CHLORINE SHALL BE PROVIDED BY CONTRACTOR.

G. BACTERIOLOGIC TESTS WILL BE PERFORMED BY CONTRACTOR.

H. CHLORINE CONCENTRATION IN THE WATER ENTERING THE PIPING SHALL BE BETWEEN 50 AND 100 PPM, SUCH THAT A MINIMUM RESIDUAL CONCENTRATION OF 25 MG/L REMAINS AFTER A 24-HOUR RETENTION PERIOD. DISINFECT THE PIPING AND ALL RELATED COMPONENTS. REPEAT AS NECESSARY TO PROVIDE COMPLETE DISINFECTION.

I. AFTER REQUIRED RETENTION PERIOD, THE CHLORINATED WATER SHALL BE FLUSHED TO A CLOSED DRAIN LINE, UNLESS OTHERWISE DIRECTED BY ENGINEER. PROPERLY DISPOSE OF CHLORINATED WATER IN ACCORDANCE WITH APPLICABLE REGULATIONS.

ARCADIS

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CHECKED BY: X. XXXX

SHEET TITLE

GENERAL

SPECIFICATIONS

SCALE: AS SHOWN

0 1 BAR IS ONE INCH ON UNREDUCED DRAWING

DRAWING NO.: G-004

SHEET NO.: 4 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\1. GENERAL\G-004.DWG Scale:1:1/2 SavedDate:6/17/2022 Time:12:56 Plot Date: Artz, Kyle; 6/20/2022; 12:31 ; Layout:04

AIR STRIPPING TOWERS

SCOPE

A. DESIGN, FABRICATE, AND FURNISH TWO ALUMINUM PACKED COLUMN AIR STRIPPING TOWERS. INCLUDED, BUT NOT LIMITED TO AIR STRIPPING TOWERS, ALL ASSOCIATED INTERNALS, PACKING MEDIA, AIR BLOWERS, AIR DUCTWORK WITH APPURTENANCES, AND STARTUP SERVICES.

MANUFACTURERS QUALIFICATIONS

A. MANUFACTURER SHALL HAVE A MINIMUM OF 5 YEARS EXPERIENCE IN THE DESIGN AND FABRICATION OF ALUMINUM FORCED DRAFT AIR STRIPPING TOWERS.

B. WELDING OF THE VESSEL AND INTERNALS SHALL BE COMPLETED BY WELDERS CERTIFIED TO EITHER ASME SECTION IX OR AWS CODE STANDARDS.

C. SUBMIT A STATEMENT OF QUALIFICATIONS UPON REQUEST.

MANUFACTURERS

A. DELOACH INDUSTRIES, INC. (DI) OF SARASOTA, FLORIDA, OR APPROVED EQUAL.

DESIGN REQUIREMENTS

A. DESIGN CRITERIA, EACH AIR STRIPPING TOWER;

1. MINIMUM FLOW RATE: 700 GPM
2. DESIGN FLOW RATE: 1,400 GPM
3. PEAK FLOW RATE: 2,100 GPM
4. TOWER DIMENSIONS: 7'-6" SQUARE.
5. PACKING TYPE AND BED DEPTH: 3.5" TRIPAK AND 14'-0".
6. MINIMUM AIR TO WATER RATIO: 20:1.
7. MAXIMUM LIQUID LOADING RATE: 37.3 GPM/ SQ.FT.
8. INFLUENT AND EFFLUENT CONNECTION DIA/TYPE: 12"/FLANGED.

B. INFLUENT WATER CHARACTERISTICS AND EFFLUENT PERFORMANCE REQUIREMENTS:

INFLUENT WATER PARAMETER	INFLUENT DESIGN VALUE	EFFLUENT PERFORMANCE REQUIREMENT
TOTAL IRON	1.5 MG/L	OXIDIZED FOR REMOVAL VIA DOWSTREAM FILTRATION
VINYL CHLORIDE	50 UG/L	LESS THAN 2 UG/L
HARDNESS (AS CACO3)	280 MG/L	-
CHLORIDE	200 MG/L	-
FLUORIDE	0.1 MG/L	-
SULFATE	50 MG/L	-
TOTAL CALCIUM	110 MG/L	-
TOTAL SODIUM	90 MG/L	-
TOTAL BARIUM	0.2 MG/L	-

C. EFFLUENT PERFORMANCE REQUIREMENTS SHALL BE MET AT MINIMUM, DESIGN, AND PEAK FLOW RATES SPECIFIED HEREIN.

D. IT IS THE RESPONSIBILITY OF THE TOWER MANUFACTURER TO SELECT AND SIZE ALL COMPONENTS OF THE COLUMN TO MEET THE EFFLUENT PERFORMANCE CRITERIA. THE COMPONENT SIZES SHALL MEET OR EXCEED THOSE SPECFIED HEREIN.

SPARE PARTS

A. PACKING MEDIA IN QUANTITY TO ALLOW FOR FULL REPLACEMENT OF ONE AIR STRIPPING TOWER MEDIA.

B. ONE COMPLETE SET OF GASKETS FOR TOWER HATCHES.

C. ONE COMPLETE SET OF GASKETS AND SEALS FOR EACH BLOWER.

D. ONE COMPLETE SET OF BEARINGS FOR EACH BLOWER

E. ONE BLOWER MOTOR.

F. FOUR BLOWER INLET AIR FILTERS.

AIR STRIPPING TOWER DESCRIPTION

A. SHELL: THE TOWER SHALL BE A FREE-STANDING UNIT DESIGNED ACCORDING TO STATE OF MICHIGAN BUILDING CODE INCLUDING WIND AND SEISMIC REQUIREMENTS. THE TOWER COLUMN SHALL BE CONSTRUCTED ENTIERLY OF TYPE 3003 OR 5052 ALUMINUM WITH A MINIMUM WALL THICKNESS OF ¼ INCH AND EXTERIOR ALUMINUM REINFORCING.

B. BOTTOM SECTION: THE BOTTOM SECTION OF THE AERATION TOWER SHALL INCLUDE AN AIR INLET CONNECTION(S), AN ACCESS PORT, WATER OUTLET, DRAIN FITTING, SIGHT GLASS CONNECTIONS, AND ALL OTHER CONNECTIONS OR COMPONENTS REQUIRED FOR PROPER OPERATION OR BY THE MANUFACTURER'S DESIGN. THE UNIT SHALL BE DESIGNED FOR GRAVITY FLOW OF WATER FROM THE BOTTOM SECTION OF THE UNIT.

C. WATER OUTLET: PROVIDE WITH A WATER SEAL AND VORTEX BREAKER TO PRECLUDE AIR FROM EXITING WITH THE WATER.

D. DRAIN: A MINIMUM OF ONE 2-INCH ALUMINUM DRAIN CONNECTION SHALL BE PROVIDED AT THE BASE OF THE VESSEL TO ALLOW COMPLETE DRAINAGE OF THE TOWER.

E. PACKING SUPPORT: THE PACKING SHALL BE SUPPORTD BY A FABRICATED SUPPORT PLATE OR GRATING. THE TOWER STRUCTURE SHALL INCLUDE AN INTERNAL STRUCTURAL SUPPORT RING CONTINUOUSLY WELDED TO THE TOWER SHELL TO SUPPORT THE WEIGHT OF THE PACKING. IF THE REQUIRED BED DEPTH EXCEEDS THE PACKING MANUFACTURER'S RECOMMENDED MAXIMUM VERTICAL DEPTH OF PACKING, AN INTERMEDIATE PACKING SUPPORT PLATE SHALL BE INSTALLED.

F. PACKING: HIGH PERFORMANCE, FREE FLOWING, RANDOM SPEHERICAL TYPE PACKING, 3.5 INCH DIAMETER, 38 SQFT/CUFT GEOMETRIC SURFACE AREA, 95% VOID SPACE, NSF61 CERTIFIED, RASCHIG USA JAEGER TRI-PACK, OR APPROVED EQUAL.

G. DISTRIBUTION SYSTEM: THE DISTRIBUTOR SHALL BE A PAN TYPE WITH NOZZLES SIZED, NUMBERED, AND LOCATED TO EVENLY DISTRIBUTE FLOW. NOZZLES SHALL BE OF NON-CLOG DESIGN. THE PAN SHALL CONTAIN AIR RELIEF PORTS TO ALLOW FOR AIR PASSAGE.

H. MIST ELIMINATOR: HIGH EFFICIENCY, LOW PRESSURE DROP DESIGN, PRECLUDING THE ENTRANCE OF SUNLIGHT INTO THE TOP OF THE TOWER. THE MIST ELIMINATOR SHALL BE POLYPROPYLENE, MUNTERS T-271 OR APPROVED EQUAL.

I. LIFTING LUGS: ALUMINUM LIFTING LUGS SHALL BE PROVIDED AS REQUIRED FOR HANDLING AND INSTALLATION OF AN EMPTY TOWER. THE ALUMINUM LUGS SHALL BE ALUMINUM 3003 MATERIAL AND WILL BE WELDED TO THE VESSEL WALL.

J. ACCESS PORTS: THE TOWER SHALL BE PROVIDED WITH TWO 24 INCH SQUARE ACCESS HATCHES TO ALLOW INSPECTIONS AND MEDIA REMOVAL. SECURE WITH EDPM GASKETS AND 316 SS HARDWARE. ALL ACCESS PORT COVERS SHALL BE GAS-TIGHT UNDER A POSITIVE INTERNAL OPERATING PRESSURE OF 10 INCHES W.C.. INCLUDE PROVISIONS TO PREVENT MEDIA FROM FALLING OUT OF UNIT WHEN LOWER COVER REMOVED.

K. ALL PIPING CONNECTIONS TO THE AERATOR TOWER SHALL BE FLANGED AND SHALL CONFORM TO ANSI B16.5, CLASS 150.

L. AIR OUTLET: AN AIR OUTLET SHALL BE PROVIDED AT THE TOP OF THE AERATION TOWER ABOVE THE DISTRIBUTION SYSTEM. OUTLET OPENINGS SHALL HAVE 24 MESH TYPE 316 STAINLESS STEEL SCREEN.

M. ACCESS LADDER: PROVIDE AN OSHA COMPLIANT LADDER FOR ACCESS AND INSPECTION OF TOWER SUPPORT FROM THE TOWER SHELL.

N. HARDWARE: ALL BOLTS, NUTS, WASHERS, AND OTHER MISCELLANEOUS HARDWARE USED TO ASSEMBLED TOWER SHALL BE TYPE 304 STAINLESS STEEL OR BETTER.

BLOWER ASSEMBLY

A. GENERAL:

1. TOWER MANUFACTURER SHALL FURNISH ONE AIR SUPPLY BLOWER AND ALL SPECIFIED APPURTENANCES AND ACCESSORIES FOR EACH AIR STRIPPING TOWER PROVIDED.
2. TYPE: CENTRIFUGAL BELT DRIVEN, SINGLE WIDTH, SINGLE INLET.
3. CONSTRUCT AND TEST IN ACCORDANCE WITH AMCA STANDARDS.
4. THE SOUND LEVELS GENERATED BY THE BLOWER DURING NORMAL OPERATION SHALL NOT EXCEED 85 DBA - WEIGHTED, SLOW RESPONSE, UNDER FREE FIELD CONDITION, AT A HORIZONTAL DISTANCE OF 10 FEET FROM THE SURFACE OF SOUND GENERATION.
5. THE BLOWER SHALL BE DYNAMICALLY BALANCED AT THE FACTORY PRIOR TO SHIPPING.

B. PERFORMANCE:

1. AIR FLOW: 5615 SCFM AT 2 INCHES STATIC PRESSURE.
2. MOTOR: 5 HP, 1725 RPM, 460 VOLT, THREE-PHASE, 60 HZ, TEFC, 1.15 SF.

C. BLOWER CONSTRUCTION:

1. THE BLOWER AND WHEEL SHALL BE CONSTRUCTED OF HEAVY GAUGE CARBON STEEL AND BE CONTINUOUSLY WELDED.
2. BEARINGS SHALL BE VISIBLE AND ACCESSIBLE FOR INSPECTION AND MAINTENANCE. BEARING LIFE SHALL HAVE A MINIMUM OF 20,000 HOURS AT A L10 RATING.
3. PROVIDE BLOWER WITH LIFTING LUGS FOR HANDLING.
4. PROVIDE BLOWER WITH WEATHER GUARDS, DRAIN CONNECTION, DRIVE GUARDS, ADJUSTABLE MOTOR BASEPLATE, AND INLET/OUTLET FLANGES.

D. BLOWER FACTORY TESTING:

1. SUBMIT CERTIFIED PERFORMANCE CURVES FOR THE BLOWER AT RATED RPM SHOWING TYPICAL FT/SEC VS. STATIC PRESSURE AND HORSEPOWER FROM "SHUTOFF" TO "FREE DELIVERY". BLOWER SHALL BE STATICALLY AND DYNAMICALLY FACTORY BALANCED AND GIVEN A RUNNING TEST WITH MOTOR AND DRIVE INSTALLED. BLOWER PERFORMANCE SHALL BE BASED ON TESTS MADE IN ACCORDANCE WITH AMCA STANDARD 210-74.

E. BLOWER MOTOR:

1. PROVIDE WITH 120 VOLT, 60 HZ, SINGLE-PHASE SPACE HEATERS WIRED TO THE MOTOR TERMINAL BOX.
2. PROVIDE NORMALLY CLOSED WINDING OVERHEAT CONTACT IMBEDDED IN MOTOR WINDINGS.

F. AIR DUCT

1. ALL REQUIRED DUCTWORK TO CONNECT THE BLOWER DISCHARGE TO THE AIR STRIPPING TOWER AND BLOWER INLET TO FILTER SHALL BE PROVIDED BY THE TOWER MANUFACTURER.
2. DUCTWORK SHALL BE OF FRP CONSTRUCTION.
3. PROVIDE FLEXIBLE CONNECTION ASSEMBLIES ON BLOWER INLET AND DISCHARGE TO ISOLATE VIBRATION AND FACILITATE INSTALLATION AND MAINTENANCE.
4. DUCTING PIPE SUPPORTS SHALL BE PROVIDED BY INSTALLING CONTACTOR.

G. ACCESSORIES

1. INTAKE LOUVER TO PREVENT THE ENTRY OF MOISTURE INTO FILTERS
2. BLOWER INLET FILTER HOUSING WITH FILTER FRAME AND RAIN GUARD.
3. HIGH-CAPACITY INLET AIR FILTERS, 4" DEPTH.
4. AIR PRESSURE GAUGE MOUNTED IN DISCHARGE DUCT. MANUFACTURERS: DWYER SERIES 2000, OR APPROVED EQUAL.
5. AIRFLOW MEASURING STATION. FRP CASING AND FLANGE CONSTRUCTION. MANUFACTURERS: AIR MONITOR PRECISION AIRFLOW MEASUREMENT MODEL FAN-EVALUATOR OR APPROVED EQUAL.
6. DIFFERENTIAL PRESSURE TRANSMITTER. NEMA 4 ENCLOSURE, 4-20MA OUTPUT, 24VDC POWER. MANUFACTURERS: DWYER MODEL 677B, OR APPROVED EQUAL.
7. DIFFERENTIAL PRESSURE SWITCH. SPDT NEMA 3, WEATHERPROOF , DWYER MODEL 1950 OR APPROVED EQUAL.
8. TUBING AND VALVING TO CONNECT DIFFERENTIAL PRESSURE TRANSMITTER AND SWITCH TO AIRFLOW MEASURING STATION.

ANCHOR BOLTS

A. PROVIDE TYPE 316 STAINLESS STEEL ANCHORS. ANCHORS SHALL BE OF AMPLE SIZE AND STRENGTH FOR THE PURPOSE INTENDED AND SHALL BE SIZED BY THE MANUFACTURER.

B. SUBMIT THE DESIGN OF THE AIR STRIPPING TOWER BASE ANCHORS TO THE STRUCTURE. THESE CALCULATIONS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MICHIGAN

MANUFACTURER'S START-UP SERVICES

A. PROVIDE FOR A MINIMUM OF TWO 8 HOUR DAYS FOR STARTING UP EQUIPMENT AND TRANING OPERATING PERSONNEL IN THE OPERATION OF THE EQUIPMENT.

WELL PUMPS

PERFORMANCE REQUIREMENTS

A. WELL PUMP NO. 2 AND WELL PUMP NO. 4:

1. DESIGN POINT: 1,400 GPM AT 71 FT TDH
2. EFFICIENCY AT DESIGN FLOW: 76% MINIMUM.
3. 2ND DESIGN POINT: 1,700 GPM AT 50 FT TDH (FLOW AT SECOND DESIGN POINT SHALL BE WITHIN 10 PERCENT OF SPECIFIED VALUE).
4. SHUTOFF HEAD MINIMUM: 115 FT OR GREATER.
5. COLUMN LENGTH FROM BASE OF DISCHARGE HEAD TO TOP OF BOWL ASSEMBLY: 60 FT.
6. COLUMN DIAMETER: 8".
7. BOWL DIAMETER: 12"
8. DISCHARGE DIAMETER: 8".
9. NO. OF STAGE: 2"
10. LIQUID PUMPED: WELL WATER.
11. TEMPERATURE: 50F.
12. HP: 40
13. RPM: 1800 RPM NOMINAL
14. ELECTRICAL: 460V, 3 PHASE. 60 HZ.
15. SUITABLE FOR OPERATION WITHOUT VACUUM RELIEF ON PUMP DISCHARGE.
16. DESIGN FOR EITHER INTERMITTENT OR CONTINUOUS 24 HOURS PER DAY OPERATION.
17. MOTOR SUPPLIED SHALL BE CAPABLE OF OPERATING THE PUMP AND IMPELLER AT ANY POINT ON THE CURVE WITHOUT EXCEEDING NAMEPLATE HORSEPOWER.

MANUFACTURERS

A. NATIONAL PUMP COMPANY, MODEL H12MC, OR APPROVED EQUAL.

PUMPS

A. ALL SURFACES, INCLUDING COATINGS WHICH WILL BE IN CONTACT WITH THE WELL WATER SHALL BE NSF61 CERTIFIED.

B. TYPE: PUMPS SHALL BE VERTICAL LINESHAFT TYPE, WATER LUBRICATED, SUITABLE FOR DEEP WELL PUMPING OF CLEAN WATER.

C. PUMP HEAD: HIGH GRADE CAST IRON CONFORMING TO ASTM A48, CLASS 30, DESIGNED TO SUPPORT THE ENTIRE COLUMN AND BOWL ASSEMBLY, CAST IRON BASE PLATE, SEAL FLUSH CONNECTION, DRAIN PLUG, AND DISCHARGE FLANGE DRILLED PER ANSI B16.1 CLASS 125. PROVIDE 1/2 INCH TAPPED CONNECTION AT FLANGE FOR PRESSURE GAGE AND 1 INCH TAP IN BASE FOR SOUNDER TUBES.

D. PUMP BOWL ASSEMBLY: CLOSE-GRAINED CAST IRON WITH 30,000 PSI MINIMUM TENSILE STRENGTH, NSF 61 SMOOTH VITREOUS ENAMEL OR NSF61 FUSION-BONDED EPOXY COATING ON BOWL INTERIOR, IMPELLER SEAL RING, LATERAL BOWL WEARING RINGS OR REPLACEABLE BRONZE WEARING RINGS, BELL MOUTH SUCTION BOWL WITH ANTI-VORTEX GUIDE VANES.

E. IMPELLERS: BRONZE, FULLY ENCLOSED, OR SEMI-ENCLOSED ACCURATELY MACHINED AND FINISHED, DYNAMICALLY BALANCED, KEYED TO SHAFT OR SECURED WITH LOCK NUT, SECURELY FASTENED TO THE IMPELLER SHAFT WITH A TAPERED BUSHING, ADJUSTABLE VERTICALLY BY MEANS OF A SHAFT NUT AT THE TOP OF THE MOTOR OR AN ADJUSTING TYPE RIGID COUPLING LOCATED BETWEEN THE PUMP AND MOTOR.

F. IMPELLER SHAFT: STAINLESS STEEL OF NOT LESS THAN 12 PERCENT CHROME, WATER-LUBRICATED, FLUTED RUBBER AND BRONZE BEARINGS.

G. COLUMN ASSEMBLY: STEEL PIPE SECTIONS A MAXIMUM OF 5 FEET IN LENGTH, INTERCHANGEABLE SECTIONS, THREADED SLEEVE TYPE COUPLINGS CONNECTED WITH STAINLESS STEEL BOLTS AND WASHERS, BUTTED JOINTS TO ENSURE PERFECT ALIGNMENT AFTER ASSEMBLY, FLANGED BEARING HOUSING RETAINERS WITH WATER-LUBRICATED, CUTLESS RUBBER BEARING DESIGNED FOR VERTICAL TURBINE PUMP SERVICE.

H. LINE SHAFT: TURNED, GROUND AND POLISHED STAINLESS STEEL A MAXIMUM OF 5 FEET IN LENGTH, INTERCHANGEABLE SECTIONS WITH STAINLESS STEEL COUPLINGS MACHINED FROM SOLID BAR STOCK. COUPLED ABOVE THE STUFFING BOX TO FACILITATE EASY REMOVAL AND REPLACEMENT OF THE DRIVER. PROVIDE SHAFTING OF AMPLE SIZE TO OPERATE THE PUMP WITHOUT DISTORTION OR VIBRATION.

I. SEALS: PACKING GLAND WITH MINIMUM FOUR RINGS NSF61 PTFE PACKING AND BRONZE LANTERN RINGS.

MOTORS

A. MOTOR: 1.15 SF, WPI ENCLOSURE, NORMALLY CLOSED WINDING OVERHEAT CONTACT IMBEDDED IN MOTOR WINDINGS, AND 120 VAC MOTOR HEATER. MOTORS SHALL BE PROVIDED WITH A NON-REVERSE RATCHET (OR SELF RELEASE COUPLING).

B. MOTORS WILL BE DRIVEN BY VARIABLE FREQUENCY DRIVES. THEY SHALL BE COMPATIBLE WITH CHARACTERISTICS OF THE INTENDED VARIABLE FREQUENCY INVERTERS AND COMPLY WITH THE PERFORMANCE STANDARDS OF NEMA MG 1-31.

C. PROVIDE SHAFT GROUND RING KIT DURING FACTORY MOTOR ASSEMBLY. MANUFACTURERS: ELECTRO STATIC TECHNOLOGYS AEGIS, OR APPROVED EQUAL.

FINISHES

A. PROVIDE PUMPS(INTERIOR AND EXTERIOR) AND MOTORS WITH A COMPLETE FACTORY FINISH USING THE MANUFACTURER'S STANDARD INDUSTRIAL GRADE COATINGS.

B. THE INTERIOR SURFACES OF THE PUMP, SUCTION BELL AND DISCHARGE COLUMN PIPES, AND THE INTERIOR SURFACES OF THE PUMP HEAD AND SUCTION BARREL SHALL BE NSF61 FACTORY FINISHED.

C. OTHERWISE PROTECT FROM CORROSION ALL METAL SURFACES SUBJECT TO CORROSION WHOSE USE PROHIBITS FACTORY FINISHING.

SEAL WATER DRAIN PIPING

A. PROVIDE PVC PIPING FROM EACH PUMP TO THE NEAREST FLOOR DRAIN TO DRAIN SEAL WATER.

WELL WATER LEVEL MEASUREMENT

A. PROVIDE NEW AIRLINE AND PRESSURE GAUGE FOR MEASURING WELL WATER LEVEL.

FACTORY PERFORMANCE TEST

A. TEST EACH PUMP AT THE FACTORY; SUBMIT CERTIFIED PERFORMANCE CURVES TO ENGINEER PRIOR TO SHIPMENT.

B. TEST EACH PUMP AT NO LESS THAN THREE HEAD CONDITIONS INCLUDING SHUT-OFF HEAD AND DESIGN HEAD.

C. PROVIDE A STANDARD NPSH CURVE BASED ON TESTING OF STANDARD TEST PUMP.

ANCHORAGE

A. COMPLY WITH MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER'S START-UP SERVICES

B. PROVIDE A MINIMUM OF TWO 8 HOUR DAYS OF SERVICE FOR START-UP AND TRAINING.

ARCADIS
LEGAL ENTITY:
ARCADIS OF MICHIGAN, LLC.

CONSULTANTS

SEALS

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MILFORD, MI
ZF ACTIVE SAFETY US INC.

VILLLAGE OF MILFORD, MI
GROUND WATER TREATMENT SYSTEM IMPROVEMENTS

CLIENT PROJ. NO.: 30126485

REVISIONS

NO.	DATE	ISSUED FOR	BY
0	06-20-22	100% DESIGN REVIEW	BOH

PROJECT STATUS:

PROJECT NO.: 30126485
DATE: JUNE 2022
DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE
GENERAL

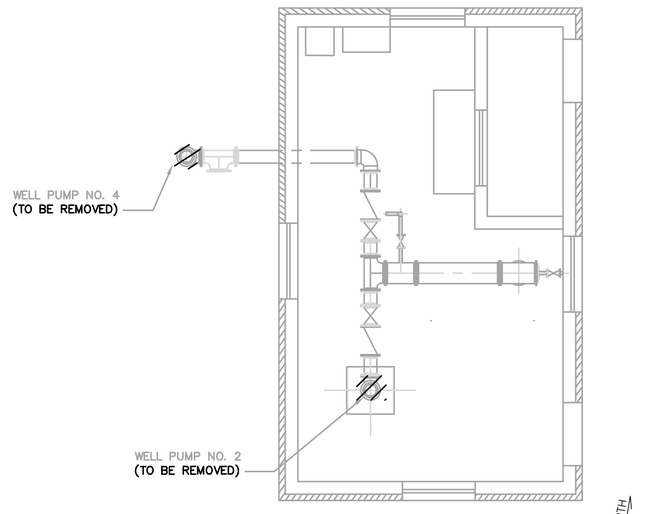
SPECIFICATIONS (CONTINUED)

SCALE: AS SHOWN
BAR IS ONE INCH ON UNREDUCED DRAWING

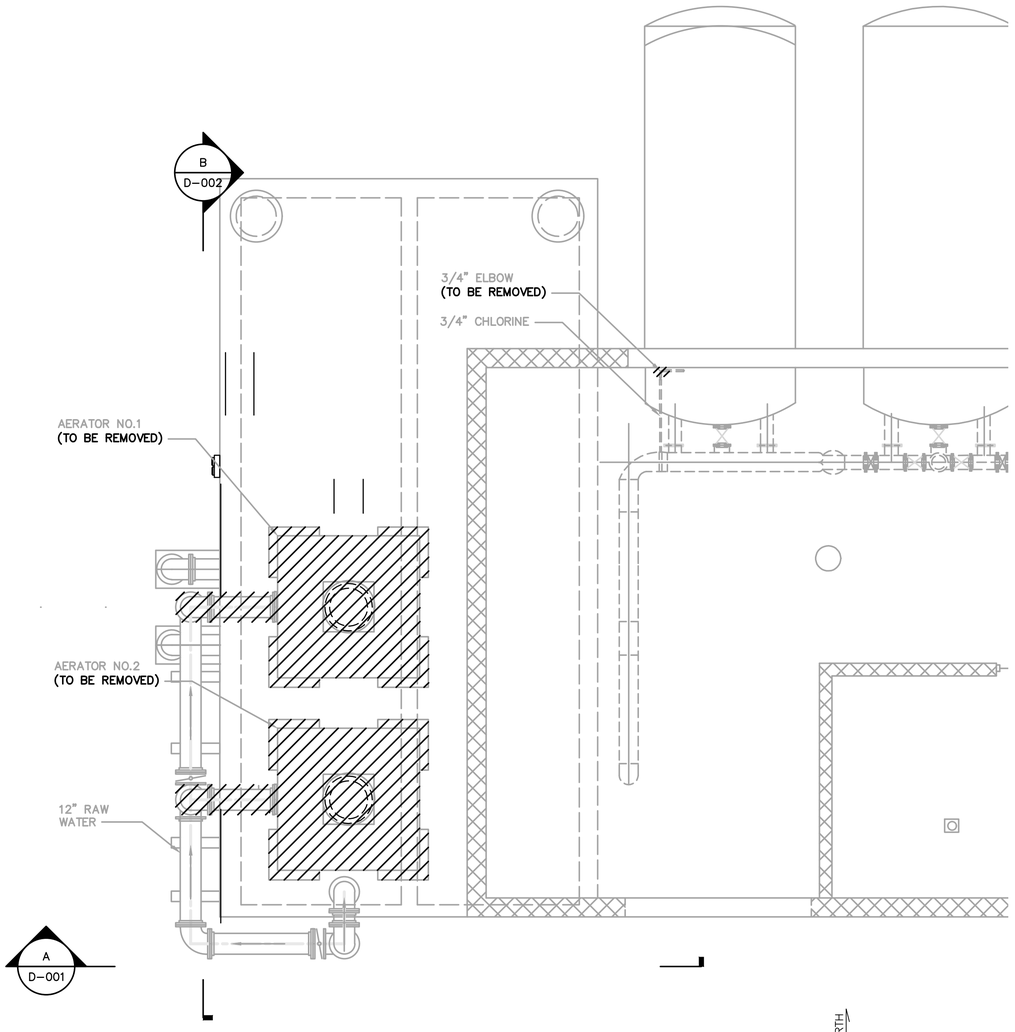
DRAWING NO.: G-005
SHEET NO.: 5 OF 12

TO BE REMOVED

NOTE:
(1) BLIND FLANGE SHALL BE INSTALLED ON ALL TANK OPENINGS UPON REMOVAL OF AERATOR EQUIPMENT AND PRIOR TO INSTALLATION OF AIR STRIPPING TOWERS.



WELL HOUSE DEMOLITION PLAN
SCALE: 1/4" = 1'-0"
0 2' 4' 8'



IRON REMOVAL PLANT DEMOLITION PLAN
SCALE: 1/4" = 1'-0"
0 2' 4' 8'
TRUE NORTH

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CHECKED BY: X. XXXX

SHEET TITLE
DEMOLITION

PLANS

SCALE:
AS SHOWN
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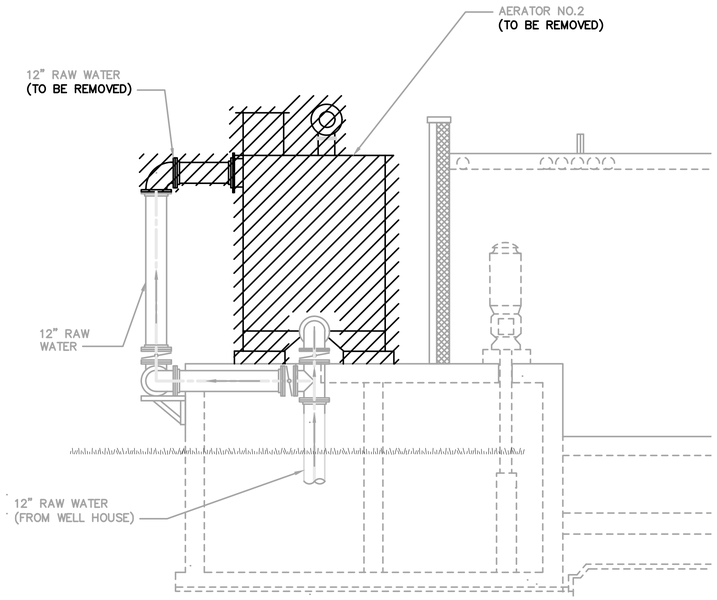
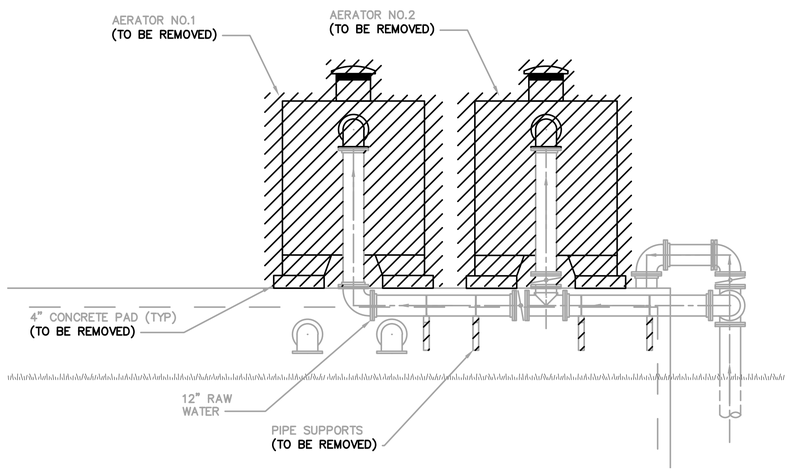
DRAWING NO.:
D-001
SHEET NO.: 6 OF 12



A M-001 IRON REMOVAL PLANT DEMOLITION SECTION

SCALE: 1/4" = 1'-0"



B M-001 IRON REMOVAL PLANT DEMOLITION SECTION

SCALE: 1/4" = 1'-0"

TO BE REMOVED

NOTES:

1. NEW PIPE SUPPORTS SHALL BE INSTALLED PRIOR TO REMOVAL OF EXISTING PIPE SUPPORTS.
2. BLIND FLANGES SHALL BE INSTALLED ON ALL TANK OPENINGS UPON REMOVAL OF AERATOR EQUIPMENT AND PRIOR TO INSTALLATION OF AIR STRIPPING TOWERS.

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PROJECT STATUS:

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DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE

DEMOLITION

SECTIONS AND DETAILS

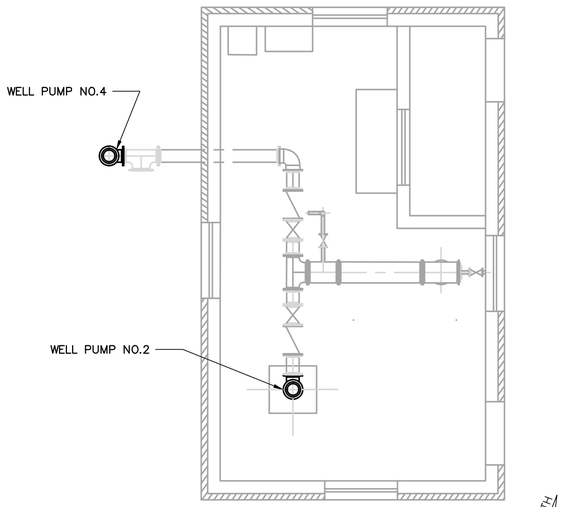
SCALE: AS SHOWN

BAR IS ONE INCH ON UNREDUCED DRAWING

DRAWING NO.: D-002

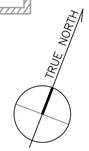
SHEET NO.: 7 OF 12

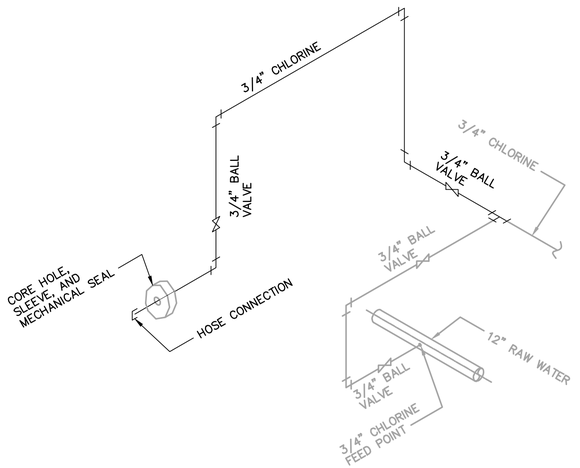
User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\2. DEMO\D-002.DWG Scale:1:1 SavedDate:6/17/2022 Time:12:50 Plot Date: Artz, Kyle; 6/20/2022; 13:01 ; Layout:D-002



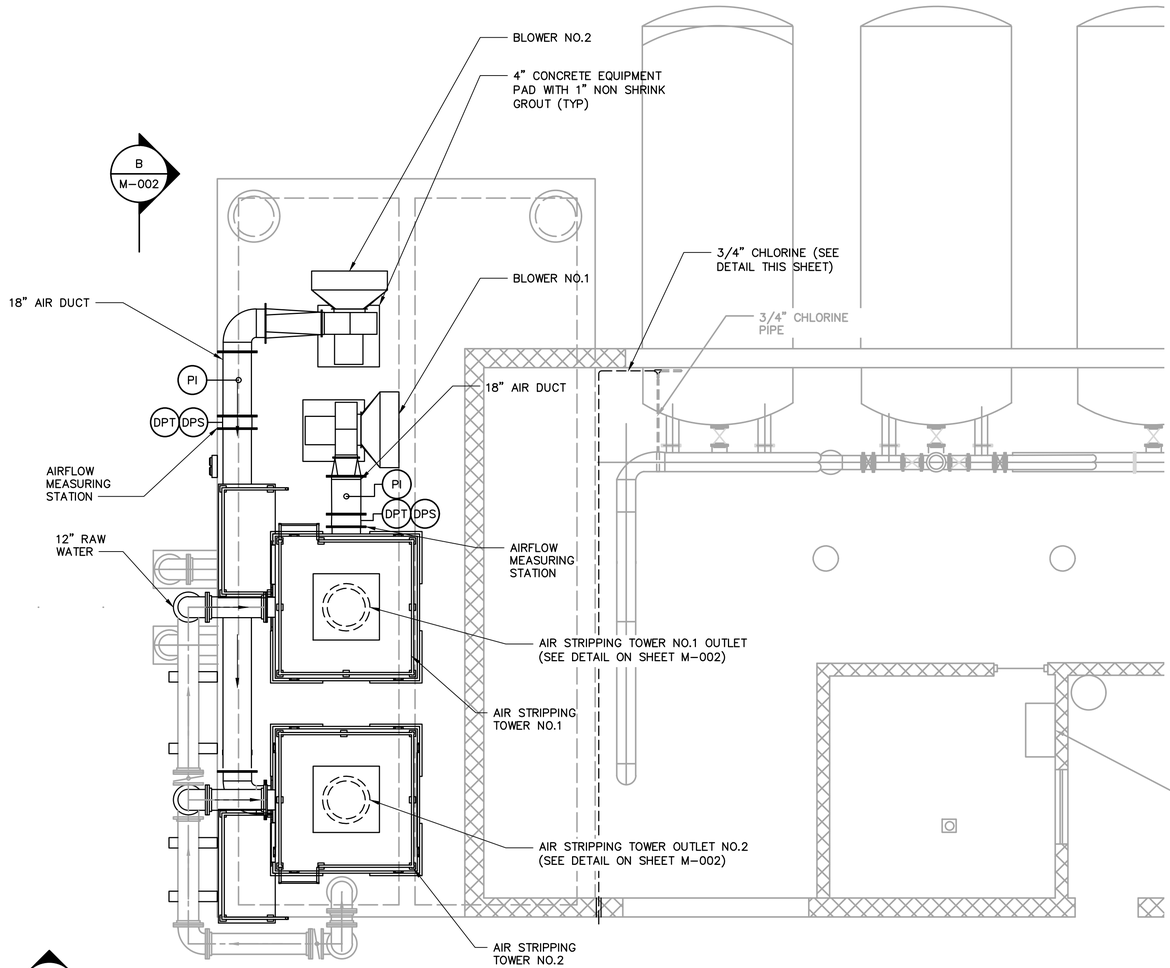
WELL HOUSE PLAN

SCALE: 1/4" = 1'-0"



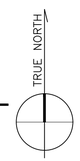


CHLORINE FEED PIPE DETAIL



IRON REMOVAL PLANT PLAN

SCALE: 1/4" = 1'-0"



KEY:

- EXISTING
- PROPOSED
- PI — PRESSURE INDICATOR
- DPT — DIFFERENTIAL PRESSURE TRANSMITTER
- DPS — DIFFERENTIAL PRESSURE SWITCH

KEY NOTE:

1. PLC SHALL ACCOMODATE NEW I/O FROM BLOWERS AND PROGRAMMING UPDATED FOR AUTOMATED FUNCTIONALITY OF NEW EQUIPMENT AS DESCRIBED IN THE CONTROL DESCIPTION. PLC MODIFICATIONS AND PROGRAMMING UPDATES SHALL BE PERFORMED BY TEAM UIS, CONTACT: KEN WESLEO. PH. 734-787 6410

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VILLLAGE OF MILFORD, MI
GROUND WATER TREATMENT SYSTEM IMPROVEMENTS

CLIENT PROJ. NO.: 30126485

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PROJECT STATUS:

PROJECT NO.: 30126485
DATE: JUNE 2022
DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE

PROCESS

PLANS

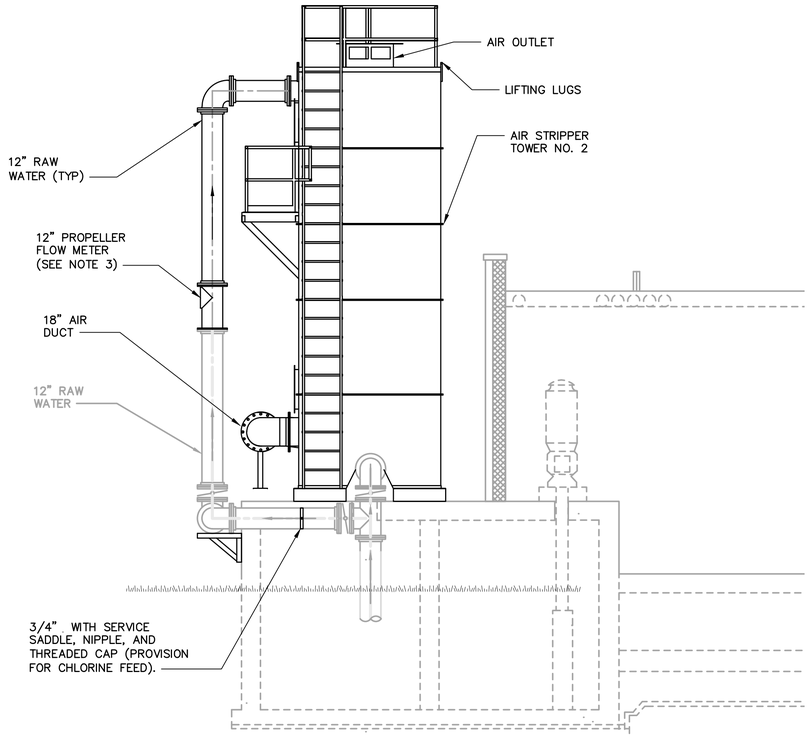
SCALE: AS SHOWN

BAR IS ONE INCH ON UNREDUCED DRAWING

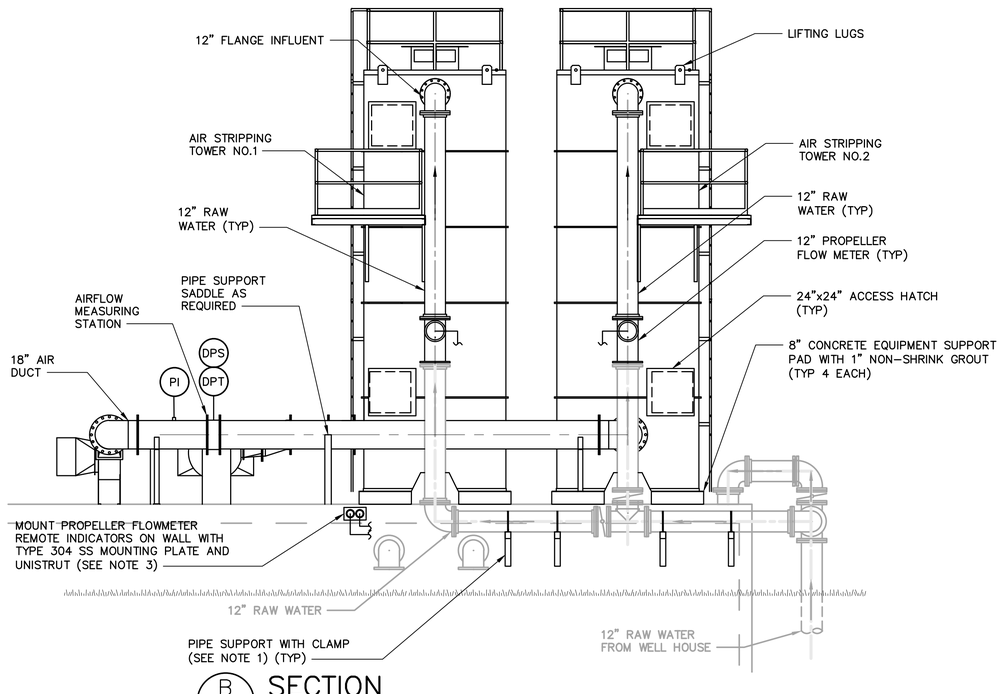
DRAWING NO.: M-001

SHEET NO.: 8 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\3. PROCESS\M-001.DWG Scale:1:1 SavedDate:6/20/2022 Time:11:54 Plot Date: Artz, Kyle; 6/20/2022; 12:31 ; Layout:M-001



A M-001 SECTION
SCALE: 1/4" = 1'-0"



B M-001 SECTION
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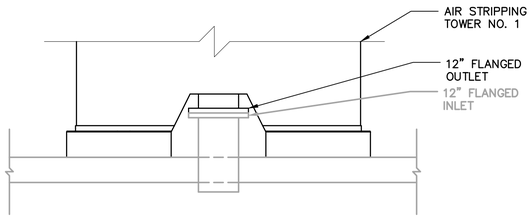
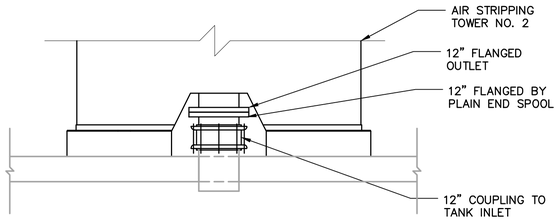
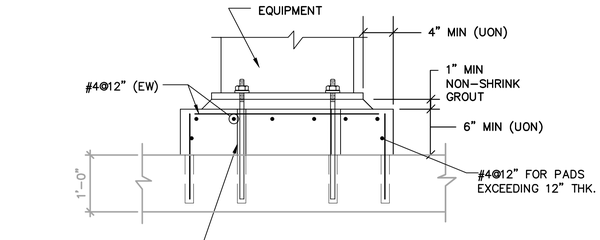


AIR STRIPPING TOWER NO.1 OUTLET DETAIL
SCALE: 1/2" = 1'-0"



AIR STRIPPING TOWER NO.2 OUTLET DETAIL
SCALE: 1/2" = 1'-0"



EQUIPMENT SUPPORT PAD DETAIL
SCALE: 1/2" = 1'-0"

KEY:
- EXISTING
- PROPOSED
- PI — PRESSURE INDICATOR
- DPT — DIFFERENTIAL PRESSURE TRANSMITTER
- DPS — DIFFERENTIAL PRESSURE SWITCH

NOTES:

1. WALL SUPPORT BRACKET TO BE FIGURE 199, BRACKET NUMBER 0 BY ANVIL INTERNATIONAL. ATTACH BRACKET WITH 3/4" DIA ADHESIVE ANCHORS WITH 7" EMBEDMENT (MIN). WALL BRACKET TO BE RATED FOR A MINIMUM 3,000 POUND LOAD.
2. NEW PIPE SUPPORTS SHALL BE INSTALLED PRIOR TO REMOVAL OF EXISTING PIPE SUPPORTS.
3. INSTALL REMOTE INDICATORS FOR FLOW METERS IN ACCORDANCE WITH THE METER MANUFACTURER'S STANDARDS. REQUIRED LENGTHS OF CABLE TO BE PROVIDED BY MANUFACTURER.

ARCADIS

LEGAL ENTITY:
ARCADIS OF MICHIGAN, LLC.

CONSULTANTS

SEALS

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MILFORD, MI
ZF ACTIVE SAFETY US INC.

VILLLAGE OF MILFORD, MI
GROUND WATER TREATMENT SYSTEM IMPROVEMENTS

CLIENT PROJ. NO.: 30126485

REVISIONS

NO.	DATE	ISSUED FOR	BY
0	06-20-22	100% DESIGN REVIEW	BOH

PROJECT STATUS:

PROJECT NO.: 30126485
DATE: JUNE 2022
DESIGNED BY: B. HITTS
DRAWN BY: K. ARTZ
CHECKED BY: X. XXXX

SHEET TITLE
PROCESS

SECTIONS AND DETAILS

SCALE: AS SHOWN
0 1 BAR IS ONE INCH ON UNREDUCED DRAWING

DRAWING NO.: M-002
SHEET NO.: 9 OF 12

User:KARTZ Spec:AUS-NCSMOD File:C:\USERS\KARTZ\ONEDRIVE - ARCADIS\01 VILLAGE OF MILFORD TREATMENT SYS DESIGN\DRAWINGS\CAD\3. PROCESS\M-002.DWG Scale:1:1 SavedDate:6/20/2022 Time:13:05 Plot Date: Artz, Kyle; 6/20/2022; 14:03 ; Layout:M-002

SYMBOL LEGEND

(NOT ALL SYMBOLS WILL APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
	EXISTING
X X X	REMOVE
	NEW WORK
	HIDDEN OR BURIED
	HOMERUN CONDUIT
	GROUND
	PHASE
	SWITCHED
	NEUTRAL
	ISOLATED GROUND
	CONDUIT TURNING DOWN
	CONDUIT TURNING UP
	FLEXIBLE CONDUIT
	CONDUIT UP AND DOWN
	CONDUIT CAP
480V / 600A	BUSWAY WITH DESCRIPTION
G / 6 X 24	GROUNDING CONDUCTOR
	CABLE TRAY WITH DESCRIPTION
OS	OCCUPANCY SENSOR
S	CEILING–RECESSED SPEAKER
	JUNCTION BOX
	DUPLEX RECEPTACLE OUTLET
	SINGLE RECEPTACLE OUTLET
	DOUBLE DUPLEX RECEPTACLE OUTLET
GFCI WP	GROUND FAULT CIRCUIT INTERUPTER DUPLEX OUTLET WITH WEATHERPROOF COVER
	SPLIT WIRED DUPLEX RECEPTACLE
	DUPLEX ISOLATED GROUND
A	FLOOR RECEPTACLE OUTLET USE SUBSCRIPT TO IDENTIFY TYPE IN SPECS
	RECEPTACLE RACEWAY
$a	SINGLE POLE SWITCH – USE SUBSCRIPT TO ESIGNATE CONTROL OF PARTICULAR OUTLETS
$D	DIMMER SWITCH
$3	THREE–WAY SWITCH
$4	FOUR–WAY SWITCH
$WP	WEATHERPROOF SWITCH
$OS	OCCUPANCY SENSOR SWITCH
600	DIMMER SWITCH – NUMBER INDICATES WATTAGE
M	OCCUPANCY SENSING SWITCH
P	PHOTOCELL
6 / T30	REMOTE CONTROL SWITCH 6 POLE, 30AMPS
A / 1, b	LED LUMINAIRE 2x4 FT A=FIXTURE TYPE 1=CIRCUIT NUMBER b=SWITCH CONTROLLING FIXTURE
	FLUORESCENT STRIP LUMINAIRE
	LED HIGH BAY LUMINAIRE
	LED LUMINAIRE 4 FT x 10 IN
	EMERGENCY LUMINAIRE
	LIGHT POLE WITH LUMINAIRE

SYMBOL	DESCRIPTION
	EMERGENCY LIGHTING UNIT
	CEILING MOUNTED EXIT SIGN – ARROW AS INDICATED
	TWO FACED EXIT SIGN
	WALL MOUNTED EXIT SIGN
	SWITCHBOARD, POWER PANELBOARD
	LIGHTING PANELBOARD
T	TRANSFORMER
30	NON–FUSIBLE SAFETY SWITCH (NUMBER INDICATES SWITCH SIZE)
40/60 F	FUSED SAFETY SWITCH (NUMBERS INDICATE FUSE/SWITCH SIZES)
20	COMBINATION MAGNETIC STARTER AND CIRCUIT BREAKER 2 – INDICATES NEMA STARTER SIZE 20– INDICATES CIRCUIT BREAKER TRIP
	MAGNETIC STARTER
ASD	ADJUSTABLE SPEED DRIVE
3	MOTOR (NUMBER INDICATES HP)
	BELL
	HORN "H" OR SIREN "S"
	BUZZER
	PUSHBUTTON
F	MANUAL PULL STATION
V	FIRE ALARM HORN (V=VISUAL SIGNAL)
P	PHOTOELECTRIC SMOKE DETECTOR
	IONIZATION SMOKE DETECTOR
T	THERMAL DETECTOR
P	DUCT SMOKE DETECTOR (PHOTOELECTRIC)
	MAGNETIC DOOR HOLDER
PS	PRESSURE SWITCH
FS	FLOW SWITCH
S	VALVE SUPERVISORY SWITCH
FACP	FIRE ALARM CONTROL PANEL
F	FIRE ALARM RACEWAY
S	CEILING SPEAKER
S	WALL SPEAKER
	ANALOG DATA OUTLET
	DIGITAL DATA OUTLET
	INTERCOM OUTLET
T	TELECOMMUNICATIONS RACEWAY
D	PROTECTED TRANSMISSION SYSTEM (PTS) DATA TERMINAL CONNECTION
TV	TELEVISION OUTLET
CR	CARD READER
ES	ELECTRIC DOOR STRIKE
DC	DOOR CONTACTS
RAP	REMOTE ACCESS PANEL
HG	HAND GEOMETRY UNIT
MD	MOTION DETECTOR
C	CLOSED CIRCUIT TV CAMERA

SYMBOL	DESCRIPTION
100/3	MEDIUM VOLTAGE DISCONNECT SWITCH
600	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
500 KVA	TRANSFORMER (DELTA–WYE CONN.)
	SHIELDED TRANSFORMER
1000 / 1600	DRAWOUT CIRCUIT BREAKER
300 / 400 GFI	CIRCUIT BREAKER (TRIP/FRAME) WITH GROUND FAULT INTERRUPTER
7 MCP	MOTOR CIRCUIT PROTECTOR
30 MCP	MOTOR CONTROL CENTER STARTER UNIT
	FUSE
	GROUND
	GENERATOR
3000/5 3	CURRENT TRANSFORMER (NUMBERS INDICATE RATIO AND QUANTITY)
3	POTENTIAL TRANSFORMER (NUMBER INDICATES QUANTITY)
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
V	VOLTMETER
A	AMMETER
KW	KILOWATT METER
N E L	TRANSFER SWITCH
K1	KEY INTERLOCK #1
	BATTERY
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	PROTECTIVE RELAY, SOLENOID COIL
	THERMAL OVERLOAD
	CONNECTION
	CROSS, NO CONNECTION
	SURGE ARRESTOR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	CAPACITOR
CR1	CONTROL RELAY #1
	BUS PLUG CIRCUIT BREAKER
T	THERMOSTAT
3	KEYED NOTE DESIGNATION
5	ELECTRICAL EQUIPMENT DESIGNATION
7	MECHANICAL EQUIPMENT DESIGNATION
WP	WEATHERPROOF
AFF	ABOVE FINISH FLOOR

GENERAL NOTES

1. PERFORM INSTALLATION IN ACCORDANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA), AND APPLICABLE ENERGY CODES. EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL).
2. PROVIDE AND MAINTAIN A CLEAR WORKING SPACE ABOUT ELECTRICAL EQUIPMENT (SWITCHBOARDS, PANELBOARDS, ETC.) IN ACCORDANCE WITH NEC ARTICLES 110.26 AND 110.34.
3. BOND RACEWAYS AND THE FRAMES AND ENCLOSURES OF MOTORS, BREAKERS, SWITCHES, AND OTHER ELECTRICAL EQUIPMENT TO THE BUILDING GROUNDING SYSTEM. INSTALL AN INSULATED EQUIPMENT GROUND CONDUCTOR IN EACH RACEWAY OR CONDUIT. SIZE EQUIPMENT GROUND CONDUCTOR IN ACCORDANCE WITH NEC TABLE 250.122.
4. PROVIDE CIRCUIT BREAKERS WITH UL LISTED INTERRUPTING RATING (RMS SYMMETRICAL AMPERES) GREATER THAN THE AVAILABLE FAULT CURRENT OF THE SYSTEM. DO NOT USE SERIES RATED BREAKERS.
5. PROVIDE PADLOCKING PROVISIONS FOR EACH NEW CIRCUIT BREAKER.
6. IDENTIFY NEW BRANCH CIRCUITS AT THE PANEL AND AT THE LOAD OUTLET, RECEPTACLE, AND SWITCH. IDENTIFY THE PURPOSE OF INDIVIDUAL CIRCUIT BREAKERS, SAFETY SWITCHES, AND MOTOR STARTERS BY MEANS OF NAMEPLATES AS INDICATED.
7. ROUTE CONDUITS TO SUIT EQUIPMENT AND BUILDING STRUCTURE. LIMIT THE USE OF ELECTRICAL METALLIC TUBING (EMT) TO INTERIOR AREAS WHERE IT WILL NOT BE SUBJECT TO PHYSICAL DAMAGE OR CORROSION. USE RIGID GALVANIZED STEEL CONDUIT (RGS) FOR WORK EMBEDDED IN CONCRETE OR EXPOSED TO PHYSICAL DAMAGE. USE MINIMUM 3/4 INCH CONDUIT.
8. SEAL AROUND CONDUIT PENETRATIONS THROUGH INTERIOR WALLS AND FLOORS SEPARATING AREAS TO RESTORE ORIGINAL FIRE RATING. USE A UL CLASSIFIED FIRE SEALANT. SEAL PENETRATIONS THROUGH ROOF AND EXTERIOR WALLS TO MAKE WATERPROOF. REQUEST INSPECTION OF FIRE SEALS BY ELECTRICAL INSPECTOR FROM AUTHORITY HAVING JURISDICTION BEFORE AND AFTER PLACEMENT OF FIRE SEAL MATERIALS.
9. USE 12 AWG OR LARGER CONDUCTORS FOR POWER WIRING. USE 14 AWG OR LARGER STRANDED CONDUCTORS FOR CONTROL WIRING UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS.
10. USE ONLY COPPER CONDUCTORS UNLESS NOTED OTHERWISE. CONDUCTORS 10 AWG AND SMALLER SHALL BE SOLID, AND 8 AWG AND LARGER SHALL BE STRANDED. PROVIDE TYPE THHN/THWN WIRE INSULATIONS. TYPE XHHW INSULATION MAY BE USED FOR 1 AWG AND LARGER.
11. USE THE FOLLOWING CONDUCTOR COLOR CODES FOR 480Y/277V:
    PHASE A: BROWN
    PHASE B: ORANGE
    PHASE C: YELLOW
    NEUTRAL: GRAY
    GROUND: GREEN
12. USE THE FOLLOWING CONDUCTOR COLOR CODES FOR 208Y/120V:
    PHASE A: BLACK
    PHASE B: RED
    PHASE C: BLUE
    NEUTRAL: WHITE
    GROUND: GREEN
13. ARRANGE CONNECTIONS FOR SINGLE PHASE CIRCUITS TO ACHIEVE THREE PHASE LOAD BALANCE WITHIN 20% OF THE AVERAGE PHASE LOAD CURRENT.
14. DO NOT USE A COMMON NEUTRAL FOR MULTIPLE CIRCUITS.
15. TEST CONDUCTORS FOR CONTINUITY AND FREEDOM FROM SHORTS AND UNINTENTIONAL GROUNDS. ELECTRICAL EQUIPMENT SPECIFIED IN THIS DOCUMENT SHALL BE ACCEPTANCE TESTED AND INSPECTED IN ACCORDANCE WITH NETA ATS.
16. PROVIDE NECESSARY SUPPORTING STRUT CHANNEL AND ALL MISCELLANEOUS HARDWARE FOR MOUNTING ELECTRICAL EQUIPMENT. MAINTAIN NEC WORKING CLEARANCES. COORDINATE EXACT LOCATION IN FIELD. DO NOT MOUNT ON EQUIPMENT ACCESS PANELS OR IN EQUIPMENT MANUFACTURER'S RECOMMENDED MAINTENANCE CLEARANCES.
17. VERIFY AND COORDINATE ELECTRICAL ROUGH–IN REQUIREMENTS FOR EQUIPMENT FURNISHED BY OWNER OR OTHER CONTRACTORS OR SYSTEM MANUFACTURERS PRIOR TO PULLING CONDUCTORS AND MAKING FINAL CONNECTIONS. LACK OF COORDINATION SHALL NOT JUSTIFY CHANGE ORDERS.
18. PROVIDE TEMPORARY POWER AND LIGHTING AS REQUIRED TO COMPLETE PROJECT IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
19. SUBMIT FOR APPROVAL SHOP DRAWINGS FOR EQUIPMENT AND MATERIALS USED ON PROJECT. OBTAIN APPROVAL BY ENGINEER PRIOR TO PURCHASE OF EQUIPMENT AND MATERIALS.
20. REPAIR AREAS DAMAGED DURING CONSTRUCTION TO MATCH ADJACENT AREAS WITH RESPECT TO BOTH COLOR AND FINISH.
21. KEEP JOB SITE IN AN ORDERLY CONDITION AND REMOVE ALL WASTE AT PROJECT COMPLETION. LEAVE THE JOB SITE IN A CONDITION ACCEPTABLE TO THE OWNER.
22. IF A CONFLICT ARISES BETWEEN THE FIELD CONDITIONS AND THESE GENERAL ELECTRICAL REQUIREMENTS, CONTACT THE OWNER FOR DIRECTIONS.

PLC/SCADA NOTES

1. MODIFICATIONS TO EXISTING PLC HARDWARE AND SOFTWARE SHALL BE COORDINATED WITH UTILITIES INSTRUMENTATION SERVICE (UIS PROGRAMMABLE SERVICES).

ARCADIS

LEGAL ENTITY:
ARCADIS OF MICHIGAN, LLC.

CONSULTANTS

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MILFORD, MI
ZF ACTIVE SAFETY US INC.

VILLAGE OF MILFORD, MI GROUNDWATER TREATMENT SYSTEM IMPROVEMENTS

ARCADIS PROJ. NO. 30126485

NO.	DATE	ISSUED FOR	BY
0	06–20–22	100% DESIGN REVIEW	JJA

DATE: JUNE 2022
PROJECT NO.: 30126485
FILE NAME: E–001
DESIGNED BY: J. ARCH
DRAWN BY: J. ARCH
CHECKED BY: D. OBERLE

SHEET TITLE

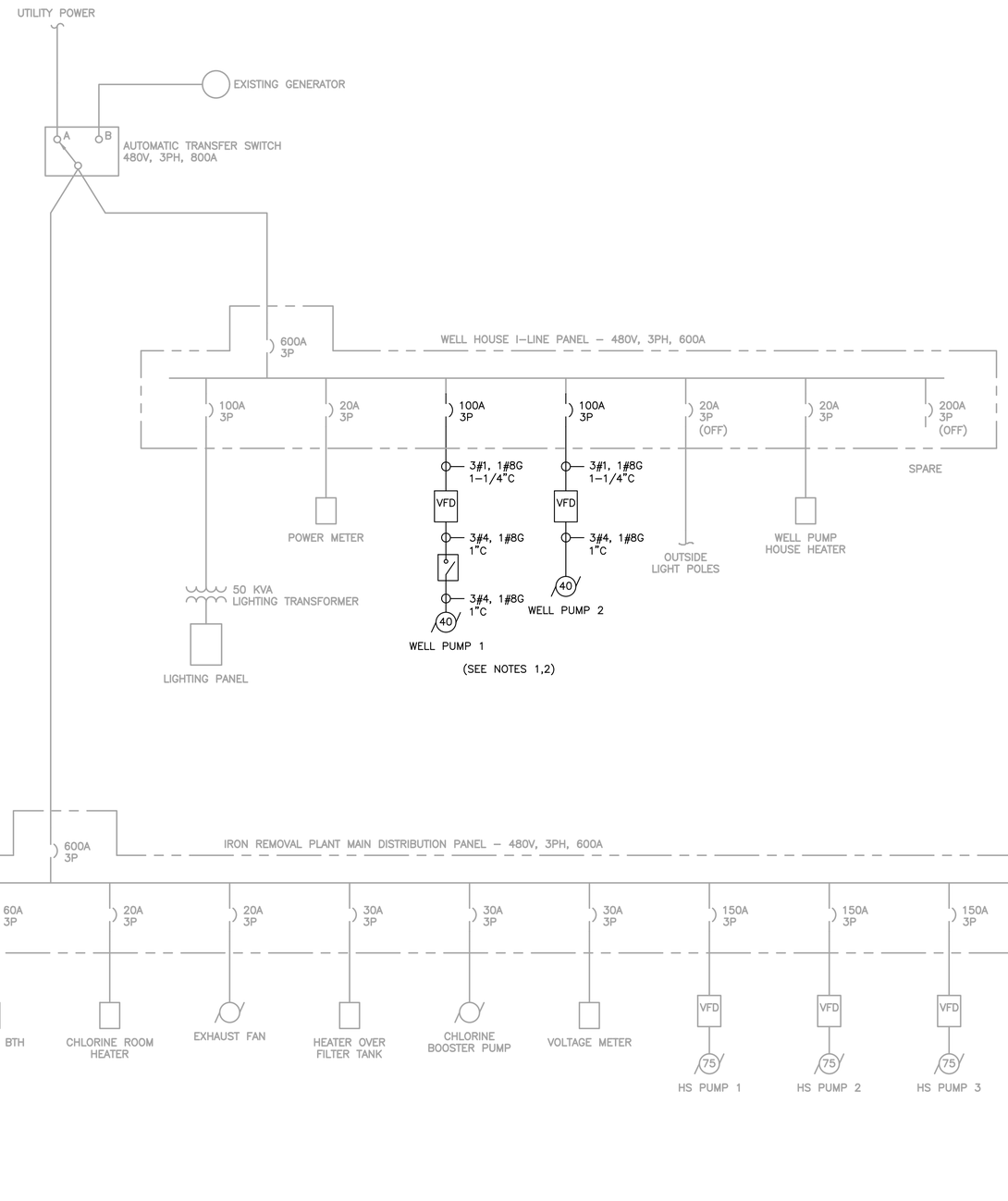
ELECTRICAL

GENERAL NOTES AND LEGEND

SCALE: AS SHOWN

E–001

SHEET 10 OF 12



NOTES:

1. REPLACE EXISTING 60A WELL PUMP FEEDER BREAKERS WITH 100A BREAKERS. PROVIDE NEW VFDs, CONDUCTORS FOR 120V MOTOR SPACE HEATER POWER AND MOTOR TEMPERATURE SWITCHES, NEW MOTORS, AND NEW CONDUIT AND POWER CONDUCTORS AS SHOWN. DEMOLISH EXISTING CONDUIT AND CONDUCTORS BACK TO SOURCE.
2. NEW VFDs SHALL BE ALLEN–BRADLEY AND SHALL BE EQUIPPED WITH LINE REACTOR AND PROVISIONS FOR POWERING MOTOR HEATER AND TEMPERATURE SWITCH CONTROLS. PROVIDE WITH ETHERNET IP MODULE.
3. PROVIDE AND INSTALL NEW 20A CIRCUIT BREAKERS IN SPARE SPACE WITHIN PANEL FOR UPSIZED AIR STRIPPING TOWERS. PROVIDE NEW COMBINATION MOTOR STARTERS, CONDUCTORS FOR 120V MOTOR SPACE HEATER POWER AND MOTOR TEMPERATURE SWITCHES, AND CONDUIT AND CONDUCTORS AS SHOWN. PROVIDE NEW LOCAL DISCONNECT SWITCHES OUTDOORS AS SHOWN ON E–003. DEMOLISH EXISTING DISCONNECT SWITCHES AND EXISTING CONDUIT AND CONDUCTORS BACK TO SOURCE.

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LEGAL ENTITY:
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ZF ACTIVE SAFETY US INC.

VILLAGE OF MILFORD, MI GROUNDWATER TREATMENT SYSTEM IMPROVEMENTS

ARCADIS PROJ. NO. 30126485

NO.	DATE	ISSUED FOR	BY
0	06–20–22	100% DESIGN REVIEW	JJA

DATE: JUNE 2022
PROJECT NO.: 30126485
FILE NAME: E–002
DESIGNED BY: J. ARCH
DRAWN BY: J. ARCH
CHECKED BY: D. OBERLE

SHEET TITLE

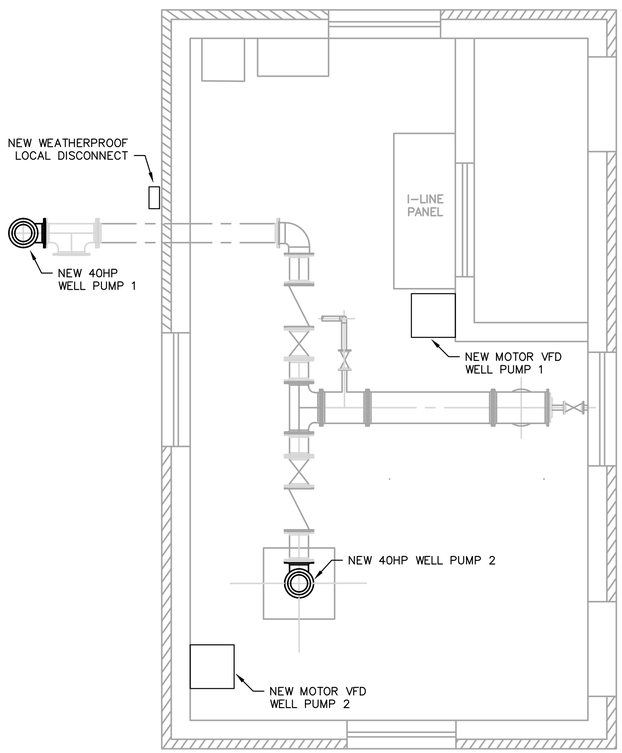
ELECTRICAL

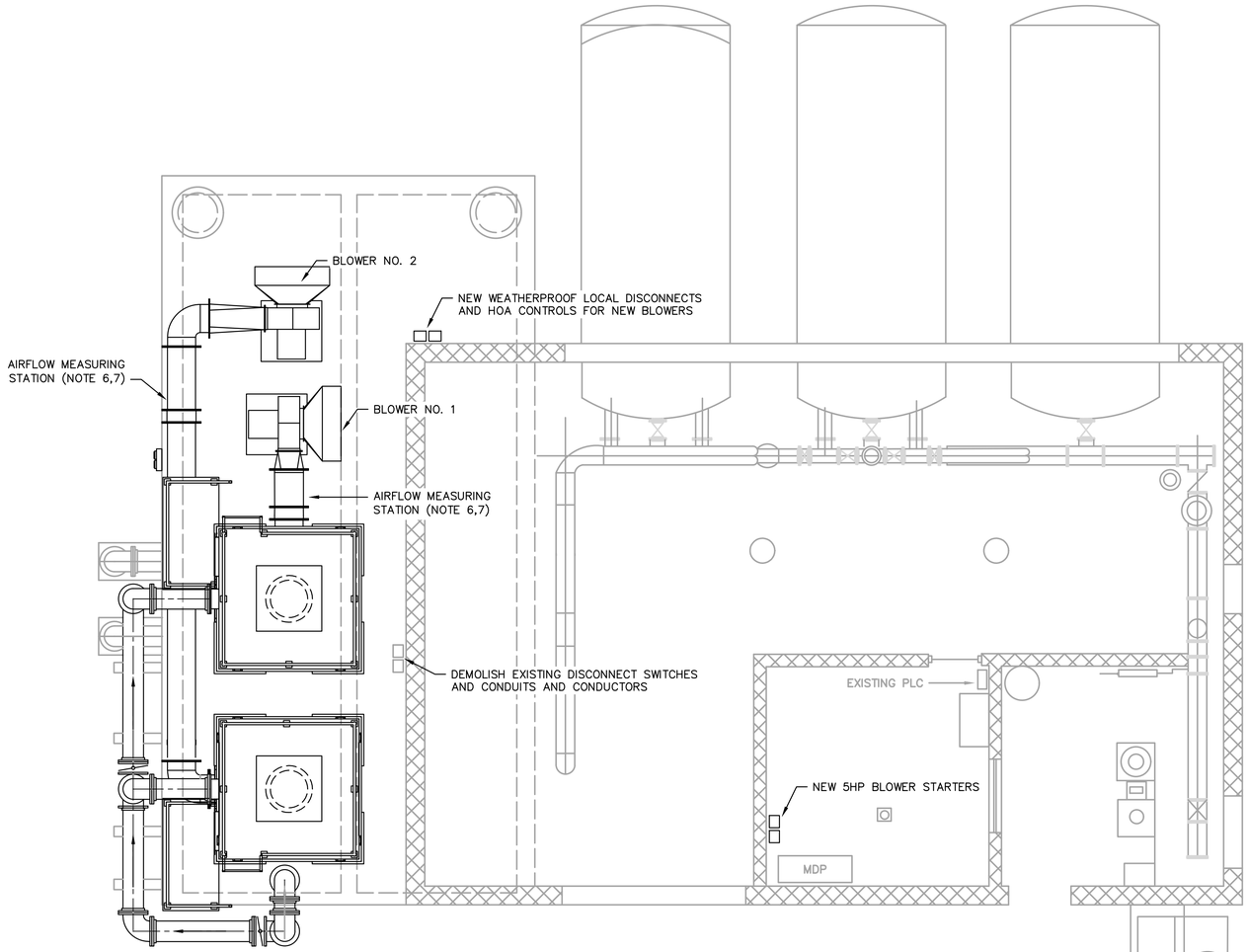
SINGLE LINE DIAGRAM

SCALE: AS SHOWN

E–002

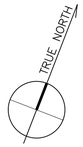
SHEET 11 OF 12





WELL HOUSE ELECTRICAL PLAN

SCALE: 3/8" = 1'-0"

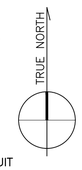


WELL HOUSE NOTES:

1. SEE SINGLE LINE DIAGRAM ON SHEET E-002 FOR CONDUIT AND CONDUCTOR INFORMATION.
2. NEW 40HP WELL PUMPS ARE TO REPLACE EXISTING 25HP PUMPS. DEMOLISH EXISTING PUMP MOTORS AND CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. NEW 40HP VFDs ARE TO REPLACE EXISTING WELL PUMP MOTOR STARTERS. LOCATE NEW VFD ENCLOSURES WHERE EXISTING STARTERS ARE LOCATED. ENSURE ADEQUATE WORKING CLEARANCES ARE MAINTAINED PER NEC.
4. REUSE CONTROLS CONDUIT AND CONDUCTORS FROM EACH MOTOR STARTER BACK TO EXISTING PLANT PLC. REUSE EXISTING START, STOP, FAULT, AND HOA SIGNALS FROM MOTOR STARTER FOR NEW VFD.
5. PROVIDE 4#14, 1#14G IN 3/4" CONDUIT FROM EACH NEW VFD TO RESPECTIVE PUMP MOTOR FOR MOTOR HEATER AND TEMPERATURE SWITCH.

IRON REMOVAL PLANT ELECTRICAL PLAN

SCALE: 1/4" = 1'-0"



TREATMENT BUILDING NOTES:

1. SEE SINGLE LINE DIAGRAM ON SHEET E-002 FOR CONDUIT AND CONDUCTOR INFORMATION.
2. NEW 5HP AERATOR BLOWERS ARE TO REPLACE EXISTING BLOWERS. DEMOLISH EXISTING BLOWERS AND CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. NEW 5HP MOTOR STARTERS ARE TO REPLACE EXISTING BLOWER MOTOR STARTERS. LOCATE NEW STARTER ENCLOSURES WHERE EXISTING STARTERS ARE LOCATED. ENSURE ADEQUATE WORKING CLEARANCES ARE MAINTAINED PER NEC.
4. REUSE CONTROLS CONDUIT AND CONDUCTORS FROM EACH MOTOR STARTER BACK TO EXISTING PLANT PLC. PROVIDE NEW 6#14 CONDUCTORS FOR ADDITIONAL BLOWER RUNNING AND FAULT SIGNALS AND SPARE.
5. PROVIDE 4#14, 1#14G IN 3/4" CONDUIT FROM EACH NEW STARTER TO RESPECTIVE BLOWER MOTOR FOR MOTOR HEATER AND TEMPERATURE SWITCH.
6. PROVIDE 2#14, 1#14G IN 3/4" CONDUIT FROM PLANT PLC TO DIFFERENTIAL PRESSURE SWITCH AT EACH BLOWER DISCHARGE FOR AIRFLOW SWITCH SIGNAL (TWO TOTAL).
7. PROVIDE 1#16TSP, 1#14G IN 3/4" CONDUIT FROM PLANT PLC TO DIFFERENTIAL PRESSURE TRANSMITTER AT EACH BLOWER DISCHARGE FOR AIRFLOW MEASUREMENT SIGNAL (TWO TOTAL). INSTRUMENTATION SHALL BE LOOP-POWERED VIA 24VDC.

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MILFORD, MI
ZF ACTIVE SAFETY US INC.

VILLAGE OF MILFORD, MI
GROUNDWATER TREATMENT SYSTEM IMPROVEMENTS

ARCADIS PROJ. NO. 30126485

NO.	DATE	ISSUED FOR	BY
0	06-20-22	100% DESIGN REVIEW	JJA

DATE: JUNE 2022
PROJECT NO.: 30126485
FILE NAME: E-003
DESIGNED BY: J. ARCH
DRAWN BY: J. ARCH
CHECKED BY: D. OBERLE

SHEET TITLE

ELECTRICAL

PROPOSED ELECTRICAL EQUIPMENT LAYOUT

SCALE: AS SHOWN

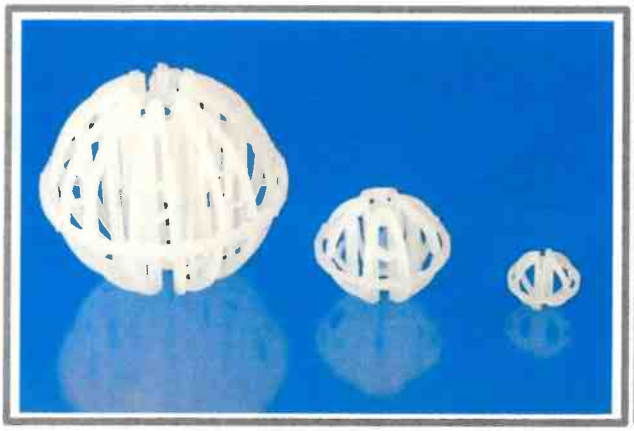
E-003

SHEET 12 OF 12

Jaeger Tri-Packs®

High-performance, free-flowing random spherical packing for scrubber and stripper applications. NSF certified or listed for potable water contact.

Raschig USA Inc.®



Size		1"	2"	3.5"
Geometric Surface Area	ft^2/ft^3	85	48	38
Packing Factor	1/ft	28	16	12
Void Space	%	90.0	93.5	95.0
Bulk Density (reference: polypropylene)	lb_m/ft^3	6.2	4.2	3.3

Jaeger Tri-Packs® (all sizes) are National Sanitation Foundation (NSF) certified or listed for potable water contact. No reground or recycled plastic resin is used to mold Jaeger Tri-Packs ®. Only virgin resin direct from a primary supplier is used. This assures that the rigid requirements of NSF including passing unannounced audits of our production facility are assured. A customer can purchase product in complete confidence that the integrity of their drinking water will be assured.

For more information and design assistance, please contact us at:

Raschig USA, Inc.
Formerly Raschig Jaeger Technologies
2201 E. Lamar Blvd. #240
Arlington, TX 76006
800-678-0345
817-695-5680
info@raschig-usa.com

Jaeger Tri-Packs® is a Registered Trademark of Raschig USA, Inc.

Version 1A 5/23/2014

The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Thursday, May 26, 2022** at 12:15 a.m. Eastern Time. Please contact NSF to confirm the status of any Listing, report errors, or make suggestions.

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NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abbreviations used in these Listings. Click here for the definitions of Water Contact Temperatures denoted in these Listings.

Raschig USA Inc.
2201 East Lamar Boulevard
Suite 240
Arlington, TX 76006
United States

800-678-0345
281-449-9500

Facility : El Dorado, KS

Process Media

Trade Designation	Size	Water Contact Temp	Water Contact Material
Aeration			
Nor-Pac Tower Packing 2", PP	2"	CLD 23	PP
Jaeger Tri-Packs PP	[1]	CLD 23	PP
Low Profile Rings (LPR)	[2]	CLD 23	PP

[1] Jaeger Tri-Packs PP is Certified for the following diameters: 1" - 3.5".
[2] Low Profile Rings (LPR) is Certified for the following diameters: 1" - 3".

NOTE: Certified for water treatment plant applications.
This product has not been evaluated for point of use applications.

Number of matching Manufacturers is 1

Number of matching Products is 3

Processing time was 0 seconds

Need information, help, a quote?

- (817) 695-5680
- info@raschig-usa.com

Product Specifications, Bulletins, Technical Articles

Questions? Need Help? Comments? **info@raschig-usa.com**




Tower Packings

Column Internals & Product Bulletins

Plastic Packings

Plastic Random Packing

- **Jaeger Tri-Packs®** ***Made in the USA*** All sizes of this product in polypropylene are **NSF 61** listed for potable water contact. File in **Spanish**.
- **Low Profile Rings®**
- **Star Rings**
- **Raschig Super Ring®, Plastic**
- File in **Spanish**.
- **Pall Rings (also called Jaeger Rings, Ballast Rings, Basic Rings, etc.)**
- **Saddles**

Plastic Packing: Technical Information

- **Maximum Temperature Tolerances of Available Plastic Resins**
- **National Sanitation Foundation NSF 61 Potable Water Certification**: Our listed products are the three sizes of the Jaeger Tri-Packs® in polypropylene.
- **Chemical Resistance** of **Plastics** and **Metals: Cole-Parmer® Chemical Compatibility Data Base**
- **Maintenance and Cleaning of Random Plastic Packings**

Metal Packings

Metal Random Packing

- **Raschig Super Ring®, Metal**
- **Raschig Super Ring® Plus, Metal**
- **Ralu-Ring, Metal**
- **Pall Ring, Metal**
- **Raschig Rings** – The Famous Packing Invented by Dr. Raschig
- **Low Profile Rings – Metal**

Column Internals

Column Internals

- **Liquid Distributors – Support Plates**
- **Hydroprocessing Reactor Internals**

Column Internals: Technical Information

- **"Influence of Liquid Redistributors on Mass Transfer Efficiency of Packed Columns"**; Industrial & Engineering Chemistry Research, Dr. Michael Schultes, Raschig Gmbh
- "**The impact of tower internals on column perfromance"**, Petroleum Technology Quarterly Q1 2016, Dr. Michael Schultes, Raschig Gmbh
- "A Modern Liquid Distributor and Redistributor Design", ***Hydrocarbon Engineering*** Part 1 January 2009 and Part 2 February 2009
  - **Part 1**
  - **Part 2**

Product Bulletins

- **Product Bulletin 100** – Introduction to our various packings
- **Raschig Super Rings® Metal and Plastic Random Packings Bulletin 200**
- **Product Bulletin 251** – RSR Plus Data – 5th Generation Random Metal Packing
- **Wire Mesh Mist Eliminators Product Bulletin 300**
- **Fractionation Tray Technology Bulletin 401**
- **Raschig Super-Pak® Structured Metal Packing Bulletin 501**
- **Jaeger Tri-Packs®/Hacketten Product Bulletin 600**
- **Raschig Super-Rings® Product Bulletin 625**

Metal Structured Packing

- Raschig Super-Pak®

Metal Packing: Technical Information

- Comparison Guide: Raschig USA Packing Equivalency Chart
- Fractionation Research Institute – Tests of Raschig Super Ring® Results

- Raschig Super Ring®, Metal
  - Raschig Super Ring®-verus Pall Rings – Table 2 Data from the paper immediately below
  - Raschig Super Ring®, 4th Generation Packing
  - Dr. Michael Schultes, Raschig Gmbh; Researching Rings
  - Fractionation Research, Inc.
    - Report of Raschig Super Ring® No. 0.3 Test
    - Report of Raschig Super Ring® No. 0.7 Test
    - Fractionation Research Institute RSR Test Results as a Brochure

- Raschig Super-Pak®
  - Raschig Super-Pak®: 4th Generation Packing Design
  - Raschig Super-Pak®: How to Surpass Conventional and High Capacity Structured Packings
  - Reaching New Performance Levels With Surface Enhanced Raschig Super-Pak®
  - Fractionation Research Institute: Test of Raschig Super-Pak® 250

Carbon Packings

- Low Profile Rings Product Bulletin 650
- Jaeger (Pall) Rings and Super Torus Saddles Bulletin 700
- Low Profile rings Bulletin 800
- Column Internals Product Bulletin 1100
- Column Internals Product Bulletin 1101 (large file, 6.43 MB)

General Technical Articles

- "How Sensitive is Your Treating Plant to Operating Conditions?" presented at the 2014 AIChE meeting in New Orleans, Dr. Michael Schultes Raschig Gmbh co-author
- "Research on Mass Transfer Columns: passé?", Dr. Michael Shultes Raschig Gmbh, Chemical Engineering Technology 2013, 36, No.9, 1539-1549
- "The Impact of Tower Internals on Packing Performance", Dr. Michael Schultes Raschig Gmbh, Chem. Ing. Tech. 2014, 86, No.5, 1-9
- Raschig High Capacity Mini Fixed Valves FRI Tested AIChE Spring Meeting Austin TX April 2015

Carbon Random Packing

- **Raschig Rings**

Ceramic Packings

Ceramic Random Packing

- **Raschig Rings – Pall Rings – Saddles**

Ceramic Structured Packing

- **Raschig-Pak Ceradur®**

Raschig USA, Inc.

Phone 817.695.5680
800.678.0345 (Toll-Free)

Fax 817.695.5697

Location 2201 East Lamar Blvd.
Suite 240 Arlington, TX
76006

News
Applications
Mass Transfer Products
Design Services
Cooling Tower Products

About Raschig
Contact Us

Raschig USA was formerly called Raschig Jaeger Technologies, as the result of the purchase of Jaeger Products.

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NSF/ANSI 51
Food Equipment Materials

Wilsonart LLC
2400 Wilson Place
P.O. Box 6110
Temple, TX 76503
United States
254-207-7000

Facility : # 1 USA

Trade Designation	Color	Type of Food	Maximum Temperature of Use in °F
Anodized Aluminum Sheet for Splash Zone[1]			
Wilsonart® 6240 (419)	Polished Mirror	N/A	212°
Wilsonart® 6251 (419)	Polished Natural Aluminum	N/A	212°
Wilsonart® 6252 (419)	Matte Natural Aluminum	N/A	212°
Wilsonart® 6256 (419)	Brite Brushed Natural Aluminum	N/A	212°
Wilsonart® 6257 (419)	Satin Brushed Natural Aluminum	N/A	212°
Wilsonart® 6277 (419)	Alumasteel™	N/A	212°
Wilsonart® 6253 (419)	Brite Brushed Gold Aluminum	N/A	212°
		N/A	212°
Wilsonart® 6254 (419)	Matte Gold Aluminum	N/A	212°
Wilsonart® 6255 (419)	Polished Gold Aluminum	N/A	212°
Wilsonart® 6258 (419)	Satin Brushed Gold Aluminum	N/A	212°
Wilsonart® 6284 (419)	Satin Brushed Copper Aluminum	N/A	212°
Wilsonart® 6285 (419)	Polished Copper Aluminum	N/A	212°
Wilsonart® 6280 (419)	Polished Smoke Aluminum	N/A	212°
Wilsonart® 6281 (419)	Satin Brushed Smoke Aluminum	N/A	212°
Wilsonart® 6295 (419)	Polished Black Aluminum	N/A	212°
Wilsonart® 6261 (419)	Satin Brushed Light Bronze Aluminum	N/A	212°
Wilsonart® 6262 (419)	Satin Brushed Medium Bronze Aluminum	N/A	212°
Wilsonart® 6296 (419)	Satin Brushed Black Aluminum	N/A	212°

[1] Decorative Metals

Number of matching Manufacturers is 1

Number of matching Products is 18

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The Public Health and Safety Organization

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NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

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Specification Rubber Products, Inc.

P.O. Box 568
Alabaster, AL 35007
United States
205-663-2521

Facility : Alabaster, AL

Joining and Sealing Materials

Trade Designation	Size	Water Contact Temp	Water Contact Material
Gasket/Sealing Materials			
Amarillo Fast-Grip® Gasket EPDM (43650)	>= 4"	CLD 23	EPDM
Amarillo Fast-Grip® Gasket FKM (9355Y)[G]	>= 3"	CLD 23	FE
Amarillo Fast-Grip® Gasket FKM (9365Y)[G]	>= 3"	CLD 23	FE
Amarillo Fast-Grip® Gasket NBR (53650)	>= 4"	CLD 23	NBR
Amarillo Fast-Grip® Gasket SBR (63650)[1] [G]	>= 3"	CLD 23	SBR
Barracuda® RJ Gasket (43650)	>= 4"	CLD 23	EPDM
Barracuda® RJ Gasket (53650)	>= 4"	CLD 23	NBR
Barracuda® RJ Gasket FKM (9355O)[G]	>= 3"	CLD 23	FE
Barracuda® RJ Gasket FKM (9365O)[G]	>= 3"	CLD 23	FE
EPDM AMERICAN Fast-Grip® Gasket (46502)	>= 3"	CLD 23	EPDM
EPDM AMERICAN Toruseal® Flange Gasket (43650)	>= 2"	CLD 23	EPDM
EPDM AMERICAN Toruseal® Flange Gasket (47501)	>= 2"	CLD 23	EPDM
EPDM Baker Coupling Gasket (46502)	>= 3"	CLD 23	EPDM
EPDM Barracuda® RJ Gasket (46502)	4" - 24"	CLD 23	EPDM
EPDM Bonnet Gasket (47501)	4" - 12"	CLD 23	EPDM
EPDM FASTITE® Joint Gasket (46502)	>= 3"	CLD 23	EPDM
EPDM FULL FACE FLANGE TYTE® Gasket (47501)	>= 3"	CLD 23	EPDM
EPDM Filler Flange Gasket (47501)	4" - 12"	CLD 23	EPDM
EPDM Flat Ring Style Gasket (47501)	2" - 30"	CLD 23	EPDM

EPDM Full Face Flat Gasket (47501)	2" - 30"	CLD 23	EPDM
EPDM Griffin TALON™ RJ Gasket (45501)	>= 3"	CLD 23	EPDM
EPDM MJ Transition Gasket (47501)	>= 3"	CLD 23	EPDM
EPDM Mechanical Joint Gasket (47501)	>= 3"	CLD 23	EPDM
EPDM Meter Gasket (47501)	>=2"	CLD 23	EPDM
EPDM MeterSeal™ Gasket (47501)	>=2"	CLD 23	EPDM
EPDM Sheet Gasket Material (47501)	>= 3"	CLD 23	EPDM
EPDM TR Flex® Gasket (45501)	>= 3"	CLD 23	EPDM
EPDM TYTON® Joint Gasket (45501)	>= 3"	CLD 23	EPDM
FKM Mechanical Joint Gasket (97501)	>= 3"	CLD 23	FE
FKM MeterSeal™ Gasket (97501)	>=3"	CLD 23	FE
Fluoroelastomer AMERICAN Fast-Grip® Gasket (95301/96001)	3" - 64"	CLD 23	FE
Fluoroelastomer AMERICAN Fastite® Joint Gasket (95301/96001)	3" - 64"	CLD 23	FE
Fluoroelastomer AMERICAN Toruseal® Flange Gasket (9365Y)[G]	>= 2"	CLD 23	FE
Fluoroelastomer AMERICAN Toruseal® Flange Gasket (97501)	>= 2"	CLD 23	FE
Fluoroelastomer Barracuda® RJ Gasket (95301)	4" - 24"	CLD 23	FE
Fluoroelastomer Griffin TALON™ RJ Gasket (95301)	3" - 64"	CLD 23	FE
Fluoroelastomer MJ Transition Gasket (97501)	>= 3"	CLD 23	FE
Fluoroelastomer Mechanical Joint Gasket (97501)	>= 3"	CLD 23	FE
Fluoroelastomer Tyton® Joint Gasket (95301)	3" - 64"	CLD 23	FE
Fluroelastomer (FKM) Mechanical Joint Gasket (97501)	>= 3"	CLD 23	FE
NBR AMERICAN Fast-Grip® Gasket (56502)	>= 3"	CLD 23	NBR
NBR AMERICAN Toruseal® Flange Gasket (53650)	>= 2"	CLD 23	NBR
NBR AMERICAN Toruseal® Flange Gasket (57502)	>= 2"	CLD 23	NBR
NBR Baker Coupling Gasket (57502)	>= 3"	CLD 23	NBR
NBR Barracuda® RJ Gasket (56502)	4" - 24"	CLD 23	NBR
NBR Bonnet Gasket (57502)	4" - 12"	CLD 23	NBR
NBR FASTITE® Joint Gasket (56502)	>= 3"	CLD 23	NBR
NBR Griffin TALON™ RJ Gasket (55301)	>= 3"	CLD 23	NBR
NBR MJ Transition Gasket (57502)	>= 3"	CLD 23	NBR

EPDM Sheet Rubber Material

STATS

- NSF-61 Certified
- Formulated to meet or exceed ANSI/AWWA C111/A21.11 compound requirements
- EPDM Elastomer sulfur cured 75 Shore A Black, Smooth Finished
- Branded "EPDM NSF-61 Made in USA" for ease of identification
- 1/16", 1/8", 1/4" and 1/2" thicknesses available
- Sold by the linear foot or in roll lengths
- Stocked and ready for immediate shipment
- Produced in the USA under a stringent ISO quality system

PDF DOWNLOAD

Product Spotlight

Submittal Sheet

Spec Sheets

Specification Rubber Products, Inc

Begun in 1968 as a manufacturer of rubber components for the waterworks industry, our company today is a primary supplier to ductile iron pipe, valve and hydrant producers. We also offer specialty mechanical molded goods for industrial applications.

Contact Us

1568 1st Street North
Alabaster, Alabama 35007
(Google Maps)

800.633.3415
Email Us
LinkedIn

Certifications

NSF Certified
ISO 9001:2015
Made In The USA

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News

AMERICAN
THE RIGHT WAY

Specification Rubber Products is a subsidiary of AMERICAN Cast Iron Pipe Company, Birmingham, AL

Made in USA

A+ Rating

Web Development By Infomedia

BETE CERTIFICATIONS & APPROVALS

Scroll/Swipe right →

APPROVAL AGENCY OR DESIGN STANDARD	APPROVAL APPLICATION	PRODUCT	APPROVAL CERTIFICA
ASME B31.1 Power Piping Code	Power piping (steam plant) applications	Boiler External Piping and Non Boiler External Piping assemblies are designed, manufactured, and inspected in compliance with ASME B31.1 when specified by customer requirements.	• BETE ASME U PP R Certificates
ASME B31.3 Process Piping Code	Various industrial process piping applications	Welded assemblies are designed, manufactured, and inspected in compliance with ASME B31.3 when specified by customer requirements.	Certificate is issued for customer- specific proc
ASME Boiler and Pressure Vessel Code, Section IX Welding Procedures	Boiler, pressure vessel, and pressure piping systems used in process industries	Assemblies are designed, manufactured, and inspected in compliance with ASME Boiler and Pressure Vessel Codes when specified by customer requirements.	• BETE ASME U PP R Certificates
ATEX 2014/34/EU	Tank washing in potentially	• Specific HydroWhirl S20, 30	• ATEX Certificate

Tank washing in potentially explosive environments	• Specific HydroWhirl 320, 30, 40, and 50 tank wash nozzles are manufactured in compliance with the ATEX standards. • All HydroWhirl Orbitors are certified to Zone 0.	• ATEX Declaration of Conformity • HWS Use and Maint Manual_v1.7
Suppliers to BETE must adopt a policy regarding conflict minerals consistent with BETE's policy, implement management systems to support compliance with their policy, and require their suppliers to take the same steps.	BETE is committed to conducting business fairly and ethically, with respect for human rights, and in compliance with all applicable laws and regulations. We are committed to complying with the SEC's rule on conflict minerals and the responsible sourcing of minerals through our global supply chain.	• BETE Conflict-Free I Due Diligence Policy
Boiler, pressure vessel, and pressure piping systems in Canada	Approvals are obtained for products when specified by customer requirements	Approvals are obtainec products when specifie customer requirement
Fixed fire protection systems for various industries	• ALL N spray nozzles in various metals and alloys TF8NN, TF8FCN, TF24-150, TF10-170 in Brass AFF Flat Fan nozzles	• FM Approval: N and TF24-150 • FM Approval: TF8NI TF8FCN • FM Approval: TF10 • FM Approval: AFF se

Boiler, pressure vessel, and pressure piping systems used in process industries	Assemblies are designed, manufactured, and inspected in compliance with ASME Boiler and Pressure Vessel Codes when specified by customer requirements.	• BETE ASME U PP R Certificates
Food processing industry	BETE products can be manufactured with the following materials that meet FDA 21CFR requirements: • Polypropylene • PTFE (Teflon) • PVDF (Kynar) • Viton o-rings	Certificate is issued for customer-specific proc
Fixed fire protection spray nozzles onboard ships and offshore installations	• All N spray nozzles in various metals and alloys specified in the certificates	• Lloyd's Register Cer
Petrochemical and Refining Industries when special corrosion resistant material is required.	Approvals are obtained for customer requirements	Certificate is issued for customer-specific proc

Repair of pressure vessels and piping components	Assemblies are repaired and inspected in compliance with the National Board Inspection Code when specified by customer requirements.	• BETE R Certificate
Fire protection onboard ships when specified by Naval Sea Systems Command, Department of the Navy, and Agencies of the Department of Defense	• 1/2" TF29-180-16 • 1/2" TF29-180-18 • 1/2" TF29-180-21 • 1/2" TF29-180-24 • 1/2" TF29-180-28 • 1/2" TF29-180-32 Brass only	Government QAR witn inspection required. BE Certificate of Compliar available upon request
Fixed fire protection systems for various industries	Refer to specific fire protection approved BETE nozzles for performance information. Contact BETE for assistance selecting fire protection nozzles that meet NFPA guidelines.	NFPA 15 is a system de standard, not a produc approval standard.
Water and beverage industries	The following NSF-61 compliant raw materials may be used to produce many BETE nozzles: Polypropylene Kynar	A statement of raw ma compliance to NSF61 i: available upon request

ASME Boiler and Pressure Vessel Code, Section IX Welding Procedures
Food and Drug Administration FDA 21CFR
BETE ISO 9001: 2015 Certificate
NACE-MR 0175 NACE-MR 0103

The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Thursday, May 26, 2022** at 12:15 a.m. Eastern Time. Please contact NSF to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information: http://info.nsf.org/Certified/Plumbing/Listings.asp?MaterialType=CPVC&

NSF/ANSI 14
Plastics Piping System Components and Related Materials

Click here for a list of End Use Code Designations.

Click on Product Standards or footnote in blue to view the referenced document

A.Y. McDonald Mfg. Co.

4800 Chavenelle Road
Dubuque, IA 52002
United States
563-583-7311

Facility : Kaohsiung, Taiwan

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard
Valves# +++	*CPVC*	*AY McDonald*	*ASTM F1970*

(2) This product was evaluated by NSF according to the requirements of NSF/ANSI/CAN 61, Section 4.
(3) The compliance of this product with the health effects requirements of NSF/ANSI/CAN 61 was determined based on the testing of pipe and fittings assembled using the cement and P48 Strong Weld Primer M1.

C.I. MEXICHEM COMPUESTOS COLOMBIA S.A.S.

Mamonal KM 8
Cartegena
Colombia
57 5 672 3150

Facility : Cartegena, Colombia

Potable Water - Materials

Material Type	End Use	Trade Name	Product Standard
CPVC 4120-06	1	Durovin CPVC-EXT03	24448 ASTM D1784

+ Material complies with NSF/ANSI/CAN 61 health effects requirements when tested at 73° F.

NOTE: All Listed products from this facility are NSF Certified, whether or not they bear the NSF Mark.

Charlotte Pipe & Foundry Company

(http://www.charlottepipe.com)

Plastics Division
4210 Old Charlotte Highway
P.O. Box 1339
Monroe, NC 28111-1339
United States

704-291-3218
Visit this company's website (http://www.charlottepipe.com)

Facility : # 1 USA

Joining Materials

Product Type	General Material	For Use With	Trade Name	Product Standard
Solvent Cement (1,2,3)+++ [G]	CPVC	PW, DWV, SW	ChemDrain® One-Step CPVC Solvent Cement	ASTM F493
Solvent Cement (1,2,3)# [G]	CPVC	CW	ChemDrain® One-Step CPVC Solvent Cement	ASTM F2618

Product has been Certified as part of the Charlotte Pipe ChemDrain System to ASTM F2618.
+++ Material complies with NSF/ANSI/CAN 61 health effects requirements when tested at temperatures up to and including Commercial Hot (180° F).
[G] Product is Certified to NSF/ANSI 372 and conforms with the lead content requirements for "lead free" plumbing as defined by California, Vermont, Maryland, and Louisiana state laws and the U.S. Safe Drinking Water Act.

(1) This product was evaluated by NSF according to the requirements of NSF/ANSI/CAN 61, Section 4.
(2) The compliance of this product with the health effect requirements of NSF/ANSI/CAN 61 was determined based on the testing of pipe and fittings assembled using the cement and either Weld-On® P-68®, P-70® Clear or Purple, or P-72 Clear Primers.
(3) This product is acceptable for use with pipe and fittings sized 1/2" and greater diameter.

Facility : Huntsville, AL

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard

INDUSTRY STANDARDS

OVERVIEW

Minimum product standards for piping components provide the specifying engineer and consumer with the confidence that the thermoplastic piping products will perform as intended. The most frequently referenced standards for Colonial products are listed here as well as installation standards for joining and buried pipe.

ASTM

Voluntary-consensus standards are updated annually by the American Society for Testing and Materials (ASTM). Most appear in volume 08.04, Plastic Pipe and Building Products.

American Society for Testing
and Materials (ASTM)
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
Phone: (610) 832-9500
Fax: (610) 832-9555
Web site: www.astm.org
E-mail: service@astm.org

PVC & CPVC MATERIALS
ASTM D-1784
Classifies compounds by minimum physical and chemical properties into cell classifications.

POLYPROPYLENE MATERIALS
ASTM D-4101
Classifies injection (formerly D-2146) molding and extrusion grades according to physical properties.

PVDF MATERIALS
ASTM D-3222
Covers polymerization method and classifies compounds by physical properties.

PVC SCH 40, 80 & 120 PIPE
ASTM D-1785
Outlines dimensional specifications, burst strength and maximum operating pressures.

CPVC SCH 40 & 80 PIPE
ASTM F-441
Outlines dimensional specifications, burst strength and maximum operating pressures.

PVC SCH 40 FITTINGS
ASTM D-2466
Outlines specifications for wall thickness and socket and thread dimensions.

PVC SCH 80 FITTINGS
ASTM D-2467
Outlines specifications for wall thickness and socket dimensions.

PVC SCH 80 FITTINGS
ASTM D-2464
Outlines specifications for wall thickness and thread dimensions.

CPVC SCH 80 FITTINGS
ASTM F-439
Outlines specifications for wall thickness and socket dimensions.

CPVC SCH 80 FITTINGS
ASTM F-437
Outlines specifications for wall thickness and thread dimensions.

CPVC-CTS (COPPER TUBE SIZE) FITTINGS
ASTM D-2846
Outlines specifications for wall thickness and socket and thread dimensions for hot and cold water distribution systems.

CPVC SOLVENT CEMENT SPECIFICATION
ASTM F-493

PVC SOLVENT CEMENT SPECIFICATION
ASTM D-2564

PVC SOLVENT CEMENTING PROCEDURE
ASTM D-2855

PRIMERS FOR SOLVENT CEMENTING
ASTM F-656

UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING
ASTM D-2774

UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS
ASTM D-2321

SELECTION, DESIGN, AND INSTALLATION OF THERMOPLASTIC WATER PRESSURE PIPING SYSTEMS
ASTM F-645

ANSI

Some ASTM standards are adopted verbatim and labeled as the ANSI (American National Standards Institute) standard on the subject. Some specific ANSI standards for threading, flanges, calibration, etc., are referenced in some sections of the ASTM standard.

American National Standards
Institute (ANSI)
11 West 42nd Street
New York, NY 10036
Phone: (212) 642-4900
Fax: (212) 398-0023

ANSI SPECIFICATION FOR TAPER PIPE THREADS

ANSI B1.20.1, ASTM F-645
(formerly B2.1)

ANSI SPECIFICATION FOR BOLT HOLE PATTERNS FOR CLASS 150 STEEL FLANGES

ANSI B16.5

NSF INTERNATIONAL

NSF International acts as a third party certification agency which tests and certifies that certain products do, in fact, meet the manufacturing standard or specifications claimed. Further, they may also test material and parts to verify compliance to NSF International health standards for potable water use. The World Health Organization (WHO) has designated NSF International as the collaborative center for drinking water safety and treatment.

NSF International
789 Dixboro Road
P.O. Box 130140
Ann Arbor, MI 48113-0140
Phone: (800) 673-8010
Fax: (734) 769-0109

STANDARD 14

This standard provides specifications for toxicological and organoleptic levels of contamination to determine the suitability of plastic piping for potable water service. It further specifies minimum quality control programs and the adherence to specific standards to which products are made. To meet this standard, a manufacturer allows NSF to sample and test products to verify that they do, in fact, conform.

STANDARD 61

This newer standard was developed to establish minimum requirements for control of potential adverse human health effects from products which contact drinking water. It does not attempt to include product performance requirements but conformance to NSF 61 is a prerequisite for NSF Standard 14 certification.

STANDARD 14 SPECIAL ENGINEERING APPURTENANCE PROGRAM (S.E.)

This standard is sometimes referred to simply as the NSF S.E. program. The NSF S.E. program establishes product performance requirements where no directly applicable ASTM specifications exist. NSF S.E. specifications are developed from a combination of applicable portions of ASTM specifications and manufacturers' design specifications as a standard for conformance verification.

DIN

Deutsches Institut Fur Normung (DIN), German (West) Standards like ASTM standards are also published annually. English translations of these standards can be obtained from the Cleveland Public Library, Photo Duplication.

Deutsches Institut Fur Normung (DIN)
Phone: (216) 623-2901
Fax: (216) 623-7078

DIN 3441

Part 1: Requirements and testing of PVC valves. This standard issued in 1982 and revised in 1989 is, as of 1996, the only published consensus standard for PVC plastic valves. Many DIN requirements will be incorporated in an expected ASTM standard. Of particular interest, thermoplastic valves must meet a long-term hydrostatic test based upon their assigned room temperature pressure ratings (see example below).

Test Temperature: 20°C (68°F)
Test Duration: 1 hour @ 4.2 X maximum pressure rating and 1000 hours @ 3.2 X maximum pressure rating.

STANDARDS BY PRODUCT LINE

PVC VALVES
True Union, Single Union, Multi-Port, MIP (Molded In Place), Compact (Super "C"), Ball Check, Butterfly

ASTM D-1784	Material Standard
ASTM D-2467	Socket Dimensions
ASTM D-2464	Thread Dimensions
ASTM D-2564	PVC Solvent Cement
ASTM D-2855	PVC Solvent Cementing Procedure
ASTM F-656	Primers for Solvent Cementing
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
ANSI B16.5	Class 150 Steel Flange Hole Pattern
DIN 3441	Requirements and Testing of PVC Valves *(True Union, Single Union & Multi-Port valves only.)*

CPVC VALVES
True Union, Single Union, Multi-Port, MIP (Molded In Place), Compact (Super "C"), Ball Check

ASTM D-1784	Material Standard
ASTM F-439	Socket Dimensions
ASTM F-437	Thread Dimensions
ASTM F-493	CPVC Solvent Cement
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
ANSI B16.5	Class 150 Steel Flange Hole Pattern
DIN 3441	Requirements and Testing of PVC Valves *(CPVC True Union, Single Union & Multi-Port valves meet the pressure testing requirements of this standard.)*

PP VALVES
True Union, Single Union, Multi-Port, Ball Check

ASTM D-4101	Polypropylene Materials
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)

PVDF VALVES
True Union, Single Union, Ball Check

ASTM D-3222	PVDF Materials
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
DIN 3441	Requirements and Testing of PVC Valves *(PVDF True Union & Single Union valves meet the pressure testing requirements of this standard.)*

CPVC CTS (COPPER TUBE SIZE) VALVES

ASTM D-1784	Material Standard
ASTM D-2846	Dimensional Specifications (sockets, threads and wall thickness)
ASTM F-493	CPVC Solvent Cement
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water

PVC SCH 40 FITTINGS
(White or Gray)

ASTM D-1784	Material Standard
ASTM D-2466	Dimensional Specifications
ASTM D-2774	Buried Pipe Specifications
ASTM D-2564	PVC Solvent Cement
ASTM D-2855	PVC Solvent Cementing Procedure
ASTM F-656	Primers for Solvent Cementing
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water

PVC SCH 80 FITTINGS
(Gray)

ASTM D-1784	Material Standard
ASTM D-2467	Dimensional Specifications (sockets)
ASTM D-2464	Dimensional Specifications (threads)
ASTM D-2774	Buried Pipe Specifications
ASTM D-2564	PVC Solvent Cement
ASTM D-2855	PVC Solvent Cementing Procedure
ASTM F-656	Primers for Solvent Cementing
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water
ANSI B16.5	Class 150 Flange Hole Pattern

CPVC SCH 80 FITTINGS (Gray)

ASTM D-1784	Material Standard
ASTM F-439	Dimensional Specifications (sockets)
ASTM F-437	Dimensional Specifications (threads)
ASTM D-2774	Buried Pipe Specifications
ASTM F-493	CPVC Solvent Cement
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water
ANSI B16.5	Class 150 Flange Hole Pattern

CPVC CTS (COPPER TUBE SIZE) FITTINGS (Tan)

ASTM D-1784	Material Standard
ASTM D2846	Dimensional Specifications (sockets, threads and wall thickness)
ASTM F-493	CPVC Solvent Cement
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water

PVC SCH 40 PIPE

ASTM D-1784	Material Standard
ASTM D-1785	Dimensional Specifications
ASTM D-2774	Buried Pipe Specifications
NSF14/61	Potable Water

PVC SCH 80 PIPE

ASTM D-1784	Material Standard
ASTM D-1785	Dimensional Specifications
ASTM D-2774	Buried Pipe Specifications
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water

CPVC SCH 80 PIPE

ASTM D-1784	Material Standard
ASTM F-441	Dimensional Specifications
ASTM D-2774	Buried Pipe Specifications
ANSI B1.20.1	Taper Pipe Threads (formerly B2.1)
NSF14/61	Potable Water

ADDITIONAL READING

1. Wayne Ulanski, "Valve and Actuator Technology," McGraw-Hill, Inc. (1991)
2. Ron D. Bliesner, "Designing, Operating and Maintaining Piping Systems Using PVC Fittings," PVC Fittings Division of the Irrigation Association (February 3, 1987)
3. Richard B. Choate, "Turf Irrigation Manual," Weather-matic Division of Telsco Industries (1994)
4. David A. Chasis, "Plastic Piping Systems," Industrial Press Inc. (1988)
5. Mohinder L. Nayyar, P.E., "Piping Handbook," McGraw-Hill, Inc. (1992)
6. Michael Frankel, "Facility Piping Systems Handbook," McGraw-Hill, Inc. (1996)
7. "The Effects of Ultraviolet Aging on PVC Pipe," a technical report by Uni-Bell Plastic Association, 2655 Villa Creek Drive, Suite 155, Dallas Texas 75234, (972) 243-3902 (UNI-TR-5-81)

The Bliesner Report was developed as a guide to assist in the design, operation and maintenance of PVC piping systems. This concise, easy-to-read report is available through Colonial Engineering, Inc.

ATTACHMENT 3

June 28, 2022 Letter From EGLE

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

June 28, 2022

VIA E-MAIL AND CERTIFIED MAIL –
RETURN RECIEPT REQUESTED

Scott Detwiler
ZF Active Safety US, Inc.
11202 East Germann Road
Mesa, Arizona 85212

Dear Scott Detwiler:

SUBJECT: Documentation Requirements related to Administrative Order for Response Activity;
EGLE Docket No. AO-RRD-22-001

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Remediation and Redevelopment Division (RRD) received ZF Active Safety US, Inc. (ZF) correspondence dated April 8, 2022, and April 13, 2022, containing information on initial redevelopment activities of Monitoring Well OW-16D2. On April 14, 2022, EGLE responded to ZF's letters noted above and agreed that the information presented by ZF regarding anomalous conditions in OW-16D2 warranted additional investigation by ZF.

On April 22, 2022, ZF submitted to EGLE a Monitoring Well Rehabilitation and Vertical Aquifer Profiling Work Plan (Work Plan) as an additional measure not required under the Administrative Order for Response Activity; EGLE Docket No. AO-RRD-22-001 (AO). ZF indicated the objectives of the Work Plan are to further investigate OW-16D2 and aquifer conditions.

If, at any point, ZF believes it has collected sufficient data to make any conclusions requiring EGLE concurrence, ZF must provide EGLE with the following documentation (at a minimum) for consideration:

- A letter outlining any conclusions reached, and a request for EGLE concurrence with the conclusions;
- A Technical Summary Report;
- A Monitoring Plan; and
- A Contingency Plan

The Technical Summary Report must include the complete data set collected during ZF's investigations that contains sufficient data and information to demonstrate ZF's conclusion(s), and for EGLE to decide on concurrence with ZF's conclusions. The

Monitoring Plan must provide for long-term monitoring of OW-16D2 and/or replacement monitoring wells to ensure protection of the Village of Milford drinking water supply wells, and the Contingency Plan shall outline what steps will be taken if vinyl chloride or other hazardous substances are detected in the future.

If you have any questions regarding this matter, please contact me.

Sincerely,

Kevin Wojciechowski
Senior Environmental Quality Analyst
Warren District Office
Remediation and Redevelopment Division
586-623-2948
WojciechowskiK@Michigan.gov

cc: Christian Wuerth, Village of Milford
John McInnis, Arcadis
Joost Vant Erve, DHHS
Paul Owens, EGLE
Cheryl Wilson, EGLE
Darren Bowling, EGLE
Lyndsey Hagy, EGLE
Katie Noetzel, EGLE
Tiffany Yusko-Kotimko, EGLE

ATTACHMENT 4

Laboratory Analytical Report (Observation Wells OW-16D2 and OW-16D2R1)

Fibertec environmental services

Thursday, July 14, 2022

Fibertec Project Number:	A09642
Project Identification:	TRW Milford (30136112) /30136112
Submittal Date:	07/11/2022

Ms. Stacey Hannula
Arcadis U.S., Inc. - Novi
28550 Cabot Drive
Suite 500
Novi, MI 48377

Dear Ms. Hannula,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Bailey Welch

By Bailey Welch at 2:53 PM, Jul 14, 2022

For Daryl P. Strandbergh
Laboratory Director

Enclosures

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-001

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**OW-16D2_071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Ground Water**	Collect Time:	**09:43**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-001** **Matrix: Ground Water**
Method: EPA 5030C/EPA 8260D **Description: OW-16D2_071122**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
3. Benzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
4. Bromobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
5. Bromochloromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
6. Bromodichloromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
7. Bromoform	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
8. Bromomethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
9. 2-Butanone	U		µg/L	25	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
10. n-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
13. Carbon Disulfide	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
15. Chlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
16. Chloroethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
17. Chloroform	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
18. Chloromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
21. Dibromochloromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
22. Dibromomethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
27. 1,1-Dichloroethane	**3.5**		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
30. cis-1,2-Dichloroethene	**18**		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
35. Ethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
37. 2-Hexanone	U		µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC

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Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-001

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**OW-16D2_071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Ground Water**	Collect Time:	**09:43**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-001** **Matrix: Ground Water**
Method: EPA 5030C/EPA 8260D **Description: OW-16D2_071122**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
38. Isopropylbenzene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
40. Methylene Chloride	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
42. MTBE	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
43. Naphthalene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
44. n-Propylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
45. Styrene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
48. Tetrachloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
49. Toluene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
53. Trichloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
59. Vinyl Chloride	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
60. m&p-Xylene	U		µg/L	2.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
61. o-Xylene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC
‡ 62. Xylenes	U		µg/L	3.0	1.0	07/12/22	VM22G12B	07/12/22 14:32	VM22G12B	SNC

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Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-002

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**OW-16D2R1_071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Ground Water**	Collect Time:	**10:42**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-002** **Matrix: Ground Water**
Method: EPA 5030C/EPA 8260D **Description: OW-16D2R1_071122**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Acetone	U	L-	µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡	2. Acrylonitrile	U		µg/L	2.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	3. Benzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	4. Bromobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	5. Bromochloromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	6. Bromodichloromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	7. Bromoform	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	8. Bromomethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	9. 2-Butanone	U		µg/L	25	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	10. n-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	11. sec-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	12. tert-Butylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	13. Carbon Disulfide	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	14. Carbon Tetrachloride	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	15. Chlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	16. Chloroethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	17. Chloroform	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	18. Chloromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	19. 2-Chlorotoluene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡	20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	21. Dibromochloromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	22. Dibromomethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	27. 1,1-Dichloroethane	**2.2**		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	30. cis-1,2-Dichloroethene	**20**		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	31. trans-1,2-Dichloroethene	**1.2**		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	35. Ethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	36. Ethylene Dibromide	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
	37. 2-Hexanone	U		µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC

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Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-002

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**OW-16D2R1_071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Ground Water**	Collect Time:	**10:42**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-002** **Matrix: Ground Water**
Method: EPA 5030C/EPA 8260D **Description: OW-16D2R1_071122**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
38. Isopropylbenzene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
40. Methylene Chloride	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
42. MTBE	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
43. Naphthalene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
44. n-Propylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
45. Styrene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
48. Tetrachloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
49. Toluene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
53. Trichloroethene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
59. Vinyl Chloride	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
60. m&p-Xylene	U		µg/L	2.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
61. o-Xylene	U		µg/L	1.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC
‡ 62. Xylenes	U		µg/L	3.0	1.0	07/12/22	VM22G12B	07/12/22 15:00	VM22G12B	SNC

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-003

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**FIELD BLANK _071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Blank: Field**	Collect Time:	**10:10**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-003** **Matrix: Blank: Field**
Method: EPA 5030C/EPA 8260D **Description: FIELD BLANK _071122**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Acetone	U	L-	µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡	2. Acrylonitrile	U		µg/L	2.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	3. Benzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	4. Bromobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	5. Bromochloromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	6. Bromodichloromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	7. Bromoform	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	8. Bromomethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	9. 2-Butanone	U		µg/L	25	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	10. n-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	11. sec-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	12. tert-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	13. Carbon Disulfide	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	14. Carbon Tetrachloride	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	15. Chlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	16. Chloroethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	17. Chloroform	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	18. Chloromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	19. 2-Chlorotoluene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡	20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	21. Dibromochloromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	22. Dibromomethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	35. Ethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	36. Ethylene Dibromide	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
	37. 2-Hexanone	U		µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-003

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**FIELD BLANK _071122**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Blank: Field**	Collect Time:	**10:10**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-003** **Matrix: Blank: Field**
Method: EPA 5030C/EPA 8260D **Description: FIELD BLANK _071122**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
38. Isopropylbenzene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
40. Methylene Chloride	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
42. MTBE	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
43. Naphthalene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
44. n-Propylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
45. Styrene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
48. Tetrachloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
49. Toluene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
53. Trichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
59. Vinyl Chloride	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
60. m&p-Xylene	U		µg/L	2.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
61. o-Xylene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC
‡ 62. Xylenes	U		µg/L	3.0	1.0	07/13/22	VM22G13A	07/13/22 12:26	VM22G13A	BRC

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-004

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**TB005473**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Blank: Trip**	Collect Time:	**NA**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-004** **Matrix: Blank: Trip**
Method: EPA 5030C/EPA 8260D **Description: TB005473**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
3. Benzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
4. Bromobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
5. Bromochloromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
6. Bromodichloromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
7. Bromoform	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
8. Bromomethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
9. 2-Butanone	U		µg/L	25	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
10. n-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
13. Carbon Disulfide	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
15. Chlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
16. Chloroethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
17. Chloroform	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
18. Chloromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
21. Dibromochloromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
22. Dibromomethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
35. Ethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
37. 2-Hexanone	U		µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: A09642
Laboratory Sample Number: A09642-004

Order: A09642
Date: 07/14/22

Client Identification:	**Arcadis U.S., Inc. - Novi**	Sample Description:	**TB005473**	Chain of Custody:	**205973**
Client Project Name:	**TRW Milford (30136112)**	Sample No:		Collect Date:	**07/11/22**
Client Project No:	**30136112**	Sample Matrix:	**Blank: Trip**	Collect Time:	**NA**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS **Aliquot ID: A09642-004** **Matrix: Blank: Trip**
Method: EPA 5030C/EPA 8260D **Description: TB005473**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
38. Isopropylbenzene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
40. Methylene Chloride	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
42. MTBE	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
43. Naphthalene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
44. n-Propylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
45. Styrene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
48. Tetrachloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
49. Toluene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
53. Trichloroethene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
59. Vinyl Chloride	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
60. m&p-Xylene	U		µg/L	2.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
61. o-Xylene	U		µg/L	1.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC
‡ 62. Xylenes	U		µg/L	3.0	1.0	07/13/22	VM22G13A	07/13/22 12:54	VM22G13A	BRC

Definitions/ Qualifiers:

A: Spike recovery or precision unusable due to dilution.
B: The analyte was detected in the associated method blank.
E: The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J: The concentration is an estimated value.
M: Modified Method
U: The analyte was not detected at or above the reporting limit.
X: Matrix Interference has resulted in a raised reporting limit or distorted result.
W: Results reported on a wet-weight basis.
***:** Value reported is outside QC limits

Exception Summary:

L- : Recovery in the associated laboratory sample (LCS) exceeds the lower control limit. Results may be biased low.

Analysis Locations:

All analyses performed in Holt.

Accreditation Number(s):

T104704518-19-8 (TX)

VM22G12B: Method Blank (MB)

EPA 8260D

Run Time: VM22G12B.MB 07/12/2022 11:43 [VM22G12B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
Bromomethane	U		5.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50

VM22G12B: Method Blank (MB)

EPA 8260D

Run Time: VM22G12B.MB 07/12/2022 11:43 [VM22G12B]

Analyte	MB Result µg/L	MB Qualifier	MB RDL µg/L
trans-1,3-Dichloropropene	U		0.50
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	*89*		*80-120*
Dibromofluoromethane(S)	*89*		*80-120*
1,2-Dichloroethane-d4(S)	*114*		*80-120*
Toluene-d8(S)	*94*		*80-120*

VM22G12B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VM22G12B.LCS: 07/12/2022 10:19 [VM22G12B] VM22G12B.LCSD: 07/12/2022 10:47 [VM22G12B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Acetone	50.0	25.8	52	54-140	*	50.0	25.8	52	*	0	20	
Acrylonitrile	50.0	46.4	93	70-130		50.0	47.2	94		1	20	
Benzene	50.0	46.3	93	80-120		50.0	45.3	91		2	20	
Bromobenzene	50.0	48.1	96	75-125		50.0	47.6	95		1	20	
Bromochloromethane	50.0	47.6	95	70-130		50.0	46.5	93		2	20	
Bromodichloromethane	50.0	43.2	86	75-120		50.0	42.9	86		0	20	
Bromoform	50.0	48.2	96	70-130		50.0	48.8	98		2	20	
Bromomethane	50.0	54.0	108	68-135		50.0	51.6	103		5	20	
2-Butanone	50.0	36.4	73	70-148		50.0	38.3	77		5	20	
n-Butylbenzene	50.0	53.1	106	70-133		50.0	50.4	101		5	20	
sec-Butylbenzene	50.0	52.2	104	70-125		50.0	49.7	99		5	20	
tert-Butylbenzene	50.0	52.0	104	70-130		50.0	50.1	100		4	20	
Carbon Disulfide	50.0	43.5	87	70-130		50.0	36.6	73		18	20	
Carbon Tetrachloride	50.0	41.8	84	70-130		50.0	40.8	82		2	20	
Chlorobenzene	50.0	50.1	100	80-120		50.0	48.9	98		2	20	
Chloroethane	50.0	57.8	116	61-130		50.0	55.9	112		4	20	
Chloroform	50.0	47.0	94	80-120		50.0	45.9	92		2	20	
Chloromethane	50.0	50.3	101	67-125		50.0	47.5	95		6	20	
2-Chlorotoluene	50.0	48.4	97	75-125		50.0	47.6	95		2	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	47.5	95	70-130		50.0	48.4	97		2	20	
Dibromochloromethane	50.0	43.2	86	70-130		50.0	44.7	89		3	20	
Dibromomethane	50.0	42.8	86	75-125		50.0	42.7	85		1	20	
1,2-Dichlorobenzene	50.0	50.5	101	70-120		50.0	49.8	100		1	20	
1,3-Dichlorobenzene	50.0	50.8	102	75-125		50.0	49.1	98		4	20	
1,4-Dichlorobenzene	50.0	51.0	102	75-125		50.0	49.8	100		2	20	
Dichlorodifluoromethane	50.0	49.2	98	70-136		50.0	45.9	92		6	20	
1,1-Dichloroethane	50.0	47.9	96	70-130		50.0	46.0	92		4	20	
1,2-Dichloroethane	50.0	49.8	100	70-130		50.0	48.9	98		2	20	
1,1-Dichloroethene	50.0	50.3	101	78-120		50.0	43.1	86		16	20	
cis-1,2-Dichloroethene	50.0	48.8	98	70-125		50.0	48.0	96		2	20	
trans-1,2-Dichloroethene	50.0	51.1	102	70-130		50.0	49.4	99		3	20	
1,2-Dichloropropane	50.0	47.4	95	80-121		50.0	46.5	93		2	20	
cis-1,3-Dichloropropene	50.0	41.1	82	70-130		50.0	40.8	82		0	20	

VM22G12B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260D

Run Time: VM22G12B.LCS: 07/12/2022 10:19 [VM22G12B] VM22G12B.LCSD: 07/12/2022 10:47 [VM22G12B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
trans-1,3-Dichloropropene	50.0	44.4	89	70-132		50.0	44.8	90		1	20	
Ethylbenzene	50.0	51.5	103	80-120		50.0	49.2	98		5	20	
Ethylene Dibromide	50.0	44.2	88	80-120		50.0	45.7	91		3	20	
2-Hexanone	50.0	47.8	96	70-130		50.0	48.2	96		0	20	
Isopropylbenzene	50.0	50.9	102	75-125		50.0	48.5	97		5	20	
4-Methyl-2-pentanone	50.0	53.0	106	70-130		50.0	52.3	105		1	20	
Methylene Chloride	50.0	47.2	94	70-130		50.0	45.2	90		4	20	
2-Methylnaphthalene	50.0	45.9	92	70-130		50.0	46.8	94		2	20	
MTBE	50.0	47.3	95	70-125		50.0	49.8	100		5	20	
Naphthalene	50.0	43.3	87	70-130		50.0	43.3	87		0	20	
n-Propylbenzene	50.0	50.9	102	70-130		50.0	49.0	98		4	20	
Styrene	50.0	43.1	86	70-130		50.0	41.9	84		2	20	
1,1,1,2-Tetrachloroethane	50.0	46.9	94	80-130		50.0	47.2	94		0	20	
1,1,2,2-Tetrachloroethane	50.0	49.6	99	70-130		50.0	50.2	100		1	20	
Tetrachloroethene	50.0	49.8	100	70-130		50.0	49.0	98		2	20	
Toluene	50.0	48.5	97	80-120		50.0	45.3	91		6	20	
1,2,4-Trichlorobenzene	50.0	48.3	97	70-130		50.0	47.0	94		3	20	
1,1,1-Trichloroethane	50.0	43.3	87	70-130		50.0	42.4	85		2	20	
1,1,2-Trichloroethane	50.0	46.2	92	75-125		50.0	48.5	97		5	20	
Trichloroethene	50.0	43.7	87	71-125		50.0	42.4	85		2	20	
Trichlorofluoromethane	50.0	55.3	111	70-133		50.0	54.0	108		3	20	
1,2,3-Trichloropropane	50.0	51.2	102	75-125		50.0	52.1	104		2	20	
1,2,3-Trimethylbenzene	50.0	50.4	101	70-130		50.0	48.8	98		3	20	
1,2,4-Trimethylbenzene	50.0	51.9	104	75-130		50.0	50.2	100		4	20	
1,3,5-Trimethylbenzene	50.0	51.7	103	75-130		50.0	50.1	100		3	20	
Vinyl Chloride	50.0	48.9	98	74-125		50.0	45.2	90		9	20	
m&p-Xylene	100	99.8	100	75-130		100	95.1	95		5	20	
o-Xylene	50.0	49.3	99	80-120		50.0	47.3	95		4	20	
4-Bromofluorobenzene(S)			*98*	*80-120*				*97*				
Dibromofluoromethane(S)			*93*	*80-120*				*93*				
1,2-Dichloroethane-d4(S)			*111*	*80-120*				*110*				
Toluene-d8(S)			*99*	*80-120*				*95*				

VM22G13A: Method Blank (MB)

EPA 8260D

Run Time: VM22G13A.MB 07/13/2022 11:01 [VM22G13A]

Analyte	MB Result µg/L	MB Qualifier	MB RDL µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
Bromomethane	U		5.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50

VM22G13A: Method Blank (MB)

EPA 8260D

Run Time: VM22G13A.MB 07/13/2022 11:01 [VM22G13A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
trans-1,3-Dichloropropene	U		0.50
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	*91*		*80-120*
Dibromofluoromethane(S)	*91*		*80-120*
1,2-Dichloroethane-d4(S)	*113*		*80-120*
Toluene-d8(S)	*94*		*80-120*

VM22G13A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260D

Run Time: VM22G13A.LCS: 07/13/2022 09:37 [VM22G13A] VM22G13A.LCSD: 07/13/2022 10:05 [VM22G13A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Acetone	50.0	25.8	52	54-140	*	50.0	25.6	51	*	2	20	
Acrylonitrile	50.0	48.0	96	70-130		50.0	48.5	97		1	20	
Benzene	50.0	46.4	93	80-120		50.0	47.6	95		2	20	
Bromobenzene	50.0	49.5	99	75-125		50.0	48.6	97		2	20	
Bromochloromethane	50.0	48.8	98	70-130		50.0	48.9	98		0	20	
Bromodichloromethane	50.0	45.0	90	75-120		50.0	45.6	91		1	20	
Bromoform	50.0	50.1	100	70-130		50.0	51.4	103		3	20	
Bromomethane	50.0	53.1	106	68-135		50.0	55.7	111		5	20	
2-Butanone	50.0	37.5	75	70-148		50.0	38.4	77		3	20	
n-Butylbenzene	50.0	55.0	110	70-133		50.0	55.1	110		0	20	
sec-Butylbenzene	50.0	53.5	107	70-125		50.0	53.6	107		0	20	
tert-Butylbenzene	50.0	52.8	106	70-130		50.0	53.1	106		0	20	
Carbon Disulfide	50.0	44.6	89	70-130		50.0	45.2	90		1	20	
Carbon Tetrachloride	50.0	45.1	90	70-130		50.0	45.9	92		2	20	
Chlorobenzene	50.0	50.8	102	80-120		50.0	51.5	103		1	20	
Chloroethane	50.0	58.5	117	61-130		50.0	59.2	118		1	20	
Chloroform	50.0	47.6	95	80-120		50.0	48.2	96		1	20	
Chloromethane	50.0	49.2	98	67-125		50.0	52.3	105		7	20	
2-Chlorotoluene	50.0	49.5	99	75-125		50.0	49.5	99		0	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	49.5	99	70-130		50.0	49.7	99		0	20	
Dibromochloromethane	50.0	45.4	91	70-130		50.0	46.5	93		2	20	
Dibromomethane	50.0	45.8	92	75-125		50.0	45.7	91		1	20	
1,2-Dichlorobenzene	50.0	51.2	102	70-120		50.0	51.1	102		0	20	
1,3-Dichlorobenzene	50.0	51.7	103	75-125		50.0	51.7	103		0	20	
1,4-Dichlorobenzene	50.0	51.8	104	75-125		50.0	51.5	103		1	20	
Dichlorodifluoromethane	50.0	53.2	106	70-136		50.0	55.4	111		5	20	
1,1-Dichloroethane	50.0	48.0	96	70-130		50.0	48.6	97		1	20	
1,2-Dichloroethane	50.0	50.0	100	70-130		50.0	49.9	100		0	20	
1,1-Dichloroethene	50.0	50.9	102	78-120		50.0	51.9	104		2	20	
cis-1,2-Dichloroethene	50.0	49.0	98	70-125		50.0	50.1	100		2	20	
trans-1,2-Dichloroethene	50.0	51.8	104	70-130		50.0	52.6	105		1	20	
1,2-Dichloropropane	50.0	47.8	96	80-121		50.0	48.7	97		1	20	
cis-1,3-Dichloropropene	50.0	42.7	85	70-130		50.0	43.6	87		2	20	

VM22G13A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260D

Run Time: VM22G13A.LCS: 07/13/2022 09:37 [VM22G13A] VM22G13A.LCSD: 07/13/2022 10:05 [VM22G13A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
trans-1,3-Dichloropropene	50.0	47.0	94	70-132		50.0	47.9	96		2	20	
Ethylbenzene	50.0	51.7	103	80-120		50.0	52.7	105		2	20	
Ethylene Dibromide	50.0	47.3	95	80-120		50.0	48.2	96		1	20	
2-Hexanone	50.0	48.4	97	70-130		50.0	49.4	99		2	20	
Isopropylbenzene	50.0	51.8	104	75-125		50.0	53.1	106		2	20	
4-Methyl-2-pentanone	50.0	53.6	107	70-130		50.0	53.9	108		1	20	
Methylene Chloride	50.0	46.6	93	70-130		50.0	47.3	95		2	20	
2-Methylnaphthalene	50.0	48.0	96	70-130		50.0	46.6	93		3	20	
MTBE	50.0	48.4	97	70-125		50.0	49.9	100		3	20	
Naphthalene	50.0	46.0	92	70-130		50.0	44.3	89		3	20	
n-Propylbenzene	50.0	52.2	104	70-130		50.0	52.2	104		0	20	
Styrene	50.0	44.1	88	70-130		50.0	44.5	89		1	20	
1,1,1,2-Tetrachloroethane	50.0	49.0	98	80-130		50.0	51.0	102		4	20	
1,1,2,2-Tetrachloroethane	50.0	52.6	105	70-130		50.0	52.8	106		1	20	
Tetrachloroethene	50.0	52.4	105	70-130		50.0	53.0	106		1	20	
Toluene	50.0	48.3	97	80-120		50.0	48.6	97		0	20	
1,2,4-Trichlorobenzene	50.0	50.8	102	70-130		50.0	49.4	99		3	20	
1,1,1-Trichloroethane	50.0	44.7	89	70-130		50.0	46.4	93		4	20	
1,1,2-Trichloroethane	50.0	48.4	97	75-125		50.0	49.6	99		2	20	
Trichloroethene	50.0	44.3	89	71-125		50.0	45.9	92		3	20	
Trichlorofluoromethane	50.0	59.1	118	70-133		50.0	60.0	120		2	20	
1,2,3-Trichloropropane	50.0	54.0	108	75-125		50.0	52.0	104		4	20	
1,2,3-Trimethylbenzene	50.0	51.2	102	70-130		50.0	50.8	102		0	20	
1,2,4-Trimethylbenzene	50.0	52.9	106	75-130		50.0	52.6	105		1	20	
1,3,5-Trimethylbenzene	50.0	52.7	105	75-130		50.0	52.9	106		1	20	
Vinyl Chloride	50.0	49.1	98	74-125		50.0	51.6	103		5	20	
m&p-Xylene	100	100	100	75-130		100	102	102		2	20	
o-Xylene	50.0	49.8	100	80-120		50.0	50.5	101		1	20	
4-Bromofluorobenzene(S)			*98*	*80-120*				*99*				
Dibromofluoromethane(S)			*94*	*80-120*				*94*				
1,2-Dichloroethane-d4(S)			*107*	*80-120*				*108*				
Toluene-d8(S)			*98*	*80-120*				*97*				

Definitions/ Qualifiers:

U: The analyte was not detected at or above the Reporting Limit (RL).
***:** Value reported is outside QC limits

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Bailey Welch

By Bailey Welch at 3:12 PM, Jul 14, 2022

Fibertec environmental services

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1914 Holloway Drive
Holt, MI 48842
Phone: 517 699 0345
Fax: 517 699 0388
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8660 S. Mackinaw Trail
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11766 E. Grand River Rd.
Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Revised

Chain of Custody # 205973
PAGE 1 of 1

Client Name: Arcadis
Contact Person: Stacey Hannula
Project Name/ Number: 30136112 TRW Milford
Email distribution list: stacey.hannula@arcadis.com
john.mcinnis@arcadis.com
Quote#
Purchase Order# 30136112

Date	Time	Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	VOC 8260R	HOLD SAMPLE	Remarks:
7.11.22	0943		OW-16D2-071122	GW	3	3		48hr TAT
			~~OW-D~~					
7.11.22	1042		OW-16D2R1_071122	GW	3	3		48hr TAT
7.11.22	1010		FIELD BLANK_071122	GW	3	3		std TAT
~~7-11-22~~			~~Trip Blank~~			1		~~std~~ TAT

PARAMETERS

Matrix Code: S Soil; A Air; O Oil; P Wipe; GW Ground Water; SW Surface Water; WW Waste Water; X Other: Specify

Deliverables: X Level 2; Level 3; Level 4; EDD

Received By Lab
JUL 11 2022
Initials: BP

Comments:
~~Client~~ confirmed via email 7/11/22 -RL

Sampled/Relinquished By: Stacey Hannula	Date/ Time 7.11.22 1225	Received By: Kriss Scott
Relinquished By: Kriss Scott	Date/ Time	Received By:
Relinquished By:	Date/ Time 7/11/22 14:45	Received By Laboratory: Brandi Powers 7/11/22 12:40

Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY

_____1 bus. day 2 2 bus. days _____3 bus. days _____4 bus. days

1 5-7 bus. days (standard) Other (specify time/date requirement): _____

LAB USE ONLY
Fibertec project number: A09642
Temperature upon receipt at Lab: 5.1 °C

Please see back for terms and conditions

Fibertec environmental services

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Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody # 205973
PAGE 1 of 1

Client Name: Arcadis
Contact Person: Stacey Hannula
Project Name/ Number: 30136112 TRW Milford
Email distribution list: stacey.hannula@arcadis.com
john.mcinnis@arcadis.com
Quote#
Purchase Order# 30136112

Date	Time	Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PARAMETERS: VOC 8260B	HOLD SAMPLE	Remarks
7.11.22	0943		OW-16D2-071122	GW	3	3		48hr TAT
			~~OW-D~~					
7.11.22	1042		OW-16D2R1_071122	GW	3	3		48hr TAT
7.11.22	1010		FIELD BLANK_071122	GW	3	3		std TAT

Matrix Code: S Soil; A Air; O Oil; P Wipe; GW Ground Water; SW Surface Water; WW Waste Water; X Other: Specify

Deliverables: X Level 2; Level 3; Level 4; EDD

Received By Lab
JUL 11 2022
Initials: BP

Comments:

Sampled/Relinquished By: Stacey Hannula	Date/ Time 7.11.22 1225	Received By:
Relinquished By:	Date/ Time	Received By:
Relinquished By:	Date/ Time 7/11/22 14:45	Received By Laboratory: 7/11/22 12:40

Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY

_____1 bus. day 2 2 bus. days _____3 bus. days _____4 bus. days
1 5-7 bus. days (standard) Other (specify time/date requirement): _____

LAB USE ONLY
Fibertec project number: A09642
Temperature upon receipt at Lab: 5.1 °C

Please see back for terms and conditions

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