

Chevron Environmental Management Company

APPENDIX A: TREATMENT SYSTEM OPERATING PLAN

Chevron Service No. 9-5439
3876 Bridge Way North
Seattle, Washington

September 29, 2023

A large, solid orange geometric shape, resembling a stylized triangle or a section of a larger triangle, is positioned in the bottom right corner of the page. It is composed of two overlapping triangles, creating a complex, angular form that extends from the bottom edge towards the top right corner.

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ATTACHMENTS

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Attachement 2	Fliteway O&M Manual
Attachement 3	CEMC DPE Standard Operating Procedures

ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis U.S., Inc.
AWS	air-water separator
bgs	below ground surface
CATOx	catalytic oxidizer
Chevron	Chevron Environmental Management Company
DPE	dual-phase extraction
Ecology	Washington State Department of Ecology
FFS	fit for service
GAC	granular activated carbon
gpm	gallon per minute
gpd	gallon per day
HASP	Health and Safety Plan
HOA	hand-off-auto
hp	horsepower
hz	hertz
inH ₂ O	inch(es) of water
inHg	inch(es) of mercury
LOTO	lockout/tagout
MOC	Management of Change
NPDES	National Pollutant Discharge Elimination System
OMM	operations, maintenance, and monitoring
OMM Manual	Dual-Phase Extraction System Operations, Maintenance, and Monitoring Manual
P&ID	process and instrumentation diagram
PLC	programmable logic controller
PM	project manager
PPE	personal protective equipment
PSCAA	Puget Sound Clean Air Agency
psi	pounds per square inch
scfm	standard cubic feet per minute

SOP	standard operating procedure
SVE	soil vapor extraction
TSOP	treatment system operating plan
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VFD	variable frequency drive
°F	degrees Fahrenheit
µg/L	micrograms per liter

1 INTRODUCTION

On behalf of Chevron Environmental Management Company (Chevron), Arcadis U.S., Inc. (Arcadis) prepared this treatment system operating plan (TSOP) for the former Chevron Service Station No. 9-5439, located at 3876 Bridge Way North Seattle, Washington 98103. A site location map is provided on Figure A-1 and a site aerial vicinity map is provided on Figure A-2.

Consistent with requirements of the National Pollutant Discharge Elimination System (NPDES) Permit No. WA0991041 (Permit) issued to Chevron for discharges from the onsite dual-phase extraction (DPE) system), this appendix of the DPE System Operations, Maintenance, and Monitoring Manual (OMM Manual) includes a treatment system operating plan (TSOP). Per WAC 173-240-140 requirements, the TSOP provides a concise summary of specifically defined elements of the OMM Manual and includes the following:

- Operating procedures at baseline operating conditions used to meet effluent limits of the S1 of the Permit at the production levels used in developing these limits including:
 - Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the permit.
 - Directions for staff when cleaning or maintaining equipment which are necessary to protect operation of the wastewater system.
 - Emergency procedures for plant shutdown and cleanup in event of upset or failure.
 - Description of regularly scheduled maintenance or repair activities at the facility which would affect volume or characteristics of the wastes discharged.
- Operating procedures and conditions needed to maintain design treatment efficiency including monitoring and reporting in the event of production rates, which are below the baseline levels.
- Operating procedures and conditions employed to mitigate upsets as well as monitoring and reporting in the event of an upset.

1.1 Background

The Site consists of a multi-tenant office building and associated parking. The DPE treatment system and treated groundwater discharge to Outfall 001 are located within the parking lot and lower level of the office building and are depicted on Figure A-3. Figure A-4 depicts the location of the DPE system and extraction wells, and schematic of the DPE treatment system. Attachment 1 includes DPE system design drawings.

The facility submitted the conceptual plan and the plans and specifications for the selected pre-engineered Dual-Phase Extraction (DPE) treatment system to Ecology for review. Ecology reviewed and accepted the conceptual plan for the treatment system. The system controls, process piping, and treatment equipment within the shipping containers was constructed, tested, and shipped to the Site by Fliteway Technologies, Inc. (Fliteway) as a turnkey system. The operation and maintenance manual provided by Fliteway for the system is included as Attachment 2 to this Appendix. Installation of external

power, process piping, and extraction wells was conducted by various subcontractors in conjunction with system fabrication and installation.

The remediation system will operate groundwater extraction pumps in up to 8 of the 14 extraction wells at a time. The pumps will depress the groundwater table and simultaneously apply vapor extraction to remove hydrocarbon impacts within the dewatered soils. Each extraction phase (groundwater and soil vapor) is treated separately within the treatment compound, which includes the system equipment and controls housed within a prefabricated building consisting of three 40-foot-long modified shipping containers. The DPE system is equipped with an electric catalytic oxidizer to treat petroleum hydrocarbons in the vapor stream extracted from the subsurface. From the vapor manifold, a combined flow manifold header leads to an air-water separator (AWS), through the system blowers, is treated with a catalytic oxidizer (CATOx), and discharged to ambient air. Discharge vapor will be monitored to meet the requirements of the Puget Sound Clean Air Agency (PSCAA) permit issued for this system. The extracted groundwater will then be collected within a main header pipe and collected in a batch tank. A pump will then transfer the collected groundwater through two sets of two bag filters in parallel before being treated through a minimum of three 1000-lb granular activated carbon (GAC) vessels. It is expected that the groundwater extraction rate from wells will range from 0.5 to up to 5 gallons per minute (GPM), with a maximum discharge rate of 40 GPM or 57,600 gallons per day (GPD). The system will operate 24 hours a day, 7 days a week.

1.2 Discharge Limits

Chevron is permitted to discharge treated groundwater to Lake Union via City of Seattle storm sewer line subject to complying with the following limits:

Effluent Limitations Outfall 001	
Parameter	Maximum Daily Effluent Limit ^a
Flow	57,600 gallons per day
Ph	Between 6 and 9 standard units
Benzene	0.44 µg/L
BTEX ^b	100
Total Petroleum Hydrocarbons-Gasoline	1 mg/L
Total Petroleum Hydrocarbons – Diesel	5 mg/L

Notes:

a – Maximum daily effluent limit means the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar year. For units of concentration, the daily discharge is the average measurement of the pollutant over the day.

b – BTEX is defined as benzene, toluene, ethylbenzene, and xylene.

2 OPERATING PROCEDURES

This section includes operational procedures used to ensure compliance with the NPDES Permit.

2.1 Baseline Operating Procedures

As described in Section 1.1, the DPE system extracts vapor and groundwater through an array of 14 DPE wells that are connected to the DPE system via separate conveyance piping. The groundwater recovery portion of the DPE system is processed through multiple stages, including cylindrical closed top equalization tank, two sets in parallel of two bag filters, and three liquid-phase GAC vessels, prior to discharging to Outfall 001. This process is monitored to comply with the regulations of the NPDES Permit. The soil vapor recovery portion of the DPE system leads to an AWS and is treated with a CATOx and discharged to ambient air under an PSCAA permit. Equipment specifications, capabilities, and processes of the systems associated with meeting NPDES permit compliance are described below and can be found in Attachment 2 (Fliteway O&M Manual).

The DPE system is designed for continuous operation. The system should be started, operated, and shut down in accordance with the procedures outlined below to run the system safely, optimize remedial effectiveness, and meet the permitted groundwater and vapor treatment requirements. The system will be operated under the CEMC DPE Standard Operating Procedures (Attachment 3). System technicians will visit the site once per week to maintain equipment and ensure permit compliance. Analytical samples will be collected monthly to ensure permit effluent limits are met. Equipment maintenance schedules recommended by equipment manufacturers will be followed. Equipment specifications and maintenance schedules are included at Attachment 2 and summarized in Section 2.1.2.1 below.

The PLC unit provides continuous automatic operational control of the DPE system equipment. With the system operating, there are several mechanical ways to adjust the extraction and treatment processes. Well pumps are self-regulating based on the water levels in extraction wells. Pump installation depth may be adjusted to optimize total fluids recovery and/or adjust the groundwater radial cone of depression. From the PLC, well pumps can also be selected and turned on or off. Except for the physical settings of the well pumps, the system components should operate automatically, with automatic system shutdown after a programmed alarm condition.

Additionally, a Chevron required fit for service (FFS) review will be conducted annually by Chevron personnel with Arcadis personnel present. If Chevron personnel are not available for inspection, Arcadis personnel will complete the inspection and document observations on the checklist provided by Chevron. The FFS review is conducted to ensure the Site is ready for continued operation and that critical devices are tested.

2.1.1 Startup and Shutdown Procedures

The DPE system is designed for continuous operation; however, if the system is shut down for a prolonged period of time, the pre-startup and startup procedures must be followed upon restarting to protect the system from damage and ensure compliance with permit conditions.

2.1.1.1 Dual-Phase Extraction System Pre-Startup Activities

The following procedures for the pre-startup activities must be performed prior to starting the system:

1. Confirm that all operators and personnel have been trained to operate the system and are wearing adequate PPE, as defined in the Health and Safety Plan (HASP).
2. Confirm that all safety devices, including emergency shutoff switches, first aid kit, eye wash station, and fire extinguisher are in place and in good operating condition.
3. Inspect all equipment for obvious damage or changes that could affect safe operation of the system.
4. Inspect all exposed piping for obvious damage that could affect safe operation of the system.
5. Inspect all system instruments.
6. Ensure that all extraction wells and groundwater discharge lines are closed.
7. If the system has been powered off at the main disconnect, a qualified electrical subcontractor will perform an electrical inspection to:
 - a. Test across phases and to ground.
 - b. Make sure connections are tight (not loose).
8. Record required pre-start up field data (eg. pump intake depth)
9. Alert all personnel present within the equipment compound that you are ready to start the systems.

2.1.1.2 Dual-Phase Extraction System Startup Procedures

Once pre-startup activities have been completed, the operator will perform the following procedures:

1. Turn on main power.
2. Ensure that power to the extraction and groundwater treatment components of the system are on and are able to function as designed.
3. Ensure that there are no level/pressure/vacuum switches in alarm status.
4. Check that the groundwater process flow piping valves are open, including: manifold valves, outlet of the equalization tank, outlet of the transfer pump, inlet/outlet of the bag filters, and inlet/outlet of the GAC vessels.
5. Ensure that the pumps are at the appropriate depth and connected to PLC.
6. Turn on the submersible pumps to each well and ensure the groundwater process flow is functioning properly. Open the control panel and access the submersible pump HOA screen, then set the switch to Auto. The level transducer should communicate with the VFD to set the pump rate for each pump.
7. Turn on the CATOx power, heater power, and vapor control valve switches. Ensure that the CATOx lower temperature limit is within permitted levels and that the vapor control valve is open to dilution air. Open manual dilution air valve to allow 100 percent dilution air during startup activities.

8. Select the three to five well grouping where SVE will start, open valves to those wells, close the valves to the other wells, and open the valve between the AWS and transfer pump.
9. Once CATOx is at the appropriate starting temperature and the groundwater process is operating, start vapor extraction.
10. While monitoring the CATOx temperature, gradually close the SVE dilution valve.
11. Once the system is in operation, ensure that the operating temperature, flow rate, and vacuum are within acceptable ranges and compliant with PSCAA requirements.
12. Walk the groundwater process piping from the extraction wells, through the system, and along the discharge line to DB-1 while making visual observations for any leaks or damage.
13. Record required field data for performance monitoring.

2.1.1.3 Dual-Phase Extraction System Shutdown Procedures

To shut down the system while it is running, perform the following procedures:

1. If prolonged shutdown is required, turn the solenoid valve to operate in manual (hand) mode for 10 seconds to allow vegetable oil to coat claw blowers.
2. Shut down the SVE system by turning the blowers to off on the HOA screen; the CATOx should shut down automatically because it is interlocked with the blowers.
3. Shut down the groundwater extraction system by turning the submersible pumps to off on the HOA screen. If longer term shutdown is required, allow the transfer pump to process the remaining groundwater in the compound.
4. Turn off power to system sub panels.
5. Turn off the main electrical panel.
6. Follow LOTO procedures for the main electrical panel.
7. Close extraction wells at the manifold and groundwater discharge lines.

2.1.1.4 Dual-Phase Extraction System Emergency Shutdown Procedures

To shut down the system in an emergency while it is running:

1. Press the nearest emergency stop button, and/or
2. Disconnect all power to the unit via the main disconnect switch located outside of the southeastern wall of the compound enclosure.

2.1.1.5 System Upset

Shutdown may need to take place when an upset of the system has occurred. The following conditions or events may require necessary implementation of shutdown procedures:

- Overflow of tanks or GACs

- Failure of equipment (GAC leak, alarm not working properly)
- Power interruption.

After any of these events, a field visit will take place after it is determined safe to do so. The goal of the field visit will be to assess damage to the piping, system equipment, and equipment building. If the system is off, an inspection of all equipment will be completed and repairs will be implemented if possible. Notifications of any upset that has caused an occurrence of non compliance with the NPDES permit will be made to Ecology within 24 hours.

2.1.1.6 Extreme Conditions and Natural Disasters

Startup and shutdown may need to take place when inclement weather is expected or other events occur that are outside of operational control. The following conditions or events may require necessary implementation of shutdown or startup procedures:

- Extreme weather (e.g., lightning strike, wind storm, heavy rains, significant freeze event)
- Earthquakes
- Security breach
- Power interruption.

After any of these events, a field visit will take place after it is determined safe to do so. The goal of the field visit will be to assess damage to the piping, system equipment, and equipment building. If the system is off and is determined to be in good condition, the system will be restarted using the procedures described above. An electrical check of the system should be completed by a licensed electrician following extended shutdown, severe flooding events, or other occurrences where the project team feels the electrical system has been compromised.

If an extreme weather condition is anticipated, discuss with the PM and/or Project Engineer to determine if a system shutdown prior to the event is necessary.

2.1.2 Monitoring Requirements

Compliance monitoring during DPE operation includes performance of system operational data, PSCAA compliance monitoring of effluent air, and NPDES monitoring of treated water effluent.

2.1.2.1 Performance Monitoring

Routine OMM of the remediation system will be performed to collect data and perform tasks that will be used to track remedial progress, verify operational compliance, and (if necessary) schedule maintenance for system repair. Table 2-2 outlines where data will be collected from the wells and DPE system.

Performance Monitoring	Location	Units	Safe Operating Range	Target Value
Depth to water	Response wells	Feet below TOC	NA	5 to 8
Pump intake depth	DPE wells	Feet below TOC	15 to 20 feet bgs	18
Individual Extraction Well Flow	Manifold	Gallons/GPM	0.5 to 5	3 to 5
Groundwater system hour meter	PLC screen	Hours	NA	NA
Process flow pressure	Groundwater manifold	psi	0 to 15	5
Submersible pump VFD setting	PLC screen	hz	30 to 60	50
Bag filter total influent pressure	Process piping between transfer pump and bag filters	psi	0 to 20	10
Bag filter #1 and #2 influent and effluent pressure	Bag filter top and bottom influent and effluent gauges	psi	0 to 20	10
GAC total influent Pressure	Process piping between bag filters and GAC vessels	psi	0 to 45	25
Pressure in GAC vessels	Top of GAC vessels	Psi	0 to 45	25
Groundwater effluent totalizer/flowrate	Effluent process piping	Gpm	0 to 90	60
Effluent groundwater analytical samples	Effluent (post-GAC) sample ports on each vessel	Collection Y/N	NA	NA

Notes:

hz = hertz

* = not a critical safety range

NA = not applicable

TOC = top of casing

2.1.2.2 Permit Compliance Monitoring

Groundwater and soil vapor air streams will be treated and discharged under separate process flows and will comply with permit regulations.

Post-treatment effluent air monitoring will occur monthly to maintain compliance with the requirements of the PSCAA permit. Extracted vapor from the treatment wells will be treated by a CATOx and vented to ambient air. Air samples will be collected monthly in Tedlar® bags from the pretreatment and post-CATOx treatment effluent stack. Samples will be analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (USEPA) Method 18
- Total petroleum hydrocarbons as gasoline (TPH-g) by USEPA Method 25
- Fixed gas (carbon dioxide, oxygen, and methane).

Post-treatment DPE effluent groundwater sampling will occur as required by the NPDES permit. Treated groundwater will be sampled before Outfall 001 and analyze for the following compounds:

- Benzene by USEPA Method 624

- BTEX by USEPA Method 624
- TPH-g by USEPA Method NWTPH-Gx
- TPH-d by USEPA Method NWTPH-Dc
- Lead are USEPA Method 200.8.

Permit Name/Number	Requirements
PSCAA – Extracted Vapor Effluent Air Discharge	<ul style="list-style-type: none"> • All data to be recorded monthly • All vapors vented to CatOx until TPH<14 ppm and benzene <0.3 ppm • Control efficiency > 98.5% for concentrations > 2000ppm • Control efficiency > 97% for concentrations > 200 ppm • Control efficiency > 90% for concentrations >100 ppm • Effluent not to exceed 10 ppm for concentrations <100 ppm • Catalyst inlet temperature shall be at least 600 °F not to exceed 1200 °F and recorded monthly • Records shall be kept for two years.
NPDES – Post-Treatment Effluent Groundwater Discharge	<ul style="list-style-type: none"> • See Section 2.1 for individual effluent limitations. • Continuous flow readings. • Monthly and quarterly grab samples.

2.1.3 System Maintenance and testing

The Site operator is responsible for OMM of the DPE system. OMM activities, whether routine or nonroutine, should be documented on system maintenance logs. The log will be used to summarize and track maintenance, testing, and repair activities performed on the system equipment. Activities such as filter changeouts and valve replacements will be detailed on the field data sheets and summarized on the maintenance summary log. Routine maintenance items are summarized in the table below and manufacturer's maintenance procedures are included in the Fliteway Technologies, Inc. Operation and Maintenance Manual (Attachment 2).

Equipment	Maintenance Needed	Schedule/Frequency
Reciprocating air compressor	Various (e.g., oil change, valve inspection)	See Appendix D for tasks associated with daily, weekly, monthly, quarterly, and SA maintenance.
Busch mink vacuum pumps	Various (e.g., oil change, filter inspection)	See Appendix D for tasks associated with daily, weekly, monthly, quarterly, and SA maintenance.
Horizontal centrifugal transfer pumps	Various (e.g., regrease bearing frame, alignment inspection)	See Appendix D for tasks associated with daily, weekly, monthly, quarterly, and SA maintenance.
Horizontal globe, ball, and check valves	Various (e.g., test valves, lubricate with silicone)	See Appendix D for tasks associated with daily, weekly, monthly, quarterly, and SA maintenance.
Bag filters	Regularly change bag filters Check for cracks and leaks in filter housing	As necessary
GAC tanks	Various (e.g., corrosion inspection, change spent carbon)	As necessary
Fliteway knockout tank	Various (e.g., sediment buildup inspection, drain and flush tank)	As necessary
Level switches	Test switch operation Check debris buildup by removing switch	As necessary
Flow meter	Test operation Disassemble and clean internal components	As necessary
Gauges	Test operation of all gauges Clear obstructions from inlet fittings	As necessary

Transmitters	Various (e.g., test operation, ensure alarm settings)	As necessary
Switches	Test that switches are in correct set points	As necessary
Instrumentation housings (e.g., electrical boxes, panels)	Check for moisture and condensation in box Check for proper grounding or leaks into the panel	As necessary

2.1.4 Information Management

The Site operator is responsible for OMM of the DPE system. OMM activities, whether routine or nonroutine, will be documented on system performance logs and maintenance logs, as applicable. After completion of each OMM event, the logs for that event will be sent to the Arcadis Staff Engineer. Once tabulated by the Staff Engineer, the data will be evaluated and recommendations provided by a Project Engineer and Subject Matter Expert as necessary to optimize the system. A digital copy of all logs will be maintained by Arcadis. The OMM field form will be completed during each OMM Site visit to record system performance. Field forms will include the following information:

- Date and time of the OMM visit
- Names of personnel onsite
- System status on arrival and departure
- DPE system readings outlined in Section 2.1.3
- Timeline and description of maintenance performed and general comments during the visit.

Analytical results are used for compliance reporting and system optimization. Analytical laboratory reports will be submitted as part of required permit reporting.

The purpose of the management of change (MOC) process is to ensure that potential impacts to system operation and regulatory compliance are reviewed prior to initiating changes to the system. The MOC process is intended to apply to changes in equipment, raw materials, and processing conditions. However, changes termed “replacement in kind” are excluded from the MOC process. Replacement in kind means a replacement that satisfies the design specifications. For example, replacing a well pump with one from a different manufacturer where both pumps have the same or sufficiently similar technical specifications (e.g., flow rate, pressure), piping, instrumentation, and controls is a replacement in kind.

If the change is not a replacement in kind, then an MOC process will include appropriate review and approval prior to initiating the change. This review will consider the technical basis for the change to confirm that it conforms to sound engineering and safety practices. The review will also consider operational impacts including identification of procedures that may need to change or additional training that will be required. Prior to startup of any change following the MOC process, the change will be independently verified. Appendix H includes a copy of MOC Process Documentation, which includes

detailed instructions for the MOC process and a copy of the MOC form and directions. Copies of complete MOC forms will be kept at the Arcadis Seattle office.

MOCs that pertain to OMM activities will be logged in the MOC log form included in Appendix H. The MOC log form includes the following information:

- MOC number
- MOC owner
- MOC type
- Date opened
- Date closed
- Location of completed MOC log form (stored in Arcadis' Seattle office).

2.1.5 Training

The following courses must be completed by Arcadis staff who work on Chevron-related projects:

- *HAZWOPER 40-hour training*. Required for all staff who may visit Chevron projects sites. The HAZWOPER 8-hour refresher course must be completed annually.
- *Smith System Forward Motion and Backing Modules*. Must be completed once by all staff.
- *First Aid/CPR*. Required every 2 years (once a year if Red Cross-based training).
- *Defensive Driving – Smith Hands-On*. Required once for all field employees. Following the initial class, commentary driving is required every 2 years.
- *Chevron 101 Training*. Must be completed once by all Arcadis staff members who work or will work in the field or make safety-sensitive decisions for the team.

Each operator (or person responsible for OMM of the system) must be fully trained and have at least one fully trained backup operator. Operators will be trained on the following aspects of the treatment systems:

- *National Fire Protection Association 70E electrical safety training (includes Arc flash)*. Must be completed every 3 years by system operators who will need to access internal components of the control panel.
- *Treatment theory*. How the components of the treatment system interact to treat the impacted soil and groundwater. Typically, training will be given by a Senior Engineer.
- *Treatment/remedial objectives*. The overall purpose and objective of the operating treatment systems. Typically, training will be given by a Senior Engineer.
- *Critical operating parameters*. Treatment system parameters critical to the proper operation of the treatment system and the acceptable operating range for these parameters. Typically, training will be given by a Senior Engineer.
- *Standard operating and sampling procedures*. Detailed information regarding the treatment system controls, operation of treatment system components, and treatment system sampling and

maintenance procedures. Staff will review relevant SOPs and address questions or concerns with the project's Project Engineer or PM.

- *Troubleshooting.* The operator will have a sufficient understanding of treatment system component operation to troubleshoot triggered interlocks, malfunctioning equipment and instrumentation, and treatment operation outside of the acceptable operating range. Typically, training is given by the vendor and assistance may be provided by the Senior Engineer.
- *Emergency response.* The operator will be trained on the procedures to be conducted in response to an emergency. This includes reading and understanding the emergency response procedures included in the HASP and periodically reviewing the procedures. Typically, training will be given by a Project Engineer or PM.

2.1.6 Groundwater Extraction Components

The groundwater extraction components are housed in containers located on the bottom level of the office building (Figure A-3) and comprise the submersible pumps, process piping and manifold, equalization tank, transfer pump, bag filters, and GAC vessels.

2.1.6.1 Submersible Pump and Controls

Each of the eight DPE wells are equipped with a submersible pneumatic well pumps designed for a 4-inch-diameter well. Aboveground service wiring connects the system controls to the pump lead wires through a junction box located within the well vault at each extraction wellhead and runs through above ground conduit. Lead wires for the transducer connect to aboveground cords through the junction box within the well vault and then to a PLC located in the main control panel within the control room at the treatment compound. A mechanical level switch within the well vault is connected through aboveground wiring back to the system control panel to shut off the corresponding pump if a leak of extracted groundwater occurs at the wellhead. Wellhead connection details are shown in Attachment 1.

2.1.6.2 External Process Piping and Manifold

Groundwater conveyance piping is constructed of ¾" flex hose within secondary containment hose. Groundwater is pumped through the aboveground conveyance lines to the groundwater extraction manifold. The conveyance piping transitions from flex hose to 1-inch Schedule 80 PVC construction within the remediation system compound on the manifold. Each leg of the manifold includes a gate valve, check valve, flow totalizer, pressure gauge, and ¼-inch gate valve sampling port. An external process piping cross section and manifold connection details diagram are shown in Attachment 2.

2.1.6.3 Equalization Tank

From the manifold header, groundwater flows into the equalization tank. The 300-gallon cylindrical polyethylene plastic equalization tank is 48 inches in diameter and 73 inches tall. The tank is vented out the top of the compound and a manual drain is plumbed to the exterior of the enclosure. Inside the tank is a high level alarm switch that shuts down the system, high level pump switch that turns on the transfer pump, and a low level pump switch that shuts off the transfer pump.

2.1.6.4 Transfer Pump

Process water from the equalization tank passes through a wye strainer and ball valve and is pumped through a Busch Mink model MM 1402 AV claw vacuum pump transfer pump with a 12-hp motor. Pump discharge piping contains a check valve, pressure gauge, sample port, pressure transmitter, and gate valve prior to entering the bag filters.

2.1.6.5 Bag Filters

Four ISC Liquid Filtration BF Series model BFS-2SB-2-304-2B filter housings are installed after the transfer pump. Each bag filter housing is 9 inches diameter, 39.5 inches tall, and constructed of stainless steel. Each housing's inlet and outlet piping has pressure gauges, with inlet only isolation ball valves. Common discharge piping has a check valve, pressure gauge, sample port, and pressure transmitter with a high-pressure alarm set point.

2.1.6.6 Granular Activated Carbon Vessels

Groundwater process flow from the bag filters runs through three inline GAC vessels. The GAC vessels are TetraSolv model HPAF-1000. Each tank is 3 feet in diameter and 7 feet 2 inches tall, with a pressure rating of 75 pounds per square inch (psi). Each vessel holds 1,000 pounds of regenerated GAC, and is equipped with inlet and outlet isolation ball valves, inlet pressure gauges, pressure-relief valves, and discharge sample ports. Discharge piping contains a carbon bypass line with ball valve and sample port, a flow indicating transmitter, check valve, and anti-siphon safety valve.

2.2 Operational Parameters and Procedures Under Low Flow Conditions

Low flow conditions are not anticipated to impact operation of the DPE system and would not impact discharge to Outfall 001. Use of the equalization tank described in Sections 1.1 and 2.2 allows flow to remain within design parameters for the GAC. Level switches and alarm within the equalization tank will shut the DPE system off if abnormal conditions arise (e.g., abnormal flows, inadequate pump operation).

2.3 Operational Parameters and Procedures Under Upset Conditions

If an upset condition results in non-compliance with the NPDES permit, Ecology will be notified within 24 hours. Circumstances of non-compliance include:

- Any noncompliance that may endanger the health or the environment.
- Any unanticipated bypass that causes an exceedance of any effluent limit in the permit.
- Any upset that causes exceedance of an effluent limit in the permit.
- Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants listed in Section 1.2 of the TSOP.
- Any overflow prior to treatment works, whether such overflow endangers health or the environment or exceeds any effluent limit in the permit.

Upset conditions may occur in the DPE system as a result of startups, shutdowns, severe weather event, power outages or maintenance activities. All of these conditions will be required to follow the startup and shutdown procedures listed in Section 2.1.1. In the event that an upset condition causes a release of untreated water or vapor to the environment, project teams will be notified and spill response procedures will commence. The system will be shutdown and remain offline until reason for the upset condition has been identified and remedied and all notifications have been completed.

The system is equipped with controls and alarms to protect humans and the environment in case of upset conditions. Process flow alarms and safety alarms are listed in sections below.

2.3.1 Process Flow Alarms and Safety Devices

2.3.1.1 Groundwater Process Flow Alarms and Safety Devices

- Well vault – LAHH 100: turns off corresponding pump
- Equalization tank – LAHH 201: turns off all systems
- Groundwater process piping between transfer pump and bag filters – pressure transmitter switch (PT) alarm high: turns off all systems (PAH 201)
- Groundwater process piping between bag filters and GAC vessels – PTS alarm high: turns off all systems (PAH 202)
- GAC vessels – pressure relief: mechanical pressure-relief (PI 201 through PW 204).
- Groundwater flow indicator and totalizer (FQ203).
- Siphon Break

2.3.1.2 Soil Vapor Extraction Process Flow Alarms and Safety Devices

- AWS – LAHH 101: turns off SVE system
- CATOx – air dilution control valve: opens at high temperature to cool CATOx
- Vapor process piping between air dilution control valve and blowers – vacuum switch/alarm high high: turns off all systems (YA B-301 and YA B-302)
- Each blower – vacuum relief: mechanical vacuum-relief valve
- Vapor process piping between blowers and CATOx – air proving switch/pressure switch alarm low: turns off all systems (PAH 301 and PAH 302)
- CATOx – flame arrestor: prevents ignited vapor from moving upstream into the process piping
- CATOx – temperature switch/alarm low: closes automatic dilution valve when system reaches operating temperature range.
- CATOx – temperature switch/alarm high high: turns off all systems (TAH 301 and TAH 302).

2.3.1.3 System Compound Alarms and Safety Devices

- Emergency stop switch – present in each room of the compound (control room, groundwater treatment process, and vapor treatment process): turns off all systems (ES 8201, 7911, 7912, 7921).

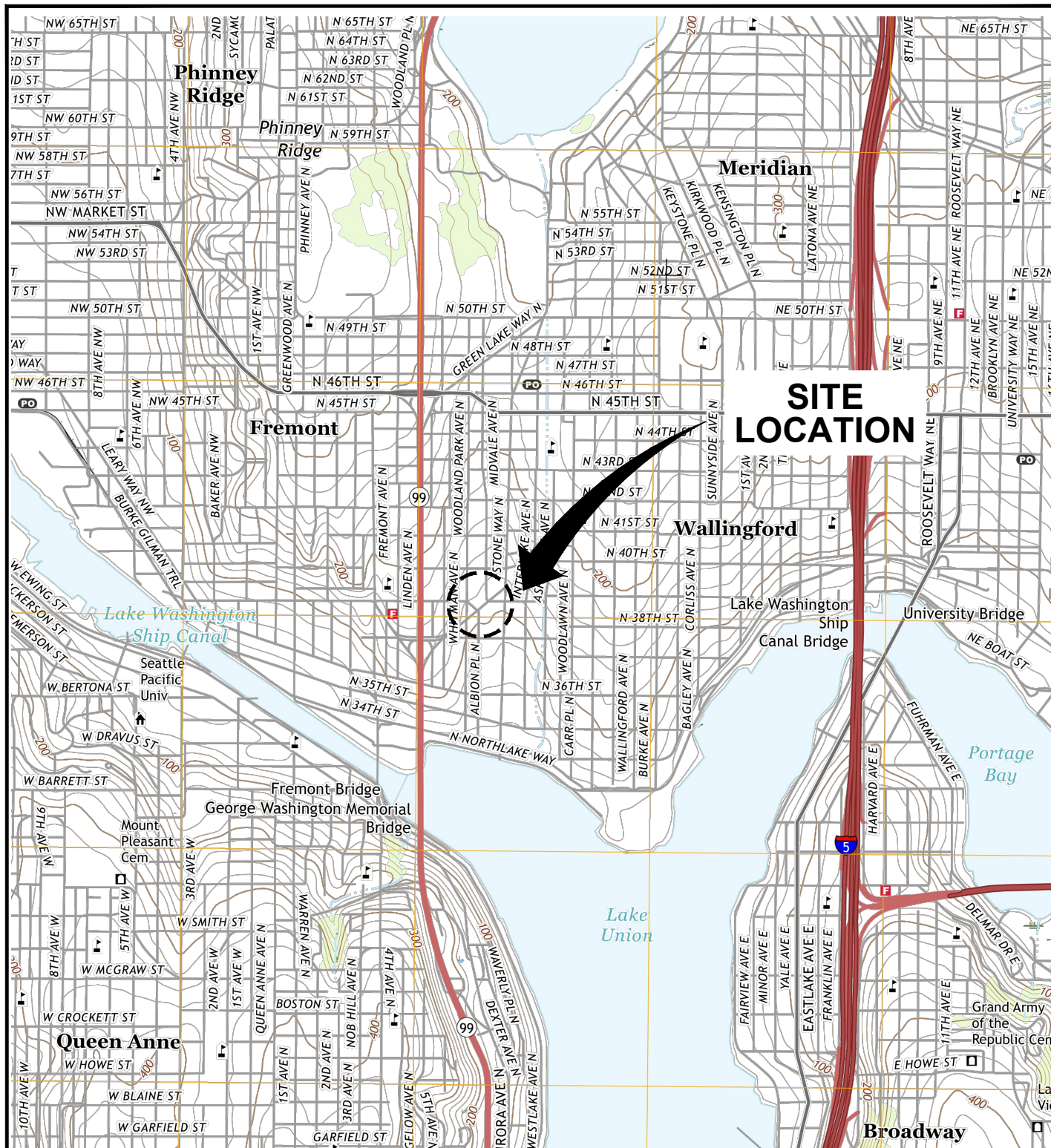
The DPE system at the Site is also equipped with following general site safety devices:

- Lockout/tagout (LOTO) box (mounted on interior of southern compound wall)
- Fire extinguishers (mounted on interior control room wall)
- Electrical ground (at temporary power pole)
- First aid kit (mounted on interior control room wall)
- Eyewash station (mounted on interior control room wall)
- Signs (e.g., emergency contact, hearing protection, emergency shutdown; mounted on exterior of system compound)
- Site restricted access gate locks
- System compound restricted access door locks.

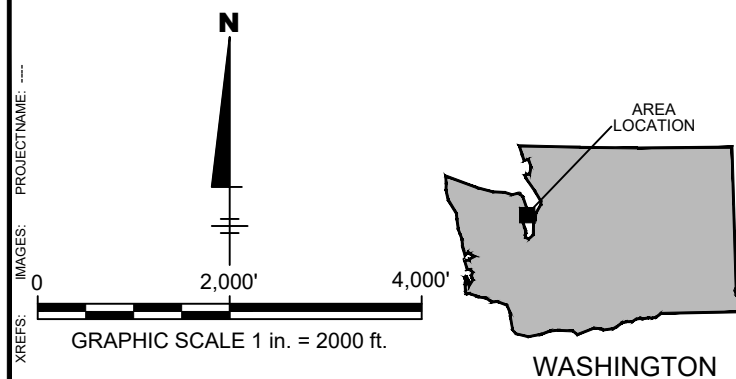
External main power disconnect switch is located at the main distribution panel outside of the southeastern wall of the remediation compound. This switch will remain unlocked and should be used to power down the equipment in the case of an emergency.

FIGURES





REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., SEATTLE NORTH, WASHINGTON, 2017



FORMER CHEVRON SERVICE STATION NO. 95439
3876 BRIDGE WAY NORTH,
SEATTLE, WASHINGTON 98103

SITE LOCATION MAP



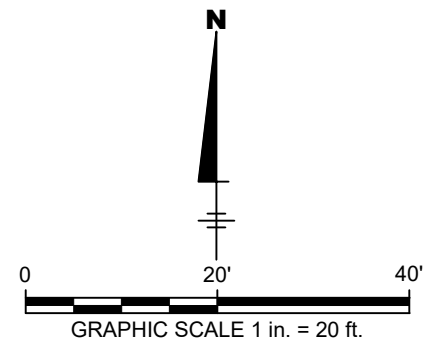
FIGURE
A-1

CITY:\Redd\DIV\GROUP\Redd\ DB\Redd\ LD\Opt\ PIC\Opt\ PM\Redd\ TM\Opt\ LVR\Opt\ONE="OFF"="REF"
C:\Users\mahakalsh\OneDrive - ARCADIS\BIM 360 Docs\CHEVRON CORPORATION\FIGURE 2019\ASRT\MEH\5439\01-DWG\FIGURE 2_ Aerial Vicinity map.dwg LAYOUT: 2 SAVED: 2/21/2019 5:28 PM ACADVER: 21.05 (LMS TECH) PAGES: 21.05 (LMS TECH) PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 2/21/2019 5:29 PM BY: MAHAKAL SHUBHAN SHIVAJI



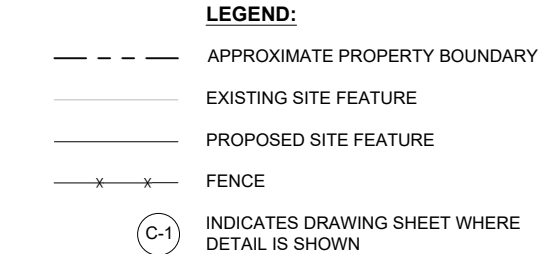
LEGEND

--- APPROXIMATE PROPERTY BOUNDARY



FORMER CHEVRON SERVICE STATION NO. 95439
3876 BRIDGE WAY NORTH,
SEATTLE, WASHINGTON 98103

SITE AERIAL VICINITY MAP



- NOTES:**
1. CONNECTION OF THE REMEDIATION SYSTEM WASTEWATER DISCHARGE PIPING TO THE EXISTING SIDE SEWER SHALL REQUIRE A SIDE SEWER PERMIT AND SITE SPECIFIC NPDES FROM THE CITY OF SEATTLE DEPARTMENT OF CONSTRUCTION AND INSPECTIONS (SDCI) AND DEPARTMENT OF ECOLOGY RESPECTIVELY. CONTRACTOR SHALL OBTAIN ALL PERMITS NECESSARY TO COMPLETE THE CONNECTION PER SDCI REQUIREMENTS.
 2. THE MAXIMUM DISCHARGE RATE TO THE STORM SIDE SEWER OF TREATED GROUNDWATER IS 50 GALLONS PER MINUTE (GPM).
 3. LAND DISTURBING ACTIVITIES SHALL BE LESS THAN 750 SQUARE FEET; THEREFORE A CONSTRUCTION STORMWATER CONTROL PLAN IS NOT REQUIRED FOR THIS PROJECT.

<div><div><div>20'</div><div>0</div><div>20'</div><div>40'</div></div></div>				Professional Engineer's Name Peter J Campbell			 Design & Consultancy for natural and built assets	FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON DUAL-PHASE EXTRACTION SYSTEM		ARCADIS Project No. 30045282		Figure A-3
				Professional Engineer's No. 45051						Date MARCH 2021		
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:		USE TO VERIFY FIGURE REPRODUCTION SCALE		1 No.				3/1/2021 Date		Building Permit Revisions Revisions		
						State CA		Date Signed 3/1/2021		Project Mgr. M.Caldwell		
						Designed by P. Campbell		Drawn by M.S. Priya		Checked by J. Brockman		
										ARCADIS U.S., INC. CIVIL		
										ARCADIS U.S., INC. 7 TOVEY ROAD CHARLESTON, SC 29407		

**Figure
A-3**

CITY: DIV/GRP: DB: LD: PIC: PM: TM: LYN ON=OFF=REF*
C:\BIM\OneDrive - ARCADIS\BIM\360 - OneDrive Sync Location\AUS-CHEVRON-95439-SEATTLE Washington\2022\01-In Progress\01-DWG\DPES-DR-G3-First Floor.dwg LAYOUT: G-3 SAVED: 1/25/2022 3:07 PM ACADVER: 23.15 (LMS TECH) PAGES: 1/1 PLOTTED: 1/25/2022 3:08 PM BY: SMALL, BRIAN

PROJECT NAME: ---
XREFS: BDR-C-LD Stamp.jpg

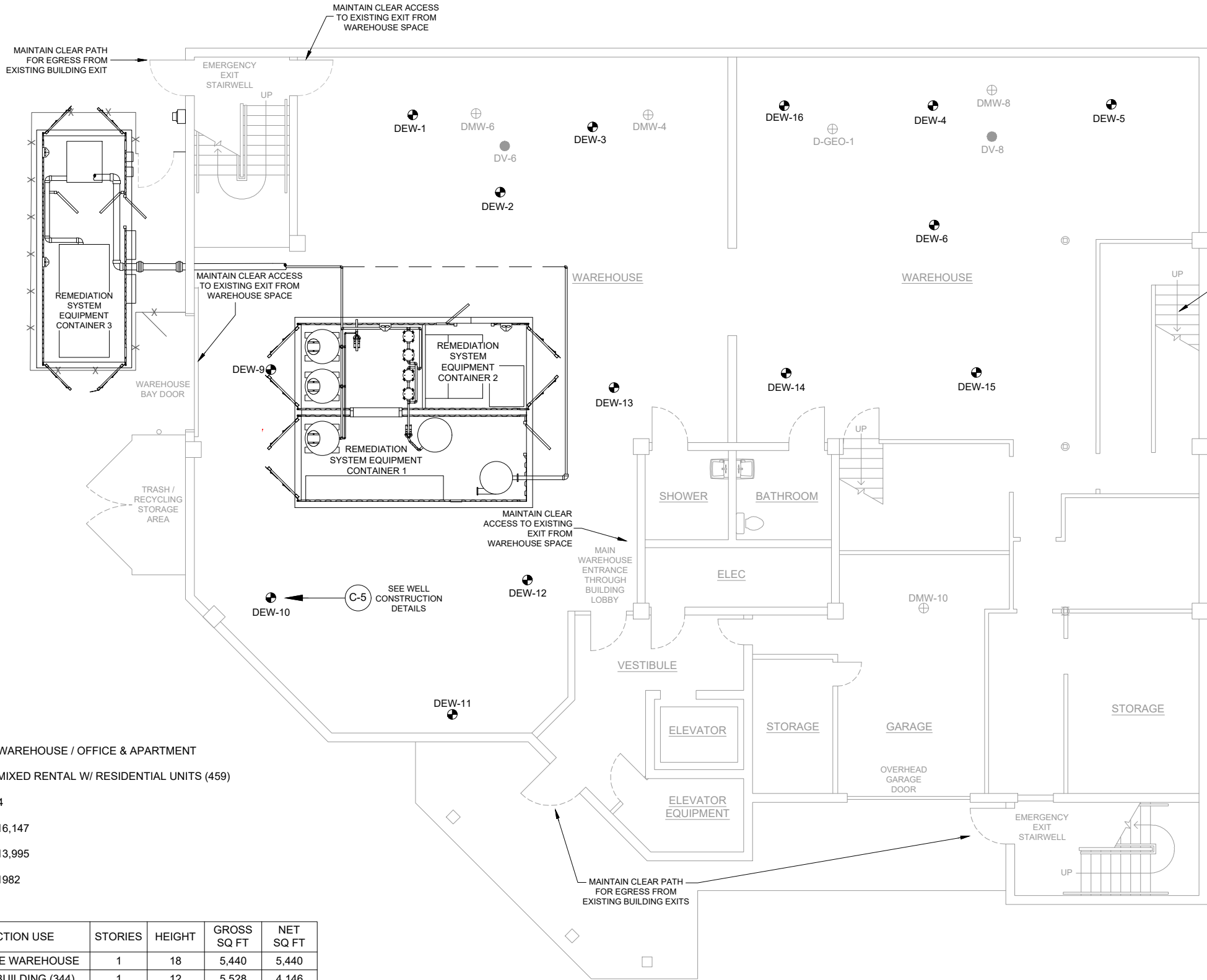
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: 3.08 PM

SECTION / FLOOR NUMBER	SECTION USE	STORIES	HEIGHT	GROSS SQ FT	NET SQ FT
1	STORAGE WAREHOUSE	1	18	5,440	5,440
2	OFFICE BUILDING (344)	1	12	5,528	4,146
3	OFFICE BUILDING (344)	1	9	3,079	2,309
4	APARTMENT (300)	1	9	2,100	2,100

BUILDING INFORMATION FROM KING COUNTY DEPARTMENT OF ASSESSMENTS PROPERTY DETAIL REPORT

BUILDING INFORMATION:

BUILDING DESCRIPTION: WAREHOUSE / OFFICE & APARTMENT
PREDOMINANT USE: MIXED RENTAL W/ RESIDENTIAL UNITS (459)
STORIES: 4
BUILDING GROSS SQ FT: 16,147
BUILDING NET SQ FT: 13,995
YEAR BUILT: 1982
SECTIONS OF BUILDING:



NOTES:

- MODIFICATIONS TO THE EXISTING BUILDING WHICH ARE ASSOCIATED WITH INSTALLATION AND OPERATION OF THE PLANNED REMEDIATION SYSTEM ARE LIMITED TO THE FIRST FLOOR WAREHOUSE SPACE AND BUILDING EXTERIOR. THEREFORE, DRAWINGS SHOWING THE EXISTING OFFICE SPACES AND APARTMENT LOCATED ON FLOORS 2-4 ARE NOT INCLUDED IN THE PLAN SET.
- CONTRACTOR AND CONSULTANT SHALL MAINTAIN CLEAR ACCESS TO ALL WAREHOUSE AND BUILDING EXIT POINTS.
- CONTRACTOR SHALL PROTECT/MAINTAIN EXISTING 1-HR RATED FLOOR/CEILING ABOVE CONTAINERS 1 & 2.

5' 0 5' 10'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: 3.08 PM

USE TO VERIFY REPRODUCTION SCALE

1	3/1/2021	Building Permit Revisions	MS	JB
No	Date	Revisions	By	Ckd

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Professional Engineer's Name
Peter J Campbell
Professional Engineer's No.
45051
State
CA
Date Signed
3/1/2021
Project Mgr.
M.Caldwell
Designed by
P.Campbell
Drawn by
M.S.Priya
Checked by
J.Brockman

SEAL OF PETER J CAMPBELL
REGISTERED PROFESSIONAL ENGINEER
EXPIRATION DATE 3/1/2022

ARCADIS Design & Consultancy for natural and built assets
ARCADIS U.S., INC.

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON
DUAL-PHASE EXTRACTION SYSTEM
BUILDING PLAN - FIRST FLOOR
CIVIL

ARCADIS Project No.
30045282
Date
MARCH 2021
ARCADIS U.S. INC.
7 TOVEY ROAD
CHARLESTON, SC 29407

Figure
A-4

ATTACHMENT 1

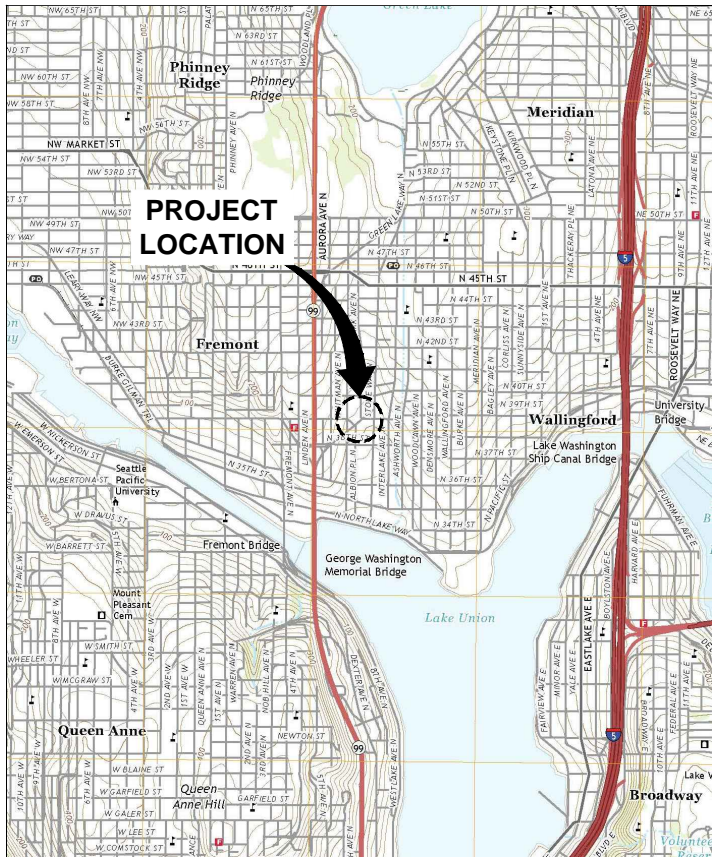
DPE System Design Drawings



DUAL-PHASE EXTRACTION SYSTEM

INDEX TO DRAWINGS

GENERAL	
T-1	TITLE SHEET
G-1A	SPECIFICATIONS SHEET (1 OF 3)
G-1B	SPECIFICATIONS SHEET (2 OF 3)
G-1C	SPECIFICATIONS SHEET (3 OF 3)
G-2	SITE PLAN
G-3	BUILDING PLAN
CIVIL	
C-1	TREATMENT SYSTEM EQUIPMENT AND PIPING LAYOUT
C-2	CONSTRUCTION DETAILS - EXTRACTION WELLHEADS
C-3	CONSTRUCTION DETAILS - DUCT AND PIPE PENETRATIONS
C-4	CONSTRUCTION DETAILS - PIPING
C-5	CONSTRUCTION DETAILS - EXTRACTION WELLS
S-1	SEISMIC ANCHORING DETAILS
PIPING (BY OTHERS)	
P-01	P&ID NOTES & LEGEND SHEET
P-02	MANIFOLD SYSTEM CONTAINER #1 P&ID
P-03	CONTROL ROOM/GWTS CONTAINER #2 P&ID
P-04	SVE/CATOX SYSTEM CONTAINER #3 P&ID
ELECTRICAL (BY OTHERS)	
E-01	ELECTRICAL DRAWINGS TITLE SHEET
E-02	NOTES & LEGEND
E-03	ELECTRICAL SINGLE LINE
E-04	AREA CLASSIFICATION
E-05	PROCESS EQUIPMENT ELECTRICAL LAYOUT
E-06	ELECTRICAL HVAC & LIGHTING LAYOUT
E-07	PROCESS EQUIPMENT ELECTRICAL CONDUIT & CONDUCTOR SCHEDULE
MECHANICAL (BY OTHERS)	
M-01	CONTAINER #1, #2, AND #3 LAYOUT
M-02	CONTAINER #1 STRUCTURAL LAYOUT
M-03	CONTAINER #2 STRUCTURAL LAYOUT
M-04	CONTAINER #3 STRUCTURAL LAYOUT
M-05	CONTAINER #1 EXTERIOR WELD
M-06	CONTAINER #2 EXTERIOR WELD
M-07	CONTAINER #3 EXTERIOR WELD



REFERENCE: BASE MAP USGS 7.5 MINUTE QUADRANGLE, SEATTLE NORTH QUADRANGLE, WASHINGTON - KING COUNTY., 2020

LOCATION MAP
0 2000' 4000'
GRAPHIC SCALE



AUGUST 2020

FORMER CHEVRON SERVICE STATION NO. 95439
3876 BRIDGE WAY NORTH
SEATTLE, WASHINGTON



ARCADIS U.S., INC.



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PROJECT NAME: ---
IMAGES: Stamp.jpg
XREFS: BDR-C-LD

1.0 Introduction

The enclosed drawings and specifications contain information for the construction and installation of a treatment facility. The following drawings depicting the treatment facility are required for construction and installation:

Drawing No.	Revision	Title
T-1	0	TITLE SHEET
G-1A	0	SPECIFICATIONS SHEET (1 OF 3)
G-1B	0	SPECIFICATIONS SHEET (2 OF 3)
G-1C	0	SPECIFICATIONS SHEET (3 OF 3)
G-2	0	SITE PLAN
G-3	0	BUILDING PLAN
C-1	0	TREATMENT SYSTEM EQUIPMENT AND PIPING LAYOUT
C-2	0	CONSTRUCTION DETAILS - EXTRACTION WELLHEADS
C-3	0	CONSTRUCTION DETAILS - DUCT AND PIPE PENETRATIONS
C-4	0	CONSTRUCTION DETAILS - PIPING
C-5	0	CONSTRUCTION DETAILS - EXTRACTION WELLS
S-1	0	SEISMIC ANCHORING DETAILS
P-01	0	P&ID NOTES & LEGEND SHEET
P-02	0	MANIFOLD SYSTEM CONTAINER #1 P&ID
P-03	0	CONTROL ROOM/GWTS CONTAINER #2 P&ID
P-04	0	SVE/CATOX SYSTEM CONTAINER #3 P&ID
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E-03	0	ELECTRICAL SINGLE LINE
E-04	0	AREA CLASSIFICATION
E-05	0	PROCESS EQUIPMENT ELECTRICAL LAYOUT
E-06	0	ELECTRICAL HVAC & LIGHTING LAYOUT
E-07	0	PROCESS EQUIPMENT ELECTRICAL CONDUIT & CONDUCTOR SCHEDULE
M-01	0	CONTAINER #1, #2, AND #3 LAYOUT
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M-03	0	CONTAINER #2 STRUTURAL LAYOUT
M-04	0	CONTAINER #2 STRUTURAL LAYOUT
M-05	0	CONTAINER #1 EXTERIOR WELD
M-06	0	CONTAINER #2 EXTERIOR WELD
M-07	0	CONTAINER #3 EXTERIOR WELD

CHEVRON: Chevron Environmental Management Company
ENGINEER: ARCADIS
CONTRACTOR: CLEARCREEK CONTRACTORS

2.0 General Construction Specifications

- 2.1 The CONTRACTOR shall review the facility design plans, and field verify all dimensions and site conditions before starting work. The ENGINEER shall be notified of any discrepancy.
- 2.2 All materials used for construction of the facility shall be new or documented to be suitable for reuse.
- 2.3 The ENGINEER will request a plan check, if applicable. The ENGINEER shall apply for and obtain all discharge permits for treated water and air, as applicable.
- 2.4 The CONTRACTOR shall obtain and pay for all building permits. The CONTRACTOR shall obtain all necessary inspections, including rough electrical, mechanical, civil, or other applicable inspections, and obtain a final signed off inspection card from the local authority.
- 2.5 The CONTRACTOR shall provide a one year warranty on all CONTRACTOR-provided materials and supplies. The CONTRACTOR shall provide a warranty on workmanship for a period of not less than one year. All defects in CONTRACTOR supplied and installed materials and supplies shall be repaired at CONTRACTOR expense.
- 2.6 In addition to the remediation design plans, the ENGINEER will supply the CONTRACTOR with manufacturer's equipment handling and installation procedures. The CONTRACTOR will install all equipment in accordance with the manufacturers' specifications and instructions.
- 2.7 The ENGINEER will clearly indicate in the remediation design plans the items to be provided by CEMC, the ENGINEER and others. All other items and equipment not clearly indicated as provided by others in the remediation design plans shall be provided by and installed by the CONTRACTOR.
- 2.8 The CONTRACTOR shall be responsible for keeping the site free of excessive debris and waste during construction. The CONTRACTOR is to take the necessary precautions to control dust and stormwater runoff from excavation and construction activities.
- 2.9 The CONTRACTOR shall be responsible for the independent location of all utilities and shall take appropriate measures to protect them from damage. The CONTRACTOR shall formally contact the regional underground utility notification service, such as the Underground Service Alert (USA), One Call, or Blue Stakes, and obtain all necessary clearances before breaking ground. Should any utilities, including but not limited to, electrical conduits, telephone lines, water lines, sewer, or storm drain lines be damaged during construction, the CONTRACTOR shall be responsible for notifying the affected parties and completing repairs, if applicable. The CONTRACTOR shall be responsible for all repair costs.
- 2.10 CONTRACTOR shall also be responsible for repairing all damage made by the CONTRACTOR to monitoring wells, well seals, manhole boxes, and all above ground structures as the result of accident or neglect.
- 2.11 The CONTRACTOR shall restore all disturbed areas to match the pre-construction conditions and the surrounding area. This includes disturbed lawns, trees, shrubs, plantings, fences, sidewalks, and other structures.

- 2.12 Upon completion of the project, the CONTRACTOR shall assist the ENGINEER in preparing "as-built" drawings. The "as-built" drawings shall show the actual construction details, including final trench and well locations, compound layout, and piping details.
- 2.13 A final inspection will be performed by the ENGINEER and/or a CEMC representative. All items not meeting the specifications and the remediation design plans shall be promptly repaired and/or replaced by the CONTRACTOR at no expense to CEMC.
- 2.14 The CONTRACTOR shall provide an electrician for a minimum of two days for the startup of the equipment, unless this work can be safely accomplished in less time. The electrician shall be prepared to demonstrate proper motor rotation, proper connections of equipment to circuit breakers, and be available to troubleshoot electrical problems with the system.
- 3.0 Trenching and Backfill
- 3.1 General
- 3.1.1 Trenching and backfill specifications will be developed by the ENGINEER, and be presented in the design plans.
- 3.1.2 The trenching and backfill specifications are subject to approval by the local authority during planning and building department permit reviews.
- 3.1.3 All mechanized equipment operation (i.e., backhoe, excavator, or other powered equipment) shall be performed by competent personnel and/or personnel licensed to perform such work. All construction shall be performed by trained personnel operating under a licensed contractor.
- 3.2 Pavement Cutting
- 3.2.1 Existing pavement shall be saw cut to provide a neat vertical face for repaving. When wet- cutting, best management practices (BMPs) shall be implemented to prevent cutting water from entering storm drains or migrating from the site.
- 3.2.2 The CONTRACTOR shall make every effort to use existing pavement edges and joints when saw cutting to reduce unnecessary cuts. Pavement removed from trenches or other excavations shall be replaced to match the existing material.
- 3.2.3 Concrete or asphalt trench cuts shall not exceed a nominal width of 36 inches, and shall be not less than 18 inches wide (nominal) unless specified otherwise in the design plans. Trenches shall be cut to the minimum width necessary to accommodate all piping shown in the design plans.
- 3.3 Trench Excavation
- 3.3.1 Trenches shall be excavated to the specified widths and depths specified in the design plans. Any deviation from the trenching plans shall be approved by the ENGINEER before work commences. All deviations shall be documented on the "As-Built drawings.
- 3.3.2 CONTRACTOR shall stop work immediately if product piping or tank field is encountered during excavation. Further excavation shall not be conducted without the approval of CEMC and ENGINEER.
- 3.3.3 All excavation activities shall be in strict accordance with OSHA regulations and all Federal, State, and Local laws and regulations.
- 3.3.4 All excavated soil shall be monitored by the ENGINEER in accordance with local contaminated soil handling regulations and permits. If hydrocarbon impacted soil is detected, the soil shall be stockpiled in an area designated by the ENGINEER. The impacted soil shall be placed on 6 mil plastic sheeting and securely covered using a minimum of 6 mil thick plastic sheeting. Alternatively, impacted soil may be placed in properly labeled DOT-approved 55 gallon steel drums or roll-off bins. The ENGINEER shall be responsible for sampling and chemically analyzing the excavated soil for hydrocarbons for waste profiling. CEMC will be responsible for disposal/treatment of hydrocarbon impacted soil.
- 3.3.5 The CONTRACTOR shall be responsible for loading soil into trucks and off-site disposal or recycling of all hydrocarbon-free soil and construction debris.
- 3.3.6 The CONTRACTOR shall take all necessary precautions to avoid damaging existing underground utilities, piping, and underground structures during excavation activities.
- 3.3.7 The CONTRACTOR shall hand-excavate to expose all existing product, vent, electrical conduit, water, and sewer lines before excavating with mechanical equipment.
- 3.3.8 Once all existing lines have been located, the trenches shall be neatly cut by a backhoe, excavator, bobcat, or other approved method to provide a square cut trench.
- 3.3.9 The CONTRACTOR shall be responsible for the safety and integrity of trenches and trench plates placed over open trenches during working and non-working hours. If trenches must remain open after normal work hours the CONTRACTOR shall implement the following measures:

Active traffic areas - open trenches shall be covered by steel trench plates capable of supporting vehicular traffic. Trench plates are to be placed so that there are no gaps between plates. The edges of the plates shall be secured with temporary asphalt patch to minimize displacement by vehicles crossing the plates.

Non-traffic areas - open trenches shall be covered by steel trench plates (non-skid plates in frequently used pedestrian areas) or ¾-inch thick plywood.
- 3.3.10 The CONTRACTOR shall take precautions to minimize surface water entering excavations and preventing oversaturation of trenches.

- 3.3.11 When required by local authority, the ENGINEER will implement a Storm Water Pollution Prevention Plan (SWPPP). The CONTRACTOR shall strictly follow the requirements of the SWPPP. If no SWPPP is required, the CONTRACTOR shall implement Best Management Practices to ensure that all storm water runoff from construction debris, excavated soil, or disturbed surfaces will not to enter a storm drain or runoff the site.

- 3.3.12 Excavation shall not interfere with 45-degree zone of influence on any existing foundation or footing. Existing footings or foundations that may be affected by any excavation shall be underpinned adequately or otherwise protected against settlement and shall be protected against lateral movement per applicable building code.

3.4 Backfill

- 3.4.1 Trenches shall be backfilled as soon as practical after pressure testing the underground pipe runs, and following any required inspections. Trenches shall not remain open longer than necessary to prevent sidewall caving. If caving is anticipated, the CONTRACTOR shall use a commercial soil sealant/binder or forms to prevent caving. Chemical soil binders/sealants shall be approved by CEMC.
- 3.4.2 Prior to backfilling, the CONTRACTOR shall confirm that the underground pipe is buried to a minimum depth of 18 inches from the top of the pipe, unless otherwise noted in the design plans and local building codes.
- 3.4.3 Underground piping shall be bedded in clean sand, or the ENGINEER-approved equivalent, to a minimum depth of 2-inches below the bottom of the piping and 2-inches above the piping. The sand shall be clean, rock-free (100 percent passing No. 4 sieve), and free of silt and clay.
- 3.4.4 Trench backfill material may consist of Class II aggregate base course, CDF slurry mix, or approved "native" excavated material. Backfill materials shall not contain rubble, vegetation, trash, boulders, or other debris.
- 3.4.5 Native soil may be used as backfill with approval of CEMC and the ENGINEER. It is recommended that native soil be tested for geotechnical properties to determine if the material is suitable for backfill.
- 3.4.6 Backfill material (other than CDF slurry) shall be placed in 8-inch maximum lifts (unless otherwise specified in the design plans), and compacted to 95 percent of the maximum dry density at optimum moisture content (based on Modified Proctor Compaction Test ASTM D1557) or in accordance with the local codes.
- 3.4.7 Backfill soil shall be compacted to 95 percent of the maximum dry density at optimum moisture content (based on ASTM D1557) or in accordance with the local codes.
- 3.4.8 Cement sand slurry (controlled density fill [CDF]) may be used as backfill material with the approval of CEMC and the ENGINEER. The CDF shall be 1.5 to 2 sack slurry. No compaction testing is required for CDF.
- 3.4.9 Class 2 aggregate base shall be placed under new asphalt pavement. The aggregate base thickness should equivalent to the existing aggregate base thickness or six inches whichever is greater.
- 3.4.10 Prior to paving, the CONTRACTOR shall remove all vegetation, surplus soil, rubble, trash, debris and other materials and provide a flat, unyielding subgrade surface for paving. Saturated, soft or pumping soils shall be removed and replaced with suitable material in accordance these specifications.
- 3.4.11 The CONTRACTOR shall prepare the sub-grade elevation to match the base of the existing pavement, unless the asphalt restoration design exceeds existing in-place asphalt design.
- 4.0 Piping
- 4.1 General
- 4.1.1 The local authority, and building and plumbing codes, along with ASTM specifications, shall be used to design the types of piping and installation methods required for each remediation site.
- 4.1.2 All piping work shall be installed by trained personnel operating under a state-licensed contractor.
- 4.1.3 All materials shall be new or documented to be suitable for reuse.
- 4.1.4 All materials and work shall be in accordance with the pipe manufacturer's specifications, the design plans, and all applicable codes.
- 4.1.5 All piping and plumbing shall be performed by trained and competent personnel, who meet all of the requirements dictated by the local authorities. In addition, the CONTRACTOR is responsible for ensuring the installation of any equipment or materials which require specific licensing shall be performed under the direction of the individual who holds a current license for such work.
- 4.1.6 When connecting to existing underground piping, the CONTRACTOR shall first verify the existing piping path. If the existing underground piping is to be used for conveyance, the CONTRACTOR shall also field verify the integrity of the existing pipe prior to connecting to it.
- 4.1.7 The pipe for vapor lines shall be sloped towards the wellheads at a ratio of 1:100 to avoid accumulation of condensate in the pipes. If a trench depth of greater than 4 feet is needed to achieve a required slope, the CONTRACTOR shall notify the ENGINEER and implement measures to address potential condensate accumulation in the pipe as directed by the ENGINEER.
- 4.1.8 Where piping is installed above ground, pipe supports and clamps shall be used to support the pipe at appropriate intervals to prevent sag as specified y the piping manufacturer's specifications. When Unistrut supports are used the ends of the supports shall be covered with plastic protective caps.

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:

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No.	Date	Revisions	By	Ckd
THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.				

Professional Engineer's Name		
Peter J Campbell		
Professional Engineer's No.		
45051		
State	Date Signed	Project Mgr.
CA	7/3/20	M.Caldwell
Designed by	Drawn by	Checked by
P.Campbell	N.Reddy	J.Brockman



Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON

DUAL-PHASE EXTRACTION SYSTEM

SPECIFICATIONS SHEET (1 OF 3)

CIVIL

ARCADIS Project No. 30045282	G-1A
Date AUGUST 2020	
ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407	

6.4 Concrete Joints

- 6.4.1 Joints shall be provided in paving where they previously existed and shall blend smoothly with those existing joints. As a general rule, joint spacing shall not exceed 15 feet.
- 6.4.2 The CONTRACTOR shall install the same type of joint as those in existing slab.
- 6.4.3 Joints shall be provided along property lines, where entry ramps cross and at changes in grade or slope
- 6.4.4 Saw cut control joints shall be cut 4 to 12 hours after concrete is poured, otherwise use tooled or preformed joint inserts.
- 6.4.5 The CONTRACTOR shall use Aqua Crete® or equivalent sealant to seal the concrete joints. Joint surfaces shall be thoroughly cleaned prior to applying joint compound.

6.5 Concrete Placement

- 6.5.1 The CONTRACTOR shall assure that the sub-grade has been properly prepared. No concrete shall be poured on soft, saturated or pumping soil, frozen soil, ice, snow, or standing water.
- 6.5.2 Concrete shall be poured in accordance with commonly accepted industry practices.
- The CONTRACTOR shall prevent overworking and aggregate segregation.
 - The concrete shall be adequately tamped or vibrated to prevent voids or honeycombing.

- Area between joints shall be cast as one continuous pour.
- Concrete curbs shall be monolithically poured with the adjacent concrete paving, unless prior approval from the ENGINEER is obtained.
- The maximum allowable travel time to the site in hot weather will be 1 hour and 15 minutes and cold weather will be 2 hours.

6.6 Concrete Finishing

- 6.6.1 The CONTRACTOR shall finish the concrete in accordance with standard industry practices.
- After all the bleed water has disappeared; the CONTRACTOR shall float the flat surface by hand using a trowel.
 - After floating, a soft concrete finish broom shall be used to finish the surface to match the existing concrete finish.
- 6.6.2 Dry cement shall not be used to remove excess water from the surface. Finish work must be delayed until the water sheen has disappeared.
- 6.6.3 Water shall not be added to ease the finishing.
- 6.6.4 Care shall be used to not overwork the surface.
- 6.6.5 Construction/control joints and edges shall be hand-tooled to a ¼-inch radius.

7.0 Electrical

7.1 General

- 7.1.1 The local authority and building codes, including the national electric code (NEC), are used to dictate the specific type of electrical enclosures and raceways that are required for use in specific hazardous and non-hazardous locations.
- 7.1.2 All work will be performed in accordance with the NEC. Local codes will govern, but any differences should be pointed out to the local authority. All work shall conform to the regulations and specifications of the local power company providing the service.
- 7.1.3 Electrical work shall only be conducted by an electrical CONTRACTOR who is licensed in the state where the work is to be performed.

7.2 Electrical Service

- 7.2.1 The CONTRACTOR shall install a weather-tight main electrical breaker/disconnect panel located outside the equipment enclosure as shown on the site plans. The main panel shall have a lockable disconnect/shut-off switch. The CONTRACTOR shall install the power as required by the ENGINEER.
- 7.2.2 All service equipment shall be enclosed in a water-tight National Electrical Manufacturers Association [NEMA] enclosure, if exposed to the elements.
- 7.2.3 The power meter is typically supplied and installed by the local power utility company.
- 7.2.4 If three-phase power is required and only single-phase power is available, a phase converter shall be used for those components requiring such service. The equipment vendor shall ensure that all electrical motors and controls are rated for converter use, and can withstand the additional heat buildup caused by phase converter use.

7.3 Electrical Service Disconnects

- 7.3.1 The CONTRACTOR shall install all service disconnect switches necessary to safely shutdown and lockout the equipment.
- 7.3.2 At a minimum, the switches shall be contained in a water-tight NEMA 4 panel.

- 7.3.3 The CONTRACTOR shall install an emergency stop switch on the exterior of the compound.

7.4 Electrical Above Ground Conduits and Enclosures

- 7.4.1 The CONTRACTOR shall install threaded rigid galvanized metal conduit in all aboveground installations, unless otherwise specified by the ENGINEER.
- 7.4.2 Threaded joints shall be installed per local code with at least five threads fully engaged.
- 7.4.3 All couplings, unions, junction boxes, device boxes, and conduit bodies shall have tight joints.
- 7.4.4 In unclassified areas, liquid-tight flexible nonmetallic tubing may be used to make connections to motors and other electrical equipment. The maximum length shall not exceed 18 inches.
- 7.5.5 Wire nuts or twist-lock terminations shall not be used for ground, motor, or power connections.

7.7 Electrical Grounding

- 7.7.1 The conduit system and neutral conductors shall be grounded in accordance with local code. Ground testing shall be documented and submitted to the ENGINEER.

8.0 Construction Details

8.1 Equipment Enclosure

- 8.1.1 Install fencing and equipment enclosure as shown on the design plans
- 8.1.2 Slats for chain link fence shall match existing building color scheme or colored as determined by the local building department.
- 8.1.3 Fence post footings shall be concrete, minimum 1-foot diameter and 3-feet deep unless otherwise specified in the applicable permit conditions or design plans.
- 8.1.4 CONTRACTOR shall install the following signage on all sides of the remediation equipment room and the inside door of the remediation equipment room:
- Danger High Voltage
 - No Smoking
 - 24-hour contact numbers
 - Others as per local code

9.0 Construction Schedule

- 9.1 The CONTRACTOR shall confirm a construction schedule with the ENGINEER least one week (5 business days) prior to any work at the site.
- 9.2 The proposed construction schedule shall be presented in a time line format showing estimated start date, duration and completion times for each activity. Any deviation from the originally proposed schedule must be communicated to the ENGINEER within 24- hours.
- 9.3 The CONTRACTOR shall make proper and timely notification of all work and inspections to regulatory or governing agencies as required by building and other construction permits.

10.0 CONTRACTOR Safety Requirements

- 10.1 The CONTRACTOR is responsible for the safety of his personnel and subcontractor personnel. The CONTRACTOR shall conform with the ENGINEER's and CEMC's Behavior Based Safety Program requirements. At a minimum the CONTRACTOR shall:
- Develop and have available site specific Health and Safety Plan (HASP) and Journey Management Plan (JMP) which conforms to the ENGINEER's and CEMC standards.
 - Develop and have available on site Job Loss Analysis (JLA) forms outlining the tasks to be performed, the job steps, the hazards, and the mitigating procedures to minimize risk and maximize safety.
 - Complete the CEMC Permit-to-Work processes and procedures.
 - Conduct and document a tailgate safety meeting each morning and afternoon when site work is to be performed.
 - Ensure compliance with all Federal and State Occupational Safety and Health Administration (OSHA) and local safety regulations.
 - Meet requirements of CEMC's Short Service Employee (SSE) Process.
 - Ensure the appropriate personnel have received Defensive Driving training.
- 10.2 Work hours shall be during daylight hours only, unless approved by the CEMC and ENGINEER prior to the work being performed. Weekend work will not be allowed, unless approved by CEMC and ENGINEER prior to the work being performed. Work hours may be dictated by the local planning department or the building permit.
- 10.3 The CONTRACTOR shall have sufficient quantities and quality of hard hats, goggles, safety glasses, reflective vests, and gloves on site to outfit all CONTRACTOR workers, and provide for a secure work area.

- 10.4 The CONTRACTOR shall secure all work areas with barricades, snow fence, or temporary chain link fence to protect the work area from intrusion by unauthorized vehicles or pedestrians. When conditions warrant, the CONTRACTOR shall provide traffic flaggers in addition to barricades to control ingress and egress from the work area. A traffic control plan shall be included in the CONTRACTOR HASP.
- 10.5 A pre-construction safety meeting shall be held at the site within two weeks prior to the anticipated start of construction. The pre-construction safety meeting shall be attended by CEMC, the ENGINEER, the CONTRACTOR, and other interested parties.
- If the site is an active business, the site owner/manager must be present to discuss impacts to the facility activities.
 - The basis for the JMP is to be discussed during the meeting. Ingress and egress for equipment and deliveries, xclusion zones, impacts on vehicle and pedestrian traffic, and emergency response are to be discussed and documented during the meeting.
- 10.6 The CONTRACTOR shall have access to at least one 20-pound dry chemical type-ABC fire extinguisher at the site, with current inspection tags, during all construction activities.
- 10.7 The CONTRACTOR shall contain loose debris and store construction materials on a daily basis make sure that the work area is clean and orderly prior to departure from the site.

SCALE(S) AS INDICATED

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Professional Engineer's Name Peter J Campbell		
Professional Engineer's No. 45051		
State CA	Date Signed 7/3/20	Project Mgr. M.Caldwell
Designed by P.Campbell	Drawn by N.Reddy	Checked by J.Brockman

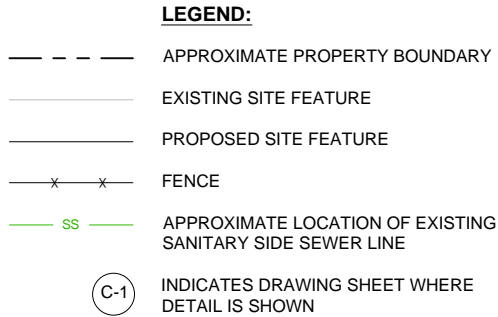
ARCADIS U.S., INC.

CIVIL

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON
DUAL-PHASE EXTRACTION SYSTEM

SPECIFICATIONS SHEET (3 OF 3)

ARCADIS Project No. 30045282	G-1C
Date AUGUST 2020	
ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407	



- NOTES:**
1. CONNECTION OF THE REMEDIATION SYSTEM WASTEWATER DISCHARGE PIPING TO THE EXISTING SIDE SEWER SHALL REQUIRE A SIDE SEWER PERMIT FROM THE CITY OF SEATTLE DEPARTMENT OF CONSTRUCTION AND INSPECTIONS (SDCI). CONTRACTOR SHALL OBTAIN ALL PERMITS NECESSARY TO COMPLETE THE CONNECTION PER SDCI REQUIREMENTS.
 2. PRIOR TO INSTALLATION OF THE WASTEWATER DISCHARGE SUBMETER, CONTACT THE SEATTLE PUBLIC UTILITIES SEWER SUBMETER PROGRAM AT 684-5089 TO SCHEDULE A PRE-INSTALLATION SITE VISIT. PROPOSED LOCATION FOR WASTEWATER DISCHARGE SUBMETER (NOT SHOWN). ACTUAL LOCATION SUBJECT TO APPROVAL BY SEATTLE PUBLIC UTILITIES.
 3. THE MAXIMUM PERMITTED DISCHARGE RATE TO THE SIDE SEWER OF TREATED GROUNDWATER IS 50 GALLONS PER MINUTE (GPM).
 4. LAND DISTURBING ACTIVITIES SHALL BE LESS THAN 750 SQUARE FEET; THEREFORE A CONSTRUCTION STORMWATER CONTROL PLAN IS NOT REQUIRED FOR THIS PROJECT.

		Professional Engineer's Name Peter J Campbell Professional Engineer's No. 45051				FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON DUAL-PHASE EXTRACTION SYSTEM	ARCADIS Project No. 30045282	
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THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.		State CA Date Signed 7/3/20 Project Mgr. M.Caldwell Designed by P.Campbell Drawn by N.Reddy Checked by J.Brockman					ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407	

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYNONE+OFF=REF* C:\Users\m0288BIM-360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\95439 - Seattle\2020\3004528201-DWG\DPES - G3 - First Floor.dwg LAYOUT: G-3 SAVED: 7/2/2020 4:51 PM ACADVER: 23.1S (LMS TECH) PAGES: 1 OF 1 PLOTTED: 7/2/2020 8:21 PM BY: M. SARAVANAPRIVA

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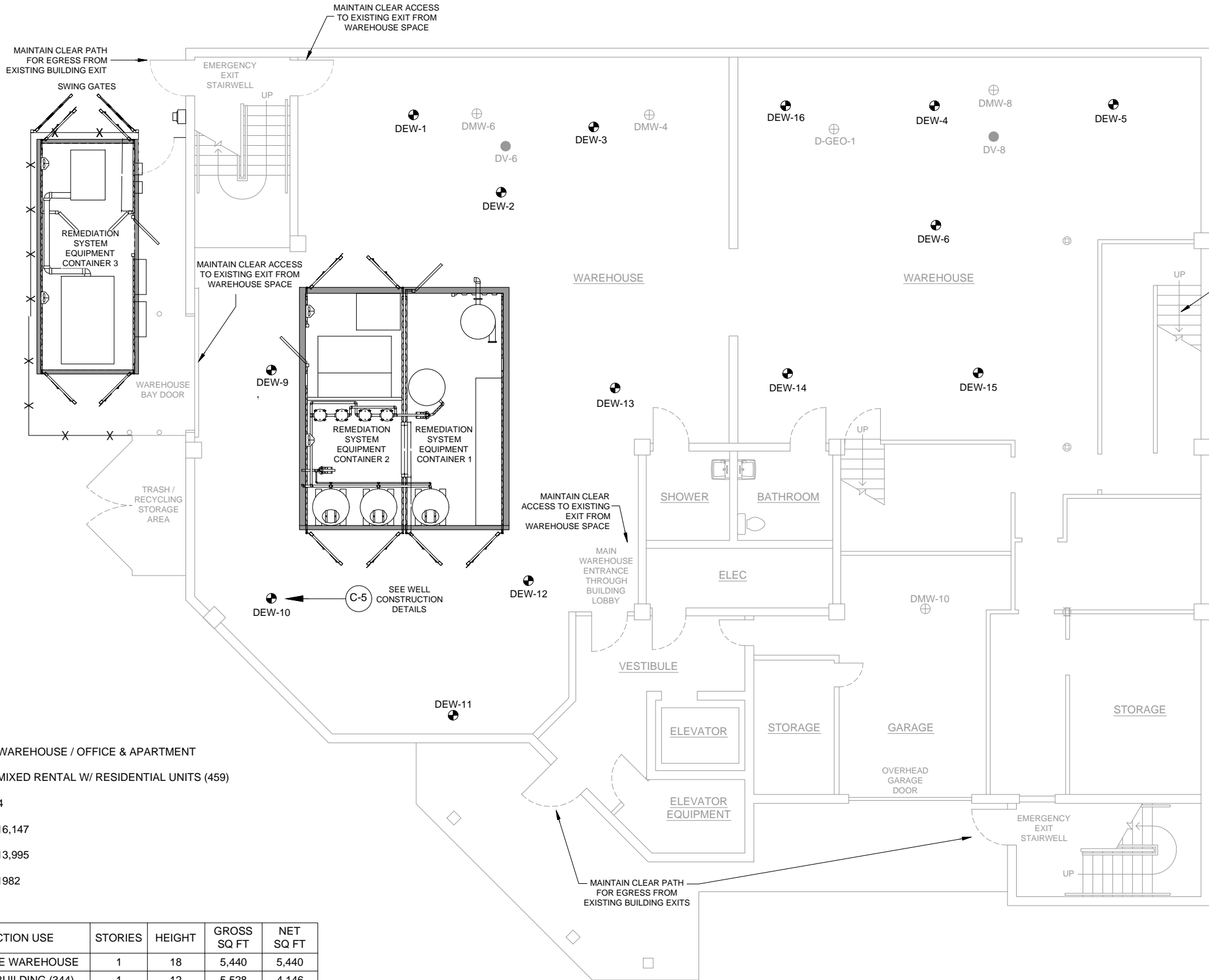
BUILDING INFORMATION:

BUILDING DESCRIPTION: WAREHOUSE / OFFICE & APARTMENT
PREDOMINANT USE: MIXED RENTAL W/ RESIDENTIAL UNITS (459)
STORIES: 4
BUILDING GROSS SQ FT: 16,147
BUILDING NET SQ FT: 13,995
YEAR BUILT: 1982

SECTIONS OF BUILDING:

SECTION / FLOOR NUMBER	SECTION USE	STORIES	HEIGHT	GROSS SQ FT	NET SQ FT
1	STORAGE WAREHOUSE	1	18	5,440	5,440
2	OFFICE BUILDING (344)	1	12	5,528	4,146
3	OFFICE BUILDING (344)	1	9	3,079	2,309
4	APARTMENT (300)	1	9	2,100	2,100

BUILDING INFORMATION FROM KING COUNTY DEPARTMENT OF ASSESSMENTS PROPERTY DETAIL REPORT



LEGEND:

- DEW-16 (Symbol) EXISTING EXTRACTION WELL LOCATION
DMW-4 (Symbol) EXISTING MONITORING WELL LOCATION
DV-6 (Symbol) EXISTING VAPOR WELL LOCATION
--- EXISTING SITE FEATURE
--- PROPOSED SITE FEATURE
--- FENCE
(C-4) INDICATES DRAWING SHEET WHERE DETAIL IS SHOWN

NOTES:

- MODIFICATIONS TO THE EXISTING BUILDING WHICH ARE ASSOCIATED WITH INSTALLATION AND OPERATION OF THE PLANNED REMEDIATION SYSTEM ARE LIMITED TO THE FIRST FLOOR WAREHOUSE SPACE AND BUILDING EXTERIOR. THEREFORE, DRAWINGS SHOWING THE EXISTING OFFICE SPACES AND APARTMENT LOCATED ON FLOORS 2-4 ARE NOT INCLUDED IN THE PLAN SET.
- CONTRACTOR AND CONSULTANT SHALL MAINTAIN CLEAR ACCESS TO ALL WAREHOUSE AND BUILDING EXIT POINTS.
- CONTRACTOR SHALL PROTECT/MAINTAIN EXISTING 1-HR RATED FLOOR/CEILING ABOVE CONTAINERS 1 & 2.

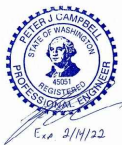


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Professional Engineer's Name Peter J Campbell		
Professional Engineer's No. 45051		
State CA	Date Signed 7/3/20	Project Mgr. M.Caldwell
Designed by P.Campbell	Drawn by N.Reddy	Checked by J.Brockman



ARCADIS U.S., INC.

Design & Consultancy for natural and built assets

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON
DUAL-PHASE EXTRACTION SYSTEM

BUILDING PLAN - FIRST FLOOR

CIVIL

ARCADIS Project No.
30045282
Date
AUGUST 2020
ARCADIS U.S. INC.
7 TOVEY ROAD
CHARLESTON, SC 29407

G-3

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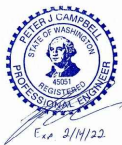
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ARCADIS

Design & Consultancy
for natural and built assets

ARCADIS U.S., INC.

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON

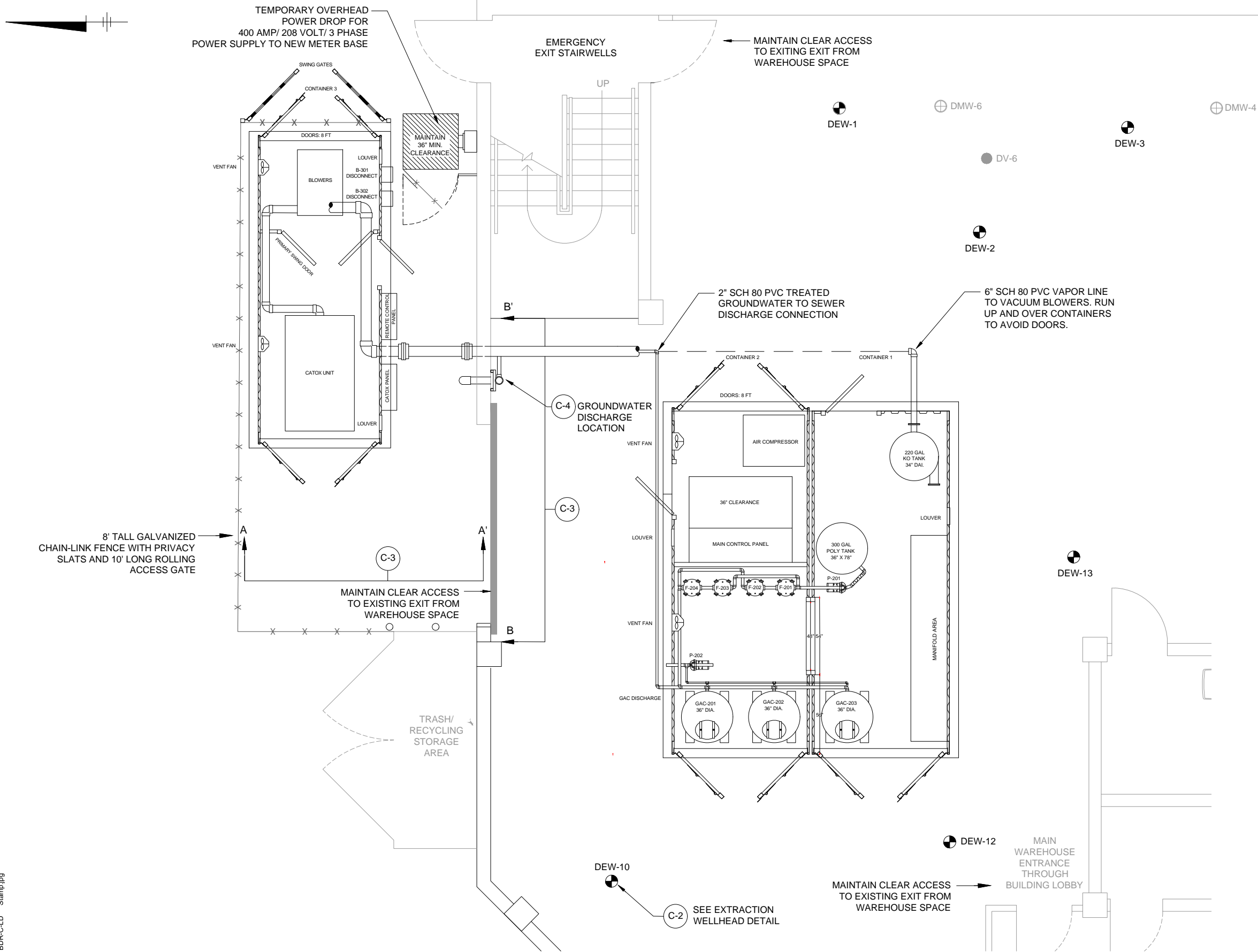
DUAL-PHASE EXTRACTION SYSTEM

TREATMENT SYSTEM EQUIPMENT AND PIPING LAYOUT

CIVIL

ARCADIS Project No. 30045282
Date AUGUST 2020
ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407

C-1



LEGEND:

DEW-13 EXISTING EXTRACTION WELL LOCATION

DMW-6 EXISTING MONITORING WELL LOCATION

DV-6 EXISTING VAPOR WELL LOCATION

EXISTING SITE FEATURE

PROPOSED SITE FEATURE

FENCE

INDICATES DRAWING SHEET WHERE DETAIL IS SHOWN

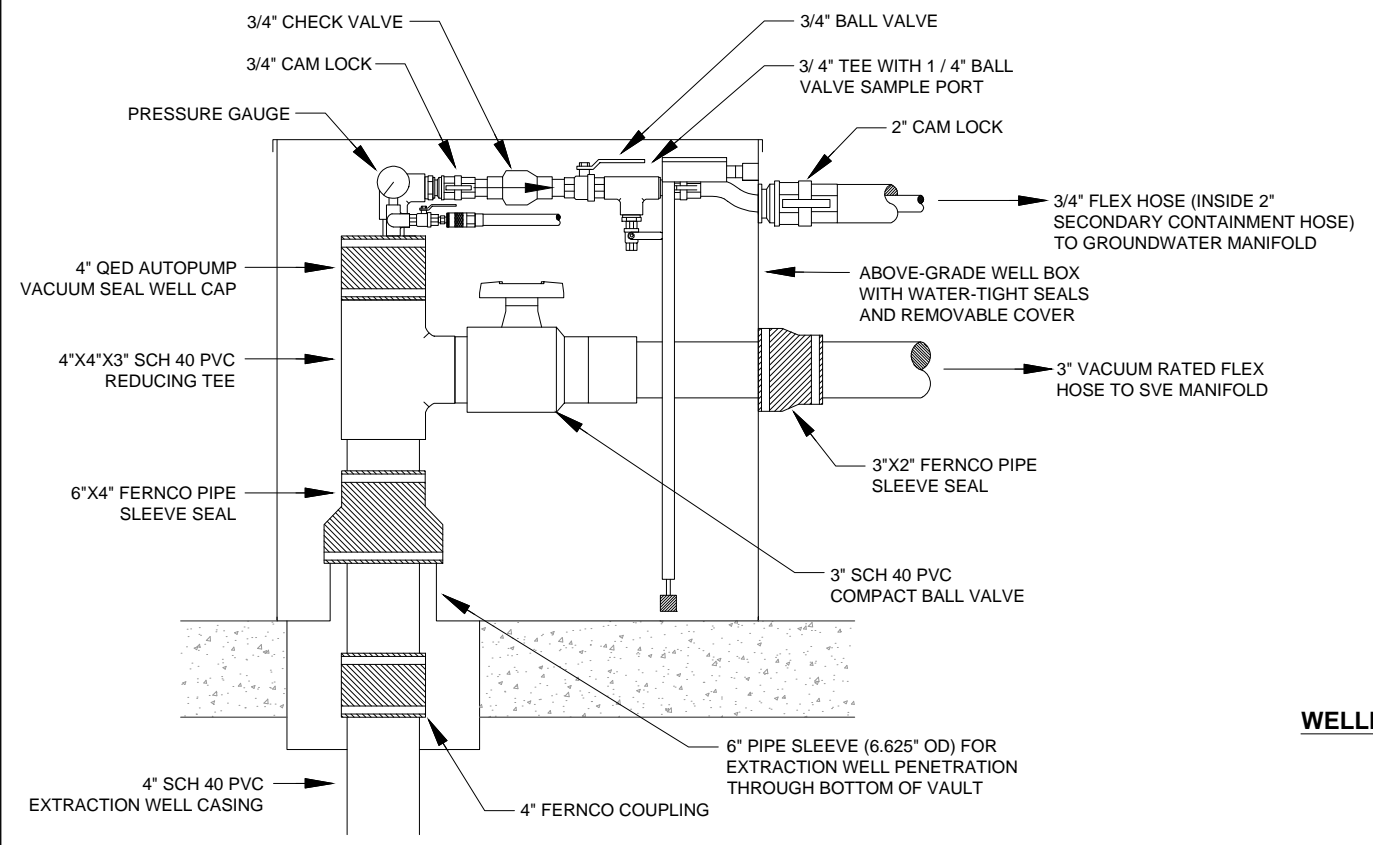
- NOTES:**
1. PRIOR TO INSTALLATION OF THE WASTEWATER DISCHARGE SUBMETER, CONTACT THE SEATTLE PUBLIC UTILITIES SEWER SUBMETER PROGRAM AT (206) 684 -5089 TO SCHEDULE A PRE-INSTALLATION SITE VISIT. PROPOSED LOCATION FOR WASTEWATER DISCHARGE SUBMETER (NOT SHOWN). ACTUAL LOCATION SUBJECT TO APPROVAL BY SEATTLE PUBLIC UTILITIES.

2. PRIOR TO ANY DISCHARGE OF WASTEWATER FROM THE SYSTEM, CONTACT THE SEATTLE PUBLIC UTILITIES SEWER SUBMETER PROGRAM AT (206) 684-5089 TO SCHEDULE AN INSPECTION OF THE WASTEWATER DISCHARGE SUBMETER INSTALLATION.

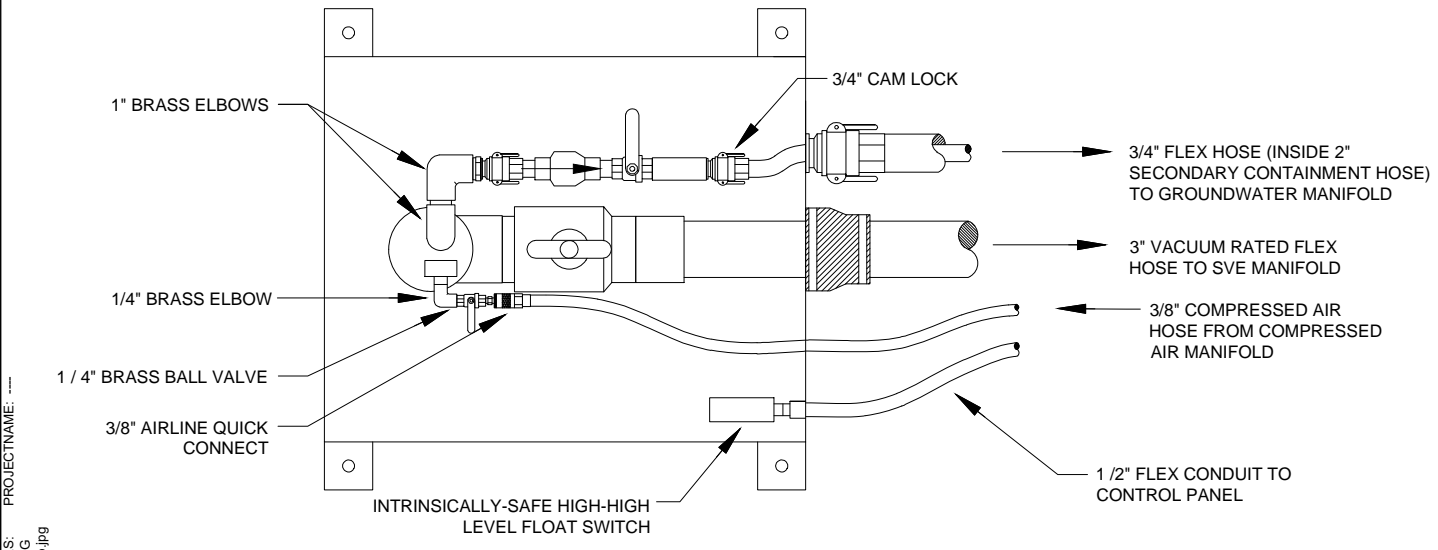
3. DISCHARGE TO THE SANITARY SEWER SHALL NOT BEGIN UNTIL THE KING COUNTY INDUSTRIAL WASTE PROGRAM HAS CONDUCTED A PREOPERATIVE INSPECTION OF THE PRETREATMENT FACILITIES AND HAS SENT WRITTEN NOTIFICATION TO THE PERMITTEE THAT DISCHARGES MAY BEGIN.

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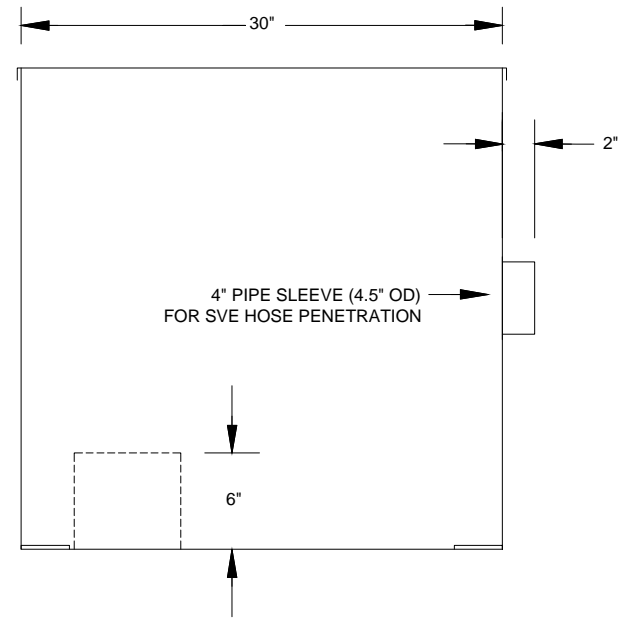
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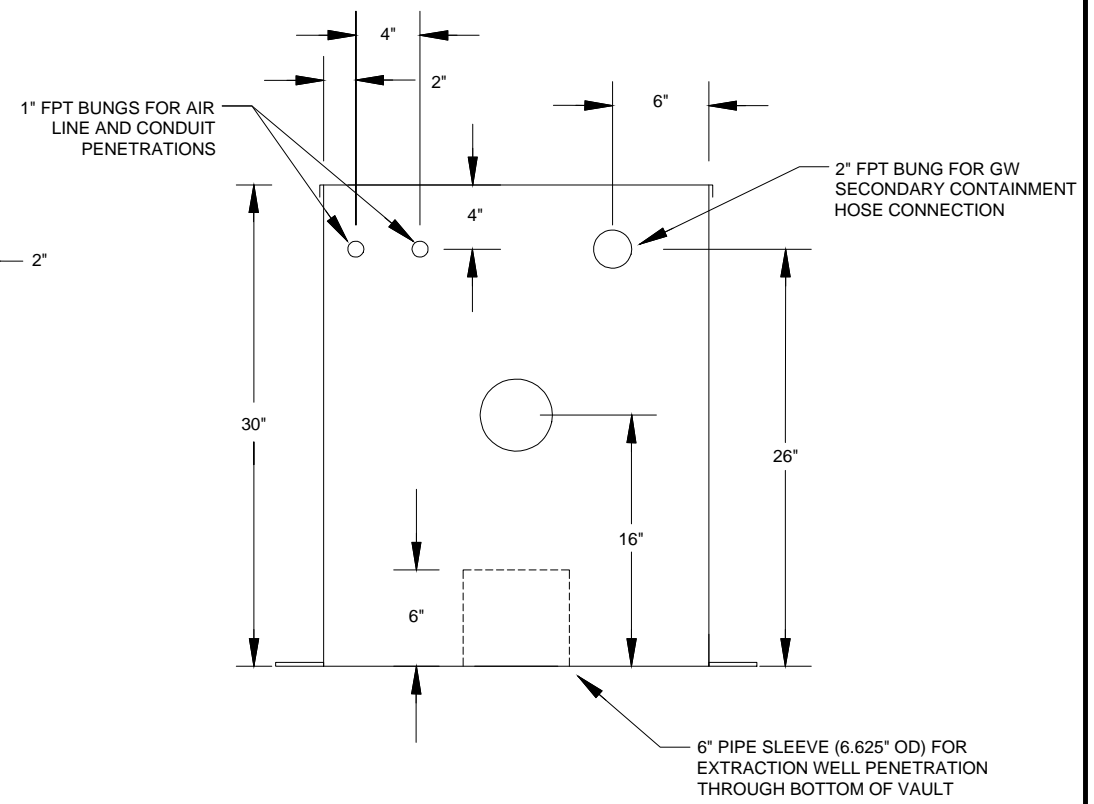
EXTRACTION WELLHEAD PIPING DETAIL - SECTION VIEW



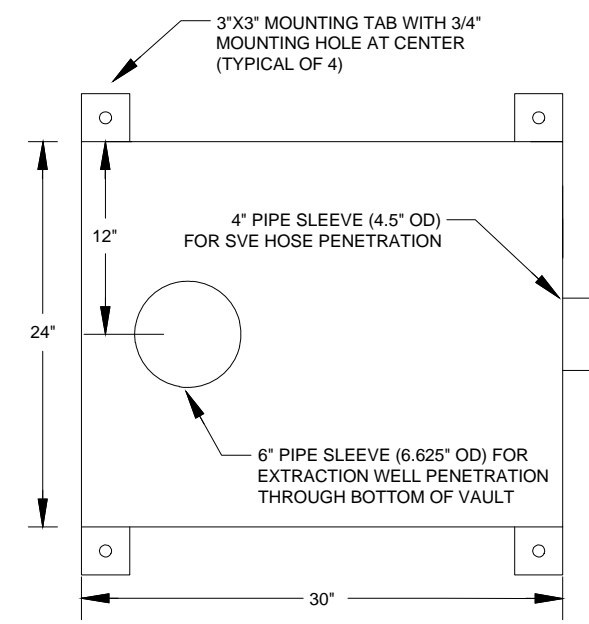
EXTRACTION WELLHEAD PIPING DETAIL - PLAN VIEW



WELLHEAD VAULT BOX DIMENSIONAL DETAIL - PROFILE VIEW



WELLHEAD VAULT BOX DIMENSIONAL DETAIL - ELEVATION VIEW

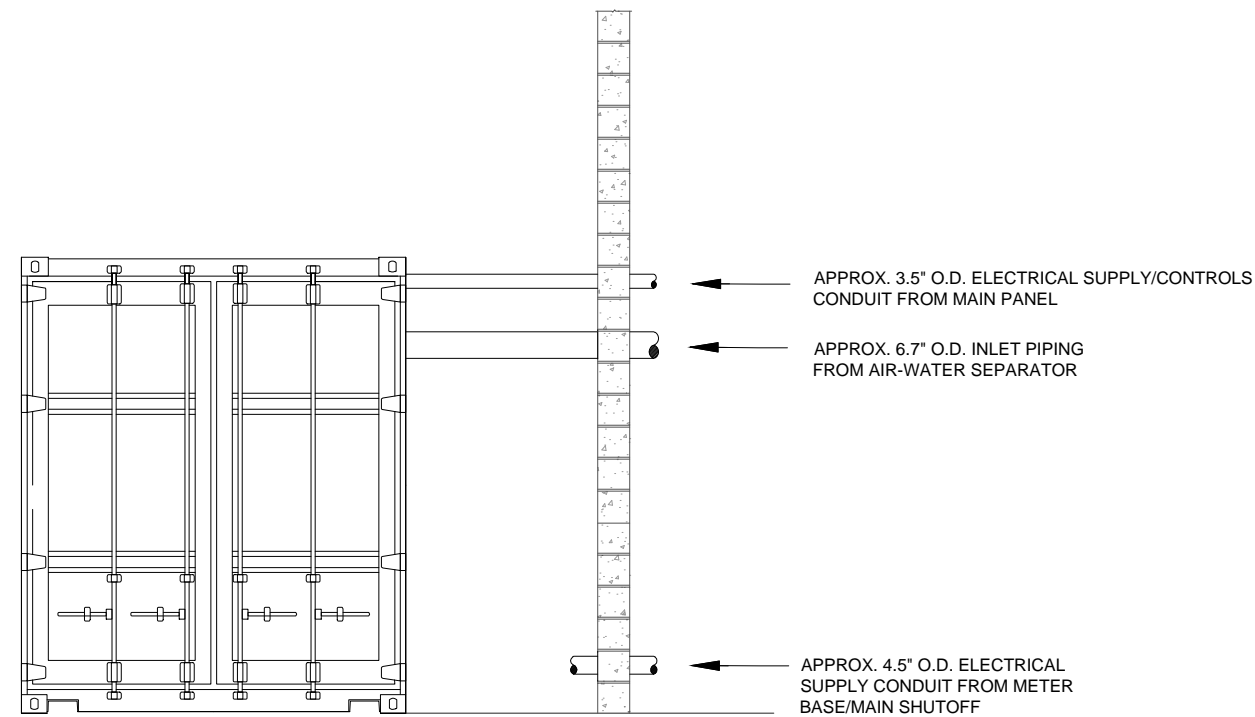


WELLHEAD VAULT BOX DIMENSIONAL DETAIL - PLAN VIEW

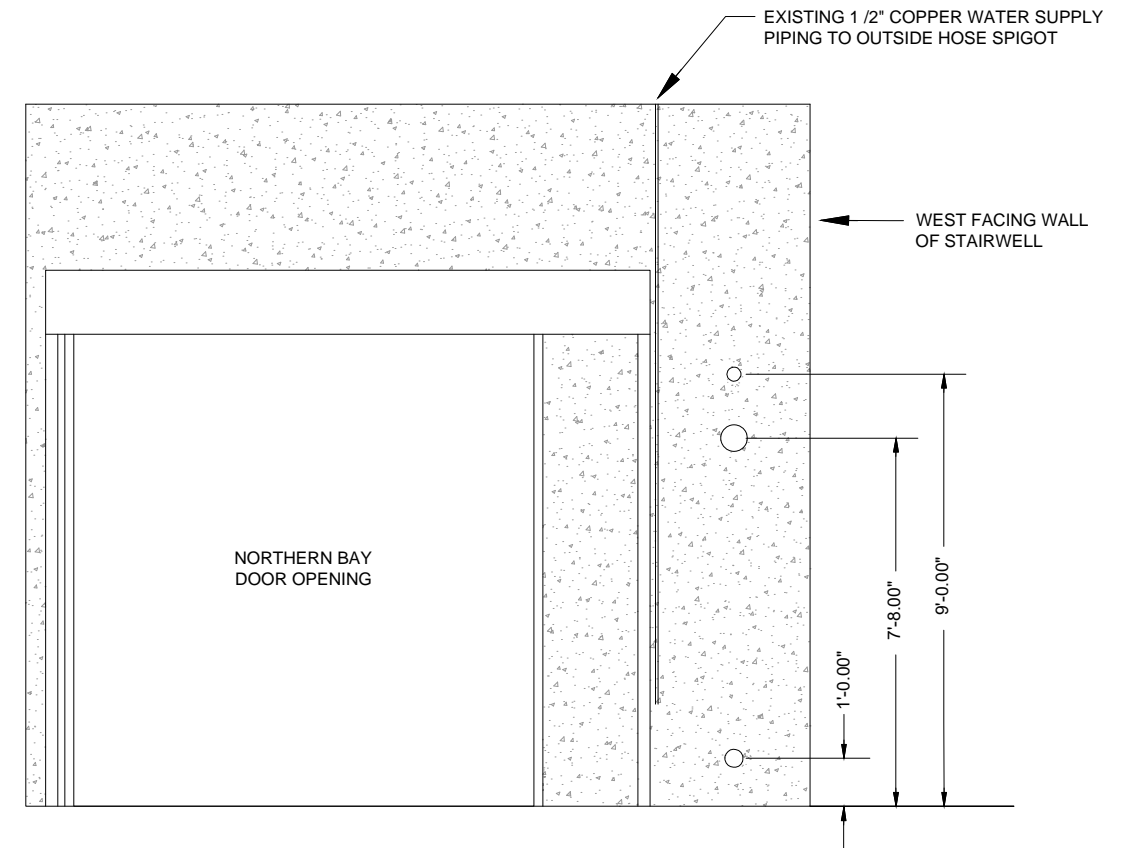
NOTES:

- EXTRACTION WELLHEAD VAULT BOXES SHALL BE CUSTOM FABRICATED ACCORDING TO THE DETAILS SHOWN.
- MATERIALS OF CONSTRUCTION SHALL BE 16 GAUGE MILD OR STAINLESS STEEL WITH CONTINUOUSLY WELDED JOINTS TO CREATE A WATER-TIGHT ENCLOSURE. UNITS CONSTRUCTED OF MILD STEEL SHALL BE POWDER COATED FOR CORROSION RESISTANCE.
- VAULT BOXES SHALL BE EQUIPPED WITH A ONE PIECE FULLY REMOVABLE LID WITH SEALING GASKET AND EQUIPPED WITH TWO HANDLES TO FACILITATE EASY REMOVAL. LIFTING HANDLES SHALL ALSO BE PROVIDED ON TWO OPPOSING SIDES OF EACH VAULT BOX TO FACILITATE LIFTING AND PLACEMENT OF THE UNIT.

SCALE(S) AS INDICATED		Professional Engineer's Name Peter J Campbell Professional Engineer's No. 45051			 Design & Consultancy for natural and built assets ARCADIS U.S., INC.	FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON DUAL-PHASE EXTRACTION SYSTEM		ARCADIS Project No. 30045282		C-2
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.		USE TO VERIFY FIGURE REPRODUCTION SCALE				CONSTRUCTION DETAILS - EXTRACTION WELLHEADS		Date AUGUST 2020		
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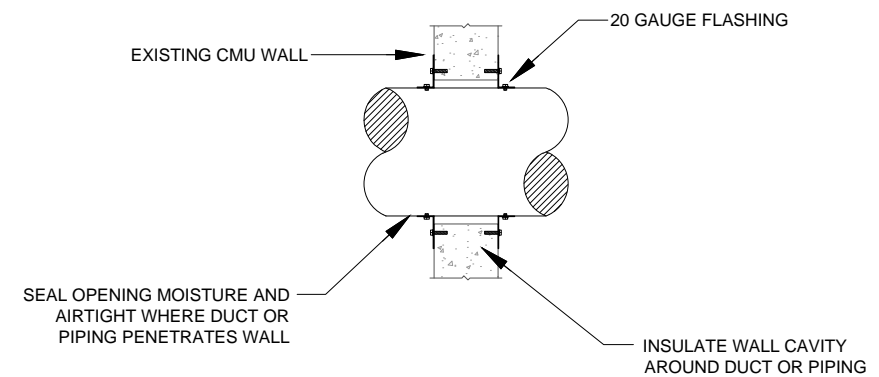
A - A' DUCT AND PIPING WALL PENETRATION ELEVATION DETAIL



B - B' DUCT AND PIPING WALL PENETRATION ELEVATION DETAIL

NOTES:

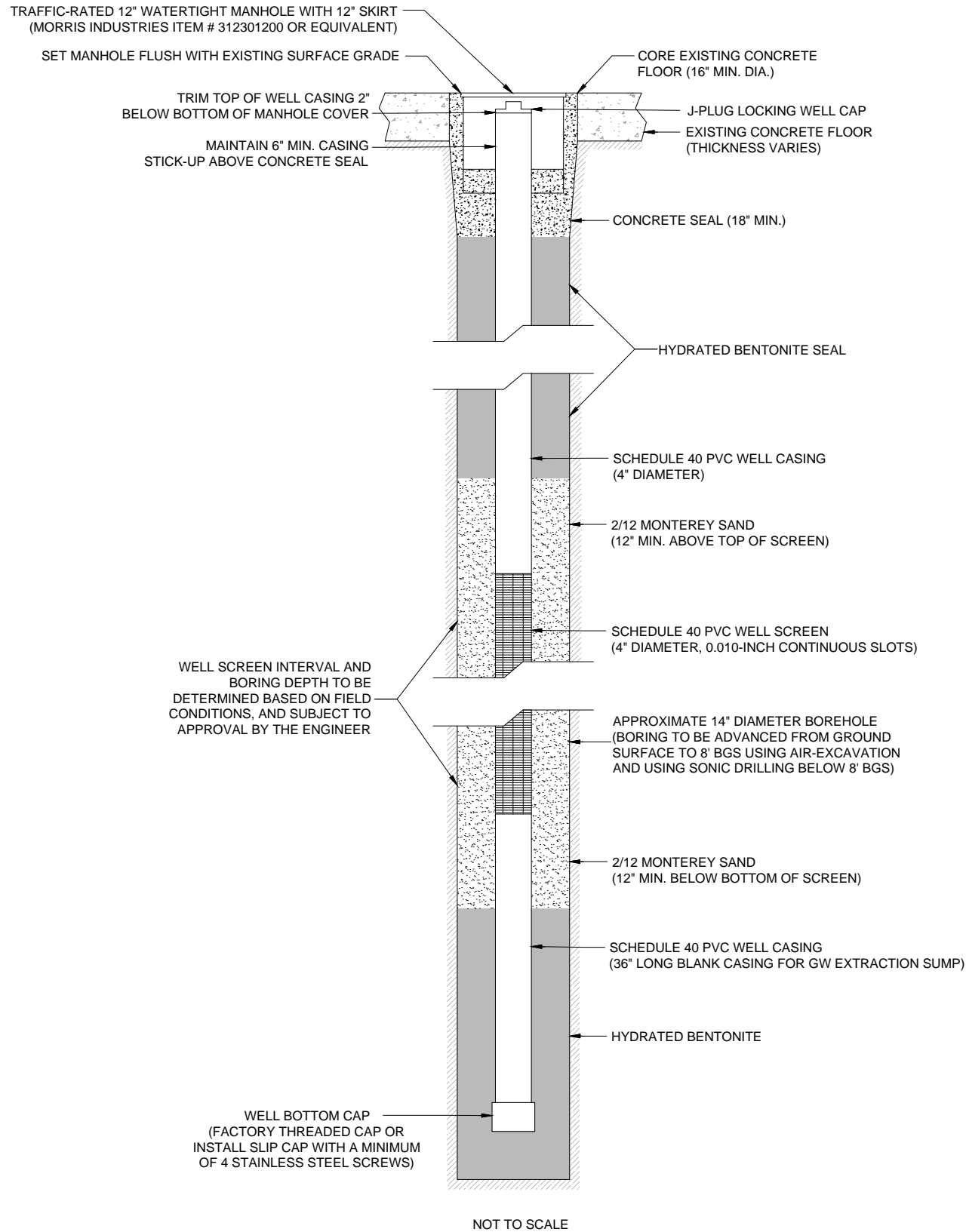
1. EXISTING CMU WALL CONTAINS NO. 6 REBAR AT 32" ON CENTER.
2. CONTRACTOR TO USE FERROSCAN OR SIMILAR DEVICE TO LOCATE EXISTING REBAR PRIOR TO CONCRETE CORING FOR PIPE OR DUCT PENETRATIONS.
3. WALL PENETRATIONS FOR ALL PIPING AND DUCT WORK SHALL BE A MINIMUM OF 4" CLEAR TO THE NEAREST REBAR.
4. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
5. WALL PENETRATION LOCATIONS SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO CONCRETE CORING FOR PIPE OR DUCT PENETRATIONS.



DUCT AND PIPING WALL PENETRATION DETAIL (TYPICAL)

SCALE(S) AS INDICATED																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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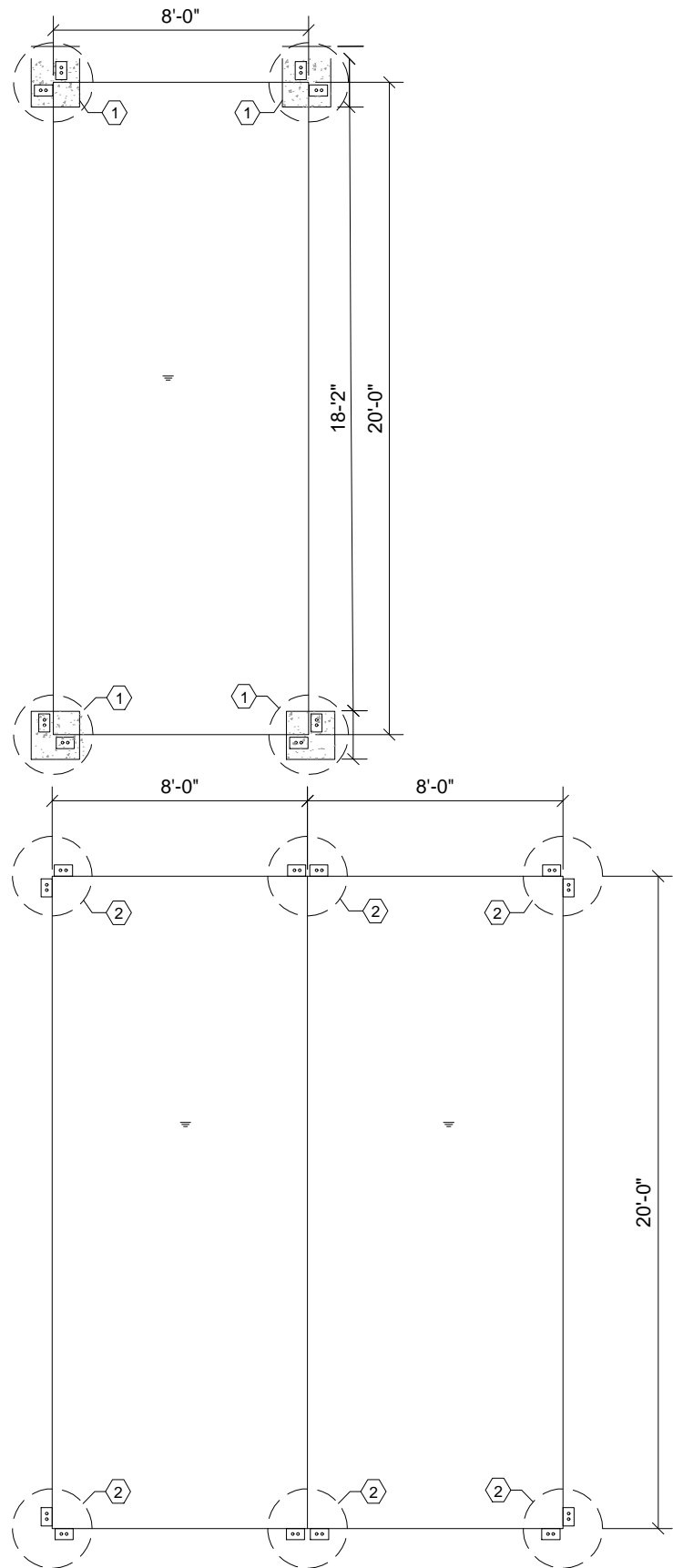
CITY: DIV/GROUP: DB: LD: PIC: PM: T.M: L.YR ON="OFF="+REF"
C:\Users\m0285\BIM-360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\95439 - Seattle\2020\3004528201-DWG\DPES - C5 - Construction Details - Extraction wells.dwg LAYOUT: C-5 SAVED: 7/20/2020 4:56 PM ACADVER: 23.1S (LMS TECH) PAGES: 1 OF 1 PLOTTED: 7/3/2020 8:26 PM BY: M. SARAVANAPRIYA PROJECTNAME: ---
XREFS: IMAGES: BDR-C-LD Stamp.jpg



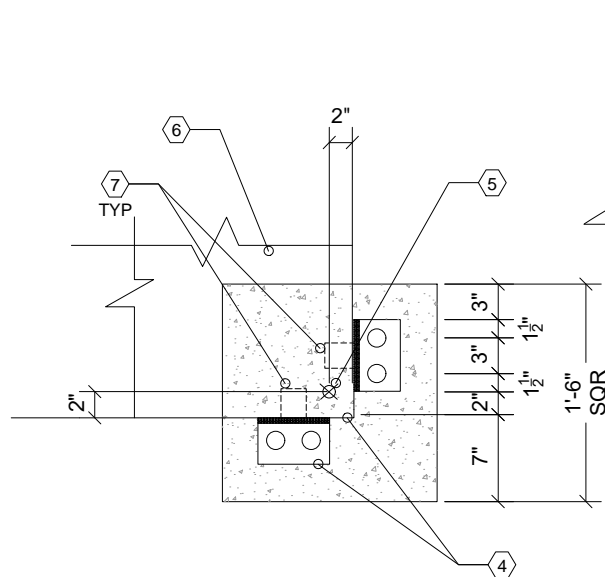
- NOTES:**
1. ALL DRILLING AND MONITORING WELL INSTALLATION WORK SHALL BE PERFORMED BY A DRILLER LICENSED TO PERFORM WORK IN WASHINGTON STATE AND PER WAC CHAPTER 173-160, MINIMUM STANDARDS FOR CONSTRUCTION AND MAINTENANCE OF WELLS.

SCALE(S) AS INDICATED		Professional Engineer's Name Peter J Campbell			 ARCADIS U.S., INC.	FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON DUAL-PHASE EXTRACTION SYSTEM CONSTRUCTION DETAILS - EXTRACTION WELLS CIVIL	ARCADIS Project No. 30045282	C-5
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.		USE TO VERIFY FIGURE REPRODUCTION SCALE					Date AUGUST 2020	
THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.		No. Date Revisions By Ckd					ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407	
Designed by P. Campbell		Date Signed 7/3/20 Project Mgr. M. Caldwell						

CITY: DIV/GROUP: DB: LD: PIC: PM: TYP: LYN: ON=OFF=REF*
C:\Users\m0295\BIM\360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\95439 - Seattle\2020\300452820\1-DWG\DPES - S1 - Seismic Anchoring Details.dwg LAYOUT: S-1
PM: BY: M. SARAVANAPRIYA
XREFS: BDR-C-LD
IMAGES: 15.PNG
Stamp.jpg
PROJECTNAME: ---
PLOTTED: 7/3/2020 8:27

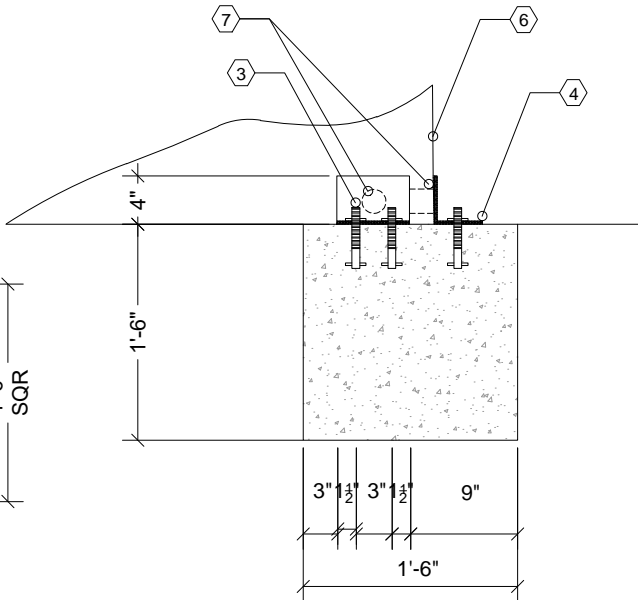


SEISMIC ANCHOR LAYOUT DETAIL - PLAN VIEW

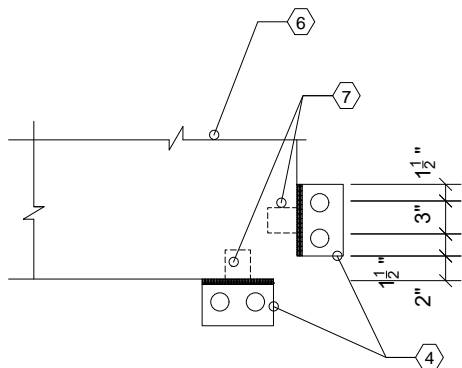


PLAN

SEISMIC ANCHOR DETAILS - EXTERIOR CONTAINERS

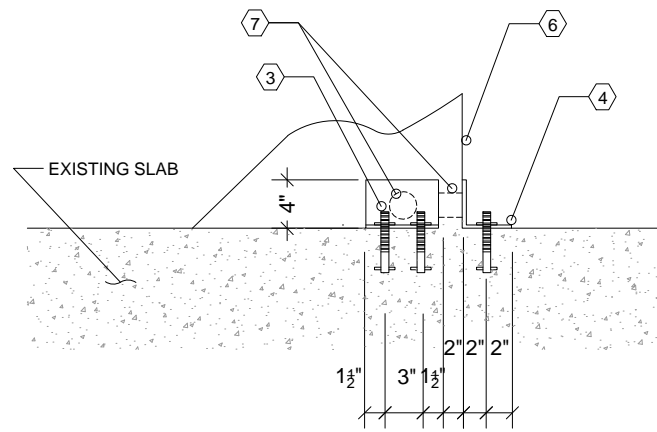


ELEVATION



PLAN

SEISMIC ANCHOR DETAILS - INTERIOR CONTAINERS



ELEVATION

GENERAL NOTES:

- BUILDING CODE: .ASCE 7-10/ IBC 2012
.SEATTLE BUILDING CODE
- SEISMIC CRITERIA
SDS: 0.868
Ip: 1.0
ap: 2.5
Rp: 6.0
- CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND INDICATED MEASUREMENTS WITH OTHER TRADED PRIOR TO THE START OF CONSTRUCTION.
- STEEL ANGLES SHALL BE ASTM A36 (FY=36 KSI).
- ALL CONCRETE WORK SHALL CONFIRM TO ACI 318 AND OTHER APPLICABLE STANDARDS.
- CONCRETE SHALL HAVE A MINIMUM DENSITY OG 145 PCF AND A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 3000 PSI.
- POST INSTALLED EXPANSION ANCHORS FOR CONCRETE SHALL BE KIWK-BOLT TZ - CS 1/2 (3 1/4) ANCHOR AS MANUFACTURED BY HILTI USA OR POWER-STUD AS MANUFACTURED BY POWERS FASTENERS. SET AND LEVEL IN PLACE AFTER EQUIPMENT IS ALIGNED.
- SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY OWNER'S DESIGNATED REPRESENTATIVE PRIOR TO THE START OF FABRICATION.

KEYED NOTES:

- NEW CONCRETE PIERS AND ANCHORS. (REFER TO DETAIL 1: S - 1).
- DENOTES ANCHORS AT INTERIOR LOCATION (REFER TO DETAIL 2: S - 1).
- KWIK-BOLT TZ - CS 1/2 (3 1/4) ANCHOR.
- STEEL ANGLES (L4X4X1/4 - 6" LONG).
- CENTER OF CONCRETE PIER FOR CONTAINER 3.
- REMEDIATION SYSTEM CONTAINER.
- 2" LG PIPE WELDED TO ANGLE. DIAMETER TO BE 1/2" +/- LESS THAN HOLE IN CONTAINER BASE.

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name Peter J Campbell		
Professional Engineer's No. 45051		
State CA	Date Signed 7/3/20	Project Mgr. M.Caldwell
Designed by P.Campbell	Drawn by N.Reddy	Checked by J.Brockman



ARCADIS Design & Consultancy for natural and built assets

ARCADIS U.S., INC.

FORMER CHEVRON SERVICE STATION NO. 95439 • SEATTLE, WASHINGTON
DUAL-PHASE EXTRACTION SYSTEM

SEISMIC ANCHORING DETAILS

CIVIL

ARCADIS Project No. 30045282	S-1
Date AUGUST 2020	
ARCADIS U.S. INC. 7 TOVEY ROAD CHARLESTON, SC 29407	

LEGEND

- MAIN PROCESS LINE
- AUXILIARY SYSTEMS
- BUILDING/AREA EXTENTS
- ELECTRIC (ELECTRONIC) SIGNAL



FLEXIBLE HOSE



BALL VALVE



BUTTERFLY VALVE



GATE VALVE



SAMPLE/BLEED VALVE



NEEDLE VALVE



GLOBE VALVE



KNIFE GATE VALVE



SWING CHECK VALVE



BALL CHECK VALVE



SOLENOID OPERATED VALVE



MOTOR OPERATED VALVE



SAMPLE PORT



PRESSURE REGULATING VALVE



FLANGED CONNECTION/PIPE TRANSITION



NON-FLANGED PIPE TRANSITION



UNION



REDUCER



Y STRAINER



PRESSURE RELIEF VALVE



VACUUM RELIEF VALVE



CAMLOCK



QUICK CONNECT FITTING (AIR)



HOSE BARB CONNECTION



CAP



PARTICULATE FILTER



COALESCING FILTER

M

MOTOR

VFD

VARIABLE FREQUENCY DRIVE



EXTRACTION WELL PUMP



CENTRIFUGAL PUMP



ROTARY-LOBE BLOWER



CHEMICAL METERING PUMP



SUMP PUMP



MAGNETIC FLOW METER



POSITIVE DISPLACEMENT FLOW METER



AVERAGING PILOT TUBE FLOW METER



ROTAMETER WITH VALVE



STATIC MIXER



SITE GLASS



FILTER



FLAME ARRESTOR

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS			
SHARED DISPLAY, SHARED CONTROL			
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.			
PROGRAMMABLE LOGIC CONTROLLER FUNCTION			

PIPELINE DESIGNATION

6"-S04P

LINE TYPE
MATERIAL
SIZE

MATERIAL:

BRZ - BRASS/BRONZE	GCS - GALVANIZED CARBON STEEL
CJR - CAST IRON	HDPE - HIGH DENSITY POLYETHYLENE
CST - CARBON STEEL	LCS - LINED CARBON STEEL
CPR - COPPER	PET - POLYETHYLENE
CVC - CHLORINATED POLYVINYL CHLORIDE	POP - POLYPROPYLENE
DIR - DUCTILE IRON	PVC - POLYVINYL CHLORIDE
FRP - FIBERGLASS	RUB - RUBBER
	S04 - 304 STAINLESS STEEL
	S4L - 304L STAINLESS STEEL
	S16 - 316 STAINLESS STEEL
	S6L - 316L STAINLESS STEEL
	TEF - TEFLON
	VIT - VITON
	TYG - TYGON

TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

ALARMS:

1. AN ALARM THAT DISABLES ALL OR ANY PART OF THE SYSTEM WILL SEND A NOTIFICATION TO THE OPERATOR VIA THE SCADA SYSTEM.

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D = USER'S CHOICE	DIFFERENTIAL			
E = VOLTAGE, EMERGENCY		SENSOR (PRIMARY ELEMENT)	STOP	
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = USER'S CHOICE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED		

ABBREVIATIONS:

AC	AIR COMPRESSOR	L	LITER
AD	AIR DRYER	LAH	LEVEL ALARM HIGH
AI	pH INDICATOR	LAHH	LEVEL ALARM HIGH HIGH
AIT	pH INDICATOR TRANSMITTER	LAL	LEVEL ALARM LOW
AR	AIR RECEIVER TANK	LE	LEVEL ELEMENT
AS	ANTI-SCALANT	LP	LIQUID PHASE
C	CENTER LINE	LS	LEVEL SWITCH
CAH	CONDUCTIVITY ALARM HIGH	LT	LEVEL TRANSMITTER
CFM	CUBIC FEET PER MINUTE	M	MOTOR
CI	CONDUCTIVITY INDICATOR	MAX	MAXIMUM
CIP	CLEAN IN PLACE	uM	MICROMETER
CIT	CONDUCTIVITY INDICATOR TRANSMITTER	mg	MILLIMETER
CO	CLEAN OUT	MIN	MINIMUM
CTE	CONDUCTIVITY TEMPERATURE ELEMENT	MMF	MULTIMEDIA FILTER
CY	CUBIC YARDS	NA	NOT APPLICABLE
°C	DEGREES CELSIUS	NC	NORMALLY CLOSED
DPAL	DIFFERENTIAL PRESSURE ALARM LOW	NO	NORMALLY OPEN
DPAH	DIFFERENTIAL PRESSURE ALARM HIGH	NPT	NATIONAL PIPE THREAD
DPIT	DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER	%	PERCENT
DPI	DIFFERENTIAL PRESSURE INDICATOR	LB	POUNDS
E	ELECTRIC ACTUATOR	PAH	PRESSURE ALARM HIGH
ECIP	ELECTRODE CLEAN IN PLACE	PAL	PRESSURE ALARM LOW
EM	ENVIRONMENTAL MEDIA	PI	PRESSURE INDICATOR
ELEV	ELEVATION	PIT	PRESSURE INDICATOR TRANSMITTER
ESS	EMERGENCY STOP SWITCH	PSIG	PRESSURE PER SQUARE FOOT GAUGE
F	FILTER	PR	PRESSURE RELIEF VALVE
FE	FLOW ELEMENT	PRV	PRESSURE REGULATING VALVE
FI	FLOW INDICATOR	PSV	PRESSURE SAFETY VALVE
FIT	FLOW INDICATING TRANSMITTER	PVR	PRESSURE VACUUM RELIEF
FMO	FLOW MONITOR	QAAPP	QUALITY ASSURANCE PROJECTION PLAN
FQ	FLOW TOTALIZER	NaOH	SODIUM HYDROXIDE
FT	FOOT/ FEET	SP	SAMPLE PORT
FT	FLOW TRANSMITTER	T	TANK
FV	FLOW VALVE	TAH	TEMPERATURE ALARM HIGH
GAC	GRANULATED ACTIVATED CARBON	TAHH	TEMPERATURE ALARM HIGH HIGH
GAL	GALLONS	TI	TEMPERATURE INDICATOR
GPD	GALLONS PER DAY	TIT	TEMPERATURE INDICATOR TRANSMITTER
HAZ	HAZARDOUS	TYP	TYPICAL
HDPE	HIGH DENSITY POLYETHYLENE	TWV	THREE WAY VALVE
HOA	HAND/ OFF/ AUTO	V	VALVE
HR	HOUR	VAH	VACUUM ALARM HIGH
HS	HAND SWITCH	VAL	VACUUM ALARM LOW
IN.	INCHES	VE	VACUUM ELEMENT
kg	KILOGRAMS	VIT	VACUUM INDICATING TRANSMITTER
KV	TIMER VALVE	XLPE	CROSS LINKED POLYETHYLENE
		YI	STATUS INDICATOR
		ZX	POSITION INDICATOR

- NOTES:
1. ANY FIRST LETTER COMBINED WITH A MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: DP= DIFFERENTIAL PRESSURE; FQ= TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
 2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THAT NATURE OF THE ANALYSIS. EXAMPLE: pH
 3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.

- GENERAL NOTES:
1. ALL ANALOG SET POINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE.
 2. ALARMS THAT SHUT DOWN TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
 3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

NOT FOR
CONSTRUCTION

REV.	ISSUED DATE	DESCRIPTION	BY	CK'D
2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS

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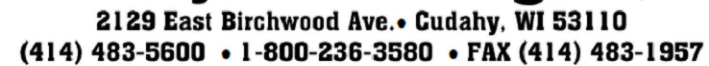
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DUAL PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

SHEET TITLE

**P&ID
NOTES & LEGEND SHEET**

APPROVED BY MPS	CHECKED BY MPS
DESIGNED BY PAP	DRAWN BY PAP
PROJECT NUMBER Q14972	DRAWING NUMBER P-01 SHEET 1 OF 4



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E-01: ELECTRICAL DRAWINGS TITLE SHEET
E-02: NOTES & LEGEND
E-03: ELECTRICAL SINGLE LINE
E-04: AREA CLASSIFICATION
E-05: PROCESS EQUIPMENT ELECTRICAL LAYOUT
E-06: ELECTRICAL HVAC & LIGHTING LAYOUT
E-07: PROCESS EQUIPMENT ELECTRICAL CONDUIT & CONDUCTOR SCHEDULE

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		2	08/13/2020	RESUBMITTED BASED ON COMMENTS	CJM	BDC	Arcadis U.S., Inc. 2300 Clayton Road, Suite 400 Concord, CA 94520 Tel: (925) 296-7849 www.arcadis.com	Fitemay Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.fitemay.com	PROJECT NUMBER Q14972			DRAWING NUMBER E-01	
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	REV.	ISSUED DATE	DESCRIPTION		BY	CK'D							SHEET 1 OF 7

ABBREVIATIONS

A	AMPERE	OC	ON CENTER
AC	ALTERNATING CURRENT	CC	CENTER TO CENTER
AL	ALUMINUM	OL	OVERLOAD RELAY
AI	ANALOG IN	OSC	OSCILLATION
AIT	CHLORINE RESIDUAL ANALYZER	P	POLE
AM	AMMETER	PB	PUSH BUTTON
ANN	ANNUNCIATOR	PF	POWER FACTOR
AMP	AMPERES, AMPERAGE	PH Ø	PHASE
AO	ANALOG OUT	PI	PULSE IN
APC	AMERICAN POWER CORP.	PL	PILOT LIGHT
APFD	APPROVED	PLC	PROGRAMMABLE LOGIC CONTROLLER
AS	AMMETER SWITCH	PNL	PANEL
AT	AMPERE TRIP	PNLBD	PANELBOARD
ATS	AUTOMATIC TRANSFER SWITCH	POS	POSITION
AUTO	AUTOMATIC	POT	POTENTIOMETER
AUX	AUXILIARY	PRI	PRIMARY
AWG	AMERICAN WIRE GAUGE	PIS	POWER SUPPLY
BATT	BATTERY	PS	PRESSURE SWITCH
BKR	BREAKER	PT	POTENTIAL TRANSFORMER
BLDG	BUILDING	PVC	POLYVINYL CHLORIDE
C	CONDUIT	REC	RECEPTACLE
CAB	CABINET	RECPTS	RECEPTACLES
CB	CIRCUIT BREAKER	REQD	REQUIRED
CKT	CIRCUIT	REV	REVERSE
CL	CIRCUIT	RGS	RIGID GALVANIZED STEEL
CO	CONDUIT ONLY	RTU	REMOTE TERMINAL UNIT
COM	COMMON	RNRV	REDUCED VOLTAGE NON-REVERSING
COND	CONDUIT	RVSS	REDUCED VOLTAGE SOLID STATE
CP	CONTROL PANEL	SC	SHORT CIRCUIT CURRENT
CPT	CONTROL POWER TRANSFORMER	SCH	SCHEDULE
CR	CONTROL RELAY	SEC	SECONDARY, SECONDS
CT	CURRENT TRANSFORMER	SECT	SECTION
CU	COPPER	SS	SELECTOR SWITCH
DC	DIRECT CURRENT	SHLD	SHIELDED
DH	DATA HIGHWAY	SP	SPARE
DI	DIGITAL IN	SPDT	SINGLE POLE DOUBLE THROW
DIO	DIGITAL IN OUTPUT	SPECS	SPECIFICATIONS
DISC	DISCONNECT	SP HTR	SPACE HEATER
DISTR	DISTRIBUTION	SPST	SINGLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW	SS	SOLID STATE
DWG	DRAWING	ST	SHUNT TRIP
(E)	EXISTING	STA	STATION
EF	EXHAUST FAN	STD	STANDARD
EHU	ELECTRIC HEATING UNIT	STL	STEEL
ELEV	ELEVATION	SOV	SOLENOID OPERATED VALVE
FDR	FEEDER	SW	SWITCH
EMT	ELECTRICAL METALLIC TUBING	SYS	SYSTEM
ENCL	ENCLOSURE	SYM	SYMMETRICAL
FUT	FUTURE	TB	TERMINAL BOX
FVR	FULL VOLTAGE REVERSING	TC	TIME CLOCK
EP	EXPLOSION PROOF	TACH	TACHOMETER
ETM	ELAPSED TIME METER	TEMP	TEMPERATURE
EXH	EXHAUST	TERM	TERMINAL
EXIST	EXISTING	TSTAT	THERMOSTAT
FLEX	FLEXIBLE	TD	TIME DELAY
FLUOR	FLUORESCENT	TS	TEMPERATURE SWITCH
FVNR	FULL VOLTAGE NON-REVERSING	TSP	TWISTED SHIELDED PAIR
FWD	FORWARD	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
GALV	GALVANIZED	TYP	TYPICAL
GEN	GENERATOR	UG	UNDERGROUND
GND	GROUND	UH	UNIT HEATER
H	HOT CONDUCTOR	UON	UNLESS OTHERWISE NOTED
HH	HAND HOLE	UPS	UNINTERRUPTIBLE POWER SUPPLY
HID	HIGH INTENSITY DISCHARGE	V	VOLTAGE, VOLTS
HG	MERCURY	VFD	VARIABLE FREQUENCY DRIVE
HMI	HUMAN MACHINE INTERFACE	VP	VAPOR PROOF
HOA	HAND-OFF-AUTOMATIC	VS	VOLTMETER SWITCH, VARIABLE SPEED
HP	HORSEPOWER	W	WATTS, WIRE
HPS	HIGH PRESSURE SODIUM	WHD	WATTHOUR DEMAND METER
HT TR	HEAT TRACED	WHM	WATTHOUR METER
HTR	HEATER	WP	WEATHERPROOF
HVAC	HEATING, VENTILATING, A/C		
HZ	HERTZ - CYCLES PER SECOND		
IMC	INTERMEDIATE METAL CONDUIT		
INCAND	INCANDESCENT		
IND	INDICATION, INDICATING		
INO	INPUT/OUTPUT		
INSTR	INSTRUMENT		
INVT	INVERT		
JB	JUNCTION BOX		
J BOX	JUNCTION BOX		
KVA	KILO VOLT AMPERES		
KW	KILOWATTS		
KWH	KILOWATT HOUR		
KCM	1,000 CIRCULAR MILS		
L	LINE		
LC	LIGHTING CONTACTOR		
LCB	LOCAL CONTROL BOARD		
LCP	LOCAL CONTROL PANEL		
LOC	LOCAL		
LS	LEVEL SWITCH		
LT	LIGHT		
LTG	LIGHTING		
LTS	LIGHTS		
M	MOTOR CONTACTOR COIL		
mA	MILLIAMPS		
MAN	MANUAL		
MAG	MAGNETIC		
MAX	MAXIMUM		
MCC	MOTOR CONTROL CENTER		
MCB	MAIN CONTROL BOARD		
MCP	MOTOR CIRCUIT PROTECTOR		
MD	MOTORIZED DAMPER		
MDR	MANUFACTURERS' DESIGNATION FOR SPECIFIC POWER SUPPLY		
MH	MANHOLE		
MTG	MOUNTING		
MIN	MINIMUM, MINUTES		
MLO	MAIN LUGS ONLY		
MOV	MOTOR OPERATED VALVE		
MS	MOTOR STARTER		
MMS	MANUAL MOTOR STARTER		
MTD	MOUNTED		
MTR	MOTOR		
N	NEUTRAL		
NA	NON-AUTOMATIC		
NC	NORMALLY CLOSED		
NO	NORMALLY OPEN		
NO	NUMBER		
NOS	NUMBERS		
NP	NAMEPLATE		
(N)	NEW OR PROPOSED		
NTS	NOT TO SCALE		

DRAWING LEGEND

	EXISTING EQUIPMENT, WIRING, DEVICES
	NEW WORK
	DEMOLISH OR REMOVE
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	EQUIPMENT OR DEVICE TAG
	SHEET NOTE TAG
	HVAC/LIGHTING ITEM (SEE SCHEDULE)
	DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	DOUBLE DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	FLUORESCENT LIGHTING FIXTURE
	JUNCTION BOX, SIZE PER NEC
	WALL MOUNTED LUMINAIRE
	LIGHT SWITCH, SINGLE ACTION.
	3/4" x 10' CU CLAD GROUND ROD.
	UNDERGROUND CONDUIT OR DUCT/BANK.
	INSTRUMENTATION DEVICE
	THERMOSTAT
	CONDUIT SEAL OFF
NOTE: NO HASH MARK INDICATES 3/4" C. 2#12+1#12G	

ELECTRICAL COMPONENTS

	EARTH GROUND
	CHASSIS GROUND
	GROUNDING RECEPTACLE
	FUSE
	HORN
	TRANSFORMER
	SOLENOID
	OVERLOAD RELAY
	CIRCUIT BREAKER
	MOTOR (NO. DENOTES HORSEPOWER), SINGLE LINE
	MOTOR, ELECTRICAL LAYOUT SHEET(S)
	RELAY CONTACT, N.O.
	RELAY CONTACT, N.C.
	SHIELDED CABLE
	DIODE, SURGE SUPPRESSOR
	SURGE SUPPRESSOR
	TERMINAL BLOCK
	SEPARABLE CONNECTOR
	POTENTIOMETER
	CURRENT TRANSFORMER

NOTES - RACEWAYS

- CONDUIT ROUTING SHOWN ON DRAWINGS IS DIAGRAMMATIC TO ILLUSTRATE DESIGN INTENT. CONTRACTOR SHALL FIELD DETERMINE THE MOST SUITABLE ROUTING TO FACILITATE INSTALLATION.
- ALL CONDUIT RUNS SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS AND OFFSETS. GENERALLY, A RUN OF CONDUIT CONTAINING LOW VOLTAGE (600 VOLT MAXIMUM) WIRE SHALL HAVE A MAXIMUM PULLING DISTANCE OF 300 FEET AND CONTAIN NO MORE THAN THREE AND ONE-HALF QUARTER BENDS (315 DEGREES TOTAL), INCLUDING OFFSETS AND BENDS LOCATED IMMEDIATELY ADJACENT TO THE PULL LOCATION. ON RUNS OVER 300 FEET THIS SHALL BE REDUCED TO TWO QUARTER BENDS (180 DEGREES TOTAL).
- FOR 600 VOLT CABLES, THE MINIMUM RADIUS OF CONDUIT BENDS SHALL BE SIX TIMES THE DIAMETER OF THE CONDUIT. WHERE BENDS OR OFFSETS ARE REQUIRED, THEY SHALL BE MADE WITH SUITABLE CONDUIT BENDING EQUIPMENT. A UNIFORM CIRCULAR CROSS SECTION OF THE CONDUIT SHALL BE MAINTAINED AT BENDS. NO SINGLE BEND SHALL BE GREATER THAN 90 DEGREES.
- CONDUIT UNIONS SHALL BE INSTALLED AT REMOVABLE DEVICES SUCH THAT THE DEVICES CAN BE EASILY AND INDEPENDENTLY REMOVED.
- NOT ALL FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM ARE SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL THE NUMBER AND TYPE OF FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM WHICH COMPLIES WITH ALL APPLICABLE CODES AND STANDARDS. THE THREADS OF FITTINGS, INCLUDING COVER SCREWS AND BOLTS, SHALL BE COATED WITH A CONDUCTING THREADED LUBRICANT PRIOR TO INSTALLATION TO PROTECT AGAINST CORROSION.
- ALL CONDUIT FITTINGS AND JUNCTION BOXES SHALL BE INSTALLED SO THAT THEIR COVERS ARE EASILY REMOVED.
- ALL METALLIC CONDUIT SHALL BE TERMINATED WITH INSULATED BUSHINGS TO PREVENT DAMAGE TO WIRE DURING PULLING OPERATIONS, EXCEPT IN ENCLOSURES WHERE HUB DESIGN IS ADEQUATE TO PREVENT INSULATION DAMAGE. GROUNDING CONNECTIONS SHALL BE PROVIDED ON ALL INSTALLED BUSHINGS FOR GROUND CONTINUITY.
- CONDUITS SHALL NOT BE SUPPORTED FROM EQUIPMENT OR PIPING. CONDUITS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED BY NEC 344.30. "SECURING AND SUPPORTS" AND TABLE 344.30(B)(2). TO PREVENT NOTICEABLE SAG, NO NOTICEABLE SAG SHALL BE ALLOWED. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SUPPORT REQUIRED TO PREVENT OBJECTIONABLE SAG. IF RIGID ALUMINUM CONDUIT IS USED, THE SUPPORT SYSTEM SHALL BE OF SUITABLE MATERIAL OR CONSTRUCTION TO PREVENT GALVANIC ACTION.
- LIQUID-TITE FLEXIBLE CONDUIT WITH PVC JACKET SHALL BE USED WHERE VIBRATION IS PRESENT, WHERE FLEXIBILITY IS REQUIRED, AND AT ALL MOTOR CONDUIT BOXES. TERMINATIONS OF FLEXIBLE METALLIC CONDUIT SHALL BE MADE USING LIQUID-TIGHT CONNECTORS WITH INTEGRAL INSULATED BUSHINGS AND POSITIVE GROUND CONNECTIONS. THE MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL BE 24 INCHES FOR INSTRUMENTS AND EQUIPMENT, 36 INCHES FOR MOTORS, AND 48 INCHES FOR LIGHTING.
- RUNS OF ABOVE GROUND CONDUIT FOR ANY SERVICE SHALL NOT BE DIRECTLY SUPPORTED FROM OVERHEAD PIPING.
- ALL ABOVE GROUND, STRAIGHT CONDUIT RUNS OVER 200 FEET LONG SHALL HAVE EXPANSION FITTINGS, WITH PROVISION FOR 4 INCHES TOTAL EXPANSION. BONDING JUMPERS SHALL BE INSTALLED TO ASSURE GROUNDING CONTINUITY.
- THREADED JOINTS FOR CONDUITS SHALL BE MADE UP WITH A METAL OXIDE PAINT SUCH AS "T&B" KOPR-SHIELD, BURNDY PENETROX E OR APPROVED EQUAL.
- PROVIDE ABOVE GRADE CONDUIT SUPPORT AT LEAST EVERY 10 FEET. FASTEN CONDUIT WITHIN 3 FEET OF EACH OUTLET BOX OR FITTING.
- USE CABLE PULLING LUBRICANT, SUCH AS, POLYMER OR EQUAL FOR CABLE PULLS IN CONDUIT GREATER THAN 10-FEET.

GENERAL ELECTRICAL CONSTRUCTION NOTES

- CONTRACTOR IS RESPONSIBLE FOR VERIFY EXISTING CONDITIONS AND ROUTE CONDUITS WITHOUT DISTURBING EXISTING UTILITIES. IN ADDITION, CONDUIT ROUTING MUST BE APPROVED BY A OWNERS REPRESENTATIVE. FEASIBILITY OF THE LOCATION OF THE EQUIPMENT SHALL BE FIELD VERIFIED. COORDINATE WITH ALL TRADES.
- VERIFY, LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. REPAIR ALL UTILITIES DAMAGED DURING CONSTRUCTION TO OWNERS SATISFACTION.
- MINOR CHANGES IN WORK DUE TO EXISTING CONDITIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.
- ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND VERIFY EXISTING CONDITIONS BEFORE BIDDING AND SHALL INCLUDE IN HIS BID THE NECESSARY COSTS TO CONSTRUCT THIS PROJECT IN ACCORDANCE WITH THE INTENT OF THE ELECTRICAL DRAWINGS, SPECIFICATIONS, AND ALL APPLICABLE CODES.
- THE ELECTRICAL INSTALLATION SHALL COMPLY WITH ALL LOCAL, STATE, AND NATIONAL CODES, LAWS, AND ORDINANCES APPLICABLE TO ELECTRICAL WORK.
- ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES.
- THE WORD PROVIDE AS USED ON THE DRAWINGS SHALL BE DEFINED AS CONTRACTOR FURNISHED AND INSTALLED.
- AT LEAST TWO WORKING DAYS PRIOR TO ANY EXCAVATION WORK, THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT AT 1-800-227-2600 FOR LOCATING AND MARKING UTILITIES IN THE AREAS OF THE WORK.
- ALL UNDERGROUND CONDUITS SHALL BE PVC, SCHEDULE 40 OR BETTER UNLESS OTHERWISE NOTED.

NOTES - WIRING

- SINGLE OR MULTICONDUCTOR CABLE MAY BE USED FOR CONTROL, INSTRUMENT, COMMUNICATION AND SIGNAL CIRCUITS. SINGLE-CONDUCTOR SHALL #14 AWG MINIMUM. SINGLE PAIRED CABLES SHALL BE #18 AWG MINIMUM. AND MULTICONDUCTOR CABLE SHALL BE #20 AWG MINIMUM. CIRCUITS CLASSIFIED AS CLASS I CIRCUITS BY NEC ARTICLE 725 SHALL BE #18 AWG MINIMUM, 600 VOLT INSULATION CLASS.
- ALL FIELD POWER, CONTROL AND LIGHTING CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS UNLESS OTHERWISE SPECIFIED.
 - BLACK - ALL UNGROUNDED CONTROL CIRCUITS AND CONDUCTORS OPERATING AT THE SUPPLY VOLTAGE.
 - RED - UNGROUNDED AC CONTROL CIRCUITS OPERATING AT A VOLTAGE LESS THAN THE SUPPLY VOLTAGE.
 - BLUE - UNGROUNDED DC CONTROL CIRCUITS.
 - YELLOW OR ORANGE - UNGROUNDED CONTROL CIRCUITS OR OTHER WIRING.
 - WHITE - GROUNDED AC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR REGARDLESS OF VOLTAGE.
 - GREY - GROUNDED DC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR.ALL INTERIOR CONTROL PANEL WIRING SHALL BE PER UL 508A, LATEST EDITION.
- NO MORE THAN TWO CONDUCTORS SHALL BE CONNECTED TO ANY ONE TERMINAL ON A TERMINAL STRIP. IF MORE THAN TWO CONDUCTORS MUST BE TERMINATED AT THE SAME POINT, THE TERMINATIONS SHALL BE MADE ON AS MANY TERMINALS AS NECESSARY AND THE TERMINALS INTERCONNECTED WITH JUMPERS. THE JUMPERS SHALL BE PHYSICALLY SEPARATED FROM THE CONDUCTORS.
- FOR POWER AND LIGHTING CIRCUITS, 600 VOLTS AND BELOW, THE SMALLEST WIRE SHALL BE #12 AWG. EXCEPT THAT #14 AWG SHALL BE USED FOR CONTROLS. WIRES SHALL BE SINGLE CONDUCTOR, COPPER, STRANDED, 600 VOLT HEAT AND MOISTURE RESISTANT THERMOPLASTIC INSULATED TYPE "THHN/THWN". UNDERGROUND CONDUCTORS MUST BE RHW, UNLESS OTHERWISE NOTED.
- #10 AWG OR LARGER SHALL BE XHHW UNLESS NOTED OTHERWISE.
- MOTOR JUNCTION BOX CONNECTIONS SHALL BE CRIMP LUG/BOLTED CONNECTIONS WITH 3M MOTOR SPICE KIT 5300 SERIES INSULATORS.

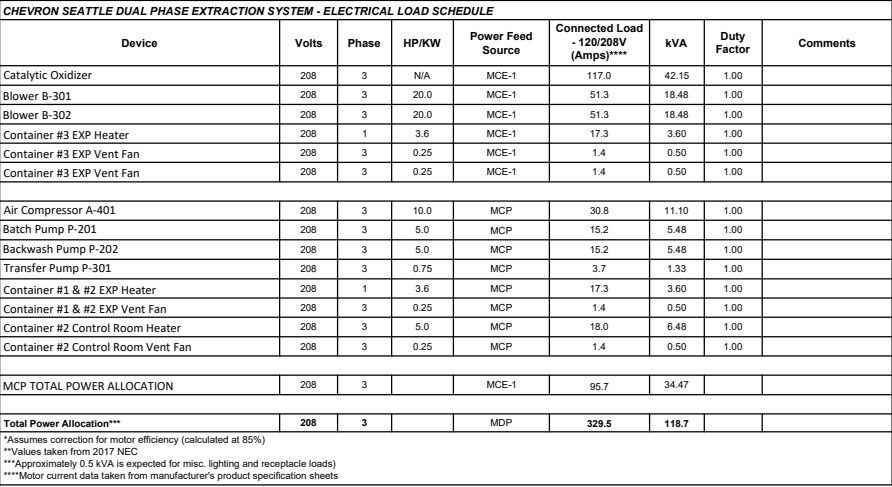
NOTES - GROUNDING

- ALL INSULATED GROUNDING CONDUCTORS SHALL BE MADE OF SOFT DRAWN, STRANDED COPPER WIRE, UTILIZING GREEN, FIRE RETARDANT INSULATION. ALL EXPOSED GROUNDING CONDUCTORS SHALL BE MINIMUM #6 AWG, RIGIDLY SUPPORTED, AND PROTECTED FROM MECHANICAL INJURY.
- ALL UN-INSULATED GROUNDING CONDUCTORS (STRANDED OR SOLID) SHALL BE TINNED COPPER.
- ALL CONNECTIONS SHALL BE COATED WITH A CONDUCTIVE, CORROSION PREVENTIVE COMPOUND BEFORE JOINING.
- ALL COPPER BUS BARS MUST BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION.
- CONTRACTOR SHALL TEST GROUNDING ELECTRODE SYSTEM USING THE FALL OF POTENTIAL METHOD OR A CLAMP-ON GROUND RESISTANCE TESTER. RESULTS SHALL SHOW THE ELECTRODE HAS A RESISTANCE TO EARTH OF 25 OHMS OR LESS. SUPPLEMENTAL ELECTRODES SHALL BE REQUIRED IF RESISTANCE TO EARTH IS GREATER THAN 25 OHMS.

NOTES - LABELS

- PROVIDE LAMINATED PLASTIC EQUIPMENT NAMEPLATE LABELS AT ALL FIELD DEVICES, DENOTING EQUIPMENT NAME, VOLTAGE AND FEEDER ORIGIN. PLASTIC NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS. ALL EXISTING PANELBOARD CIRCUIT DIRECTORIES SHALL BE UPDATED DENOTING NEW EQUIPMENT LOADS.
- ALL JUNCTION BOX COVERPLATES SHALL BE LABELED WITH CIRCUIT NUMBERS IT CONTAINS.
- NAMEPLATES AND TAGS SHALL BE PROVIDED FOR ELECTRICAL EQUIPMENT AND DEVICES, INCLUDING ALL PUSHBUTTONS, SELECTOR SWITCHES, CIRCUIT BREAKERS AND STARTERS. WHERE EQUIPMENT ALSO CAN BE STARTED FROM ANOTHER LOCATION, OR STARTED AUTOMATICALLY, A CAUTION NAMEPLATE SHALL BE PROVIDED.
- THE NAMEPLATE DESCRIPTION SHALL SHOW THE EQUIPMENT NUMBER AND SERVICE OF THE CONTROLLED EQUIPMENT. ALL PANELBOARDS SHALL HAVE NAMEPLATES STATING THE APPROPRIATE DESIGNATION, VOLTAGE, CONTINUOUS RATING, AND NUMBER OF PHASES. LIGHTING AND POWER PANELS SHALL BE SUPPLIED WITH COMPLETED CIRCUIT DIRECTORIES.
- ALL WIRING SHALL BE IDENTIFIED AT EACH TERMINATION WITH PERMANENT, PRINTED, HEAT-SHRINKABLE PLASTIC SLEEVES OR WITH CLEAR, HEAT-SHRINKABLE SLEEVES THAT COVER ADHESIVE WRAP-ON MARKERS. CONTRACTOR SHALL USE A "BRADY" OR EQUAL TYPE WIRE MARKER. THE WIRE IDENTIFICATION NUMBER SHALL INCLUDE THE COMPLETE CIRCUIT OR INSTRUMENT NUMBER. THE WIRE IDENTIFICATION SHALL BE THE IDENTIFICATION SHOWN ON THE WIRING DIAGRAM. IF NONE IS SHOWN ON A WIRING DIAGRAM, THE OWNERS REPRESENTATIVE SHALL BE CONSULTED FOR PROPER IDENTIFICATION. ELECTRICAL CABLES SHALL BE LABELED WITH THE CIRCUIT NUMBER AND PHASE DESIGNATION AT EACH END OF CABLE. IF THE CABLE IS IN CONDUIT, THE CONDUIT TAG MAY SERVE AS AN INDICATION OF THE CIRCUIT NUMBER FOR POWER CIRCUITS.

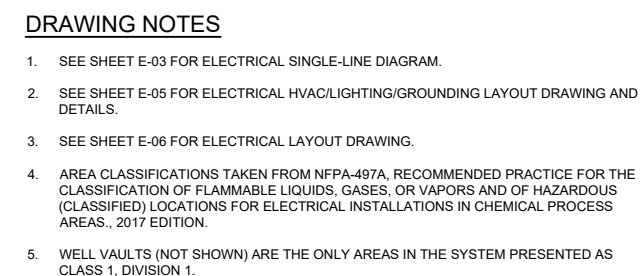
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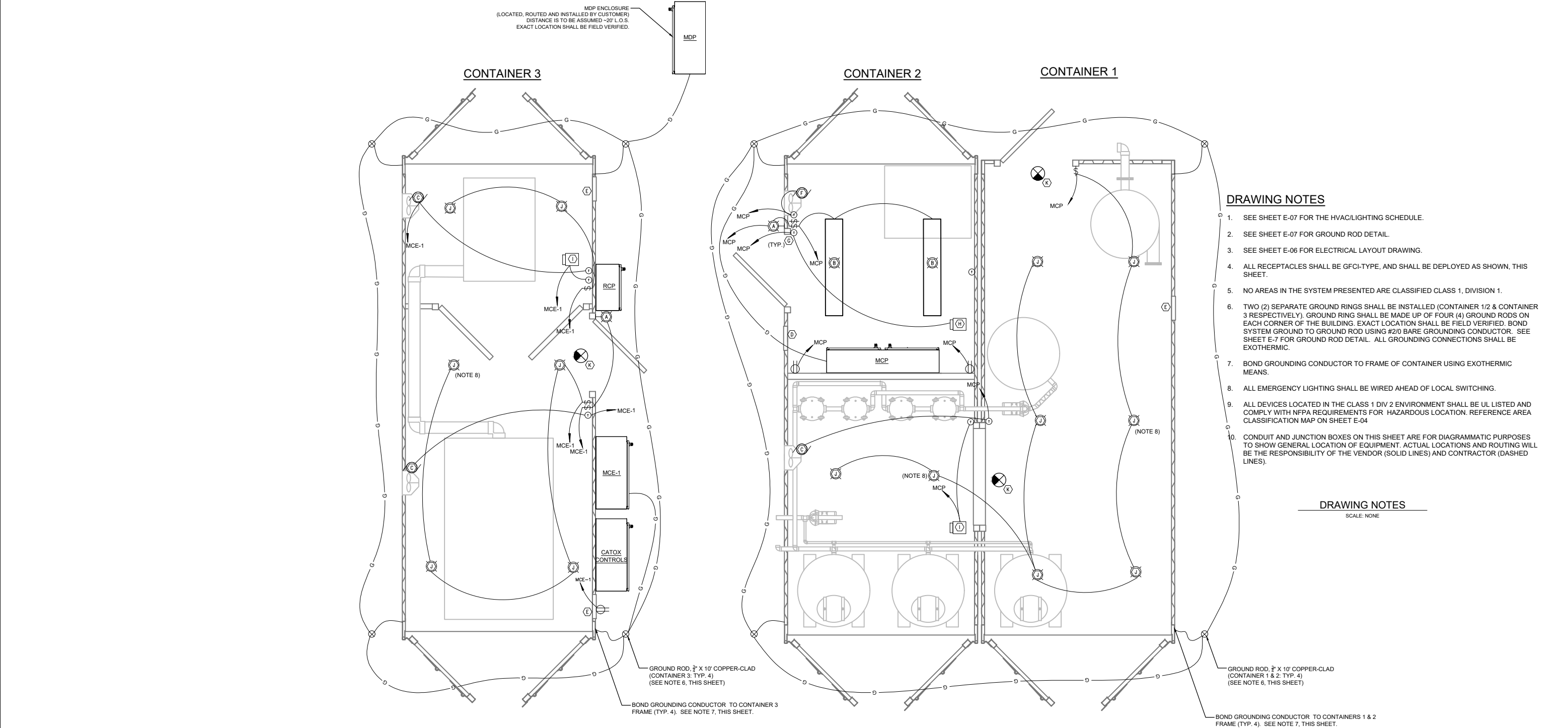
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| 1. SEE SHEET E-03 FOR ELECTRICAL AREA CLASSIFICATION DIAGRAM. | 7. DISCONNECTS LOCATED OUTDOORS SHALL BE NEMA 4XSS. DISCONNECTS LOCATED INDOORS (NON-CLASSIFIED) SHALL BE NEMA 3R. ALL SHALL BE VISIBLE-BLADE TYPE, BE SIZED APPROPRIATELY FOR THE CIRCUIT SIZE AND VOLTAGE AND LABELED "DO NOT OPEN UNDER LOAD". | 11. MCP CONTROLLER SHALL CONSIST OF A DUAL-COMPARTMENT CONTROLLER. POWER TO CONTROL COMPARTMENT SHALL BE FED INTERNALLY FROM POWER COMPARTMENT. |
| 2. SEE SHEET E-04 FOR ELECTRICAL HVAC/LIGHTING/GROUNDING LAYOUT DRAWING AND DETAILS. | 8. ALL CONDUIT CONNECTIONS TO SHEET METAL ENCLOSURES SHALL UTILIZE MYERS-TYPE HUBS. NO "COUPLE-LOCKNUTTED" CONDUIT CONNECTIONS SHALL BE PERMITTED. | 12. POWER DISTRIBUTION BLOCK SHALL BE PROTECTED WITH CURRENT LIMITING FUSES DIRECTLY UPSTREAM IN ORDER TO MAINTAIN MANUFACTURER SCCR. CIRCUIT BREAKER TYPE PROTECTION WILL RESULT IN 10KAIC RATING. |
| 3. SEE SHEET E-05 FOR ELECTRICAL LAYOUT DRAWING. | 9. INTERCONNECT CONDUIT BETWEEN SHALL BE PROVIDED & INSTALLED BY CUSTOMER ON SITE. | |
| 4. THE MDP SHALL BE EQUIPPED WITH A SURGE PROTECTION DEVICE (SPD) RATED AT A MINIMUM CAPACITY OF 80 KV. IT SHALL BE INTEGRAL TO THE MDP & INSTALLED WITHIN 12" OF CABLE CONNECTION WITH NO BENDS IN CONDUIT SYSTEM. | 10. CIRCUIT BREAKER INTERRUPT CAPACITY BASED ON ESTIMATES OF EXPECTED UTILITY SHORT CIRCUIT CURRENT RATING COMBINED WITH LAYOUT GEOMETRY OF EQUIPMENT ON SITE. | |
| 5. PANEL MCE-1 SHALL BE EQUIPPED WITH CURRENT-LIMITING FUSES ON THE MAIN CIRCUIT BREAKER. | | |
| 6. HAZARDOUS AREA CLASSIFICATION DEFINED IN NFPA-497A PUBLICATION, 2017 VERSION. | | |



AS SHOWN

SCALE: NONE





© FLITWAY TECHNOLOGIES, INC.	NOT FOR CONSTRUCTION					<div>SEAL</div> 	Prepared for:  Arcadis U.S., Inc. 2300 Clayton Road, Suite 400 Concord, CA 94520 Tel: (925) 296-7849 www.arcadis.com					Prepared by:  Flitway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.flitway.com					DUAL PHASE EXTRACTION SYSTEM CHEVRON SEATTLE SEATTLE, WA					SHEET TITLE HVAC/LIGHTING AND GROUNDING ELECTRICAL LAYOUT					APPROVED BY BDC		CHECKED BY JK	
							DESIGNED BY CJM					DRAWN BY CJM					PROJECT NUMBER Q14972					DRAWING NUMBER E-05								
	2	08/13/2020	RESUBMITTED BASED ON COMMENTS	CJM	BDC																									
	1	08/12/2020	RESUBMITTED BASED ON COMMENTS	CJM	BDC																									
	0	05/27/2020	ISSUED FOR CUSTOMER REVIEW	CJM	BDC																									
REV.	ISSUED DATE	DESCRIPTION	BY	CK'D																					SHEET 5 OF 7					



CHEVRON SEATTLE CONTROL DISTRIBUTION CONDUIT & CONDUCTOR SCHEDULE - 120/208VAC POWER CONDUITS/CONDUCTORS -										
COND. #	INSTALLED BY	PURPOSE	HAZLOC CLASSIFICATION	SIZE	CONDUIT TYPE*	CONDUCTOR SIZE & TYPE	PURPOSE	ORIGINATION	TERMINATION	COMMENTS
P-1	SITE CONTRACTOR	208VAC POWER	UNCLASSIFIED	4"	PVC/RGS	(4) 600 KCM RHW-USE	MAIN UTILITY POWER FEED	UTILITY TRANSFORMER	MDP	FIELD INSTALLED
P-2	SITE CONTRACTOR	208VAC POWER	UNCLASSIFIED	4"	PVC/RGS	(4) 600 KCMIL XHHW + (1) 4/0 AWG GND	MAIN UTILITY POWER FEED	MDP	MCE-1	FIELD INSTALLED
P-3	FACTORY	208VAC POWER	UNCLASSIFIED	2"	RGS	(4) 2/0 THWN + (1) #2 AWG GND	CATOX POWER FEED	MCE-1	CATOX CONTROLS	
P-4	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	2"	RGS	(4) 2/0 THWN + (1) #2 AWG GND	CATOX HEATER POWER FEED	CATOX CONTROLS	CATOX HEATERS	
P-5	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	1 1/4"	RGS/LT FLEX	(3) #3 AWG THWN + (1) #3 AWG GND	BLOWER B-301 MOTOR POWER	MCE-1	B-301	CONNECT VIA DISCONNECT, AS SHOWN
P-6	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	1 1/4"	RGS/LT FLEX	(3) #3 AWG THWN + (1) #3 AWG GND	BLOWER B-302 MOTOR POWER	MCE-1	B-302	CONNECT VIA DISCONNECT, AS SHOWN
P-7	FACTORY	120VAC POWER	UNCLASSIFIED	3/4"	RGS	(2) #12 AWG THWN + #12 AWG GND	PANEL RCP POWER	MCE-1	PANEL RCP	FIELD INSTALLED
P-8	SITE CONTRACTOR	208VAC POWER	UNCLASSIFIED	2"	PVC/RGS	(4) #1 AWG THWN + #6 AWG GND	PANEL MCP POWER	MCE-1	PANEL MCP	FIELD INSTALLED
P-9	FACTORY	208VAC POWER	UNCLASSIFIED	1"	EMT/LT FLEX	(3) #8 AWG THWN + #8 AWG GND	COMPRESSOR A-401 POWER FEED	MCP	A-401	FIELD INSTALLED
P-10	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	2"	RGS/LT FLEX	(3) #10 AWG THWN + #10 AWG GND	BATCH PUMP P-201 POWER FEED	MCP	P-201	COMPLETED AS PART OF SYSTEM PACKAGE
P-11	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	2"	RGS/LT FLEX	(3) #10 AWG THWN + #10 AWG GND	BACKWASH PUMP P-202 POWER FEED	MCP	P-202	COMPLETED AS PART OF SYSTEM PACKAGE
P-12	FACTORY	208VAC POWER	CLASS 1, DIVISION 2, GP C/D	1-1/2"	RGS/LT FLEX	(3) #12 AWG THWN + #12 AWG GND	TRANSFER PUMP P-301 POWER FEED	MCP	P-301	COMPLETED AS PART OF SYSTEM PACKAGE

CHEVRON SEATTLE CONTROL DISTRIBUTION CONDUIT & CONDUCTOR SCHEDULE - 120VAC CONTROL CONDUITS/CONDUCTORS										
COND. #	INSTALLED BY	PURPOSE	HAZLOC CLASSIFICATION	SIZE	CONDUIT TYPE*	CONDUCTOR SIZE & TYPE	PURPOSE	ORIGINATION	TERMINATION	COMMENTS
C-1	FACTORY	120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	1"	RGS/L.T. FLEX	(4) BELDEN 8760 TSP + (17) #14 AWG THWN	CONTROL JUNCTION BOX JB-04 HOMERUN	RCP	JUNCTION BOX JB-4	
C-2	FACTORY	24VDC/120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) BELDEN 8760 TSP + (7) #14 AWG THWN	MOTORIZED VALVE MOV-301A CONTROL	JUNCTION BOX JB-4	MOV-301A	UTILIZE FLEXIBLE CONNECTION TO DEVICE
C-3	FACTORY	24VDC/120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) BELDEN 8760 TSP + (7) #14 AWG THWN	MOTORIZED VALVE MOV-301B CONTROL	JUNCTION BOX JB-4	MOV-301B	UTILIZE FLEXIBLE CONNECTION TO DEVICE
C-4	FACTORY	120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(3) #14 AWG THWN	SOLENOID VALVE SV-301 CONTROL	JUNCTION BOX JB-4	SV-301	UTILIZE FLEXIBLE CONNECTION TO DEVICE
C-5	FACTORY	24VDC/120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(7) #14 AWG THWN	MOTORIZED VALVE M-201 CONTROL	MCP	MOV-201	UTILIZE FLEXIBLE CONNECTION TO DEVICE
C-6	FACTORY	24VDC/120VAC CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(7) #14 AWG THWN	MOTORIZED VALVE M-202 CONTROL	MCP	MOV-202	UTILIZE FLEXIBLE CONNECTION TO DEVICE
C-7	FACTORY	120VAC CONTROL	UNCLASSIFIED	3/4"	RGS/L.T. FLEX	(3) #14 AWG THWN	SOLENOID VALVE SV-101 CONTROL	MCP	SV-101	UTILIZE FLEXIBLE CONNECTION TO DEVICE

CHEVRON SEATTLE CONTROL DISTRIBUTION CONDUIT & CONDUCTOR SCHEDULE - INTRINSICALLY SAFE CONDUITS/CONDUCTORS										
COND. #	INSTALLED BY	PURPOSE	HAZLOC CLASSIFICATION	SIZE	CONDUIT TYPE*	CONDUCTOR SIZE & TYPE	PURPOSE	ORIGINATION	TERMINATION	COMMENTS
IS-1	SITE CONTRACTOR	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 1, GP C/D	2"	PVC	(16) #14 THWN	WELL VAULT SWITCH HOMERUN	PANEL MCP	VARIOUS WELL VAULTS	FIELD INSTALLED
IS-2	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(1) BELDEN 8760 TSP + (6) #14 AWG THWN	I.S. JUNCTION BOX JB-01 HOMERUN	PANEL RCP	JUNCTION BOX JB-1	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-3	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) #14 AWG THWN	PRESSURE SWITCH PSH-301 FEED	JUNCTION BOX JB-1	PSH-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-4	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) #14 AWG THWN	PRESSURE SWITCH PSH-302 FEED	JUNCTION BOX JB-1	PSH-302	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-5	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) #14 AWG THWN	VACUUM SWITCH VSH-301 FEED	JUNCTION BOX JB-1	VSH-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-6	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(1) BELDEN 8760 TSP	FLOWMETER FIT-301 FEED	JUNCTION BOX JB-1	FIT-301 INST.	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-7	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(2) BELDEN 8760 TSP + (2) #14 AWG THWN	I.S. JUNCTION BOX JB-02 HOMERUN	PANEL RCP	JUNCTION BOX JB-2	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-8	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	LEL METER AIT-300 FEED	JUNCTION BOX JB-2	AIT-300 INST.	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-9	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-300 FEED	JUNCTION BOX JB-2	TT-300 INST.	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-10	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(2) #14 AWG THWN	EMERGENCY STOP PUSHBUTTON	JUNCTION BOX JB-2	E-STOP	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-11	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(5) BELDEN 8760 TSP	I.S. JUNCTION BOX JB-03 HOMERUN	PANEL RCP	JUNCTION BOX JB-3	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-12	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	VACUUM TRANSMITTER VT-301 FEED	JUNCTION BOX JB-3	VT-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-13	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(1) BELDEN 8760 TSP	FLOW TRANSMITTER FIT-302 FEED	JUNCTION BOX JB-3	FIT-302	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-14	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	PRESS. TRANSMITTER PT-301 FEED	JUNCTION BOX JB-3	PT-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-15	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-302 FEED	JUNCTION BOX JB-3	TT-302	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-16	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-301 FEED	JUNCTION BOX JB-3	TT-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-17	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(1) BELDEN 8760 TSP + (2) #14 AWG THWN	I.S. INSTRUMENT HOMERUN	PANEL MCP	CONDULET	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-18	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-203 FEED	CONDULET	FQI-203	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-19	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) #14 AWG THWN	HIGH LEVEL SWITCH LSH-200 FEED	CONDULET	LSH-200	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-20	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(4) BELDEN 8760 TSP	I.S. JUNCTION BOX JB-05 HOMERUN	PANEL MCP	JUNCTION BOX JB-5	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-21	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	PRESS. TRANSMITTER PT-203 FEED	JUNCTION BOX JB-5	PT-203	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-22	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	FLOW TRANSMITTER FIT-204 FEED	JUNCTION BOX JB-5	FIT-204	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-23	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-200B FEED	JUNCTION BOX JB-5	TT-200B	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-24	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	PRESS. TRANSMITTER PT-202 FEED	JUNCTION BOX JB-5	PT-202	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-25	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	1 1/2"	RGS	(10) BELDEN 8760 TSP + (8) #14 AWG THWN	I.S. JUNCTION BOX JB-06 HOMERUN	PANEL MCP	JUNCTION BOX JB-6	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-26	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-401 PULSE INPUT	JUNCTION BOX JB-6	FQI-401	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-27	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-402 PULSE INPUT	JUNCTION BOX JB-6	FQI-402	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-28	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-403 PULSE INPUT	JUNCTION BOX JB-6	FQI-403	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-29	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-404 PULSE INPUT	JUNCTION BOX JB-6	FQI-404	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-30	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-405 PULSE INPUT	JUNCTION BOX JB-6	FQI-405	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-31	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-406 PULSE INPUT	JUNCTION BOX JB-6	FQI-406	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-32	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-407 PULSE INPUT	JUNCTION BOX JB-6	FQI-407	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-33	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(1) BELDEN 8760 TSP	FLOW TOTALIZER FQI-408 PULSE INPUT	JUNCTION BOX JB-6	FQI-408	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-34	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	LEL METER AIT-100 FEED	JUNCTION BOX JB-6	AIT-100	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-35	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(2) #14 AWG THWN	LEVEL SWITCH LSH-100 FEED	JUNCTION BOX JB-6	LSH-100	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-36	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(2) #14 AWG THWN	EMERGENCY STOP PUSHBUTTON	JUNCTION BOX JB-6	E-STOP	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-37	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS	(6) #14 AWG THWN	I.S. JUNCTION BOX JB-07 HOMERUN	JUNCTION BOX JB-6	JUNCTION BOX JB-7	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-38	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(2) #14 AWG THWN	LEVEL SWITCH LSL-301	JUNCTION BOX JB-7	LSL-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-39	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(2) #14 AWG THWN	LEVEL SWITCH LSH-301	JUNCTION BOX JB-7	LSH-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-40	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	N/A	FLEXIBLE CABLE	(2) #14 AWG THWN	LEVEL SWITCH LSHH-301	JUNCTION BOX JB-7	LSHH-301	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-41	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	1 1/2"	RGS	(X) BELDEN 8760 TSP + (X) #14 AWG THWN	I.S. JUNCTION BOX JB-08 HOMERUN	PANEL MCP	JUNCTION BOX JB-8	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-42	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-100 FEED	JUNCTION BOX JB-8	TT-100	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-43	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	PRESS. TRANSMITTER PT-201 FEED	JUNCTION BOX JB-8	PT-201	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-44	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(1) BELDEN 8760 TSP	FLOW TRANSMITTER FIT-201 FEED	JUNCTION BOX JB-8	FIT-201	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-45	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	LEVEL INDICATING TRANSMITTER LIT-201	JUNCTION BOX JB-8	LIT-201	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-46	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(2) #14 AWG THWN	LEVEL SWITCH LOW LSSL-201B	JUNCTION BOX JB-8	LSSL-201B	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-47	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(2) #14 AWG THWN	LEVEL SWITCH HIGH LSHH-201A	JUNCTION BOX JB-8	LSHH-201A	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.
IS-48	FACTORY	INTRINSICALLY SAFE CONTROL	CLASS 1, DIVISION 2, GP C/D	3/4"	RGS/FLEX CABLE	(1) BELDEN 8760 TSP	FLOW TRANSMITTER FIT-202	PANEL MCP	FIT-202	FOLLOW ALL REQUIREMENTS OF ART. 504 OF NEC.

CHEVRON SEATTLE CONTROL DISTRIBUTION CONDUIT & CONDUCTOR SCHEDULE - 24VDC/NETWORK INSTRUMENT CONDUITS/CONDUCTORS										
COND. #	INSTALLED BY	PURPOSE	HAZLOC CLASSIFICATION	SIZE	CONDUIT TYPE*	CONDUCTOR SIZE & TYPE	PURPOSE	ORIGINATION	TERMINATION	COMMENTS
I-1	FACTORY	ETHERNET NETWORK	UNCLASSIFIED	3/4"	RGS	(2) ETHERNET CAT6	RCP-MCE-1 NETWORK CONNECTION	PANEL RCP	PANEL MCE-1	
I-2	SITE CONTRACTOR	ETHERNET NETWORK	UNCLASSIFIED	3/4"	RGS	(1) ETHERNET CAT6	RCP-MCP NETWORK CONNECTION	PANEL RCP	PANEL MCP	FIELD INSTALLED
I-3		FACTORY	ETHERNET NETWORK	UNCLASSIFIED	3/4"	RGS	(1) ETHERNET CAT6	RCP-CATOX NETWORK CONNECTION	PANEL RCP	
I-4	FACTORY	24VDC INSTRUMENT	UNCLASSIFIED	3/4"	RGS	(2) BELDEN 8760 TSP	INSTRUMENT JUNCTION BOX JB-09 HOMERUN	PANEL MCP	JUNCTION BOX JB-9	
I-5	FACTORY	24VDC INSTRUMENT	UNCLASSIFIED	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	TEMP TRANSMITTER TT-200A FEED	JUNCTION BOX JB-9	TT-200A	
I-6	FACTORY	24VDC INSTRUMENT	UNCLASSIFIED	3/4"	RGS/L.T. FLEX	(1) BELDEN 8760 TSP	PRESSURE TRANSMITTER PT-101 FEED	JUNCTION BOX JB-9	PT-101	

*All conduit fittings to be listed for wet-location with sealing gaskets on all penetrations entering/exiting junction boxes & enclosures. Liquid-tight flexible conduit shall be used where vibration is present, flexibility is required, and at all motor conduit boxes. Terminations of flexible conduit shall be made using liquid-tight connectors with integral insulated bushings and positive ground connections. The maximum length of flexible conduit shall be 24" for instruments & equipment, 36" for motors, and 48" for lighting.

CONDUIT AND CONDUCTOR SCHEDULE

SCALE: NONE

SEAL



Prepared for:



Arcadis U.S., Inc.
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Prepared by:



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DUAL PHASE EXTRACTION SYSTEM CHEVRON SEATTLE SEATTLE, WA

SHEET TITLE

PROCESS EQUIPMENT ELECTRICAL CONDUIT & CONDUCTOR SCHEDULE

APPROVED BY
BDC

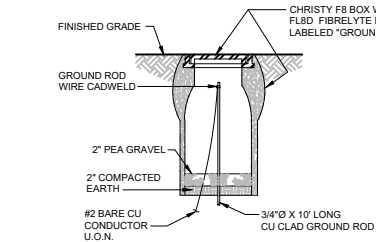
DESIGNED BY
CJM

PROJECT NUMBER
Q14972

CHECKED BY
JK

DRAWN BY
CJM

DRAWING NUMBER
E-07
SHEET 7 OF 7

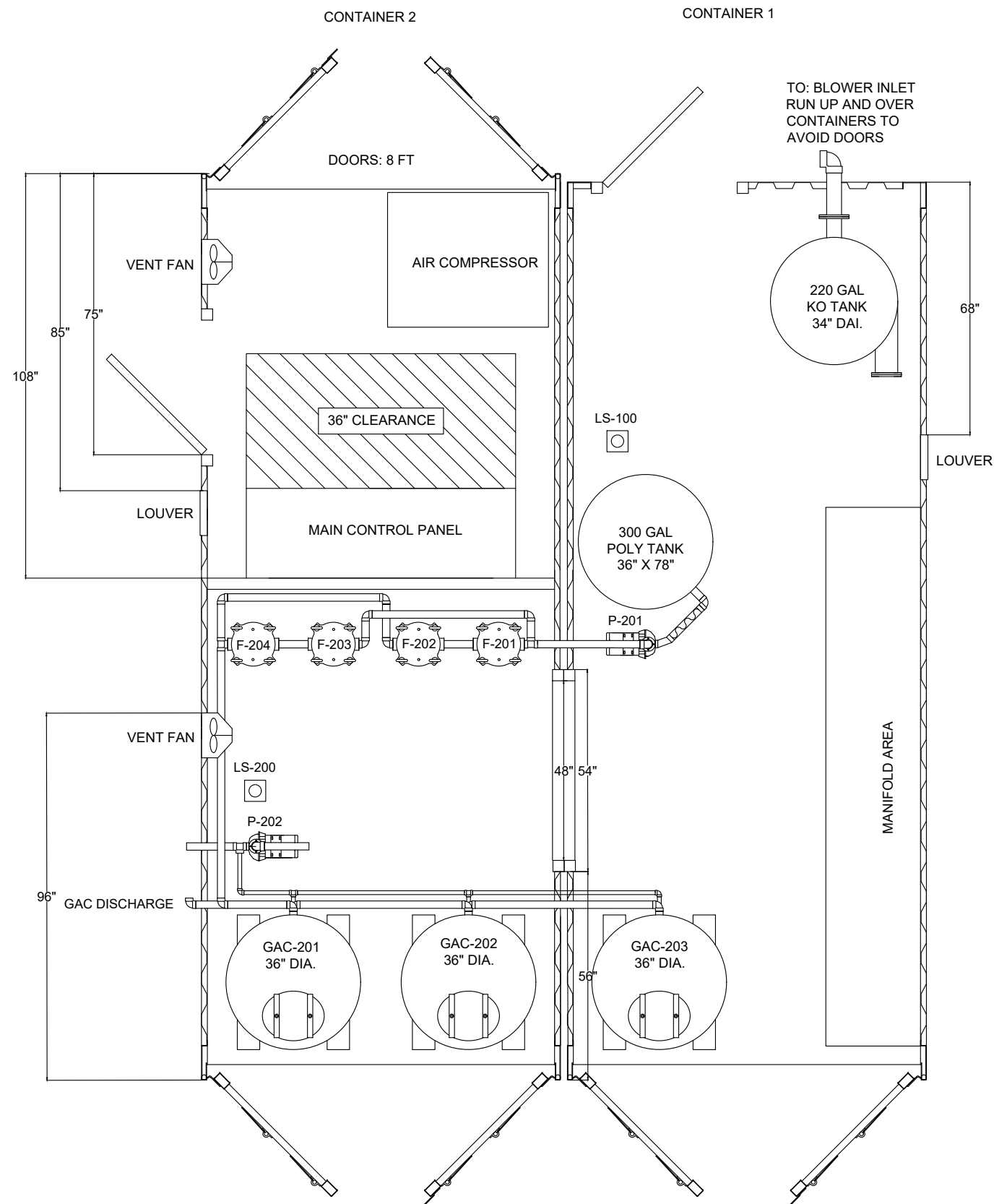
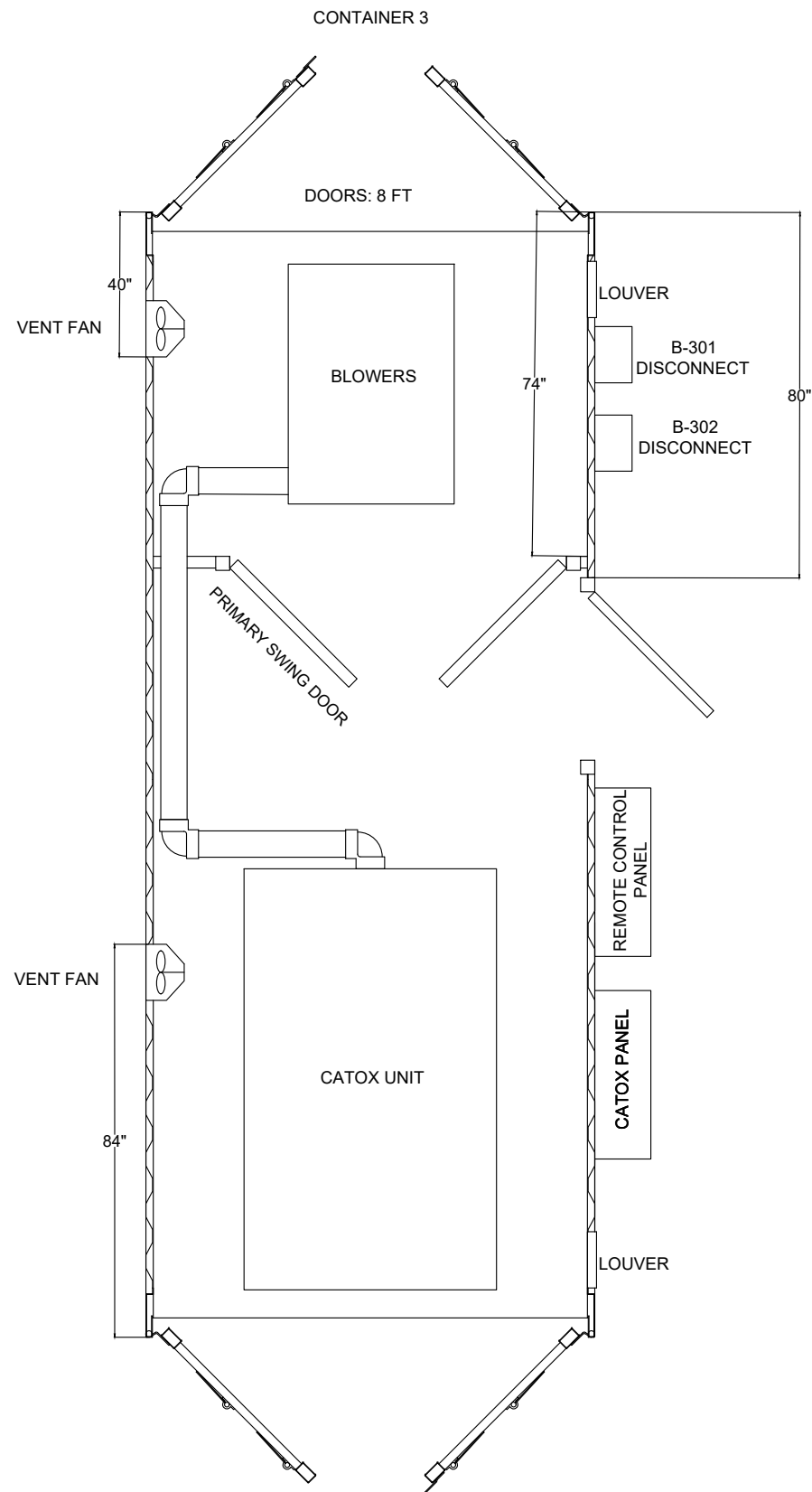


GROUND ROD ACCESS (TYPICAL)

SCALE: NONE

NOT FOR
CONSTRUCTION

REV.	ISSUED DATE	DESCRIPTION	BY	CHK'D
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1	08/12/2020	RESUBMITTED BASED ON COMMENTS	CJM	BDC
0	05/27/2020	ISSUED FOR CUSTOMER REVIEW	CJM	BDC



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REV.	ISSUED DATE	DESCRIPTION	BY	CK'D
3	05/21/2020	ISSUED FOR REVIEW	PAP	MPS
2	04/27/2020	ISSUED FOR REVIEW	PAP	MPS

SEAL



Prepared for:
ARCADIS
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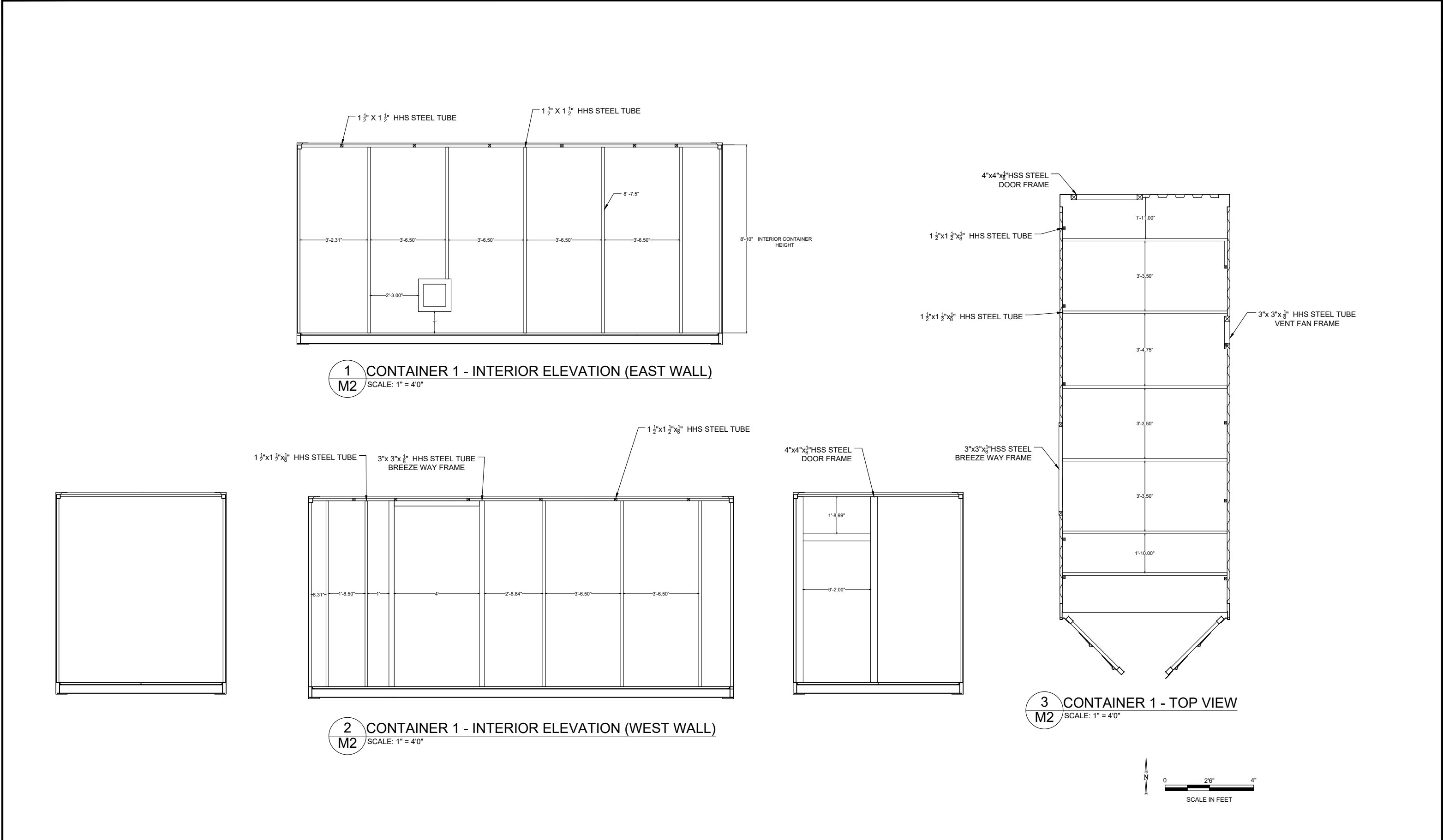
Prepared by:
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DUAL-PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

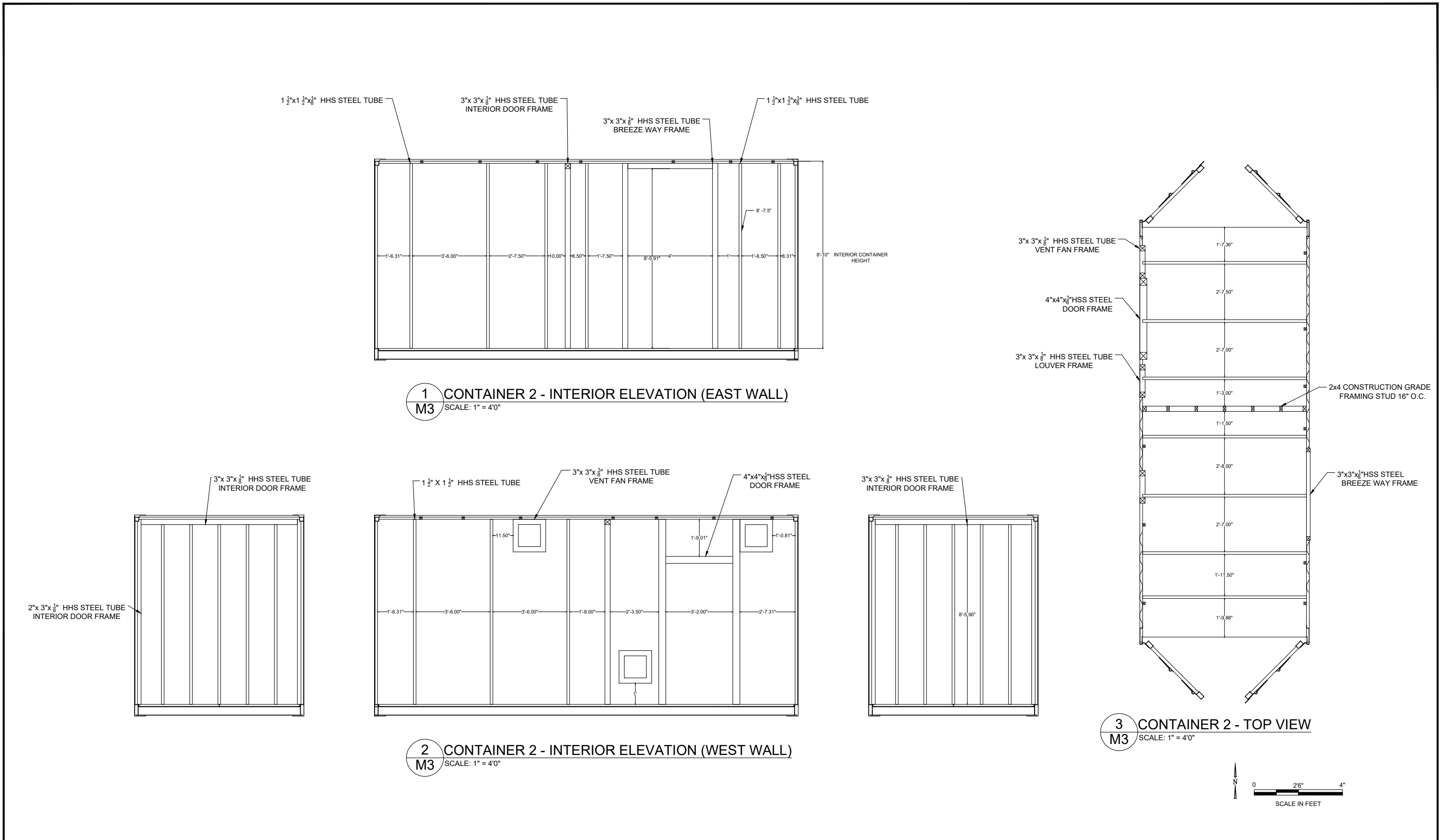
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**CONTAINER #1, #2 AND #3
LAYOUT**

APPROVED BY
MPS
DESIGNED BY
PAP
PROJECT NUMBER
Q14972

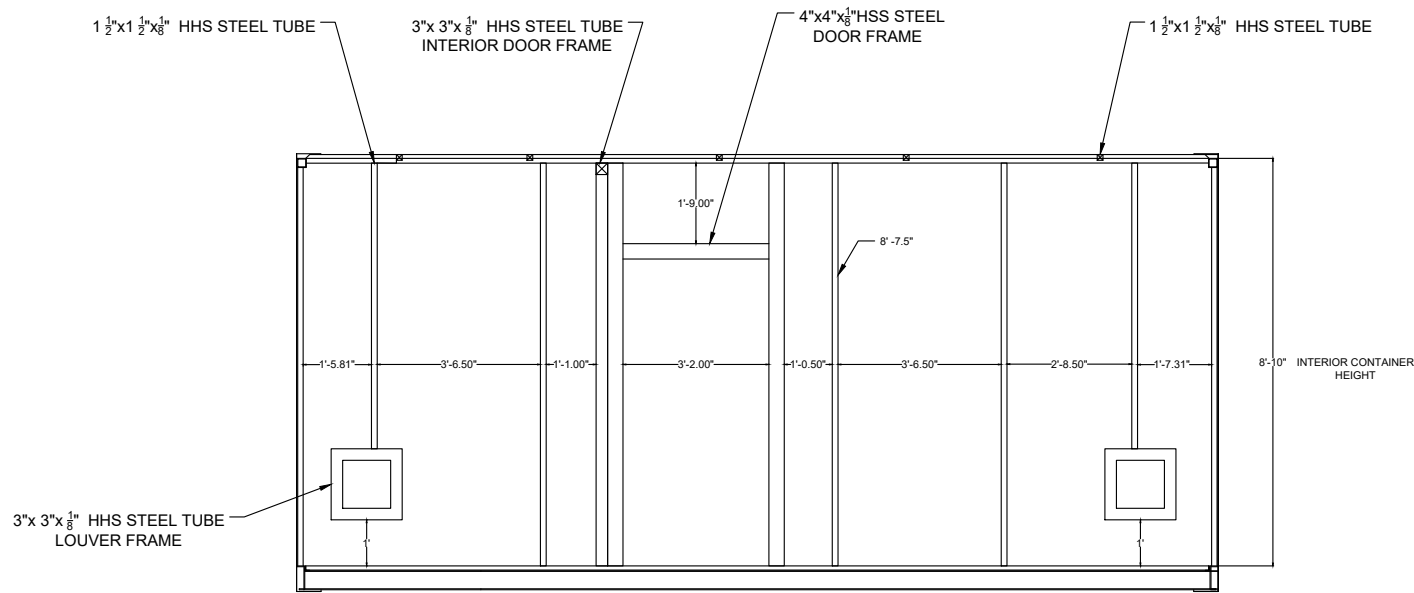
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DRAWN BY
PAP
DRAWING NUMBER
M-01
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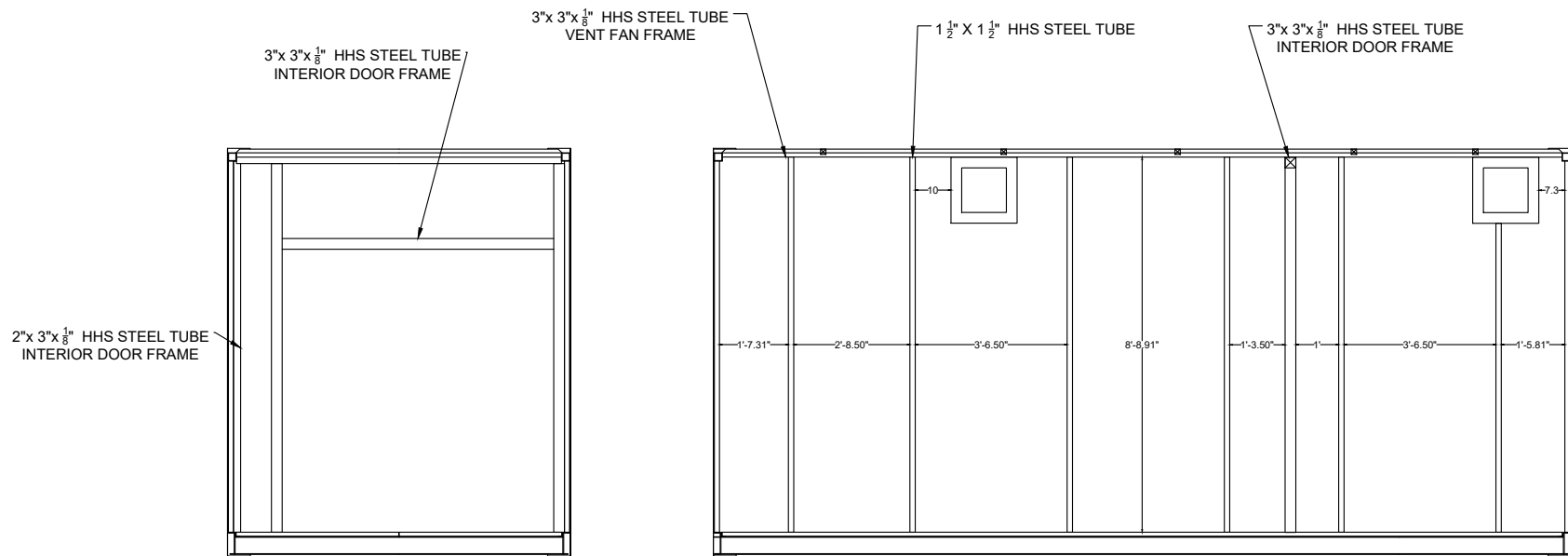
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										MPS			MPS	
										DESIGNED BY			DRAWN BY	
										PAP			PAP	
										PROJECT NUMBER			DRAWING NUMBER	
	REV.	ISSUED DATE	DESCRIPTION		BY	CK'D		Arcadis U.S., Inc. 126 N Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com	Fliteway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.fliteway.com		Q14972	M-02	SHEET 2 OF 7	



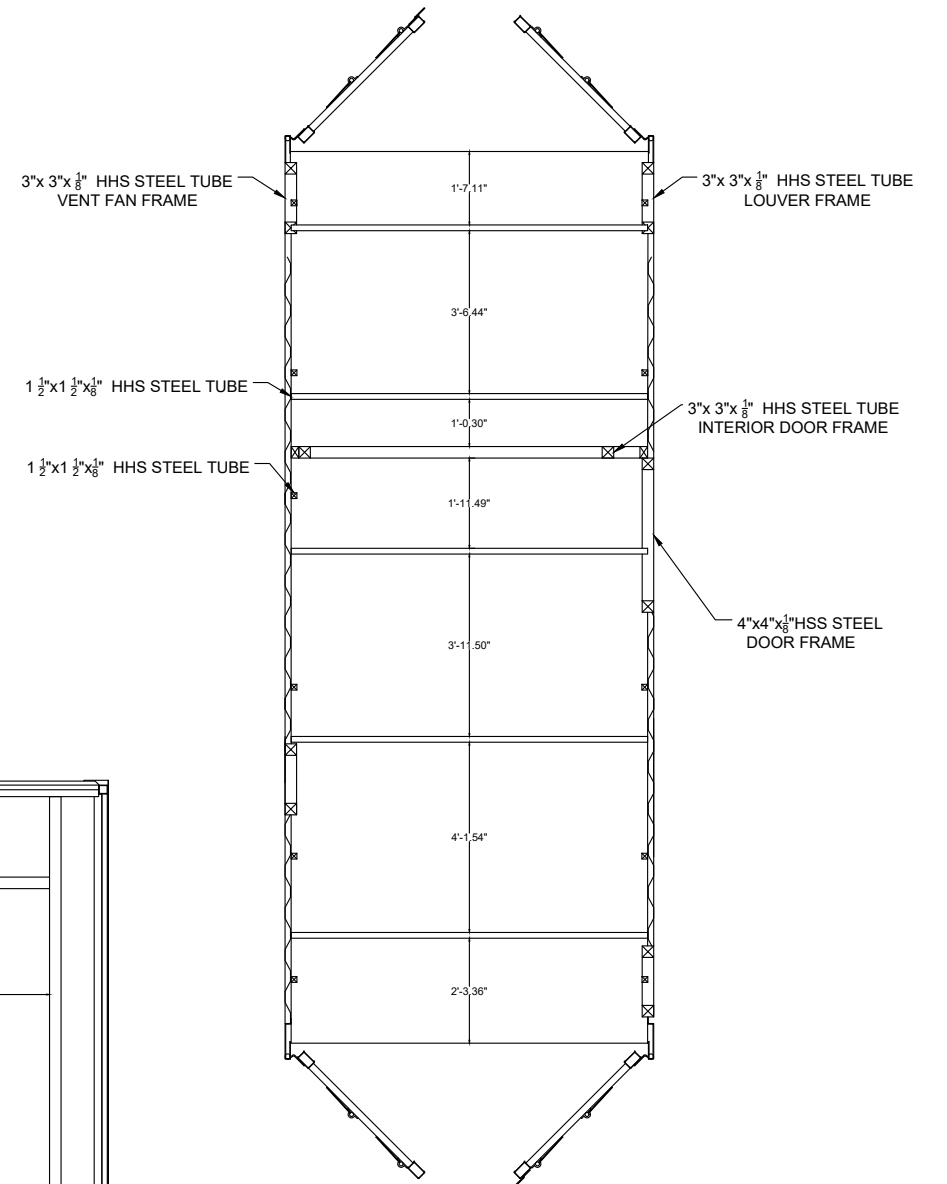
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							 Arcadis U.S., Inc. 126 N Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com		 Fliteway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.fliteway.com				MP	MP
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													PROJECT NUMBER	DRAWING NUMBER
													Q14972	M-03
REV. ISSUED DATE DESCRIPTION					BY	CK'D							SHEET 3 OF 7	
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2 04/27/2020 ISSUED FOR REVIEW					PAP	MPS								



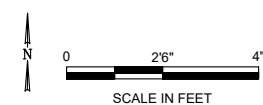
1 CONTAINER 3 - INTERIOR ELEVATION (EAST WALL)
M4 SCALE: 1" = 4'0"



2 CONTAINER 3 - INTERIOR ELEVATION (WEST WALL)
M4 SCALE: 1" = 4'0"



3 CONTAINER 3 - TOP VIEW
M4 SCALE: 1" = 4'0"



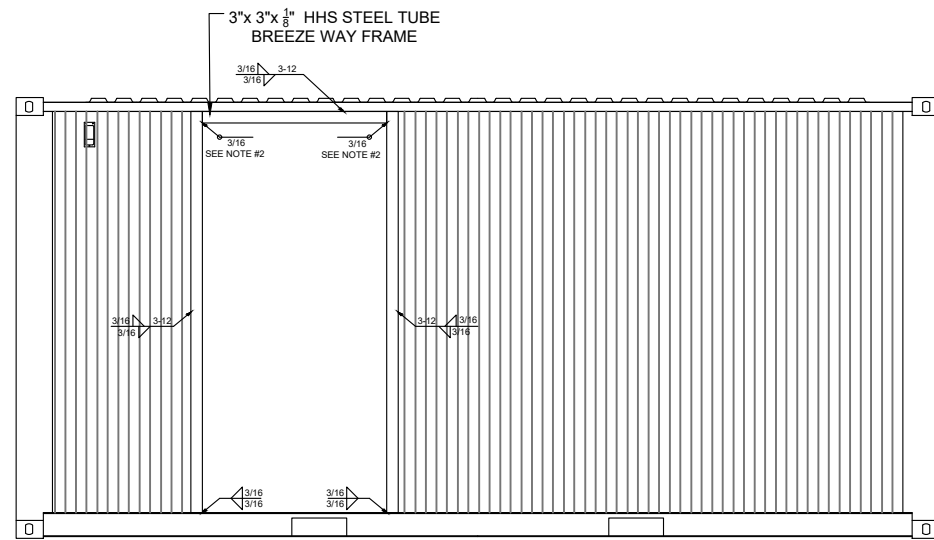
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							<div>ARCADIS</div> <div>Arcadis U.S., Inc. 126 N Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com</div>			<div>Fliteway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.fliteway.com</div>								MPS		MPS	
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																		PROJECT NUMBER		DRAWING NUMBER	
														Q14972		M-04					
																SHEET 4 OF 7					



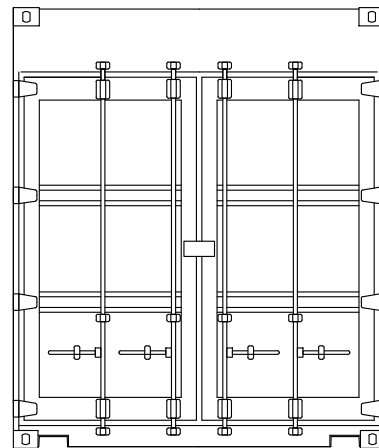
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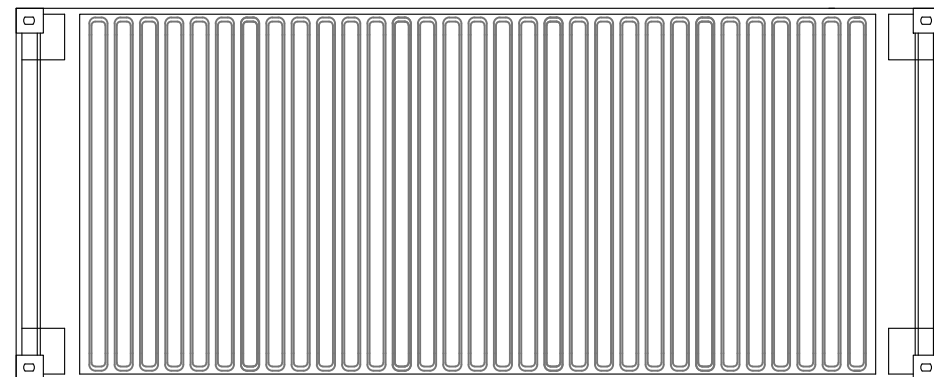
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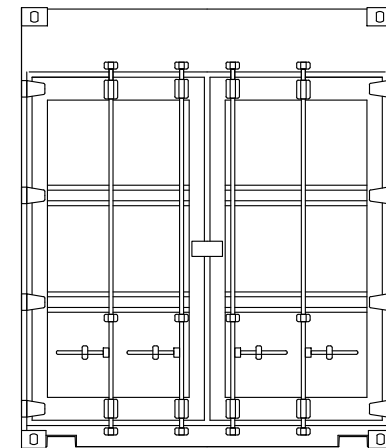
Side **1** **CONTAINER 2 - EXTERIOR ELEVATION (EAST WALL)**
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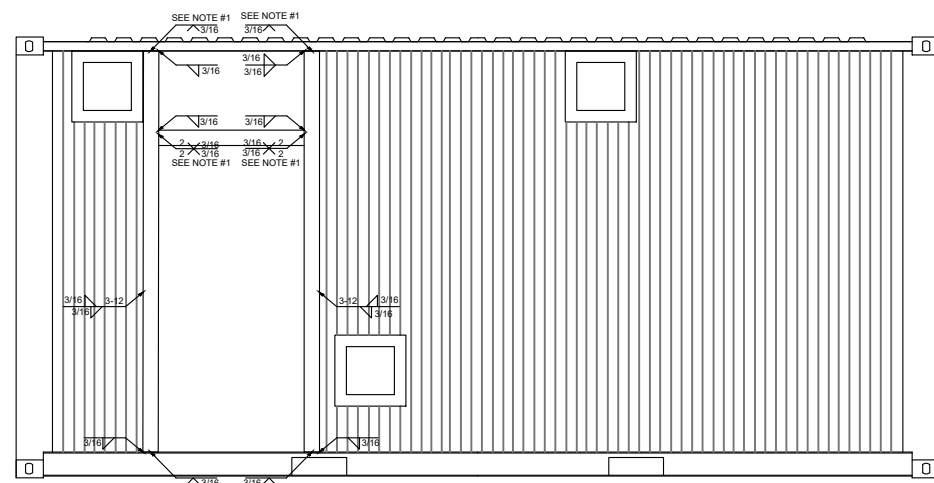
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Plan

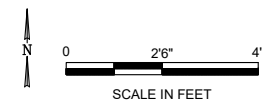


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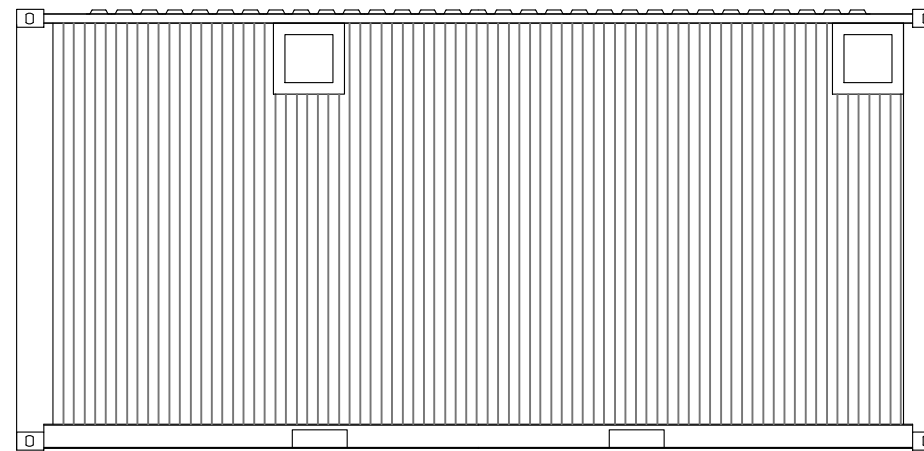


Side **2** **CONTAINER 2 - EXTERIOR ELEVATION (WEST WALL)**
M6 SCALE: 1" = 4'0"

- NOTES:
- #1. WELD GROUND FLAT FOR WELDED ON DRIP EDGE PLATE
 - #2. OUTSIDE ONLY WELD GROUND FLAT

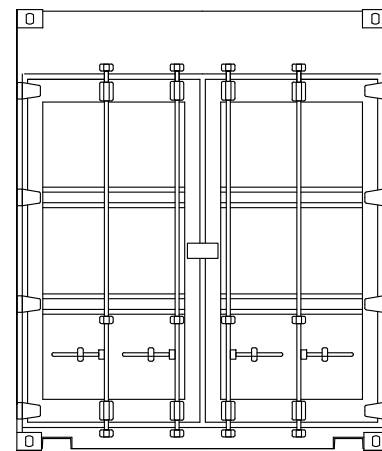


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							<div>ARCADIS</div> <div>Arcadis U.S., Inc. 126 N Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com</div>			<div>Flitway Technologies, Inc.</div> <div>2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.flitway.com</div>						CONTAINER #2 EXTERIOR WELDS		MPS		MPS	
													DESIGNED BY		DRAWN BY						
													PROJECT NUMBER		DRAWING NUMBER						
													Q14972		M-06						
													SHEET 6 OF 7								
					REV. ISSUED DATE DESCRIPTION			BY CK'D													
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					2 04/27/2020 ISSUED FOR REVIEW			PAP MPS													

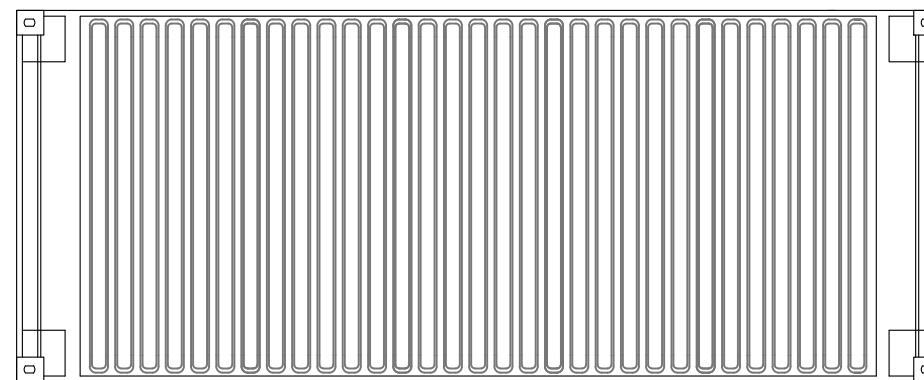


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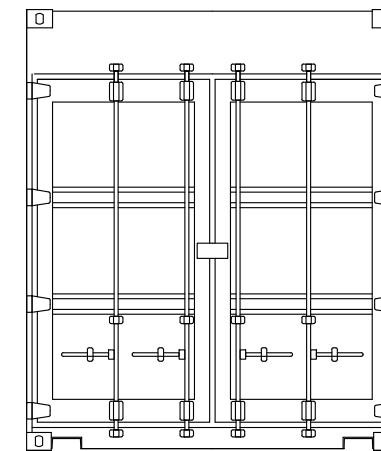
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M7 CONTAINER 3 - EXTERIOR ELEVATION (WEST WALL)
SCALE: 1" = 4'0"



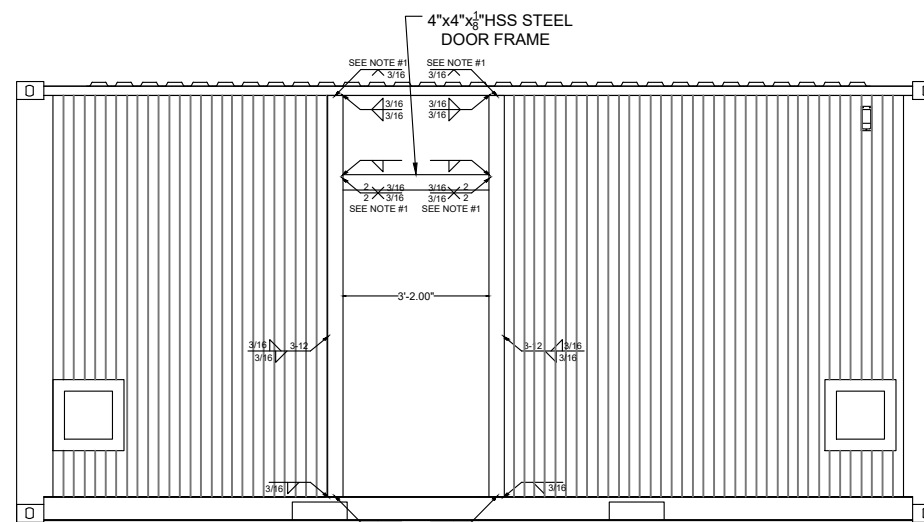
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Plan



Front

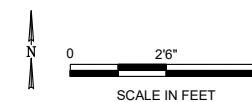


Side

2 CONTAINER 3 - EXTERIOR ELEVATION (EAST WALL)
M7 SCALE: 1" = 4'0"

NOTES:

#1. WELD GROUND FLAT FOR WELDED ON DRIP EDGE PLATE



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3	05/21/2020	ISSUED FOR REVIEW	PAP	MPS
2	04/27/2020	ISSUED FOR REVIEW	PAP	MPS
REV.	ISSUED DATE	DESCRIPTION	BY	CK'D

SEAL



Prepared for:



Prepared by:



DUAL-PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

	SHEET TITLE
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CONTAINER #3 EXTERIOR WELDS

APPROVED BY	MPS
DESIGNED BY	PAP
PROJECT NUMBER	Q14972

CHECKED BY	MPS
DRAWN BY	PAP
DRAWING NUMBER	M-07
SHEET	7 OF 7

ATTACHMENT 2

Fliteway Operations and Maintenance Manual





Operation and Maintenance Manual

Arcadis U.S. Inc.

Reference: Dual Phase Extraction System

Location: Seattle, Washington

Project #: 14972

TABLE OF CONTENTS

- Warranty.....1
- System Maintenance.....2-5
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- Data
 - Engineer Drawings
 - Alarm List, FAT I/O Testing Form, Motor Name Plates
 - Equipment Manuals

WARRANTY

ONE YEAR LIMITED WARRANTY

Fliteway Technologies, Inc. remediation equipment is warranted by Fliteway to the original user against defects in workmanship or materials under normal use for one year after date of shipment. Exceptions to this are positive displacement vacuum pumps and blowers which have 18 Month warranties direct from the original manufacturer (Roots and Sutorbilt only). Any part determined by Fliteway Technologies, Inc. to be defective in material or workmanship and returned to Fliteway Technologies, Inc., shipping costs prepaid, will be repaired or replaced at Fliteway's option, as the exclusive remedy. See PROMPT DISPOSITION below for limited warranty claim procedures. This limited warranty gives the purchaser specific legal rights which may vary from state to state.

LIMITATIONS OF LIABILITY

To the extent allowable under applicable law, Fliteway's liability (or incidental and consequential damages) is expressly disclaimed. Fliteway's liability in all events is limited to, and shall not exceed, the purchase price.

PRODUCT SUITABILITY

Many states and localities have regulations and codes governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Fliteway Technologies, Inc. attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, please determine local and national codes and regulations, review the product application, and verify that the product, installation and use comply with those regulations and codes.

PROMPT DISPOSITION

Fliteway Technologies, Inc. will make every effort for a prompt correction or other adjustment with respect to any product which proves to be defective within the limited warranty. For any product believed to be defective within limited warranty, first write or call Fliteway Technologies, Inc. giving the model and serial number of the unit and describing the nature of the defect. Title and risk of loss pass to the buyer on delivery to common carrier. If product was damaged in transit to you, file a claim with carrier. Freight or postage charges on returns to the factory are at the customer's expense. If returned product is returned under warranty, the manufacturer will cover return freight.

PHONE SUPPORT

Fliteway will provide full-service support (over the phone support following the two- day field startup support) during that one-year period should issues arise in the normal operation of the system.

SYSTEM MAINTENANCE CONSIDERATIONS

DAILY CHECKLIST

- Check the control panel for running status.
- Check the system operation for:
 - Alarms
 - Operating:
 - Temperatures
 - Pressures
 - Flows
 - Set Points

WEEKLY CHECKLIST

- Check for leaks.
- Check fluid levels.
- Check for excessive noise of various components.
- Check for alarms.
- Check and record flow rates, pressures, and temperatures.
- Check for excessive moisture inside the control panels and process piping.
- Check for corrosion and grease the moving parts if required to reduce corrosion.

SCHEDULED MAINTENANCE - MONTHLY

- Test critical inputs for proper shutdown capacity.
- Follow maintenance procedures for specific items as listed below.
- Complete items listed in weekly checklist.
- Test the operation of the overload.

YEARLY MAINTENANCE

- Test each input.
- Test alarm conditions.
- Test the operation of each output device.
- Complete the maintenance checks listed below for the various items.
- Complete the items listed in weekly checklist.

RECOMMENDED MAINTENANCE OF VARIOUS LARGE COMPONENTS

RECIPRICATING AIR COMPRESSOR

- **DAILY MAINTENANCE**
 - Check oil level. Check oil for discoloration and filth. Drain oil and replace if required. Check for oil leaks.
 - Open drain cock located at the bottom of the tank to relieve condensation.
- **WEEKLY MAINTENANCE**
 - Manually operate the pressure relief valves to be certain they are working.
 - Clean the cooling surfaces of the intercooler and compressor.
 - Check the compressor for air leaks.
 - Check the compressed air distribution system for leaks.
- **MONTHLY MAINTENANCE**
 - Check bolt torques, pulley clamp screws, and jam nuts for tightness. Torque if necessary.
 - Inspect entire air distribution system for leaks.
 - Check all connections tighten as necessary.
- **EVERY THREE MONTHS**
 - Change oil (Use Genuine CURTIS-LUBEPLUS Lubricants)
 - Inspect valves for rust, wear, and carbon build up, if necessary, replace with kit
 - Check air filter for cleanliness and replace as necessary.
 - Check belt tension.
- **EVERY SIX MONTHS**
 - Replace Air Filter.
- Default to the manufacturer's manual for anything other than regular maintenance.

BUSCH MINK VACUUM PUMPS

- **MONTHLY**
 - Check the inlet filter cartridge, replace if necessary.
- **EVERY THREE MONTHS**
 - Check the oil level.
- **EVERY SIX MONTHS**
 - Clean the machine from dust and dirt buildup.
- **EVERY 20000 HOURS**
 - Change the oil.
- **EVERY 6 YEARS**
 - Have a major overhaul on the machine (contact Busch).
- Default to the manufacturer's manual for anything other than regular maintenance.

HORIZONTAL CENTRIFUGAL TRANSFER PUMPS

- Bearing frame should be regreased every 2,000 hours or 3-month interval, whichever occurs first. Use a #2 sodium or lithium-based grease. Fill until grease comes out of relief fittings, or lip seals, then wipe off excess.
- Follow motor and coupling manufacturers' lubrication instructions.
- Alignment must be rechecked after any maintenance work involving any disturbance of the unit.
- Default to the manufacturer's manual for anything other than regular maintenance.

HEADER GLOBE, BALL, AND CHECK VALVES

- Test the operation of the header valves.
- Lubricate with silicone to prevent from seizing in the Teflon-sealed housing.
- Adjust the compression force by rotating the threaded internal component that presses the Teflon seal up against the housing.
- Disassemble the valve and clean out any debris or scale buildup.

BAG FILTERS

- Regularly change bag filters when necessary.
- Check for any cracks or leaks in filter housing.

GAC TANKS

- Inspect inside of vessel for any corrosion.
- Regularly change out spent carbon.
- Check for any cracks or leaks in the tank.

FLITEWAY KNOCKOUT TANK

- Check for sediment buildup
- Drain and flush out the tank
- Check for water leaks

RECOMMENDED MAINTENANCE OF VARIOUS INSTRUMENTATION COMPONENTS

LEVEL SWITCHES

- Test the operation of the switch.
- Remove the switch and check for debris buildup that can potentially cause a failure of normal operation.

FLOW METER

- Test the operation of the flow meter.
- Disassemble and clean the internal components if dirt or particles are preventing the meter from working properly.

GAUGES

- Test operation of all system gauges.
- Clear particulate obstructions from inlet fitting ports.

TRANSMITTERS

- Test operation of transmitters and readouts against gauge readings.
- Ensure alarm set points are set at desired level.
- Clear particulate obstructions from inlet fitting ports.

SWITCHES

- Test that switches are at correct set points.

INSTRUMENTATION HOUSINGS SUCH AS ELECTRICAL BOXES AND PANELS

- Open the box and check for moisture and condensation. Condensation can be a problem in humid climates that experience temperature fluctuations. The temperature changes cause the box to breathe and condensation will form inside. If humidity is a problem, desiccant bags should be kept inside the panel to absorb the humidity. These bags should be changed regularly. The desiccant will be blue when it is dry and orange when it is wet. The bag can be dried in a microwave or oven depending on the materials.
- Check for proper grounding or leaks into the panel.

SYSTEM START-UP

- 1.) Confirm MCE, RCP, and Catox panels are energized.
- 2.) Turn local/remote switches located on MCE door for Blowers B-101 and B-201 to “Remote”.
- 3.) Turn local/remote switches located on the MCP door for Pumps P-201, P-202, and P-101 to “Remote”.
- 4.) Clear Alarms by pressing “Alarm Reset” button on the System HMI. Ensure all alarms are cleared in the Alarms Summary HMI screen.
- 5.) On the HMI Controls Screen, set B-101, B-201, P-201, P-202, and P-101 virtual HOA’s to “Auto”.
- 6.) Alarm VSH-301 must be manually disabled during system start up from the settings screen.
- 7.) Press system Enable on the HMI to start the system.

SYSTEM SHUTDOWN

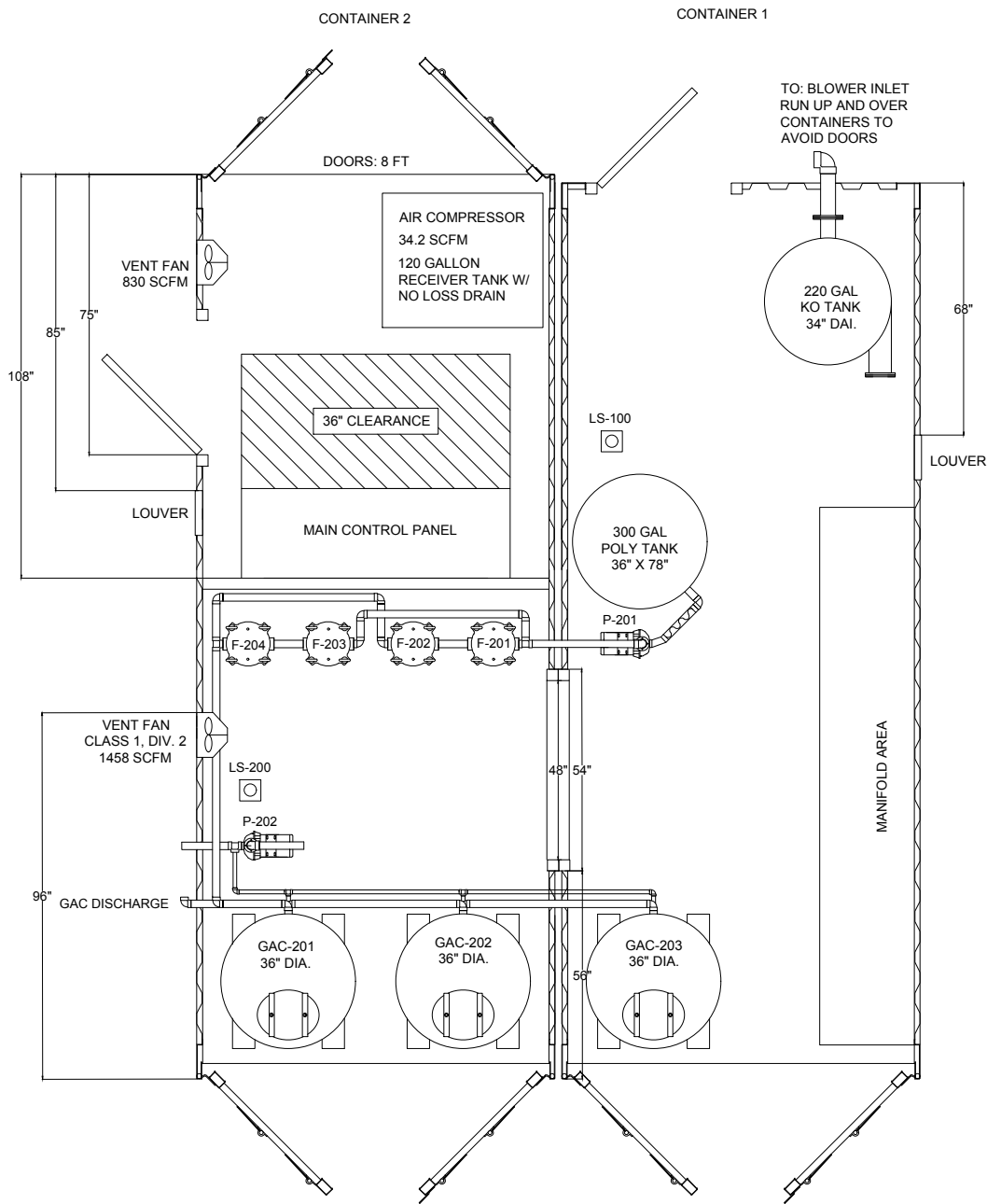
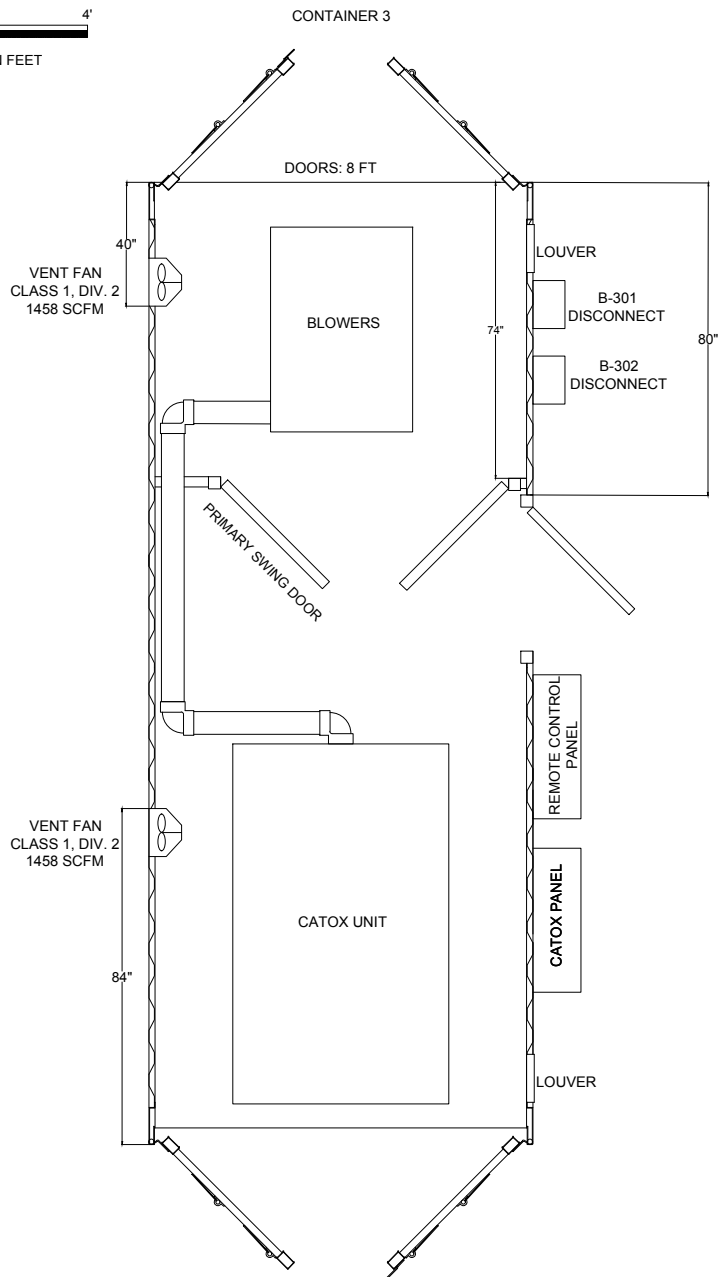
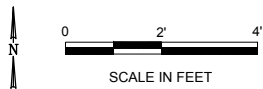
- 1.) Press “System Disable” Button on HMI screen.

TROUBLESHOOTING CHART

SYMPTOM	POTENTIAL CAUSE	POSSIBLE SOLUTION
Electrical Motor		
Motor will not start and there is no noise	Motor may not be receiving the proper power.	Check fuses and power distribution between power lines to motor.
	Overload is tripped.	Reset Overload.
	Main power may be off.	Check main power.
	Contactor may not be closing because motor is in manual position.	Switch motor to back to Auto position.
	Contactor may not be closing because PLC is not telling output to be on.	Check PLC operating sequence to determine if a start requirement is not met.
Motor does not start but makes a humming noise	One of the phases of power is not getting to the Motor as a result of a blown fuse.	Change Fuse.
	One of the phases of power is not getting to the Motor as a result of a poor wire connection	Check wiring for a loose wire or a poor connection.
	The driven component, i.e. pump, will not spin and could be seized up.	Disassemble driven component, check clearances and clean internal components and replace any damaged components.
	Bearing on drive shaft of motor or driven component may be seized up.	Replace bearings.
Overloads Trip immediately after startup	Check for Short Circuit in motor windings.	Re-wind motor.
	One of the phases of power is not getting to the Motor as a result of a blown fuse.	Change Fuse.
	Motor power wires may be shorting out to ground.	Search for wiring short and replace wiring if required.
	Motor may have too much load or backpressure as a result of operating the driven component outside of its operating capabilities.	Check operating capabilities of driven component I.e., Ensure positive displacement pump is not over pressured or that centrifugal pump is not operating at too high a flow rate.
Motors amps are above the allowable value on the nameplate	Motor may be designed to operate on the upper limit.	Calculate maximum allowable amps. Name plate amps x safety factor.
	Driven component may have scale built up inside.	Clean internal components of driven component.
	Driven component may be rotating in the wrong direction.	Check direction of rotation and switch rotation of motor if it is incorrect.

	Check voltage of power. Low voltage results in high amps.	Adjust overloads for higher amps if the difference is only slight. Otherwise change power or motor.
Knockout Tank		
Water will not pump out of phase separator tank	Base of separator may be plugged with sand.	Flush sand and debris out of separator.
Level Switches		
Level switch is staying closed when water in tank drops below switch	Level switch is upside down or on its side.	Check orientation of level switch. Level switch may be designed as normally closed and therefore will be upside down.
	Sight Glass is plugged giving a false level in the tank.	Clean sight glass.
	Level switch has dirt or film causing it to stick up.	Remove level switch, clean and test for normal operation using a millimeter.
	Level switch may be damaged or faulty and failed closed regardless of the switch position.	Replace switch.
	Wiring to level switch may be shorting out to ground causing the switch to appear closed at all times.	Disconnect switch from system wiring and separate system wires so they are not in contact with each other or any metal. If the input is still on then the input wiring is being grounded somewhere. Find short and replace or fix wiring.
	IS barrier is shorted out internally.	Switch IS barrier with working barrier and if problem goes away then the barrier may be faulty and should be changed.
	Input wiring is loose in terminal strip.	Tighten terminal strip where field wiring is brought into panel.
	Level switch is wired incorrectly	Consult input wiring diagram and inspect wiring of level switch. Change if required.
Level switch stays open when water in tank is above the switch	Level switch is upside down or on its side.	Check orientation of level switch. Level switch may be designed as normally closed and therefore will be upside down.
	Sight Glass is plugged giving a false level in the tank.	Clean sight glass.
	Level switch has dirt or film causing it to stick down.	Remove level switch, clean and test for normal operation using a millimeter.
	Level switch may be damaged or faulty and failed open regardless of the switch position.	Replace switch.
	IS barrier is blown preventing the level switch signal from crossing the barrier.	Switch IS barrier with working barrier and if problem goes away then the barrier may be blown. If barrier is blown then the input wire on the right side of the barrier will have 24 V DC and the wire on the opposite side will have 0V DC.
	Level switch is wired incorrectly	Consult input wiring diagram and inspect wiring of level switch. Change if required.

REVISION 3

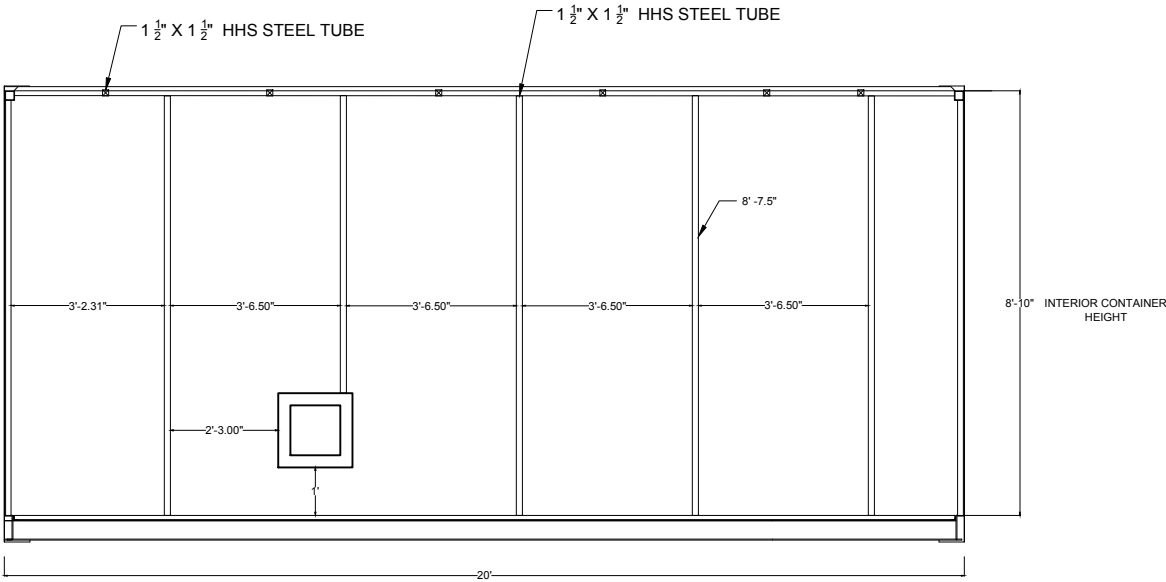


SEE P&ID FOR SCHEDULE OF
EQUIPMENT, MATERIALS, AND SIZES

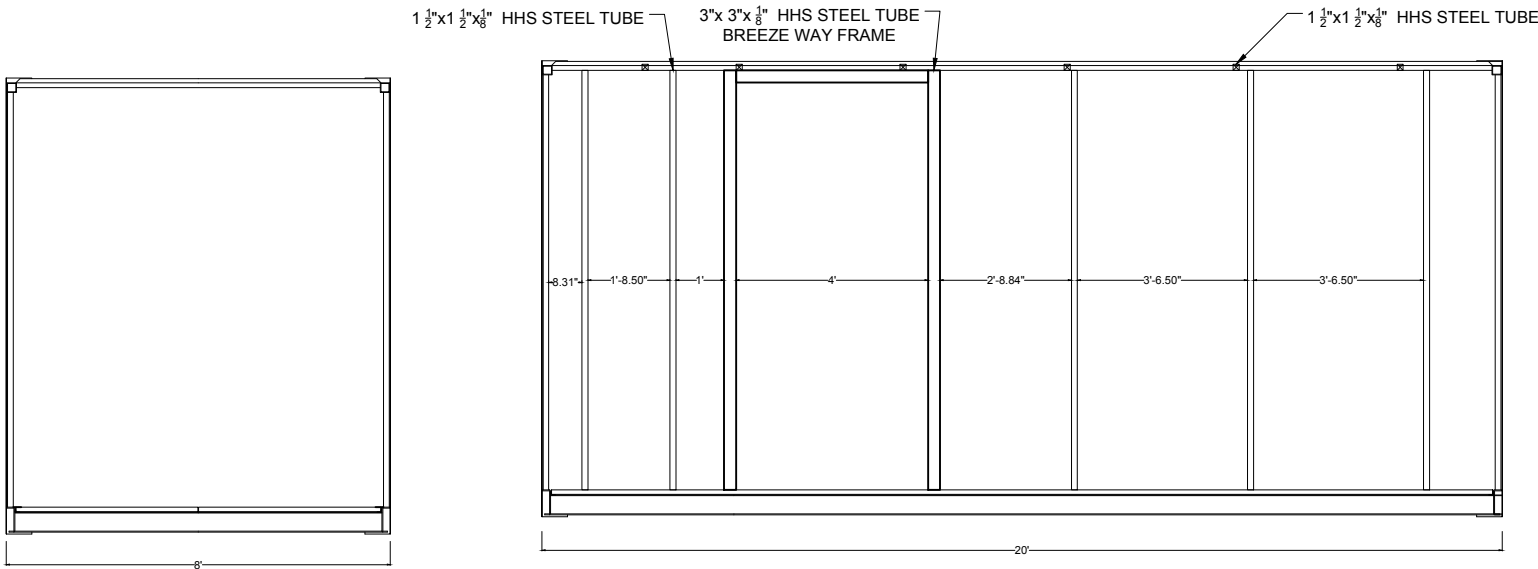
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 - 4. 2015 SEATTLE BUILDING CODE (SBC)
 - 5. NFPA 497

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											MPS	MPS
	3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS		Arcadis U.S., Inc. 126 N. Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com	Flitway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.flitway.com			DESIGNED BY	DRAWN BY
	2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS						PAP	PAP
	1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS						PROJECT NUMBER	DRAWING NUMBER
	0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS						Q14972	M-01
	REV.	ISSUED DATE	DESCRIPTION	BY	CK'D							SHEET 1 OF 7

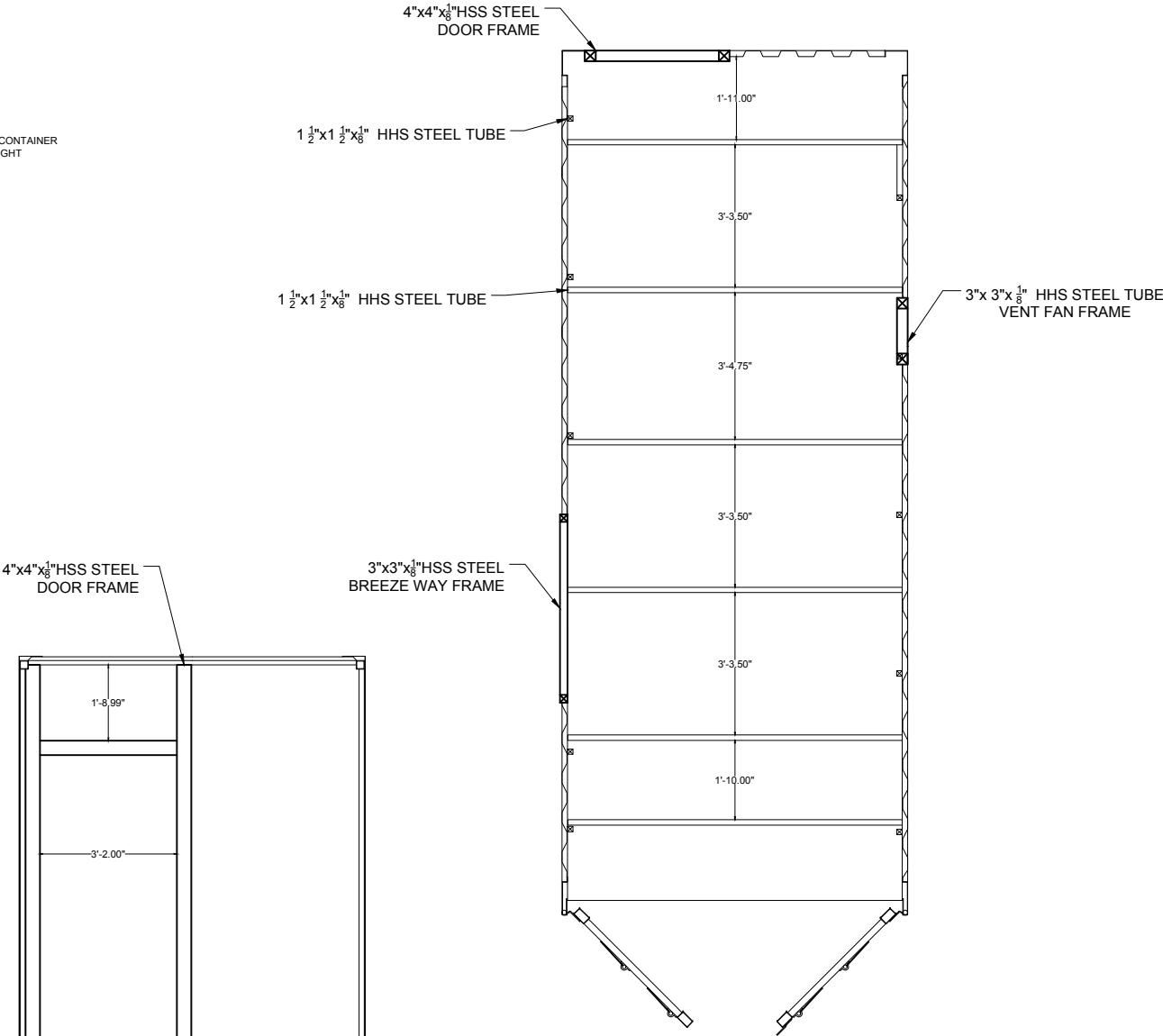
REVISION 3



1
M2
CONTAINER 1 - INTERIOR ELEVATION (EAST WALL)
SCALE: 1" = 4'0"

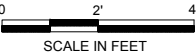


2
M2
CONTAINER 1 - INTERIOR ELEVATION (WEST WALL)
SCALE: 1" = 4'0"



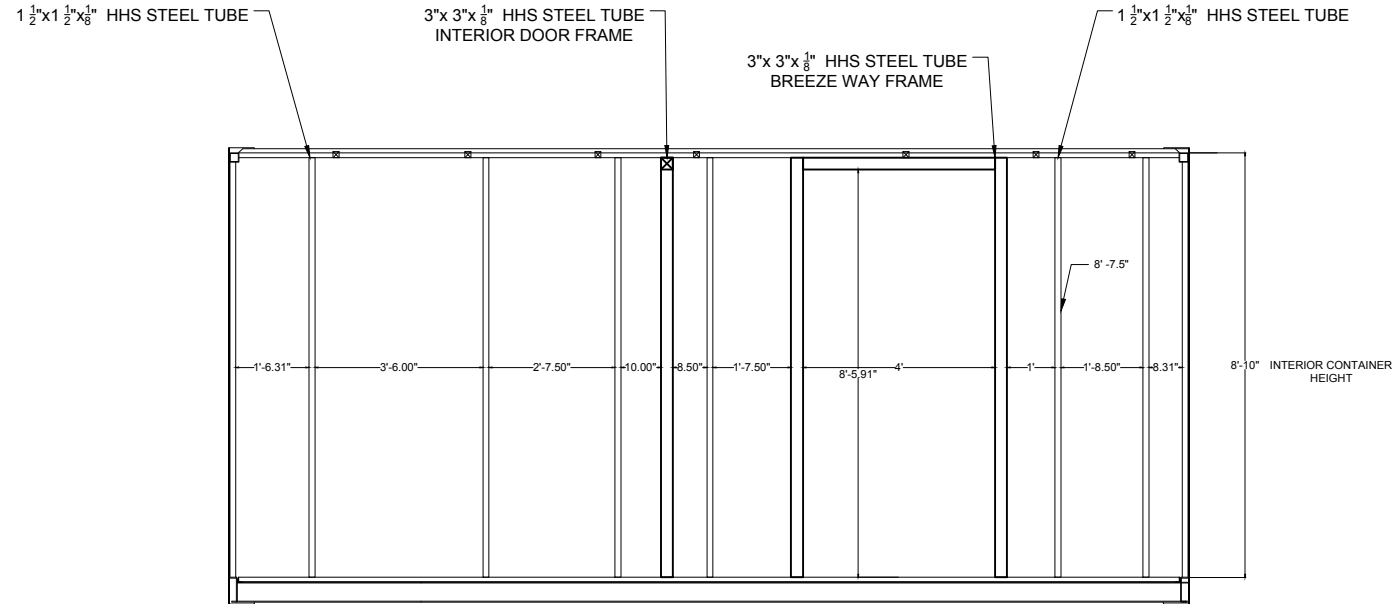
3
M2
CONTAINER 1 - TOP VIEW
SCALE: 1" = 4'0"

- CODES:
1. 2015 SEATTLE MECHANICAL CODE (SMC)
 2. 2015 SEATTLE ENERGY CODE (SEC)
 3. 2015 SEATTLE FUEL GAS CODE (SFGC)
 4. 2015 SEATTLE BUILDING CODE (SBC)
 5. NFPA 497

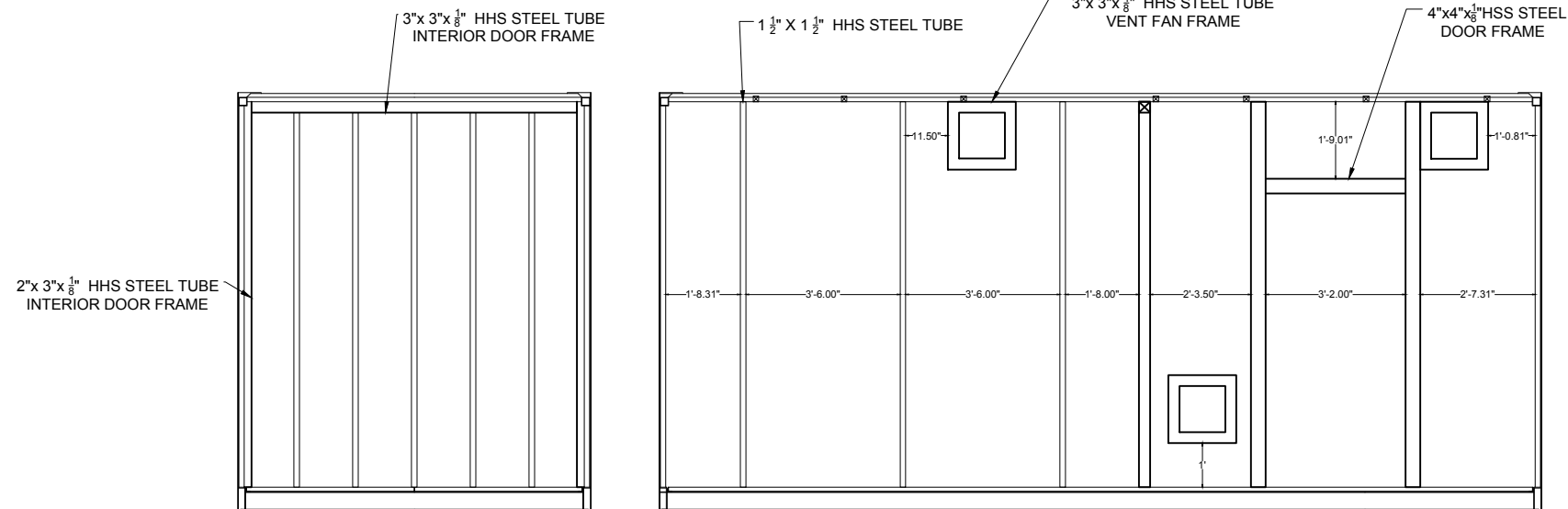


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	3	03/01/21		BUILDING PERMIT REVISIONS	PAP	MPS								 ARCADIS U.S., Inc. 126 N Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com	 Flitway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.flitway.com
	2	05/21/2020		ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS									
	1	04/14/2020		ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS									
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	REV.			ISSUED DATE	DESCRIPTION										

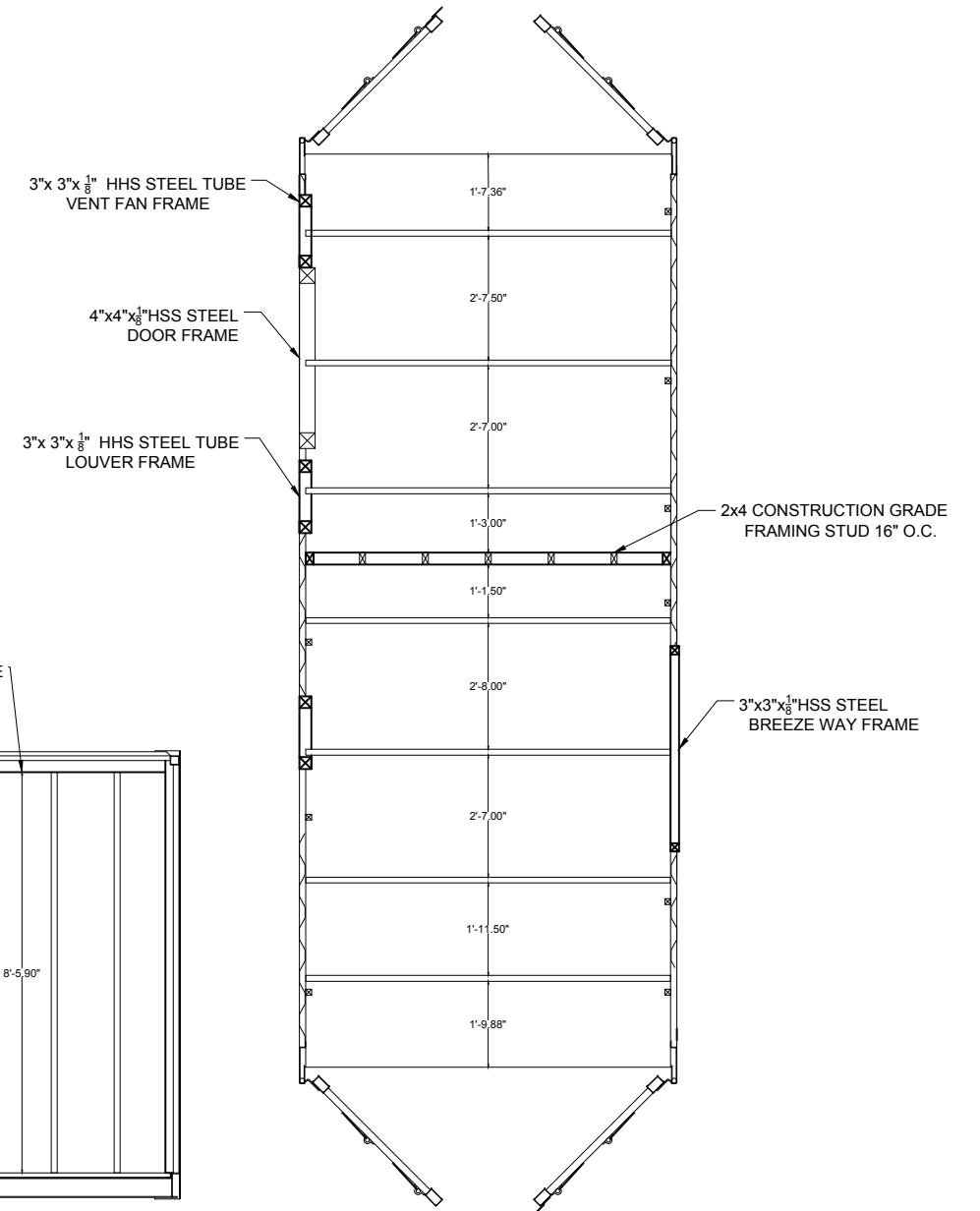
REVISION 3



1
M3 CONTAINER 2 - INTERIOR ELEVATION (EAST WALL)
SCALE: 1" = 4'0"



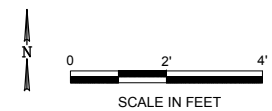
2
M3 CONTAINER 2 - INTERIOR ELEVATION (WEST WALL)
SCALE: 1" = 4'0"



3
M3 CONTAINER 2 - TOP VIEW
SCALE: 1" = 4'0"

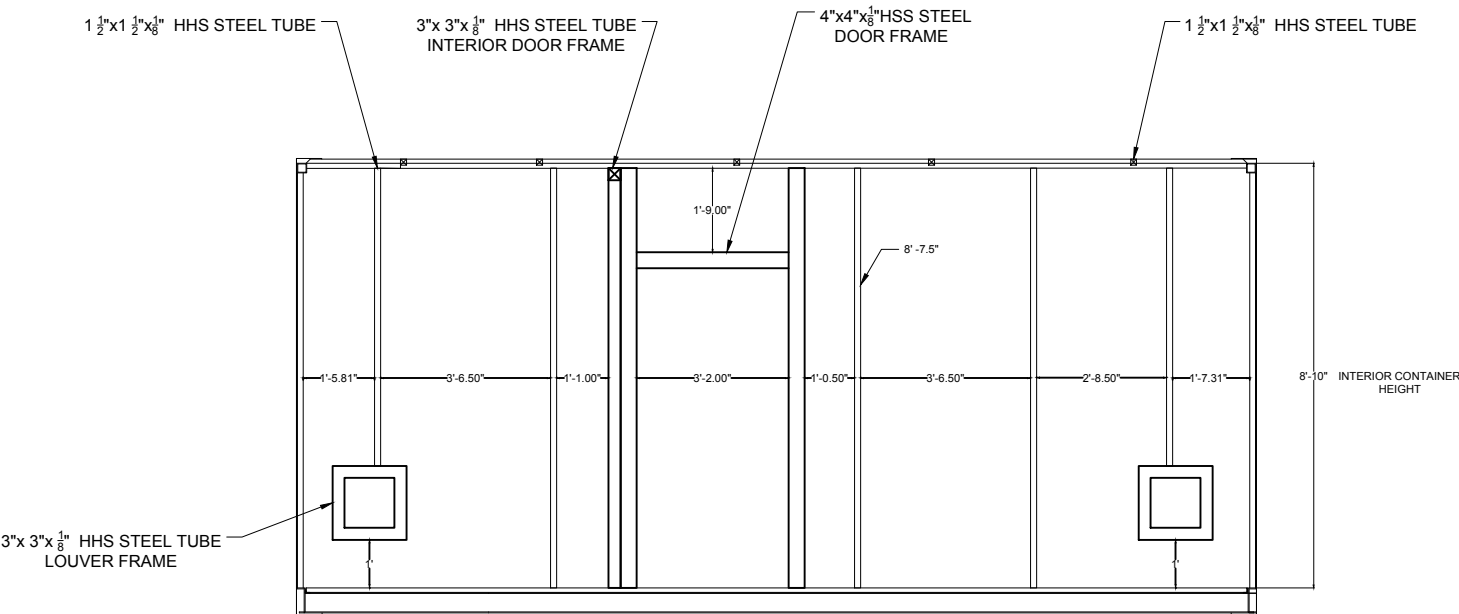
CODES:

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- 2015 SEATTLE ENERGY CODE (SEC)
- 2015 SEATTLE FUEL GAS CODE (SFGC)
- 2015 SEATTLE BUILDING CODE (SBC)
- NFPA 497

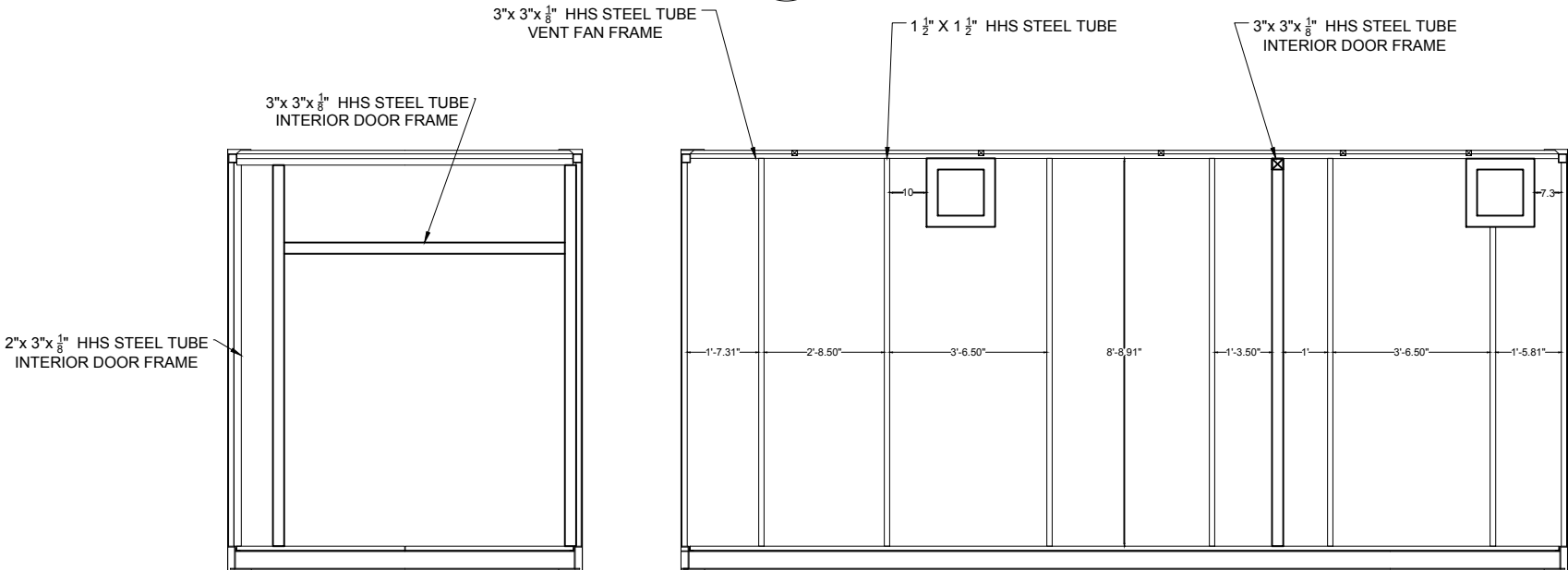


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	3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS						DESIGNED BY PAP	DRAWN BY PAP
	2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS						PROJECT NUMBER Q14972	DRAWING NUMBER M-03 SHEET 3 OF 7
	1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS							
	0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS							
	REV.	ISSUED DATE	DESCRIPTION	BY	CK'D							

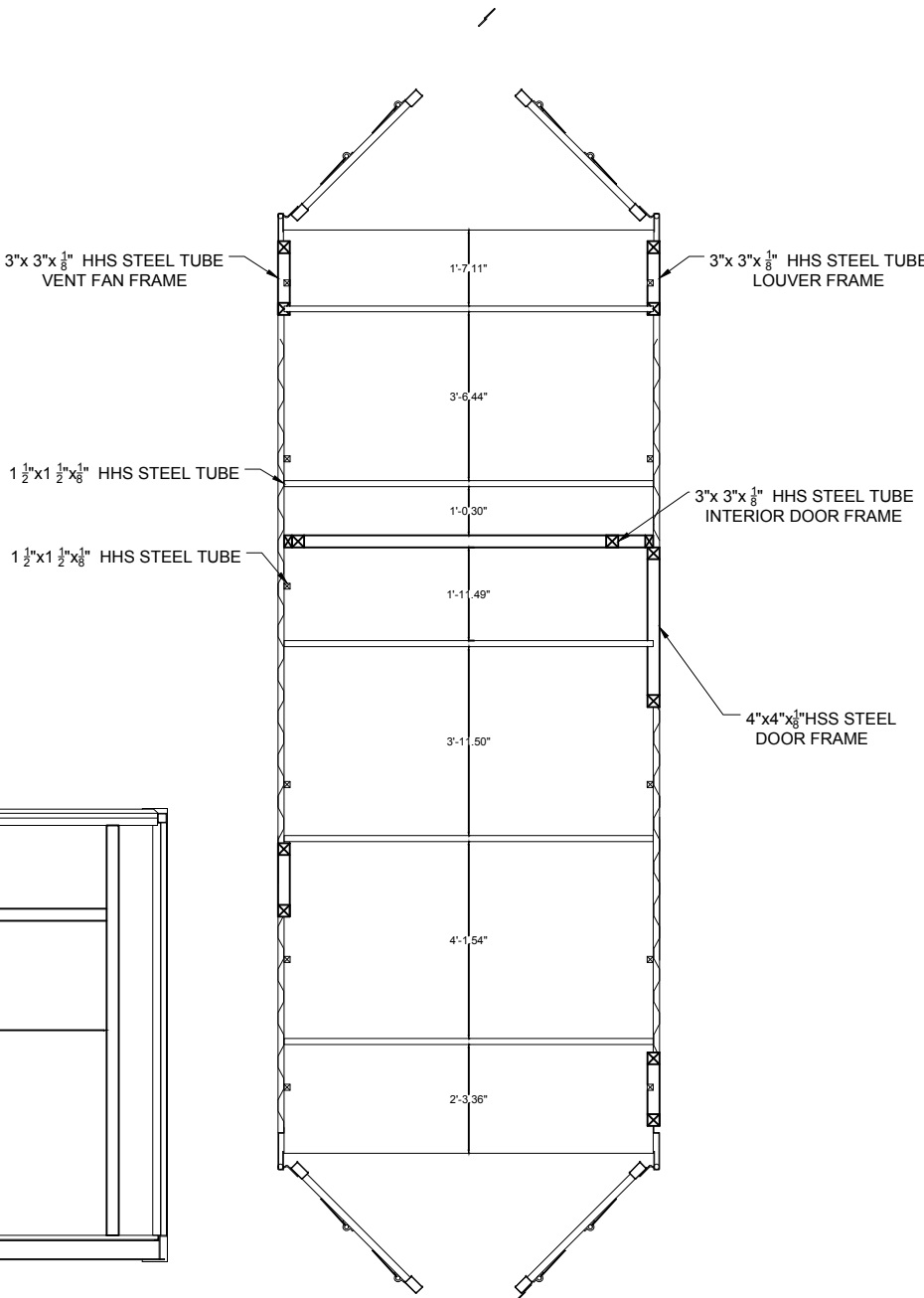
REVISION 3



1 CONTAINER 3 - INTERIOR ELEVATION (EAST WALL)
M4 SCALE: 1" = 4'0"



2 CONTAINER 3 - INTERIOR ELEVATION (WEST WALL)
M4 SCALE: 1" = 4'0"



3 CONTAINER 3 - TOP VIEW
M4 SCALE: 1" = 4'0"

- CODES:
1. 2015 SEATTLE MECHANICAL CODE (SMC)
 2. 2015 SEATTLE ENERGY CODE (SEC)
 3. 2015 SEATTLE FUEL GAS CODE (SFGC)
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REV.	ISSUED DATE	DESCRIPTION	BY	CHK'D
3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS
2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
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0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS

SEAL



Prepared for:

ARCADIS Design & Construction

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126 N Jefferson St., Suite 400
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Tel: (414)-276-7742
www.arcadis.com

Prepared by:

Flitway Technologies, Inc.
2129 East Birchwood Ave.
Cudahy, WI 53110
Tel: (414) 483-5600 Fax: (414) 483-1957
www.flitway.com

DUAL-PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

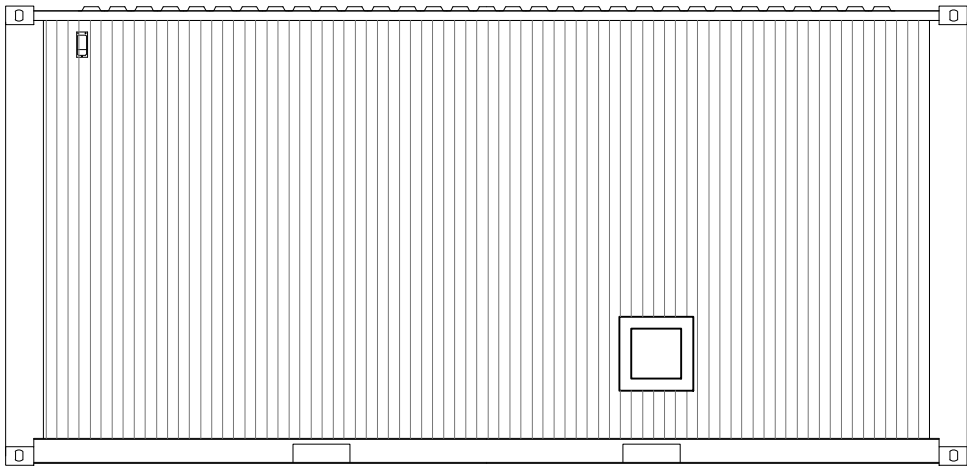
SHEET TITLE

CONTAINER #3
STRUCTURAL LAYOUT

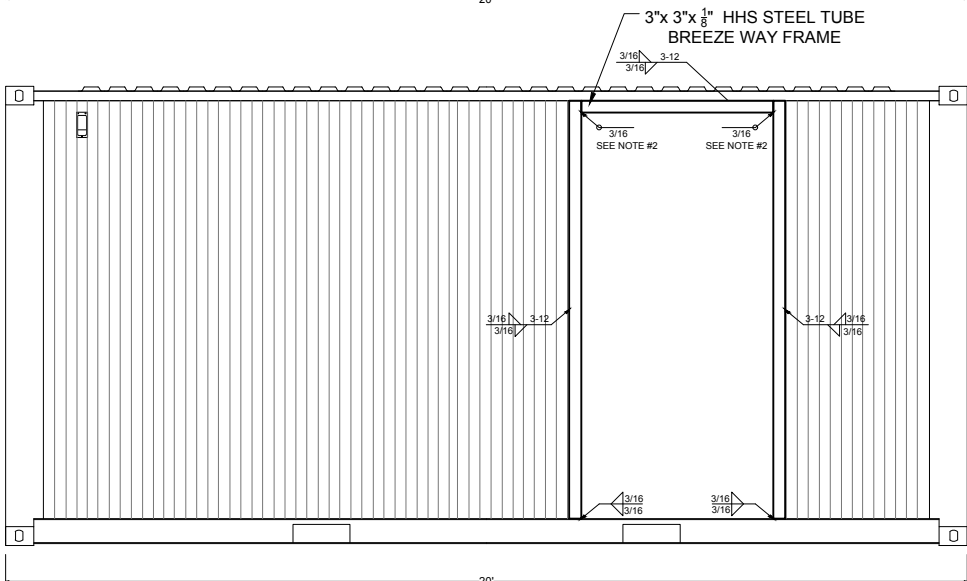
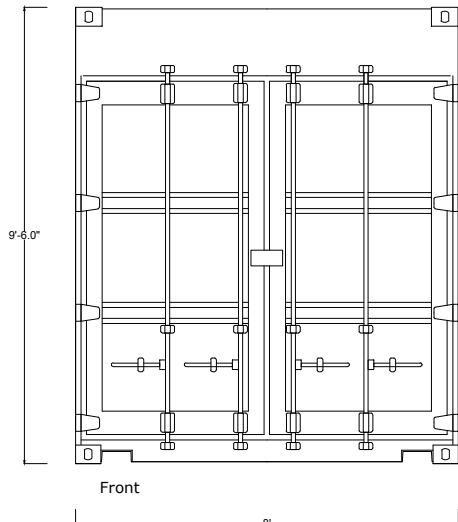
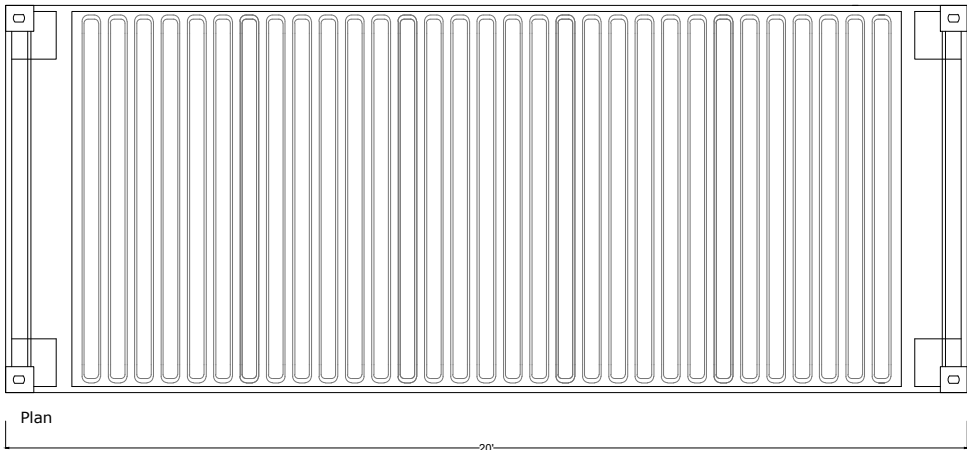
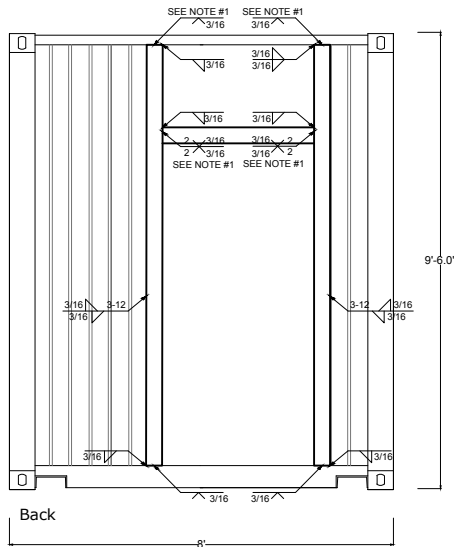
APPROVED BY: **MPS**
SCALE IN FEET
DESIGNED BY: **PAP**
PROJECT NUMBER
Q14972

CHECKED BY: **MPS**
DRAWN BY: **PAP**
DRAWING NUMBER
M-04
SHEET 4 OF 7

REVISION 3

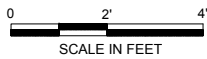


1 CONTAINER 1 - EXTERIOR ELEVATION (EAST WALL)
SCALE: 1" = 4'0"



2 CONTAINER 1 - EXTERIOR ELEVATION (WEST WALL)
SCALE: 1" = 4'0"

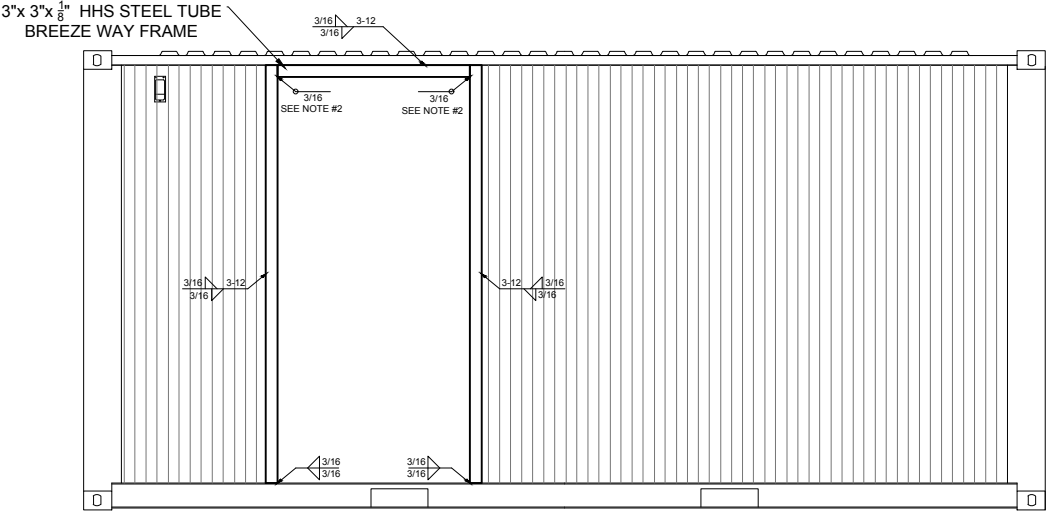
- NOTES:
- #1. WELD GROUND FLAT FOR WELDED ON DRIP EDGE PLATE
 - #2. OUTSIDE ONLY WELD GROUND FLAT



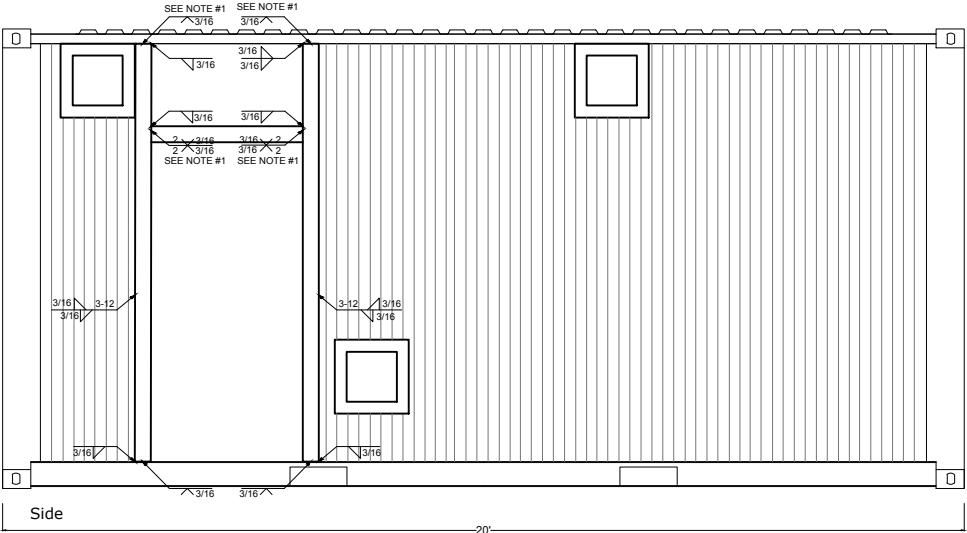
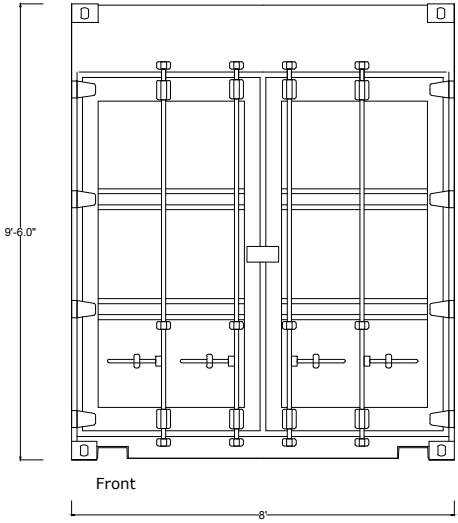
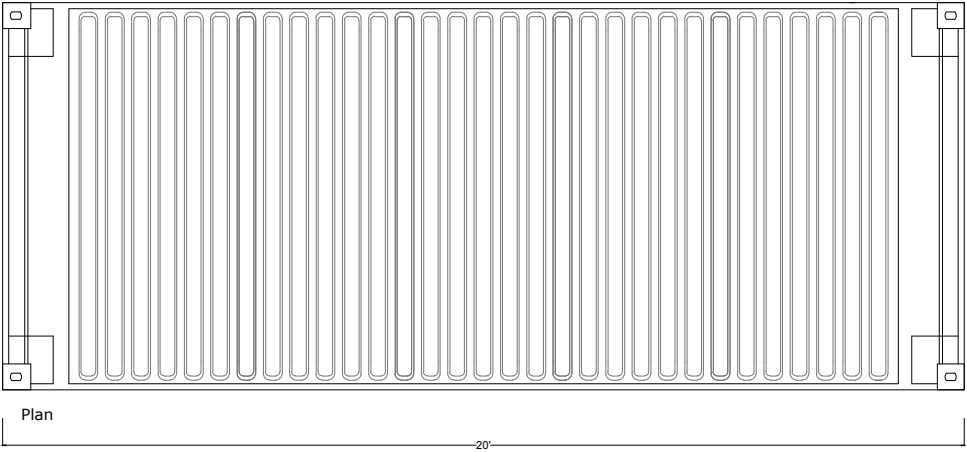
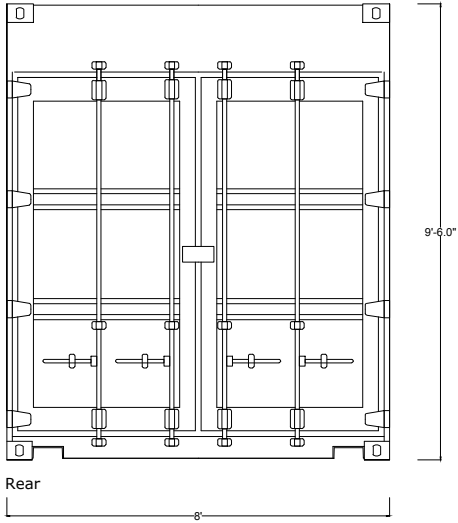
- CODES:
- 1. 2015 SEATTLE MECHANICAL CODE (SMC)
 - 2. 2015 SEATTLE ENERGY CODE (SEC)
 - 3. 2015 SEATTLE FUEL GAS CODE (SFGC)
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 - 5. NFPA 497

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REVISION 3



1 CONTAINER 2 - EXTERIOR ELEVATION (EAST WALL)
M6 SCALE: 1" = 4'0"



2 CONTAINER 2 - EXTERIOR ELEVATION (WEST WALL)
M6 SCALE: 1" = 4'0"

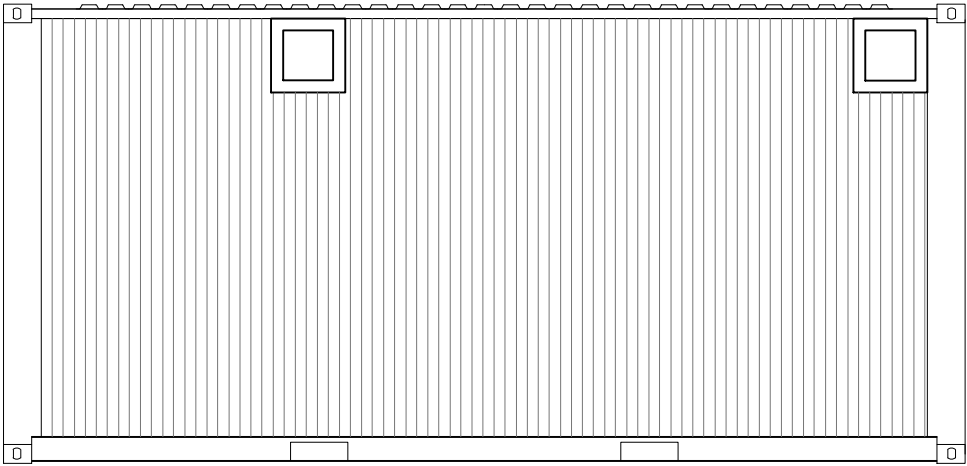
- NOTES:
- #1. WELD GROUND FLAT FOR WELDED ON DRIP EDGE PLATE
 - #2. OUTSIDE ONLY WELD GROUND FLAT



- CODES:
- 1. 2015 SEATTLE MECHANICAL CODE (SMC)
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 - 4. 2015 SEATTLE BUILDING CODE (SBC)
 - 5. NFPA 497

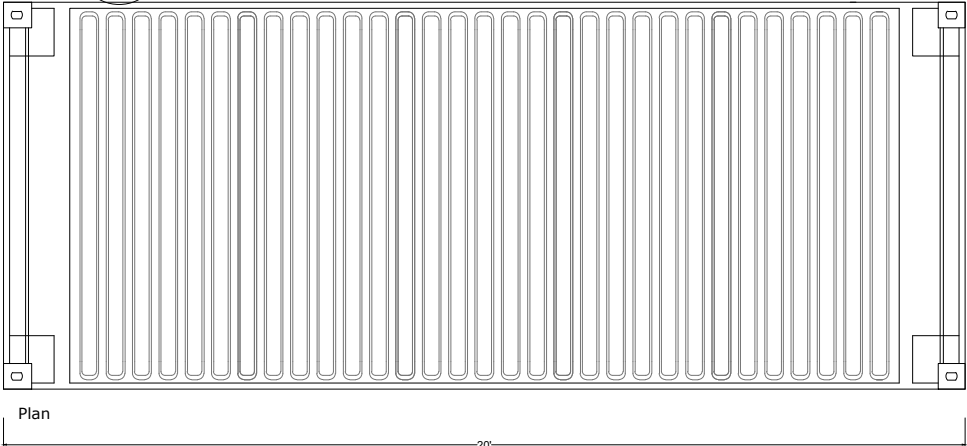
© FLITWAY TECHNOLOGIES, INC.						SEAL	Prepared for:	Prepared by:	DUAL-PHASE EXTRACTION SYSTEM CHEVRON SEATTLE SEATTLE, WA	SHEET TITLE CONTAINER #2 EXTERIOR WELDS	APPROVED BY	CHECKED BY		
							 Arcadis U.S., Inc. 126 N. Jefferson St., Suite 400 Milwaukee, WI 53202 Tel: (414)-276-7742 www.arcadis.com	 Flitway Technologies, Inc. 2129 East Birchwood Ave. Cudahy, WI 53110 Tel: (414) 483-5600 Fax: (414) 483-1957 www.flitway.com			DESIGNED BY	DRAWN BY		
											PAP	PAP		
											PROJECT NUMBER	DRAWING NUMBER		
											Q14972	M-06		
	REV.	ISSUED DATE	DESCRIPTION	BY	CK'D							SHEET 6 OF 7		
	3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS									
	2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS									
	1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS									
	0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS									

REVISION 3

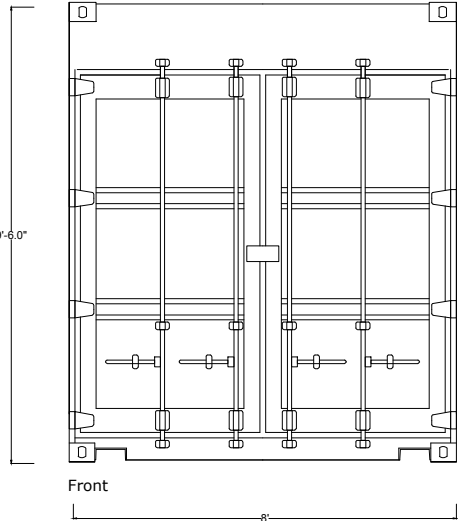


Side

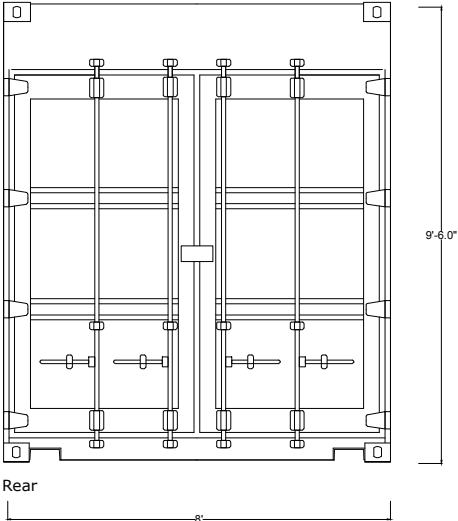
1 CONTAINER 3 - EXTERIOR ELEVATION (WEST WALL)
M7 SCALE: 1" = 4'0"



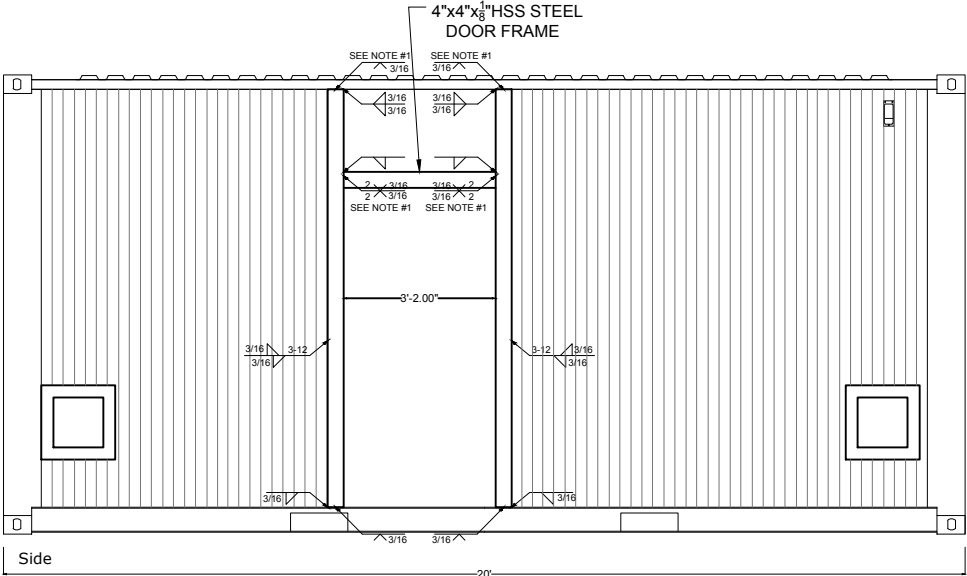
Plan



Front



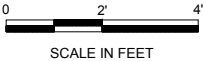
Rear



Side

2 CONTAINER 3 - EXTERIOR ELEVATION (EAST WALL)
M7 SCALE: 1" = 4'0"

NOTES:
#1. WELD GROUND FLAT FOR WELDED ON DRIP EDGE PLATE



- CODES:
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 2. 2015 SEATTLE ENERGY CODE (SEC)
 3. 2015 SEATTLE FUEL GAS CODE (SFGC)
 4. 2015 SEATTLE BUILDING CODE (SBC)
 5. NFPA 497

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REV.	ISSUED DATE	DESCRIPTION	BY	CK'D
3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS
2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS

SEAL



Prepared for:

ARCADIS Design & Construction Services

Arcadis U.S., Inc.
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Milwaukee, WI 53202
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Prepared by:

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Tel: (414) 483-5600 Fax: (414) 483-1957
www.flitway.com

DUAL-PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

SHEET TITLE

**CONTAINER #3
EXTERIOR WELDS**

APPROVED BY
MPS

DESIGNED BY
PAP

PROJECT NUMBER
Q14972

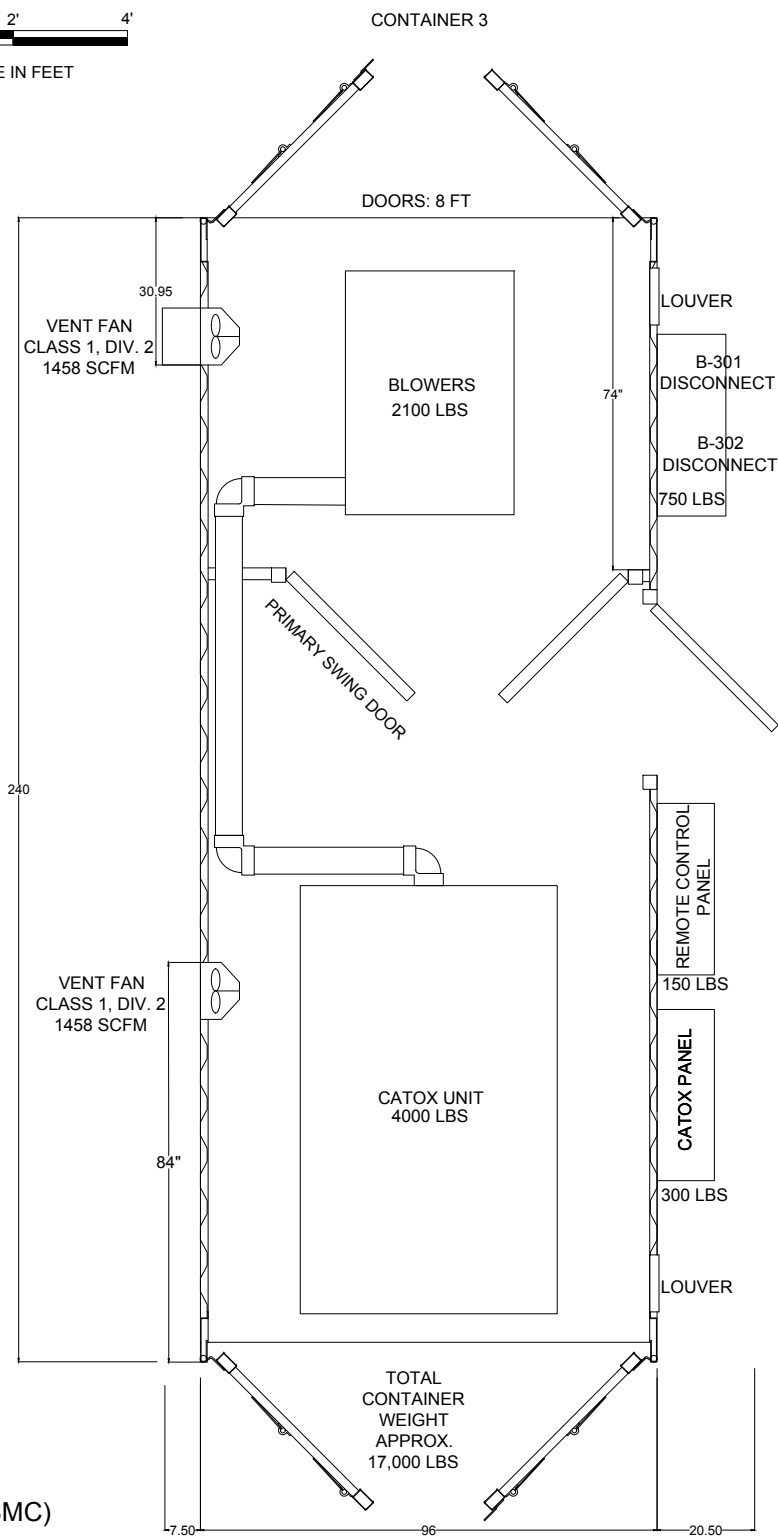
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DRAWN BY
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DRAWING NUMBER
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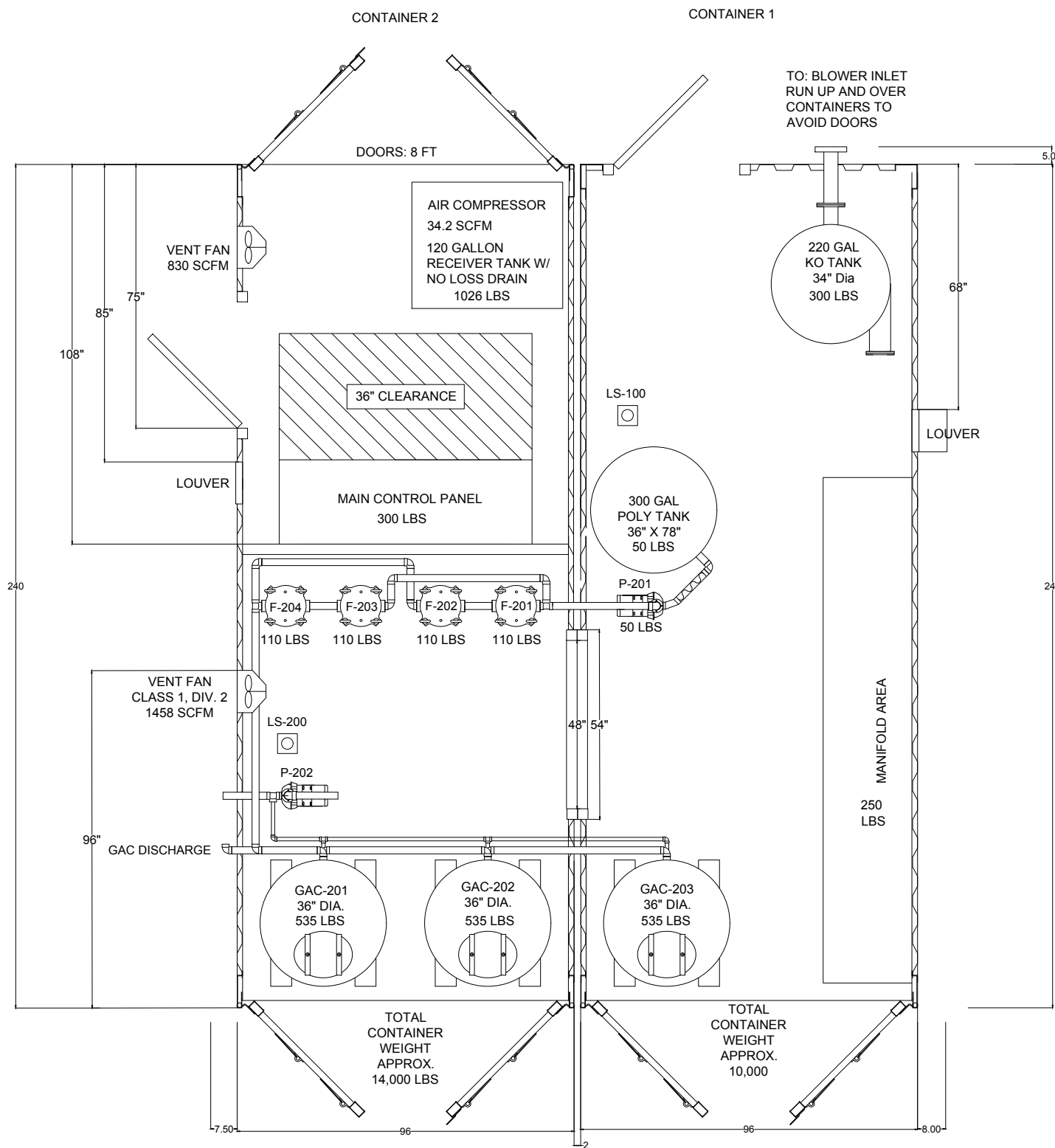
SHEET 7 OF 7

REVISION 3



SEE P&ID FOR SCHEDULE OF EQUIPMENT, MATERIALS, AND SIZES

- CODES:
- 1. 2015 SEATTLE MECHANICAL CODE (SMC)
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	3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS						DESIGNED BY PAP		DRAWN BY PAP	
	2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS						PROJECT NUMBER Q14972		DRAWING NUMBER M-08	
	1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS									
	0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS									
	REV.	ISSUED DATE	DESCRIPTION	BY	CK'D								SHEET 1 OF 7	

LEGEND

- ▶ MAIN PROCESS LINE
- - - - -▶ AUXILIARY SYSTEMS
- - - - - BUILDING/AREA EXTENTS
————— ELECTRIC (ELECTRONIC) SIGNAL



FLEXIBLE HOSE



BALL VALVE



BUTTERFLY VALVE



GATE VALVE



SAMPLE/BLEED VALVE



NEEDLE VALVE



GLOBE VALVE



KNIFE GATE VALVE



SWING CHECK VALVE



BALL CHECK VALVE



SOLENOID OPERATED VALVE



MOTOR OPERATED VALVE



SAMPLE PORT



PRESSURE REGULATING VALVE



FLANGED CONNECTION/PIPE TRANSITION



NON-FLANGED PIPE TRANSITION



UNION



REDUCER



Y STRAINER



PRESSURE RELIEF VALVE



VACUUM RELIEF VALVE



CAMLOCK



QUICK CONNECT FITTING (AIR)



HOSE BARB CONNECTION



CAP



PARTICULATE FILTER



COALESCING FILTER



MOTOR



VARIABLE FREQUENCY DRIVE



EXTRACTION WELL PUMP



CENTRIFUGAL PUMP



ROTARY-LOBE BLOWER



CHEMICAL METERING PUMP



SUMP PUMP



MAGNETIC FLOW METER



POSITIVE DISPLACEMENT FLOW METER



AVERAGING PILOT TUBE FLOW METER



ROTAMETER WITH VALVE



STATIC MIXER



SITE GLASS



FILTER



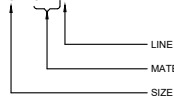
FLAME ARRESTOR

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS			
SHARED DISPLAY, SHARED CONTROL			
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.			
PROGRAMMABLE LOGIC CONTROLLER FUNCTION			

PIPELINE DESIGNATION

6"-S04P



MATERIAL:

BRZ - BRASS/BRONZE
CIR - CAST IRON
CST - CARBON STEEL
CPR - COPPER
CVC - CHLORINATED POLYVINYL CHLORIDE
DIR - DUCTILE IRON
FRP - FIBERGLASS
GCS - GALVANIZED CARBON STEEL
HDPE - HIGH DENSITY POLYETHYLENE
LCS - LINED CARBON STEEL
PET - POLYETHYLENE
POP - POLYPROPYLENE
PVC - POLYVINYL CHLORIDE
RUB - RUBBER
S04 - 304 STAINLESS STEEL
S4L - 304L STAINLESS STEEL
S16 - 316 STAINLESS STEEL
S6L - 316L STAINLESS STEEL
TEF - TEFLON
VIT - VITON
TYG - TYGON

TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

ALARMS:

1. AN ALARM THAT DISABLES ALL OR ANY PART OF THE SYSTEM WILL SEND A NOTIFICATION TO THE OPERATOR VIA THE SCADA SYSTEM.

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D = USER'S CHOICE	DIFFERENTIAL			
E = VOLTAGE, EMERGENCY		SENSOR (PRIMARY ELEMENT)	STOP	
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = USER'S CHOICE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED		

ABBREVIATIONS:

AC AIR COMPRESSOR
AD AIR DRYER
AI pH INDICATOR
AIT pH INDICATOR TRANSMITTER
AR AIR RECEIVER TANK
AS ANTI-SCALANT
C CENTER LINE
CAH CONDUCTIVITY ALARM HIGH
CFM CUBIC FEET PER MINUTE
CI CONDUCTIVITY INDICATOR
CIP CLEAN IN PLACE
CIT CONDUCTIVITY INDICATOR TRANSMITTER
CO CLEAN OUT
CTE CONDUCTIVITY TEMPERATURE ELEMENT
CY CUBIC YARDS
°C DEGREES CELSIUS
DPAH DIFFERENTIAL PRESSURE ALARM LOW
DPIT DIFFERENTIAL PRESSURE ALARM HIGH
DPI DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER
E ELECTRIC ACTUATOR
ECIP ELECTRODE CLEAN IN PLACE
EM ENVIRONMENTAL MEDIA
ELEV ELEVATION
ESS EMERGENCY STOP SWITCH
F FILTER
FE FLOW ELEMENT
FI FLOW INDICATOR
FIT FLOW INDICATING TRANSMITTER
FMO FLOW MONITOR
FQ FLOW TOTALIZER
FT FOOT/ FEET
FT FLOW TRANSMITTER
FV FLOW VALVE
GAC GRANULATED ACTIVATED CARBON
GAL GALLONS
GPD GALLONS PER DAY
HAZ HAZARDOUS
HDPE HIGH DENSITY POLYETHYLENE
HOA HAND/ OFF/ AUTO
HR HOUR
HS HAND SWITCH
IN. INCHES
kg KILOGRAMS
KV TIMER VALVE

L LITER
LAH LEVEL ALARM HIGH
LAHH LEVEL ALARM HIGH HIGH
LAL LEVEL ALARM LOW
LE LEVEL ELEMENT
LP LIQUID PHASE
LS LEVEL SWITCH
LT LEVEL TRANSMITTER
M MOTOR
MAX MAXIMUM
µM MICROMETER
mg MILLIGRAM
MIN MINIMUM
MMF MULTIMEDIA FILTER
NA NOT APPLICABLE
NC NORMALLY CLOSED
NO NORMALLY OPEN
NPT NATIONAL PIPE THREAD
% PERCENT
LB POUNDS
PAH PRESSURE ALARM HIGH
PAL PRESSURE ALARM LOW
PI PRESSURE INDICATOR
PIT PRESSURE INDICATOR TRANSMITTER
PSIG PRESSURE PER SQUARE FOOT GAUGE
PR PRESSURE RELIEF VALVE
PRV PRESSURE REGULATING VALVE
PSV PRESSURE SAFETY VALVE
PVR PRESSURE VACUUM RELIEF
QAAPP QUALITY ASSURANCE PROJECTION PLAN
NaOH SODIUM HYDROXIDE
SP SAMPLE PORT
T TANK
TAH TEMPERATURE ALARM HIGH
TAHH TEMPERATURE ALARM HIGH HIGH
TI TEMPERATURE INDICATOR
TIT TEMPERATURE INDICATOR TRANSMITTER
TYP TYPICAL
TWV THREE WAY VALVE
V VALVE
VAH VACUUM ALARM HIGH
VAL VACUUM ALARM LOW
VE VACUUM ELEMENT
VIT VACUUM INDICATING TRANSMITTER
XLPE CROSS LINKED POLYETHYLENE
YI STATUS INDICATOR
ZX POSITION INDICATOR

NOTES:

1. ANY FIRST LETTER COMBINED WITH A MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: DP= DIFFERENTIAL PRESSURE; FQ= TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THAT NATURE OF THE ANALYSIS. EXAMPLE: pH
3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.

GENERAL NOTES:

1. ALL ANALOG SET POINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE.
2. ALARMS THAT SHUT DOWN TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

CODES:

1. 2015 SEATTLE MECHANICAL CODE (SMC)
2. 2015 SEATTLE ENERGY CODE (SEC)
3. 2015 SEATTLE FUEL GAS CODE (SFGC)
4. 2015 SEATTLE BUILDING CODE (SBC)
5. NFPA 497

REVISION 3

NOT FOR
CONSTRUCTION

4	07/23/21	CONSTRUCTION RECORD	BMA	MPS
3	03/01/21	BUILDING PERMIT REVISIONS	PAP	MPS
2	05/21/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
1	04/14/2020	ISSUED FOR 90% CUSTOMER REVIEW	PAP	MPS
0	02/25/2020	ISSUED FOR CUSTOMER REVIEW	PAP	MPS
REV.	ISSUED DATE	DESCRIPTION	BY	CK'D

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DUAL PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

SHEET TITLE

P&ID
NOTES & LEGEND SHEET

APPROVED BY

MPS

DESIGNED BY

PAP

PROJECT NUMBER

Q14972

CHECKED BY

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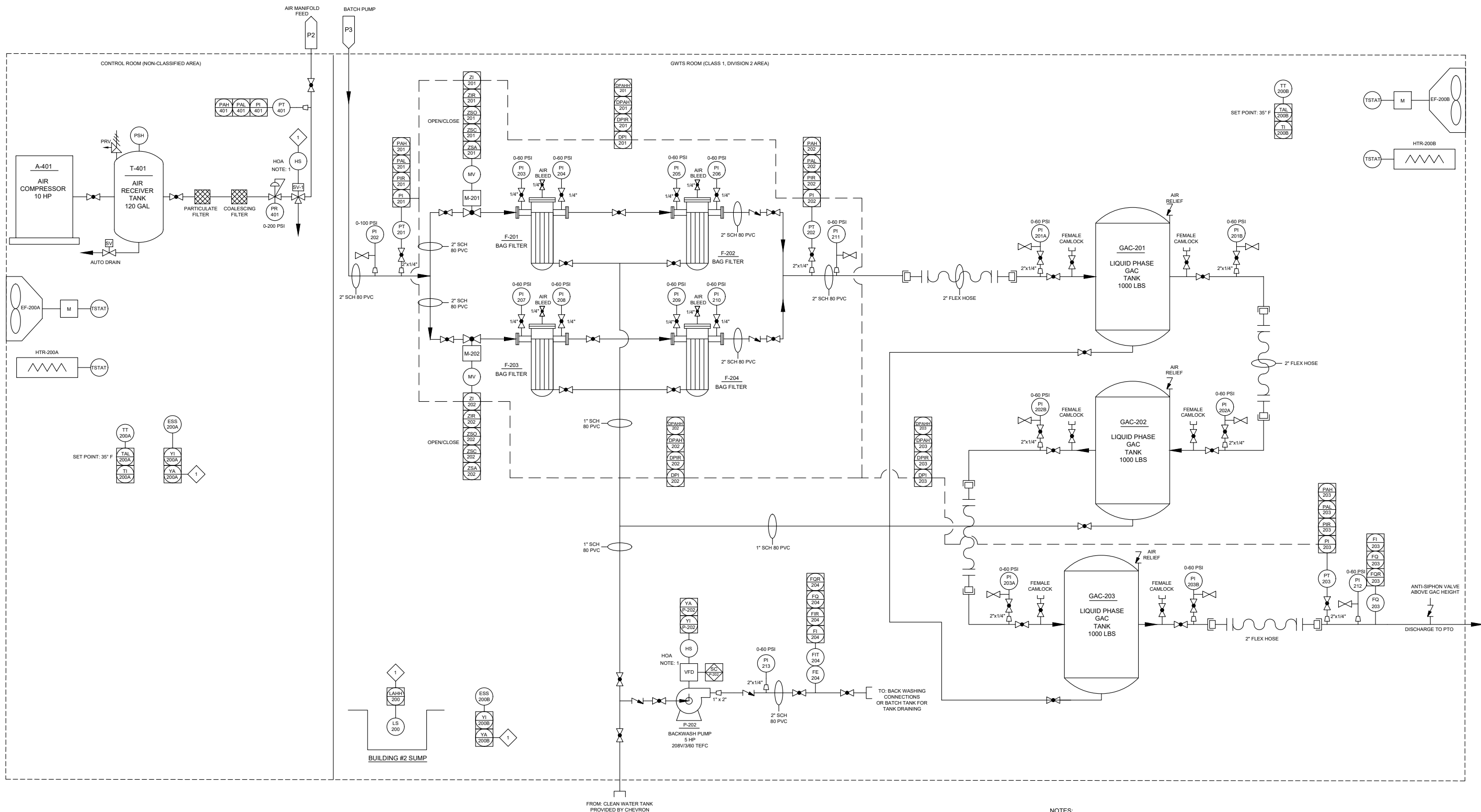
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SHEET 1 OF 4



NOTES:
1.) HAND/OFF/AUTO (HOA) WILL BE VIRTUAL SWITCH ON HMI

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DUAL PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

SHEET TITLE
**CONTROL ROOM / GWTS
CONTAINER #2
P&ID**

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P-03
SHEET **3** OF **4**

ABBREVIATIONS

A	AMPERE	OC	ON CENTER
AC	ALTERNATE CURRENT	CC	CENTER TO CENTER
AL	ALUMINUM	OL	OVERLOAD RELAY
AI	ANALOG IN	OSC	OSCILLATION
AIT	CHLORINE RESIDUAL ANALYZER	P	POLE
AM	AMMETER	PB	PUSH BUTTON
ANN	ANNUNCIATOR	PF	POWER FACTOR
AMP	AMPERES, AMPERAGE	PH Ø	PHASE
AO	ANALOG OUT	PI	PULSE IN
APC	AMERICAN POWER CORP.	PL	PILOT LIGHT
APFD	APPROVED	PLC	PROGRAMMABLE LOGIC CONTROLLER
AS	AMMETER SWITCH	PNL	PANEL
AT	AMPERE TRIP	PNLBD	PANELBOARD
ATS	AUTOMATIC TRANSFER SWITCH	POS	POSITION
AUTO	AUTOMATIC	POT	POTENTIOMETER
AUX	AUXILIARY	PRI	PRIMARY
AWG	AMERICAN WIRE GAUGE	PIS	POWER SUPPLY
BATT	BATTERY	PS	PRESSURE SWITCH
BKR	BREAKER	PT	POTENTIAL TRANSFORMER
BLDG	BUILDING	PVC	POLYVINYL CHLORIDE
C	CONDUIT	REC	RECEPTACLE
CAB	CABINET	RECPTS	RECEPTACLES
CB	CIRCUIT BREAKER	REQD	REQUIRED
CKT	CIRCUIT	REV	REVERSE
CL	CIRCUIT	RGS	RIGID GALVANIZED STEEL
CO	CONDUIT ONLY	RTU	REMOTE TERMINAL UNIT
COM	COMMON	RVNR	REDUCED VOLTAGE NON-REVERSING
COND	CONDUIT	RVSS	REDUCED VOLTAGE SOLID STATE
CP	CONTROL PANEL	SC	SHORT CIRCUIT CURRENT
CPT	CONTROL POWER TRANSFORMER	SCH	SCHEDULE
CR	CONTROL RELAY	SEC	SECONDARY, SECONDS
CT	CURRENT TRANSFORMER	SECT	SECTION
CU	COPPER	SS	SELECTOR SWITCH
DC	DIRECT CURRENT	SHLD	SHIELDED
DH	DATA HIGHWAY	SP	SPARE
DI	DIGITAL IN	SPDT	SINGLE POLE DOUBLE THROW
DIO	DIGITAL IN OUTPUT	SPECS	SPECIFICATIONS
DISC	DISCONNECT	SP HTR	SPACE HEATER
DISTR	DISTRIBUTION	SPST	SINGLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW	SS	SOLID STATE
DWG	DRAWING	ST	SHUNT TRIP
(E)	EXISTING	STA	STATION
EF	EXHAUST FAN	STD	STANDARD
EHU	ELECTRIC HEATING UNIT	STL	STEEL
ELEV	ELEVATION	SOV	SOLENOID OPERATED VALVE
FDR	FEEDER	SW	SWITCH
EMT	ELECTRICAL METALLIC TUBING	SYS	SYSTEM
ENCL	ENCLOSURE	SYM	SYMMETRICAL
FUT	FUTURE	TB	TERMINAL BOX
FVR	FULL VOLTAGE REVERSING	TC	TIME CLOCK
EP	EXPLOSION PROOF	TACH	TACHOMETER
ETM	ELAPSED TIME METER	TEMP	TEMPERATURE
EXH	EXHAUST	TERM	TERMINAL
EXIST	EXISTING	TS1AT	THERMOSTAT
FLEX	FLEXIBLE	TD	TIME DELAY
FLUOR	FLUORESCENT	TS	TEMPERATURE SWITCH
FVNR	FULL VOLTAGE NON-REVERSING	TSP	TWISTED SHIELDED PAIR
FWD	FORWARD	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
GALV	GALVANIZED	TYP	TYPICAL
GEN	GENERATOR	UG	UNDERGROUND
GND	GROUND	UH	UNIT HEATER
H	HOT CONDUCTOR	UON	UNLESS OTHERWISE NOTED
HH	HAND HOLE	UPS	UNINTERRUPTIBLE POWER SUPPLY
HID	HIGH INTENSITY DISCHARGE	V	VOLTAGE, VOLTS
HG	MERCURY	VFD	VARIABLE FREQUENCY DRIVE
HMI	HUMAN MACHINE INTERFACE	VP	VAPOR PROOF
HOA	HAND-OFF-AUTOMATIC	VS	VOLTMETER SWITCH, VARIABLE SPEED
HP	HORSEPOWER	W	WATTS, WIRE
HPS	HIGH PRESSURE SODIUM	WHD	WATTHOUR DEMAND METER
HT TR	HEAT TRACED	WHM	WATTHOUR METER
HTR	HEATER	WP	WEATHERPROOF
HVAC	HEATING, VENTILATING, A/C		
HZ	HERTZ - CYCLES PER SECOND		
IMC	INTERMEDIATE METAL CONDUIT		
INCAND	INCANDESCENT		
IND	INDICATION, INDICATING		
INO	INPUT/OUTPUT		
INSTR	INSTRUMENT		
INVT	INVERT		
JB	JUNCTION BOX		
J BOX	JUNCTION BOX		
KVA	KILO VOLT AMPERES		
KW	KILOWATTS		
KWH	KILOWATT HOUR		
KCM	1,000 CIRCULAR MILS		
L	LINE		
LC	LIGHTING CONTACTOR		
LCB	LOCAL CONTROL BOARD		
LCP	LOCAL CONTROL PANEL		
LOC	LOCAL		
LS	LEVEL SWITCH		
LT	LIGHT		
LTG	LIGHTING		
LTS	LIGHTS		
M	MOTOR CONTACTOR COIL		
mA	MILLIAMPS		
MAN	MANUAL		
MAG	MAGNETIC		
MAX	MAXIMUM		
MCC	MOTOR CONTROL CENTER		
MCB	MAIN CONTROL BOARD		
MCP	MOTOR CIRCUIT PROTECTOR		
MD	MOTORIZED DAMPER		
MDR	MANUFACTURERS DESIGNATION FOR SPECIFIC POWER SUPPLY		
MH	MANHOLE		
MTG	MOUNTING		
MIN	MINIMUM, MINUTES		
MLO	MAIN LUGS ONLY		
MOV	MOTOR OPERATED VALVE		
MS	MOTOR STARTER		
MMS	MANUAL MOTOR STARTER		
MTD	MOUNTED		
MTR	MOTOR		
MTR	MANUAL TRANSFER SWITCH		
N	NEUTRAL		
NA	NON-AUTOMATIC		
NC	NORMALLY CLOSED		
NO	NORMALLY OPEN		
NO	NUMBER		
NOS	NUMBERS		
NP	NAMEPLATE		
(N)	NEW OR PROPOSED		
NTS	NOT TO SCALE		

DRAWING LEGEND

	EXISTING EQUIPMENT, WIRING, DEVICES
	NEW WORK
	DEMOLISH OR REMOVE
	CONDUIT TURNING UP
	CONDUIT TURNING DOWN
	EQUIPMENT OR DEVICE TAG
	SHEET NOTE TAG
	HVAC/LIGHTING ITEM (SEE SCHEDULE)
	DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	DOUBLE DUPLEX RECEPTACLE, 20A, 125V, NEMA 5-20R
	FLUORESCENT LIGHTING FIXTURE
	JUNCTION BOX, SIZE PER NEC
	WALL MOUNTED LUMINAIRE
	LIGHT SWITCH, SINGLE ACTION
	3/4" x 10' CU CLAD GROUND ROD.
	UNDERGROUND CONDUIT OR DUCT/BANK.
	INSTRUMENTATION DEVICE
	THERMOSTAT
	CONDUIT SEAL OFF
	SHORT HASH MARK INDICATES HOT WIRE
	INDICATES GROUND CONDUCTOR
	LONG HASH MARK INDICATES NEUTRAL WIRE
NOTE: NO HASH MARK INDICATES 3/4"C. 2#12+1#12G	

ELECTRICAL COMPONENTS

	EARTH GROUND
	CHASSIS GROUND
	GROUND RECEPTACLE
	FUSE
	HORN
	TRANSFORMER
	SOLENOID
	OVERLOAD RELAY
	CIRCUIT BREAKER
	MOTOR (NO. DENOTES HORSEPOWER), SINGLE LINE
	MOTOR, ELECTRICAL LAYOUT SHEET(S)
	RELAY CONTACT, N.O.
	RELAY CONTACT, N.C.
	SHIELDED CABLE
	DIODE, SURGE SUPPRESSOR
	SURGE SUPPRESSOR
	TERMINAL BLOCK
	SEPARABLE CONNECTOR
	POTENTIOMETER
	CURRENT TRANSFORMER

NOTES - RACEWAYS

- CONDUIT ROUTING SHOWN ON DRAWINGS IS DIAGRAMMATIC TO ILLUSTRATE DESIGN INTENT. CONTRACTOR SHALL FIELD DETERMINE THE MOST SUITABLE ROUTING TO FACILITATE INSTALLATION.
- ALL CONDUIT RUNS SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS AND OFFSETS. GENERALLY, A RUN OF CONDUIT CONTAINING LOW VOLTAGE (600 VOLT MAXIMUM) WIRE SHALL HAVE A MAXIMUM PULLING DISTANCE OF 300 FEET AND CONTAIN NO MORE THAN THREE AND ONE-HALF QUARTER BENDS (315 DEGREES TOTAL), INCLUDING OFFSETS AND BENDS LOCATED IMMEDIATELY ADJACENT TO THE PULL LOCATION. ON RUNS OVER 300 FEET THIS SHALL BE REDUCED TO TWO QUARTER BENDS (180 DEGREES TOTAL).
- FOR 600 VOLT CABLES, THE MINIMUM RADIUS OF CONDUIT BENDS SHALL BE SIX TIMES THE DIAMETER OF THE CONDUIT, WHERE BENDS OR OFFSETS ARE REQUIRED, THEY SHALL BE MADE WITH SUITABLE CONDUIT BENDING EQUIPMENT. A UNIFORM CIRCULAR CROSS SECTION OF THE CONDUIT SHALL BE MAINTAINED AT BENDS. NO SINGLE BEND SHALL BE GREATER THAN 90 DEGREES.
- CONDUIT UNIONS SHALL BE INSTALLED AT REMOVABLE DEVICES SUCH THAT THE DEVICES CAN BE EASILY AND INDEPENDENTLY REMOVED.
- NOT ALL FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM ARE SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL THE NUMBER AND TYPE OF FITTINGS REQUIRED FOR A COMPLETE CONDUIT SYSTEM WHICH COMPLIES WITH ALL APPLICABLE CODES AND STANDARDS. THE THREADS OF FITTINGS, INCLUDING COVER SCREWS AND BOLTS, SHALL BE COATED WITH A CONDUCTIVE THREED LUBRICANT PRIOR TO INSTALLATION TO PROTECT AGAINST CORROSION.
- ALL CONDUIT FITTINGS AND JUNCTION BOXES SHALL BE INSTALLED SO THAT THEIR COVERS ARE EASILY REMOVED.
- ALL METALLIC CONDUIT SHALL BE TERMINATED WITH INSULATED BUSHINGS TO PREVENT DAMAGE TO WIRE DURING PULLING OPERATIONS, EXCEPT IN ENCLOSURES WHERE HUB DESIGN IS ADEQUATE TO PREVENT INSULATION DAMAGE. GROUNDING CONNECTIONS SHALL BE PROVIDED ON ALL INSTALLED BUSHINGS FOR GROUND CONTINUITY.
- CONDUITS SHALL NOT BE SUPPORTED FROM EQUIPMENT OR PIPING. CONDUITS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED BY NEC 344.30, "SECURING AND SUPPORTS" AND TABLE 344.30(B)(2), TO PREVENT NOTICEABLE SAG. NO NOTICEABLE SAG SHALL BE ALLOWED. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SUPPORT REQUIRED TO PREVENT OBJECTIONABLE SAG. IF RIGID ALUMINUM CONDUIT IS USED, THE SUPPORT SYSTEM SHALL BE OF SUITABLE MATERIAL OR CONSTRUCTION TO PREVENT GALVANIC ACTION.
- LIQUID-TITE FLEXIBLE CONDUIT WITH PVC JACKET SHALL BE USED WHERE VIBRATION IS PRESENT, WHERE FLEXIBILITY IS REQUIRED, AND AT ALL MOTOR CONDUIT BOXES. TERMINATIONS OF FLEXIBLE METALLIC CONDUIT SHALL BE MADE USING LIQUID-TIGHT CONNECTORS WITH INTEGRAL INSULATED BUSHINGS AND POSITIVE GROUND CONNECTIONS. THE MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL BE 24 INCHES FOR INSTRUMENTS AND EQUIPMENT, 36 INCHES FOR MOTORS, AND 48 INCHES FOR LIGHTING.
- RUNS OF ABOVE GROUND CONDUIT FOR ANY SERVICE SHALL NOT BE DIRECTLY SUPPORTED FROM OVERHEAD PIPING.
- ALL ABOVE GROUND, STRAIGHT CONDUIT RUNS OVER 200 FEET LONG SHALL HAVE EXPANSION FITTINGS, WITH PROVISION FOR 4 INCHES TOTAL EXPANSION. BONDING JUMPERS SHALL BE INSTALLED TO ASSURE GROUNDING CONTINUITY.
- THREADED JOINTS FOR CONDUITS SHALL BE MADE UP WITH A METAL OXIDE PAINT SUCH AS "T&B" KOPR-SHIELD, BURNDY PENTROX E OR APPROVED EQUAL.
- PROVIDE ABOVE GRADE CONDUIT SUPPORT AT LEAST EVERY 10 FEET. FASTEN CONDUIT WITHIN 3 FEET OF EACH OUTLET BOX OR FITTING.
- USE CABLE PULLING LUBRICANT, SUCH AS, POLYWATER OR EQUAL FOR CABLE PULLS IN CONDUIT GREATER THAN 10-FEET.

NOTES - WIRING

- SINGLE OR MULTICONDUCTOR CABLE MAY BE USED FOR CONTROL, INSTRUMENT, COMMUNICATION AND SIGNAL CIRCUITS. SINGLE-CONDUCTOR SHALL #14 AWG MINIMUM. SINGLE PAIRED CABLES SHALL BE #18 AWG MINIMUM. AND MULTICONDUCTOR CABLE SHALL BE #20 AWG MINIMUM. CIRCUITS CLASSIFIED AS CLASS I CIRCUITS BY NEC ARTICLE 725 SHALL BE #18 AWG MINIMUM, 600 VOLT INSULATION CLASS.
- ALL FIELD POWER, CONTROL AND LIGHTING CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS UNLESS OTHERWISE SPECIFIED.
 - BLACK - ALL UNGROUNDED CONTROL CIRCUIT CONDUCTORS OPERATING AT THE SUPPLY VOLTAGE.
 - RED - UNGROUNDED AC CONTROL CIRCUITS OPERATING AT A VOLTAGE LESS THAN THE SUPPLY VOLTAGE.
 - BLUE - UNGROUNDED DC CONTROL CIRCUITS.
 - YELLOW OR ORANGE - UNGROUNDED CONTROL CIRCUITS OR OTHER WIRING.
 - WHITE - GROUNDED AC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR REGARDLESS OF VOLTAGE.
 - GREY - GROUNDED DC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR.ALL INTERIOR CONTROL PANEL WIRING SHALL BE PER UL 508A, LATEST EDITION.
- NO MORE THAN TWO CONDUCTORS SHALL BE CONNECTED TO ANY ONE TERMINAL ON A TERMINAL STRIP. IF MORE THAN TWO CONDUCTORS MUST BE TERMINATED AT THE SAME POINT, THE TERMINATIONS SHALL BE MADE ON AS MANY TERMINALS AS NECESSARY AND THE TERMINALS INTERCONNECTED BY JUMPERS. THE JUMPERS SHALL BE PHYSICALLY SEPARATED FROM THE CONDUCTORS.
- FOR POWER AND LIGHTING CIRCUITS, 600 VOLTS AND BELOW, THE SMALLEST WIRE SHALL BE #12 AWG. EXCEPT THAT #14 AWG SHALL BE USED FOR CONTROLS. WIRES SHALL BE SINGLE CONDUCTOR, COPPER, STRANDED, 600 VOLT HEAT AND MOISTURE RESISTANT THERMOPLASTIC INSULATED TYPE "THHN/THWN". UNDERGROUND CONDUCTORS MUST BE RHW, UNLESS OTHERWISE NOTED.
- #10 AWG OR LARGER SHALL BE XHHW UNLESS NOTED OTHERWISE.
- MOTOR JUNCTION BOX CONNECTIONS SHALL BE CRIMP LUG/BOLTED CONNECTIONS WITH 3M MOTOR SPICE KIT 5300 SERIES INSULATORS.

NOTES - GROUNDING

- ALL INSULATED GROUNDING CONDUCTORS SHALL BE MADE OF SOFT DRAWN, STRANDED COPPER WIRE, UTILIZING GREEN, FIRE RETARDANT INSULATION. ALL EXPOSED GROUNDING CONDUCTORS SHALL BE MINIMUM #6 AWG, RIGIDLY SUPPORTED, AND PROTECTED FROM MECHANICAL INJURY.
- ALL UN-INSULATED GROUNDING CONDUCTORS (STRANDED OR SOLID) SHALL BE TINNED COPPER.
- ALL CONNECTIONS SHALL BE COATED WITH A CONDUCTIVE, CORROSION PREVENTIVE COMPOUND BEFORE JOINING.
- ALL COPPER BUS BARS MUST BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION.
- CONTRACTOR SHALL TEST GROUNDING ELECTRODE SYSTEM USING THE FALL OF POTENTIAL METHOD OR A CLAMP-ON GROUND RESISTANCE TESTER. RESULTS SHALL SHOW THE ELECTRODE HAS A RESISTANCE TO EARTH OF 25 OHMS OR LESS. SUPPLEMENTAL ELECTRODES SHALL BE REQUIRED IF RESISTANCE TO EARTH IS GREATER THAN 25 OHMS.

NOTES - LABELS

- PROVIDE LAMINATED PLASTIC EQUIPMENT NAMEPLATE LABELS AT ALL FIELD DEVICES, DENOTING EQUIPMENT NAME, VOLTAGE AND FEEDER ORIGIN. PLASTIC NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS. ALL EXISTING PANELBOARD CIRCUIT DIRECTORIES SHALL BE UPDATED DENOTING NEW EQUIPMENT LOADS.
- ALL JUNCTION BOX COVERPLATES SHALL BE LABELED WITH CIRCUIT NUMBERS IT CONTAINS.
- NAMEPLATES AND TAGS SHALL BE PROVIDED FOR ELECTRICAL EQUIPMENT AND DEVICES, INCLUDING ALL PUSHBUTTONS, SELECTOR SWITCHES, CIRCUIT BREAKERS AND STARTERS. WHERE EQUIPMENT ALSO CAN BE STARTED FROM ANOTHER LOCATION, OR STARTED AUTOMATICALLY, A CAUTION NAMEPLATE SHALL BE PROVIDED.
- THE NAMEPLATE DESCRIPTION SHALL SHOW THE EQUIPMENT NUMBER AND SERVICE OF THE CONTROLLED EQUIPMENT. ALL PANELBOARDS SHALL HAVE NAMEPLATES STATING THE APPROPRIATE DESIGNATION, VOLTAGE, CONTINUOUS RATING, AND NUMBER OF PHASES. LIGHTING AND POWER PANELS SHALL BE SUPPLIED WITH COMPLETED CIRCUIT DIRECTORIES.
- ALL WIRING SHALL BE IDENTIFIED AT EACH TERMINATION WITH PERMANENT, PRINTED, HEAT-SHRINKABLE PLASTIC SLEEVES OR WITH CLEAR, HEAT-SHRINKABLE SLEEVES THAT COVER ADHESIVE WRAP-ON MARKERS. CONTRACTOR SHALL USE A "BRADY" OR EQUAL TYPE WIRE MARKER. THE WIRE IDENTIFICATION NUMBER SHALL INCLUDE THE COMPLETE CIRCUIT OR INSTRUMENT NUMBER. THE WIRE IDENTIFICATION SHALL BE THE IDENTIFICATION SHOWN ON THE WIRING DIAGRAM. IF NONE IS SHOWN ON A WIRING DIAGRAM, THE OWNERS REPRESENTATIVE SHALL BE CONSULTED FOR PROPER IDENTIFICATION. ELECTRICAL CABLES SHALL BE LABELED WITH THE CIRCUIT NUMBER AND PHASE DESIGNATION AT EACH END OF CABLE. IF THE CABLE IS IN CONDUIT, THE CONDUIT TAG MAY SERVE AS AN INDICATION OF THE CIRCUIT NUMBER FOR POWER CIRCUITS.

GENERAL ELECTRICAL CONSTRUCTION NOTES

- CONTRACTOR IS RESPONSIBLE FOR VERIFY EXISTING CONDITIONS AND ROUTE CONDUITS WITHOUT DISTURBING EXISTING UTILITIES. IN ADDITION, CONDUIT ROUTING MUST BE APPROVED BY A OWNERS REPRESENTATIVE. FEASIBILITY OF THE LOCATION OF THE EQUIPMENT SHALL BE FIELD VERIFIED. COORDINATE WITH ALL TRADES.
- VERIFY, LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. REPAIR ALL UTILITIES DAMAGED DURING CONSTRUCTION TO OWNER'S SATISFACTION.
- MINOR CHANGES IN WORK DUE TO EXISTING CONDITIONS SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER.
- ELECTRICAL CONTRACTOR SHALL VISIT JOB SITE AND VERIFY EXISTING CONDITIONS BEFORE BIDDING AND SHALL INCLUDE IN HIS BID THE NECESSARY COSTS TO CONSTRUCT THIS PROJECT IN ACCORDANCE WITH THE INTENT OF THE ELECTRICAL DRAWINGS, SPECIFICATIONS, AND ALL APPLICABLE CODES.
- THE ELECTRICAL INSTALLATION SHALL COMPLY WITH ALL LOCAL, STATE, AND NATIONAL CODES, LAWS, AND ORDINANCES APPLICABLE TO ELECTRICAL WORK.
- ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES.
- THE WORD PROVIDE AS USED ON THE DRAWINGS SHALL BE DEFINED AS CONTRACTOR FURNISHED AND INSTALLED.
- AT LEAST TWO WORKING DAYS PRIOR TO ANY EXCAVATION WORK, THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT AT 1-800-227-2600 FOR LOCATING AND MARKING UTILITIES IN THE AREAS OF THE WORK.
- ALL UNDERGROUND CONDUITS SHALL BE PVC, SCHEDULE 40 OR BETTER UNLESS OTHERWISE NOTED.

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3	12/17/2020	RESUBMITTED BASED ON COMMENTS	CJM	BDC		
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DUAL PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

ELECTRICAL
NOTES & LEGEND

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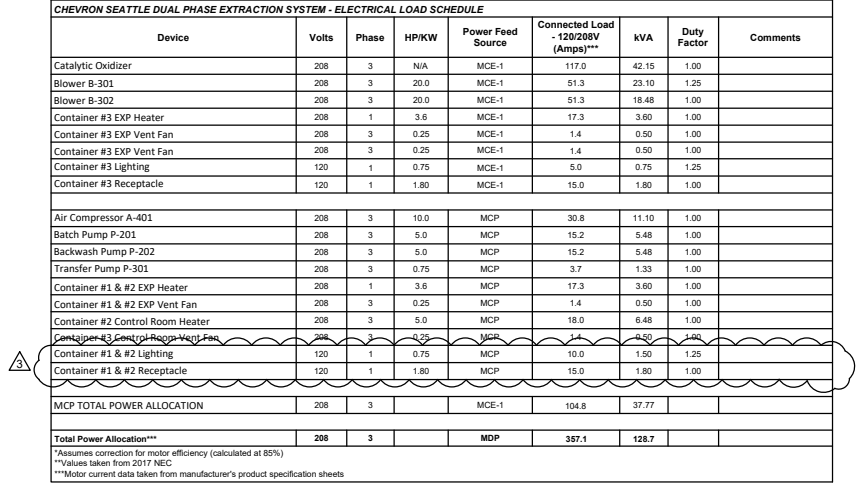
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SHEET 2 OF 7



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- 3

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DUAL PHASE EXTRACTION SYSTEM
CHEVRON SEATTLE
SEATTLE, WA

SHEET TITLE

HVAC/LIGHTING AND
GROUNDING
ELECTRICAL LAYOUT

APPROVED BY
BDC

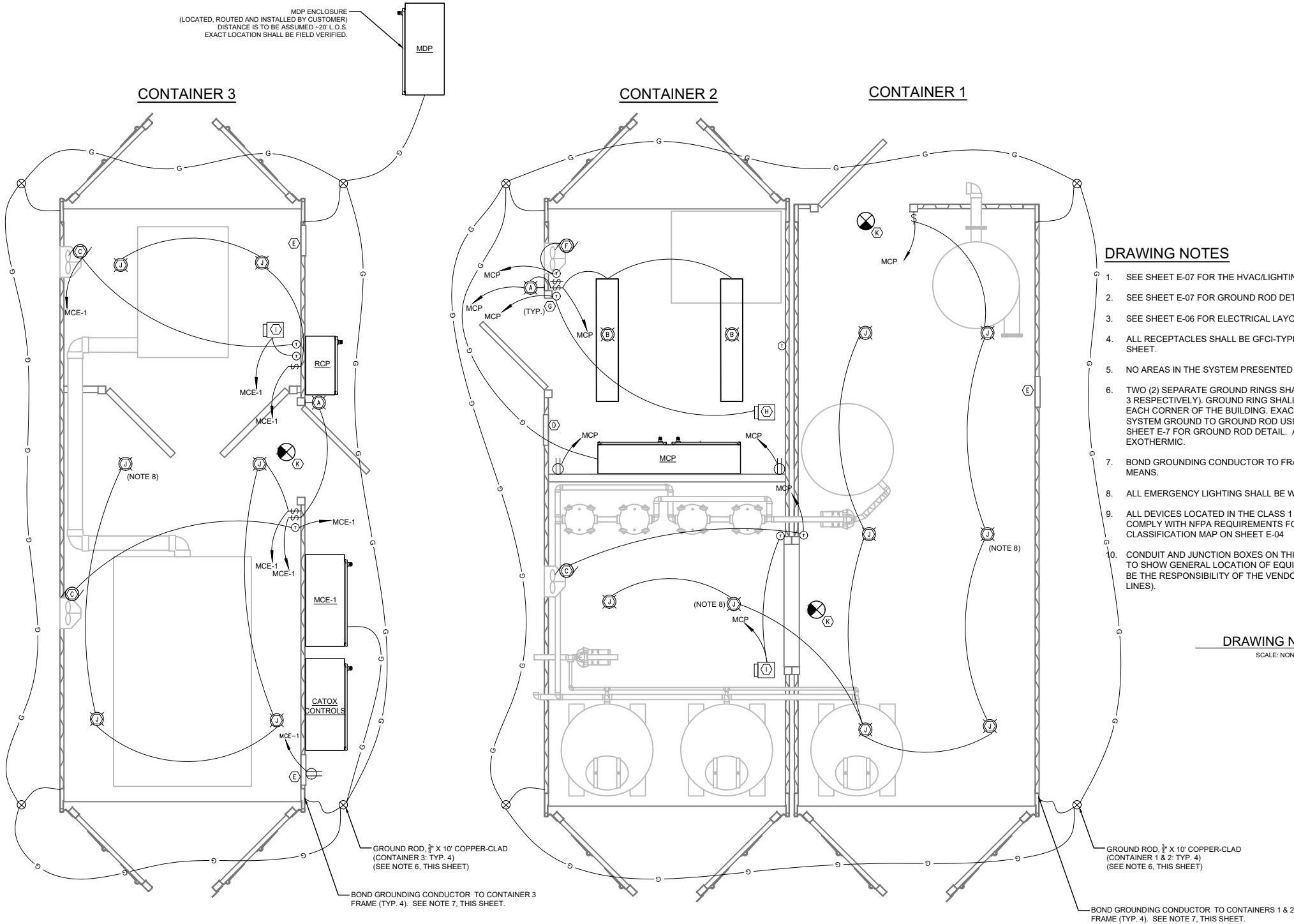
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E-05
SHEET 5 OF 7

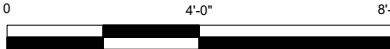


DRAWING NOTES

1. SEE SHEET E-07 FOR THE HVAC/LIGHTING SCHEDULE.
2. SEE SHEET E-07 FOR GROUND ROD DETAIL.
3. SEE SHEET E-06 FOR ELECTRICAL LAYOUT DRAWING.
4. ALL RECEPTACLES SHALL BE GFCI-TYPE, AND SHALL BE DEPLOYED AS SHOWN, THIS SHEET.
5. NO AREAS IN THE SYSTEM PRESENTED ARE CLASSIFIED CLASS 1, DIVISION 1.
6. TWO (2) SEPARATE GROUND RINGS SHALL BE INSTALLED (CONTAINER 1/2 & CONTAINER 3 RESPECTIVELY). GROUND RING SHALL BE MADE UP OF FOUR (4) GROUND RODS ON EACH CORNER OF THE BUILDING. EXACT LOCATION SHALL BE FIELD VERIFIED. BOND SYSTEM GROUND TO GROUND ROD USING #2/0 BARE GROUNDING CONDUCTOR. SEE SHEET E-7 FOR GROUND ROD DETAIL. ALL GROUNDING CONNECTIONS SHALL BE EXOTHERMIC.
7. BOND GROUNDING CONDUCTOR TO FRAME OF CONTAINER USING EXOTHERMIC MEANS.
8. ALL EMERGENCY LIGHTING SHALL BE WIRED AHEAD OF LOCAL SWITCHING.
9. ALL DEVICES LOCATED IN THE CLASS 1 DIV 2 ENVIRONMENT SHALL BE UL LISTED AND COMPLY WITH NFPA REQUIREMENTS FOR HAZARDOUS LOCATION. REFERENCE AREA CLASSIFICATION MAP ON SHEET E-04
10. CONDUIT AND JUNCTION BOXES ON THIS SHEET ARE FOR DIAGRAMMATIC PURPOSES TO SHOW GENERAL LOCATION OF EQUIPMENT. ACTUAL LOCATIONS AND ROUTING WILL BE THE RESPONSIBILITY OF THE VENDOR (SOLID LINES) AND CONTRACTOR (DASHED LINES).

DRAWING NOTES

SCALE: NONE



SCALE IN FEET