

Q&A

RFQ 2601 GREC UNIT 3 COOLING TOWER INSPECTION SERVICES

Q: Can you please provide a photo or google map that highlights Unit 3 Tower location at the Grand River Energy Center?



Q: Can you provide any drawings, manufacturer information, model, etc?

A: [EvapTech Series EC, drawings included/attached.](#)

Q: We would like to confirm that this cooling tower is a large EvapTech field erected cooling tower? This is an EvapTech field erected cooling tower.

A: [Correct](#)

Q: Is Awarded Vendor to pull bays of fill media and weigh them for fouling? If so, how many bays of fill media does GRDA want pulled during the inspection?

A: [One bay to get an overall for the tower](#)

Q: What is the fill depth and typical pack size (i.e. a 4'0" pack is much harder to pull than a 1'0" pack)?

A: [See attachment](#)

Q: Do you have any photos you can share of the distribution area to help us understand the arrangement of the lateral piping we will need to work around to pull the fill?

A: [See attachment](#)

Q: The Scope of Work asks for vendor to "Check Fan Balance and Record Vibration Levels." This is not a typical request of a cooling tower inspection, can you please help explain what is expected for this scope item? Is there a particular issue that needs to be investigated?

A: [This can be removed.](#)

Q: Will the fans be in service during the outage? If this is something that the plant wants done, is the expectation that spectral vibration data is captured or just amplitude?

A: [No, system will be out of service](#)

Q: Can you please provide some basic information on the cooling tower? For example, type (counter or crossflow), number of cells, materials of construction, general size, etc?

A: [Please see attached/included drawings and EvapTech Series Comprehensive Equipment Manual](#)

COMPREHENSIVE EQUIPMENT MANUAL

Grand River Dam Authority Grand River Energy Center Unit 3

KED Specification # 94.03.52.175
PKS PO # 7900-102739

EvapTech, Inc.
8331 Nieman Road
Lenexa, KS 66214
Phone # 913-322-5165
Fax # 913-322-5166

Cooling Tower
03-CWS-CTW-01
Order # 15001197

VOLUME 1 OF 1



Kiewit

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Spare Parts

- ◆ EvapTech can order parts for all cooling tower mechanical equipment. If emergency service is necessary, contact the local EvapTech sales office or representative for assistance.
 - ❖ To prevent prolonged shutdown periods in case of damage to the mechanical equipment, it is suggested that the following parts be carried in the owner's stock:
 - ◆ One (1) fan assembly
 - ◆ One (1) gear box assembly
 - ◆ One (1) drive shaft assembly
 - ◆ One (1) motor
 - ◆ Minimum of ten (10) distribution spray nozzles
- Be sure to furnish the tower serial number when ordering parts. Refer to the following Parts List for details.

MECHANICAL EQUIPMENT:

Fans

	Number	APT-32.8K-9
	Type or Model	APT-32.8K-9 Tuf-Lite III W/Q2 Bushing
	Manufacturer	Hudson
	Diameter	32.81'
	Number of Blades	9
	Fan Speed	118.33 RPM
	Blade Material	Powder Coated Aluminum
	Hub Material	HDG plates w/ epoxy coated aluminum blade clamps
	Fan Blade Pitch Angle	11.8°

Speed Reducer

	Number	FD1712 15
	Type	Splash Lubricated, Right Angle
	Model	Series 1712
	Manufacturer	Amarillo Gear Corporation
	Reduction ratio	15.0:1
	Number of Reductions	Double



Drive Shaft

	Number	LRF650.625SS
	Type	Full Floating, Non-Lubricated
	Model	LRF650.625SS, 165.75" DBSE
	Manufacturer	Rexnord/Addax
	Drive Shaft Material	Composite Shaft & Flange
	Coupling Material	316 Stainless Steel with composite flex elements

Vibration Switch

	Manufacturer	Metrix
	Model	440

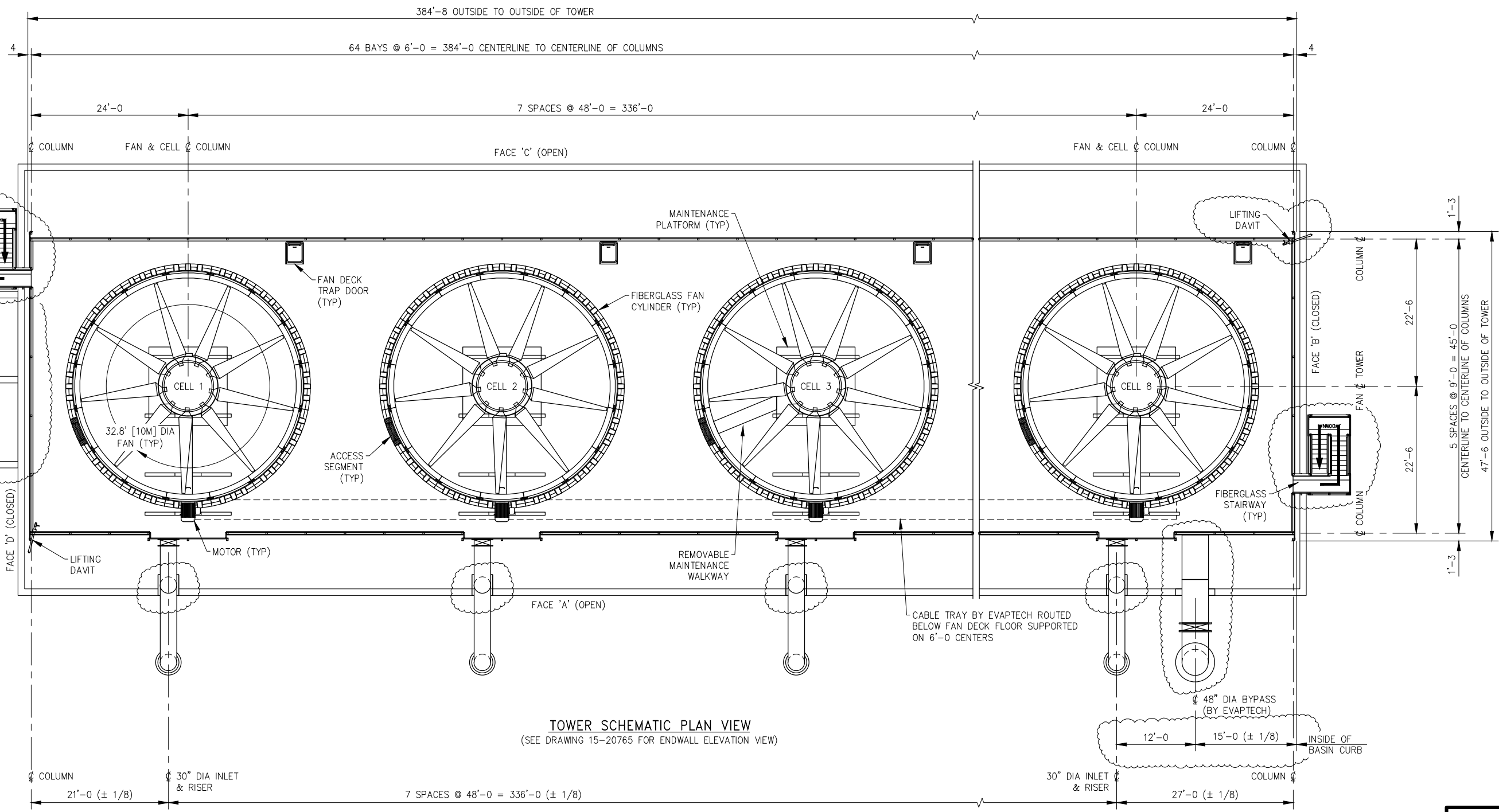
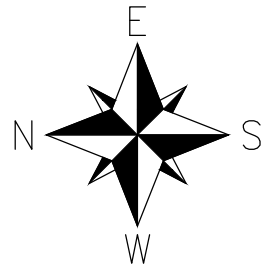
Distribution Spray Nozzles

	Manufacturer	EvapTech
	Model / Orifice Diameter	EvapJet II .94 Dia. Exit Orifice

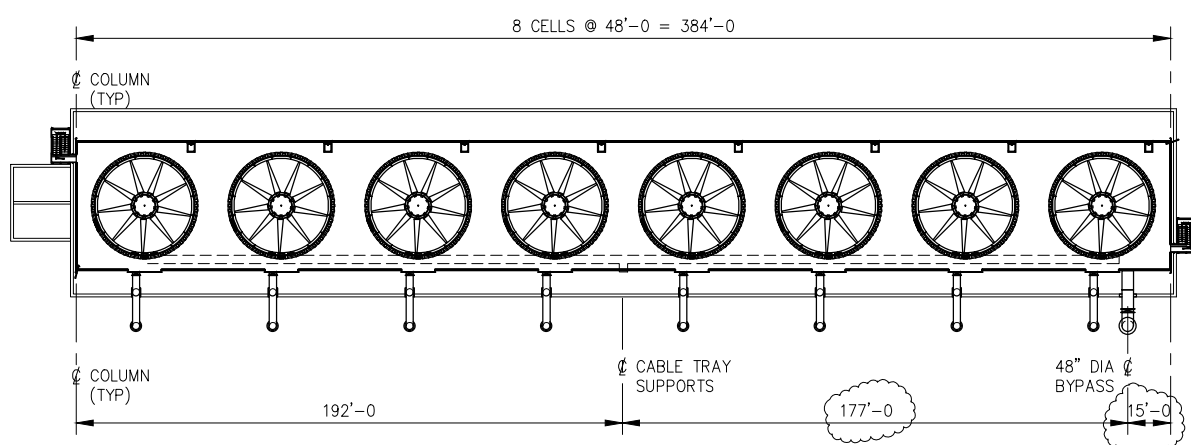
Driver

	Number	W22
	Kind	Electric
	Enclosure	Totally Enclosed, Fan Cooled, Premium Efficiency
	Manufacturer	WEG
	Full Load Speed, RPM	1780
	Elec. Char. -Phase/Cycles/Volts	3/60/460
	Rated Capacity	200 HP





TOWER SCHEMATIC PLAN VIEW
(SEE DRAWING 15-20765 FOR ENDWALL ELEVATION VIEW)



KEY PLAN

TOWER TAG # : 03-CWS-CTW-01					
CELL #	CELL TAG #	FAN TAG #	FAN MOTOR TAG #	EXPANSION JOINT TAG # M-1	RISER VALVE TAG # 0-1
1	03-CWS-CTC-01	03-CWS-FAN-01	03-CWS-MFN-01	03-EXJ-262608	03-V262617
2	03-CWS-CTC-02	03-CWS-FAN-02	03-CWS-MFN-02	03-EXJ-262609	03-V262618
3	03-CWS-CTC-03	03-CWS-FAN-03	03-CWS-MFN-03	03-EXJ-262610	03-V262619
4	03-CWS-CTC-04	03-CWS-FAN-04	03-CWS-MFN-04	03-EXJ-262611	03-V262620
5	03-CWS-CTC-05	03-CWS-FAN-05	03-CWS-MFN-05	03-EXJ-263605	03-V263600
6	03-CWS-CTC-06	03-CWS-FAN-06	03-CWS-MFN-06	03-EXJ-263606	03-V263602
7	03-CWS-CTC-07	03-CWS-FAN-07	03-CWS-MFN-07	03-EXJ-263607	03-V263604
8	03-CWS-CTC-08	03-CWS-FAN-08	03-CWS-MFN-08	03-EXJ-263608	03-V263606
				03-EXJ-263601 (BYPASS)	03-MOV-263609 (BYPASS)

Approved For
Construction

By: J.H. AHERN
Further Changes Could Result
In Added Cost And/Or Delays
In Shipment.

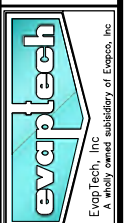
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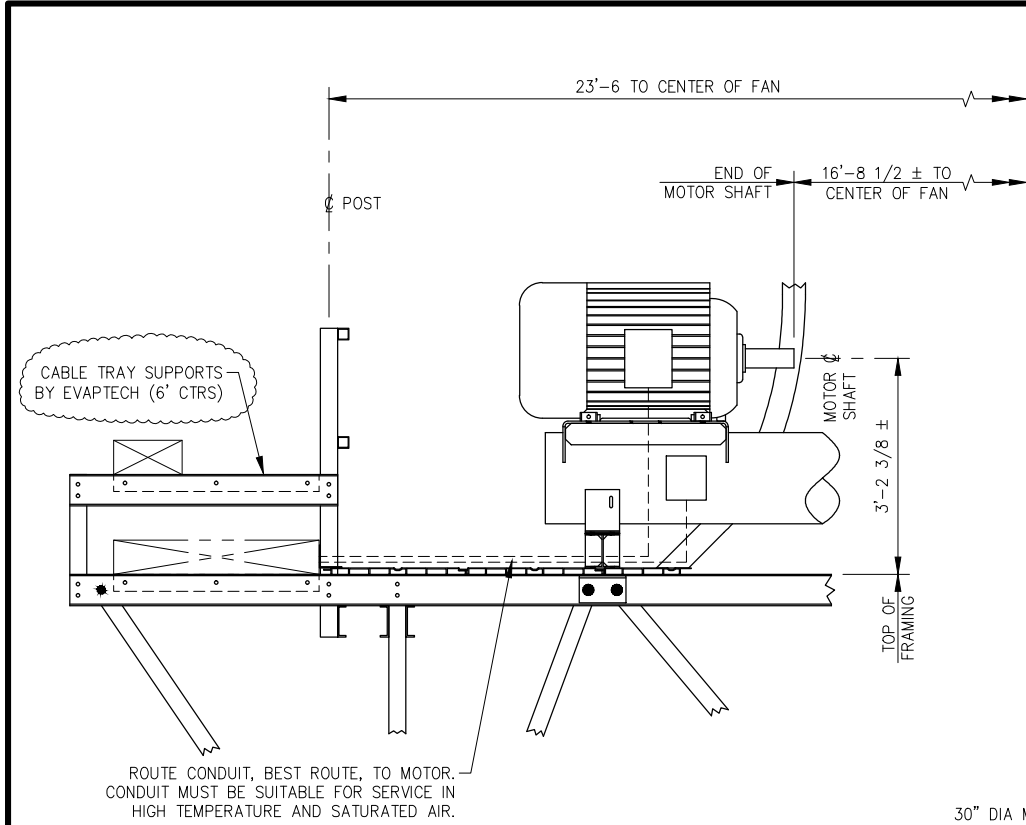
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DATE:	5/26/2015	ORDER NUMBER:	15001197
DRAWN BY:	REA	APPROVED BY:	JHA

TOWER SCHEMATIC PLAN VIEW
MODEL ESE845-448R FBGLS TOWER

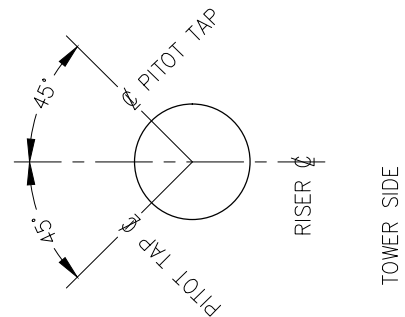
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Ph: (913) 322-5165
Fax: (913) 322-5166





SUGGESTED CONDUIT LOCATION

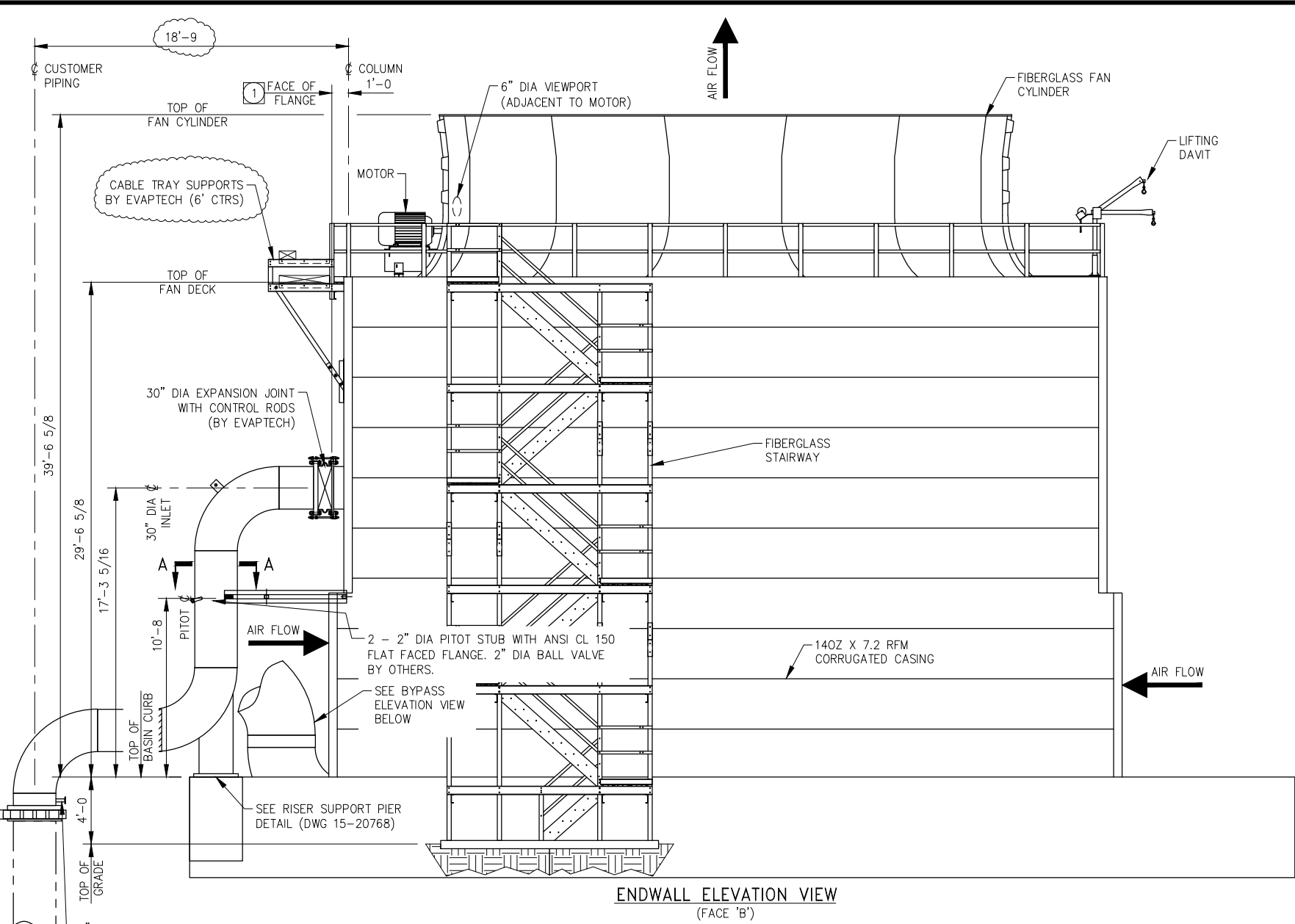


SECTION A-A

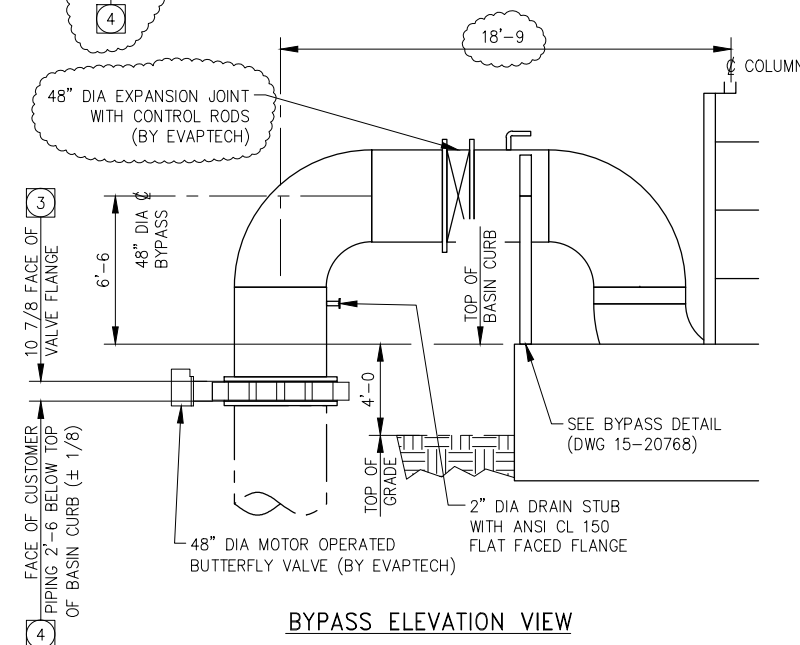
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ENDWALL ELEVATION VIEW (FACE 'B')



BYPASS ELEVATION VIEW

GENERAL NOTES

- 1 EVAPTECH PIPING STOPS AT FACE OF FRP FLAT FACED FLANGE WHICH IS 1 3/8" (+1/2, -1/8) THICK. THERE ARE 28 - 1 3/8" DIA. BOLT HOLES ON 36" DIA BOLT CIRCLE. BOLT HOLES STRADDLE CENTERLINES. FLANGE DRILLING CONFORMS TO CLASS 125# ANSI B16.1 SPECIFICATIONS. CUSTOMER MUST PROVIDE SUPPORT FOR ALL PIPE, WATER, AND VALVE AT THE CUSTOMER SUPPLIED CONNECTING FLANGE. CARE MUST BE TAKEN WHEN INSTALLING CUSTOMER PROVIDED CONNECTING HARDWARE INCLUDING STANDARD CUT WASHERS FOR FRP FLANGE.

MAXIMUM NOZZLE START-UP PRESSURE AT INLET FLANGE (17'-3 5/16 ABOVE TOP OF BASIN CURB) = 10 P.S.I
MAXIMUM NOZZLE OPERATING PRESSURE AT INLET FLANGE (17'-3 5/16 ABOVE TOP OF BASIN CURB) = 5 P.S.I.
- 2 **INSTALLER NOTE:** CONNECTING PIPING MUST BE PROPERLY ALIGNED AT INSTALLATION TO AVOID DAMAGING OR MOVING THE F.R.P PIPE WHEN PULLING UP THE FLANGE BOLTS. CARE MUST BE TAKEN WHEN INSTALLING CONNECTING PIPING TO AVOID OVERLOADING OR DAMAGING THE TOWER STRUCTURE.
- 3 EVAPTECH PIPING STOPS AT FACE OF FRP FLAT FACED FLANGE WHICH IS 5 3/8" (+1/2, -1/8) THICK. THERE ARE 44 - 1 5/8" DIA. BOLT HOLES ON 56" DIA BOLT CIRCLE. BOLT HOLES STRADDLE CENTERLINES. FLANGE DRILLING CONFORMS TO CLASS 125# ANSI B16.1 SPECIFICATIONS. CUSTOMER MUST PROVIDE SUPPORT FOR ALL PIPE, WATER, AND VALVE AT THE CUSTOMER SUPPLIED CONNECTING FLANGE. CARE MUST BE TAKEN WHEN INSTALLING CUSTOMER PROVIDED CONNECTING HARDWARE INCLUDING STANDARD CUT WASHERS FOR FRP FLANGE.

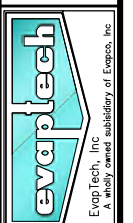
MAXIMUM OPERATING PRESSURE AT BYPASS FLANGE = 20 P.S.I.
- 4 ALLOWABLE FORCES AND MOVEMENTS FOR THE RISER PIPE & BYPASS CONNECTION FLANGE (BY CUSTOMER) IS AS FOLLOWS:
A. HORIZONTAL PLANE: ± 250 LBS; ± 1/8 INCH.
B. VERTICAL PLANE: ± 250 LBS; ± 1/8 INCH.
- 5 EVAPTECH PIPING STOPS AT FACE OF FRP FLAT FACED FLANGE WHICH IS 1 3/8" (+1/2, -1/8) THICK. THERE ARE 28 - 1 3/8" DIA. BOLT HOLES ON 36" DIA BOLT CIRCLE. BOLT HOLES STRADDLE CENTERLINES. FLANGE DRILLING CONFORMS TO CLASS 125# ANSI B16.1 SPECIFICATIONS. CUSTOMER MUST PROVIDE SUPPORT FOR ALL PIPE, WATER, AND VALVE AT THE CUSTOMER SUPPLIED CONNECTING FLANGE. CARE MUST BE TAKEN WHEN INSTALLING CUSTOMER PROVIDED CONNECTING HARDWARE INCLUDING STANDARD CUT WASHERS FOR FRP FLANGE.

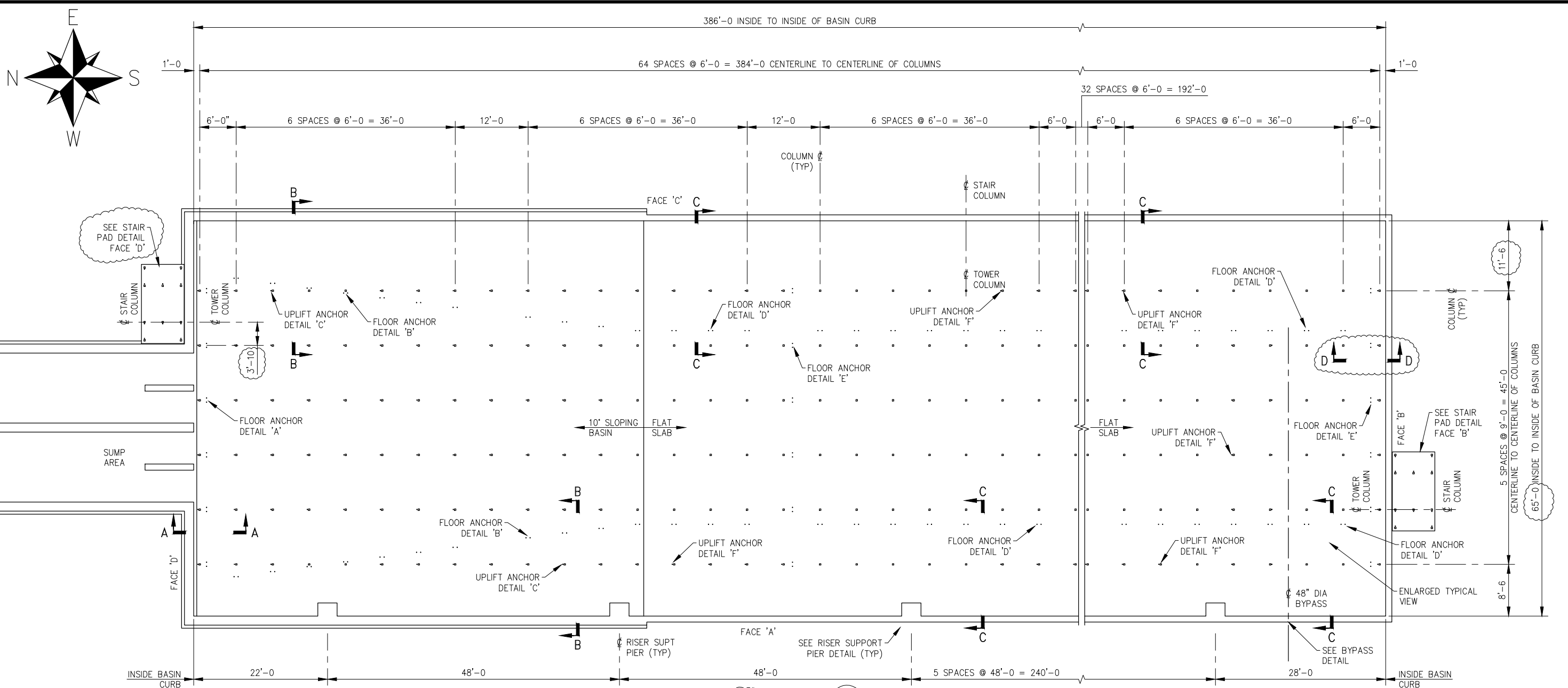
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REVISION:	15-20765
DRAWING NUMBER:	15-20765
SCALE:	1=96
ORDER NUMBER:	15001197
APPROVED BY:	JHA
CHECKED BY:	RDF
REVISION:	15-20765
DATE:	5/26/2015
DRAWN BY:	REA

ENDWALL ELEVATION VIEW
MODEL ESE845-448R FBGLS TOWER

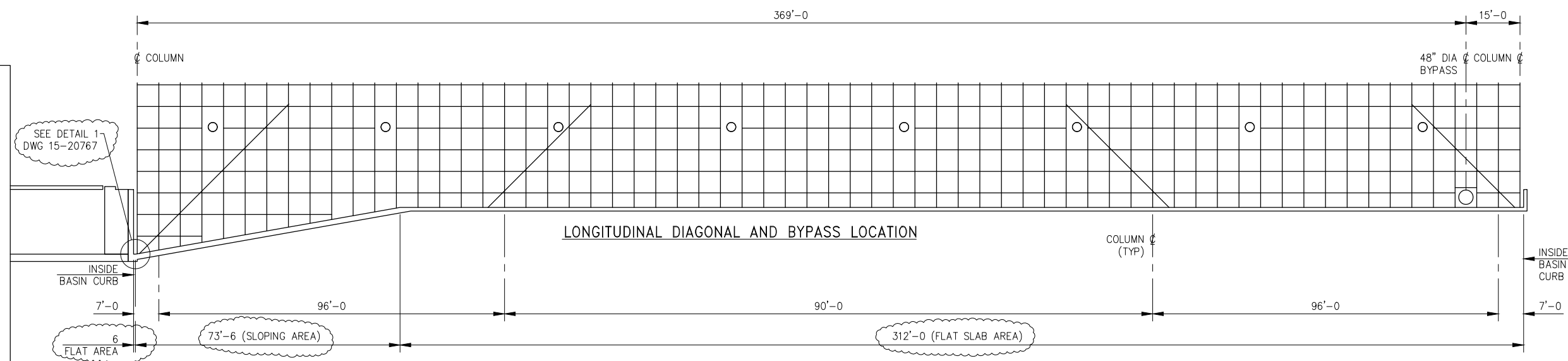
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CONCRETE COLD WATER BASIN PLAN
 (SEE DRAWINGS 15-20767 FOR SECTIONS AND 15-20768 FOR DETAILS & NOTES)



Approved For
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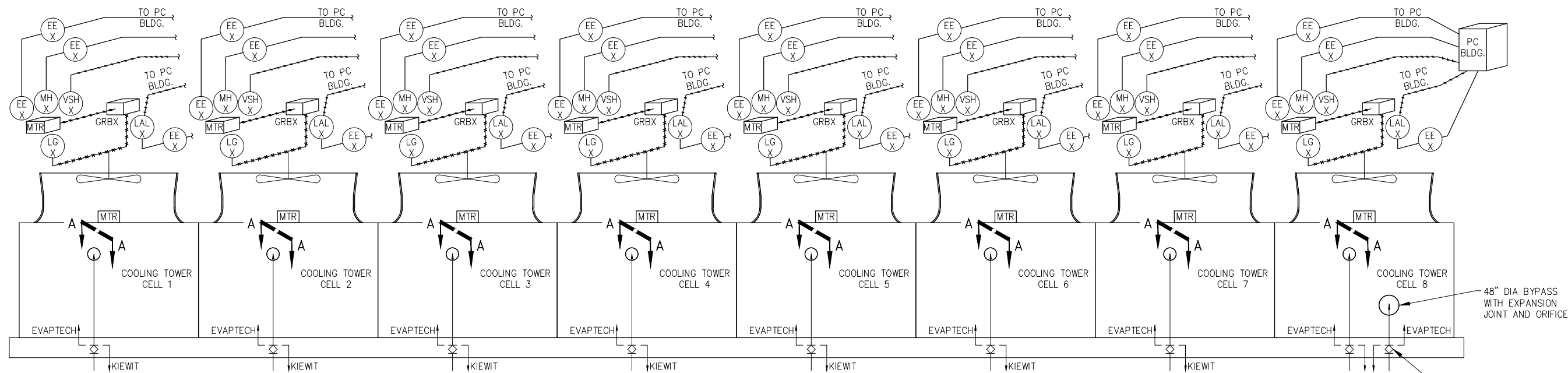
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REVISIONS	REV. DATE:	7/24/2015	REV. CHECKED:	RDF
	SCALE:	1=192	DRAWING NUMBER:	15-20766
	ORDER NUMBER:	15001197	APPROVED BY:	JHA
	DATE:	5/27/2015	CHECKED BY:	RDF
	DRAWN BY:	REA	REVIEWED BY:	REA
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CONCRETE COLD WATER BASIN PLAN MODEL ESE845-448R FBGLS TOWER				



DESIGN & OPERATING CONDITIONS	
CIRCULATING WATER FLOW	125,370 GPM
HOT (INLET) WATER TEMP.	85.90 °F
COLD (OUTLET) WATER TEMP.	72.20 °F
WET BULB TEMP., INLET	54.40 °F
WET BULB TEMP., AMBIENT	54.40 °F
TOWER PUMP HEAD	24.58'

FAN	
FAN SIZE	32.81' DIA (10M)
FAN SPEED	118.33 RPM
TOTAL STATIC PRESSURE	0.631 inWg
VELOCITY PRESSURE	0.783 inWg
AIR DELIVERY PER FAN	1,251,660 CFM
GEARBOX REDUCTION RATIO	15:1

MOTOR	
FULL LOAD SPEED	1800 RPM
PHASE/CYCLES/VOLTS	3/60/460
RATED CAPACITY	200 HP

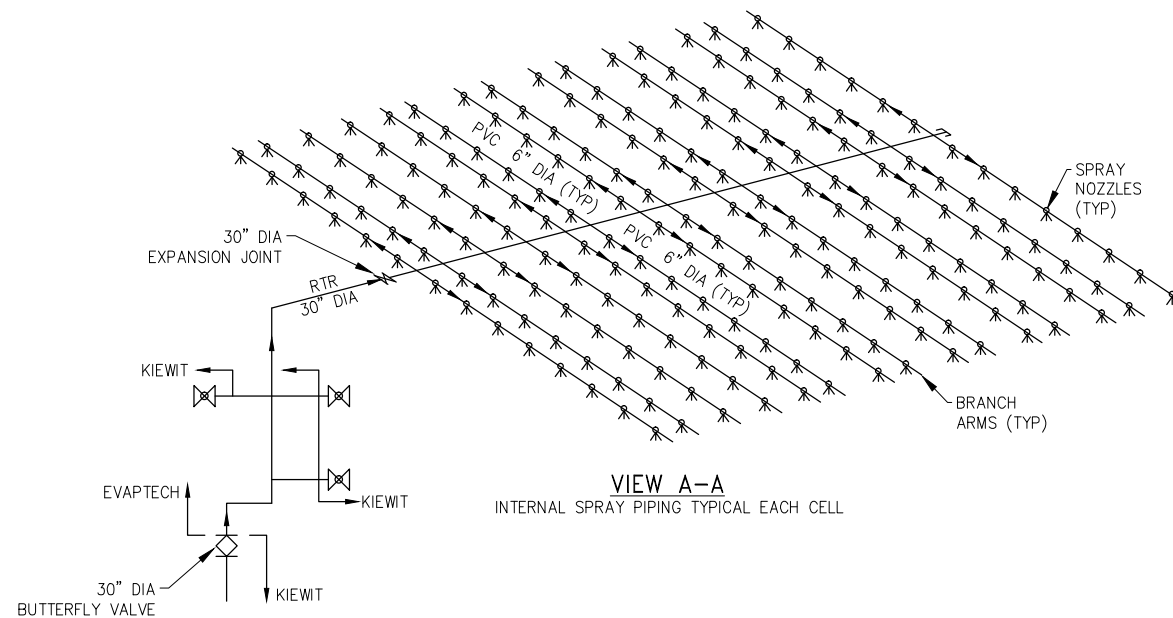
CONNECTOR NUMBERS		
VALVE	TEST CONN	DRAIN
42	51, 52	53
...
...
...
50	N/A	75

TOWER TAG # : 03-CWS-CTW-01							
CELL #	CELL TAG #	FAN TAG #	FAN MOTOR TAG #	EXPANSION JOINT TAG # M-1	RISER VALVE TAG # 0-1	VIBRATION SWITCH TAG #	LEVEL SWITCH TAG #
1	03-CWS-CTC-01	03-CWS-FAN-01	03-CWS-MFN-01	03-EXJ-262608	03-V262617	03-VSH-262601	03-LSL-262601
2	03-CWS-CTC-02	03-CWS-FAN-02	03-CWS-MFN-02	03-EXJ-262609	03-V262618	03-VSH-262602	03-LSL-262602
3	03-CWS-CTC-03	03-CWS-FAN-03	03-CWS-MFN-03	03-EXJ-262610	03-V262619	03-VSH-262603	03-LSL-262603
4	03-CWS-CTC-04	03-CWS-FAN-04	03-CWS-MFN-04	03-EXJ-262611	03-V262620	03-VSH-262604	03-LSL-262604
5	03-CWS-CTC-05	03-CWS-FAN-05	03-CWS-MFN-05	03-EXJ-263605	03-V263600	03-VSH-263605	03-LSL-263605
6	03-CWS-CTC-06	03-CWS-FAN-06	03-CWS-MFN-06	03-EXJ-263606	03-V263602	03-VSH-263606	03-LSL-263606
7	03-CWS-CTC-07	03-CWS-FAN-07	03-CWS-MFN-07	03-EXJ-263607	03-V263604	03-VSH-263607	03-LSL-263607
8	03-CWS-CTC-08	03-CWS-FAN-08	03-CWS-MFN-08	03-EXJ-263608	03-V263606	03-VSH-263608	03-LSL-263608
				03-EXJ-263601 (BYPASS)	03-MOV-263609 (BYPASS)		

Submitted For Approval

To Avoid Delays In Shipment
This Drawing Must Be Returned
By The Date Noted Below.

Date: 9/2/2015



LEGEND	
	- MECHANICAL CONNECTION
	- ELECTRIC SIGNAL
	- EQUIPMENT/INSTRUMENT SUPPLY
	- CAPILLARY TUBE
	- OIL LEVEL SIGHTGLASS
	- LOW ALARM LEVEL (LOW OIL LEVEL SWITCH)
	- MOTOR HEATER
	- VIBRATION SWITCH, HIGH ALARM
	- ELECTRICAL SUPPLY

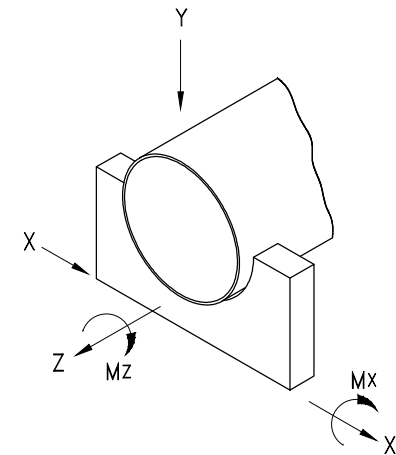
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 CHECKED BY: RDF
 REVISED BY: REA
 REV DATE: 8/19/2015
 SCALE: 1=256
 ORDER NUMBER: 15001197
 DRAWING NUMBER: 15-21101
 REV: A

P & ID FLOW DIAGRAM
 MODEL ESE845-448R FBGLS TOWER

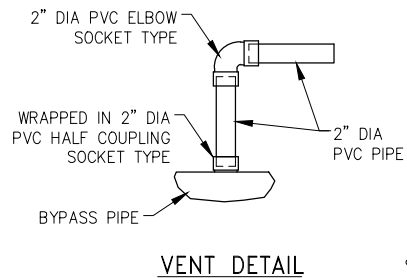
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PIPE SUPPORT LOADS DIAGRAM

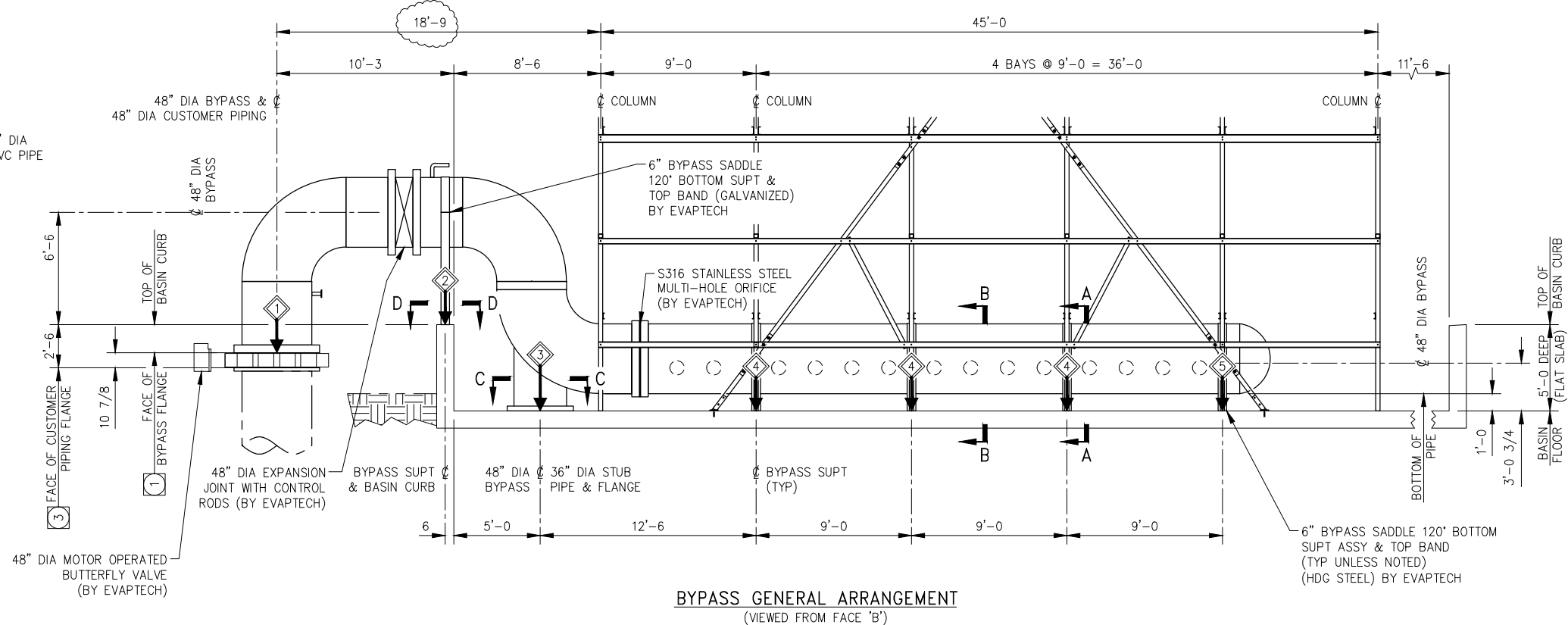


VENT DETAIL

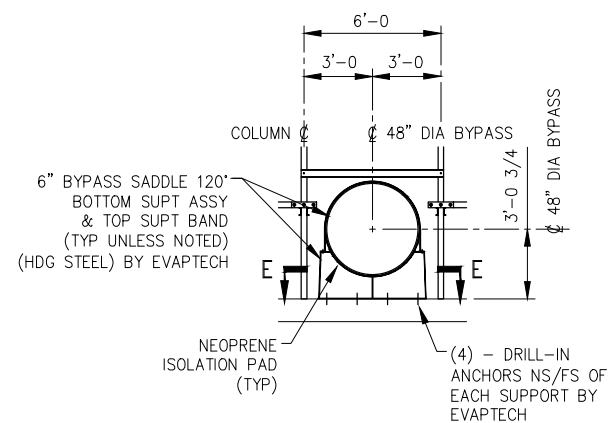
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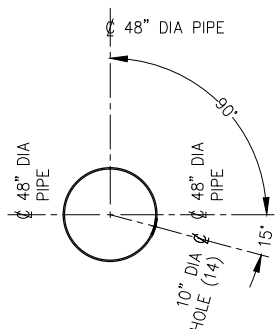
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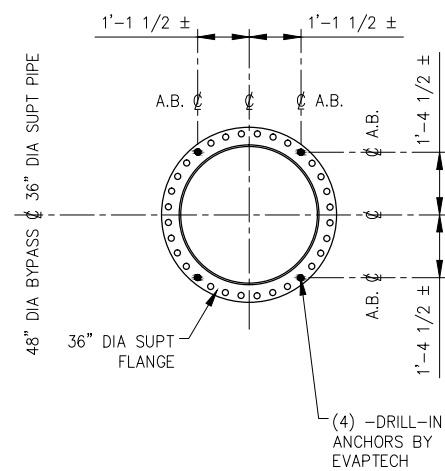
BYPASS GENERAL ARRANGEMENT
(VIEWED FROM FACE 'B')



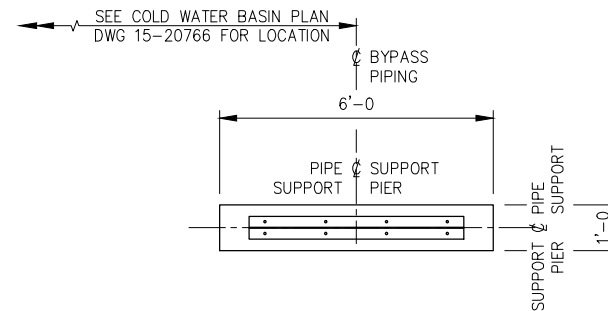
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SECTION B-B

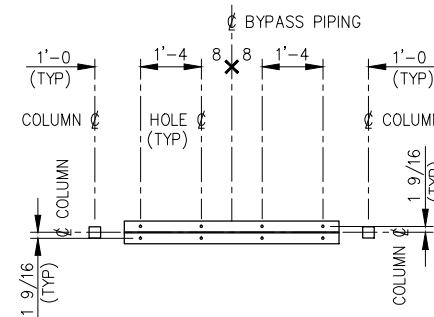


SECTION C-C



SECTION D-D

TOP OF PIER SUPPORT TO BE FLUSH WITH TOP OF BASIN CURB
(SEE SECTION E-E FOR TYPICAL DIMENSIONING)



SECTION E-E

LOAD TABLE							
LOCATION	SHUTDOWN	OPERATING	WIND MOMENT (Z)	WIND BASE SHEAR (X)	OPERATING SEISMIC MOMENT (X OR Z)	OPERATING SEISMIC BASE SHEAR (X OR Z)	OPERATING SEISMIC VERTICAL (Y)
1	3987 LBS	12,985 LBS	3308 LBS	551 LBS	14,959 FT-LBS	1662 LBS	332 LBS
2	560 LBS	8558 LBS	2442 LBS	271 LBS	7120 FT-LBS	1095 LBS	219 LBS
3	1118 LBS	13,916 LBS	1508 LBS	302 LBS	12,469 FT-LBS	1781 LBS	356 LBS
4	629 LBS	7828 LBS	0 LBS	0 LBS	3006 FT-LBS	1002 LBS	200 LBS
5	418 LBS	5219 LBS	0 LBS	0 LBS	2004 FT-LBS	688 LBS	134 LBS

GENERAL NOTES

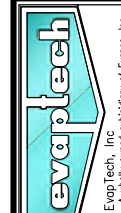
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MAXIMUM OPERATING PRESSURE AT BYPASS FLANGE = 20 P.S.I.
2. SEE DRAWING 15-20766 FOR BYPASS LOCATION ON BASIN PLAN.
3. ALLOWABLE FORCES AND MOVEMENTS FOR THE BYPASS CONNECTION FLANGE, BY CUSTOMER, IS AS FOLLOWS:
A. HORIZONTAL PLANE: ± 250 LBS; ± 1/8 INCH.
B. VERTICAL PLANE: ± 250 LBS; ± 1/8 INCH.

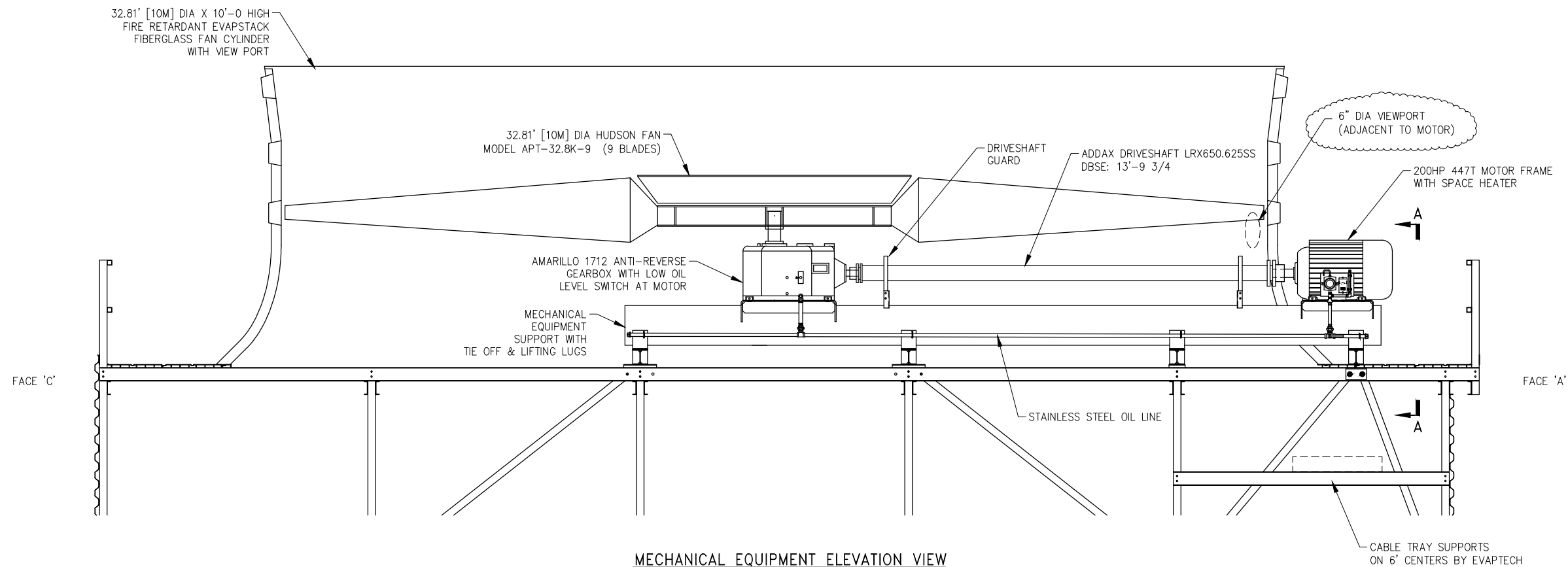
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DRAWING NUMBER:	15-20770
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CHECKED BY:	RDF
REVIEWED BY:	REA
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BYPASS GENERAL ARRANGEMENT
MODEL ES845-448R FBGLS TOWER

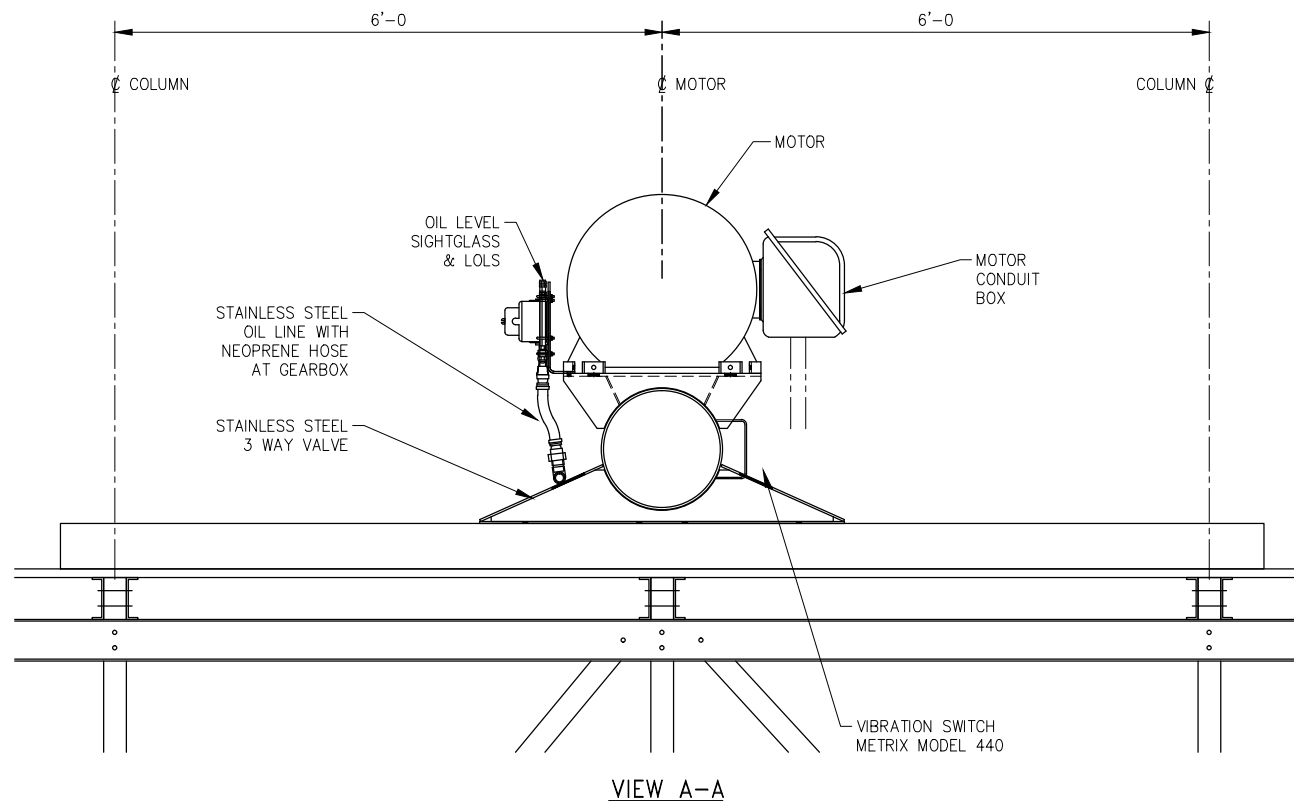
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MECHANICAL EQUIPMENT ELEVATION VIEW



VIEW A-A

TOWER TAG # : 03-CWS-CTW-01

CELL #	CELL TAG #	FAN TAG #	FAN MOTOR TAG #
1	03-CWS-CTC-01	03-CWS-FAN-01	03-CWS-MFN-01
2	03-CWS-CTC-02	03-CWS-FAN-02	03-CWS-MFN-02
3	03-CWS-CTC-03	03-CWS-FAN-03	03-CWS-MFN-03
4	03-CWS-CTC-04	03-CWS-FAN-04	03-CWS-MFN-04
5	03-CWS-CTC-05	03-CWS-FAN-05	03-CWS-MFN-05
6	03-CWS-CTC-06	03-CWS-FAN-06	03-CWS-MFN-06
7	03-CWS-CTC-07	03-CWS-FAN-07	03-CWS-MFN-07
8	03-CWS-CTC-08	03-CWS-FAN-08	03-CWS-MFN-08

Approved For
Construction

By: J.H. AHERN
Further Changes Could Result
In Added Cost And/Or Delays
In Shipment.

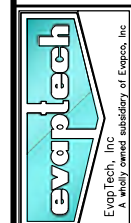
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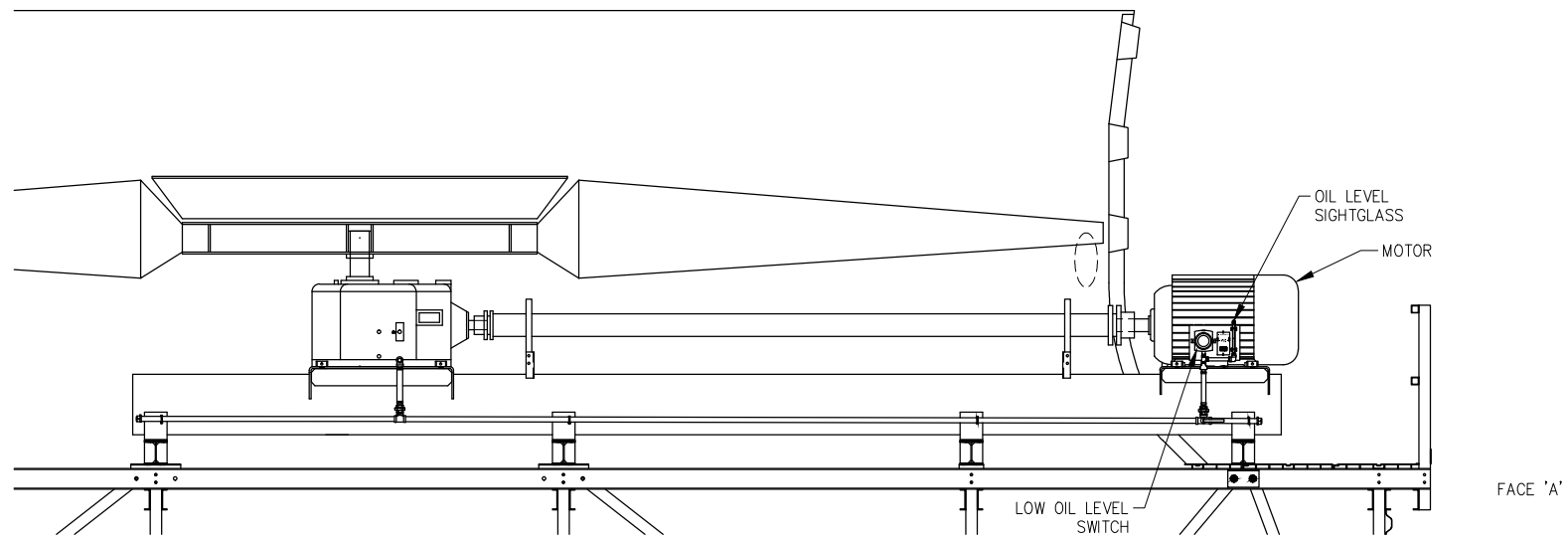
REV CHECKED:	RDF	REV DATE:	7/1/2015
DRAWING NUMBER:	15-20790	SCALE:	1 = 48
REV:	A		
CHECKED BY:	RDF	APPROVED BY:	JHA
REVISION:	REA	ORDER NUMBER:	15001197
DRAWN BY:	REA	DATE:	6/8/2015

MECHANICAL EQUIPMENT ARRANGEMENT
MODEL ESE845-448R FBGLS TOWER
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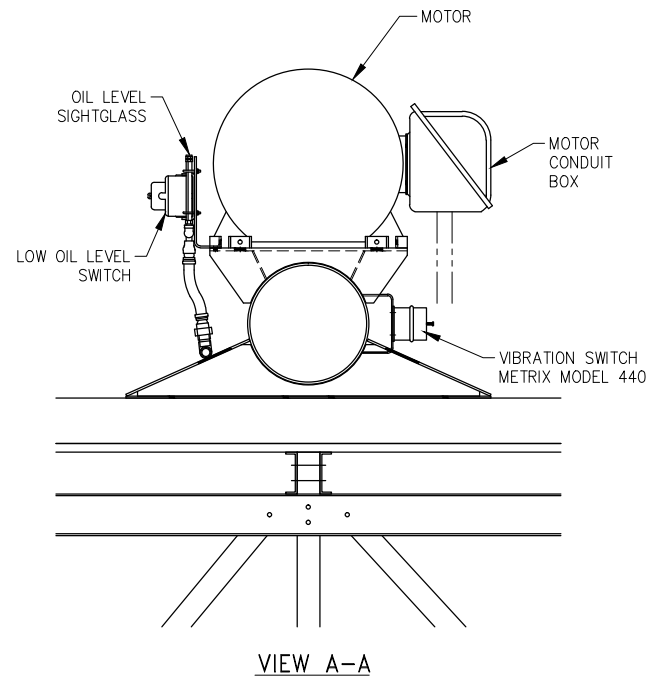
KIEWIT
GRDA CHOUTEAU
CHOUTEAU, OK

EvapTech, Inc.
8331 Nieman Road
Lenexa, KS 66214
Ph: (913) 322-5165
Fax: (913) 322-5166





INSTRUMENTATION LAYOUT ELEVATION VIEW

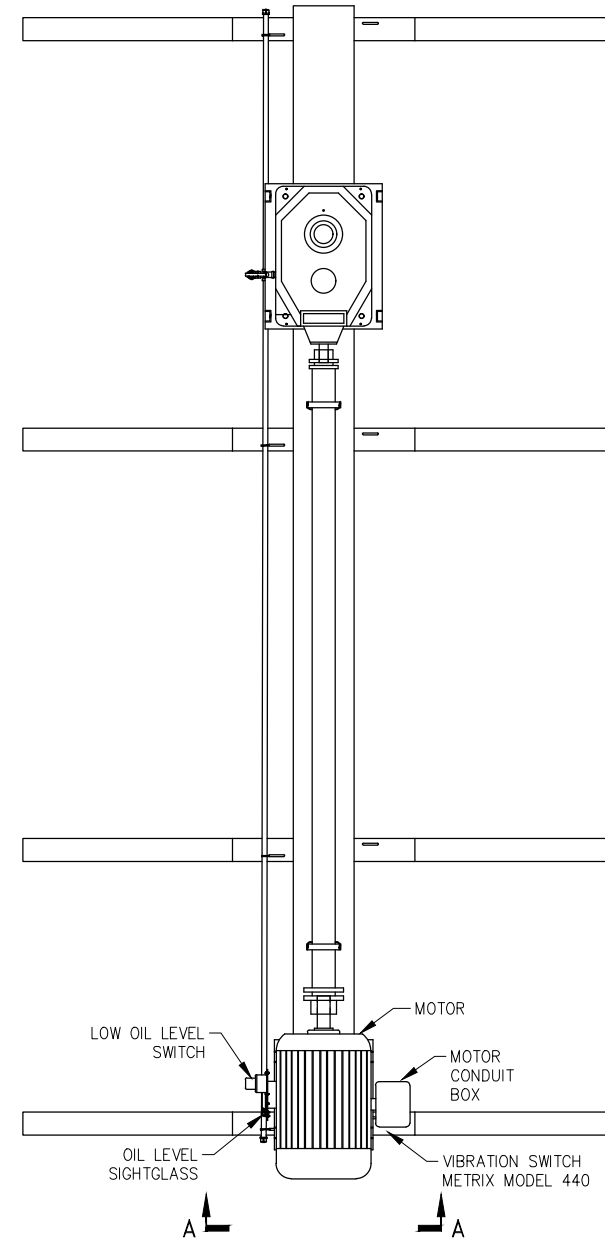


VIEW A-A

Submitted For Approval

To Avoid Delays In Shipment
This Drawing Must Be Returned
By The Date Noted Below.

Date: 9/10/2015



INSTRUMENTATION LAYOUT PLAN VIEW

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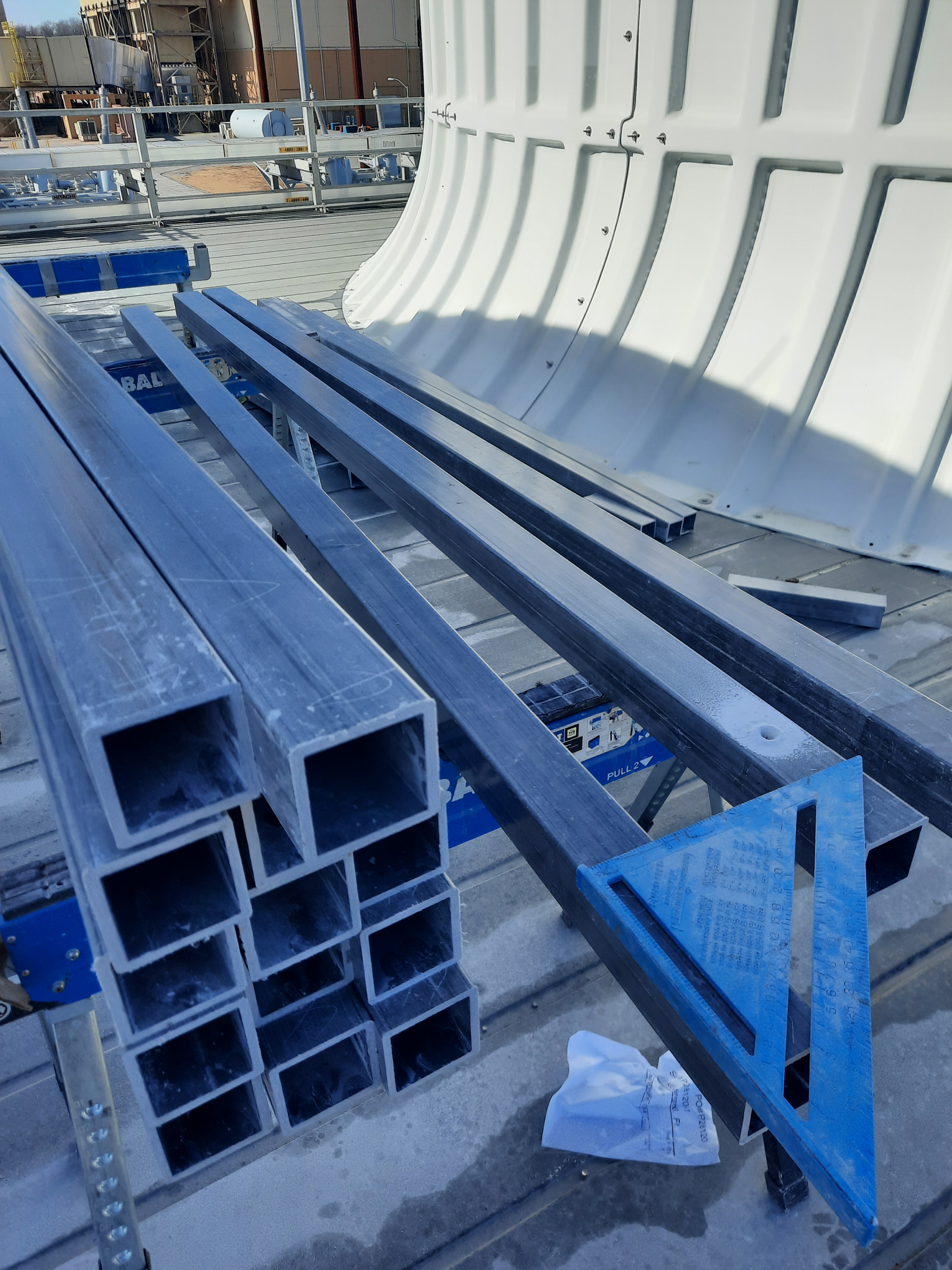
INSTRUMENTATION LAYOUT
MODEL ESE845-448R FBGLS TOWER

DRAWN BY:	REA	CHECKED BY:	RDF	REV BY:		REV DATE:	
DATE:	8/17/2015	APPROVED BY:	RF	ORDER NUMBER:	15001197	SCALE:	1 = 48
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