

APPENDIX B: AERATION SYSTEM SPECIFICATIONS AND DRAWINGS

Contents: Performance Guarantees (Specifications) for Fine Bubble Diffusers and Rotary Lobe Blowers
Fine Bubble Diffuser Aeration System Design Drawings

Performance Guarantee

This Performance Guarantee is made to Inland Empire Paper Company (IEP) (Buyer) by SSI Aeration Inc. (Vendor) for the fine bubble diffused aeration diffuser grids (diffuser grids), furnished by Vendor pursuant to the purchase order terms and conditions between Vendor and IEP. Subject to the provisions contained within Vendor's Quotation # P-012224[C] dated April 16th, 2024; and the Performance Guarantee herein, Vendor hereby guarantees that the diffuser grids will comply with the following performance criteria:

1. The standard oxygen transfer rate (SOTR) from 16 diffuser grids shall not be less than that specified below in clean water at 14.7 PSI, 20 deg. C, and zero dissolved oxygen at the following specified conditions:
 - a. Minimum Standard Oxygen Transfer Rate (SOTR) (lb/hour): 2,510
 - b. Maximum Volumetric Air Flow (SCFM): 10,560
 - c. Diffuser Submergence (ft): 13.0
 - d. Maximum Diffuser Height Above Floor (ft): 1.0
 - e. Minimum Standard Oxygen Transfer Efficiency (SOTE): 22.75%
 - f. Maximum Volumetric Air Rate per effective membrane surface area (SCFM/SQFT): 6.7 (2.75 SCFM per 9-inch disc diffuser)
 - g. Number of 9-inch Membrane Diffusers per Grid: 240 to 247
 - h. Maximum Dynamic Wet Pressure (DWP) at design air rate, in. w.c.: 20
 - i. Maximum Pressure Loss at top of drop leg, psig: 6.55
 - j. Site Elevation: 1955 ft MSL
 - k. Maximum Liquid Temperature, deg C: 34
 - l. Minimum Target Dissolved Oxygen in Aeration Basin, mg/L: 2

FACTORY AND FIELD PERFORMANCE TESTING

The performance testing is a demonstration of the diffuser grids' ability to meet the performance criteria stated herein. The following testing procedures shall be implemented to validate actual performance. In the event that the supplied equipment fails to meet the performance criteria, Vendor shall be solely responsible to make any necessary adjustments to its scope to meet the performance criteria.

FACTORY TESTING

Perform factory quality control testing on the membrane diffusers.

1. Dynamic Wet Pressure (DWP): Factory test minimum 4% of the diffusers (10 diffusers per grid) for a maximum DWP of 10 inches \pm 20% water column at 1.0 SCFM/diffuser, and maximum DWP of 20 inches \pm 20% water column at 2.75 SCFM/diffuser at 2 inches submergence to verify compliance with the performance criteria.
2. Air Flow Visual Uniformity: Visually inspect minimum 4% of the diffusers (10 diffusers per grid) for uniform air distribution across the active surface of the diffuser at 1.0 SCFM and 2 inches submergence. Active surface is defined as the perforated horizontal projected area of the diffuser.
3. Certified copies of the factory test reports shall be submitted to the Buyer prior to shipment.

FIELD TESTING

1. All diffuser grid ballasts shall be tested to verify they will prevent uplift against a buoyant force. Each grid shall be attached to a lever or other lifting device. A vertical extracting force equal to at least twice the calculated maximum buoyant force to which the grid will be subjected at the specified submergence shall be applied to each grid.
2. A field leakage test shall be performed for the drop leg, manifold, and headers for each grid. The procedure shall consist of submerging all piping in clean water, turning the air on at minimum flow and observing and correcting leaks.
3. The proper elevation of diffusers shall be verified by filling the tank with clean water to the top of the diffusers. Diffusers shall be within $\pm 1/4"$ of the same elevation.
4. The diffuser grids shall be tested for uniform air distribution. The tank shall be filled with clean water to a depth 2" above the top of the diffusers. The system shall be operated at an air flow of 1.0 SCFM per diffuser, with air flow uniformity being verified by means of visual inspection. The tank shall then be filled to the normal operating level and the surface shall be observed for air flow uniformity at the maximum specified air flow per diffuser.
5. The pressure loss at the top of the drop leg shall be measured for each diffuser grid at the maximum specified air flow per grid.

All field measurements shall be measured by the Buyer's personnel using Buyer's equipment. The initial field tests shall be at Buyer's expense. Vendor shall provide personnel to observe the field tests.

The initial field tests shall be performed within 5 days after start-up of the diffuser grids and verification by the Vendor that the diffuser grids have been installed in accordance with the diffuser grid manufacturer's instructions. Field testing shall be considered complete when the diffuser grids are operational without fault and in accordance with the specified performance criteria. Final acceptance of the diffuser grids shall be contingent upon the successful completion of the field tests.

Buyer shall provide Vendor with written notice of the test results within four (4) weeks after completion of the field tests and a copy of the test data. If the initial field tests are deemed unsuccessful, Vendor shall be provided the opportunity to make adjustments or modifications. If deemed successful, Buyer shall provide Vendor notice that the system has fulfilled the field testing requirements specified herein and Vendor shall have no further obligation or liability hereunder except as follows:

In the event the diffuser panels are unable to comply with the specified performance criteria during the Vendor's warranty period, the Buyer, at Buyer's expense, reserves the right to require the Vendor to conduct a field oxygen transfer test in accordance with American Society of Civil Engineers (ASCE) *Standard Guidelines for In-Process Oxygen Transfer Testing*, (ASCE-18-18). If the diffuser panels are unable to provide the specified minimum SOTR or SOTE, then the Vendor shall make modifications to the grids and retest the grids at Vendor's expense.

Before the field oxygen transfer test is performed, the Vendor, at Buyer's expense, may conduct oxygen transfer testing of Buyer's used diffusers in a third-party lab to determine if the used diffusers are able to comply with the performance criteria. If the diffusers are unable to comply with the performance criteria in the lab, then Vendor shall make the required modifications to the grids in the field until the performance criteria are attained and shall field test the grids at Vendor's expense. The cost of testing shall be at Buyer's expense until testing shows that Vendor's equipment is unable to comply with the performance criteria.

The guarantee shall be in effect while Buyer operates and maintains the warranted equipment in accordance with Vendor's Installation Operation & Maintenance Manual and maintains maintenance records for the duration of the warranty period for Vendor's review should a warranty claim arise.

Exclusive Remedy

In the event the diffuser grids fail to meet the performance criteria, then Vendor will, at its expense, provide operating assistance as required and/or modifications to the equipment supplied by Vendor at Vendor's discretion until the performance criteria is attained or the contract price of the equipment is expended by Vendor.

Performance Guarantee

This Performance Guarantee is made to Inland Empire Paper Company (IEP) (Buyer) by Beckwith & Kuffel (Vendor) for the Positive Displacement Rotary Lobe Blowers (blowers), furnished by Vendor pursuant to the purchase order terms and conditions between Vendor and IEP. Subject to the provisions contained within Beckwith & Kuffel's Quotation #B24-00107 dated January 9, 2024; and the Performance Guarantee herein, Vendor hereby guarantees that the blowers will comply with the following performance criteria:

1. Air flow capacity, maximum, Standard Cubic Feet per Minute (SCFM) (at 14.7 PSIA, 68 deg F, 36% RH): 5,280 SCFM at 9 psi differential pressure
2. Speed, maximum: 1,800 RPM
3. Site elevation: 1955 ft MSL

FACTORY AND FIELD PERFORMANCE TESTING

The performance testing is a demonstration of the blowers' ability to meet the performance criteria stated herein. The following testing procedures shall be implemented to validate actual performance. In the event that the supplied equipment fails to meet the performance criteria, Vendor shall be solely responsible to make any necessary adjustments to its scope to meet the performance criteria.

FACTORY TESTING

1. Each blower stage shall be factory tested in accordance with ISO 1217 to verify flow and brake horsepower at the specified blower maximum operating conditions. Performance shall be within +/- 5% of specified operating conditions.
2. A package mechanical run test at the maximum speed and pressure shall be performed for a minimum of three (3) hours on each blower to document that the blower has achieved the specified performance.
3. Motors shall be tested in accordance with IEEE 112 for polyphase motors. Routine (production) tests shall be in accordance with NEMA MG 1. Multispeed motors shall be tested at all speeds. Efficiency and power factor shall be measured in accordance with IEEE 112, Test Method B, and NEMA MG 1, Paragraph 12.60.
4. Certified performance curves and certified copies of the factory test reports shall be submitted to Buyer for approval prior to shipment.

FIELD TESTING

1. Each blower shall be field tested a minimum of 4 hours. During field testing, the inlet vacuum, discharge pressure, air flow, temperature, rotor speed, noise level, motor current, and voltage shall be measured at a minimum of four speeds within the blower performance range, including the minimum and maximum operating conditions.
2. Noise levels shall be measured with a sound level meter that is properly calibrated and complies with the accuracy requirements of OSHA's noise standard, 29 CFR 1910.95. Blower system, including silencers and sound attenuating housing, shall be designed for operation at noise level not to exceed 80 dB(A) at 3 feet from the blower assembly in any direction in free-field conditions.

All field measurements shall be measured by Buyer's personnel using Buyer's equipment. The initial field performance test shall be at Buyer's expense. Vendor shall provide personnel to observe the performance test.

The initial field performance test shall be performed within 5 days after start-up of the blowers and verification by Vendor that the blowers have been installed in accordance with the blower and motor manufacturer's instructions. Performance testing shall be considered to be complete when the blowers are operational without fault and in accordance with the specified performance criteria. Final acceptance of the blowers shall be contingent upon the successful completion of the field performance test.


Buyer shall provide Vendor with written notice of the test results within four (4) weeks after completion of the performance test and a copy of the test data. If deemed successful, Buyer shall provide Vendor notice that the system has fulfilled the performance requirements specified herein and Vendor shall have no further obligation or liability hereunder.

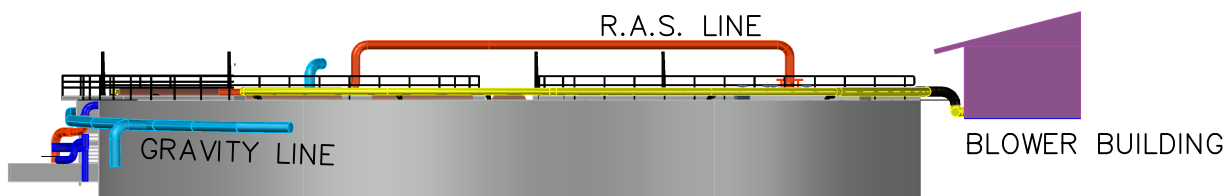
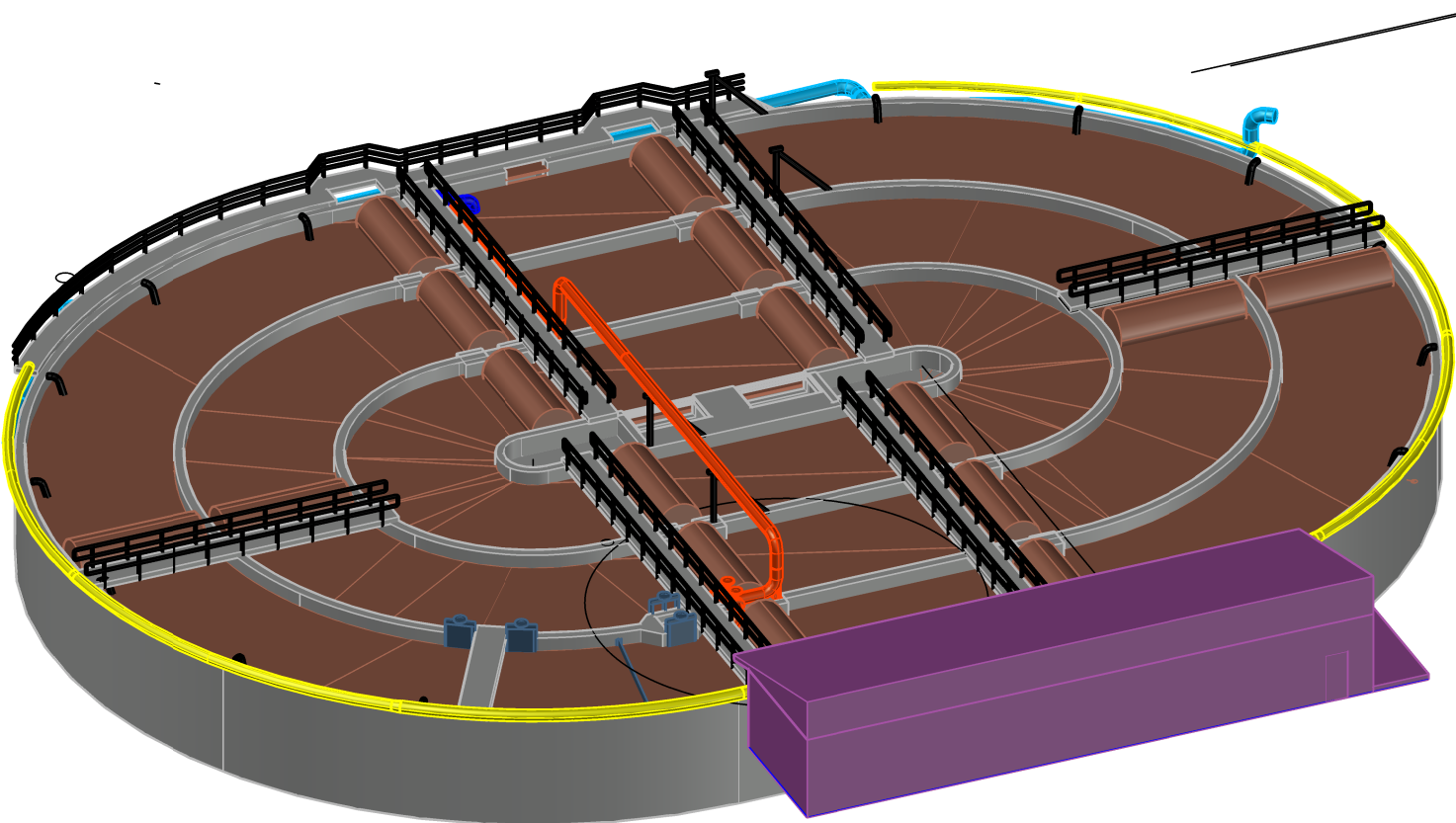
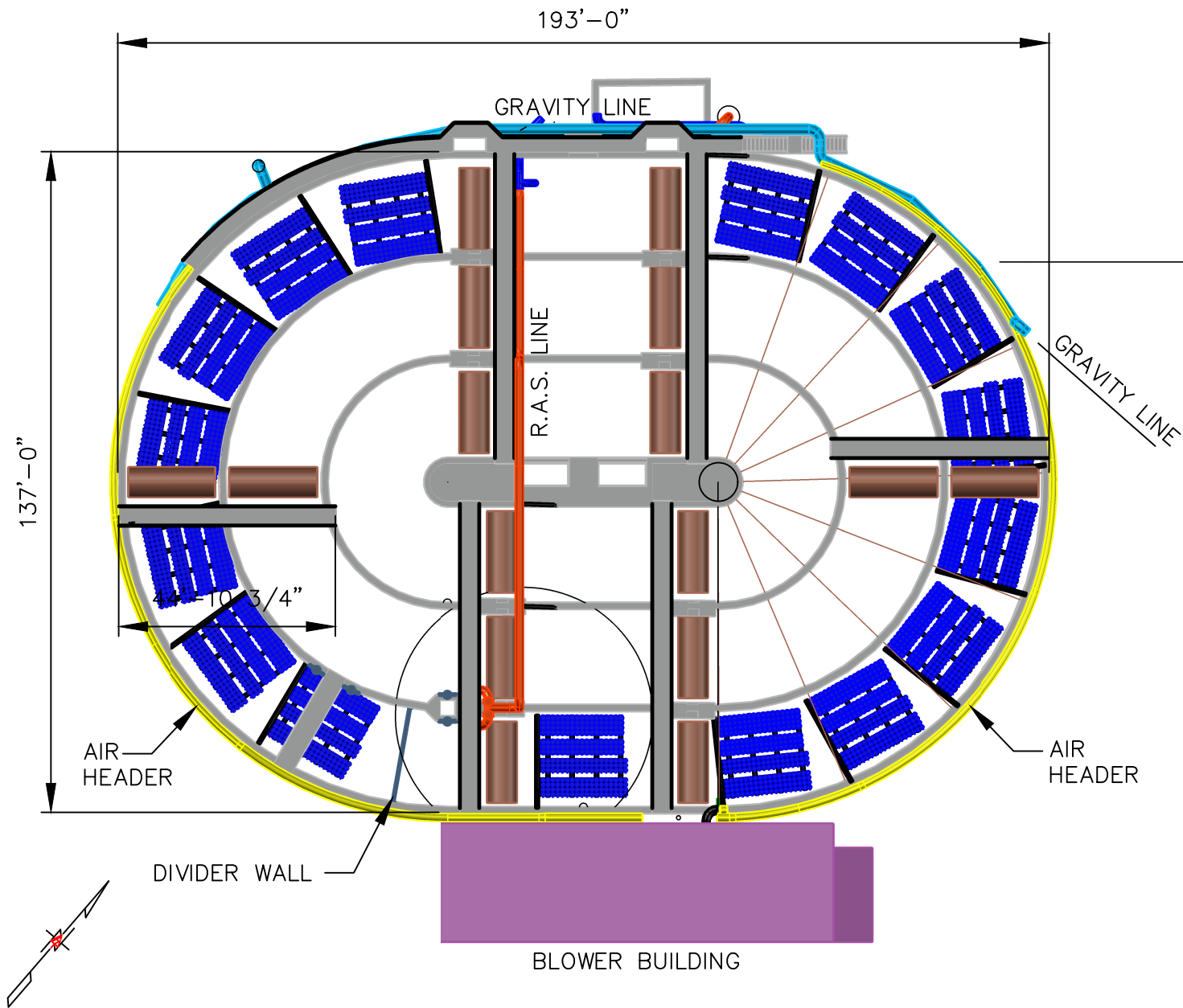
In the event that the initial performance test is deemed unsuccessful, Vendor shall be provided the opportunity to make adjustments or modifications.


Exclusive Remedy

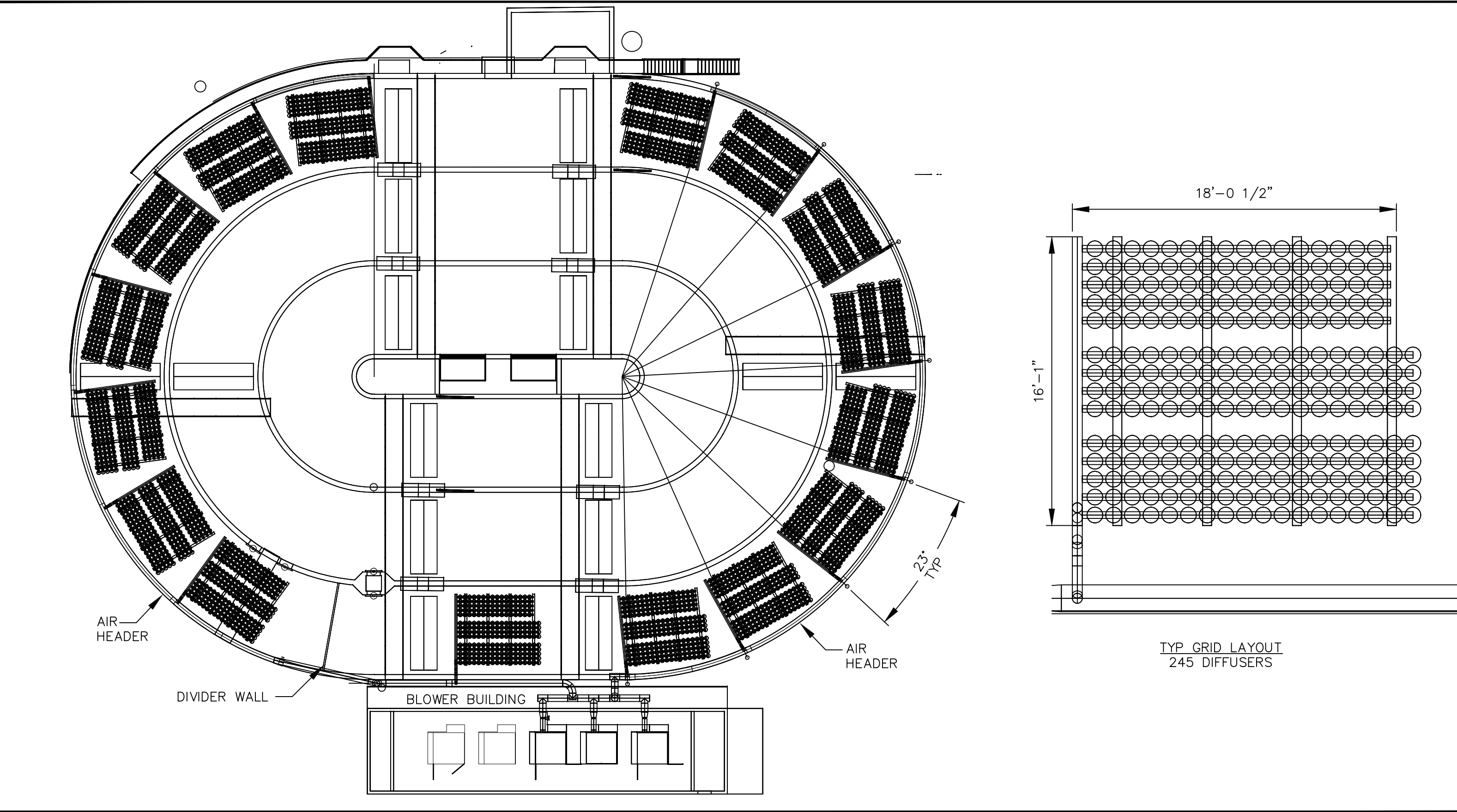
In the event the blowers fail to meet the performance criteria, then Vendor will, at its expense, provide operating assistance as required and/or modifications to the equipment supplied by Vendor or its operation at Vendor's discretion until the performance criteria is attained or not to exceed the contract price of the equipment is expended by Vendor.




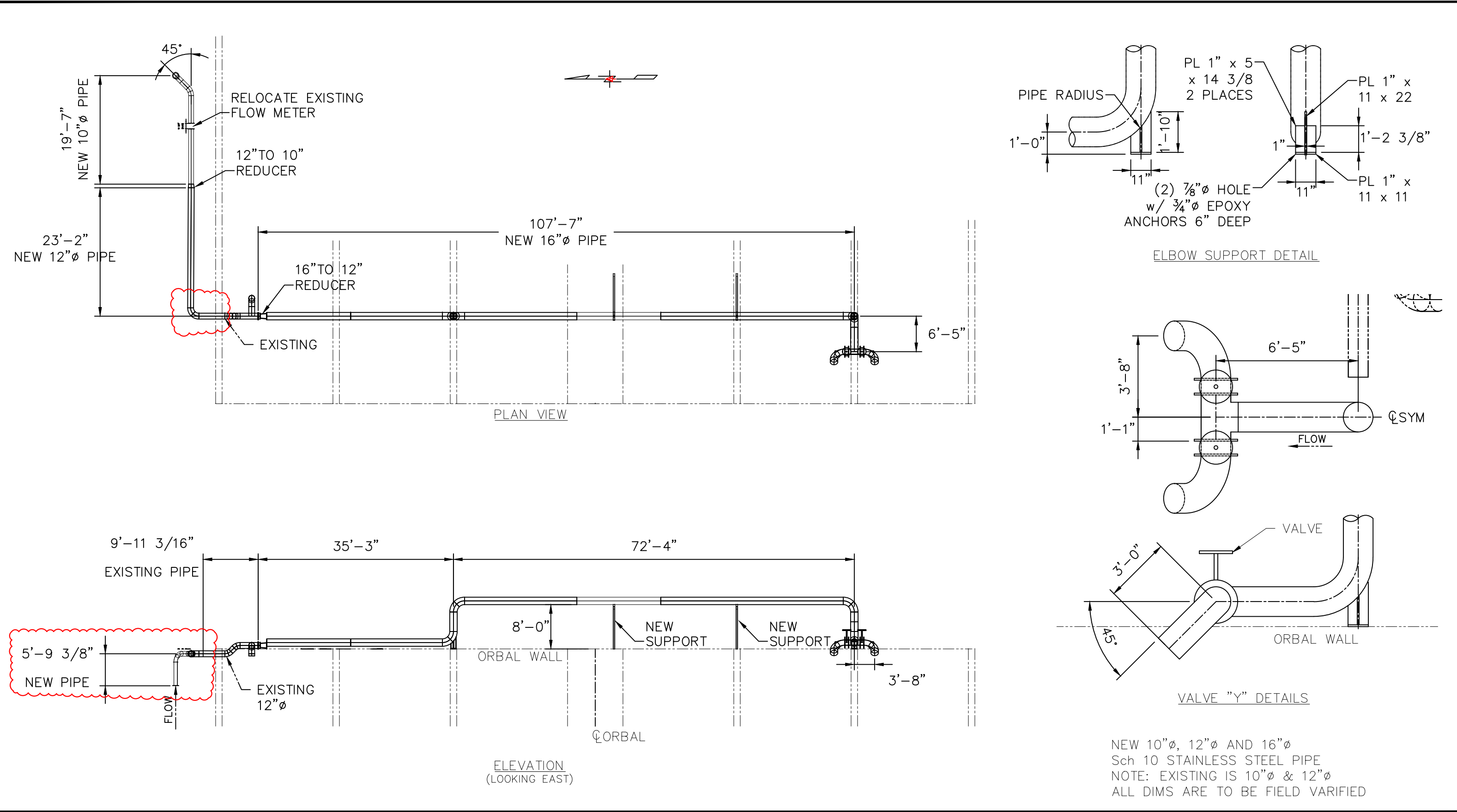
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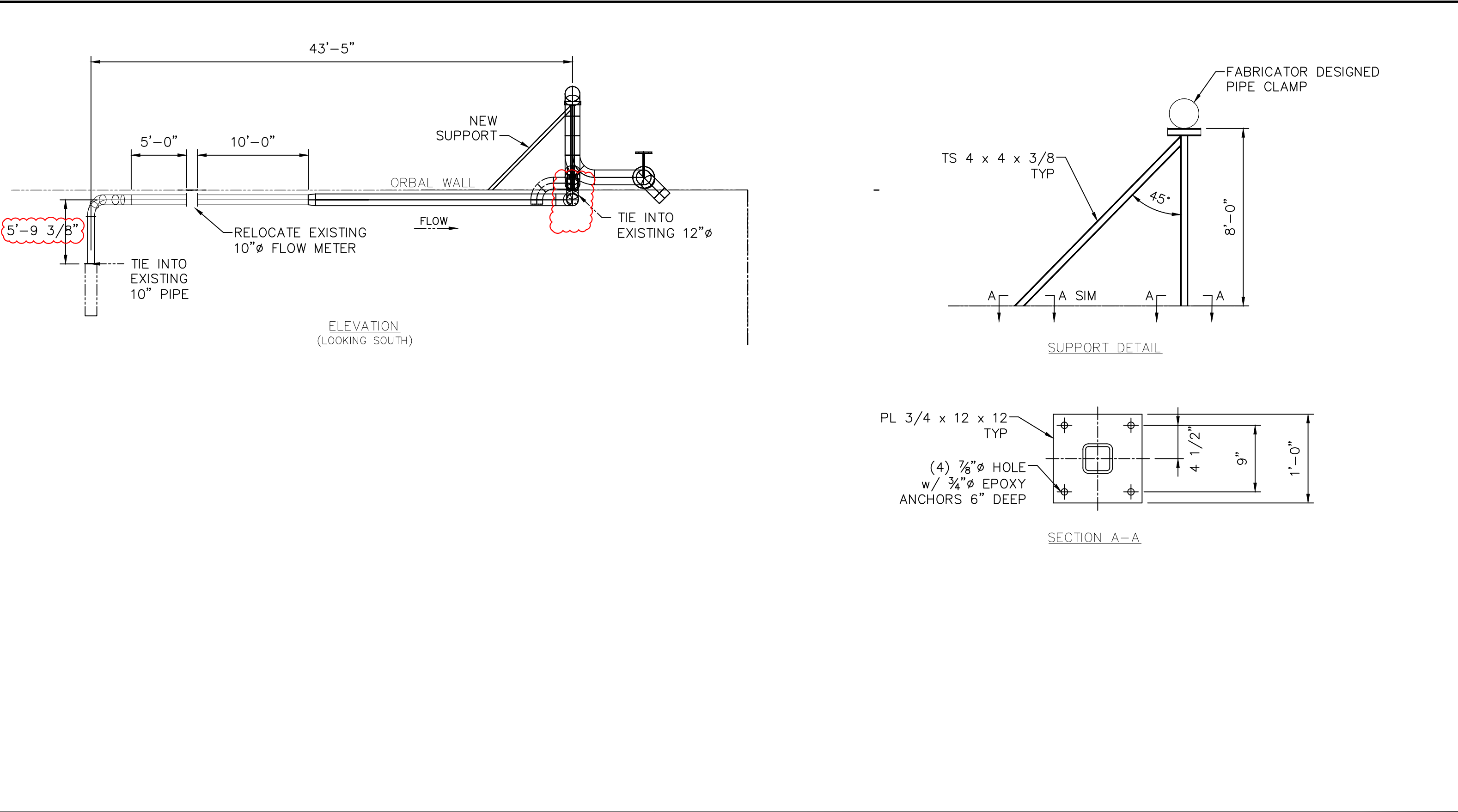
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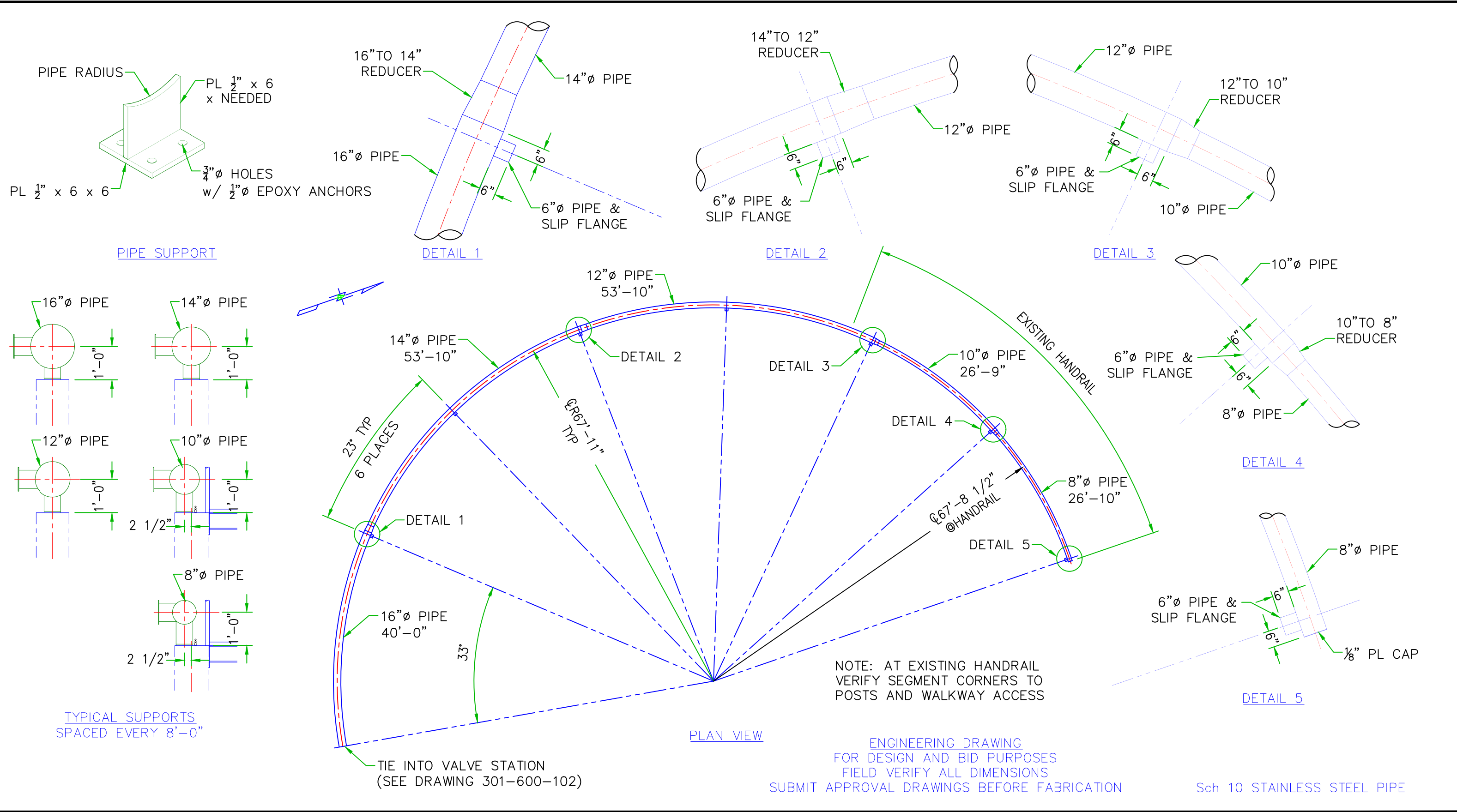
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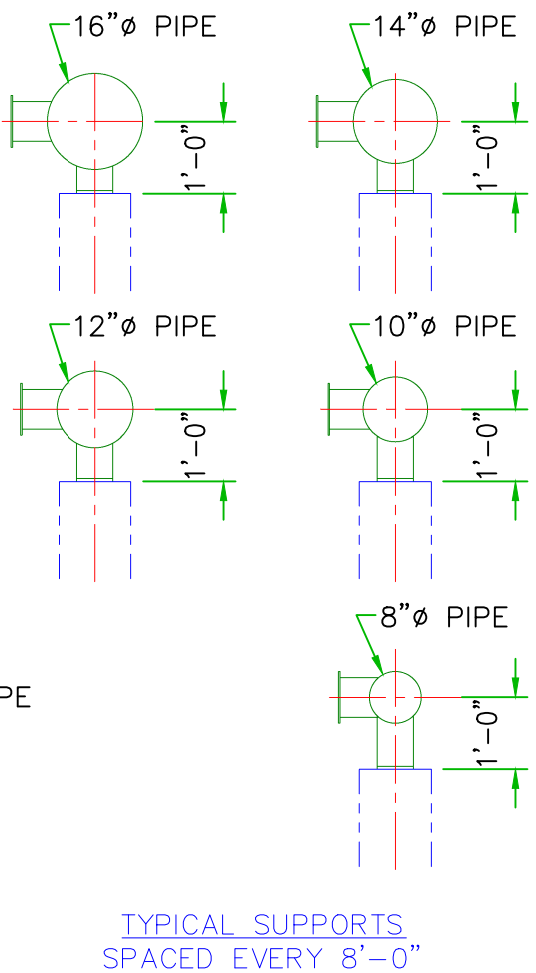
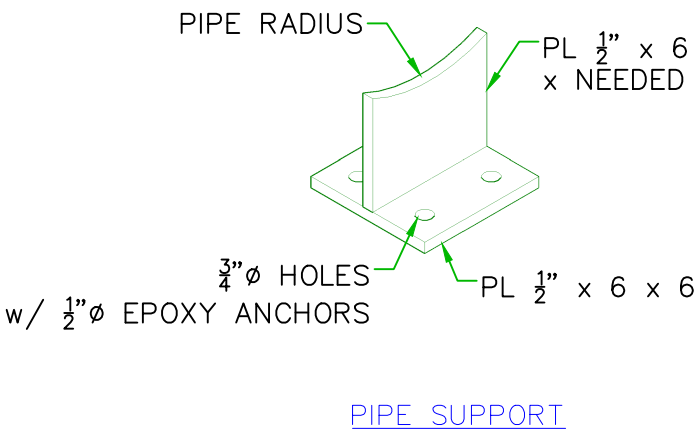
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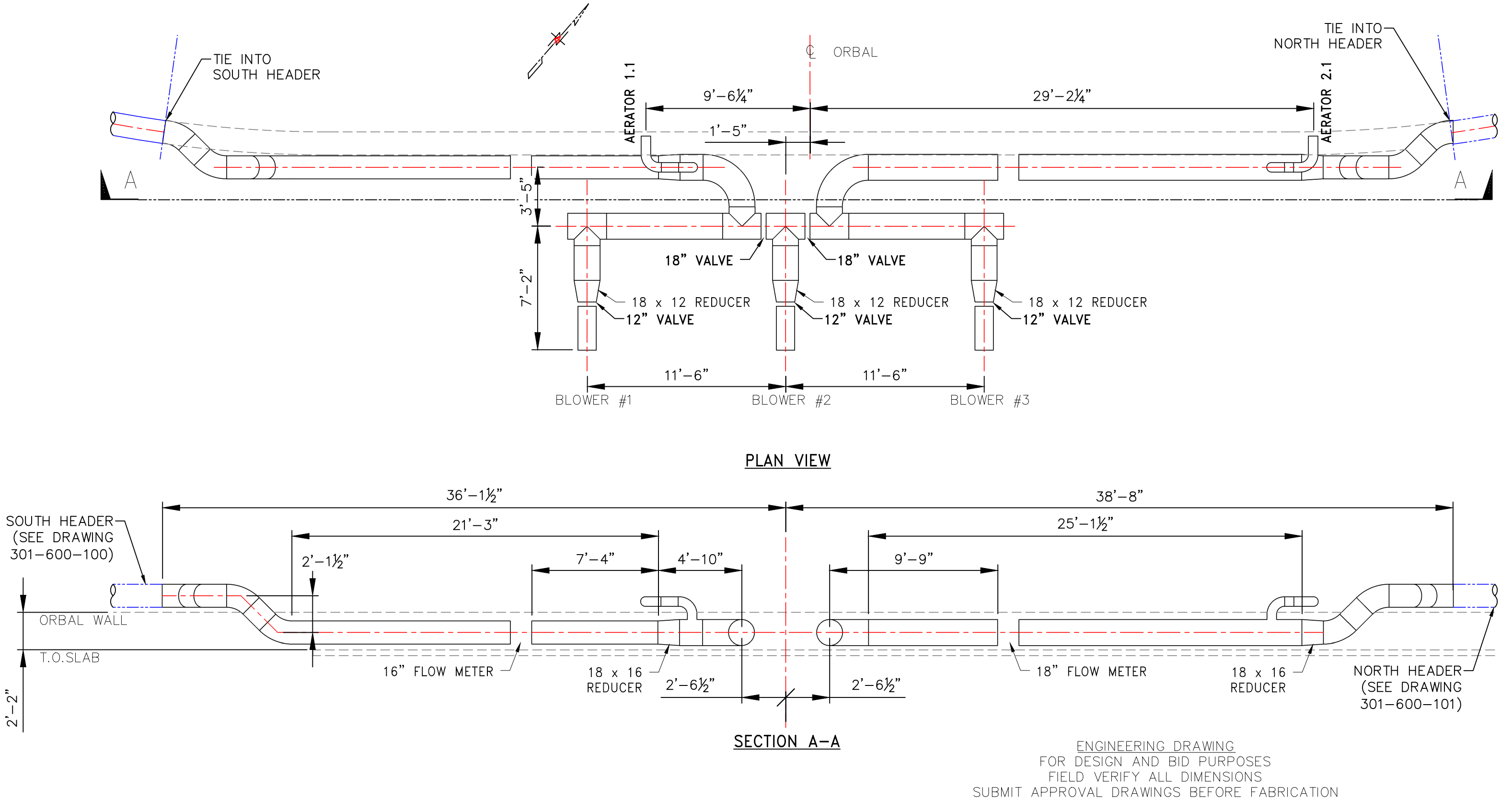
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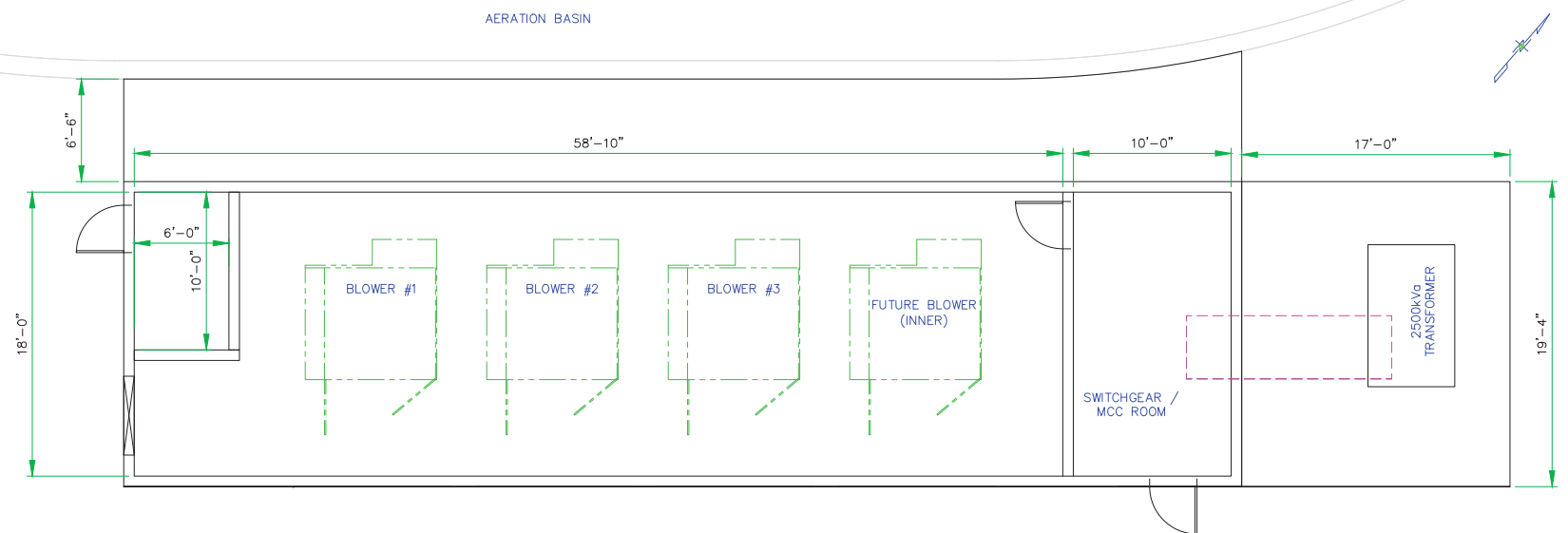
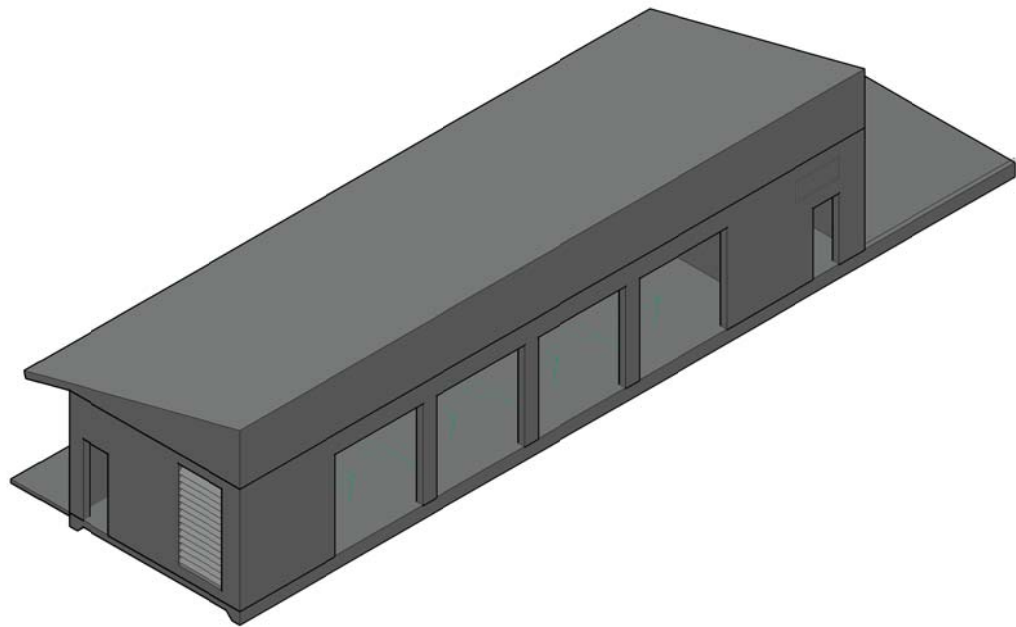
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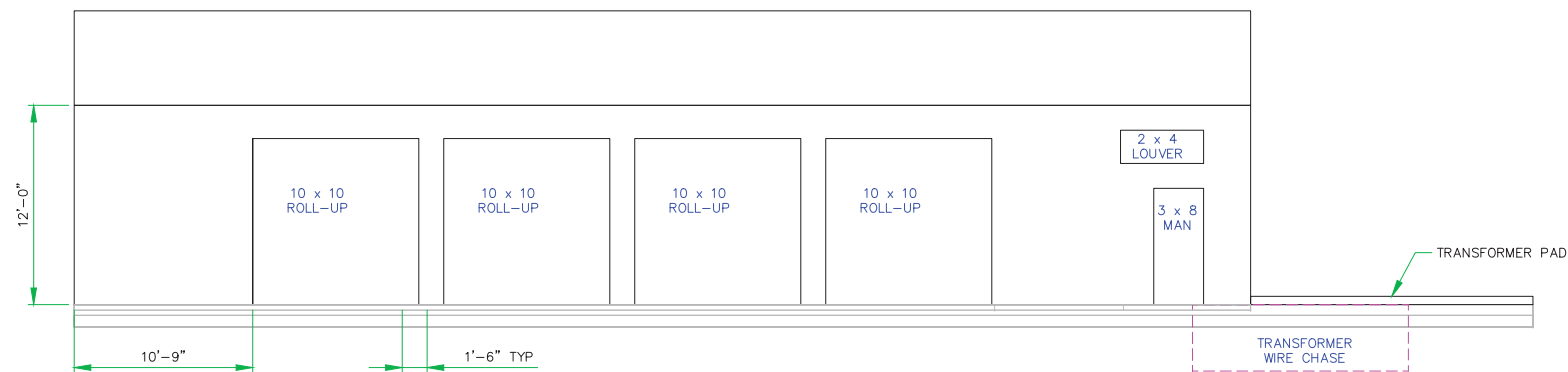
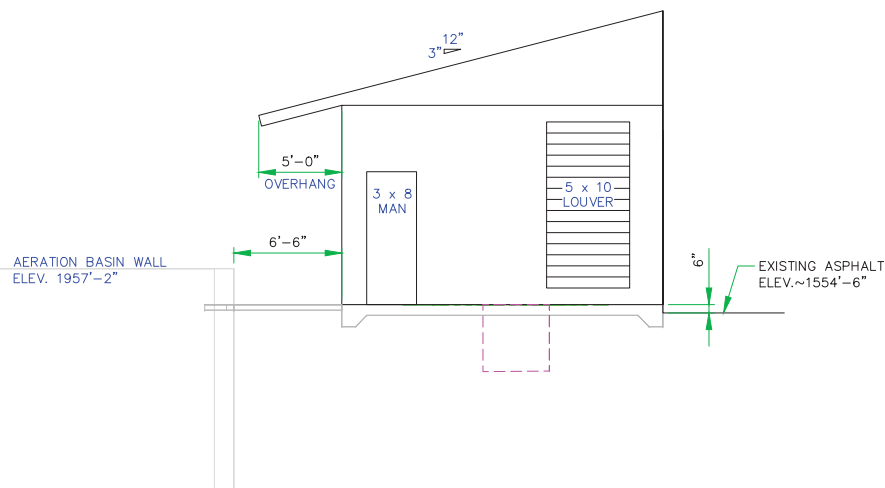
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REFERENCE		REVISIONS			DRAWN BY:	KmR	28	JUL	2024		P.O.NUMBER	B	301-600-101



					INLAND EMPIRE PAPER COMPANY MILLWOOD WASHINGTON					BLOWER VALVE STATION ORBAL AERATION PROJECT 3141		
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REFERENCE		REVISIONS			DRAWN BY: KmR	20	JULY	2024		P.O.NUMBER B	301-600-102	0



PLAN VIEW
NOM. EL. 1955'-0"



SITE CONDITIONS:

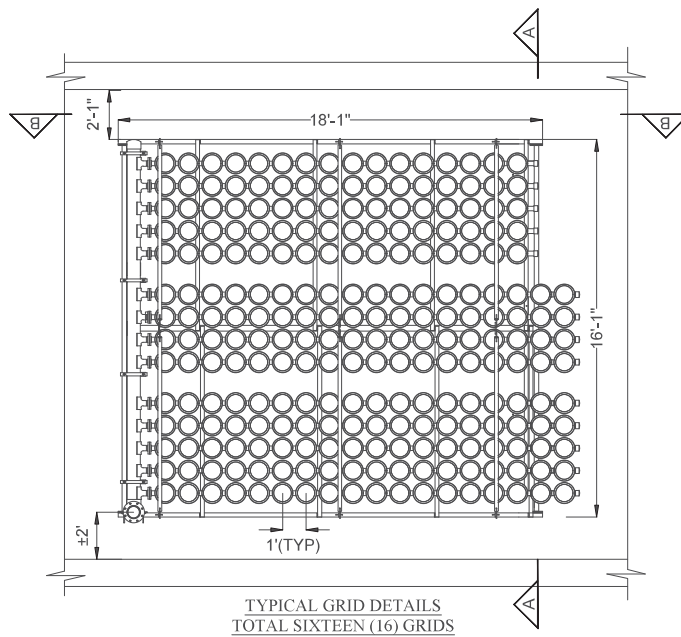
Location:	Spokane, WA, USA
Elevation:	1,950 feet
Minimum Dry Bulb Temperature:	-20 °F
Maximum Dry Bulb Temperature:	100 °F
Design Wind Speed:	Per latest revision of IBC
Exposure (UBC, wind design):	Per latest revision of IBC
Maximum Snow Load:	Per latest revision of IBC
Frost Penetration:	Per latest revision of IBC
Seismic Zone:	Per latest revision of IBC
Installation:	Outdoors
Design Relative Humidity (Outdoors):	80%

GENERAL NOTES:

1. DIMENSIONS ARE FOR INTERIOR SPACE
2. BLOWER WEIGHT = 6,950lbs EACH
3. LOUVER 40+% FREE AREA = 16,800sqft
4. TRANSFORMER WEIGHT = 12,500lbs.
5. REFERENCED EQUIPMENT INSTALLED BY I.E.P.

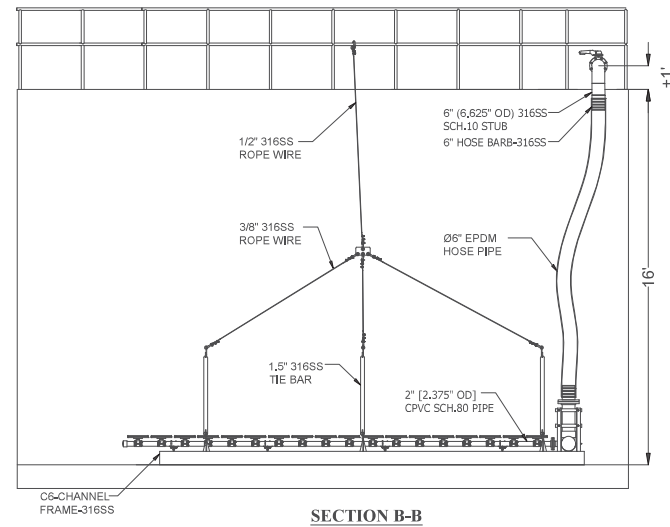
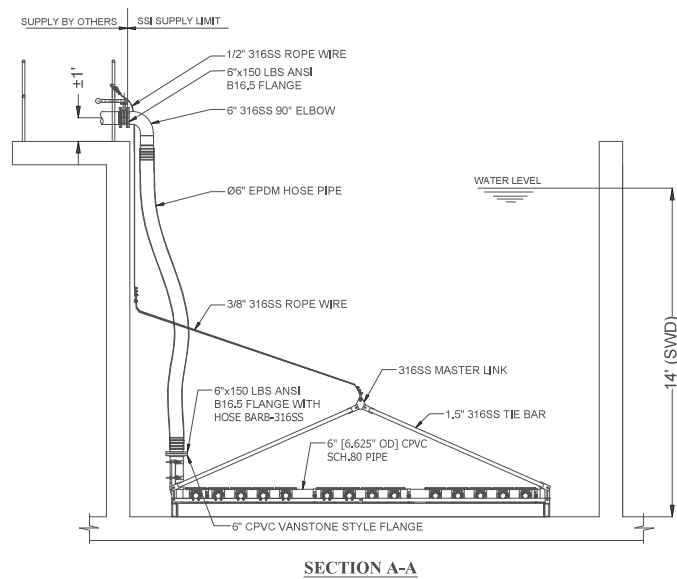
There are various minimum requirements affecting the design and/or supply of this building. IEP is relying upon the Contractor's representation as experts in the design and supply of the specified building and/or services.

[illegible]



NOTES:

1. ALL FIELD DIMENSIONS AND DROP LOCATIONS ARE TO BE CONFIRMED BEFORE RELEASING THE ORDER FOR PRODUCTION.
2. THIS DRAWING IS NOT INSTALLATION, SSI WILL PROVIDE INSTALLATION DRAWINGS AT THE TIME OF SHIPMENT WITH SEPARATE COVER.



**SSI AFD270-P (9") DISC DUFFUSER WITH
PTFE MEMBRANE C/W CLAMP ON SADDLES**

INLAND EMPIRE PAPER COMPANY, WA

**AERATION TANK - 1 NO.
GRID DETAILS**

SSI-Aeration,Inc.
CLEAR WATER DEPT.

SUBMITTED:

SCALE: NTS

DATE: AUGUST, 2024

APPROVED BY: KIRAN KUMAR
REVIEWED BY: KARTHIK
CHECKED BY: SUDARSHAN
DRAWN BY: BALAKRISHNA
SHEET NO.: 02

APPROVED SUBMITTAL

DWG.NO: #22007_Inland Empire Paper Company, WA _ Aeration Tank_AFD270-P_ D01[B]

REV	DESCRIPTION	DATE	BY
B	RE SUBMITTAL #2	08/19/2024	PAVAN
A	RE SUBMITTAL #1	07/31/2024	PAVAN
0	ISSUED FOR APPROVAL SUBMITTAL	07/05/2024	BALAKRISHNA