MAUL FOSTER ALONGI
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April 9, 2025
Project No. M0968.07.002

John Snowden
Tapani, Inc.
1705 SE 9th Ave
Battle Ground, WA 98604

Re: PDX Fuel Facility Improvements – Dewatering Sampling Plan
4300 NE Marine Drive, Portland, OR 97218
Tapani Job# 253003

Dear John Snowden:

This dewatering sampling plan (the "Plan") was prepared for the PDX Fuel Storage Facility Improvements Project (Project) at the Portland International Airport (PDX) in Portland, Oregon. The Project location is shown on the drawing in Attachment A. The Project includes demolition of three existing jet fuel storage tanks, construction of three new jet fuel storage tanks, and various other facility upgrades.

Construction dewatering will be required near the depth of the shallow water table. Groundwater removed by dewatering will be filtered using activated carbon and other specialty media suitable for per- and polyfluoroalkyl substances (PFAS) and other Contaminants of Potential Concern (COPCs).

Project Organization

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) will serve as General Contractor (as well as Engineer) on this Project and will manage the construction activities.

Tapani, Inc. (Tapani) will serve as the construction contractor. Tapani subcontracted the following operations to Clear Creek Systems, Inc (Clear Creek):

- Turbidity control operation
- Water treatment system operation

Tapani will be responsible for implementing the Plan. Clear Creek will provide equipment for turbidity controls (e.g., weir tanks) and water treatment. The Clear Creek treatment system is shown on the drawing in Attachment B. Daily observations and required operations and maintenance associated with the treatment equipment will be provided by Tapani and Clear Creek. Details related to system operation will be presented in a site-specific Operations Plan.

Sampling Precautions

Tapani or their representative must take specific precautions to minimize the potential for cross-contamination, including the following:

- Use Appropriate Sampling Materials: Utilize stainless steel, silicone, and high-density polyethylene (HDPE) in sampling equipment, field supplies, and bottle selection. Avoid materials that may contain PFAS, such as low-density polyethylene (LDPE) tubing.
- Decontamination Procedures: Ensure thorough decontamination of reusable sampling equipment before and after use. This includes using PFAS-free cleaning agents and avoiding materials that may introduce PFAS during the cleaning process.
- Personal Protective Equipment (PPE): Wear powderless nitrile gloves and well-laundered clothing without fabric softener. Avoid new, unwashed clothing or clothing treated for water, stain, dirt, insect, or ultraviolet protection.
- Avoid PFAS-Containing Products: Review the ingredients lists for sunscreens, cosmetics, shampoo, insect repellents, and other personal care products to ensure they do not contain PFAS. Do not apply these products near the sample collection area.
- Avoid Cross-Contamination from Field Clothing and Equipment: Items such as field clothing, personal protective equipment, sun and biological protection products, personal hygiene products, and food packaging can be potential sources of PFAS cross-contamination.

This is not meant to be an exhaustive list. Other good sampling resources include:

1. General PFAS Sampling Guidance developed by the Michigan Department of Environmental Quality (MDEQ, 2018), along with media-specific PFAS sampling guidance located on their website: https://www.michigan.gov/pfasresponse/investigations/sampling-guidance
2. PFAS sampling guidance developed by the State of California Water Boards (CWB) for drinking water and non-drinking water sources. https://www.waterboards.ca.gov/pfas/docs/sept_2020_pfas_sampling_guidelines.pdf

Sampling Protocols

Sample Handling and Storage

The analytical laboratory will provide clean sample containers ready for sample collection, including preservative, if required. A laboratory-supplied label will be affixed to each sample container and marked with identifying information. Sample containers will be stored in a cooled ice chest until being transported to refrigerated storage or to the analytical laboratory. Chain of custody will be maintained and documented at all times.

Decontamination

Decontamination of non-disposable field equipment (e.g., sampling tube, spoons, etc.) will be performed to prevent cross-contamination between sampling locations.

Analyses for Chemicals of Concern

Samples will be submitted to an Oregon-accredited analytical laboratory for the following.

- Gasoline-range total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Gx
- Diesel- and heavy-oil-range TPH by NWTPH-Dx (with silica gel cleanup)
- Benzene, toluene, ethylbenzene, total xylenes, and naphthalene (BTEX-N) by U.S. Environmental Protection Agency (EPA) Method 8260
- PFAS by EPA Method 1633

Sampling Approach

Samples will be collected to assess influent concentrations, performance of the treatment media, and effluent concentrations. Details regarding the sampling approach are presented on the flow chart in Attachment C (Burns & McDonnell 2025) and discussed below.

Influent Sampling

Sampling from the system influent will be conducted to estimate treatment media consumption rates. The system may be operated by batch or continuous discharge depending on flow rates. Influent sampling will be conducted at the time of effluent sampling.

Performance Sampling

Sampling between the lead and lag 6K media vessels (shown on the Clear Creek drawing in Attachment B) will be completed on a weekly basis to assess carbon consumption and the potential for breakthrough. Samples will be submitted to the analytical laboratory on a rush turnaround time (e.g., 24 to 48 hours for TPH and BTEX-N and 5 to 15 business days for PFAS). If breakthrough occurs from the array of the lead vessels, the array of lag vessels will be moved into the lead position and the media in the vessels that experienced breakthrough will be replaced. For TPH, BTEX-N, and PFAS breakthrough is considered to have occurred when concentrations are reported above the method reporting limit (MRL).

Effluent Sampling

A system effluent sample will be collected after treatment of the first batch of water in order to verify compliance with the discharge criteria. The samples will be submitted to the analytical laboratory on a rush turnaround time (e.g., 24 to 48 hours for TPH and BTEX-N and 5 to 15 business days for PFAS).

Sampling from the system effluent will be completed on a weekly basis to verify compliance with the discharge criteria. Samples will be submitted to the analytical laboratory on a rush turnaround time (e.g., 24 to 48 hours for TPH and BTEX-N and 5 to 15 business days for PFAS).

Discharge Criteria

Discharges will be monitored and recorded by Tapani and Clear Creek on discharge forms. These forms will include start and end times of discharge events, flow rates, volumes discharged, and other observations.

For TPH and BTEX-N, the discharge criteria are the Oregon Department of Environmental Quality (DEQ) groundwater in excavation Risk-Based Concentrations (RBCs) for construction and excavation workers listed below.

Analyte	RBC (micrograms per liter [ug/L])
Gasoline TPH	14,000
Diesel TPH	>Saturation
Heavy Oil TPH	>Saturation
Benzene	1,800
Toluene	220,000
Ethylbenzene	4,500
Total Xylenes	23,000
Naphthalene	500

For PFAS, the discharge criteria are the EPA Maximum Contaminant Levels (MCLs) listed below.

Analyte	MCL (nanograms per liter [ng/L])
Perfluorooctanoic acid (PFOA)	4
Perfluorooctanesulfonic acid (PFOS)	4
Perfluorohexane sulfonic acid (PFHxS)	10
Perfluorononanoic acid (PFNA)	10
Hexafluoropropylene oxide dimer acid (HFPO-DA, GenX chemicals)	10
Mixture of PFHxS, PFNA, HFPO-DA, and perfluorobutane sulfonic acid (PFBS)	Hazard Index of 1

Note: A Hazard Index of 1 is used for mixtures of PFHxS, PFNA, HFPO-DA, and PFBS. This is calculated by summing the ratios of each compound's concentration to its health-based water concentration value.

Burns & McDonnell indicated on the flow chart in Appendix C that compliance with the discharge criteria will be determined based on monthly running average effluent concentrations.

Sincerely,

Maul Foster & Alongi, Inc.

Michael Pickering, RG
Principal Geologist

Michael Whitson, RG
Project Geologist

Attachments

Reference

Limitations

A—Project Map

B—Clear Creek Treatment System Drawing

C—PFAS Dewatering of Groundwater Treatment Flow Chart

Reference

Burns & McDonnell. 2025. *Contaminated Media Management Plan, PDX Fuel Facility Improvements Phase II.* Prepared for PDX Fuel Company, LLC. Burns & McDonnell Engineering Company, Inc. February 25.

Limitations

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Attachment A

Project Map

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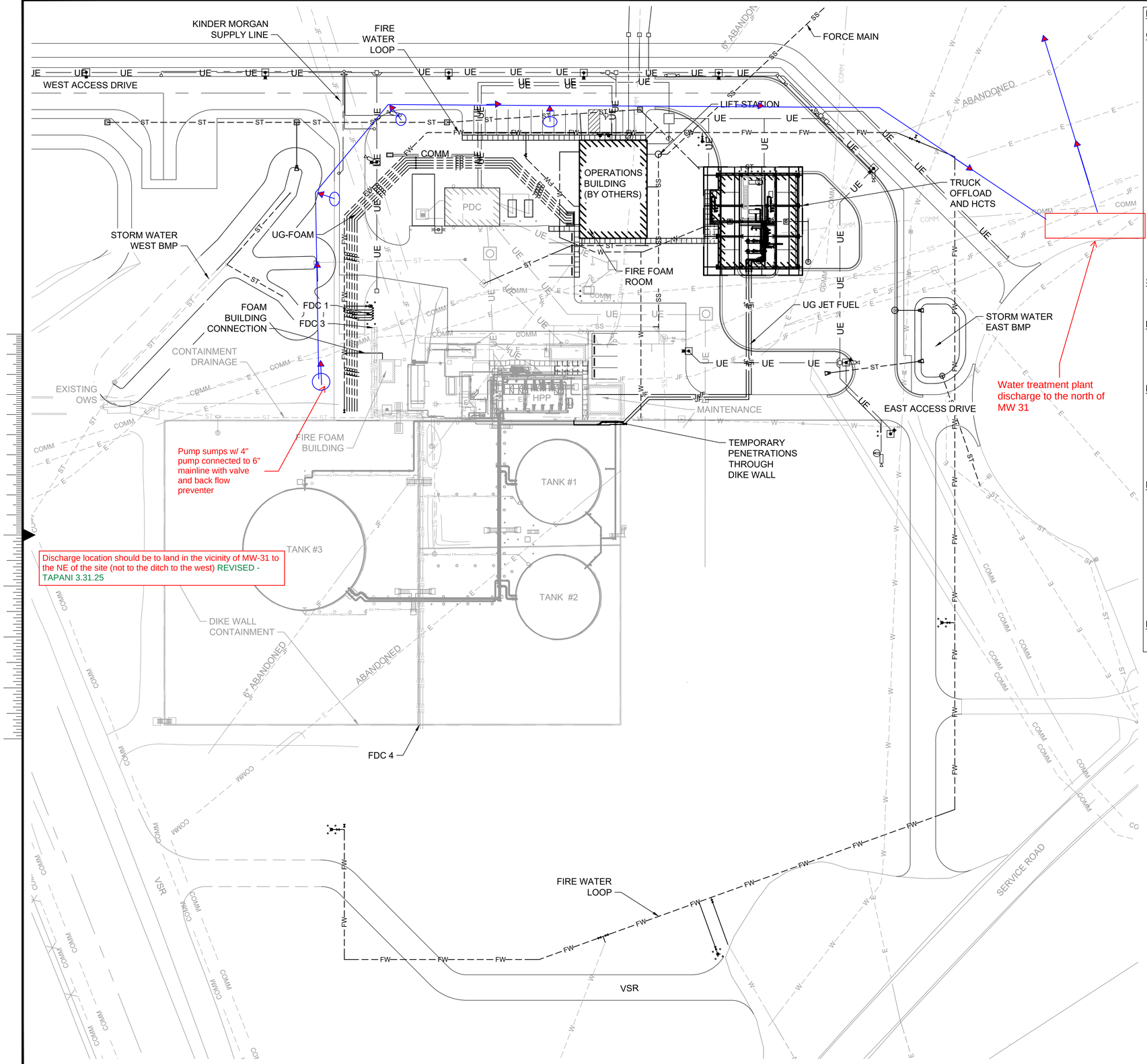

ITEMS TO BE INSTALLED AND COMPLETE BY END OF PHASE:

CIVIL:
1. NECESSARY SITE GRADING
2. EAST AND WEST STORM WATER BMP'S
3. STORM SEWER AND ASSOCIATED BMP'S
4. UNDERGROUND FIRE FOAM PIPING AND FDC'S
5. OPERATIONS BUILDING CONNECTIONS
   - 5.1. WATER
   - 5.2. FIRE WATER
   - 5.3. STORM
   - 5.4. SANITARY
6. HCTS BUILDING CONNECTIONS
   - 6.1. WATER
   - 6.2. STORM
   - 6.3. CONTAINMENT DRAINAGE
5. UNDERGROUND JET FUEL LINES
6. LIFT STATION AND ASSOCIATED FORCE MAIN
6. EXISTING LIFT STATION AND FORCE MAIN REMOVED
7. FIRE WATER LOOP (PARTIAL)
8. CONNECT EXISTING FOAM BUILDING TO NEW FW LOOP
9. SITE DRIVES AND PARKING NECESSARY FOR OPERATIONS (COORDINATE WITH SITE OPERATOR)
10. ROUGH GRADE AND ROCK ACCESS ROADS

STRUCTURAL:
1. TRUCK OFFLOAD AND HCTS PILES, FOUNDATION AND CONTAINMENT

FIRE:
1. FIRE FOAM BUILDING AND SYSTEM TO REMAIN OPERATIONAL
2. REMOVE / RELOCATE FDC 4 TO DIKE WALL AND FDC 3 TO NEW LOCATION

MECHANICAL:
1. EQUIPMENT AND PIPING FOR HYDRANT CART TEST STAND, RECLAIM TANK, AND TWO TRUCK OFFLOAD POSITIONS
2. UNDERGROUND JET FUEL LINES AND CATHODIC PROTECTION
3. TIE UNDERGROUND JET FUEL LINES INTO EXISTING INFRASTRUCTURE

ELECTRICAL:
1. NECESSARY UNDERGROUND DUCT BANKS TO SUPPORT SITE NORTH OF EAST ACCESS DRIVE AND STUBBED SOUTH OF DRIVE
2. LIGHTING NORTH OF EAST ACCESS DRIVE (FOAM BUILDING LIGHT POLE STUBBED)
3. SECURITY NORTH OF EAST ACCESS DRIVE
4. SITE COMMUNICATIONS NORTH OF EAST ACCESS DRIVE
5. EXISTING OPERATIONS BUILDING HARDWARE REMOVAL AND RELOCATION TO OPERATIONS BUILDING

DONE BY OTHERS:
1. OPERATIONS BUILDING
2. TRUCK OFFLOAD AND HCTS CANOPY

SITE OPERATION PHASING PLAN - 1

0 20' 40' 80'
SCALE IN FEET

NORTH

no.	date	by	ckd	description
0	01/10/25	MRG	SEW	ISSUED FOR CONSTRUCTION

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.

date	detailed
08/23/23	C. SOUBA
designed	checked
M. GREUFE	S. WAGNER

PDX FUEL COMPANY L.L.C

PORTLAND INTERNATIONAL AIRPORT
5000 NE MARINE DR.
PORTLAND, OREGON 97218

PDX FACILITY IMPROVEMENTS

SITE OPERATION PHASING PLAN - 1

project	contract
153929	

drawing **G-106** rev. **0**

file PHASING PLAN.DWG

REGISTERED PROFESSIONAL ENGINEER 97632PE OREGON SEPTEMBER 14, 2021 STACY E. WAGNER 01/10/2025

EXPIRES: 06/30/2026

Scale For Microfilming: Millimeters / Inches

\\BMCD\DFS\CLIENTS\ANF\PORTLANDPORT\PDX\153929_FACILITYIMPRV\DESIGN\CIVIL\SHEETS\PHASING PLAN.DWG

Attachment B

Clear Creek Treatment System Drawing

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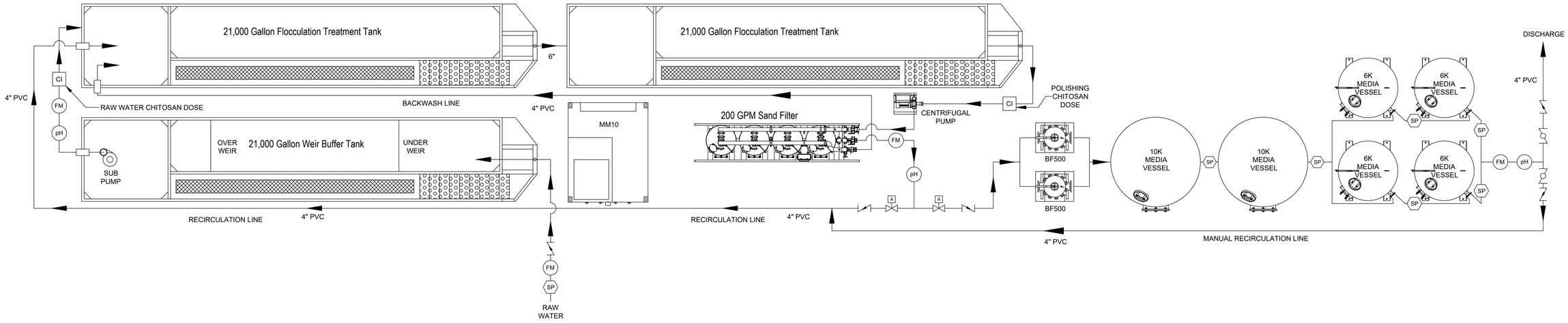

LEGEND

FM	FLOW SENSOR/METER
A	AUTO VALVE
	MANUAL VALVE
SP	SAMPLE PORT
pH	PH METER / SAMPLE
CI	CHEMICAL INJECTION
	CHECK VALVE

EQUIPMENT ELECTRICAL SPECIFICATIONS

MM10	(1) - CONEX TWO LEGS OF 480V 20AMPS
SUB PUMP	(1) - 5HP 3 PHASE 480V 8AMP
CENTRIFUGAL PUMP	(1) - 15HP 3 PHASE 480V 20AMP

CLEAR CREEK SYSTEMS, INC.

TITLE: PDX FACILITY IMPROVEMENTS

JOB #: 240629 | DATE: 2/18/25 | DRAWN BY: SPC | REV: 1.1

NOTES:

1. System Flow Rate 200 GPM
2.
3.

Attachment C

PFAS Dewatering of Groundwater Treatment Flow Chart

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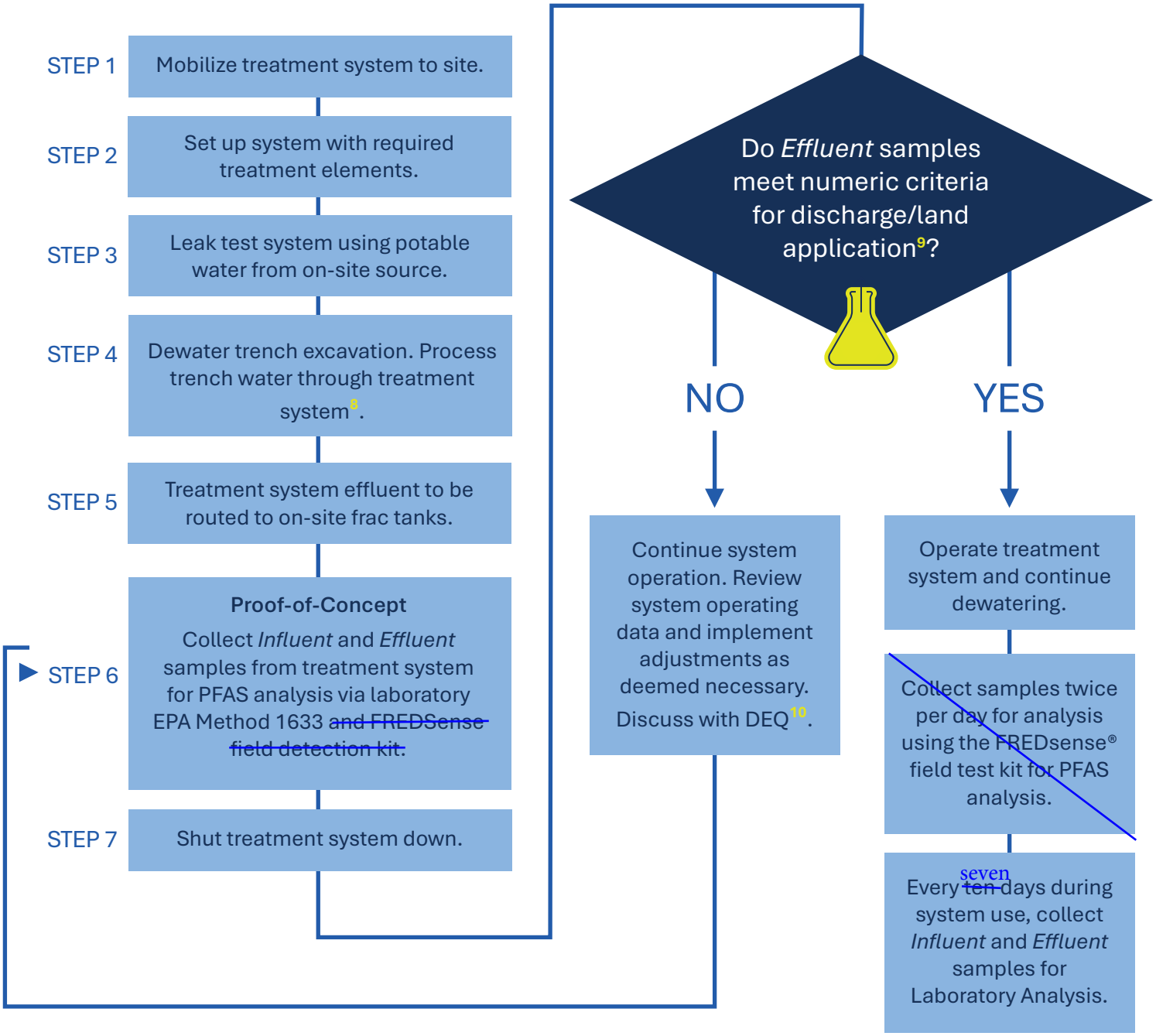
PFAS Dewatering of Groundwater Treatment Flow Chart



8: Any free product (i.e., LNAPL) encountered during dewatering will be containerized on site pending further characterization and disposal.

9: For TPH, the discharge/land application criteria are the DEQ groundwater in excavation RBCs. For PFAS, the discharge/land application critera are the USEPA drinking water MCLs. Compliance with discharge/land application criteria is determined based on monthly running average effluent concentrations.

10: Operational adjustments may include bag filter changeouts, media backwashing, rearranging lead and lag treatment vessels, replacement of media, and/or addition of treatment processes. Treated groundwater discharge occurs to land surface in the vicinity of MW-31, above an area of known PFAS contamination with concentrations ranging from 300 to 3,000 parts per trillion. Due to existing impacts to groundwater, the dewatering treatment system may continue to operate during interim periods of exceedances while system modifications are implemented.

BURNS McDONNELL