

# 11-Tanks Design Criteria-HH-06-12-14-V001

Client: **CCSD**  
Project: **Emergency Water Supply System**  
Detail: **Tanks**

Job No.:  
Checked By:  
Date Checked:

Computed By: **Hoon Hyung**  
Date: **6/9/2014**  
Page No.: --

## Influent Tank

No. of Duty Tanks	1	
Type of Tank	HDPE	
Nominal Capacity per Tank	5,000	gallons
Tank Diameter, Maximum	10	ft
Tank Sideshell Height, Minimum	10.0	ft
Residence Time at Design Flow	7.5	minutes
Tank Color	Black	

## Break/Backwash Tank

No. of Duty Tanks	1	
Type of Tank	HDPE	
Nominal Capacity per Tank	10,000	gallons
Tank Diameter, Maximum	10	ft
Tank Sideshell Height, Minimum	10.0	ft
Residence Time at Design Flow	17.8	minutes
Tank Color	Black	

## Product Water Tank

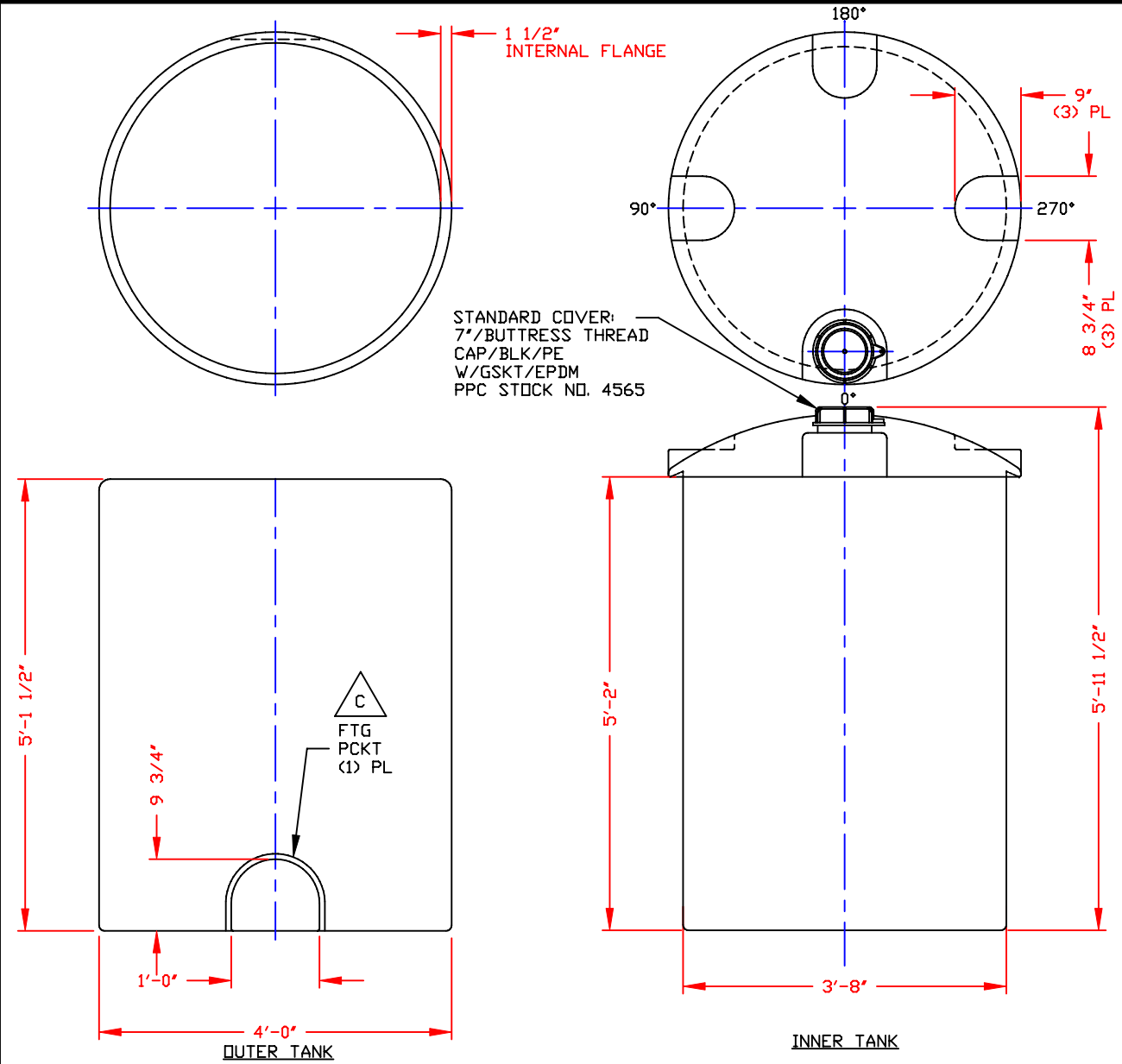
No. of Duty Tanks	1	
Type of Tank	HDPE	
Nominal Capacity per Tank	5,000	gallons
Tank Diameter, Maximum	10	ft
Tank Sideshell Height, Minimum	10.0	ft
Residence Time at Design Flow	10.3	minutes
Tank Color	Black	



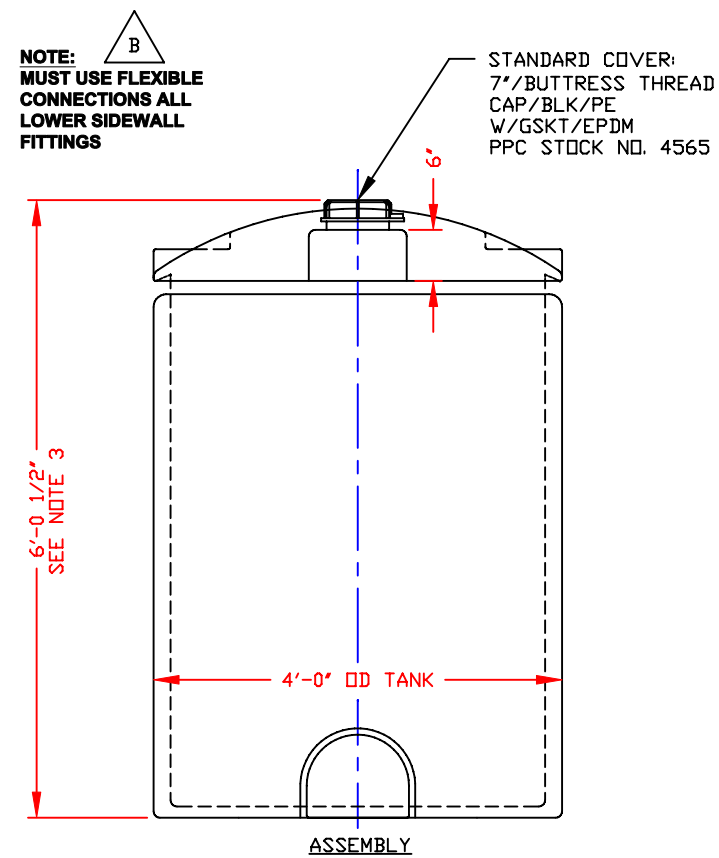


# 11-AA SHC SA and HPO Tanks Cutsheet-EY-061114-V001

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  2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVELANT DURING MANUFACTURE & USAGE.
  3. OVERALL HEIGHT WILL VARY WITH THE PENETRATION OF THE INNER TANK INTO THE OUTER TANK.



REV 'D' REVISED FOR MOLD MODIFICATIONS BY:MBW 3/28/06 CK:JM  
 REV 'C' ADDED FTG POCKET BY:MBW 7/9/04 CK:JB  
 REV 'B' ADDED FITTING NOTE BY:MBW 4/15/03 CK:JB  
 REV 'A' REVISED & REDRAWN FOR MOLD MODIFICATIONS BY:MBW 7/24/00 CK:JB

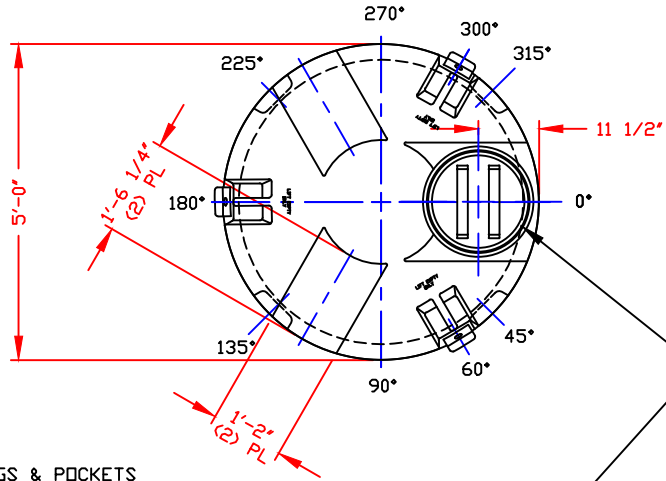
CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS			
TANK	SHELL CAP	DOME VOL	TOTAL VOL
INNER	405	25	430
OUTER	467	N/A	467

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DWG TITLE		405 GALLON SAFE-TANK ASSEMBLY	
SCALE:	3/4"=1'-0"	 <b>POLYPROCESSING                  COMPANY</b>	DR: MB WILKERSON
DATE:	11/23/99		CK: D. RECTOR
		SHEET	COMPUTER FILE
		1 OF 1	2000405 D

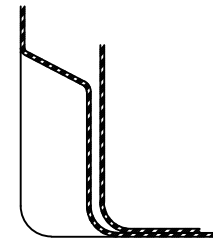
**11-CC Tank Cutsheet-EY-061114-V001**

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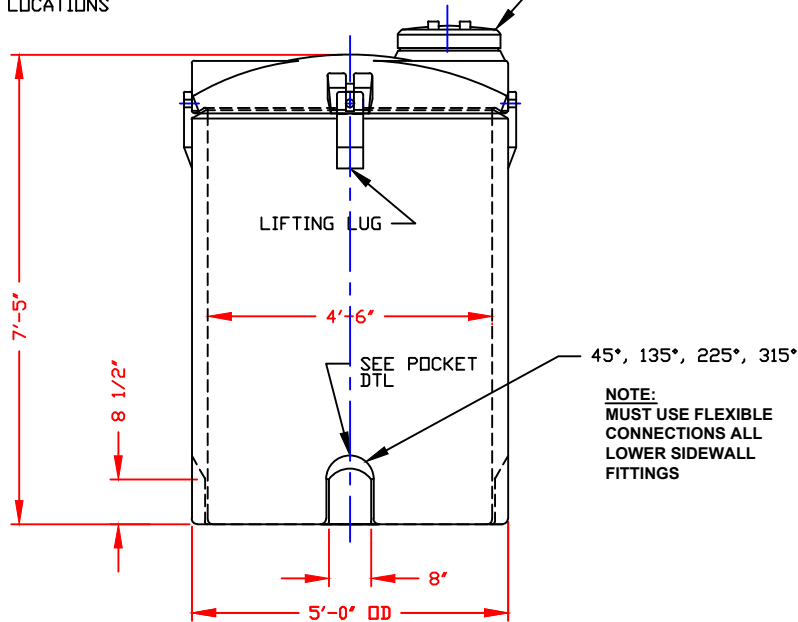


NOTE: LUGS & POCKETS ROTATED INTO VIEW FOR CLARITY. SEE PLAN VIEW FOR DEGREE LOCATIONS

STANDARD COVER:  
 17" CAP/BUTTRESS THR'D  
 BLACK PE  
 STOCK NO. 4558



POCKET DETAIL  
 SCALE: NONE




NOTE:  
 MUST USE FLEXIBLE CONNECTIONS ALL LOWER SIDEWALL FITTINGS

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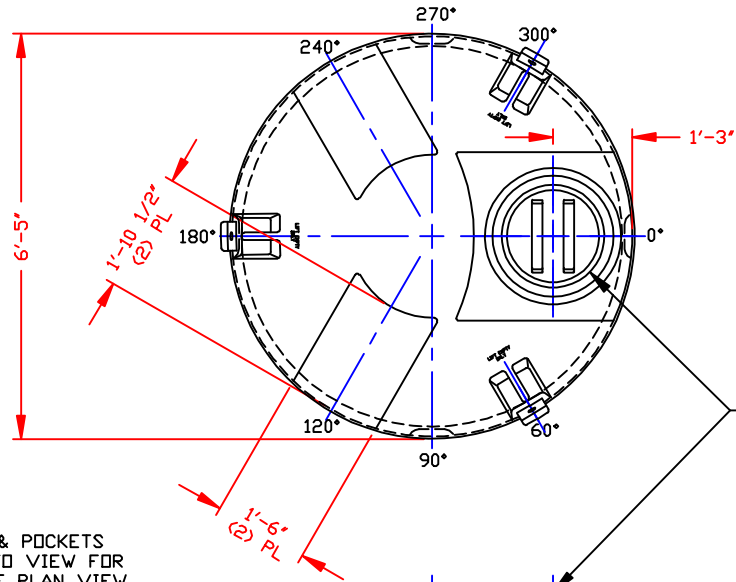
CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS			
TANK	DESIGN CAP	DOME VOL	TOTAL VOL
INNER	750	56	806
OUTER	944	N/A	944

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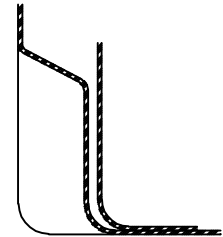
DWG TITLE			
750 GALLON SAFE-TANK ASSEMBLY			
SCALE:	1/2"=1'-0"	 Central Region P.O. Box 4580 Grand Bay, Old Springington Rd. Norcross, LA 72605 CS&D 343-7863 FAX CS&D 343-9795	DR:
DATE:	11/26/12		CK:
		SHEET	REV
		1 OF 1	2000750A -

# 11-SH Tank Cutsheet-EY-061114-V001

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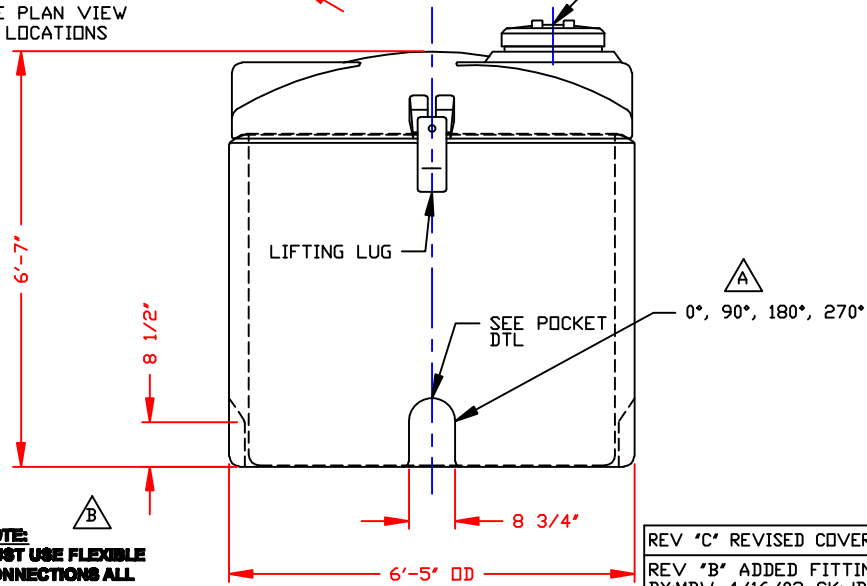


**C**  
 STANDARD COVER:  
 17" CAP/BUTTRESS THR'D  
 BLACK PE  
 STOCK NO. 4558



**POCKET DETAIL**  
 SCALE: NONE

NOTE: LUGS & POCKETS  
 ROTATED INTO VIEW FOR  
 CLARITY. SEE PLAN VIEW  
 FOR DEGREE LOCATIONS




**NOTES:**

1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLD'S & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. FOR INNER TANK DTL'S SEE COMPUTER FILE NO. 12001000, TITLE '1000 GALLON INNER SAFE-TANK'; FOR OUTER TANK DTL'S SEE COMPUTER FILE NO. 12101200, TITLE '1000 GALLON OUTER SAFE-TANK'/ 1200 GALLON OPEN TOP TANK.'

**NOTE:**  
**MUST USE FLEXIBLE CONNECTIONS ALL LOWER SIDEWALL FITTINGS**

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS		
TANK	DESIGN CAP	DOME VOL/TOTAL VOL
INNER	1016	187 1203
OUTER	1215	N/A 1215

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DWG TITLE		1000 GALLON SAFE-TANK ASSEMBLY		
SCALE:	1/2"=1'-0"	 Western Region P.O. Box 40 8025 South Ash Street French Camp, CA 95021 (925) 782-0764 FAX (925) 982-0435	DR:	MB WILKERSON
DATE:	6/28/00		CK:	J. BRANTLEY
		SHEET	COMPUTER FILE	REV
		1 OF 1	12001000A	C

REV 'C' REVISED COVER BY:JB 7/27/09 CK:WM  
 REV 'B' ADDED FITTING NOTE BY:MBW 4/16/03 CK:JB  
 REV 'A' ADDED NOTE & POCKETS IN IN PLAN VIEW BY:JB 1/28/02 CK:WM

**11-UF System Design Criteria-HH-06-09-14-V001**

Client: **CCSD**  
Project: **Emergency Water Supply System**  
Detail: **MF System Design Criteria**

Job No.:  
Checked By:  
Date Checked:

Computed By: **Hoon Hyung**  
Date: **6/9/2014**  
Page No.: --

**Strainer**

Type	Auto-Backwash Strainer	
No. of Units	1	units
Strainer Influent Flow	994,466	gpd
	691	gpm
Screen Pore Size, Minimum	300	microns
Strainer Recovery, Minimum	99%	

**MF System**

MF Influent Flow	984,522	gpd
	684	gpm
MF Influent Pressure	10 to 30	psi
MF Recovery, Minimum	92%	
MF Filtrate Flow	905,760	gpd
	629	gpm

**MF Membrane**

Nominal pore size	0.01	micron
Material	PVDF	
Type/Fiber Flow path	Pressurized/Outside-In	
Manufacturer	Toray	
Model	HFU 2020N	
Membrane Area per Module	775	ft2
Number of Module	38	
Number of MF Train	1	

**Operating Conditions**

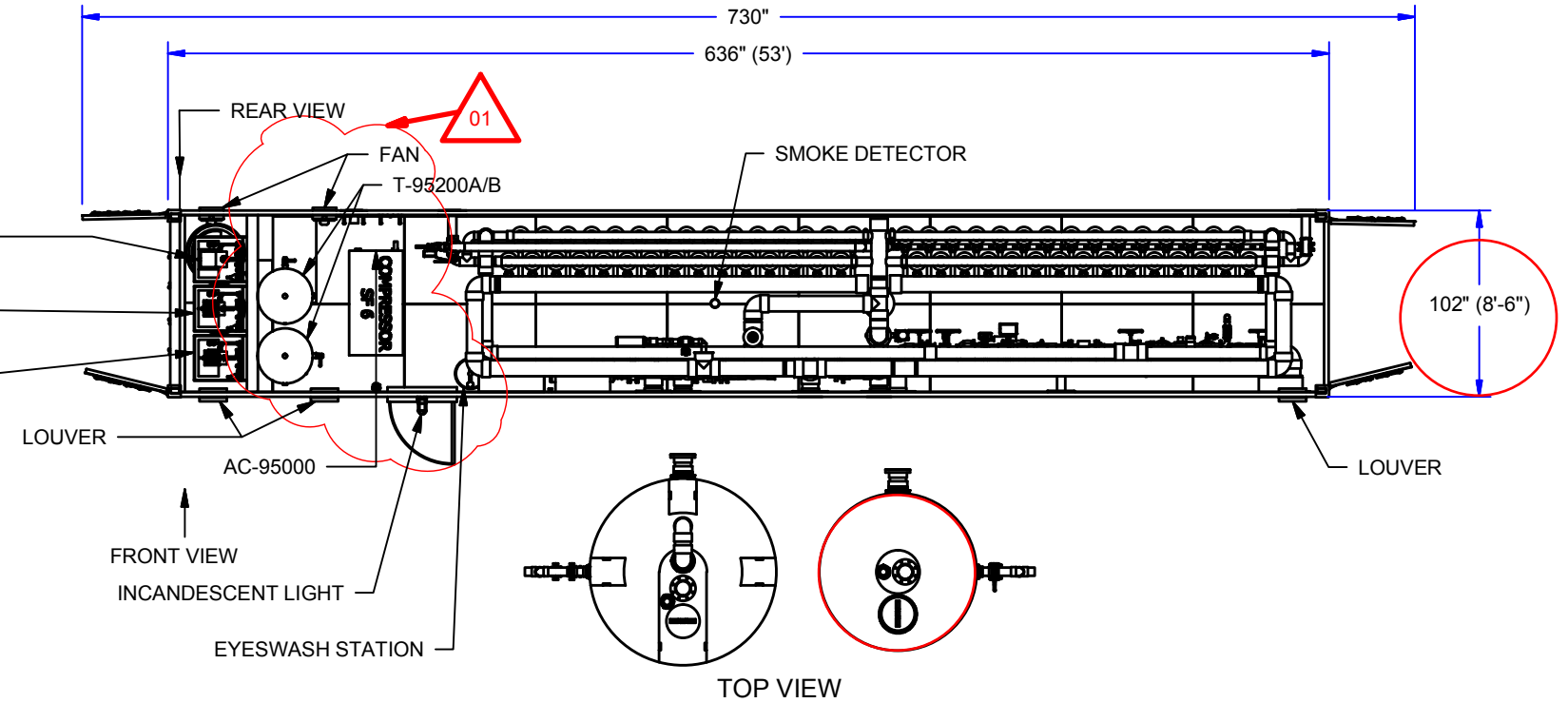
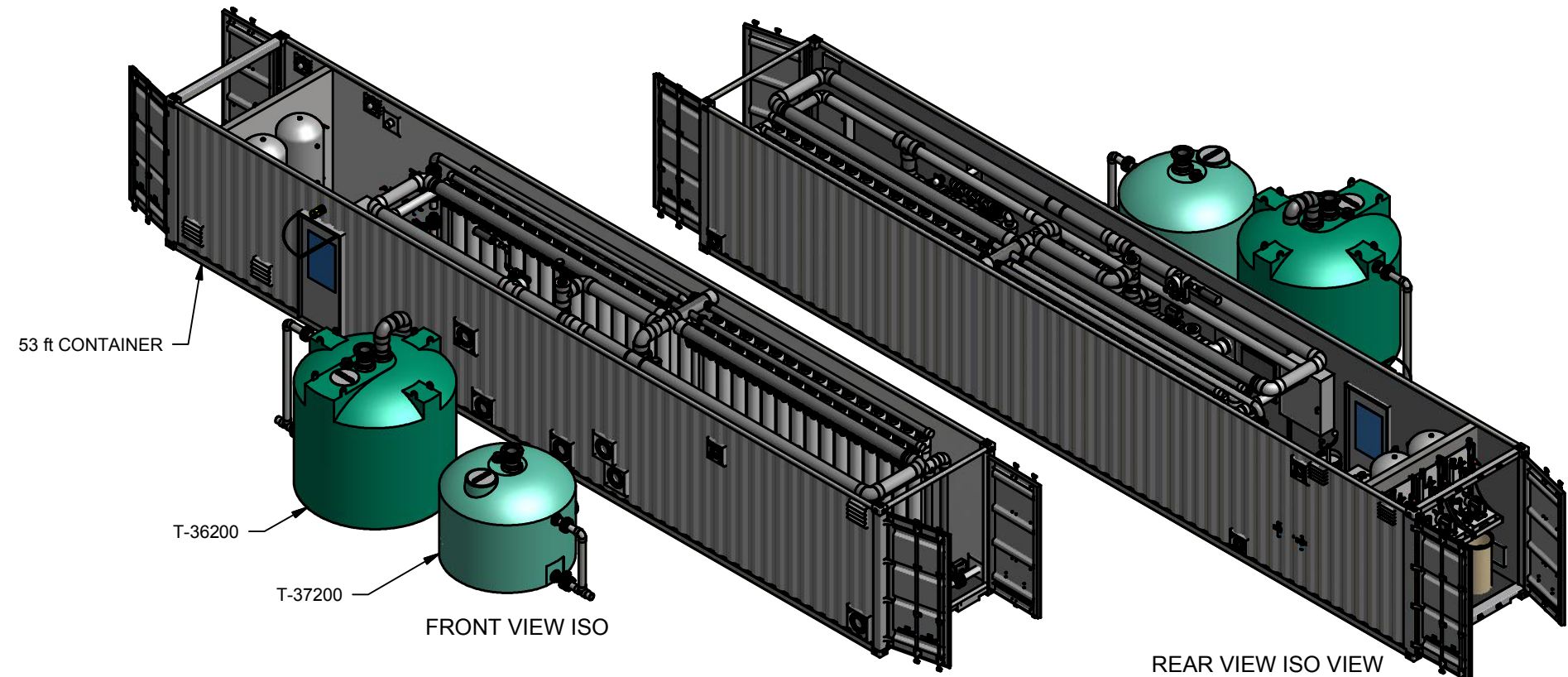
Instantaneous Flux, Maximum	33	gfd
Backwash Interval	20 to 30	minutes
Backwash Duration	2	minutes
Maintenance Wash Interval, Minimum	1	day
CIP Interval, Minimum	30	days

**Filtrate Water Quality**

Filtrate Turbidity All Time	<0.5	NTU
Filtrate Turbidity 95th Percentile within a 24 hr Period	<0.2	NTU



**11-UF Container Arrangement-HH-060914-V001**



**NOTES:**

1. REFERENCE P&ID #P14761-C01-0001.
2. ALL WELDING TO CONFORM TO: AWS D1.1.
3. NO VERTICAL DOWN WELDS ARE ALLOWED UNLESS CERTIFIED PER AWS D1.1.
4. STITCH WELDS NOT ALLOWED UNLESS APPROVED BY H<sub>2</sub>O INNOVATION.
5. WELDER CERTIFICATION FOR ALL WELDERS MUST BE PROVIDED TO H<sub>2</sub>O INNOVATION.
6. BOLTS AND NUTS ARE STAINLESS STEEL TYPE 18-8 SS. WASHERS AND LOCK WASHERS ARE STAINLESS STEEL TYPE 18-8 SS. DIMENSIONS PER ASME B18.2.1. MECHANICAL PROPERTIES PER CONDITION CW OF ASTM F593. THREADS PER ANSI B1.1 CLASS 2A.
7. ALL STAINLESS STEEL TO BE PASSIVATED TO ASTM 380-06. TEST REPORT REQUIRED.
8. SAND BLAST TO SSPC-SSP6 FINISH. ACCEPTABLE FOR POWDER COAT OR PAINTING.
9. APPLY ONE (1) COAT, WITH MINIMUM DRY FILM THICKNESS (DFT) PER COAT OF 4 TO 7 MILS, OF POLYAMIDE EPOXY PRIMER, PITT-GUARD 95-245 SERIES FROM PPF OR APPROVED EQUAL.
10. APPLY TWO (2) COATS, WITH MINIMUM DRY FILM THICKNESS (DFT) PER COAT OF 2 TO 3 MILS, OF ACRYLIC ALIPHATIC URETHANE PAINT. PITTHANE ULTRA 95-812 SERIES FROM PPG OR APPROVED EQUAL. TO ACHIEVE FINAL 8 TO 13 MILS TOTAL DRY FILM THICKNESS.
11. ALL PVC PIPE TO BE SCHEDULE 80, GRAY, U.N.O. PIPE MATERIAL TO CONFORM TO ASTM D-1784. PHYSICAL DIMENSIONS, SCHEDULES, AND TOLERANCES TO CONFORM TO ASTM D-1785.
12. ALL PVC FITTINGS TO BE SCHEDULE 80, GRAY. SOCKET FITTINGS TO CONFORM TO ASTM D-2467.
13. ALL PVC FLANGED CONNECTIONS TO BE VAN STONE STYLE WITH GLASS FILLED PVC RING, CLASS 150, U.N.O. PVC MATERIAL TO CONFORM TO ASTM D-1784. BOLT HOLE PATTERN PER ANSI B16.5; ASTM D-4024.
14. PRIMER TO CONFORM TO ASTM-656. PVC SOLVENT CEMENT TO CONFORM TO ASTM D-2564.
15. ALL GASKETS TO CONFORM TO ASTM F-447.
16. TAP (1/2" NPT ONLY) INTO PVC / CPVC FITTING IS ALLOWED BUT ONLY IN SPECIFIC LOCATION WHERE NO ADEQUATE FITTING IS PROVIDED.
17. FINISHED ASSEMBLY (WITHOUT HFUF MODULES) MUST BE HYDROSTATICALLY TESTED TO 70 psi. TESTING MUST BE WITNESSED BY AN H<sub>2</sub>O INNOVATION REPRESENTATIVE.
18. FITTINGS PROTRUDING THROUGH THE ROOF WILL BE REMOVED FOR SHIPPING TO BE SITE INSTALLED.
19. APPROXIMATE WEIGHT: 82,061 LBS.

TOTAL QUANTITY REQUIRED FOR THE PROJECT:	<b>1</b>
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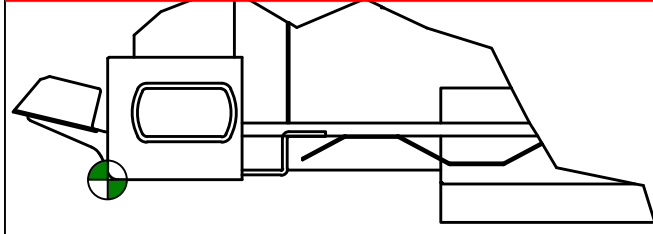
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ANSI Y14.5  
TOLERANCES  
FRACTIONS: 1/64, 1/32, 1/16, 3/32, 1/8, 3/16, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1  
DECIMALS: 0.005, 0.010, 0.015, 0.020, 0.030, 0.040, 0.050, 0.060, 0.070, 0.080, 0.090, 0.100, 0.125, 0.150, 0.175, 0.200, 0.250, 0.300, 0.375, 0.450, 0.500, 0.625, 0.750, 0.875, 1.000  
ANGLES: 15°, 30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°, 150°, 165°, 180°  
HOLE SIZES: 1/16", 3/32", 1/8", 3/16", 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1"  
HOLE CENTERS: 1/16", 3/32", 1/8", 3/16", 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1"  
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WEST BASIN MUNICIPAL WATER DISTRICT, CA.  
CONTAINERIZED WATER TREATMENT SYSTEM

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SCALE: N/A	DRAWING NUMBER: P14761-B01-0001	REVISION <b>01</b>

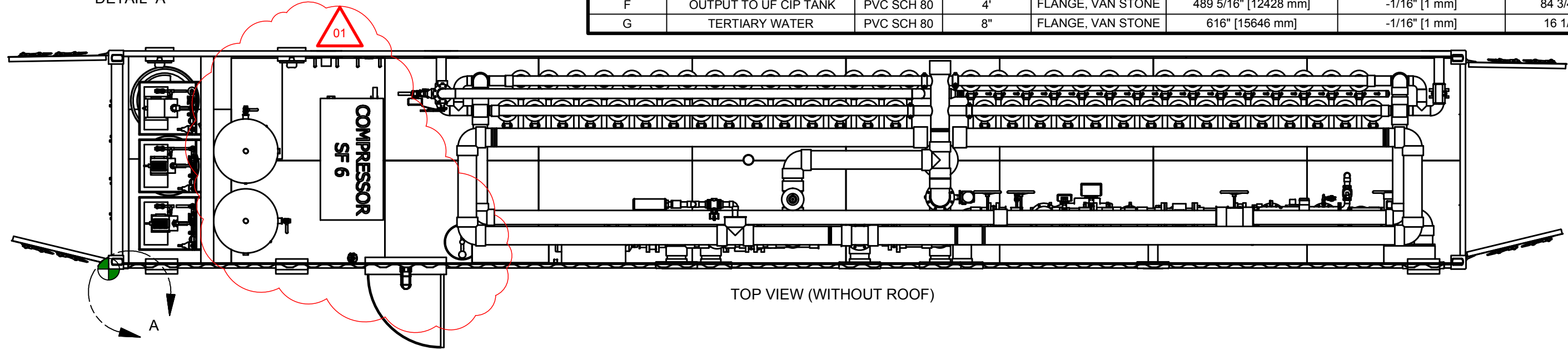


11-UF Container Arrangement-HH-060914-V001

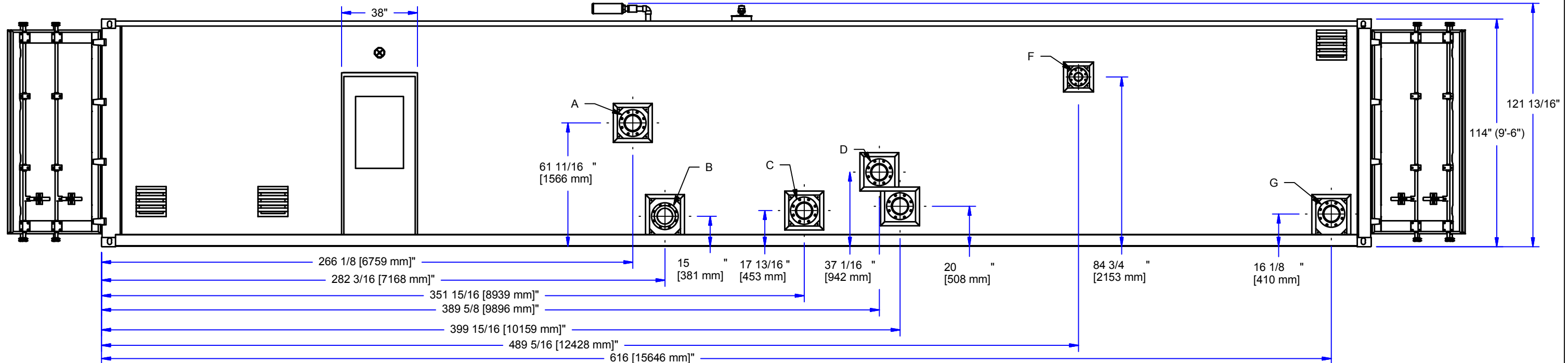


DETAIL A

NOZZLE#	DESCRIPTION	MATERIAL	DIAMETER	CONNECTION	NOZZLE LOCATION X	NOZZLE LOCATION Y	NOZZLE LOCATION Z
A	UF FILTRATE TO FINISHING WATER STORAGE TANK	PVC SCH 80	8"	FLANGE, VAN STONE	266 1/8" [6759 mm]	-1/16" [1 mm]	61 11/16" [1566 mm]
B	UF BACKPULSE TANK INPUT	PVC SCH 80	8"	FLANGE, VAN STONE	282 3/16" [73168 mm]	-1/16" [1 mm]	15" [381 mm]
C	BACKWASH WASTE TO DRAIN	PVC SCH 80	8"	FLANGE, VAN STONE	351 15/16" [8938 mm]	-1/16" [1 mm]	17 13/16" [453 mm]
D	UF CIP RECIRCULATION TO UF CIP TANK	PVC SCH 80	8"	FLANGE, VAN STONE	389 5/8" [9896 mm]	-1/16" [1 mm]	37 1/16" [942 mm]
E	INPUT UF CIP TANK TO UF CIP PUMP	PVC SCH 80	8"	FLANGE, VAN STONE	399 15/16" [10159 mm]	-1/16" [1 mm]	20" [508 mm]
F	OUTPUT TO UF CIP TANK	PVC SCH 80	4"	FLANGE, VAN STONE	489 5/16" [12428 mm]	-1/16" [1 mm]	84 3/4" [2153 mm]
G	TERTIARY WATER	PVC SCH 80	8"	FLANGE, VAN STONE	616" [15646 mm]	-1/16" [1 mm]	16 1/8" [410 mm]



TOP VIEW (WITHOUT ROOF)



FRONT VIEW

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00	2014-02-03	PRELIMINARY	Y.D.	B.K.	R.G.	R.G.



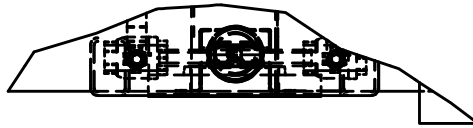
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FRACTIONS: ±.004  
DECIMALS: ±.0030  
DIMENSIONS: ±.0015  
ANGLES: ±.005°  
HOLE SIZES: 1/16"  
HOLE CENTERS: 1/16"  
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CONTAINERIZED WATER TREATMENT SYSTEM

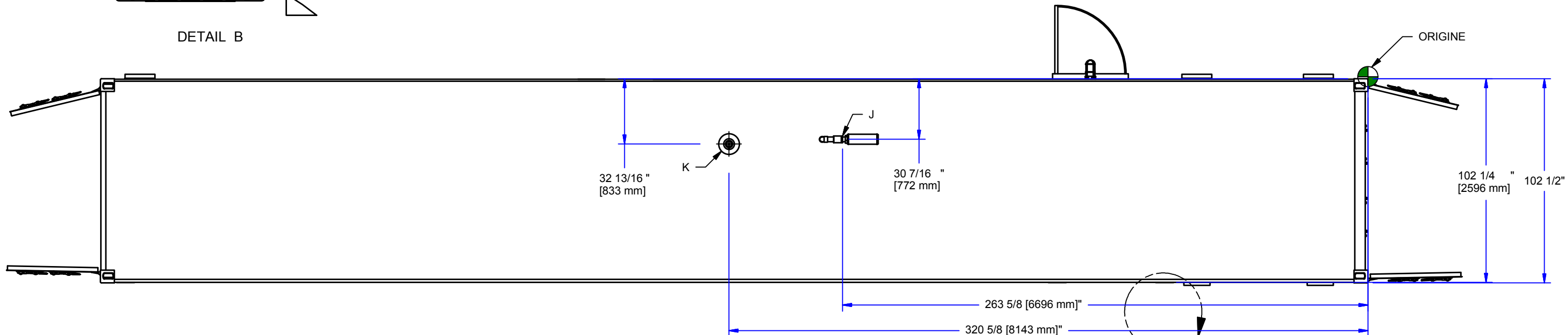
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SHEET: 2 OF 5		

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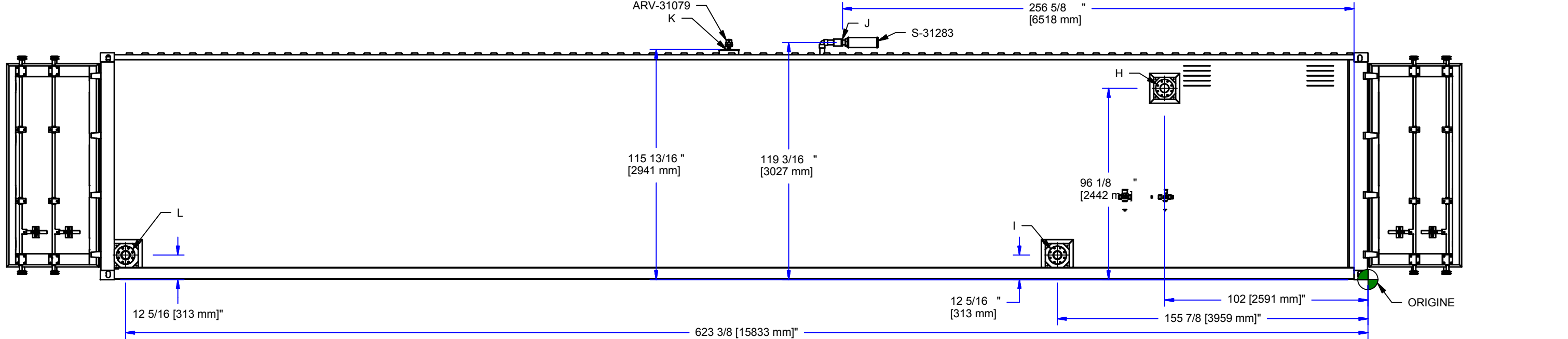
NOZZLE#	DESCRIPTION	MATERIAL	DIAMETER	CONNECTION	NOZZLE LOCATION X	NOZZLE LOCATION Y	NOZZLE LOCATION Z
H	AIR BLOWER INPUT	SS316 SCH10	4"	FLANGE LAP JOINT CLASS 150	102" [2591 mm]	102 1/4" [2596 mm]	96 1/8" [2442 mm]
I	UF MODULE DRAIN	PVC SCH80	4"	FLANGE, VAN STONE CLASS 150	155 7/8" [3959 mm]	102 1/4" [2596 mm]	12 5/16" [313 mm]
J	MUFFLER	PVC SCH80	2"	BUSHING, REDUCING, SOCKET X FNPT, 2 1/2" X 2"	256 5/8" [6518 mm]	30 7/16" [772 mm]	119 3/16" [3027 mm]
K	AIR RELIEVE VALVE	PVC SCH80	8"	REDUCER BUSHING, 2" x 1"	320 5/8" [8143 mm]	32 13/16" [833 mm]	115 13/16" [2941 mm]
L	UF MODULE DRAIN	PVC SCH80	4"	FLANGE, VAN STONE CLASS 150	623 3/8" [15833 mm]	102 1/4" [2596 mm]	12 5/16" [313 mm]



DETAIL B



TOP VIEW (WITH ROOF)



REAR VIEW

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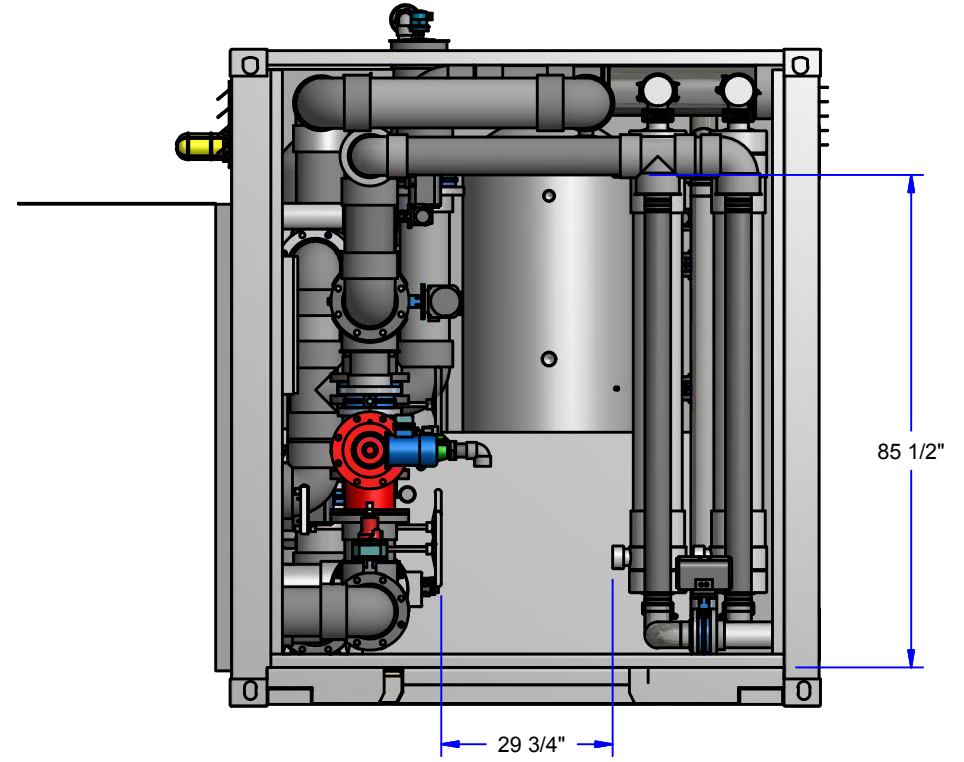
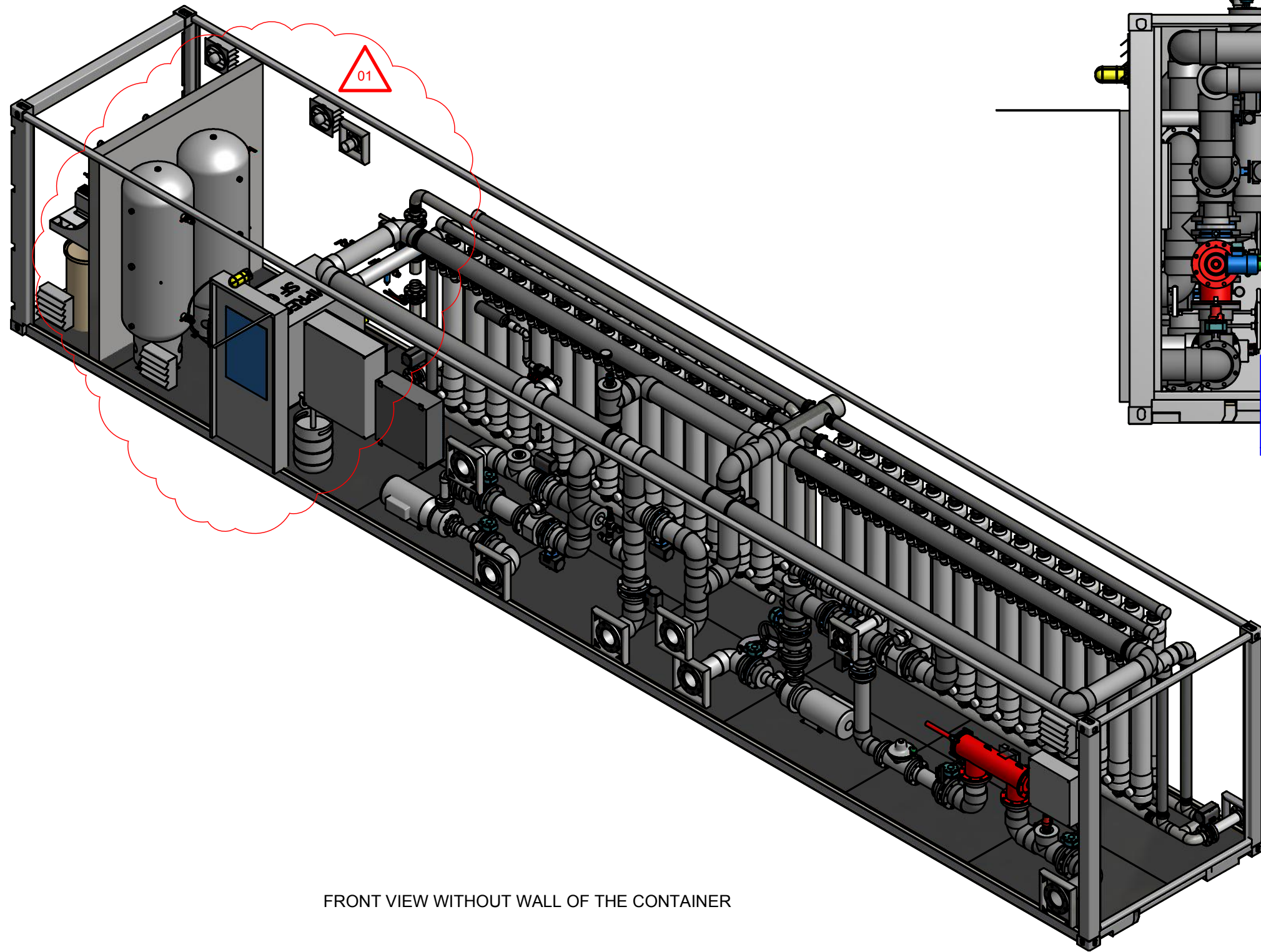


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ANSI Y14.5  
TOLERANCES:  
FRACTIONS: ±0.005  
DECIMALS: ±0.015  
ANGLES: ±0.5°  
HOLE SIZES: ±0.001  
HOLE CENTERS: ±0.005  
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WEST BASIN MUNICIPAL WATER DISTRICT, CA.  
CONTAINERIZED WATER TREATMENT SYSTEM

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RIGHT VIEW

FRONT VIEW WITHOUT WALL OF THE CONTAINER

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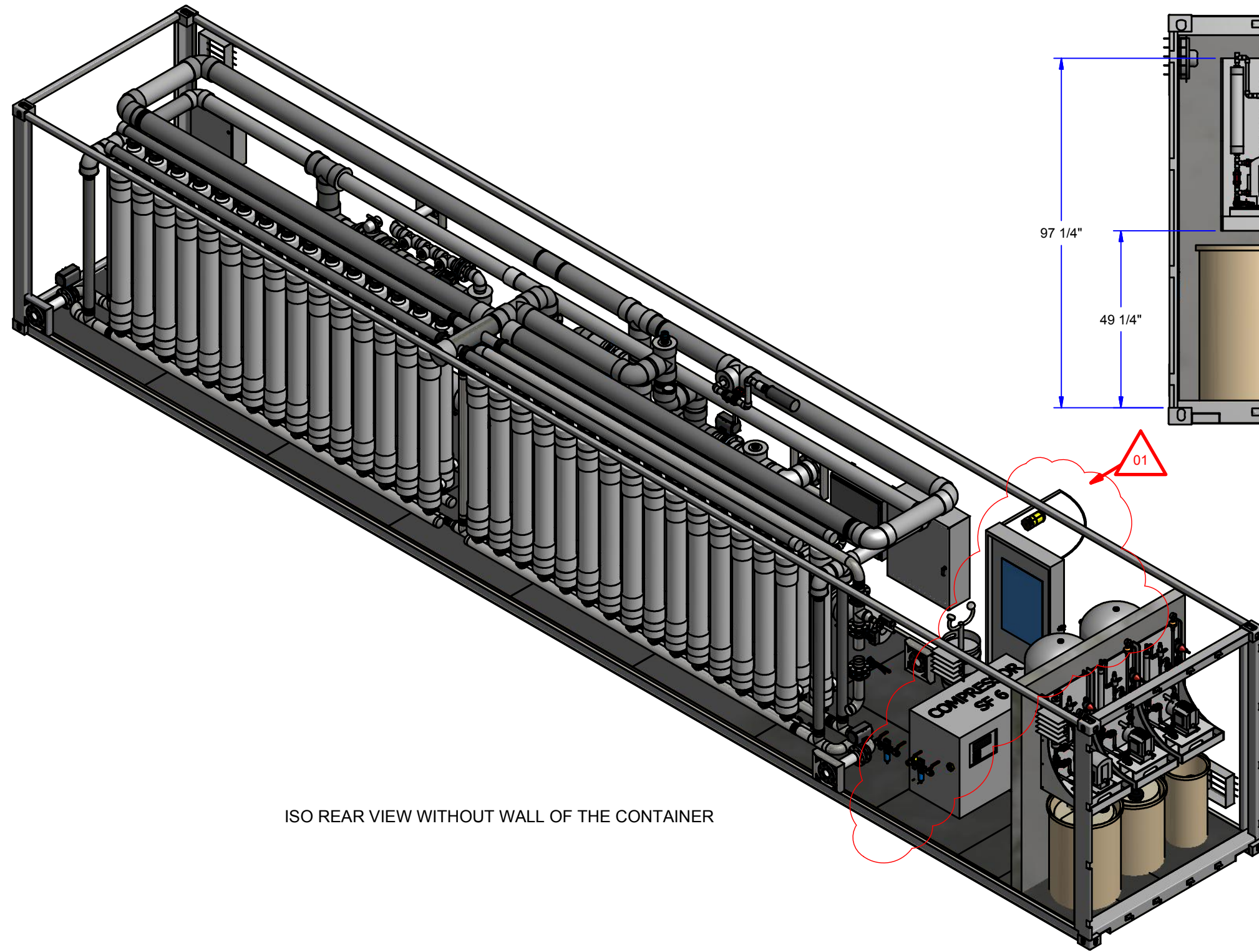
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ANSI Y14.5  
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FRACTIONS: ±1/64  
DECIMALS: ±0.030  
0.0XX: ±0.015  
ANGLES: ±0.5°  
HOLE SIZES: 1/16"  
HOLE CENTERS: 1/32"  
**DO NOT SCALE PRINTS**

WEST BASIN MUNICIPAL WATER DISTRICT, CA.  
CONTAINERIZED WATER TREATMENT SYSTEM

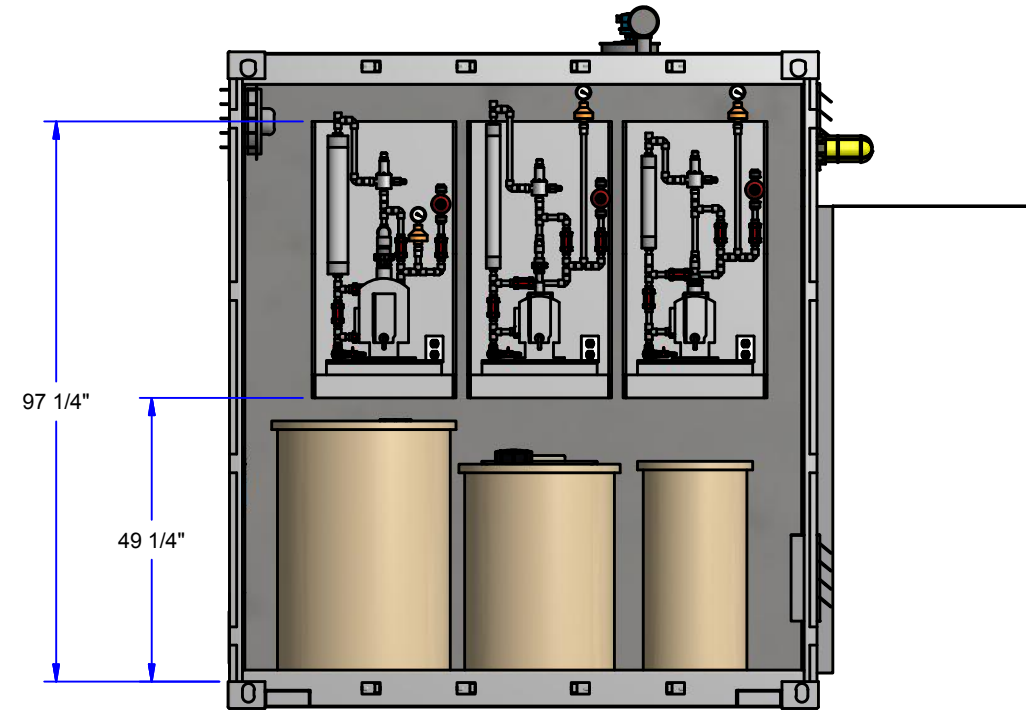
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		SHEET: 4 OF 5



11-UF Container Arrangement-HH-060914-V001



ISO REAR VIEW WITHOUT WALL OF THE CONTAINER



LEFT VIEW



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DRAWING REVISION		REV	DATE	REVISION DESCRIPTION	DRAWN	CHKD	ENG	APPVD
01	2014-02-21			REVISED PER COMMENTS	Y.D.	B.K.	R.G.	R.G.
00	2014-02-03			PRELIMINARY	Y.D.	B.K.	R.G.	R.G.



UNLESS NOTED OTHERWISE  
INTERPRETATION: ANSI Y14.5  
TOLERANCES: FRACTIONS: ±0.005  
DECIMALS: ±0.015  
0.XX: ±0.015  
ANGLES: ±0.5°  
HOLE SIZES: 1/16" ±0.005  
HOLE CENTERS: 1/16" ±0.005  
**DO NOT SCALE PRINTS**

WEST BASIN MUNICIPAL WATER DISTRICT, CA.  
CONTAINERIZED WATER TREATMENT SYSTEM

TITLE: LAYOUT GENERAL ARRANGEMENT DRAWING		
SCALE:	DRAWING NUMBER: P14761-B01-0001	REVISION 01
SHEET: 5 OF 5		

# 11-RO System Design Criteria-HH-06-09-14-V001

Client: **CSD**  
Project: **Emergency Water Supply System**  
Detail: **RO System Design Criteria**

Job No.:  
Checked By:  
Date Checked:

Computed By: **Hoon Hyung**  
Date: **6/9/2014**  
Page No.: **1 of 3**

## RO System

Total RO Feed Flow	762,261	gpd	529	gpm
RO Recovery, Minimum	92%			
Total RO Permeate Flow	701,280	gpd	487	gpm

## Primary RO Train 1

### Primary RO 1 Feed Pump

Flow	265	gpm
Head	160	psi
Motor HP	50	hp

Pump Type Horizontal Centrifugal

Pump Material 316 SS  
VFD Yes

### Primary RO 1 Booster Pump

Flow	130	gpm
Head	50	psi
Motor HP	7.5	hp

Pump Type Horizontal Centrifugal

Pump Material 316 SS  
VFD Yes

### Cartridge Filter

Cartridge filter Influent Flow	265	gpm
Number of Cartridge Filter Vessel	1	
Cartridge Filter Pore Size	5	µm

## RO Membranes

Material Composite Polyamide  
Configuration Spiral Wound  
Manufacturer Hydranautics  
Model ESPA4 MAX

## Configuration

Number of Stages	2
Stage 1	
Number of Vessels	5
Elements per Vessel	6
Stage 2	
Number of Vessels	3
Elements per Vessel	6
Total Number of Elements	48

## Operating Condition

Stage 1 Flux (average)	15.2	gfd
Stage 2 Flux (average)	13.6	gfd
Stage 1 Flux (lead element)	18.1	gfd
Stage 2 Flux (lead element)	17.4	gfd

# 11-RO System Design Criteria-HH-06-09-14-V001

Client: **CCSD**  
Project: **Emergency Water Supply System**  
Detail: **RO System Design Criteria**

Job No.:  
Checked By:  
Date Checked:

Computed By: **Hoon Hyung**  
Date: **6/9/2014**  
Page No.: **2 of 3**

## Primary RO Train 2

### Primary RO 2 Feed Pump

Flow	265	gpm
Head	160	psi
Motor HP	50	hp

Pump Type Horizontal Centrifugal

Pump Material 316 SS  
VFD Yes

### Primary RO 2 Booster Pump

Flow	130	gpm
Head	50	psi
Motor HP	7.5	hp

Pump Type Horizontal Centrifugal

Pump Material 316 SS  
VFD Yes

### Cartridge Filter

Cartridge filter Influent Flow	265	gpm
Number of Cartridge Filter Vessel	1	
Cartridge Filter Pore Size	5	um

### RO Membranes

Material	Composite Polyamide
Configuration	Spiral Wound
Manufacturer	Hydranautics
Model	ESPA4 MAX

### Configuration

Number of Stages	2
Stage 1	
Number of Vessels	5
Elements per Vessel	6
Stage 2	
Number of Vessels	3
Elements per Vessel	6
Total Number of Elements	48

### Operating Condition

Stage 1 Flux (average)	15.2	gfd
Stage 2 Flux (average)	13.6	gfd
Stage 1 Flux (lead element)	18.1	gfd
Stage 2 Flux (lead element)	17.4	gfd

# 11-RO System Design Criteria-HH-06-09-14-V001

Client: **CCSD**  
Project: **Emergency Water Supply System**  
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Job No.:  
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Date: **6/9/2014**  
Page No.: **3 of 3**

## Third Stage RO

### Third Stage RO Booster Pump

Flow	110	gpm
Head	120	psi
Motor HP	15	hp

Pump Type Horizontal Centrifugal

Pump Material 316 SS

VFD Yes

### RO Membranes

Material Composite Polyamide

Configuration Spiral Wound

Manufacturer Hydranautics

Model ESPA4 MAX

### Configuration

Number of Stages 1

Stage 1

Number of Vessels 3

Elements per Vessel 6

Total Number of Elements 18

### Operating Condition

Flux (average) 10.6 gfd

Flux (lead element) 23.0 gfd