AFS technology
Alternative fuel systems engineered for cement kilns

4060 Gibson Drive
Tipp City, Ohio 45371
USA

Phone: 937 669 3548
Fax: 858 300 5404
www.afstechnology.com

TIRE TIPPER
SYSTEM MANUAL

OKLAHOMA TIRE RECYCLERS

Bristow, Oklohama
By AFS Technology
Project 1619

18 MAY 2017

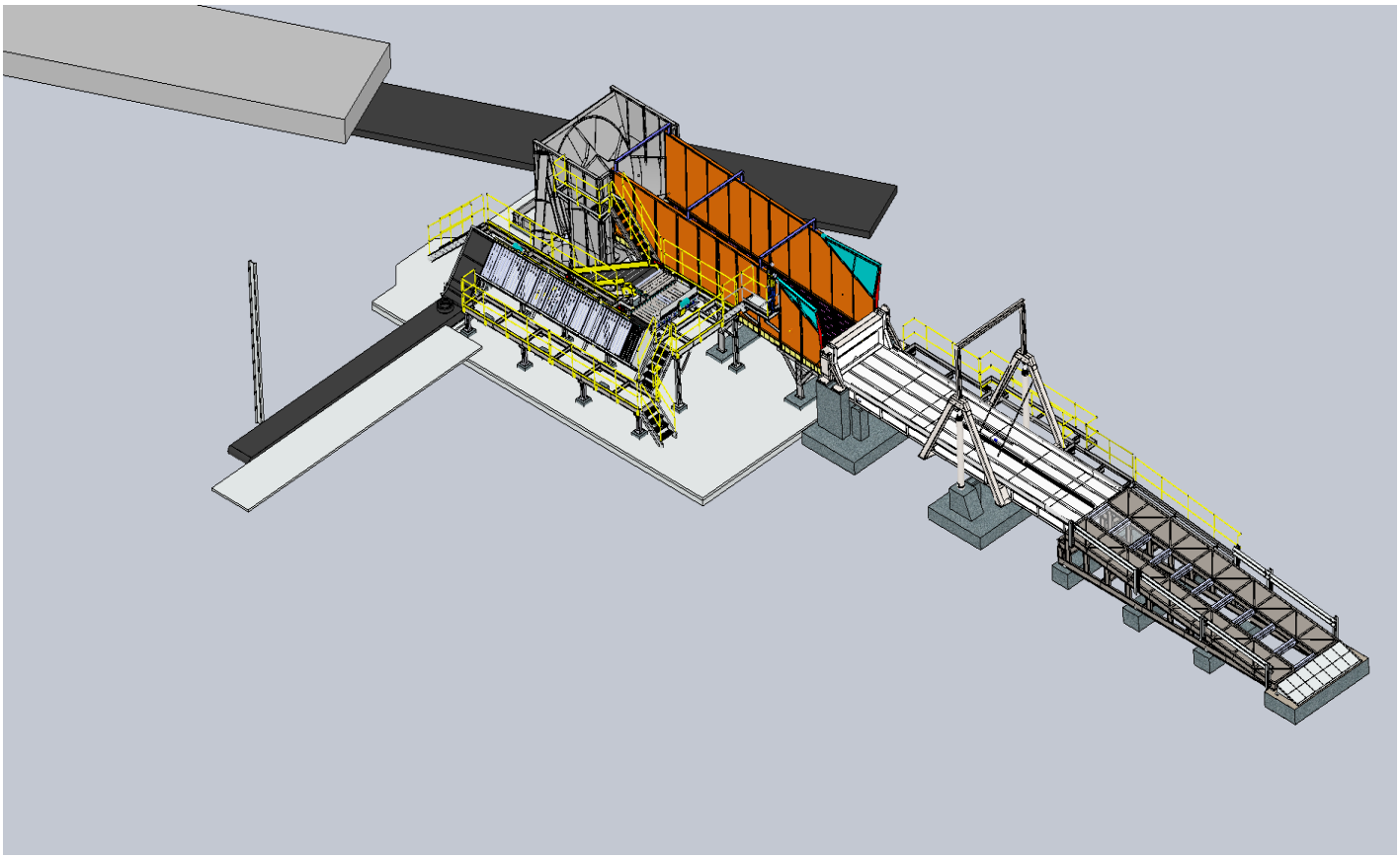


Table of Contents

RECOMMENDED SPARE PARTS

			CLASS I -SHOULD BE STOCKED AT ALL TIMES		
			CLASS II -MAY REQUIRE REPLACEMENTS WITHIN 2 YEARS		
CLASS	**Total QTY**	**Recom. Spares**	**PART NO. / DESCRIPTION**		**EQUIPMENT USED ON**
			MECHANICAL:		
I	4	2	Gates Polychain Belt #8mgt-896-21		BDLR CONVEYOR
I	7	2	Gates Polychain Belt #8mgt-4400-21		BDLR CONVEYOR
I	1	1	Gates Polychain Belt #8mgt-2600-21		BDLR CONVEYOR
I	1	1	Gates Polychain Belt #8mgt-3280-21		BDLR CONVEYOR
I	202	10	F2B-SC-100 Dodge - 2-Bolt Normal Duty Flange Bearing - 1.00" I.D		BDLR CONVEYOR
I	113	5	MARTIN-PB8MX32S21 SINTERED STEEL 32 TOOTH SPROCKET		BDLR CONVEYOR
I	33	3	FI-325-125 JAYDEE IDLER PULLEY 3.25 OD X 1.25 WIDE		BDLR CONVEYOR
I	12	2	C5-RET-54 Conveyor ldler Roller - 54' wide		DISCHARGE BELT CONVEYOR
I	18	2	32-000219 Roller Bracket BRACKET, RISE, 3", SLOTTED		DISCHARGE BELT CONVEYOR
I	6	2	32-000018 Roller Bracket BRACKET, DROP, 1.5, SLOTTED		DISCHARGE BELT CONVEYOR
II	1	1	CHAIN SPROCKET 60 M/G 60BS54 2		DISCHARGE BELT CONVEYOR
II	1	1	CHAIN SPROCKET 60 M/G 60BS13 1		DISCHARGE BELT CONVEYOR
I	1	1	CHAIN 60 US TSUBAKI Chain 60 RIV, 66 Pitches w/C/L		DISCHARGE BELT CONVEYOR
I	1	1	UST 200 C/L US TSUBAKI Connecting Master Link for Chain RIV x 68PTS		DISCHARGE BELT CONVEYOR
I	4	1	P2B-SCM-200-FF Dodge - Pillow Block 2 inch Bearing Medium Duty		DISCHARGE BELT CONVEYOR
II	1	1	DCEMA-1457CFXT3014s conveyor pulley DRUM,14"-DIA,57"-FACE,XT30,CF,1/4 S		DISCHARGE BELT CONVEYOR
II	1	1	DCEMA-1257CFXT3014s conveyor pulley DRUM,12"-DIA,57"-FACE,XT30,CF,1/4 S		DISCHARGE BELT CONVEYOR
I	1	1	Drive Sprocket 21 tooth C type qd style hub for 3 5/8” bore hardened teeth #200 M21-358H		SEPARATOR
I	1	1	Driven Sprocket 54 tooth C type qd style hub for 4 15/16” bore #200 M54-415		SEPARATOR
I	1	1	Roller chain 2 ½” pitch #RC200-1		SEPARATOR
I	2	1	Dodge tapered roller 4 bolt pillow block bearings 4 15/16” shaft #E-415-P4		SEPARATOR
II	4	1	Hamilton castor 8” Dia. X 4” rigid v-groove type #R-MD-84FVH		SEPARATOR
II	1	1	54" Wide, 40' Long 2/220 Mor V-Cleat 1/8 X 1/16. Ends laced with Steel R-5		

			ELECTRICAL:		
I	3	1	S47DRN90S4 SEW EURODRIVE GEARMOTOR 1.5 HP		BDLR CONVEYOR
I	1	1	S47DRN80M4/DH SEW EURODRIVE 1 HP		BDLR CONVEYOR
I	1	1	SA77/TDRN90L4/DH SEW 2 HP GEARBOX MOTOR		DISCHARGE BELT CONVEYOR
I	1	1	SEW Eurodrive in line helical gear motor 10 hp 188.45:1 ratio 3 5/8" output shaft 460V/3ph/60Hz #R137DV132M4		SEPARATOR
I	2	1	Telemecanique Safety Limit Switch #XCS A503		SEPARATOR
I	2	1	Telemecanique Safety Latch (key) #XCS Z05		SEPARATOR
I	7	2	SMA30PELQD Banner Engineering SM30 Series: Emitter - Frequency A PBT Polyester, Range: 200 m; Input: 10-30V dc / 12 to 240Vac, Output: Not applicable - No outputs, Quick-Disconnect Connector		BDLR CONVEYOR AND HOPPER
I	7	2	SM2A30PRLNCQD Banner Engineering SM30 Series: Receiver - Frequency A PBT Polyester, Range: 200 m; Input: 12 to 240V ac, Output: SPST Solid-state - Dark Operate, Quick-Disconnect Connector		BDLR CONVEYOR AND HOPPER
I	14	2	SM30CC-312 Banner Engineering Mini-style Quick Disconnect Cable; 3 Pin Female Pin-out Straight Connector; 4 m (12 ft) in Length; Nylon coupling nut		BDLR CONVEYOR AND HOPPER
I	2	1	NI15-S30-RZ3X7M Turck Sensor; nonembeddable; 15mm Range; 30 mm Plastic Barrel; Partial Threaded; normally closed (N.C.) 2-wire AC or 2-wire AC/DC, 20-250 VAC, 10-300 VDC, 1 LED, 7m cable; (T4355797)		SEPARATOR
			HYDRAULICS:		
I	2	2	Insert Grainger 29HZ19		HOPPER
I	2	2	Coupling Insert Grainger 29HZ13		HOPPER
I	2	2	Breather Vickers BR110		HOPPER

SYSTEM OPERATION DESCRIPTION

DESIGN BASIS

The automated feed system will be designed to accept whole car and truck tires of maximum size 1220 mm diameter x 450 mm wide.

The maximum designed feed rate of the system will be 900 tires per hour (15 per minute). 900 x 23 lbs./tire = 20,700 lbs. = 10.35 tons/hour

The tire feed system will be located adjacent to the existing tire loading belt on the west side of the plant building and north of the truck scale.

The system will be designed for continuous 24 hour operation in a harsh duty environment.

SYSTEM OPERATION

A customer supplied Trailer Tipper will dump tires directly from trailers into the AFS Live Bottom Hopper. The Live Bottom Hopper will be 40' long x 9'-7.5" wide (inside dimension) and have a capacity of approximately 1100 car passenger tires. The hopper will also allow for side loading with a front-end loader. A sensor near the discharge of the Trailer Tipper will detect when each trailer is empty and signal the operator that reloading a new trailer is possible.

From the Live Bottom Hopper tires are discharged into an AFS Rotary Disk Separator. The Rotary Disk Separator will coarse separate the tires and feed them onto a 48" wide Separator Discharge Belt Conveyor.

The Separator Discharge Belt conveyor conveys tires up an incline to the Separation Refinement and Accumulation Platform. Debris falls off the end of the conveyor and into an easily accessible debris containment area under this platform.

From the Separator Discharge Belt Conveyor tires take a right turn on to a BDLR Transfer Conveyor where they are conveyed approximately 8 feet and onto the Angled BDLR Accumulation Feeder. The right turn on to the BDLR Transfer Conveyor provide separation refinement. The second right turn on to the Angled BDLR Accumulation Feeder further refines the separation.

The Angled BDLR Accumulation Feeder is 30 feet long which provide accumulation for

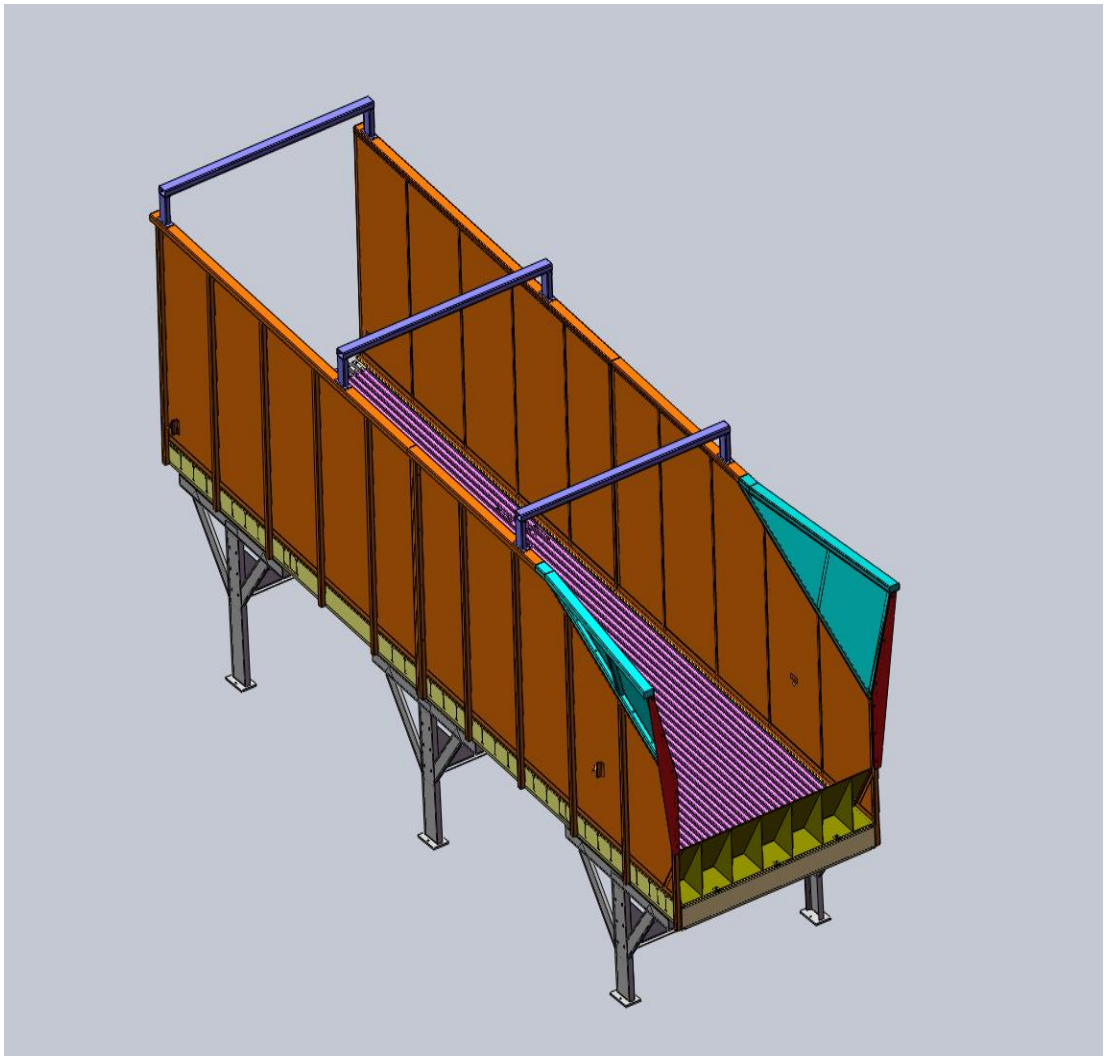
approximately 10 to 15 tires. The unit is equipped with 3 independent power- driven sections and photo electric sensors to detect the level of tire accumulation in each section. The level of tire accumulation is used to control the speed of the Rotary Disk Separator. Low levels increase the separator speed and high levels decrease the separator speed.

The final discharge section of the Angled BDLR Accumulation Feeder includes a variable speed drive which regulates the speed to match the speed of the existing manual tire loading belt. This zone also includes heavy duty traction rollers to grip the tires and prevent them from slipping when there is back pressure from accumulated tires.

The Separator Discharge Belt, BDLR Transfer Conveyor and the Angled BDLR Accumulation Feeder will be setup in the AFS shop for thorough testing and approval by the customer prior to shipping to the jobsite.

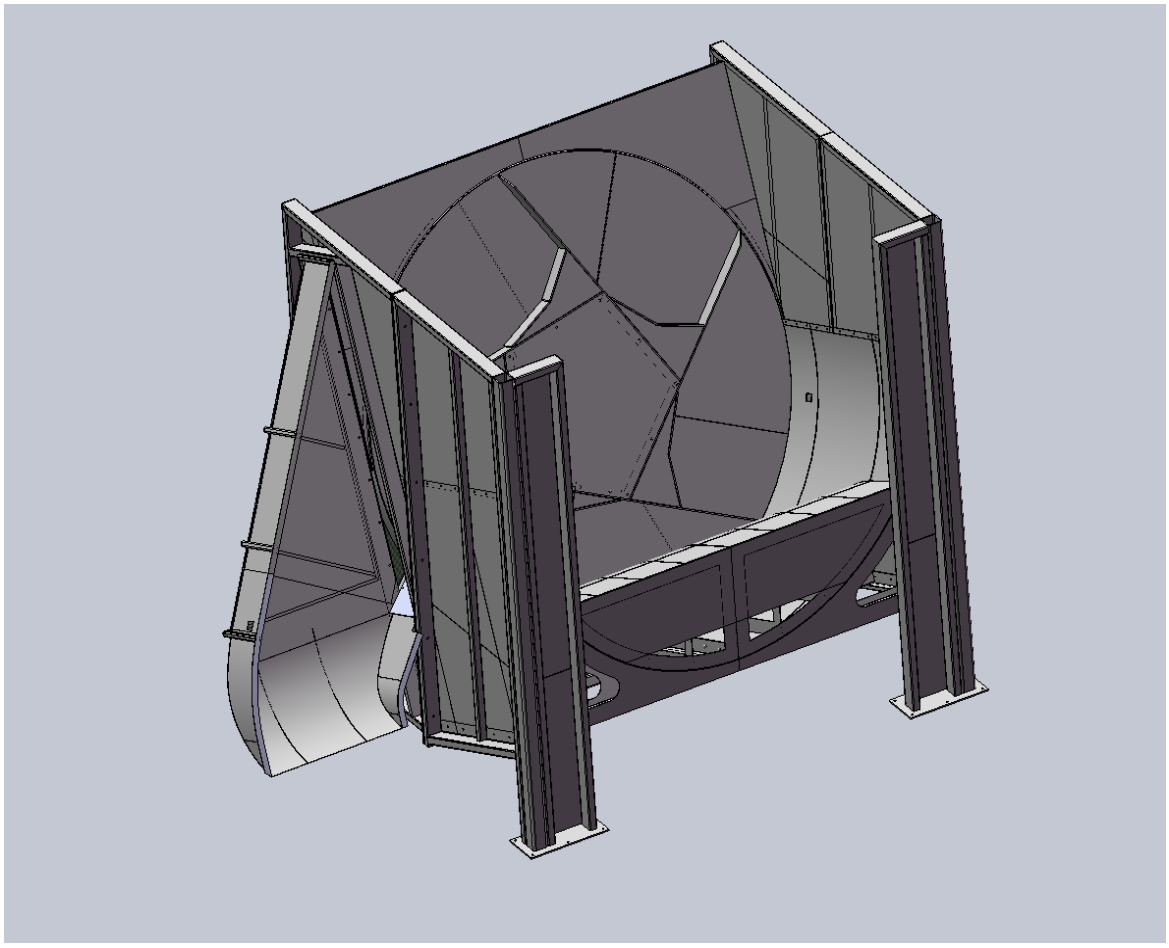
LIVE BOTTOM HOPPER

The Live Bottom Hopper is comprised of interior dimensions of 8'- 8" high x 9'- 6 3/4" wide x 40' long. The unit incorporates one independent 40' long live floor powered by a 20 HP Hallco 3200 series hydraulic system. The hydraulic pumping unit is a combined 400 gallon hydraulic unit with oil heater and temperature switch. The live floor is supported by a structural steel tubular frame. The expected duty cycle of the hydraulic power unit is less than 10% of the system running time.



TIRE SEPARATOR

The Rotating Disk Separator has a 14’ diameter flat face disk, with five radial flights equally spaced on the front face surface of the disk. It has a receiving hopper and curved ramp leading up to the discharge of the live-bottom hopper. It is powered by a variable speed 10 HP, SEW Euorodrive Gearmotor drive arrangement. The maximum feed rate is 15 tires per minute. The speed of the separator is dependent on the number tires accumulated in the accumulation-refinement conveyor directly following the discharge of the separator.



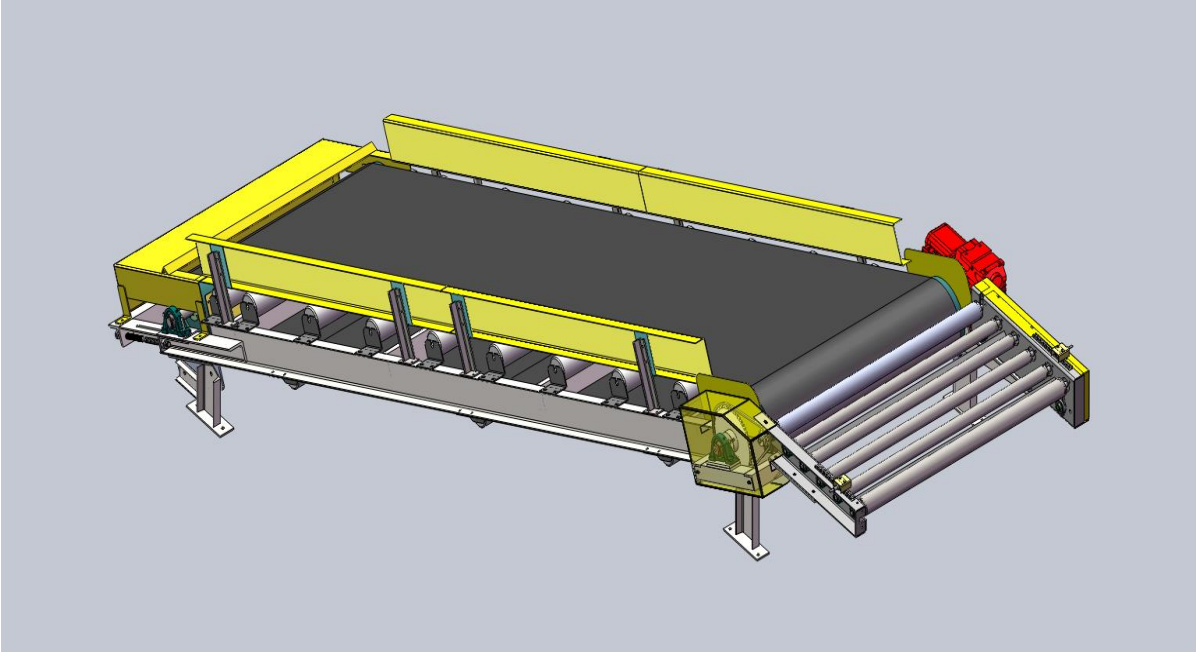
DISCHARGE BELT CONVEYOR

This Conveyor is a 54" Wide x 40'-6" Long c/c Belt Conveyor engineered to convey a maximum 10 TPH of Whole Tires, having a average weight of 20 lbf each, up an incline. The conveyor will also transfer loose debris associated with waste tires from the separator, and deposit them at the in feed of the refinement conveyor system. It is important to maintain access under the head pulley for the removal of this waste.

One 14" Dia. x 57" crowned face drive head pulley with 1/4" plain lagging, QD hubs mounted on 2" Dia. SAE 1045 steel shaft, TG&P set in 2" ball bearing pillow blocks. Mounted and aligned in a structural steel weldment, OSHA nip guard included and mounted at head pulley.

On tail section, one 12" dia. x 57" crowned face drum tail pulley with QD hubs mounted on 2" dia. SAE 1045 steel shaft, TG&P set in 2" dia. ball bearing pillow blocks, and OSHA pulley guard, mounted and aligned in a structural steel weldment.

This belt conveyor is powered by a 1.5 KW SEW Eurodrive gear motor.

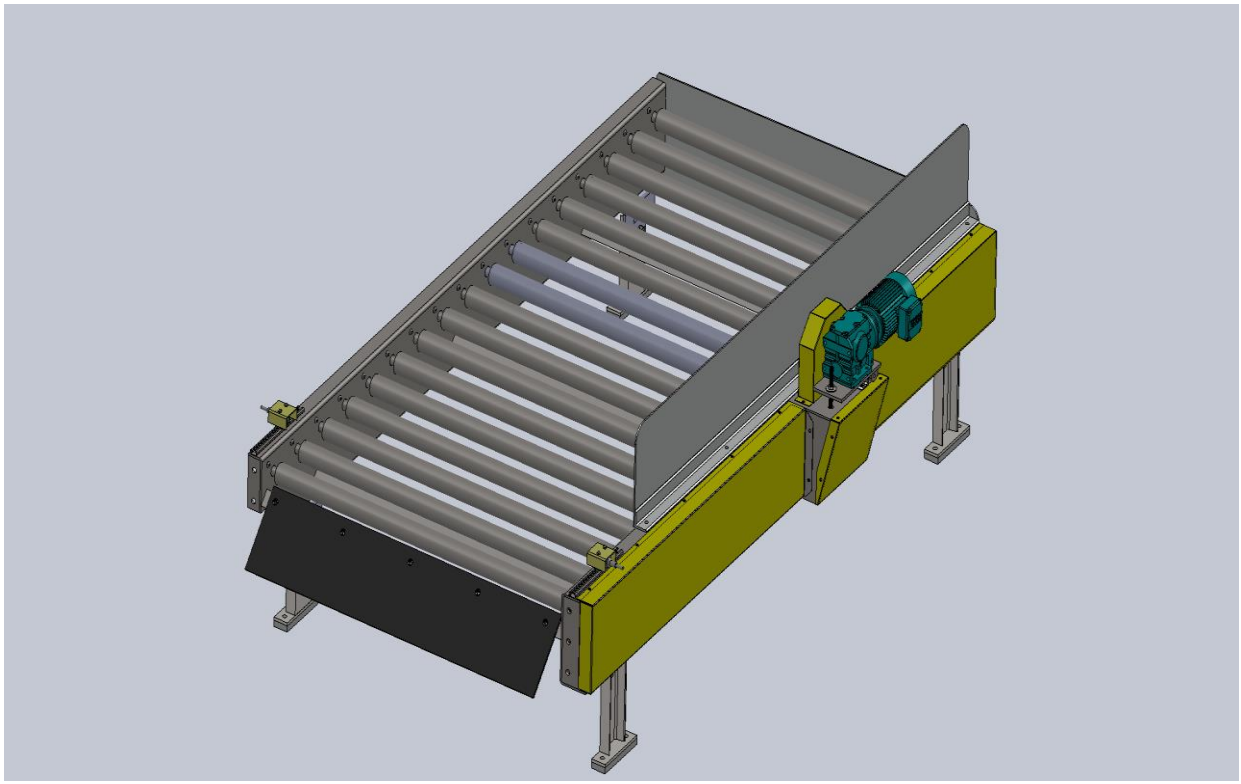


BDLR CONVEYOR

This will consist of Belt Driven Live Rollers (BDLR) conveyors. Each will have an effective width of 50” with 2.5” diameter rollers made of 3 mm thick steel with a solid shaft and externally mounted 2-bolt flange bearings mounted on 6” centers.

The rollers for each conveyor will be externally driven by a serpentine belt drive using a Gates or Goodyear belt and pulley system.

The conveyor will be driven by a 1 HP SEW-Eurodrive electric gear motor.



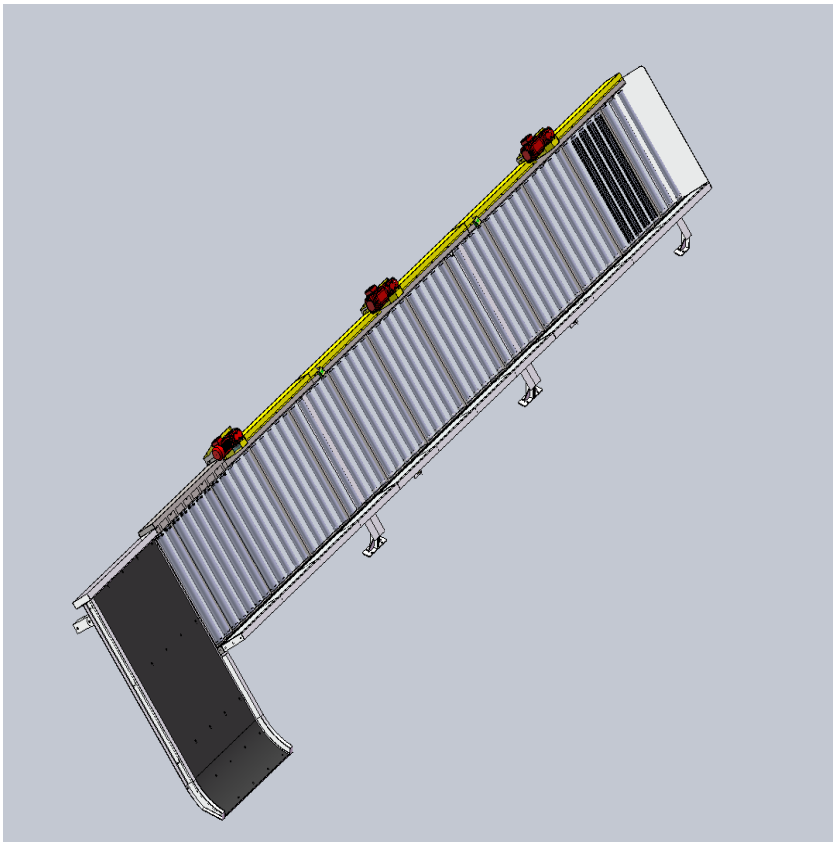
ANGLED TIRE ACCUMULATION FEEDER

The Angled Tire Accumulation Feeder utilizes power and gravity to provide a reliable and continuous flow of single-file-row tires onto the existing tire loading belt conveyor. The conveyor arranges the tires along one side of the conveyor using gravity and accumulates the tires to the discharge end using three powered zones with 1 HP SEW motors. The final discharge zone includes 10 super grip traction rollers and a variable speed drive to synchronize the accumulator discharge speed to the speed of the manual loading belt conveyor.

The conveyor will consist of Belt Driven Live Rollers with an effective width of 50”. The rollers will be 2.5” diameter with a solid shaft and externally mounted 2-bolt flange bearings mounted on 6” centers. All rollers will include thrust bearings on the low side which are mounted inside the roller to avoid contamination from water, dust and debris.

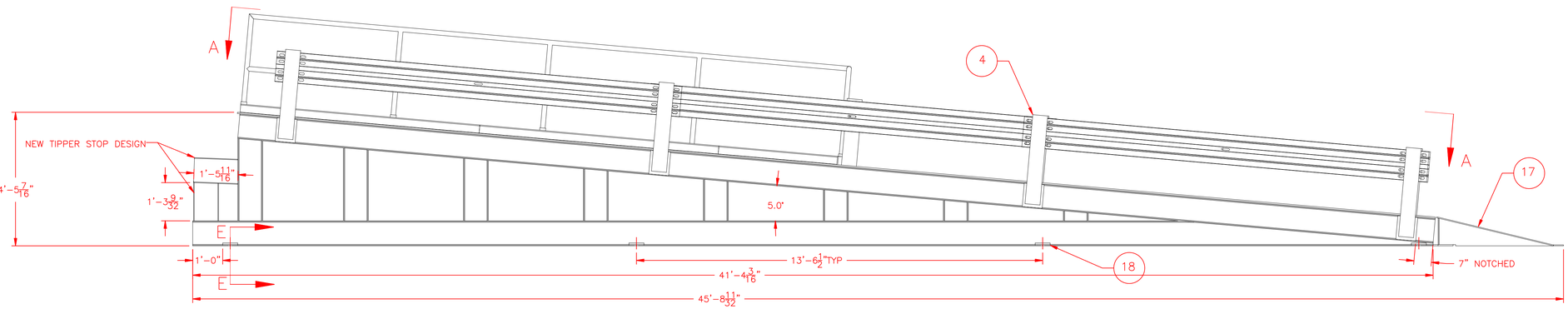
The rollers for each conveyor will be externally driven by a serpentine belt drive using a Gates or Goodyear belt and pulley system.

Each of the three zones will be driven by a 2 HP SEW-Eurodrive electric gear motor.



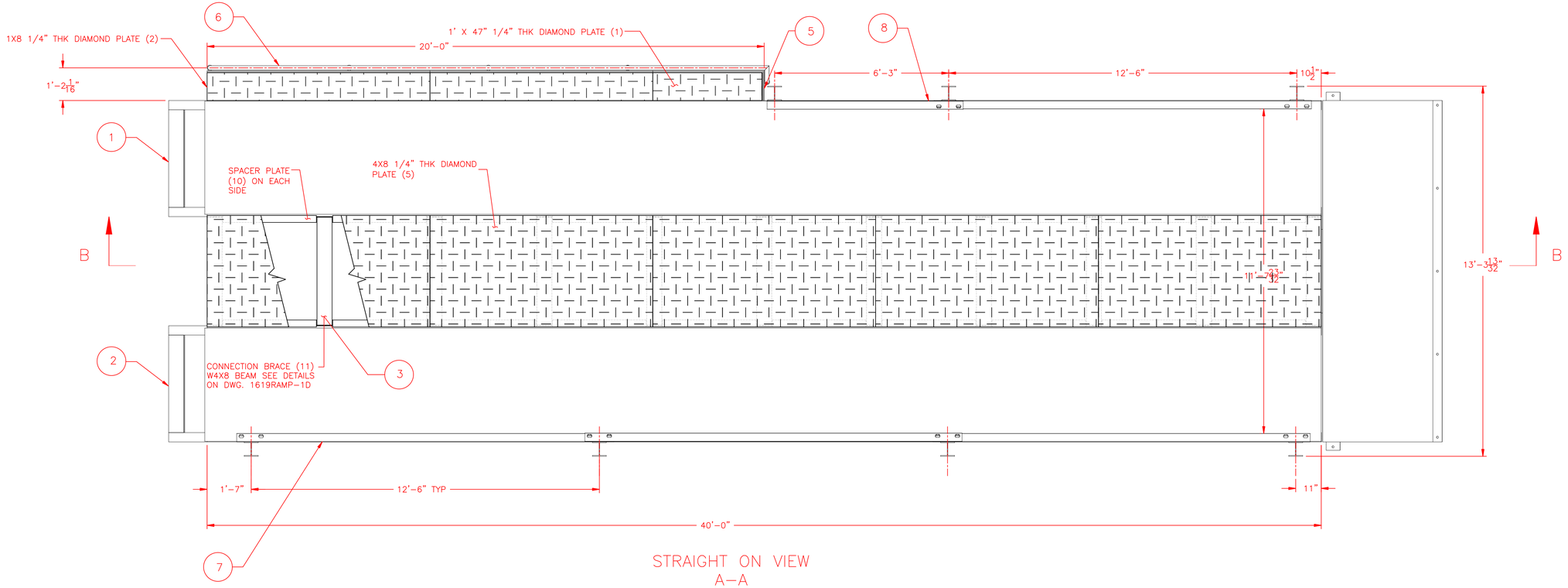
EQUIPMENT ASSEMBLY DRAWINGS

ITEM	QTY	DESCRIPTION	DWG NO.
1	1	RAMP A WELDMENT	1619RAMP-1A
2	1	RAMP B WELDMENT	1619RAMP-1A
3	11	CONNECTION BRACE	1619RAMP-1D
4	7	GUARD RAIL SUPPORT	1619RAMP-1E
5	1	RAMP WALKWAY FRAME WELDMENTS	1619RAMP-1J
6	1	RAMP WALKWAY HANDRAILS	1619RAMP-1K
7	4	12 GUAGE "W" BEAM GUARDRAILS (12'-6")	1619RAMP-1K
8	1	12 GUAGE "W" BEAM GUARDRAILS (6'-3")	
9	2	FLARED END SECTION	
10	66	5/8-11 X 1 3/4 HEX HEAD BOLT	
11	132	5/8 FLAT WASHER	
12	66	5/8 LOCK WASHER	
13	42	1/2-13 x 1 3/4" HEX HEAD BOLT	
14	84	1/2" FLAT WASHER	
15	42	1/2" LOCK WASHER	
16	42	1/2-13 HEX NUT	
17	1	SMALL RAMP WELDMENT	1619RAMP-1L
18	16	ANCHOR PAD	1619RAMP-1F
19			
20			
21			



RAMP LEFT SIDE VIEW

E



STRAIGHT ON VIEW
A-A

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersed two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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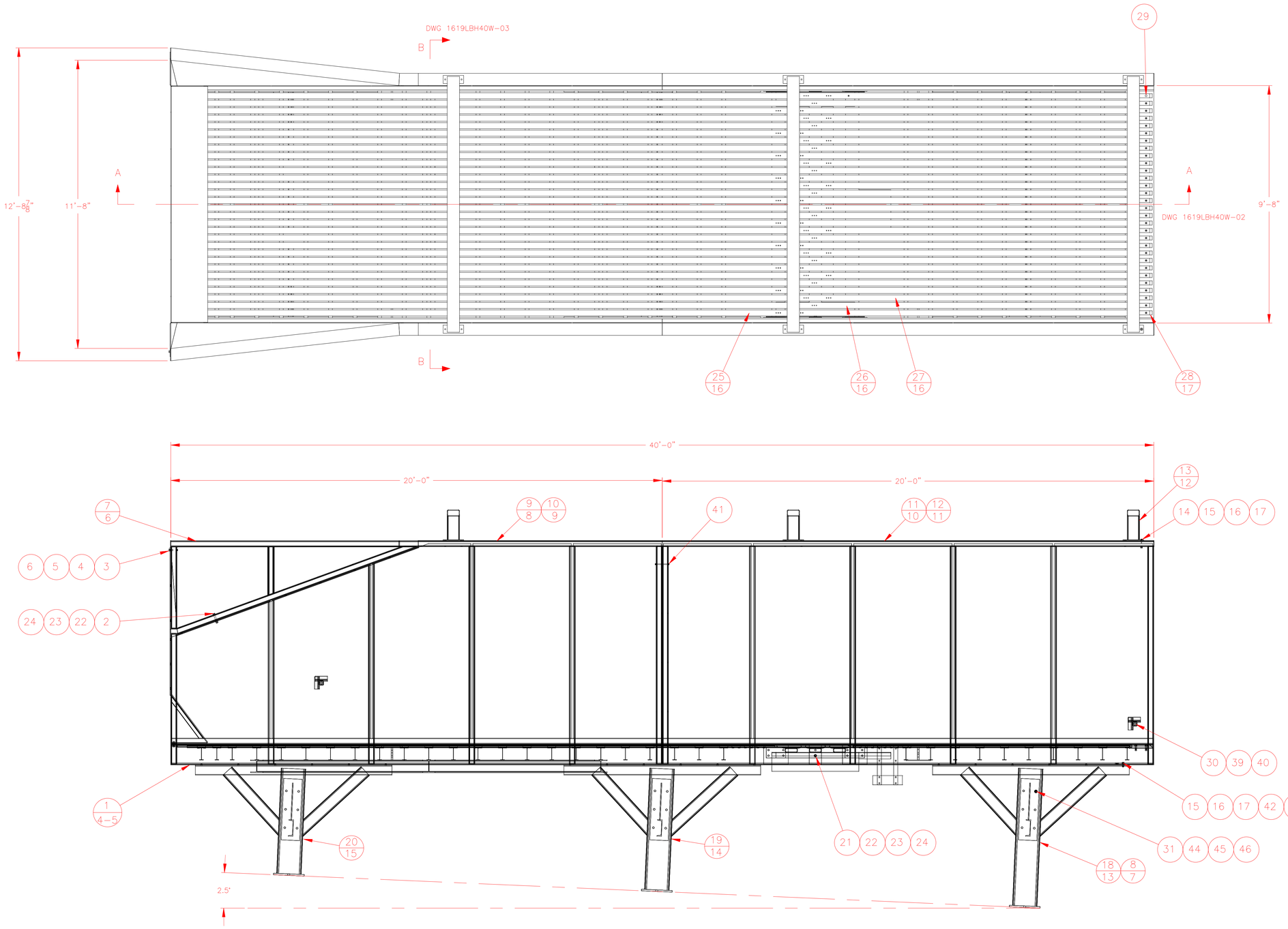
TITLE
OKLAHOMA TIRE RECYCLYER
TIRE SYSTEM
RAMP

DRAWN BY	SCALE	DATE
SW	1/2"=1'-0"	2016-NOV-14
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619RAMP-1A		01 OF 11



ITEM	QTY	DESCRIPTION	MATERIAL
1	1	HOPPER FLOOR WELDMENT	WELDMENT
2	14	5/8-11 X 4 1/2" HHCS	–
3	12	3/8-16 X 4" HHCS	–
4	20	3/8" WASHER	–
5	20	3/8" LOCK WASHER	–
6	20	3/8-16 HEX NUT	–
7	1LH 1RH	ENTRY PANEL	WELDMENT
8	3	LEG CROSS BRACE	WELDMENT
9	1	LEFT SIDE ANGLED WALL	WELDMENT
10	1	RIGHT SIDE ANGLED WALL	WELDMENT
11	1	LEFT SIDE WALL	WELDMENT
12	1	RIGHT SIDE WALL	WELDMENT
13	3	TOP CROSS BAR	WELDMENT
14	12	1/2-13 X 4 1/4" HHCS	–
15	48	1/2" WASHER	–
16	48	1/2" LOCK WASHER	–
17	48	1/2-13 HEX NUT	–
18	1LH 1RH	LONG LEG	WELDMENT
19	1LH 1RH	MEDIUM LEG	WELDMENT
20	1LH 1RH	SHORT LEG	WELDMENT
21	20	5/8-11 X 1 1/2" HHCS	–
22	37	5/8" WASHER	–
23	37	5/8" LOCK WASHER	–
24	37	5/8-11 HEX NUT	–
25	1	SLAT NO. 3	SEE DETAIL
26	1	SLAT NO. 2	SEE DETAIL
27	1	SLAT NO. 1	SEE DETAIL
28	30	REAR SUPPORT BLOCK	SEE DETAIL
29	60	3/8-16 X 2" HHCS	–
30	4	STAUFF MOUNTING BRACKET	#SM4300PPDPAS
31	36	3/4-10 X 1 3/4" HHCS	–
32	4	4 HOLE HALLCO SHIM PLATE	SEE DETAIL
33	2	2 HOLE HALLCO SHIM PLATE	SEE DETAIL
34	1	HALLCO MODIFICATIONS PUR/ALTER	32 110 J 6 D 20 N 0 W X N40
35	1	FRAME SUPPORT	WELDMENT
36	2	SIDE SUPPORT PLATE	SEE DETAIL
37	1	TIRE RAMP	WELDMENT
38	3	5/8-11 X 2 1/2" HHCS	–
39	2	PHOTO ELECTRIC TRANSMITTER	#E5830TS250-GA
40	2	PHOTO ELECTRIC TRANSMITTER	#E5830TS250-GL
41	8	3/8-16 X 6 1/2" HHCS	–
42	36	1/2-13 X 2" HHCS	–
43	36	McMASTERCARR BEVEL WASHER	#91573A035
44	36	3/4" WASHER	–
45	36	3/4" LOCK WASHER	–
46	36	3/4-10 HEX NUT	–

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum Grade 5 and zinc plated.
2. Paint is to be interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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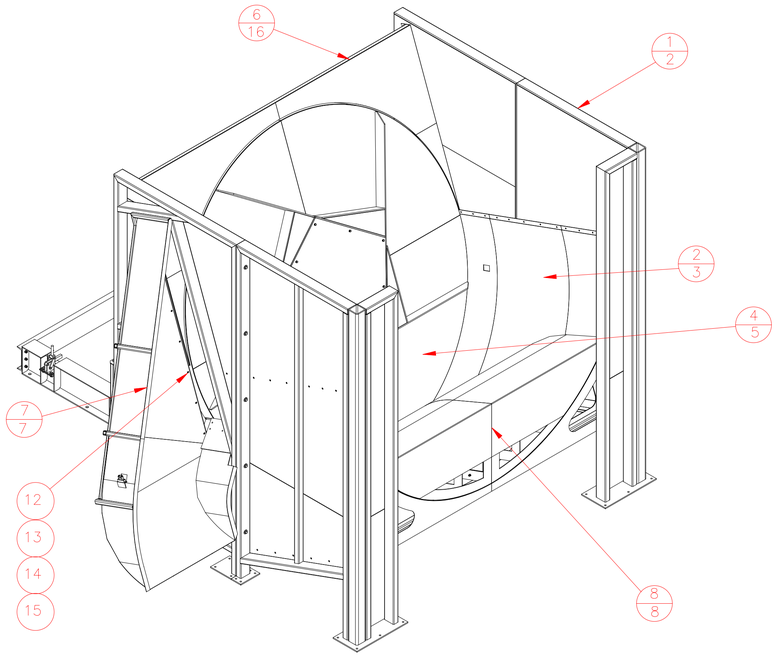
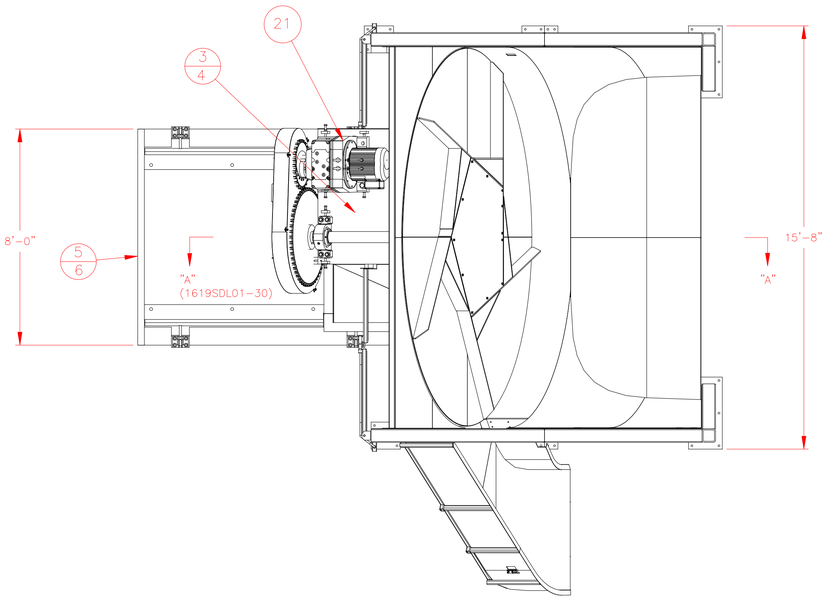
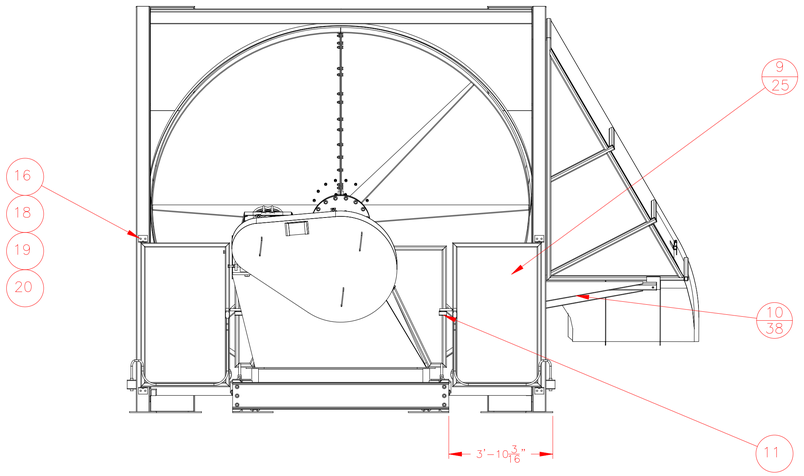
TITLE
OKLAHOMA TIRE SYSTEM
LIVE BOTTOM HOPPER
MAIN ASSEMBLY

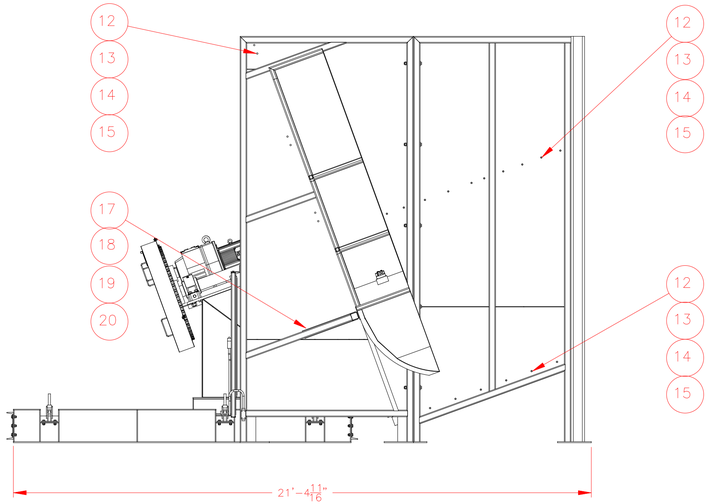
DRAWN BY	SCALE	DATE
MR	1/2"=1'-0"	2016-OCT-25
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619LBH40W-01		01 OF 22





ITEM	QTY	DESCRIPTION	DWG NO.
1	1	SEPARATOR WALL ASSEMBLY	1620SDR01-2
2	1	SEPARATOR BOTTOM RADIUS	1620SDR01-3
3	1	SEPARATOR BASE ASSEMBLY	1620SDR01-4
4	1	SEPARATOR DISK ASSEMBLY	1620SDR01-5
5	1	SEPARATOR BASE TRACK ASSEMBLY	1620SDR01-6
6	1	DISCHARGE CHUTE WELDMENT	1620SDR01-7
7	1	SEPARATOR TRANSITION RAMP ASSEMBLY	1620SDR01-8
8	1	SEPARATOR TOP RADIUS	1620SDR01-16
9	2	SAFETY GATE	1620SDR01-24
10	1	CHUTE SUPPORT ARM	1620SDR01-37
11	2	SAFETY SWITCH	
12	59	1/2-13 x 1 1/2" HEX HEAD BOLT	
13	59	1/2" FLAT WASHER	
14	59	1/2" LOCK WASHER	
15	59	1/2-13 HEX NUT	
16	8	5/8-11 x 4 1/2" HEX HEAD BOLT	
17	4	5/8-11 x 5" HEX HEAD BOLT	
18	12	5/8" FLAT WASHER	
19	12	5/8" LOCK WASHER	
20	12	5/8-11 HEX NUT	
21	1	SEW EURODRIVE INLINE HELICAL GEARMOTOR 10 HP, 480 VAC, 3 PH, 60 HZ, 9.2 RPM OUTPUT, 188.45:1, 3 5/8ø SHAFT	R137DV132M4





DET SHT — SEPARATOR REQ'D — 1

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Fax: 858 300 5404
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TITLE
OKLAHOMA TIRE SYSTEM
SDL1619 TIRE SEPARATOR
MAIN ASSEMBLY

DRAWN BY	SCALE	DATE
MR	3/8"=1'-0"	2016-OCT-11
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619SDL01-01		SHEET NO. 01 OF 40

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersed two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2.
4. All welds and corners are to be spot primed.

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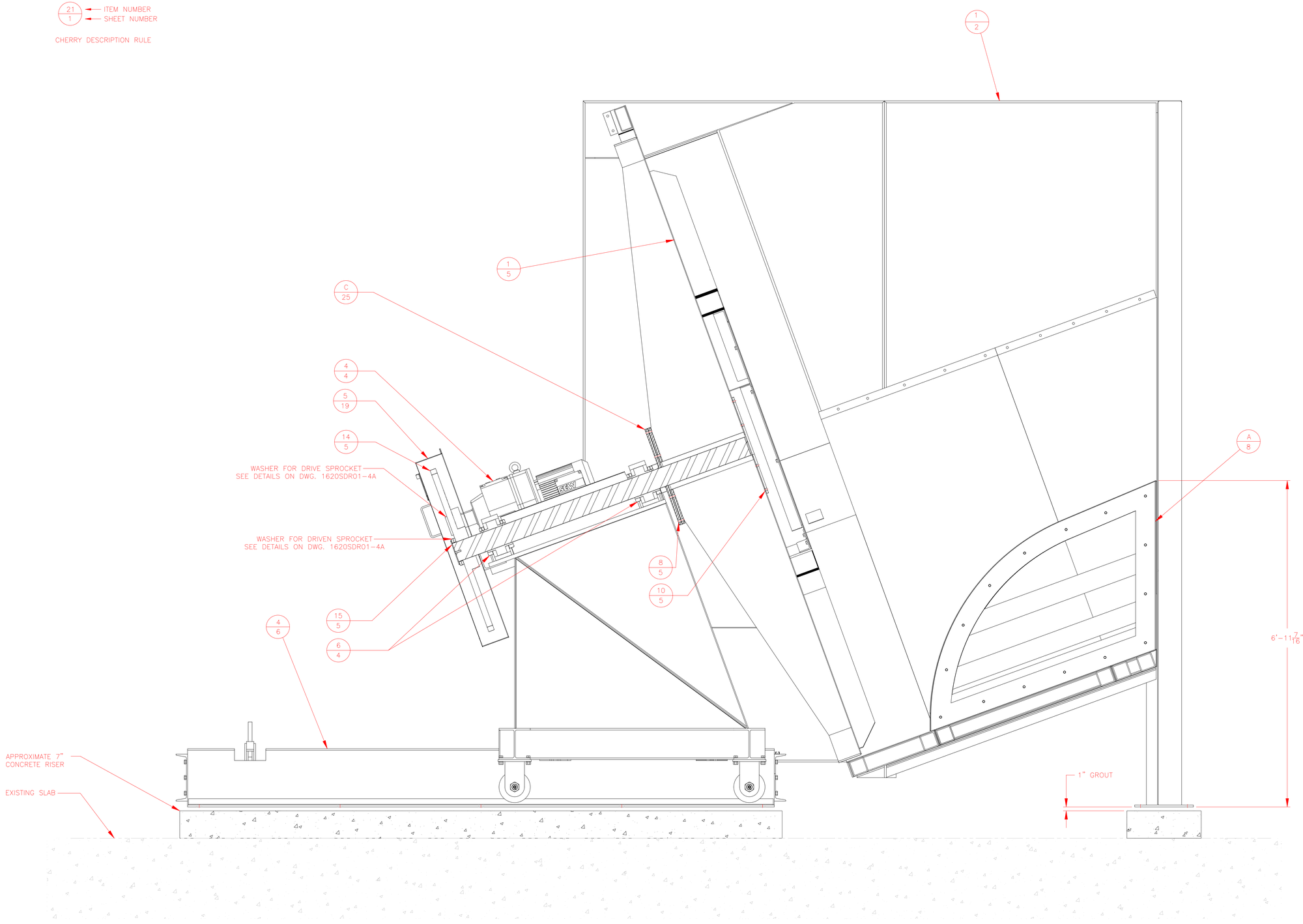
21/1 ← ITEM NUMBER / SHEET NUMBER

CHERRY DESCRIPTION RULE



SEPARATOR SECTION VIEW A-A
FROM 1620SDR01-1A

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
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0.000	0.005	▱	0.03
+/+	1/32	—	0.03
Ø	0.03	∠	0.03

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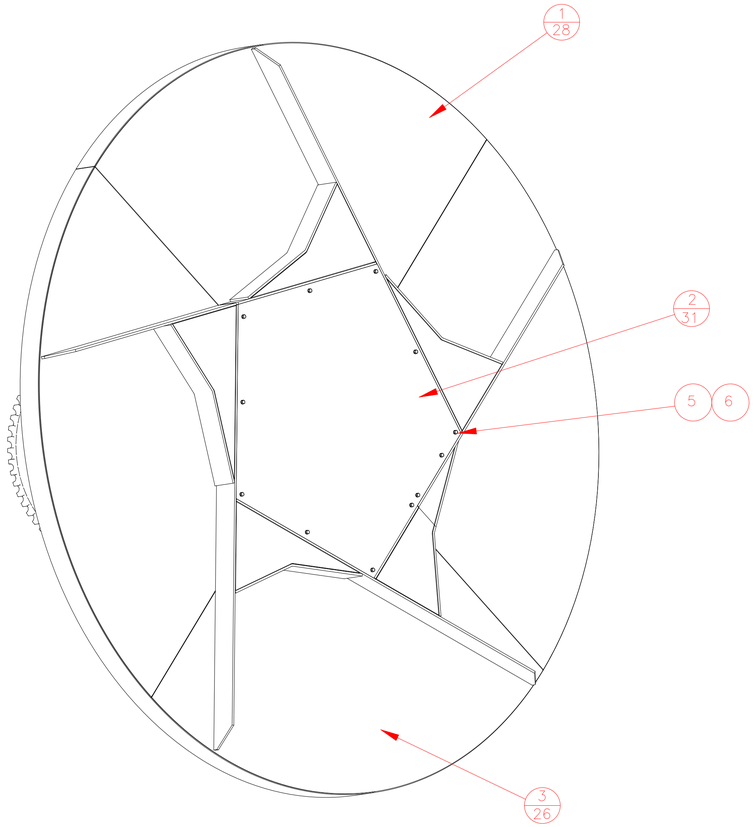
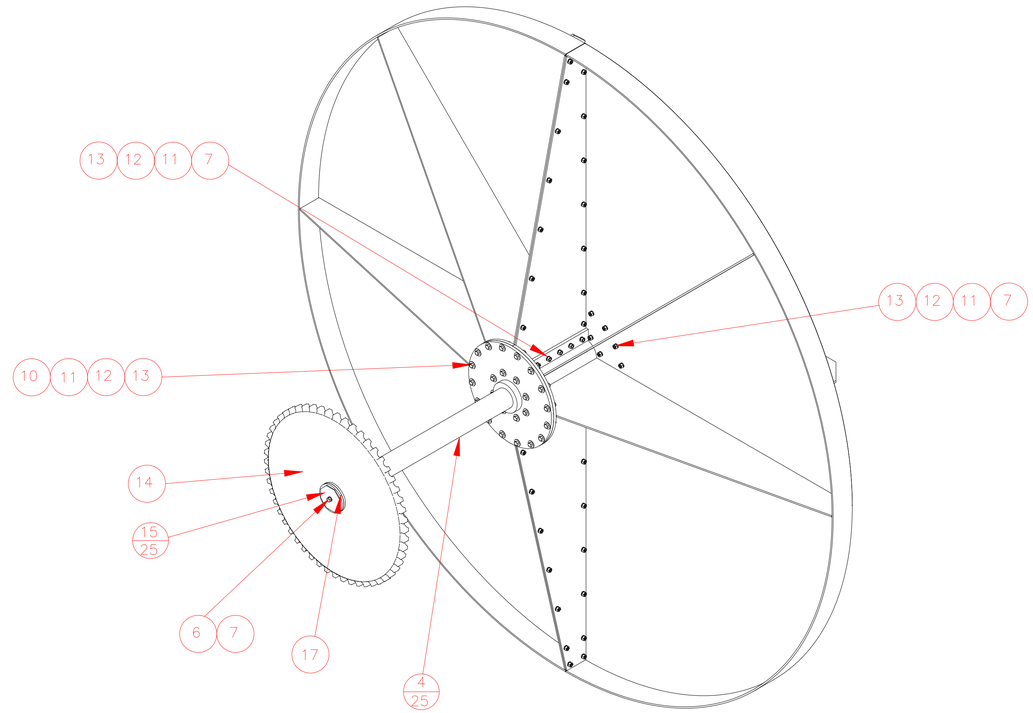
TITLE
OKLAHOMA TIRE SYSTEM
SDL1619 TIRE SEPARATOR
SEPARATOR SECTION VIEW

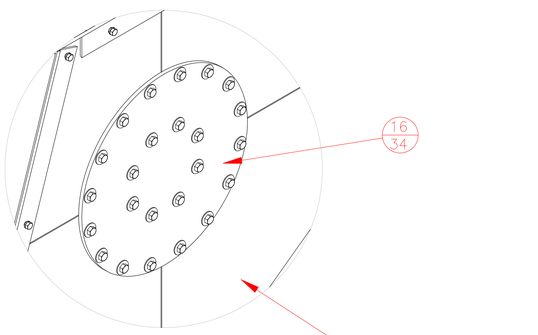
DRAWN BY	SCALE	DATE
MR	1"=1'-0"	2016-OCT-11
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619SDL01-01B		30 OF 40

ITEM	QTY	DESCRIPTION	MATERIAL	SHT
1	1	SEPARATOR DISK HALF LH	HRS	1620SDR01-28
2	1	HUB COVER	HRS	1620SDR01-39
3	1	SEPARATOR DAISK HALF RH.	HRS	1620SDR01-26
4	1	SEPARATOR DISK SHAFT	HRS	1620SDR01-25
5	13	1/2-13 x 1 1/2" HEX HEAD BOLT		
6	13	1/2" LOCK WASHER		
7	12	5/8-11 x 3.5" HEX HEAD BOLT		
8	24	5/8-11 x 2" HEX HEAD BOLTS		
9	32	5/8-11 x 2" HEX HEAD BOLTS		
10	24	5/8-11 x 2 1/2" HEX HEAD BOLTS		
11	92	5/8" FLAT WASHER		
12	92	5/8" LOCK WASHER		
13	92	5/8-11 HEX NUT		
14	1	MTO ROLLER CHAIN SPROCKET #200 B54 4-15/16	200M54-415	
15	1	SHAFT CAP	HRS	1620SDR01-25
16	1	DISK JOINER PLATE	HRS	1620SDR01-32
17	2	WASHER FOR DRIVEN SPROCKET	HRS	1620SDR01-4A

HUB COVER BOLTS
SHAFT SLEEVE BOLTS
DISK FACE BOLTS
DISK RIB BOLTS
DISK FLANGE BOLTS







DETAIL A
SCALE 1 : 8

4/1 DISK ASSEMBLY
REQ'D - 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersel two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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x/x	1/32	—	0.03
◎	0.03	∠	0.03

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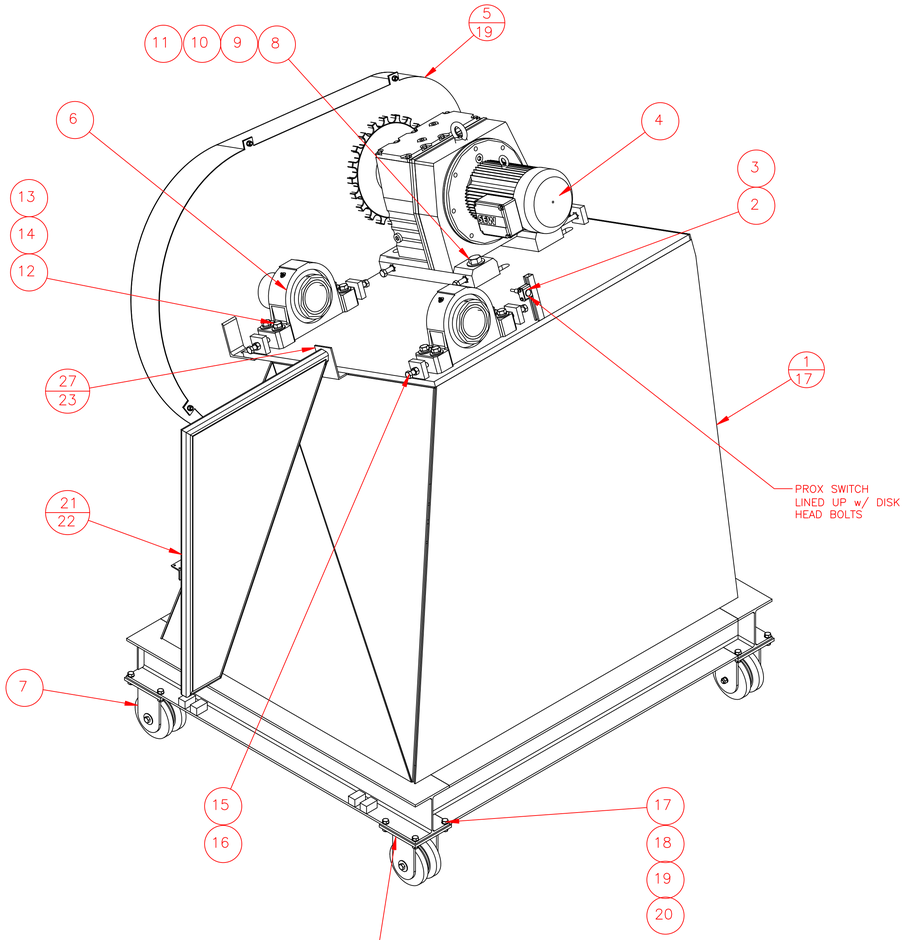
Fax: 858 300 5404
www.afstechnology.com

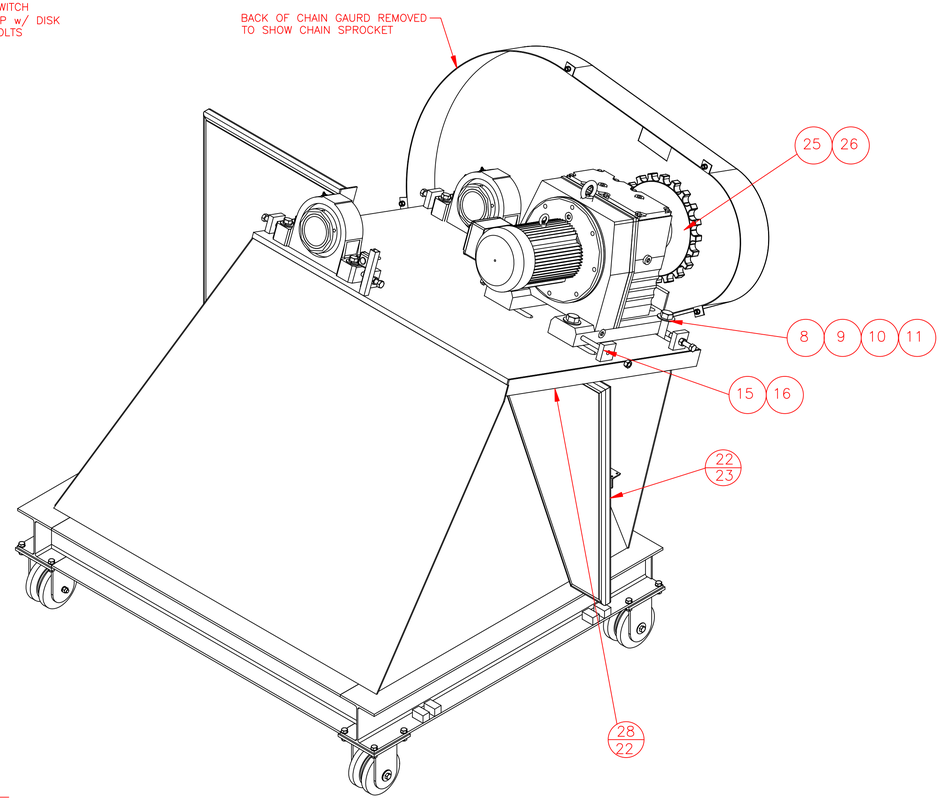
TITLE
OKLAHOMA TIRE SYSTEM
SDL1619 TIRE SEPARATOR
DISK ASSEMBLY

DRAWN BY	SCALE	DATE
MR	3/4"=1'-0"	2016-OCT-11
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619SDL01-05		05 OF 40

ITEM	QTY	DESCRIPTION	MATERIAL	SHT
1	1	DISK BASE WELDMENT	HRS	1620SDR01-17
2	1	PROX SWITCH	E-57 LAL30-A2	
3	1	30mm PROX BLOCK	HRS	
4	1	SEW-EURODRIVE	R147DV160M4, 15HP, 460v-60Hz	
5	1	CHAIN GAURD	HRS	1620SDR01-19
6	2	DODGE TAPPERED PILLOW BLOCK BEARING	E-415-P4	
7	4	HAMILTON V-GROVE CASTOR	R-MD-84FVH	
8	4	1 1/4-7 X 6" HEX HEAD BOLT		
9	8	1 1/4" WASHER		
10	4	1 1/4" LOCK WASHER		
11	4	1 1/4-7 HEX NUT		
12	8	7/8-9 X 5" HEX HEAD BOLT		
13	8	7/8" WASHER		
14	8	7/8" LOCK WASHER		
15	8	3/4-10 X 5" HEX HEAD BOLT		
16	8	3/4-10 HEX NUT		
17	16	5/8-11 X 1 3/4" HEX HEAD BOLT		
18	16	5/8" WASHER		
19	16	5/8" LOCK WASHER		
20	16	5/8-11 HEX NUT		
21	1	LONG BASE GATE	HRS	1620SDR01-22
22	1	SHORT BASE GATE	HRS	1620SDR01-23
23	2	1/2-13 X 1" HEX BOLT		
24	2	1/2" LOCK WASHER		
25	1	DRIVE SPROCKET, 21-TOOTH, C-TYPE, QD HUB 3 5/8"ø BORE W/KW & SS	200M21-358	
26	1	TSUBAKI ROLLER CHAIN #200 RIV x 68PTS.	HRS	
27	1	LONG GATE CLIP	HRS	1620SDR01-23
28	1	SHORT GATE CLIP	HRS	1620SDR01-22



NOTE: CASTERS ARE TO BOLTED TO THE BASE FOR SHIPPING & SET UP. WELDED TO BASE AFTER BASE IS ASSEMBLED AND POSITIONED ON TRACKS AND CASTER ALINGMENT IS VERIFIED.



3 / 1 SEPARATOR BASE ASSEMBLY
REQ'D – 1

FABRICATION NOTES:
1) LOCATE & WELD BASE GATES (21 & 22) TO WIDE FLANGE BEAMS OF BASE ASSEMBLY.
2) LOCATE & WELD CLIP ANGLES TO BASE ASSEMBLY & BASE GATES.
3) LINE-UP LATCH ANGLE WITH SAFETY GATE LATCH. WELD LATCH ANGLE TO BASE GATE.

NOTE:
1. ALL FASTENERS TO BE GRADE 8 YELLOW ZINC PLATED UNLESS OTHERWISE NOTED.

PAINT SPEC: Finish paint to be minimum 6 mils DFT of International Protective Coatings Interseal 670HS two part epoxy in color Haze Grey. All steel surface prep to be SSPC.SP6

NOTES:
Unless otherwise noted, the following shall apply:
1. All steel to be ASTM minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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+/+	1/32	—	0.03
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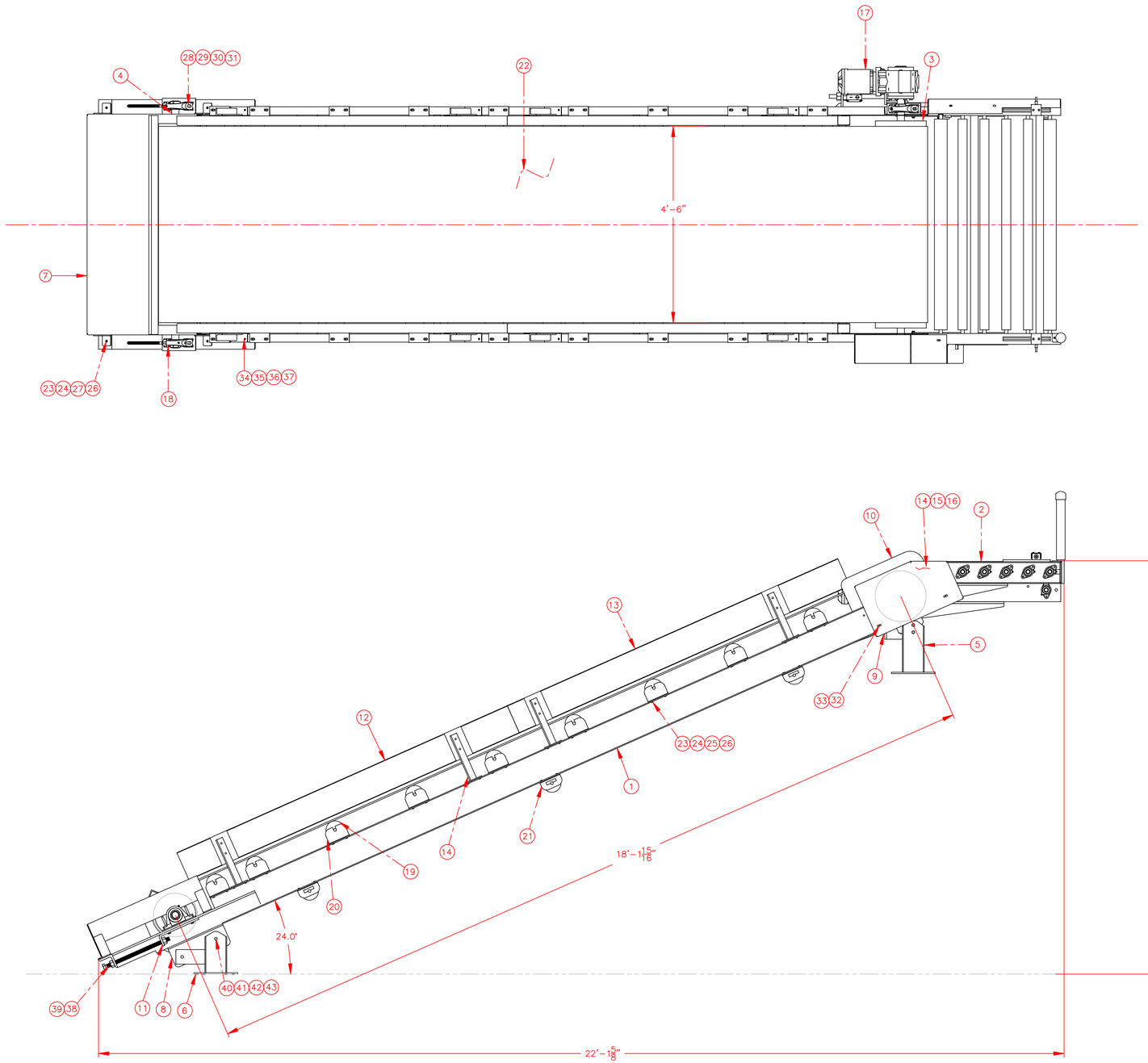
TITLE
OKLAHOMA TIRE SYSTEM
SDL1619 TIRE SEPARATOR
BASE ASSEMBLY

DRAWN BY	SCALE	DATE
MR	1"=1'-0"	2016-OCT-11
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619SDL01-04		04 OF 40



SEPARATOR DISCHARGE
BELT CONVEYOR ASSEMBLY

ITEM	QTY	DESCRIPTION	MATL/DWG.NO
1	1	FRAME WELDMENT	1619BC-02
2	1	SLAVE DRIVE ASSEMBLY	1619BC-
3	1	HEAD PULLEY ASSEMBLY SEE NOTE 1	1619BC-HP
4	1	TAIL PULLEY ASSEMBLY SEE NOTE 2	1619BC-TP
5	1	SUPPORTING LEG ASSEMBLY	1619BC-
6	1	SUPPORTING LEG ASSEMBLY	1619BC-
7	1	TAIL PULLEY FIXED GUARD	1619BC-
8	2	TAIL PULLEY GUARD	1619BC-
9	1	HEAD PULLEY GUARD	1619BC-
10	2	HEAD PULLEY GUARD	1619BC-
11	2	SIDE GUARD-01	1619BC-
12	2	SIDE GUARD-02	1619BC-
13	4	SIDE GUARD SUPPORT LEG	1619BC-
14	1	CHAIN SPROCKET 13 TOOTH	12BTB13
15	1	CHAIN 60-66LINKS WITH 1 MASTER LINKS	
16	1	BDLR DRIVE SPROCKET 54 TOOTH	12BTB54
17	1	1.5 KW SEW EURO DRIVE GEAR BOX	SA77TDRE90L
18	4	DODGE BALL BEARING PILLOW BLOCK	10-P2B-SCM-50M
19	12	5" DIA X 57" LG FLAT CARRYING IDLERS	
20	18	CARRYING IDLERS BRACKET	
21	6	RETURN IDLER BRACKET	
22	1	54" WIDTH BELT	
23	60	1/2-13 X 1 1/2 HEX BOLT	
24	60	1/2-13 HEX NUT	
25	60	1/2 BEVEL WASHER	
26	60	1/2 FLAT WASHER	
27	4	1/2 LOCK WASHER	
28	8	5/8-11 X 3" HEX BOLT	
29	8	5/8-11 HEX NUT	
30	8	5/8 PLAIN WASHER	
31	8	5/8 FLAT WASHER	
32	10	5/16 X 1 HEX BOLT	
33	10	5/16-HEX NUT LOCK WASHER FLAT WASHER	
34	32	3/8 X 1 1/2 HEX BOLT	
35	32	3/8 HEX BOLT	
36	32	3/8 FLAT WASHER	
37	32	3/8 BEVEL WASHER	
38	2	1" THREADED ROD 20" LG	
39	8	1" HEX NUT	
40	8	5/8-11 X 1 1/2 HEX BOLT	
41	14	5/8-11 HEX NUT	
42	14	5/8 FLAT WASHER	
43	14	5/8 LOCK WASHER	
44	14	5/8-11 X 1 3/4 HEX BOLT	
45			
46			
47			

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersed two-part epoxy with minimum 3 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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Phone: 937 669 3548
Fax: 858 300 5404
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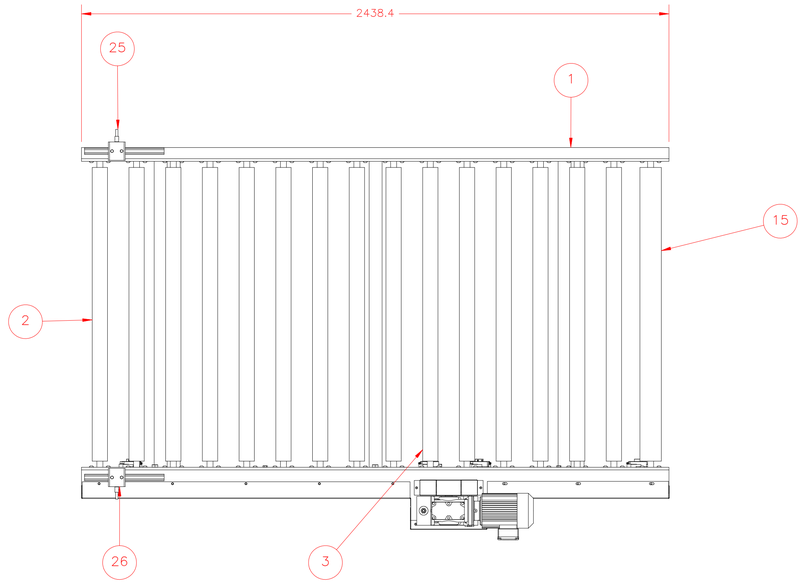
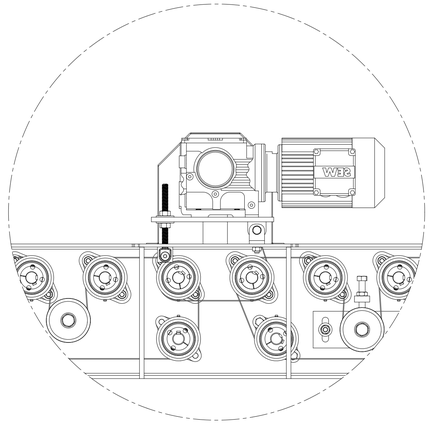
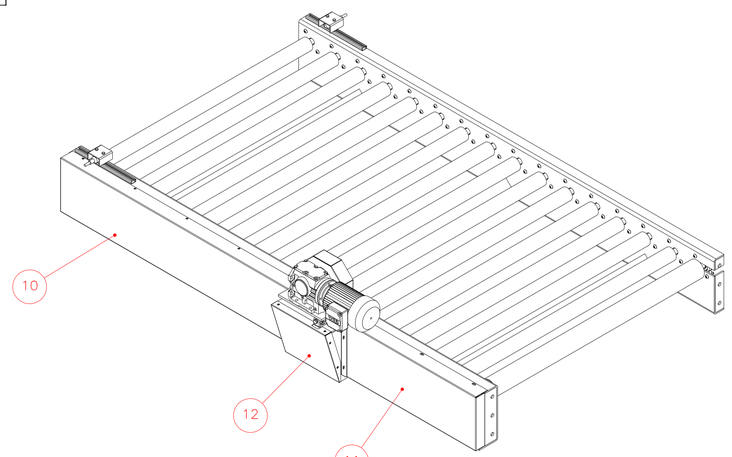
TITLE
OKLAHOMA TIRE SYSTEM
SEPARATOR DISCHARGE BELT CONVEYOR ASSEMBLY

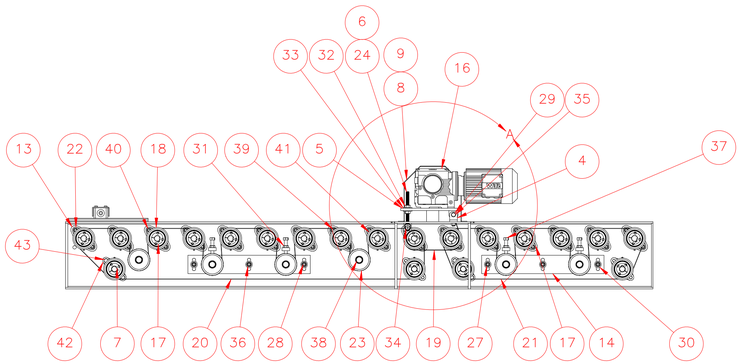
DRAWN BY	SCALE	DATE
MR	1/16	2017-MAR-08
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619BC-01		SHEET NO. OF

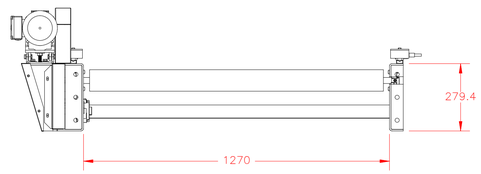




DETAIL A
SCALE 1 : 6







ITEM	WITH OUT GUARD/ QTY.	DESCRIPTION	PART NO./MATERIAL
1	1	SIDE FRAME WELDMENT	RBFW-1004-2
2	13	DRIVEN ROLLER	R48-2.5-25M-55KA1.62KB0
3	2	DRIVE ROLLER	R48-2.5-25M-55KA2.62KB0
4	1	MOTOR MOUNT HINGE	RBMH-001
5	1	MOTOR MOUNT	RBMM-001
6	2	COUPLING NUT	RBCN-001
7	4	25MM IDLER SHAFT	RBIS-25MM-4.5
8	1	MOTOR BELT TOP GUARD INNER DOUBLE SHAFT	RBG-MBT-2-1
9	1	MOTOR BELT TOP GUARD OUTER DOUBLE SHAFT	RBG-MBT-2-2
10	1	SPROCKET BELT GUARD LEFT	RBG-1004-2-16-M-L
11	1	SPROCKET BELT GUARD RIGHT	RBG-1004-2-16-M-R
12	1	MOTOR BELT BOTTOM GUARD FOR DOUBLE SHAFT	RBG-MBB-2
13	16	BEARING COVER 25MM	RBC-001
14	2	2 PULLEY BELT TENSIONER	RBT-001
15	1	DRIVEN TRACTION ROLLER	R48-3.5-25M-55KA1.62KB0
16	1	SEW EURO DRIVE 0.75 KW 380 VAC 50 HZ 9.23 RATIO 155 RPM	S47DRE80M4
17	23	TAPER LOCK BUSHING 25MM	11-1210-25MM-TL
18	23	GATES SPROCKET	11-8MX-32S-21-TL
19	1	TIMING BELT	11-8MGT-896
20	1	TIMING BELT	11-8MGT-4400-21
21	1	TIMING BELT	11-8MGT-2600-21
22	40	DODGE 2-BOLT BEARING	11-F2B-SC-25M
23	6	IDLER PULLEY	11-FI-325-125
24	1	SHOULDER ROD END	14-3800K24
25	1	CULTER-HAMMER TRANSMITTER PHOTOEYE	21-E5818TS250-GA
26	1	CULTER-HAMMER RECEIVER PHOTOEYE	21-E5818TS250-GL
27	8	M10 HEX NUT	
28	8	HEX HEAD CAP SCREW, M10 x 1.5 x 35	
29	4	M10 LOCK WASHER	
30	8	M10 HEAVY WASHER	
31	6	1/2-13 JAM NUT	
32	2	M12 NUT	
33	2	M12 HEAVY WASHER	
34	1	M12 X 16MM SHOULDER BOLT	
35	2	Hex cap screw, M10 x 1.5 x 25	
36	6	M10 LOCK WASHER	
37	4	HEX BOLT 1/2-13 X 3-1/2"	
38	6	HEX HEAD CAP SCREW 5/8-11 X 3/4"	
39	64	M - 10 x 1.5 x 35 SBHCS	
40	68	M10 LOCK WASHER	
41	68	M10 HEX NUT	
42	4	M10 WASHER	
43	4	Hex cap screw, M10 x 1.5 x 45	
44	2	HEX HEAD CAP SCREW 5/8-11 X 3/4"	

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersesd two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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Fax: 858 300 5404
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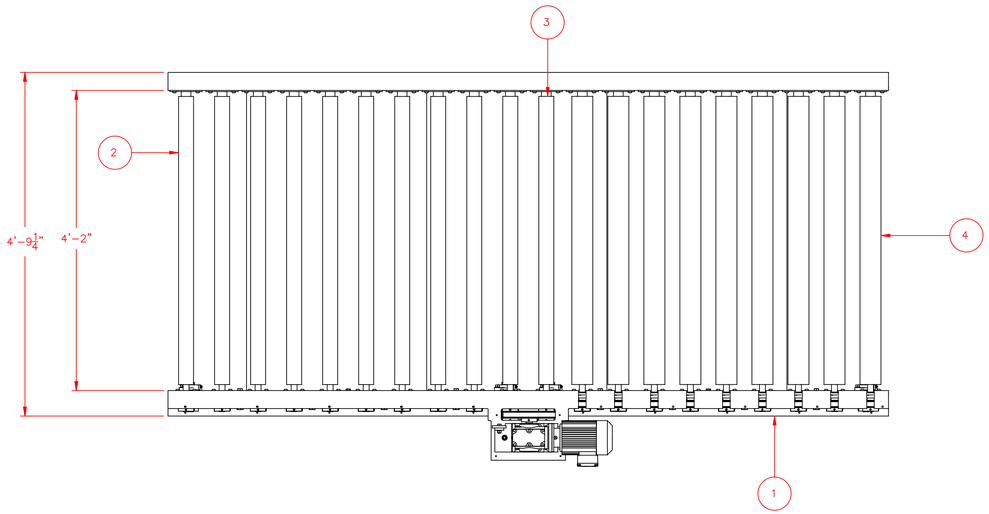
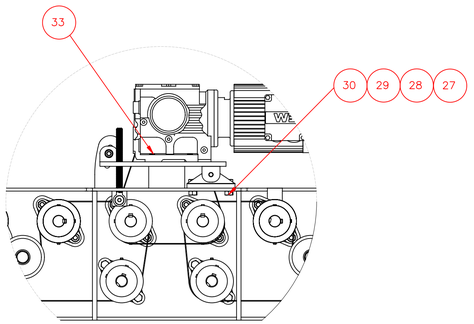
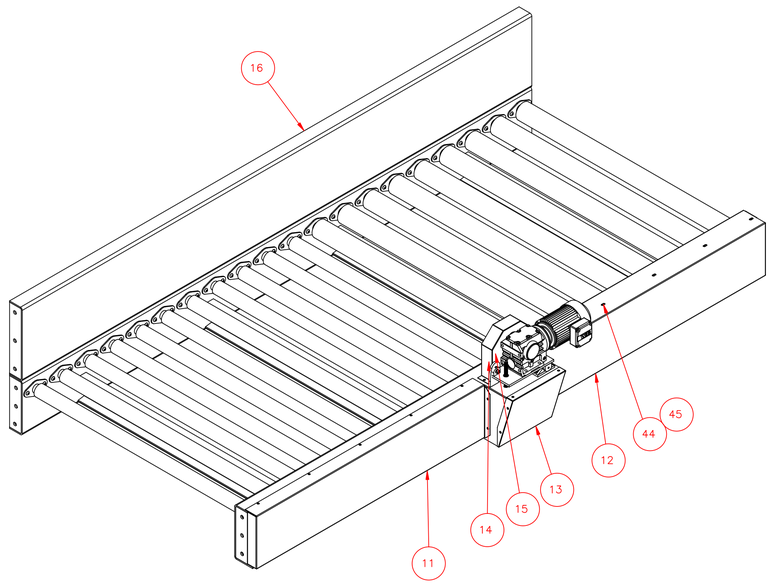
TITLE
OKLOHAMA TIRE RECYLERS
TIRE SEPARATOR SYSTEM
BDLR CONVEYOR

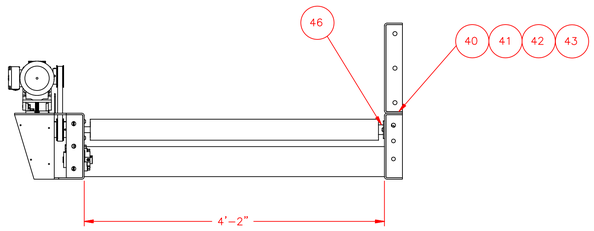
DRAWN BY	SCALE	DATE
MR	1:12	5/9/2017
CHECKED BY	APPROVED	PROJECT#
JMB	—	1004
DWG. NO.		SHEET NO.
1619BDLR-02		1 OF 1

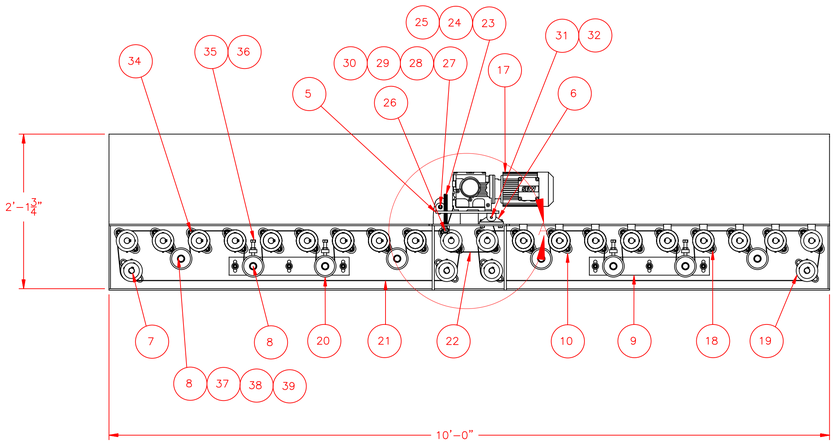




DETAIL A
SCALE 1:6







ITEM NO.	QTY	DESCRIPTION	PART NO./MATERIAL
1	1	SIDE FRAME WELDMENT	1619BDLR–05
2	9	DRIVEN ROLLER	R52–2.5–59–KA1.37–KB0
3	2	DRIVE ROLLER	R52–2.5–60–KA2.37–KB0
4	9	TRACTION ROLLER	R52–2.5–60–KA2.37–KB0
5	1	MOTOR MOUNT	RBMM–001
6	4	MOTOR MOUNT HINGE	RBMH–001
7	4	IDLER SHAFT	RBIS–25MM–4.5
8	8	COUPLING NUT	RBCN–001
9	2	BDLR IDLER TENSIONER PLATE	RBT–001
10	20	BAERING COVER	RBC–001
11	1	SPROCKET BELT GUARD LEFT	RBG–1620–2–10–M–L
12	1	SPROCKET BELT GUARD RIGHT	RBG–1620–2–10–M–R
13	1	MOTOR BELT BOTTOM GUARD FOR DOUBLE SHAFT	RBG–MBB–2
14	1	MOTOR BELT TOP GUARD INNER	RBG–MBT–2–1
15	1	MOTOR BELT TOP GUARD OUTER	RBG–MBT–2–2
16	1	SIDE GUARD	
17	1	SEW EURODRIVE 1.5 HP, 480 VAC, 3 PH, 60 HZ	S47DRE80M4
18	48	DODGE 2 BOLT FLANGE BEARING	
19	27	GATES SPROCKET	11–8MX–32S–21–TL
20	8	FLATBACK IDLER	
21	2	GATES POLY CHIAN BELT 21 mm X 8 PITCH 4400	11–8MGT–4400–21
22	1	GATES POLY CHAIN BELT	11–8MGT–896–21
23	1	1/2–13 THREADED ROD 6" LG	3798K26
24	2	1/2–13 HEX NUT	
25	2	1/2 FLAT WASHER	
26	1	1/2" DIA x 1/2" LG, 3/8"–16 Thread Size	91259A707
27	5	3/8 –16 X 1.25 HEX BOLT	
28	5	3/8–16 HEX NUT	
29	5	3/8 LOCK WASHER	
30	9	3/8 FLAT WASHER	
31	2	3/8–16 X 1 HEX BOLT	
32	2	3/8 LOCK WASHER	
33	4	3/8 –16 X 1.5 HEX BOLT	
34	94	3/8 –16 X 1.5 SBHCS	
35	4	1/2–13 X 3.5 HEX BOLT	
36	4	1/2–13 HEX NUT	
37	12	M16 X 1.75MM X 20MM LG	
38	12	M16 X 1.75MM X 35MM LG	
39	12	M16 FLAT WASHER	
40	8	1/2–13 X 1.25 HEX BOLT	
41	8	1/2–13 HEX NUT	
42	8	1/2–13 LOCK WASHER	
43	8	1/2–13 FLAT WASHER	
44	22	5/16 X 1/2 HEX BOLT	
45	22	5/16 LOCK WASHER	
46	20	THRUST BEARING ASSEMBLY	

COMPONENTS ARE SAME FOR 411, 421, 431 BDLR CONVEYORS

ANGULAR CONVEYOR BDLR ASSEMBLY
(1)–REQ'D

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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Fax: 858 300 5404
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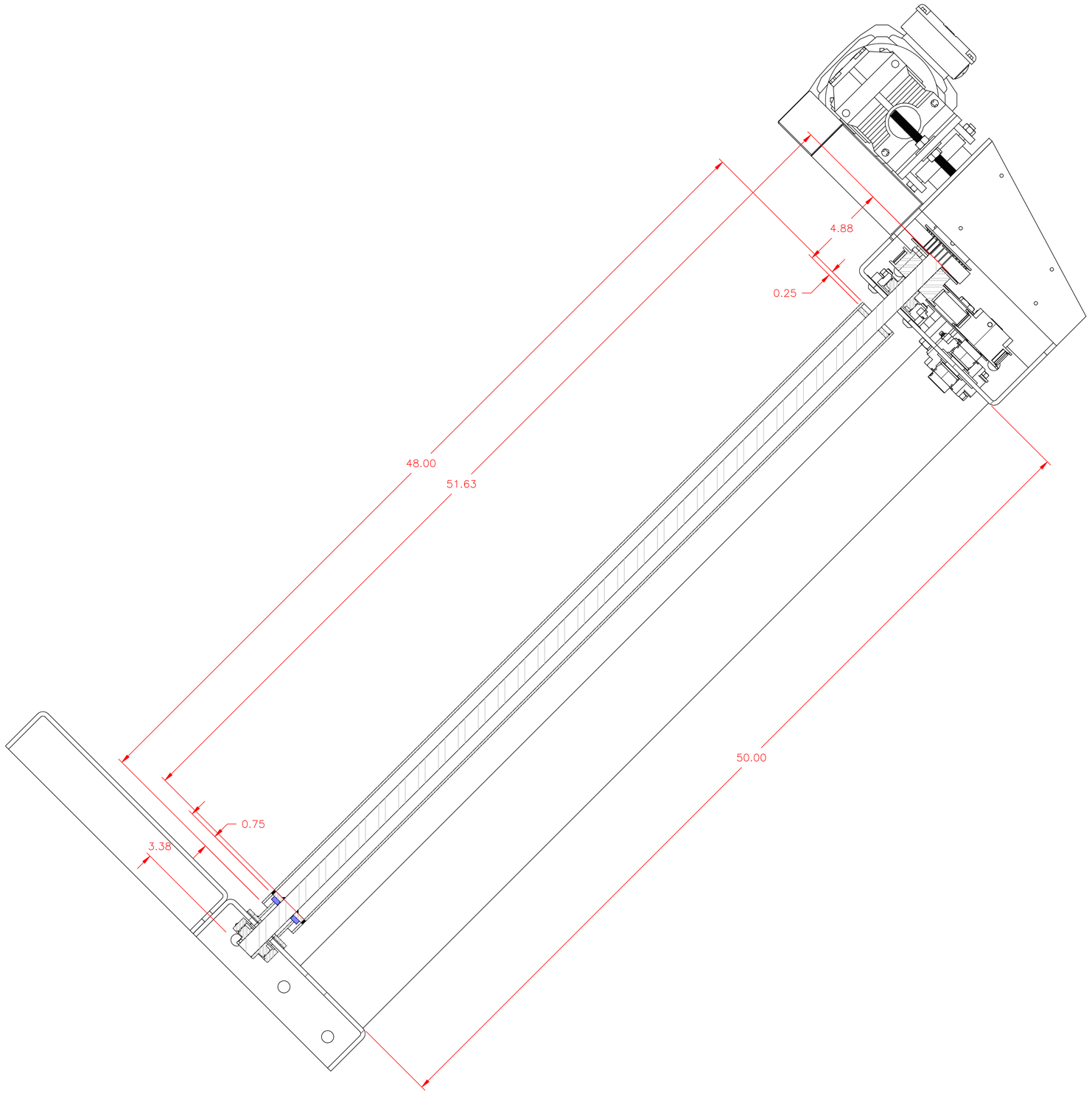
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE SEPARATOR SYSTEM
ANGULAR CONVEYOR BDLR ASSEMBLY

DRAWN BY	SCALE	DATE
MR	1/12	2017–MAR–09
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619–BDLR–05		01 OF 01



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Fax: 858 300 5404
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TITLE
OKLAHOMA TIRE RECYCLERS
TIRE SEPARATOR SYSTEM
ANGULAR CONVEYOR SECTION VIEW

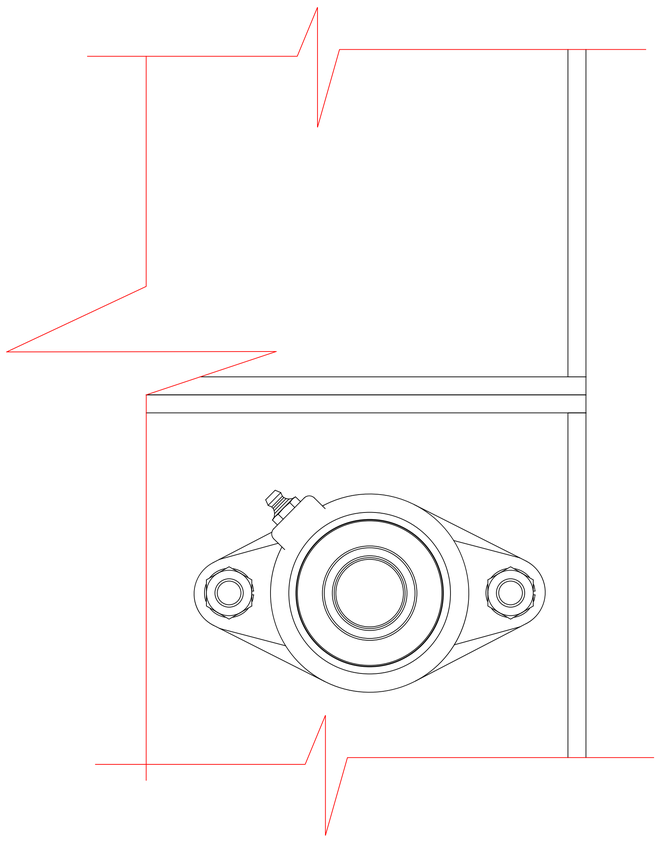
DRAWN BY	SCALE	DATE
MR	FULL	2017–JAN–23
CHECKED BY	APPROVED	PROJECT#

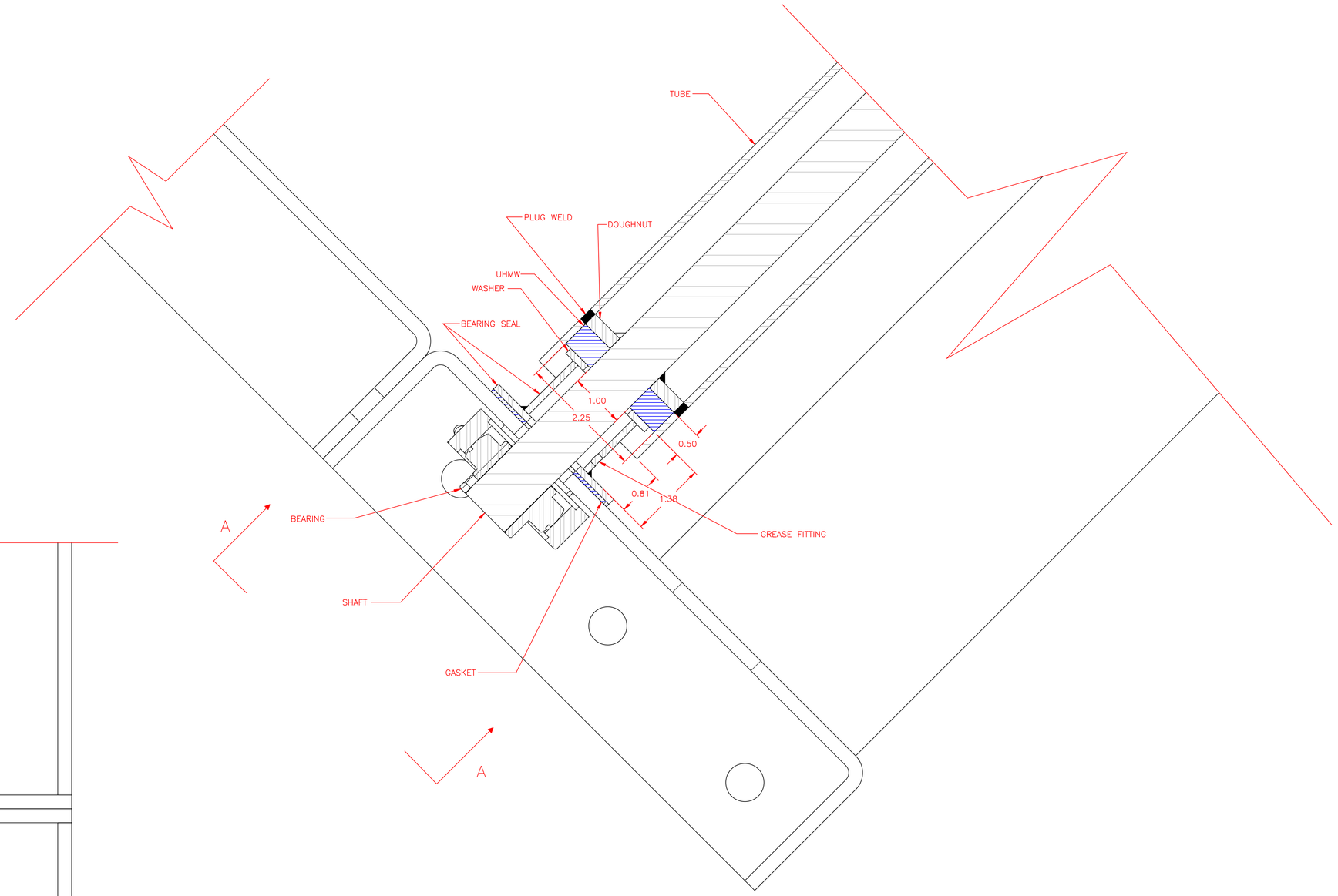
DWG. NO. 1619BDLR–06

SHEET NO. 01 OF 01

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersed two–part epoxy with minimum 3 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03





NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. All paint is to be intermediate coat, epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

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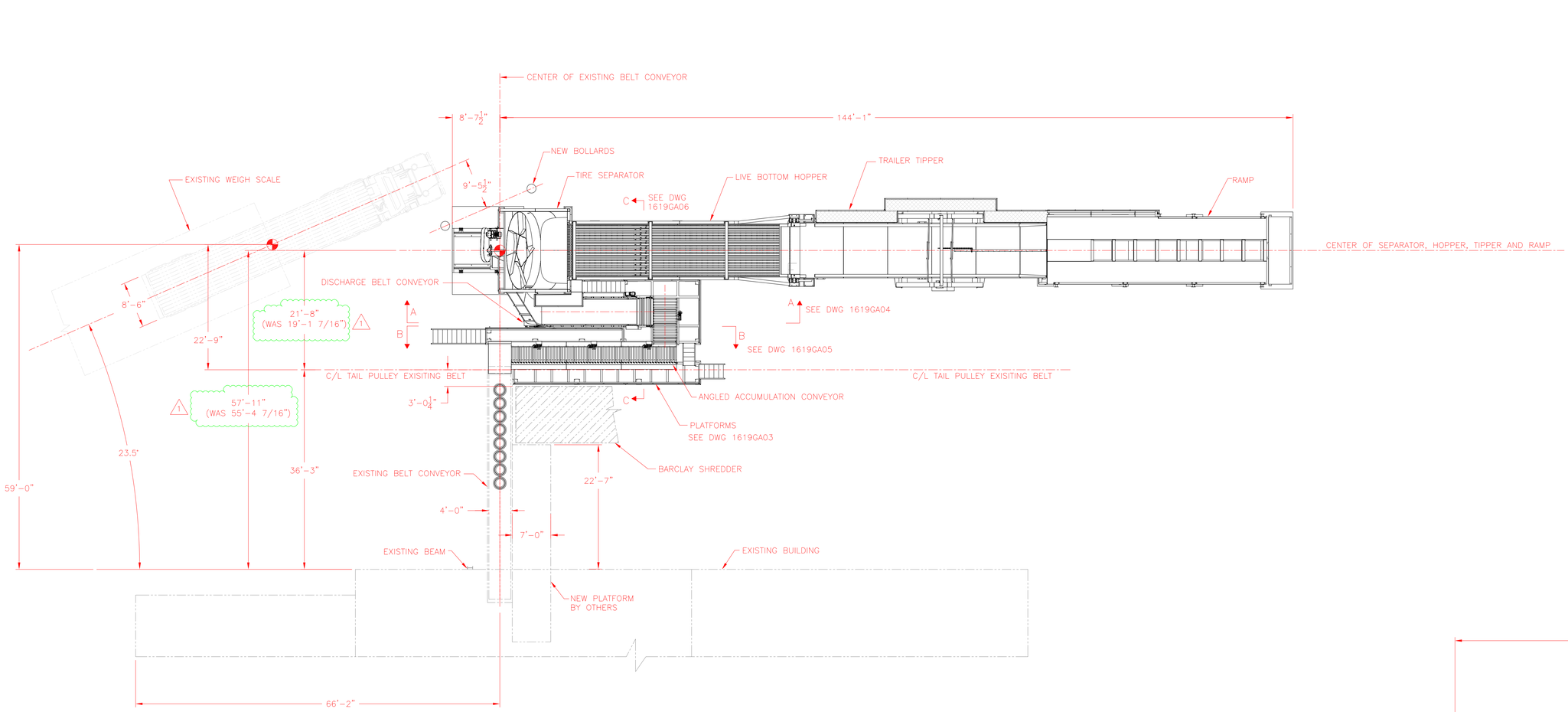
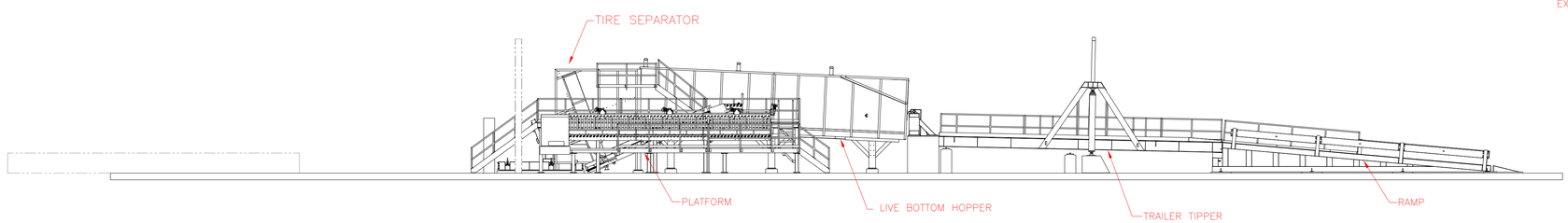
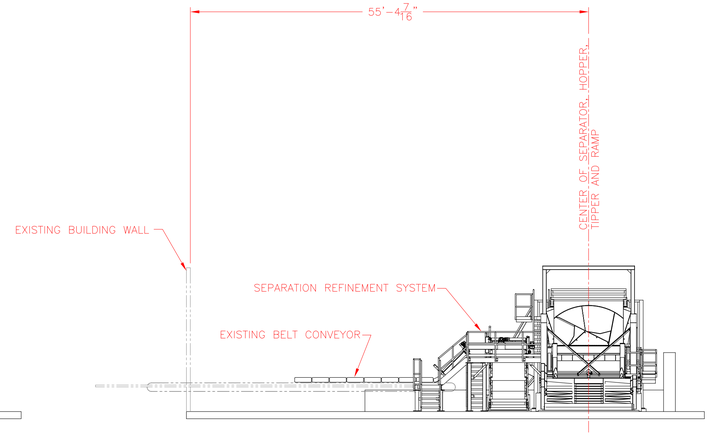
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE SEPARATOR SYSTEM
ANGULAR BDLR SECTION VIEW DRIVEN SIDE

DRAWN BY	SCALE	DATE
MR	FULL	2017–JAN–23
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619BDLR–07		01 OF 01

GENERAL ARRANGEMENT DRAWINGS







NORTH

GENERAL ARRANGEMENT

DRAWING CHANGES

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersest two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

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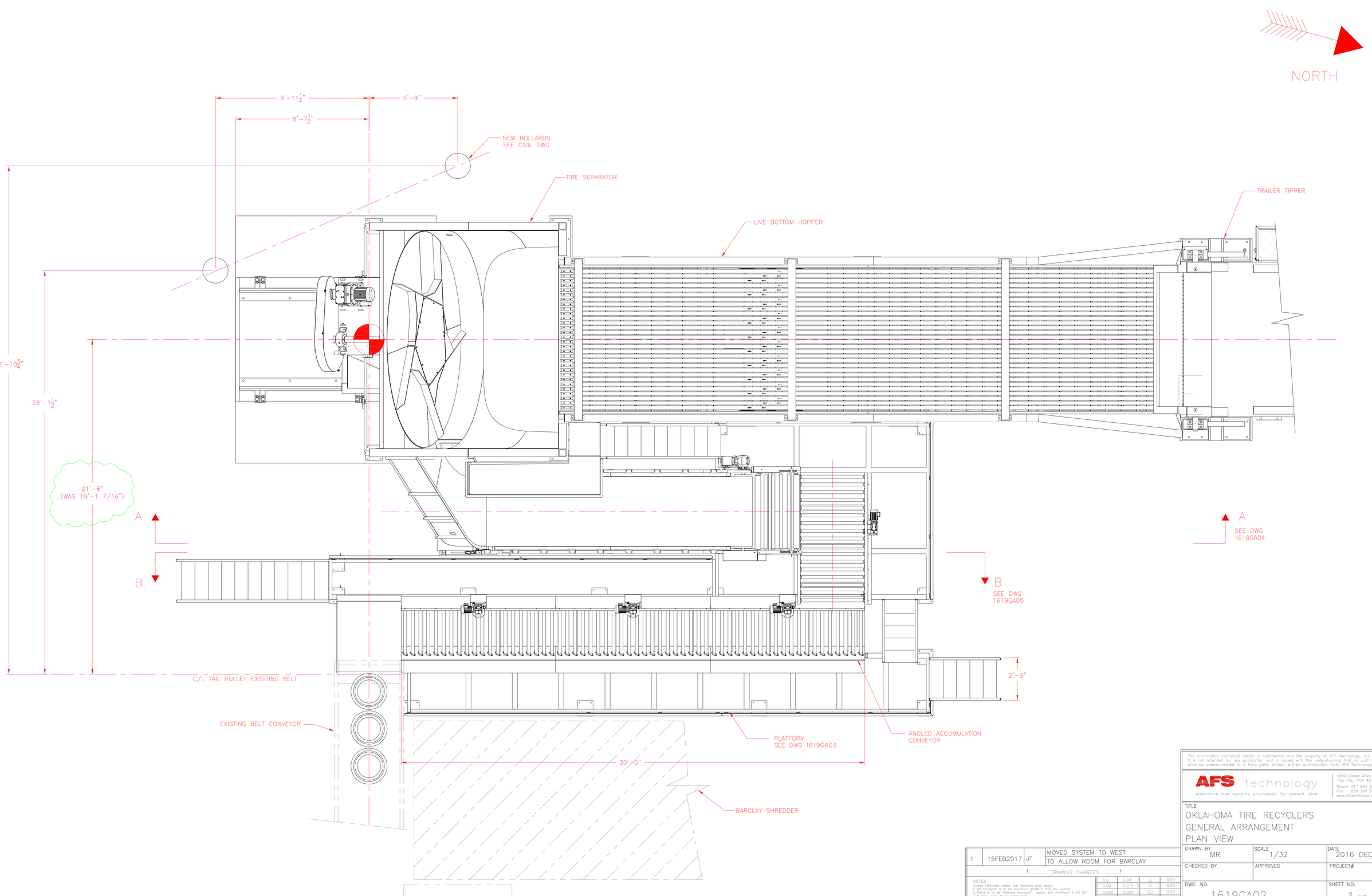
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT

DRAWN BY: MR	SCALE: 1/120	DATE: 2016 DEC 06
CHECKED BY	APPROVED	PROJECT#
DWG. NO.: 1619GA01		SHEET NO.: 1 OF 6



1	15FEB2017	JT	MOVED SYSTEM TO WEST TO ALLOW ROOM FOR BARCLAY

DRAWING CHANGES

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03

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4060 Gibson Drive
Tipp City, Ohio 45371 USA
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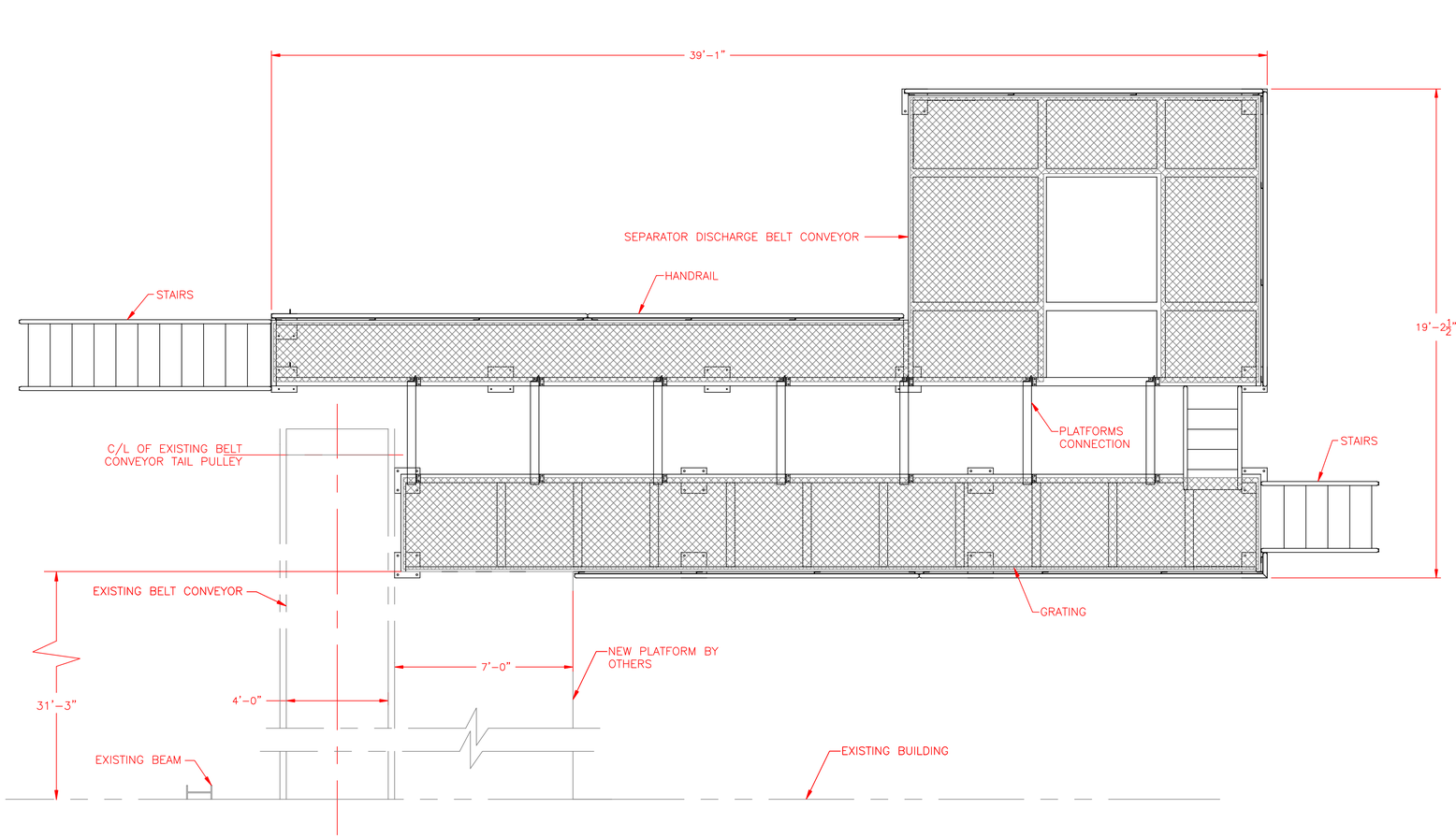
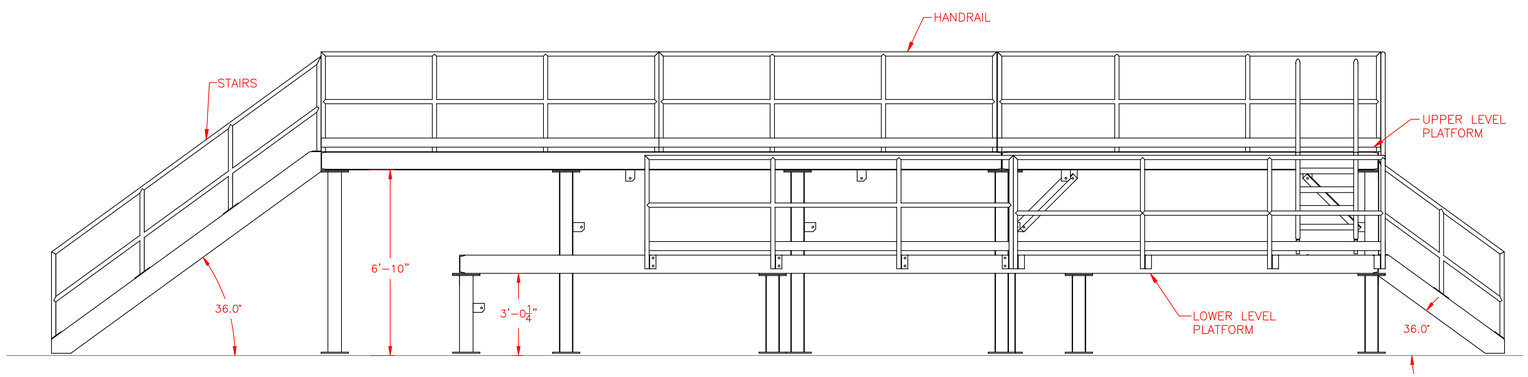
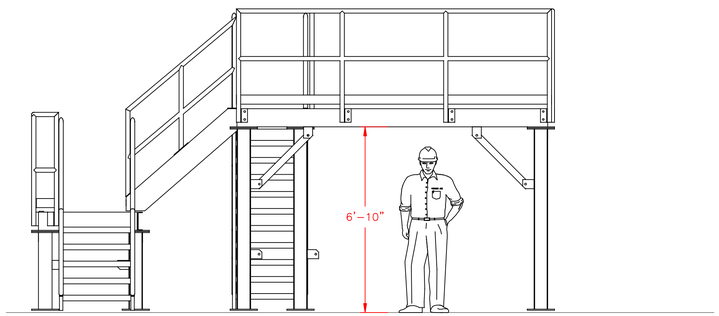
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT
PLAN VIEW

DRAWN BY: MR	SCALE: 1/32	DATE: 2016 DEC 28
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619GA02		SHEET NO. 2 OF 6







NORTH

PLATFORM

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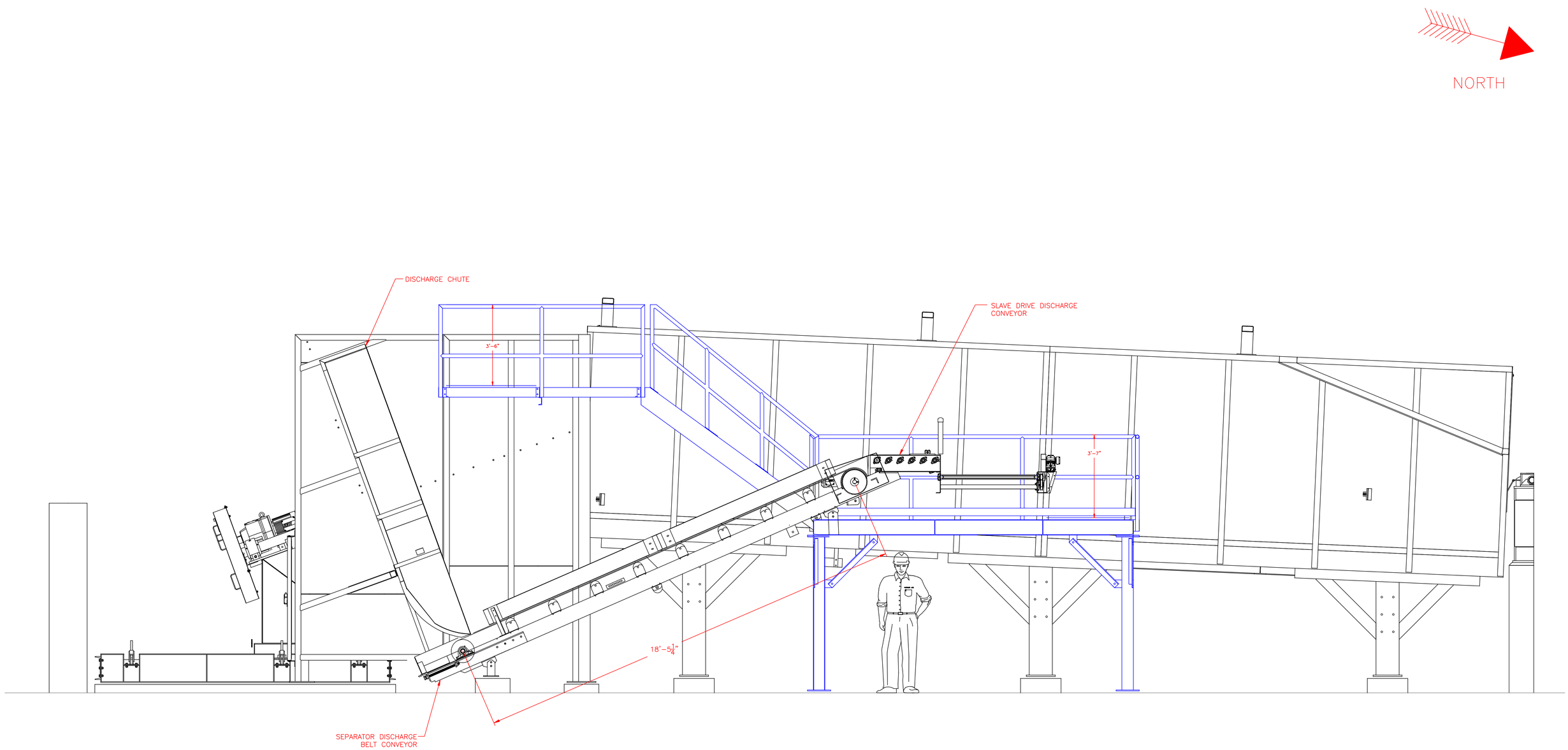
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT
PLATFORMS

DRAWN BY	SCALE	DATE
MR	1/32	2016 DEC 28
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619GA03		3 OF 6

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intereseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03



SECTION A–A

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersesd two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03

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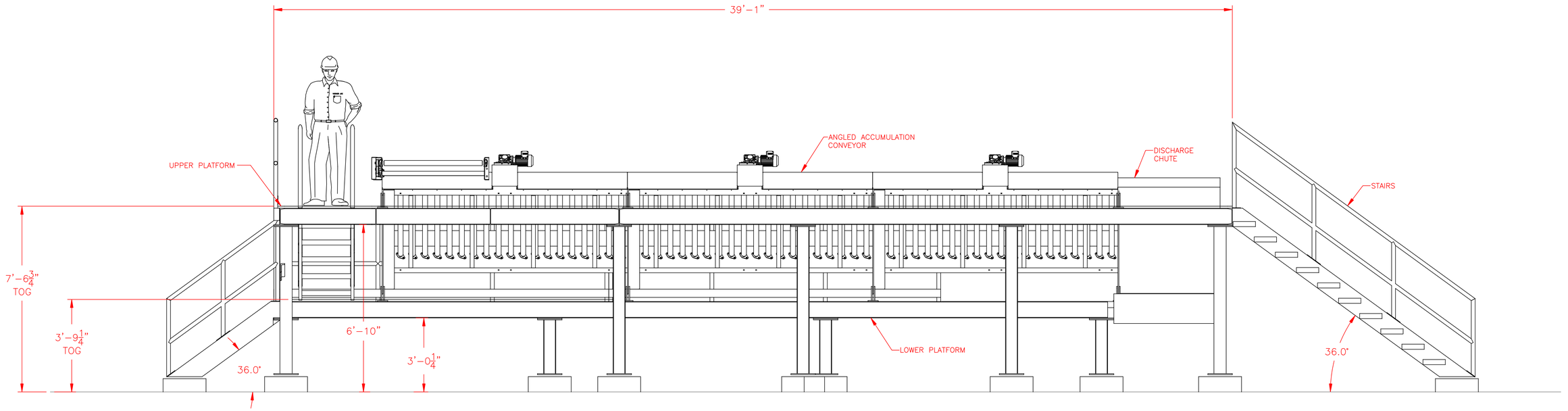
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT
SECTION A–A

DRAWN BY	SCALE	DATE
MR	1/24	2016 DEC 20
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619GA04		4 OF 6

NORTH



SECTION B–B

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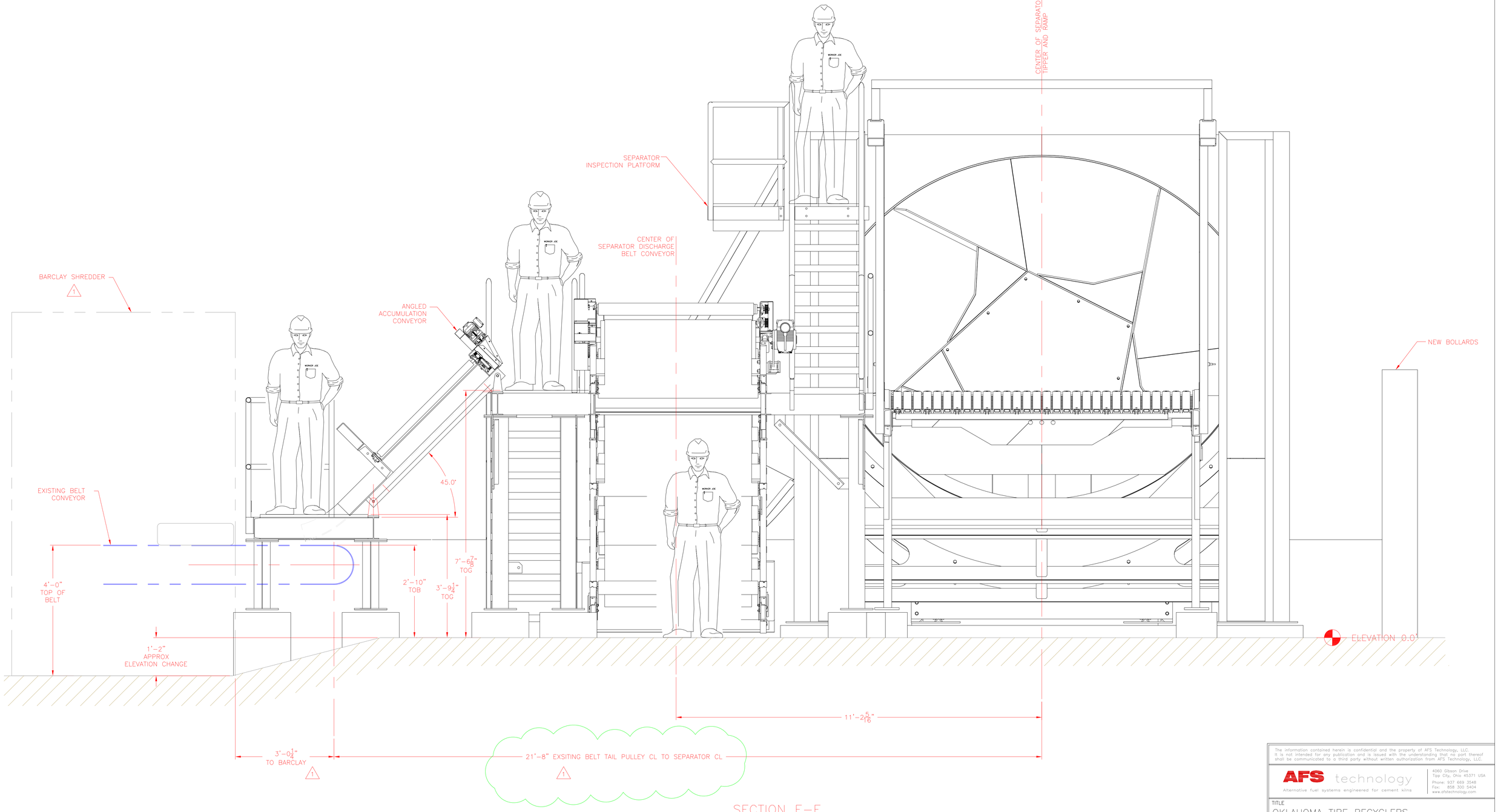
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT
SECTION A–A

DRAWN BY	SCALE	DATE
MR	1/24	2016 DEC 20
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619GA05		SHEET NO. 5 OF 6

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersea two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
X/X	1/32	—	0.03
Ⓜ	0.03	∠	0.03



SECTION E-E

1	15FEB2017	JT	MOVED SYSTEM TO WEST ADDED BARCLAY LOCATION

DRAWING CHANGES

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersest two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

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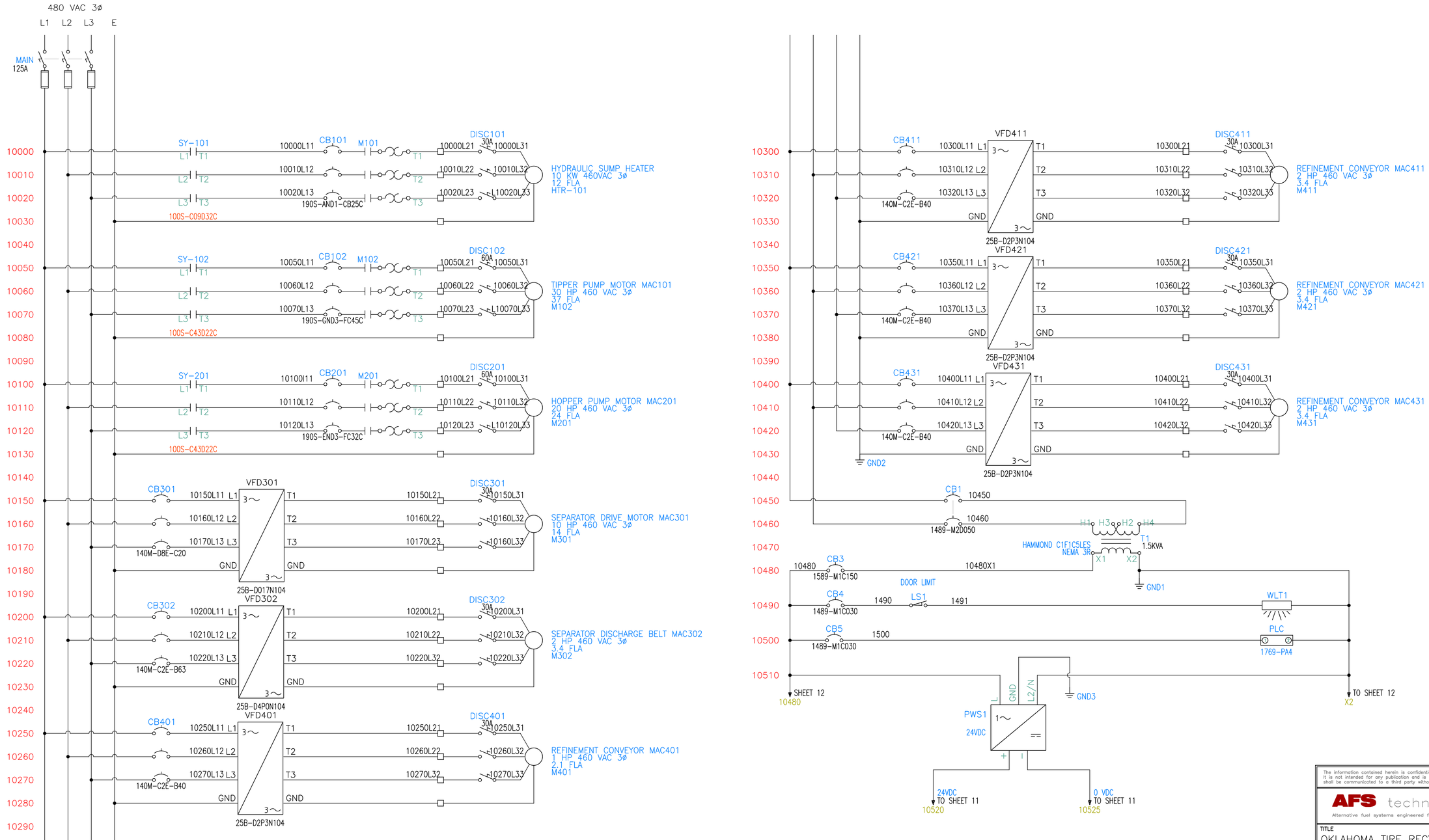
TITLE
OKLAHOMA TIRE RECYCLERS
GENERAL ARRANGEMENT
SECTION E-E

DRAWN BY: MR	SCALE: 1/16	DATE: 2016 DEC 28
CHECKED BY	APPROVED	PROJECT#
DWG. NO.: 1619GA06		SHEET NO.: 6 OF 6

ELECTRICAL DRAWINGS



AS-BUILT DRAWINGS
MAY 18 2017

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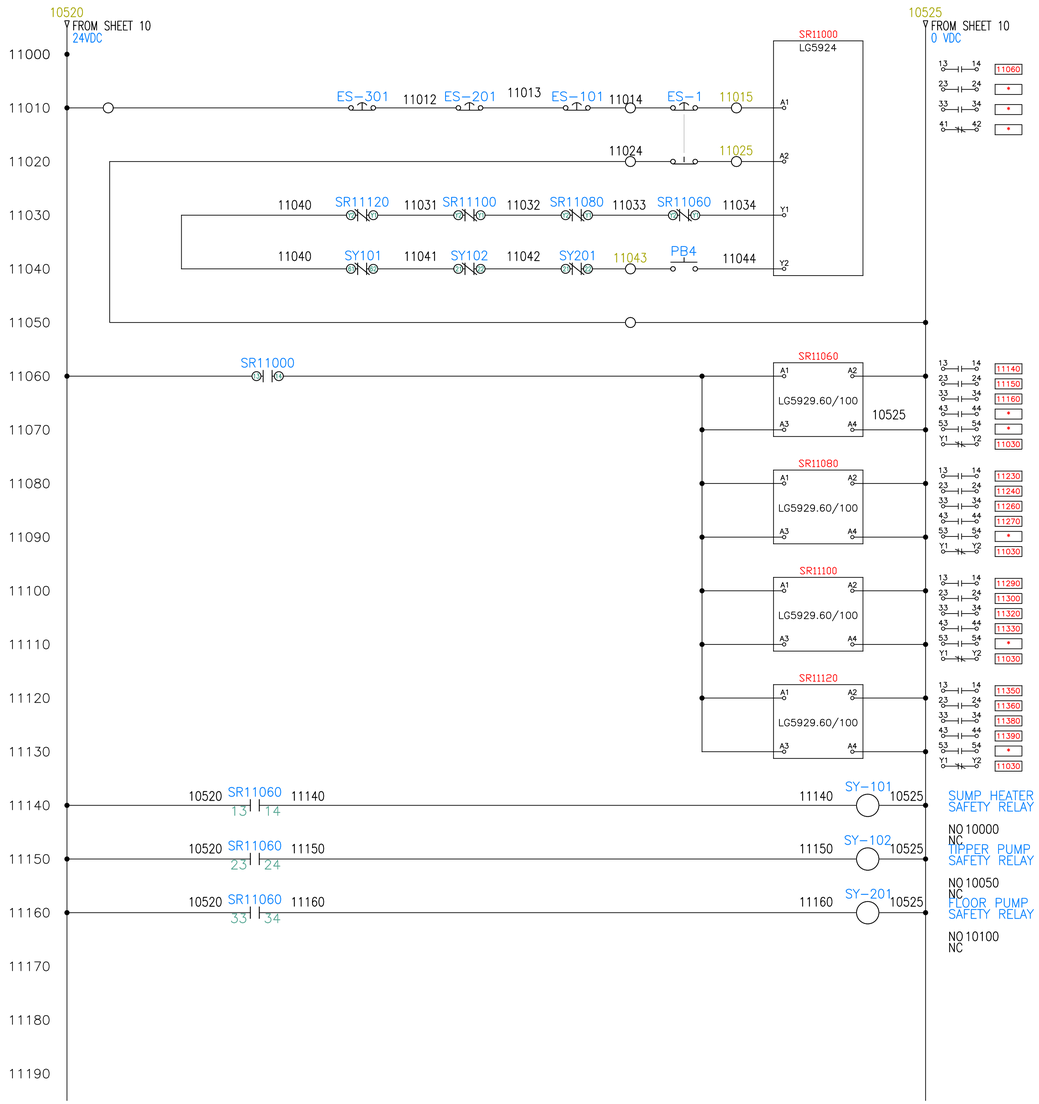
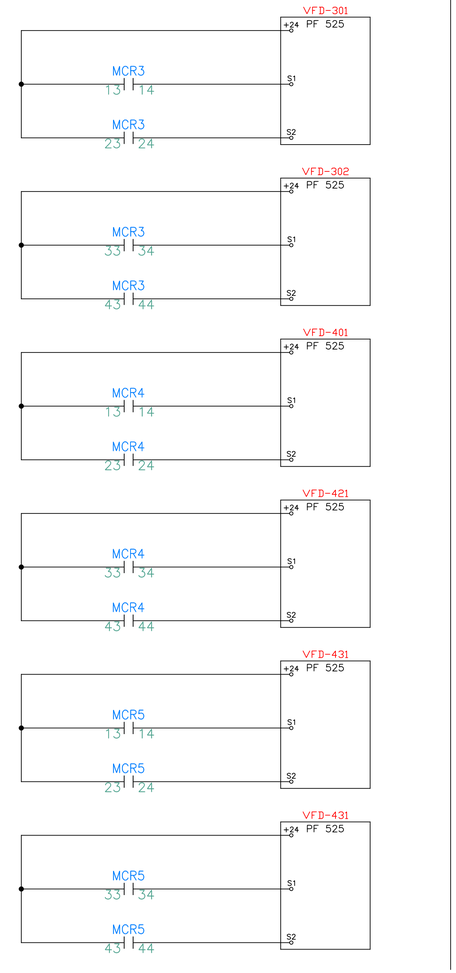
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
MOTOR AND CONTROL POWER

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619E01		1 OF 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ø	0.03	∠	0.03





AS-BUILT DRAWINGS
MAY 18 2017

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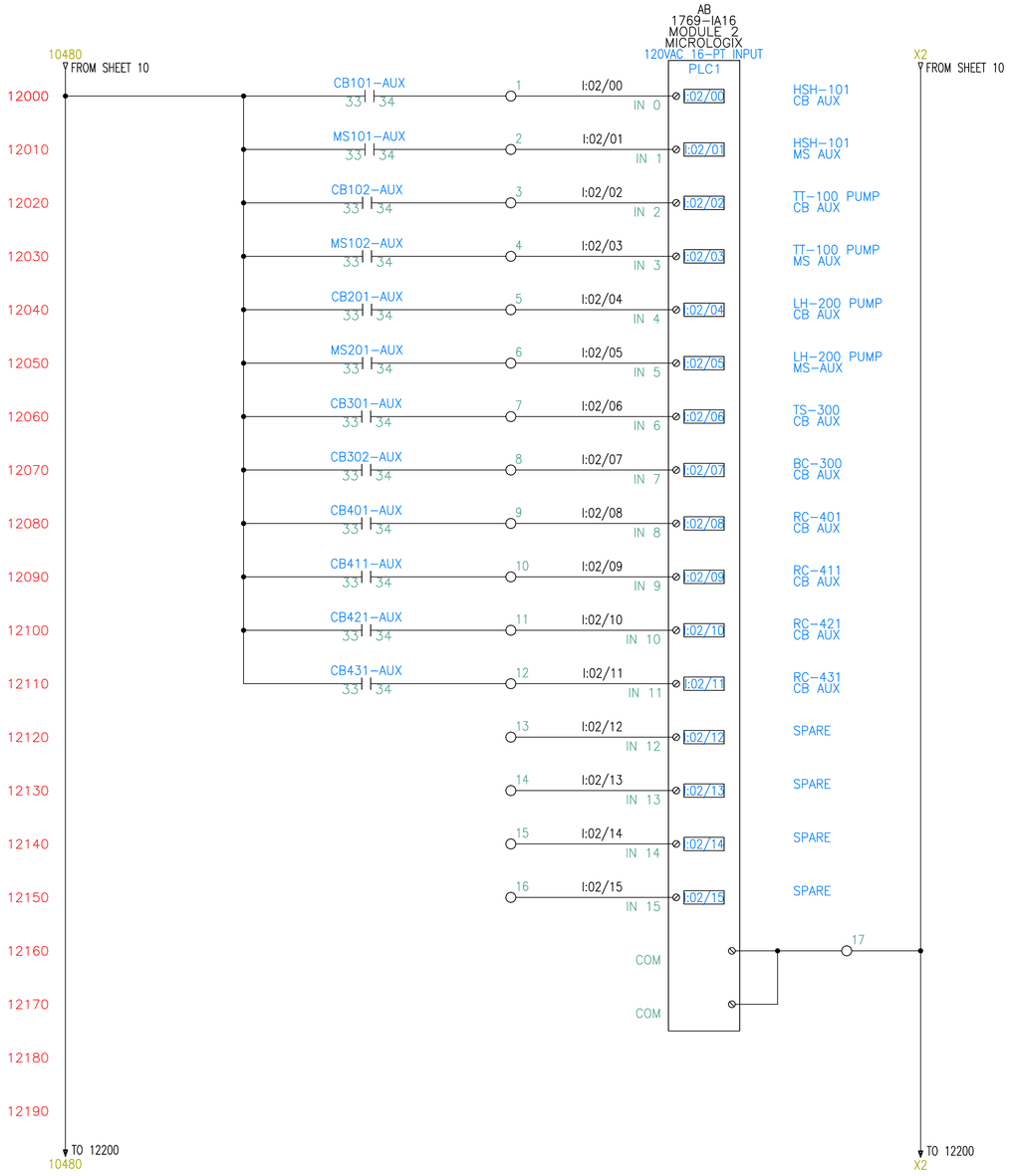
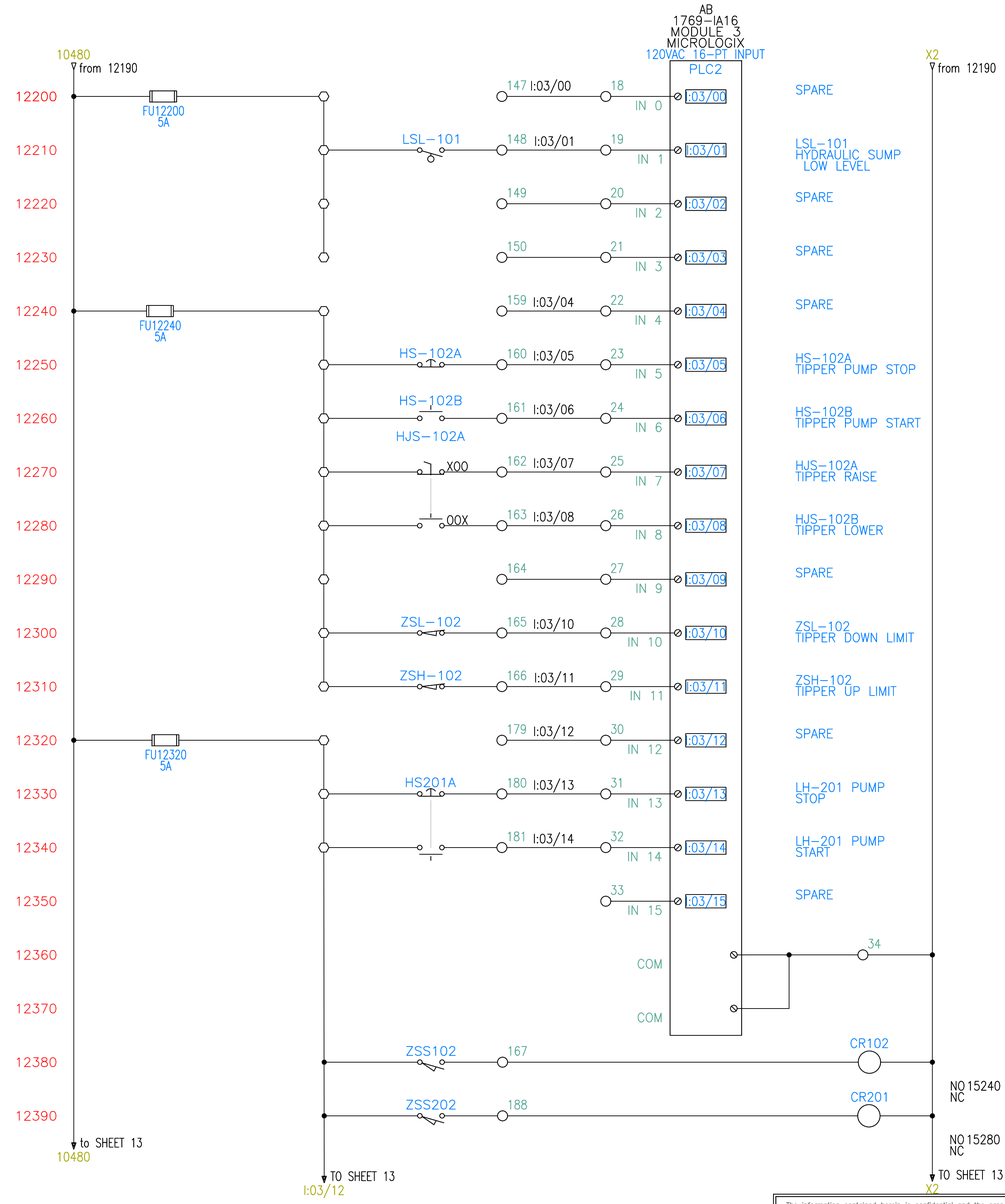
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
SAFETY CIRCUITS

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619E01		1 OF 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
⊗	0.03	∠	0.03





AS-BUILT DRAWINGS
MAY 18 2017

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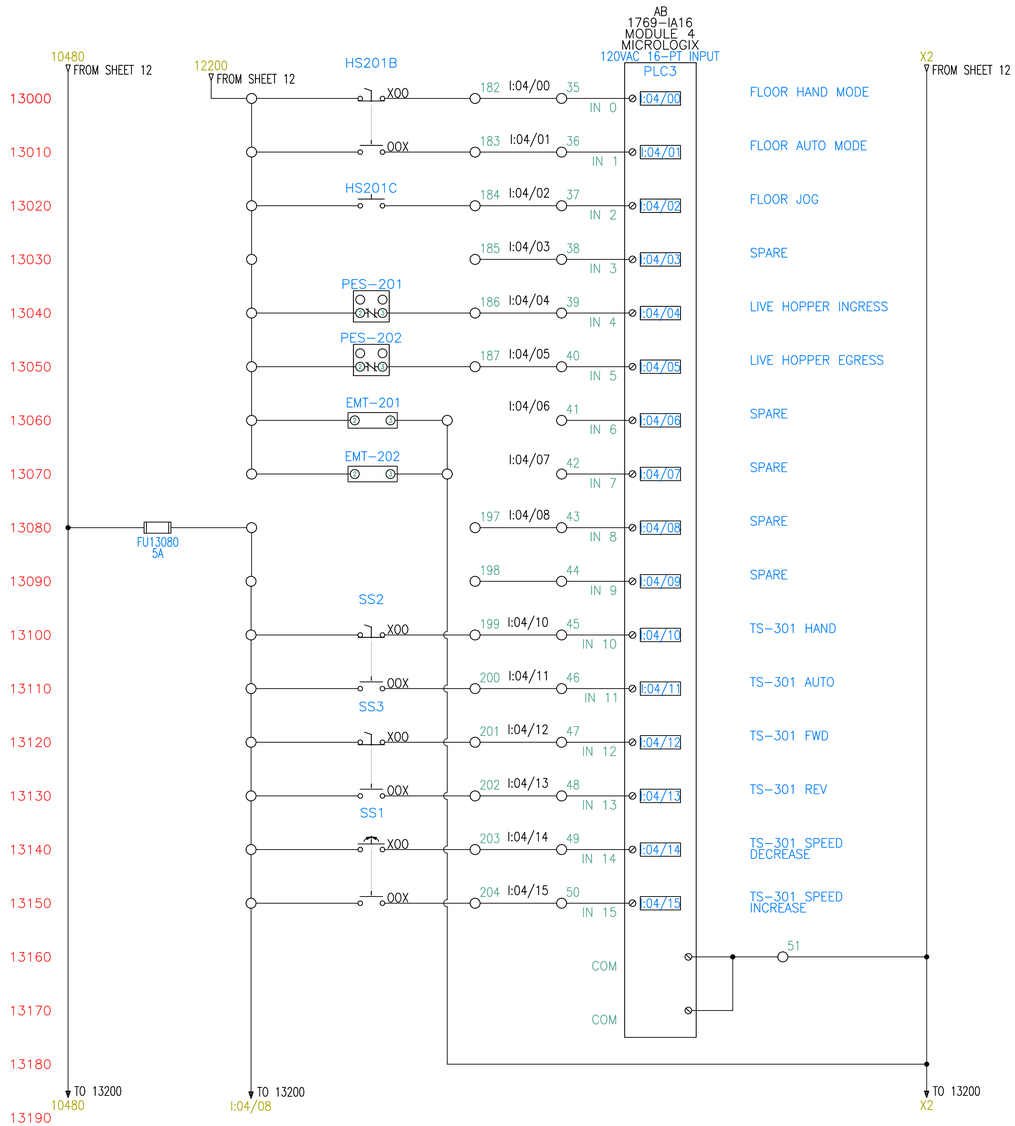
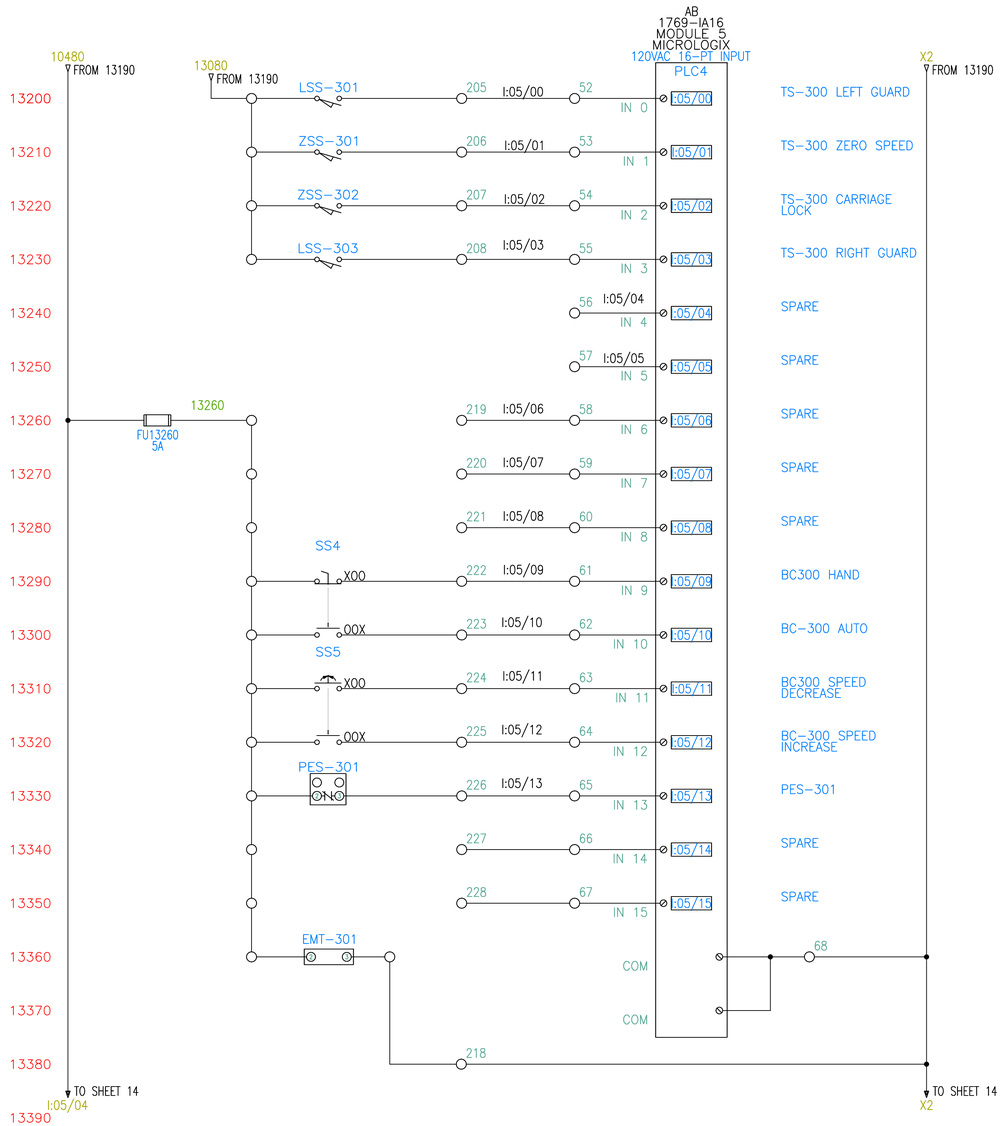
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
PLC 1/O MODULES 2 & 3

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619E01		SHEET NO. 1 OF 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intereseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03





AS-BUILT DRAWINGS
MAY 18 2017

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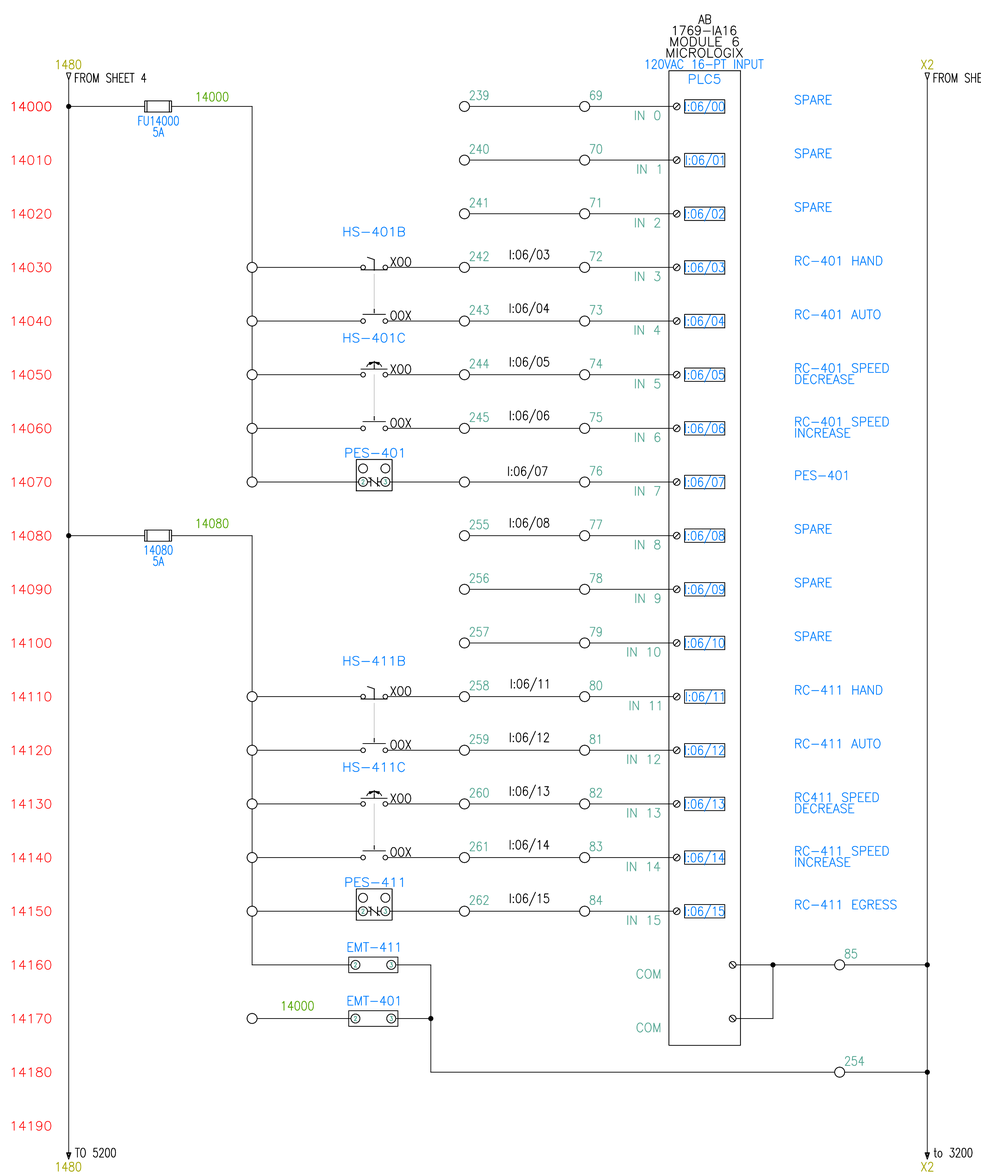
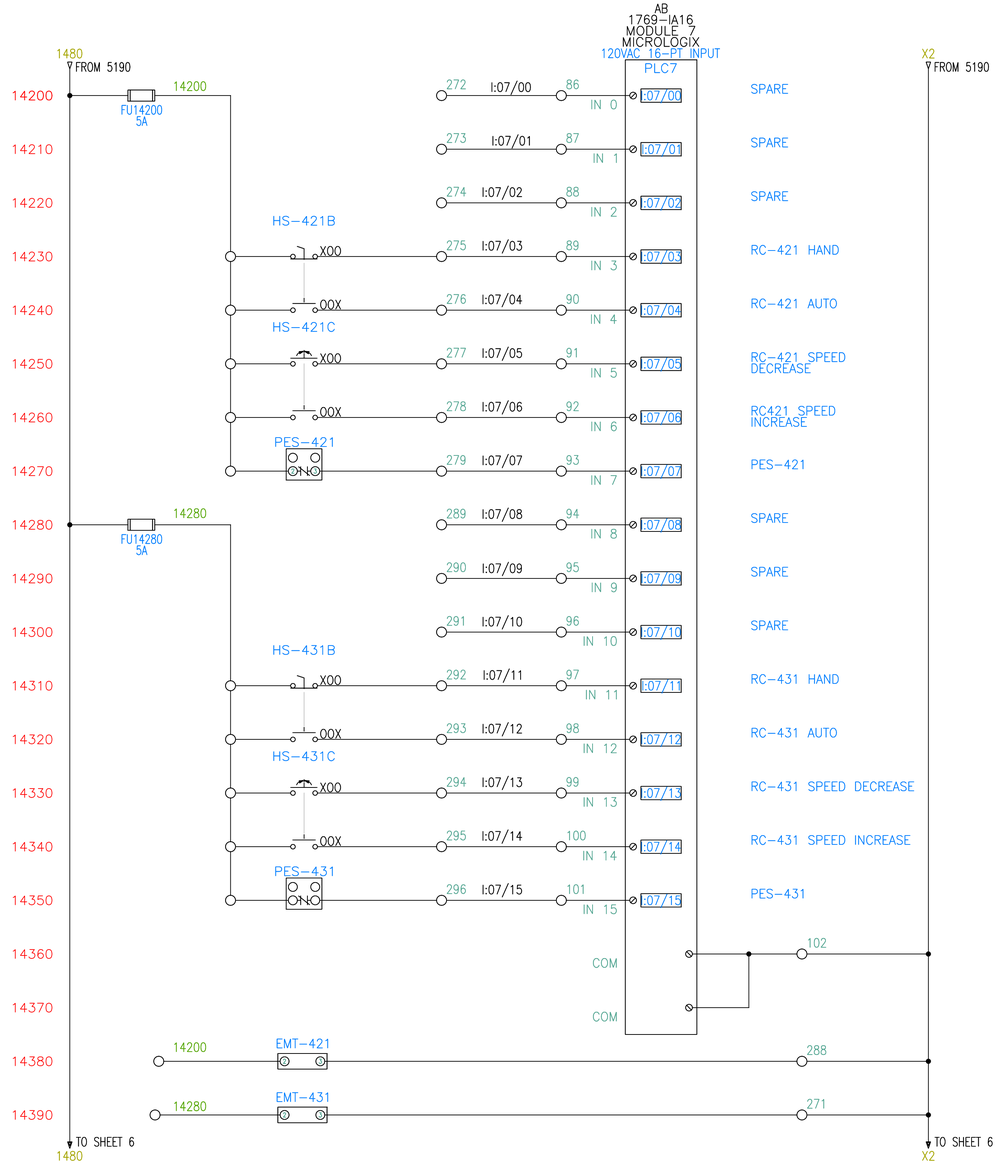
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
PLC I/O 4 & 5

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619E01		1 OF 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03





AS-BUILT DRAWINGS
MAY 18 2017

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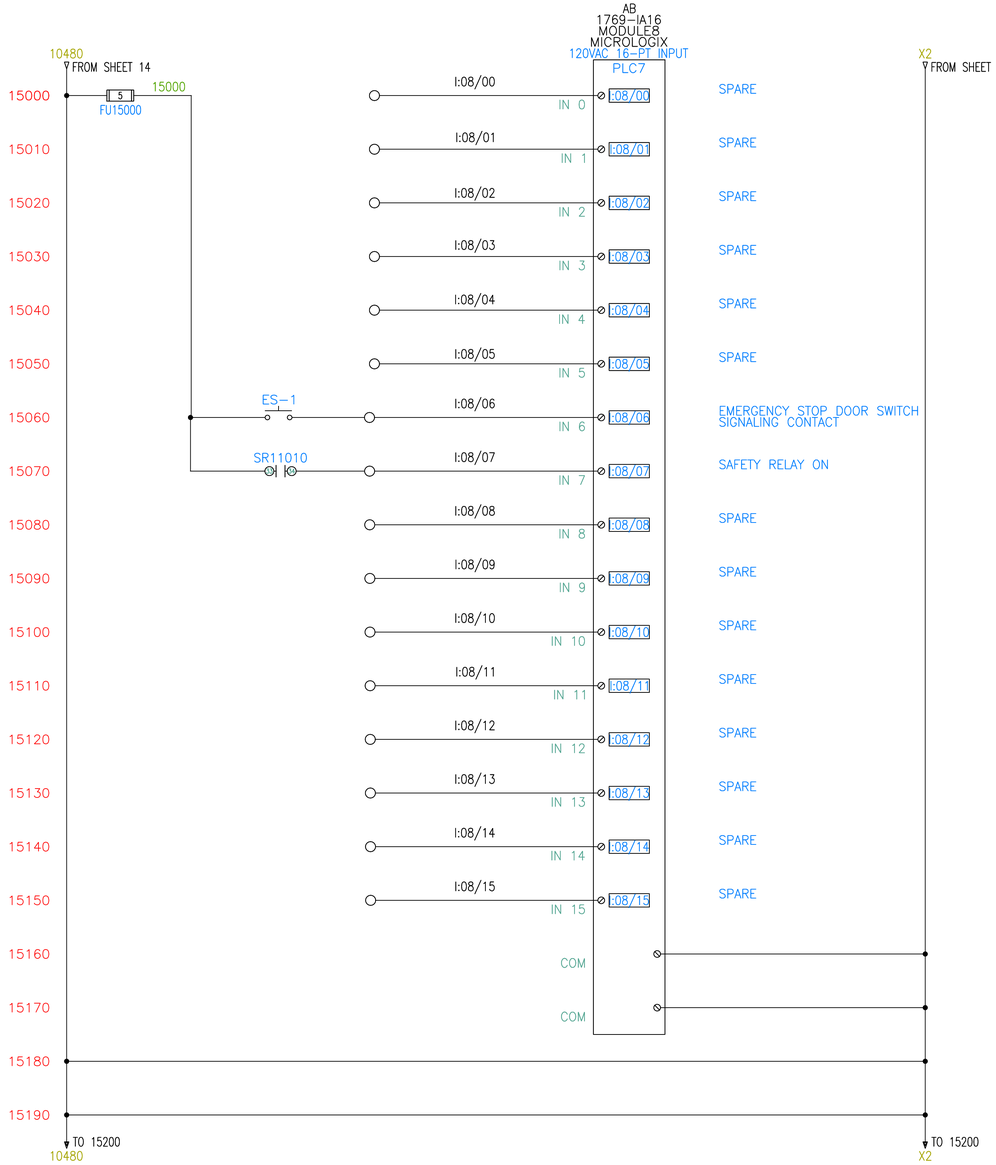
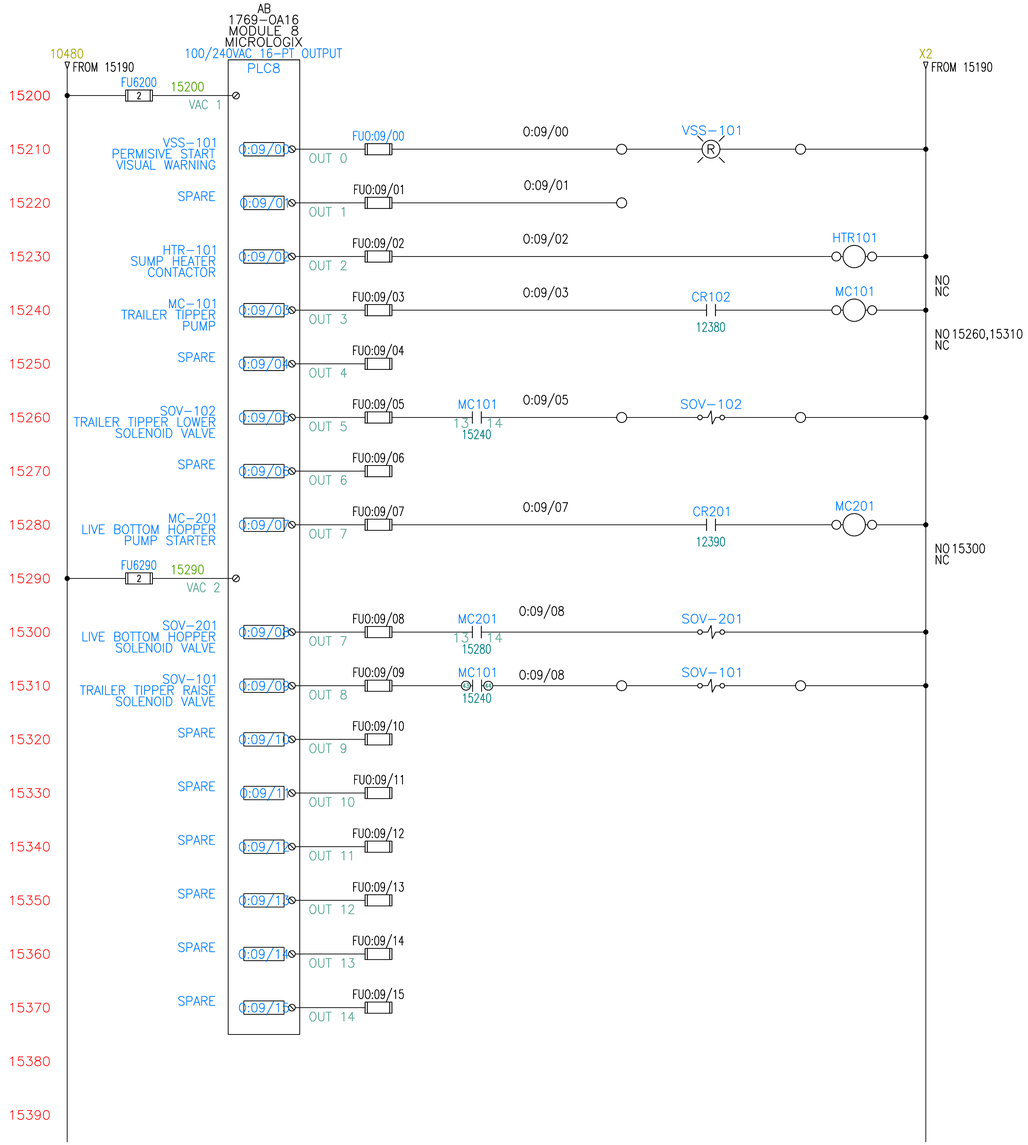
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
PLC I/O 6 & 7

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619E01		SHEET NO. 1 OF 1

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	⏥	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03





AS-BUILT DRAWINGS
MAY 18 2017

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intereseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

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4060 Gibson Drive
Tipp City, Ohio 45371 USA
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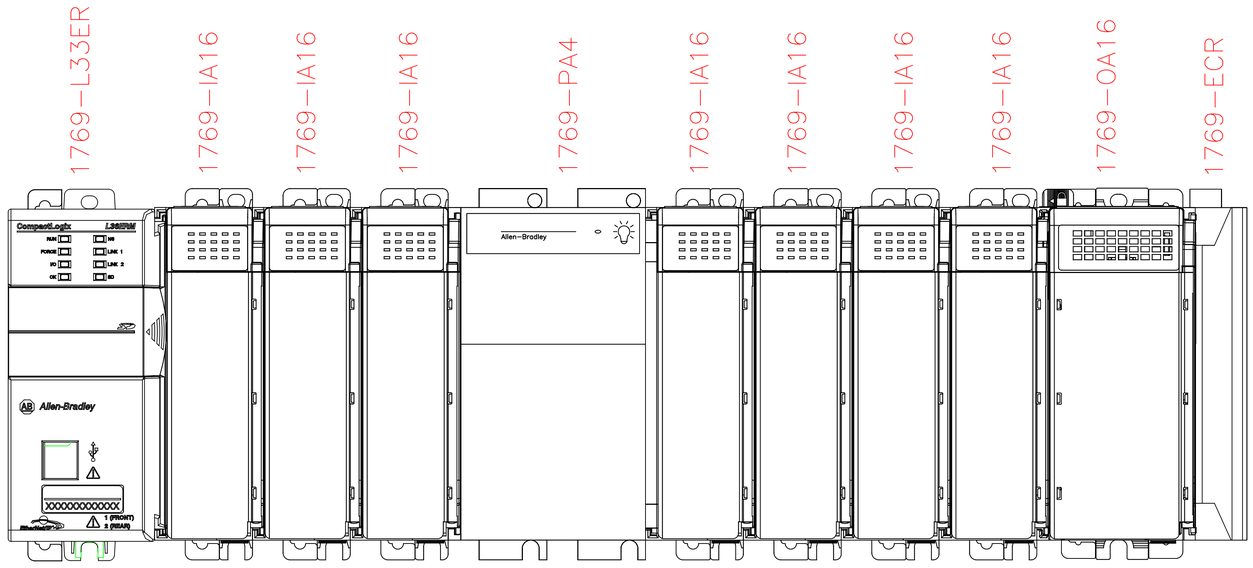
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
PLC I/O 8 & 9

DRAWN BY	SCALE	DATE
GWS	NONE	2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619E01		SHEET NO. 1 OF 1



AS-BUILT DRAWINGS
MAY 18 2017

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Interseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

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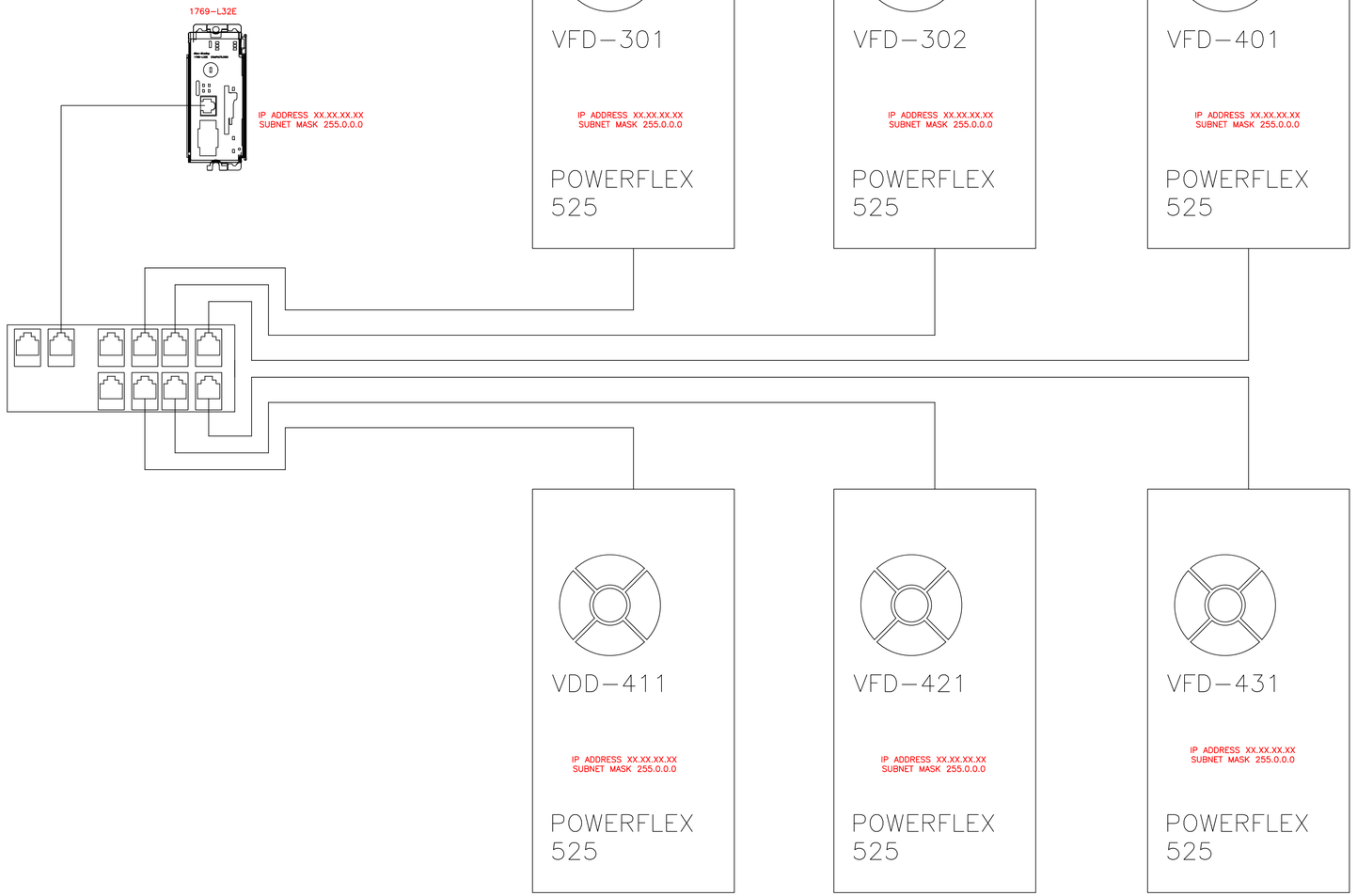
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
PLC ARRAY

DRAWN BY: GWS	SCALE: NONE	DATE: 2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO.: 1619E02		SHEET NO.: 1 OF 1



AS-BUILT DRAWINGS
MAY 18 2017

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
Ⓜ	0.03	∠	0.03

AFS technology
Alternative fuel systems engineered for cement kilns
4060 Gibson Drive
Tipp City, Ohio 45371 USA
Phone: 937 669 3548
Fax: 858 300 5404
www.afstechnology.com

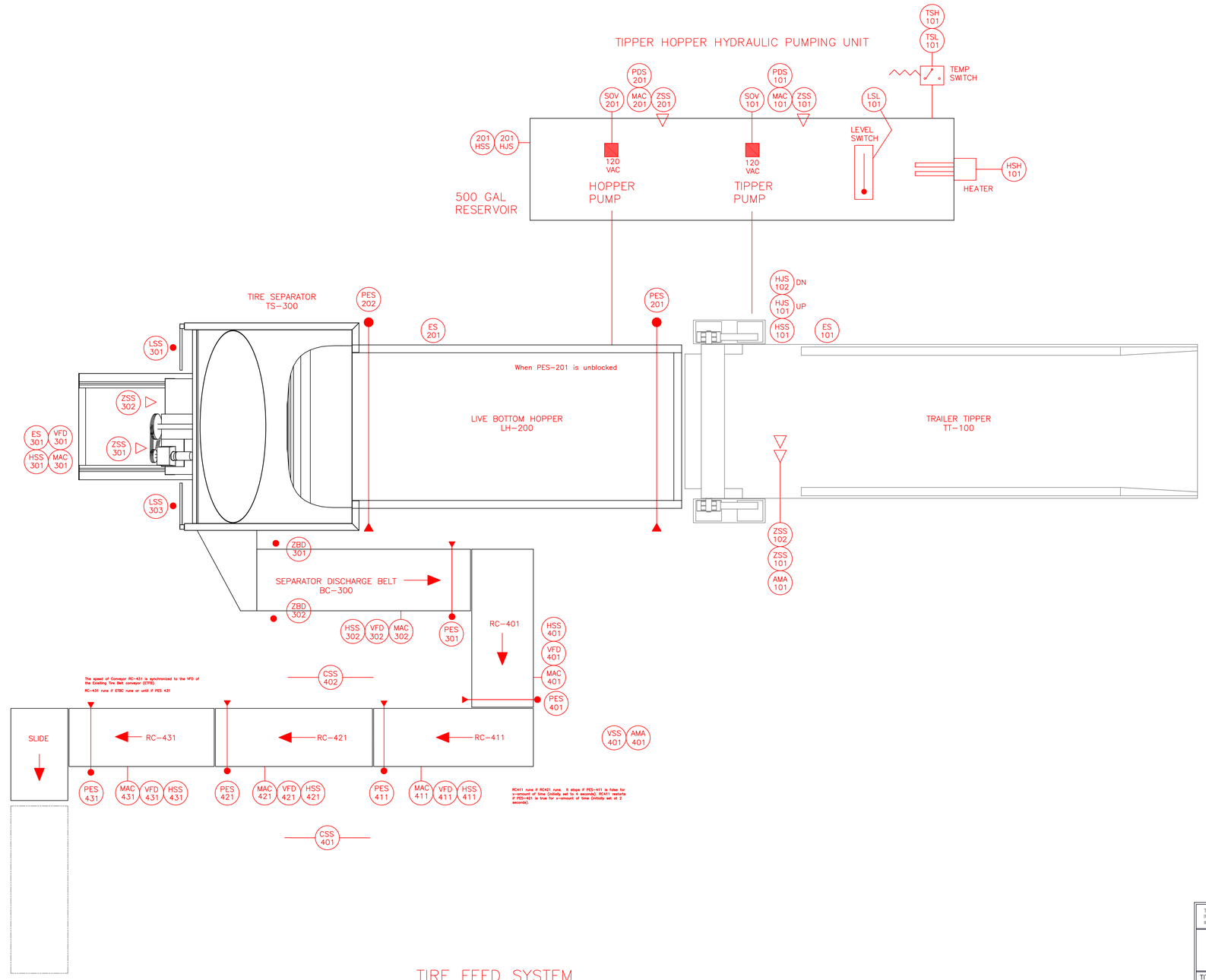
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM

DRAWN BY: GWS	SCALE: NONE	DATE: 2017 MAY 18
CHECKED BY	APPROVED	PROJECT#
DWG. NO.: 1619E02		SHEET NO.: 1 OF 1

ELECTRICAL DEVICE DIAGRAM

FIELD DEVICES TIRE AND RDF/PEF SYSTEM

SYMBOL	ABRV.	DESCRIPTION	DI	DO	AI	AO
VFD	VFD	MOTOR- A/C VARIABLE FREQUENCY DRIVE		6		
MAC	MAC	MOTOR- A/C		8		
	SOV	SOLENOID VALVE		2		
	HSH	TANK HEATER		1		
	ZSS ZSO ZSC	PROXIMITY SENSOR	6			
	PES	PHOTO ELECTRIC SENSOR	6			
	LSS	LIMIT SWITCH (ZSH and ZSL)	2			
CSS	CSS	SAFETY CABLE PULL SWITCH	2			
ES	ESP	EMERGENCY STOP PUSHBUTTON	3			
ZSS	ZSS	ZERO SPEED SWITCH	0			
ZBD	ZBD	BELT DRIFT SWITCH (2 OUTPUTS/SWITCH)	2			
HSS	HSS	HAND SELECTOR SWITCH (2 OUTPUTS/SWITCH)	8			
HJS	HJS	HAND JOG SWITCH	3			
PBS	PBS	PUSH BUTTON SWITCH	0			
	LSL	LEVEL SWITCH	1			
	TSH	TEMPERATURE SWITCH	1			
VSS	VSS	VISUAL ALARM	1			
AMA	AMA	AUDIBLE ALARM	2			
PDS	PDS	PRESSURE DIFFERENTIAL SWITCH	2			
TWT	TWT	WEIGH SCALE CONTROLLER				
	ULS	ULTRASONIC LEVEL SENSOR				
TP	TP	THERMAL PROBE				
ENC	ENC	ENCODER				
TOTALS			64	26	0	0



TIRE FEED SYSTEM
ELECTRICAL DEVICE DIAGRAM

1 2

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be Intereseal two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03

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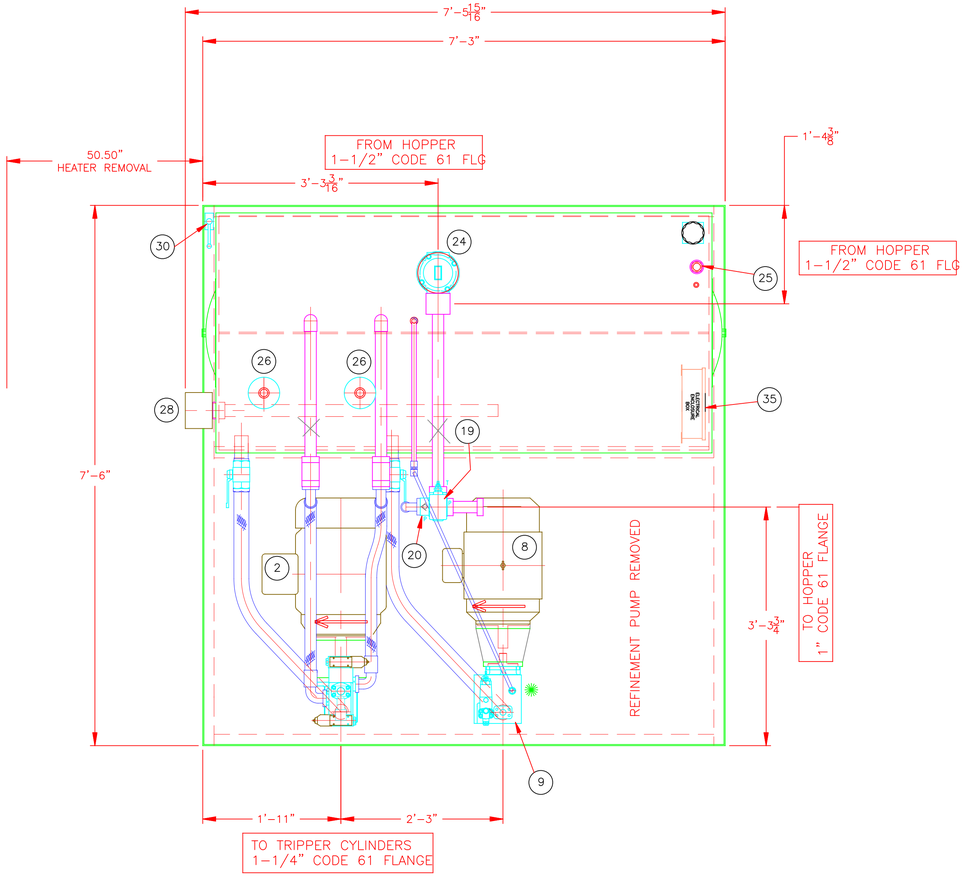
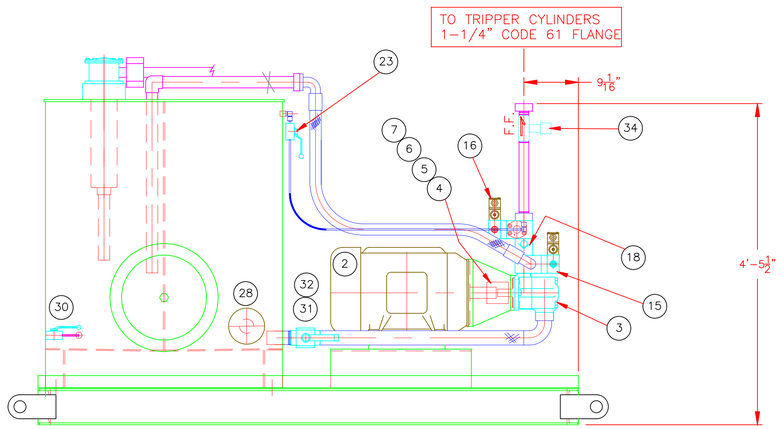
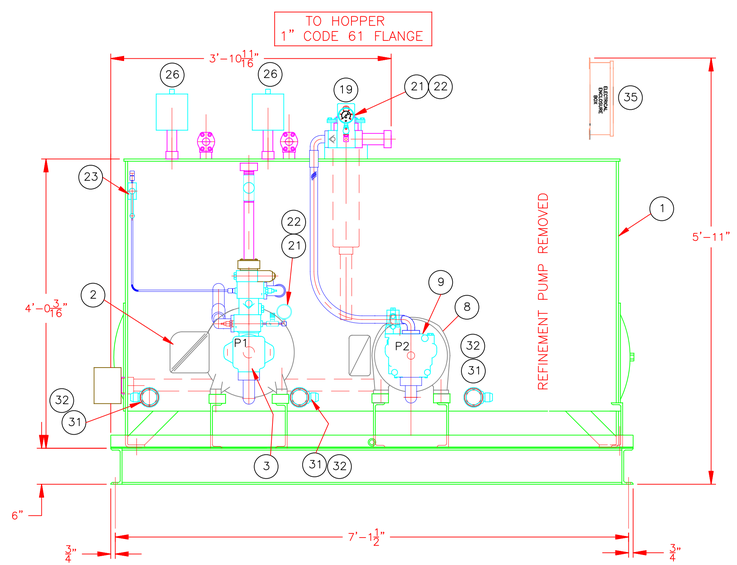
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM
DEVICE DIAGRAM

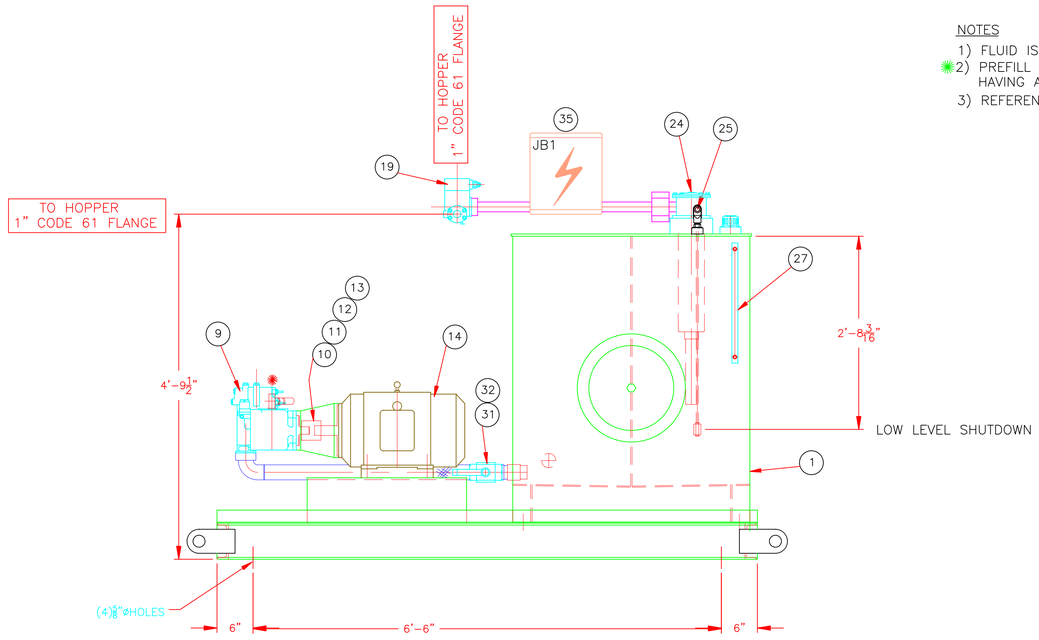
DRAWN BY	SCALE	DATE
SW	NONE	2016 NOV 14
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619DD01		OF

HYDRAULIC DRAWINGS









NOTES

1) FLUID IS TBD
2) PREFILL PISTON PUMP WITH NEW CLEAN HYDRAULIC HAVING A VISCOITY OF 150SSU @100 DEG F PRIOR TO START
3) REFERENCE SCHEMATIC SEE DWG#511H02 SH2 OF 2

REVISIONS

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TITLE
OKLAHOMA TIRE FEED SYSTEM
TIPPER AND HOPPER
HYDRAULIC PUMP SYSTEM ASSEMBLY

DRAWN BY	SCALE	DATE
JT	NONE	2017-FEB-22
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619HY-02		OF

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 6 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
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0.000	0.005	▱	0.03
x/x	1/32	—	0.03
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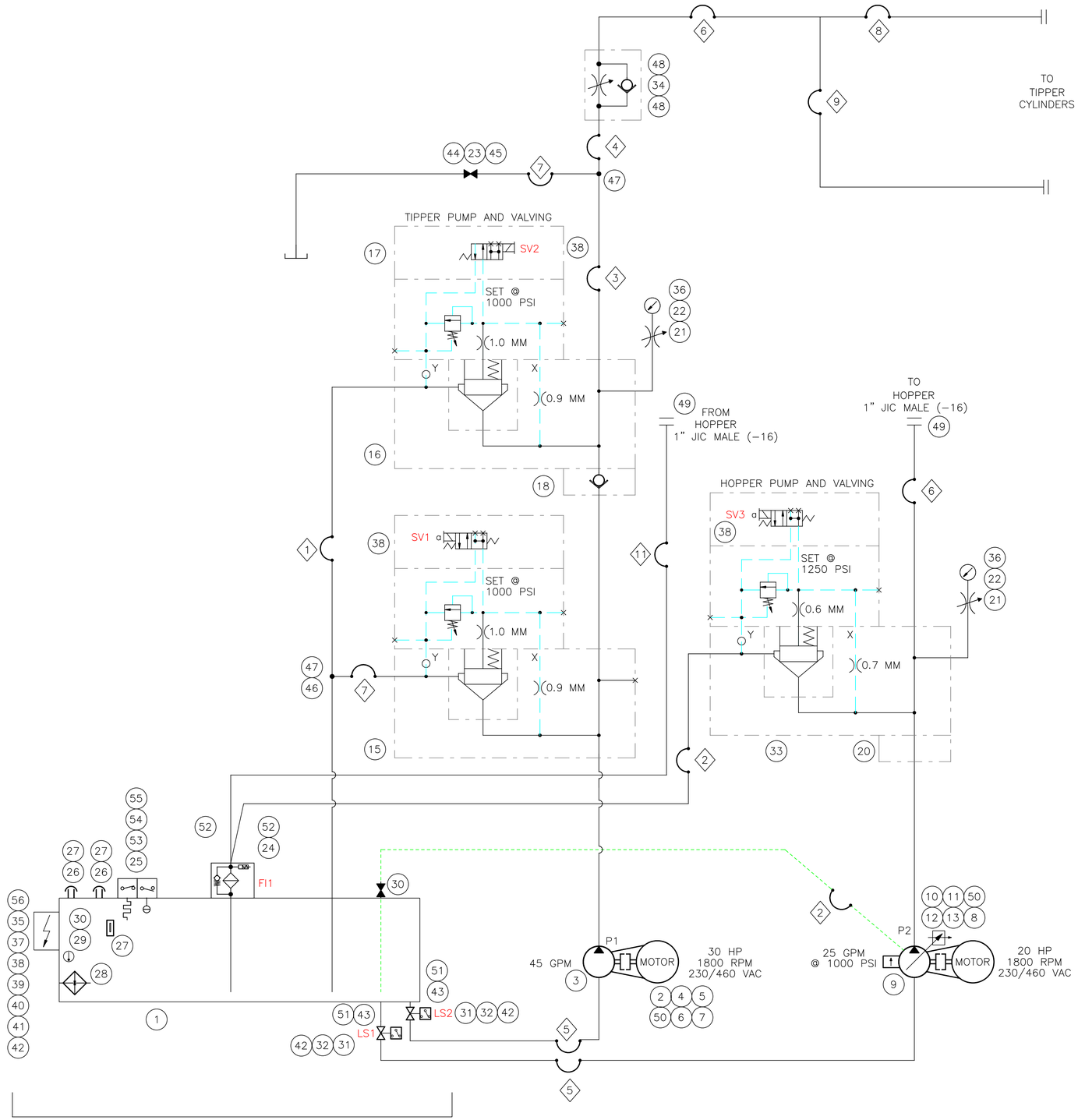

MATERIALS

MARK	QTY.	DESCRIPTION	MANUFACTURER	
1	1	RESERVOIR 400 GALLONS	HAYS ENGINEERING	17-400-AFS
2	1	ELECTRIC MOTOR	WORLDWIDE	WWE30-18-286TC
–	–	30 HP, 1800 RPM, TEFC, 286TC, 230/460/3/60		
3	1	VANE PUMP	VICKERS	35V30A1C22R
4	1	C-FACE ADAPTOR	MAGNALOY	M284862C
5	1	COUPLING HALF	GRAINGER	29HY66
6	1	COUPLING HALF	GRAINGER	29HY62
7	1	INSERT	GRAINGER	29HZ19
8	1	ELECTRIC MOTOR	WORLDWIDE	WWE20-18-256TC
–	–	20 HP, 1800 RPM, TEFC, 256TC, 230/460/3/60		
9	1	PISTON PUMP	VICKERS	PVM063ER09ES02AAA21000000A0A
10	1	C-FACE ADAPTOR	MAGNALOY	M182682C
11	1	COUPLING HALF	GRAINGER	29HY54
12	1	COUPLING HALF	GRAINGER	29HY51
13	1	COUPLING INSERT	GRAINGER	29HZ13
15	1	FLANGE RELIEF VALVE	VICKERS	CPF2S10BW3SMUB520
16	1	FLANGE RELIEF VALVE	VICKERS	CPF2S10BW3SMFWLB520-EN417
18	1	FLANGE CHECK VALVE	VICKERS	DCIPFS10
20	1	FLANGE SPACER	ANCHOR FLUID PWR	AS-16-GP
21	2	GAUGE ISOLATOR	DMIC	DMGV-SM
22	2	PRESSURE GAUGE (0-3000 PSI)	GRAINGER	19RZ24
23	1	BALL VALVE	ANCHOR	AB2S#20-11DB
24	1	RETURN FILTER	LRT	LRT18LZ10S16S16NY2
25	1	TEMP/LEVEL SWITCH	ACT	B4030AFD2C605
26.1	2	BREATHER	VICKERS	BR110
26.2	2	BREATHER ADAPTER	DONALDSON	P173545
27	1	LEVEL GAUGE	MCMASTER CARR	1106K83
28	1	IMMERSION HEATER	MCMASTER CARR	3656K323
29.1	1	THERMOMETER	MCMASTER CARR	3949K14
29.2	1	IMMERSION WELL	MCMASTER CARR	3957K37
30	1	BALL VALVE	DMIC	BVAL-0750N-4321
31	2	BALL VALVE	DMIC	BVAL-2000S-4321CEZN
32	2	LIMIT SWITCH	DMIC	DM10166
33	1	FLANGE RELIEF VALVE	VICKERS	CPF2S08BW3SMUB520
34	1	FLOW CONTROL VALVE	DMIC	FC1H-1250S
35	1	ELECTRICAL ENCLOSURE	HOFFMAN	A1210CHNF
36	2	#4 SAE F TO #6 SAE M	GRAINGER	4VRZ7
37	20	LIQUID TITE FLEX CONN	MCMASTER CARR	7514K33
38	2	LIQUID TITE ELBOW 90°	MCMASTER CARR	75145K83
39	3	CONDUIT ACCESS TEES	MCMASTER CARR	7153K82
40	50	3/4" FLEX CONDUIT FEET	MCMASTER CARR	7581K43
42	2	2" JICM X 2" ORBM	PARKER	32 F50X-S
43	2	2" JICM X 2" JICM BLKHD	PARKER	32 WTX-WLN-S
44	1	1.25 NPTM X #20 SAE ORBM	PARKER	20-1 1/4 F50F-S
45	1	#20 SAE ORBM X #20 JICM 90°	PARKER	20 C50X-S
46	1	1.25 NPTF X #20 JICF	PARKER	20 G6X-S
47	2	#20 JIC M-M-M TEE	PARKER	20 JTX-S
48	2	#20 SAE ORBM X #20 JICM	PARKER	20 F50X-S
49	2	1" NPTM X -16 JICM	PARKER	16 FTX-S
50	1	1/4 X 5/16 KEYSTOCK	GRAINGER	5WA66
51	2	O RING -32 SAE ORB	PARKER	3-932 NBR
52	1	1" JICM X 1-1/2" ORBM	PARKER	16-24 F50X-S
53	1	24" LONG SCH 40 1/2" PIPE	MCMASTER CARR	4457K31
54	1	BUSHING, 3/4 NPT TO 1/2 NPT	MCMASTER CARR	44605K346
55	1	ELBOW 1/2 NPT TO 3/4 NPT	MCMASTER CARR	44605K572
56	2	TERMINAL STRIPS	MCMASTER CARR	9130K48

HOSE DETAIL:

PARKER HYDRAULICS NUMBERS

#	HOSE DESCRIPTION	FITTING #1	FITTING #2	OAL	QTY
1	1-1/4" RETURN, -20 SAE 61 90° X -20 JICF SWIVEL	11943-20-20	10643-20-20	60"	1
2	1-1/4" RETURN, -16 SAE 61 90° X -16 JICF SWIVEL	11943-16-16	10643-16-16	78"	1
3	1-1/4" PRESSURE, -20 SAE 61 90° X -20 JICF SWIVEL	11943-20-20	10643-20-20	48"	1
4	1-1/4" PRESSURE, -20 JICF SWIVEL X -20 JICF SWIVEL	10643-20-20	10643-20-20	48"	1
5	2" SUCTION, -32 JICF SWIVEL X -32 SAE 61 90°	10643-32-32	11943-32-32	48"	2
6	1-1/4" PRESSURE, -20 JICF SWIVEL X -20 JICF SWIVEL	10643-20-20	10643-20-20	600"	1
7	1-1/4" RETURN, -20 JICF SWIVEL X -20 JICF SWIVEL	10643-20-20	10643-20-20	48"	1
8	1" PRESSURE, -20 JICF SWIVEL X -16 SAE 61 90°	10643-20-16	11943-16-16	108"	2
9	3/4" RETURN, -12 SAE ORBM SWIVEL X 3/4" NPT M SWIVEL	10G43-12-12	11343-12-12	80"	1
10	1" RETURN, 1" NPT M SWIVEL X -16 JICF SWIVEL	11343-16-16	10643-16-16	360"	1
11	1" PRESSURE, 1" NPT M SWIVEL X -16 JICF SWIVEL	11343-16-16	10643-16-16	420"	1

NOTES

1. PART NUMBERS SHOWN PROVIDE BASIS FOR DESIGN. EQUIPMENT SUPPLIED SHALL BE AS SHOWN OR APPROVED EQUAL.
2. CIRCUIT CONNECTIONS SHALL BE SIZED AS SHOWN AND SUPPORTED INDEPENDENTLY OF COMPONENT PORTS. PROVIDE HOSES AS STRAIN RELIEF BETWEEN CIRCUIT CONNECTIONS AND HPU COMPONENTS.
3. SUMP HEATER SHALL BE SIZED TO MAINTAIN 70°F OIL TEMPERATURE AT 0°F AMBIENT TEMPERATURE. HEATER ELECTRICAL SUPPLY IS 460 VAC, 3ø.
4. TANK VOLUME SHALL PERMIT CONTINUOUS OPERATION AT 100°F AMBIENT TEMPERATURE, EXCLUDING TIPPER OPPERATION AND ASSUMING A 25% LIVE BOTTOM FLOOR DUTY CYCLE. ADD 100 GALLON CAPACITY TO ACCOMODATE TIPPER DRAWDOWN.
5. TANK BREATHERS TO BE DESECATING TYPE BREATHERS SUITABLE FOR OUTDOR INSTALLATION AND SIZED TO PERMIT TIPPER DRAWDOWN AND OIL EXPANSION AND CONTRACTION.

NOTES: Unless otherwise noted, the following shall apply: 1. All hardware is to be minimum grade 5 and zinc plated. 2. Paint is to be intersed two-part epoxy with minimum 6 mil DFT. 3. Surface prep to be SSPC SP6. 4. All welds and corners are to be spot primed.				
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	◎	0.03	∠	0.03

REVISIONS

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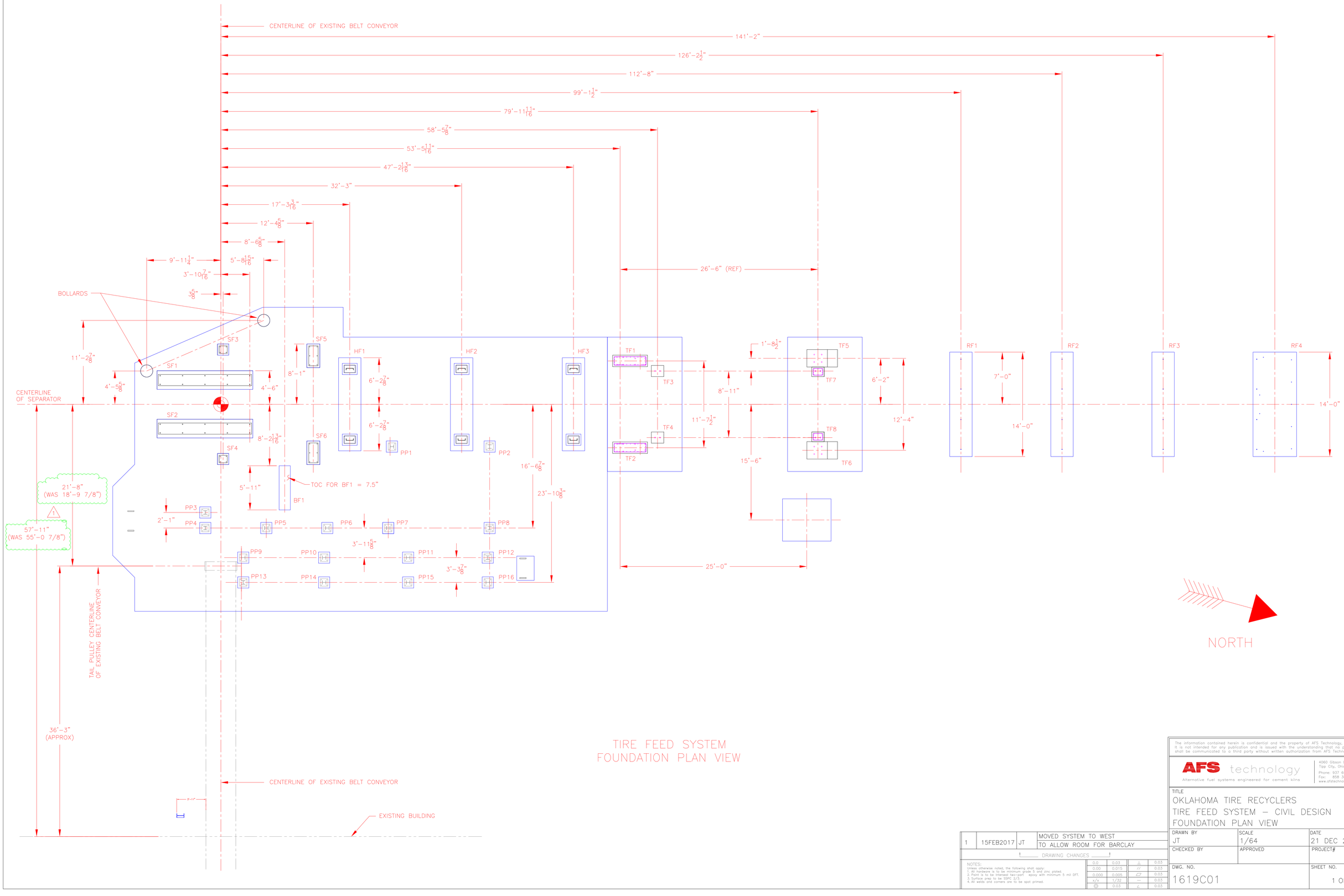
TITLE
OKLAHOMA TIRE FEED SYSTEM
TIPPER AND HOPPER
HYDRAULIC PUMP SYSTEM SCHEMATIC

DRAWN BY	SCALE	DATE
JT	NONE	2017-FEB-22
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619HY-01		OF

CIVIL DRAWINGS



TIRE FEED SYSTEM
FOUNDATION PLAN VIEW

1	15FEB2017	JT	MOVED SYSTEM TO WEST TO ALLOW ROOM FOR BARCLAY

DRAWING CHANGES

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
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4. All welds and corners are to be spot primed.

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x/x	1/32	—	0.03
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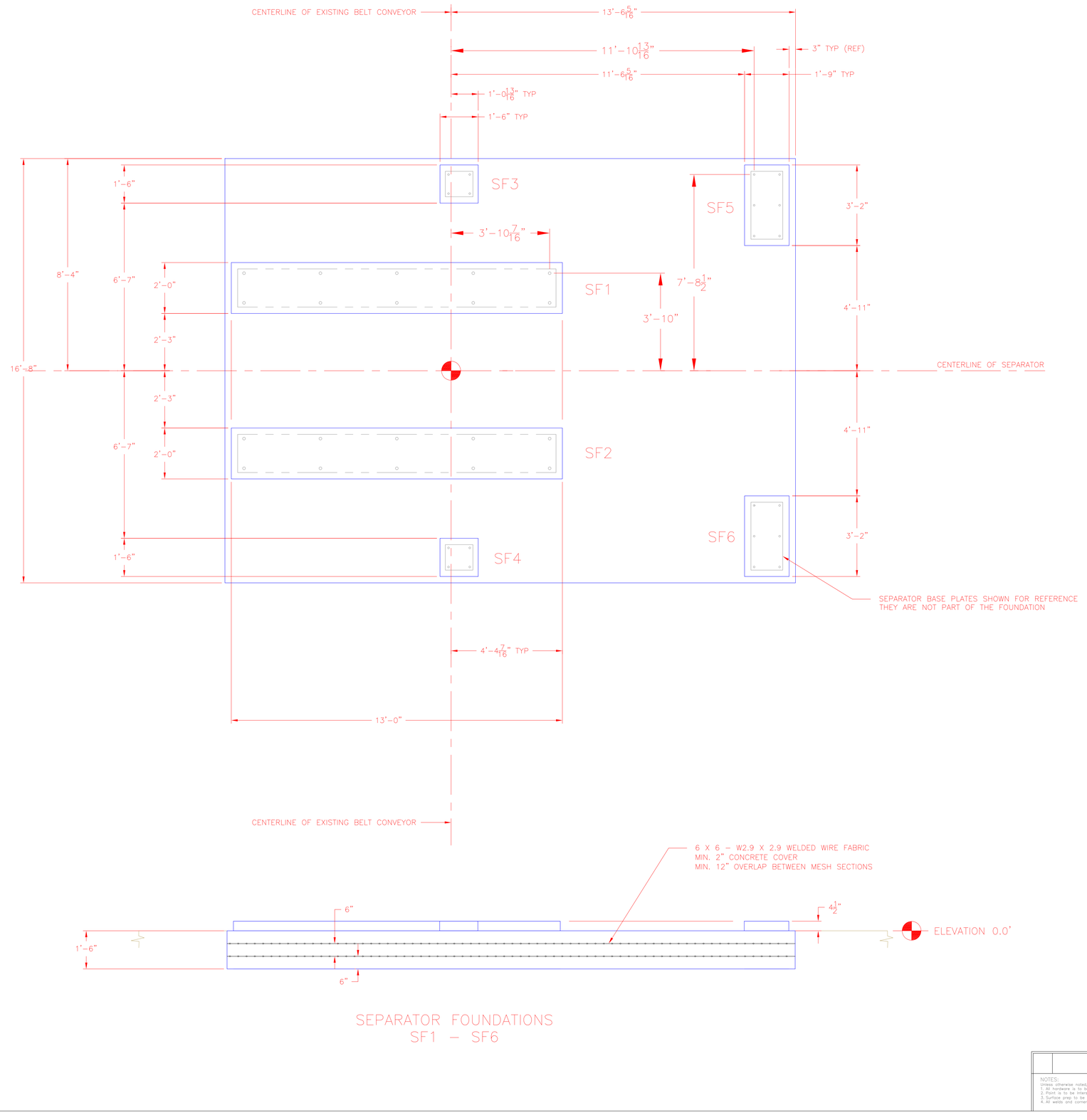
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
FOUNDATION PLAN VIEW

DRAWN BY	SCALE	DATE
JT	1/64	21 DEC 2016
CHECKED BY	APPROVED	PROJECT#

DWG. NO. 1619C01

SHEET NO. 1 OF 6



SEPARATOR FOUNDATIONS
SF1 – SF6

NOTES :

1.) ALL CONCRETE SHALL BE f'c = 4,000 psi.

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

3.) BEARING CAPACITY OF 3000 psf HAS BEEN USED IN THIS DESIGN. THIS VALUE SHALL BE FIELD VERIFIED BEFORE CONSTRUCTION. UNDERCUTTING AND PLACEMENT OF ENGINEERED FILL MAY BE REQUIRED TO ACHIEVE THIS BEARING CAPACITY.

4.) FOR ALL COLD JOINTS, THE IN-PLACE CONCRETE SURFACE SHALL BE ROUGHENED, CLEANED AND WETTED PRIOR TO PLACEMENT OF SUBSEQUENT CONCRETE. SURFACE ROUGHENING SHALL BE PERFORMED WITH A MARRING IMPACT HAMMER BIT OR EQUIVALENT.

PIER	USE	ANCHOR TYPE	BOLT DIA.	MIN EMBED	BOLT QTY.
SF1, SF2	DRIVE BASE	EPOXY	1"	8	20
SF3, SF4, SF5, SF6	SIDE WALLS	EPOXY	3/4"	6	20

NOTES:
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3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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x/x	1/32	—	0.03
◎	0.03	∠	0.03

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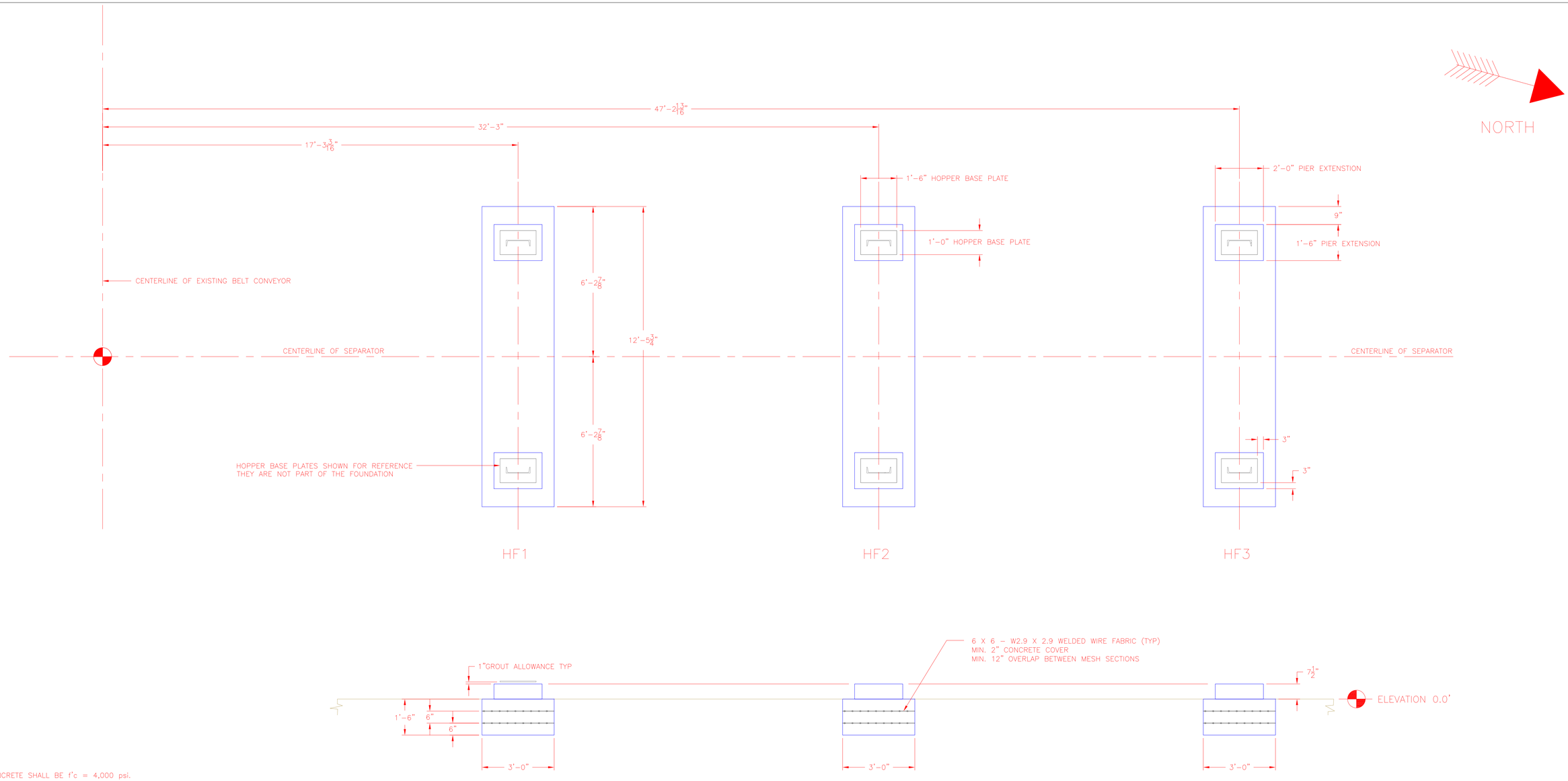
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
SEPARATOR FOUNDATION

DRAWN BY	SCALE	DATE
JT	1/24	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619C02		SHEET NO. OF



NOTES :

1.) ALL CONCRETE SHALL BE f'c = 4,000 psi.

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

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4.) FOR ALL COLD JOINTS, THE IN-PLACE CONCRETE SURFACE SHALL BE ROUGHENED, CLEANED AND WETTED PRIOR TO PLACEMENT OF SUBSEQUENT CONCRETE. SURFACE ROUGHENING SHALL BE PERFORMED WITH A MARRING IMPACT HAMMER BIT OR EQUIVALENT.

PIER	USE	ANCHOR TYPE	BOLT DIA.	MIN EMBED	BOLT QTY.
HF1 - HF3	HOPPER	EPOXY	3/4"	8	12

HOPPER FOUNDATIONS
HF1 - HF3

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TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM - CIVIL DESIGN
HOPPER FOUNDATION

DRAWN BY	SCALE	DATE
JT	1/24	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619C03		OF

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersea two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

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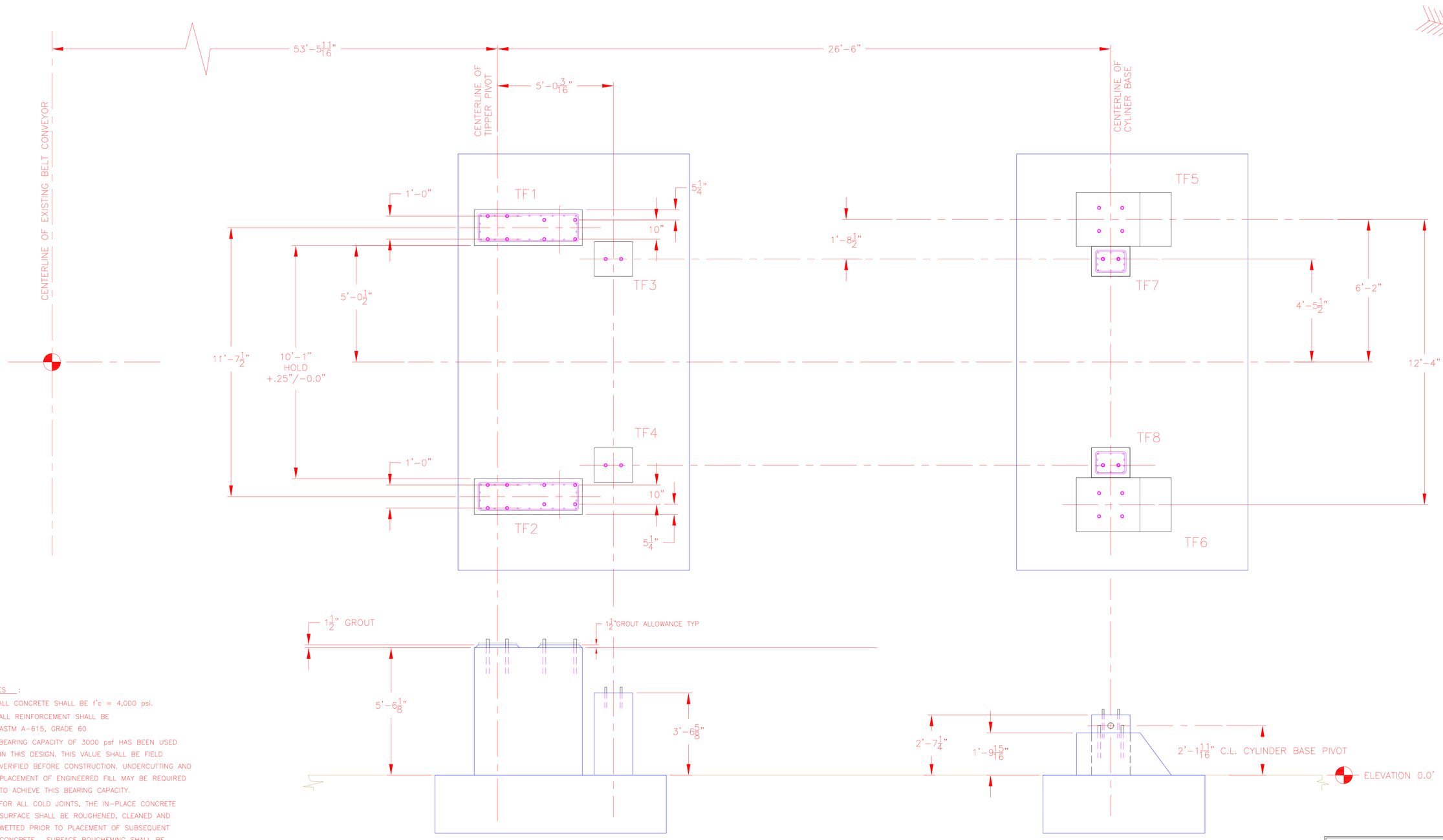

NOTES :

1.) ALL CONCRETE SHALL BE f'c = 4,000 psi.

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

3.) BEARING CAPACITY OF 3000 psf HAS BEEN USED IN THIS DESIGN. THIS VALUE SHALL BE FIELD VERIFIED BEFORE CONSTRUCTION. UNDERCUTTING AND PLACEMENT OF ENGINEERED FILL MAY BE REQUIRED TO ACHIEVE THIS BEARING CAPACITY.

4.) FOR ALL COLD JOINTS, THE IN-PLACE CONCRETE SURFACE SHALL BE ROUGHENED, CLEANED AND WETTED PRIOR TO PLACEMENT OF SUBSEQUENT CONCRETE. SURFACE ROUGHENING SHALL BE PERFORMED WITH A MARRING IMPACT HAMMER BIT OR EQUIVALENT.

TIPPER PIVOT FOUNDATIONS DETAILS
TF1 – TF2
SEE DRAWING 1619C04A

TIPPER CYLINDER FOUNDATIONS DETAILS
TF1 – TF2
SEE DRAWING 1619C04B

TIPPER FOUNDATIONS
TF1 – TF8

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TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
TIPPER FOUNDATION

DRAWN BY	SCALE	DATE
JT	1/24	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO. 1619C04		SHEET NO. OF

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intersteel two-part epoxy with minimum 5 mil DFT.
3. All welds shall be 3/16".
4. All welds and corners are to be spot primed.

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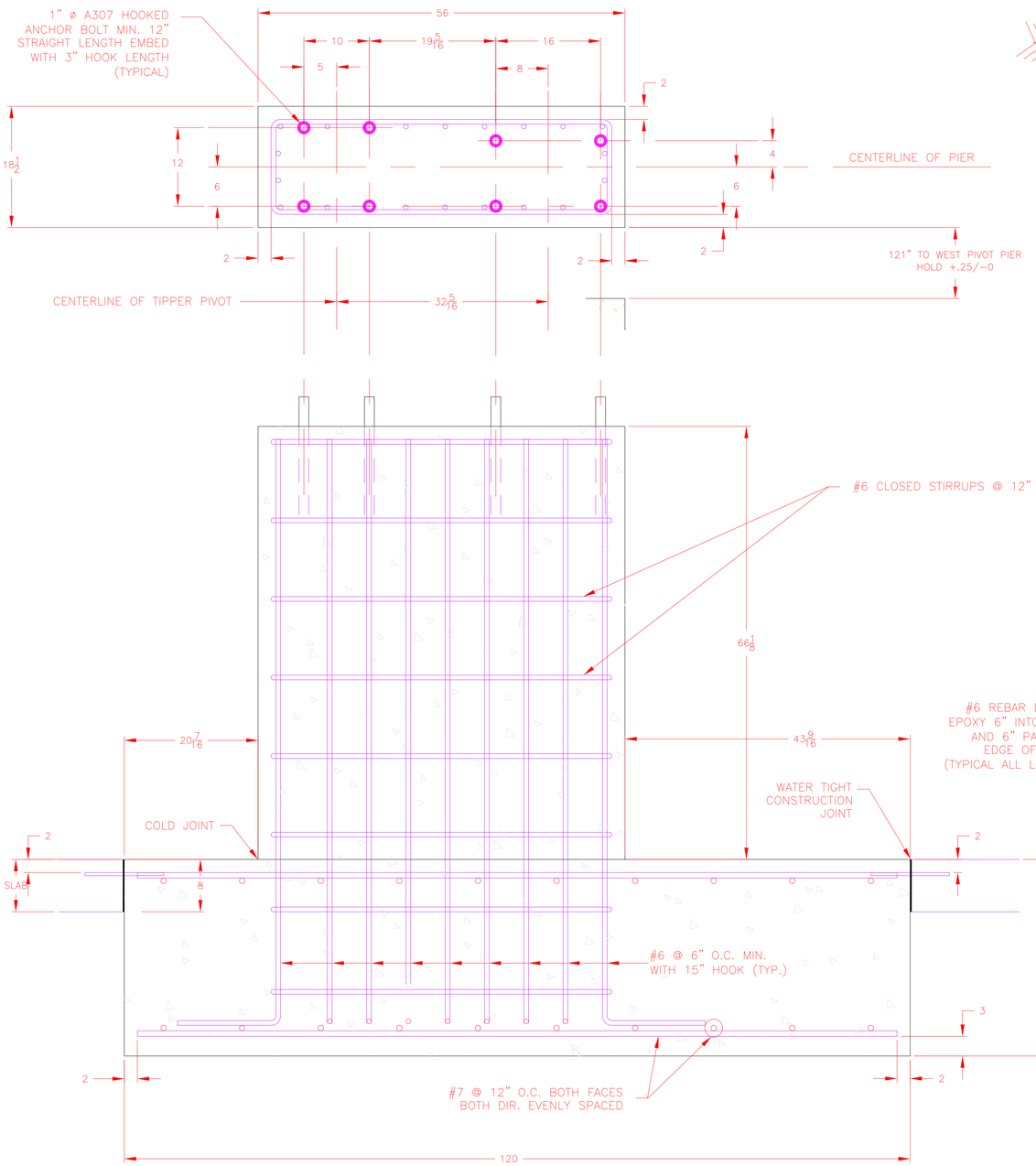
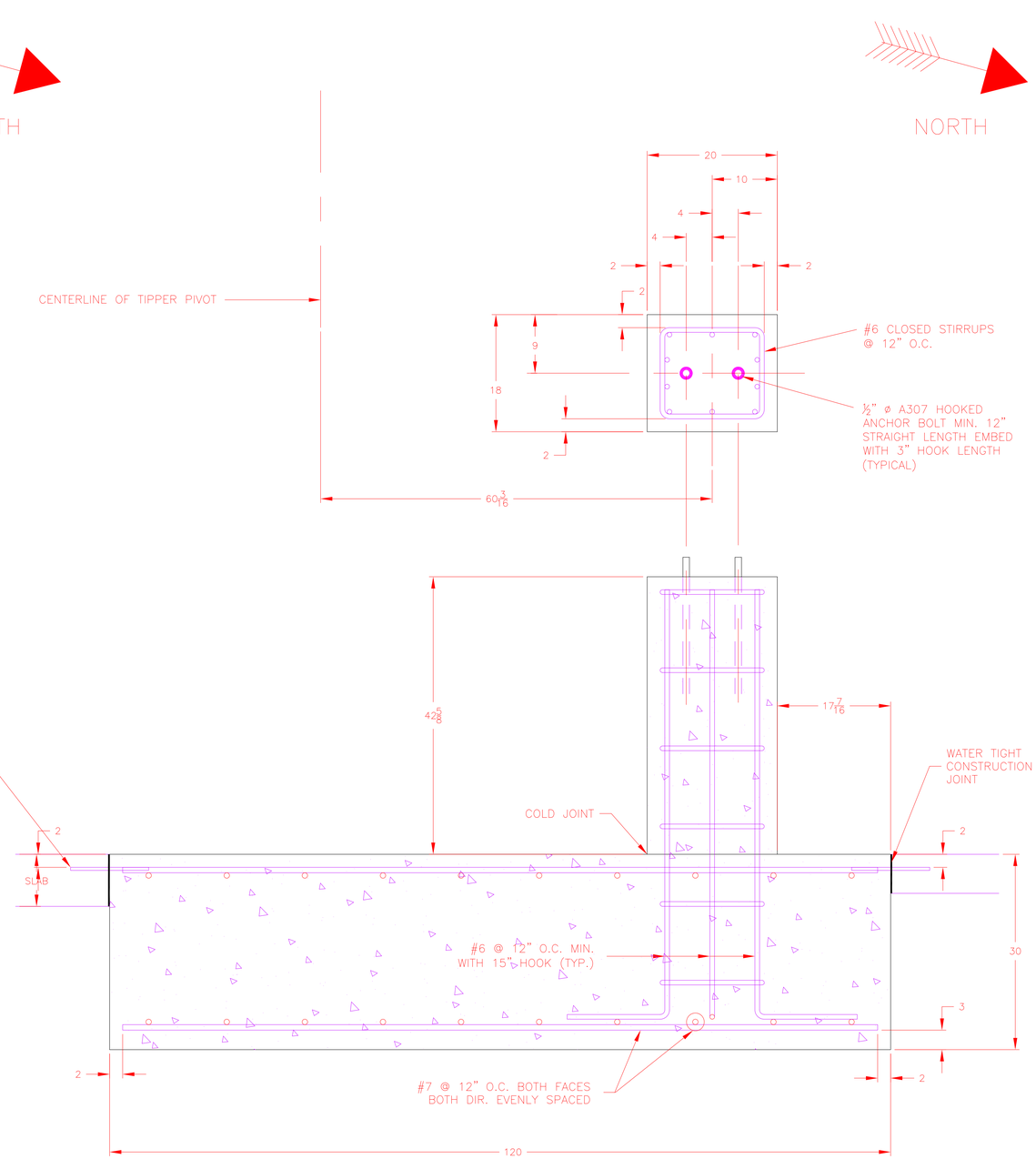


TIPPER FOUNDATION
TF1 AND TF2



TIPPER FOUNDATION
TF3 AND TF4

FOUNDATION ELEMENT DESIGN

GRAPHIC SCALE

2' 1' 0 2' 4'

NOTES:
Unless otherwise noted, the following shall apply:
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3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
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x/x	1/32	—	0.03
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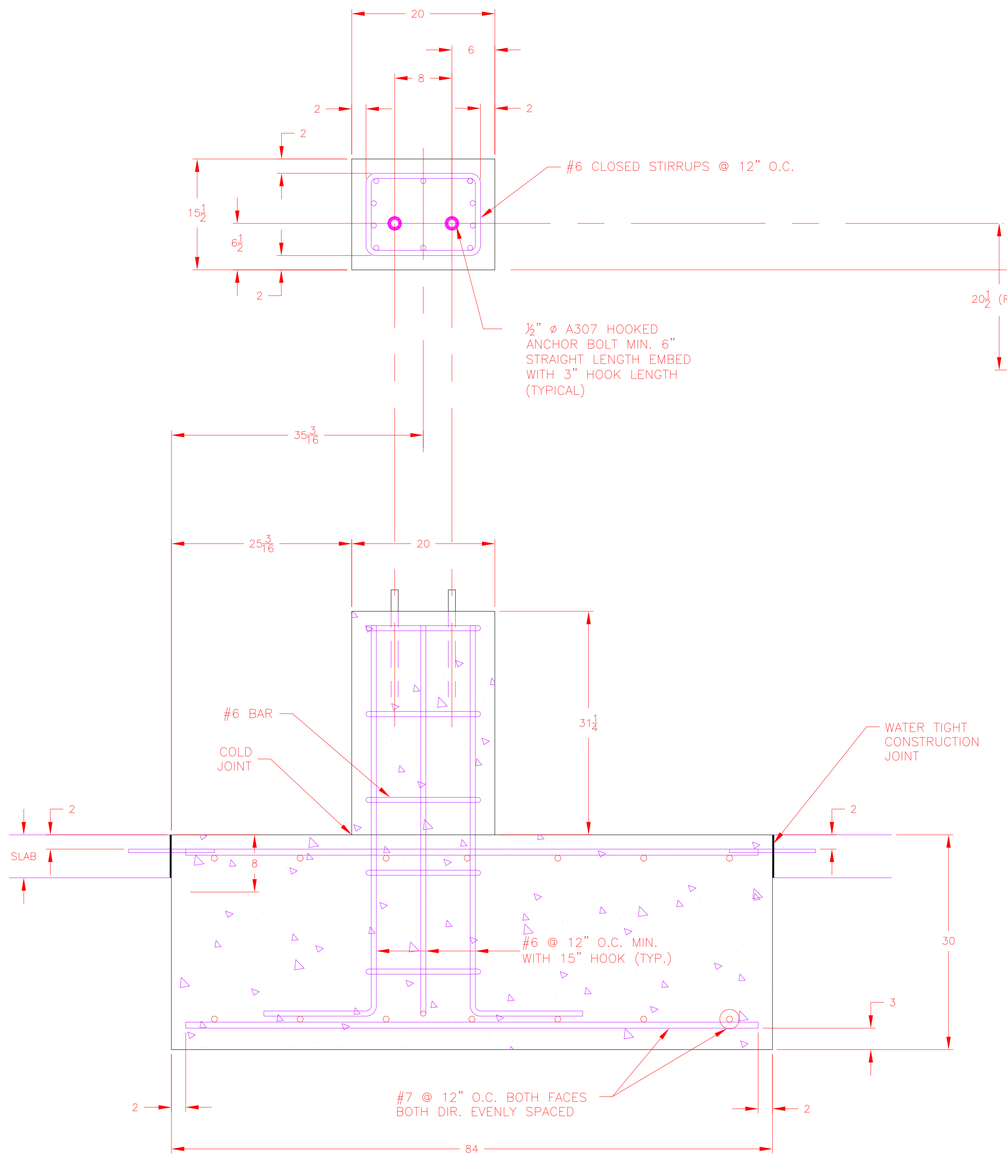
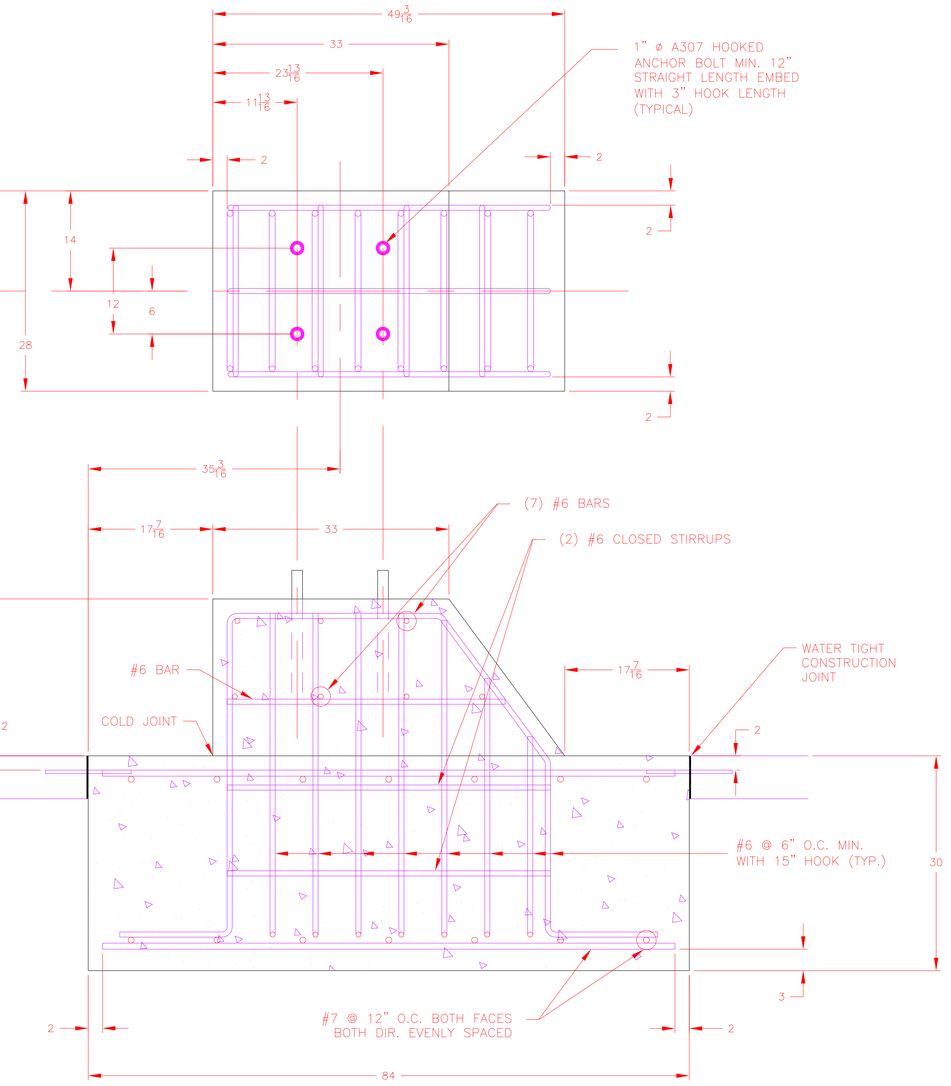
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
TIPPER FOUNDATION DETAILS

DRAWN BY	SCALE	DATE
JT	1/10	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619C04A		OF



TIPPER FOUNDATION
TF7 AND TF8



TIPPER FOUNDATION
TF5 AND TF6

FOUNDATION ELEMENT DESIGN

GRAPHIC SCALE
2' 1' 0 2' 4'

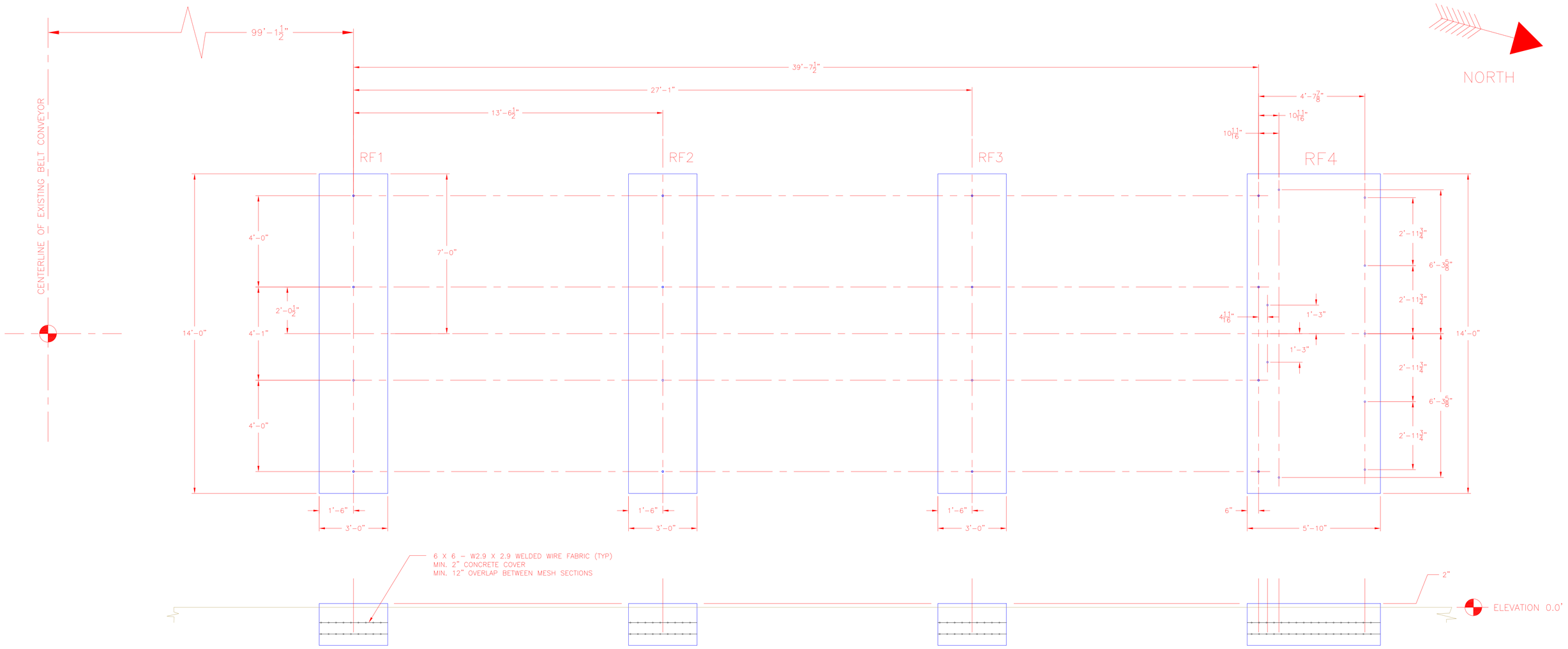
NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	⌭	0.03
x/x	1/32	—	0.03
◎	0.03	∠	0.03

AFS technology
Alternative fuel systems engineered for cement kilns
4060 Gibson Drive
Tipp City, Ohio 45371 USA
Phone: 937 669 3548
Fax: 858 300 5404
www.afstechnology.com

TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
TIPPER FOUNDATION DETAILS

DRAWN BY	SCALE	DATE
JT	1/10	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619C04B		OF



NOTES :

1.) ALL CONCRETE SHALL BE f'c = 4,000 psi.

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

3.) BEARING CAPACITY OF 3000 psf HAS BEEN USED IN THIS DESIGN. THIS VALUE SHALL BE FIELD VERIFIED BEFORE CONSTRUCTION. UNDERCUTTING AND PLACEMENT OF ENGINEERED FILL MAY BE REQUIRED TO ACHIEVE THIS BEARING CAPACITY.

4.) FOR ALL COLD JOINTS, THE IN-PLACE CONCRETE SURFACE SHALL BE ROUGHENED, CLEANED AND WETTED PRIOR TO PLACEMENT OF SUBSEQUENT CONCRETE. SURFACE ROUGHENING SHALL BE PERFORMED WITH A MARRING IMPACT HAMMER BIT OR EQUIVALENT.

PIER	USE	ANCHOR TYPE	BOLT DIA.	MIN EMBED	BOLT QTY.
RF1 - RF4	SIDE WALLS	EPOXY	3/4"	6	16

RAMP FOUNDATIONS
RF1 - RF4

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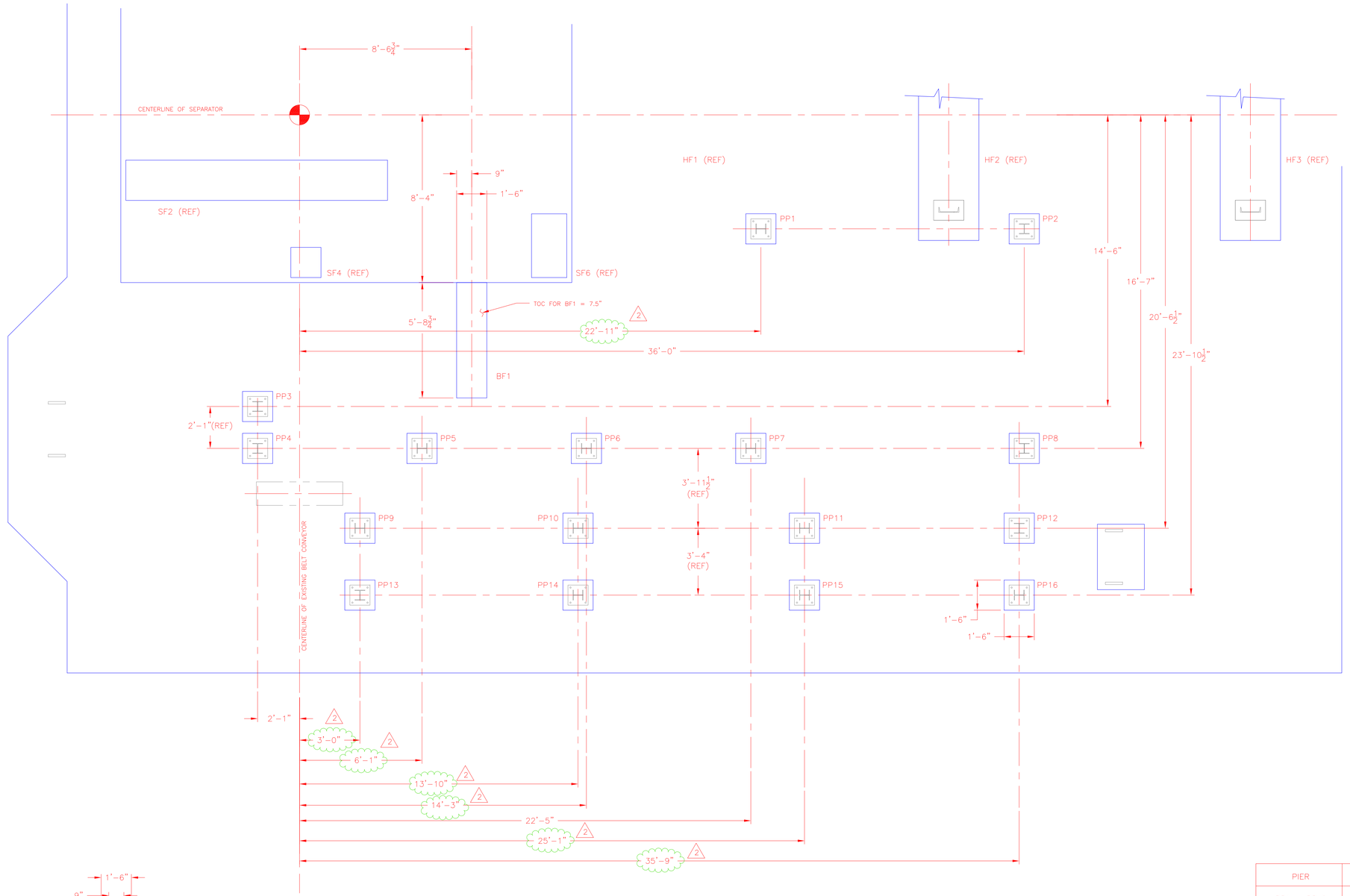
4060 Gibson Drive
Tipp City, Ohio 45371 USA
Phone: 937 669 3548
Fax: 858 300 5404
www.afstechnology.com

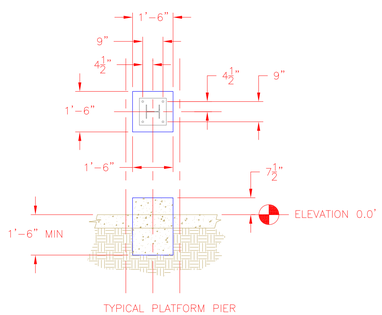
TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM - CIVIL DESIGN
SEPARATOR FOUNDATION

DRAWN BY	SCALE	DATE
JT	1/24	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619C05		OF

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	⌭	0.03
+/-	1/32	—	0.03
◎	0.03	∠	0.03





TYPICAL PLATFORM PIER
PP1 THRU PP16

NOTES :

1.) ALL CONCRETE SHALL BE f'c = 4,000 psi.

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

3.) BEARING CAPACITY OF 3000 psf HAS BEEN USED IN THIS DESIGN. THIS VALUE SHALL BE FIELD VERIFIED BEFORE CONSTRUCTION. UNDERCUTTING AND PLACEMENT OF ENGINEERED FILL MAY BE REQUIRED TO ACHIEVE THIS BEARING CAPACITY.

4.) FOR ALL COLD JOINTS, THE IN-PLACE CONCRETE SURFACE SHALL BE ROUGHENED, CLEANED AND WETTED PRIOR TO PLACEMENT OF SUBSEQUENT CONCRETE. SURFACE ROUGHENING SHALL BE PERFORMED WITH A MARRING IMPACT HAMMER BIT OR EQUIVALENT.

PIER	USE	ANCHOR TYPE	BOLT DIA.	MIN EMBED	BOLT QTY.
PP1 – PP16	PLATFORM PIERS	EPOXY	5/8"	8	64
BF1	DISCH CONV	EPOXY	5/8"	8	4

2	28FEB2017	JT	MOVED PLATFORM SUPPORTS
1	15FEB2017	JT	MOVED SYSTEM TO WEST TO ALLOW ROOM FOR BARCLAY

DRAWING CHANGES

NOTES:
Unless otherwise noted, the following shall apply:
1. All hardware is to be minimum grade 5 and zinc plated.
2. Paint is to be intercoat two-part epoxy with minimum 5 mil DFT.
3. Surface prep to be SSPC 2/3.
4. All welds and corners are to be spot primed.

0.0	0.03	⊥	0.03
0.00	0.015	//	0.03
0.000	0.005	▱	0.03
x/x	1/32	⌒	0.03
⌀	0.03	∠	0.03

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TITLE
OKLAHOMA TIRE RECYCLERS
TIRE FEED SYSTEM – CIVIL DESIGN
PLATFORM FOUNDATIONS

DRAWN BY	SCALE	DATE
.	1/32	19 DEC 2016
CHECKED BY	APPROVED	PROJECT#
DWG. NO.		SHEET NO.
1619C06 R2		OF

GENERAL MAINTENANCE

1) Bearings

a) Bearings need periodic lubrication. See recommended lubrication schedules in the Lubrication Section. Routine inspection should be performed to detect wera and/or fatigue.

2) Photoelectric Sensors

a) Occasionally clean by wiping the lens with a damp cloth.

3) Proximity Switches

a) Occasionally clean by wiping the lens with a damp cloth.

4) SEW Eurodrive Gear Motors

a) The gear motor requires lubrication.Refer to the Lubrication Section of this manual for details of lubrication type and capacities.

5) Routine Maintenance Schedule

a) All equipment should be included into your routine plant maintenance schedule.Sample lubrication schedules are provided on the following pages

LUBRICATION TABLE (Based on 40-Hour Week)										
Shaft Size - Inches		Grease Required (Oz.)		Recommended No. of Months Between Lubrication						
		To Lubricate Rebuilt Units	To Relubricate Units	Operating RPM						
Normal Duty	Heavy Duty			100	300	500	1000	1750	3000
3/4 - 1"		0.4	0.1	12	8	5	2	1	1/2
1-1/8 - 1-1/4"		0.5	0.1	12	8	5	2	1	1/2
1-7/16 - 1-1/2"	1-7/16"	0.6	0.1	12	8	5	2	1	1/2
1-11/16 - 1-3/4"	1-1/2 - 1-11/16"	0.8	0.2	12	8	5	2	1	1/2
2-3/16 - 2-1/4"	2 - 2-3/16"	1.1	0.2	8	5	3	1	1/2	-
2-3/8 - 2-1/2"	2-7/16"	1.5	0.3	8	5	3	1	1/2	-
2-11/16 - 3"	2-1/2 - 2-15/16"	2.8	0.5	8	5	3	1	1/2	-
3-3/16 - 3-1/2"	3-3/16 - 3-7/16"	3.7	0.6	8	5	3	1	1/2	-
3-11/16 - 4"	3-11/16 - 4"	6.9	1.1	6	4	2	1	1/2	-
	4-3/16" - 4-7/16"	12.1	2	6	4	2	1	1/2	-
	4-15/16 - 5"	14.3	2.5	6	4	2	1	1/2	-
	5-7/16"	22.1	4	6	4	2	1	1/2	-
	5-15/16 - 6"	25.3	4.5	4	2	1	1/2	-	-
	6-15/16 - 7"	33	6	4	2	1	1/2	-	-

BEARING LUBRICATION RECOMMENDATIONS

Bearing Precautions

1. The bearing manufacturer's warranty requires proper periodic lubrication to avoid erosion. Refer to label on housing for proper instructions.

2. Grease lubricated bearings are not recommended for ambient temperatures above 200° F.

3. Bearings which are to be stored or idle for more than one (1) month should be wrapped in neutral greaseproof paper, foil or plastic film. During storage bearings should be rotated monthly to prevent corrosion. Fresh grease should be injected prior to start-up.

High Temperature Applications

Bearings are lubricated with high temperature grease. The grease is water-resistant and has good corrosion protective properties. If fans are to be stored for a period of time, lubricate bearings and rotate shaft monthly to prevent moisture contamination. Lubrication frequency after start-up must be based on the condition of the old grease being purged during lubrication. The grease should be relatively clean. The lubrication frequency will vary depending on the fan speed, bearing operating temperature and cleanliness of the application.

DODGE (or equivalent) BALL BEARINGS - GREASE

Shaft Size (Inches)	Operating Speed (rpm)									
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	Lubrication Cycle (Months)									
5/8 thru 1	6	6	6	6	4	4	4	4	2	2
1 1/8 thru 1 1/2	6	6	6	4	4	4	2	2	2	1
1 5/8 thru 1 15/16	6	6	6	4	4	2	2	1	1	
2 thru 2 1/2	6	6	4	4	2	1	1	CONSULT		
2 11/16 thru 3 3/16	6	4	2	2	1	1	1/2	MANUFACTURER		
3 7/16 thru 3 15/16	6	4	2	1	FOR SPECIFIC RECOMMENDATIONS					

Lubricate with the following greases or their equivalent:

Shell	-- Alvania EP Grease No. 2	Gulf	-- Gulfcrown Grease No. 2
Texaco	-- Molytex Grease No. 2	American	-- Amolith Grease No. 2
Mobil	-- Mobilux EP2		

1. If fans are to be stored after arrival at job site, bearings should be immediately relubricated and shaft rotated monthly for corrosion protection.
2. Normal conditions are defined as a clean, dry atmosphere at temperatures between - 20°F and 180°F. Greater temperatures, moisture or dirt content will require more frequent lubrication cycles
3. Use sufficient volume of grease to purge the bearing seals. Rotate bearings during relubrication where good safety practice permits.

DODGE (or equivalent) PILLOW BLOCK ASSY - GREASE

Shaft Dia.	Relubrication Interval (hours)	Speed (rpm)										
		300	500	700	900	1100	1300	1500	1800	2400	2700	3000
1 7/16		6775	3995	2800	2140	1715	1425	1210	980	690	595	515
1 11/16		6400	3760	2630	2000	1600	1325	1120	900	625	535	460
1 15/16		6070	3555	2475	1880	1495	1230	1040	830	565	480	410
2 3/16		5530	3215	2220	1670	1320	1075	900	705	465	385	320
2 7/16		5090	2935	2010	1495	1170	945	780	600	375	300	
2 11/16		4900	2810	1915	1420	1105	885	725	550	330	260	
2 15/16		4720	2700	1830	1345	1040	830	670	505	295		
3 3/16		4560	2590	1750	1280	980	775	625	460			
3 7/16		4265	2400	1600	1155	875	675	535	380			
3 15/16		4010	2230	1465	1045	775	585	450	300			
4 3/16		3780	2075	1385	940	680	505	370				
4 7/16		3575	1935	1235	845	595	425	300				
4 15/16		3385	1805	1130	755	515	350					
5 3/16		3210	1685	1035	670	440	280					
5 7/16		3050	1575	940	590	365						
5 15/16		2900	1470	855	515	295						

Notes:

1. Lubricate with a Grade 2 lithium or non-soap base grease having oil viscosity of 500-1000 SUS at 100°F.
2. Should bearing operating temperature be below 32°F or above 200°F, consult fan manufacturer for lubrication recommendations.
3. Clean and repack annually.
4. If fans are to be stored after arrival at job site, bearings should be immediately relubricated and shaft rotated monthly for corrosion protection.

DODGE (or equivalent) SPHERICAL ROLLER BEARINGS - GREASE

Shaft Sizes		Amount of grease		Operating Speed (rpm)									
				500	1000	1500	2000	2200	2700	3000	3500	4000	4500
Inches	MM	IN^3	CM^3	Lubrication Cycle (months)									
3/4 - 1	25	0.39	6.4	6	6	6	4	4	4	2	2	1	1
1 1/8 - 1 1/4	30	0.47	7.7	6	6	4	4	2	2	1	1	1	1
1 7/16 - 1 1/2	35	0.56	9.2	6	4	4	2	2	1	1	1	1	1/2
1 5/8 - 1 3/4	40	0.80	13.1	6	4	2	2	1	1	1	1	1/2	
1 15/16 - 2	45-50	0.89	14.6	6	4	2	1	1	1	1	1/2		
2 3/16 - 2 1/4	55	1.09	17.9	6	4	2	1	1	1	1/2			
2 7/16 - 2 1/2	60	1.30	21.3	4	2	1	1	1	1/2				
2 11/16 - 3	65-75	2.42	39.7	4	2	1	1	1/2					
3 3/16 - 3 1/2	80-85	3.92	64.2	4	2	1	1/2						
3 11/16 - 4	90-100	5.71	93.6	4	1	1/2							
4 3/16 - 4 1/2	110-115	6.50	106.5	4	1	1/2							
4 15/16 - 5	125	10.00	163.9	2	1	1/2							

Lubricate with a multipurpose roller bearing NLGI Grade 1 or 2 grease having rust inhibitors, antioxidant additives, and minimum oil viscosity of 400 SSU at 100°F. For operation requiring a monthly or less cycle the grease should also be suitable for temperatures up to 250°F continuous, dynamically stable and must not churn or whip.

Some greases having the desired properties are:

American - Rykon Grease No. 2, Mobil - Mobilgrease® 28, Texaco - Molytex EP2 grease.

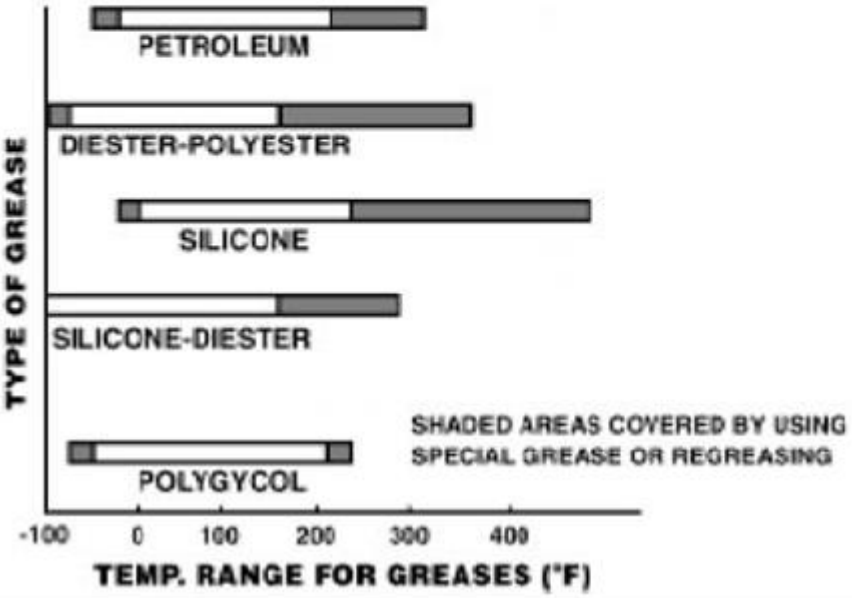
If bearings are subjected to temperatures below 32°F or above 200°F, consult equipment manufacturer for proper lubrication.

Conditions of vibration exceeding 1 to 2 mils, moisture or dirt will require a more frequent lubrication cycle or special lubricant selection. Rotate bearings during relubrication where good safety practice permits.

Lubricate bearings prior to extended shutdown or storage and rotate shaft monthly to aid corrosion protection.

Relubrication

The initial greasing interval can be determined by the conditions or bearing instructions which follow. By carefully observing the condition of the grease expelled from bearings at the time of relubrication, it can be determined whether the maintenance schedule should be altered. When regreasing, avoid mixing different brands of grease.

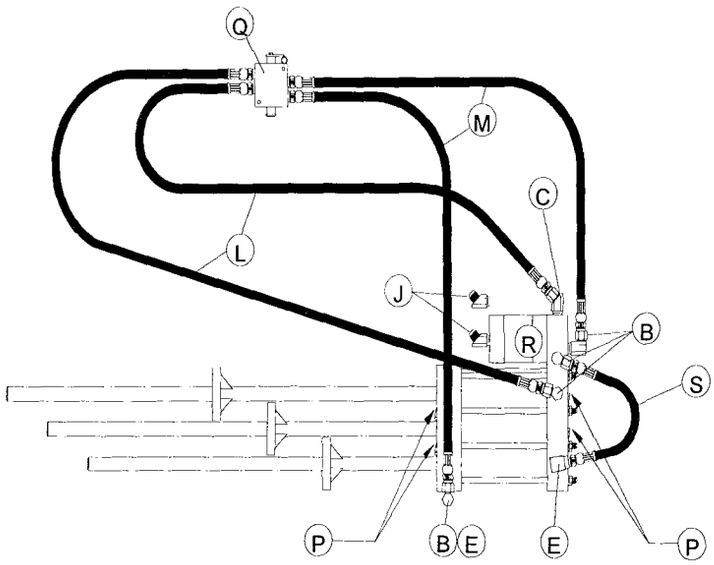


HALLCO FLOOR SYSTEMS
S TAKING THE FIRST STEP ™

HALLCO MFG. COMPANY, INC.

3000 TWO WAY PLUMBING, STANDARD UNIT

HALLCO FLOOR SYSTEMS
ALWAYS TAKING THE FIRST STEP ™

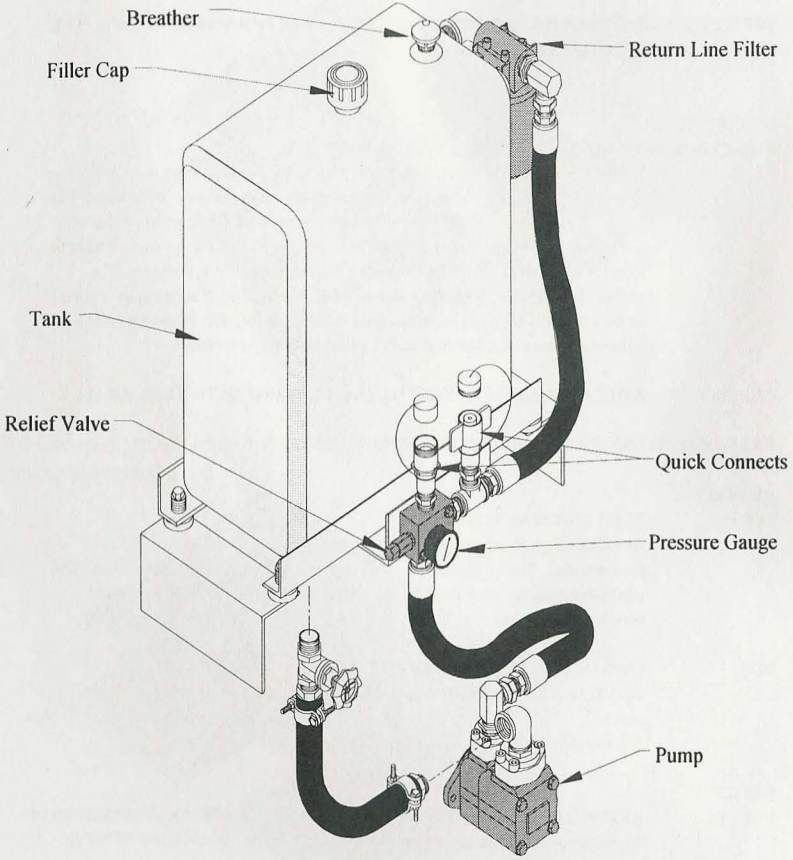


KEY LETTER	NO. REQ	PART NO.	DESCRIPTION
B	3	85-2662	90 SWIVEL FITTING, 3/4"MP - 3/4"FP
C	1	85-2663	45 SWIVEL FITTING, 3/4"MP - 3/4"FP
E	2	85-2666	90 STREET ELBOW, 3/4"MP - 3/4"FP
J	2	85-3947	45 DEGREE ELBOW, 3/4"M ORING - 1"M JIC
L	2	86-2697	HOSE ASSY, MB600-12 60", 3/4" MP ENDS
M	2	86-2698	HOSE ASSY, MB720-12 72", 3/4" MP ENDS
P	4	85-3472	POPPET VALVE CAP
	4	56-2714	POPPET VALVE SPRING
	4	56-3147	POPPET VALVE
Q	1	56-3632	2-WAY ON/OFF VALVE (replaces 56-2718)
R	1	56-3964	SWITCHING VALVE, with O-ring ports
S	1	86-2719	HOSE ASSY, MB140-12 14", 3/4" MP ENDS

HALLCO FLOOR SYSTEMS
ALWAYS TAKING THE FIRST STEP ™

3000 SERIES WET KIT REQUIREMENTS

Example of a typical tractor wet kit.



HALLCO FLOOR SYSTEMS
ALWAYS TAKING THE FIRST STEP ™

OPERATION

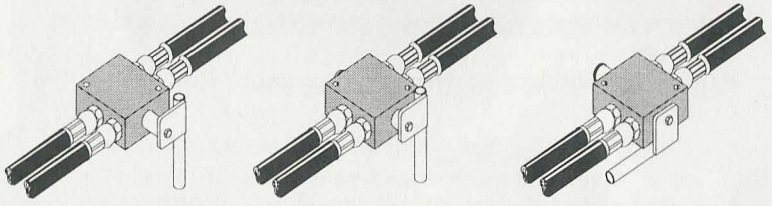
Before initial start-up, inspect the entire unit. Check floor for improperly seated bearings and deck slats. Check front and rear of floor for proper end clearances (12" front & 14" rear). Check hydraulic fittings for tightness. Make sure the control rod on the switching valve is straight and that the stops are locked in place.

Check the hydraulic lines between the truck and trailer, making sure that they are fully connected and matched.

Check the live floor hand control valve, making sure that it is in the neutral position.

The hand control valve operation is illustrated below:

UNLOAD MODE:	Pull the handle all the way out
NEUTRAL:	Push handle in until it hits valve body
LOAD MODE:	Turn handle forward and push all the way in



UNLOAD NEUTRAL LOAD

Start the truck engine and engage the pump. Move the truck hydraulic valve to supply pressure to the trailer.

Pull the hand control valve on the trailer to the UNLOAD MODE (fully out) the floor will begin to move erratically at first, but after a few minutes should begin to sequence properly.

Allow the system to run steadily while checking floor. The floor should be allowed to run for about 30 minutes unladen.

HALLCO FLOOR SYSTEMS
ALWAYS TAKING THE FIRST STEP™

HALLCO MFG. COMPANY, INC.

TROUBLE SHOOTING

Your Hallco Live Floor is designed for long trouble free operation.

The heart of the system is the hydraulic wet kit. The system requires a wet kit that will provide not less than 2800 PSI nor more than 3000 PSI.

Hallco recommends that you consult a hydraulic specialist to match the PTO and Pump to your truck's transmission.

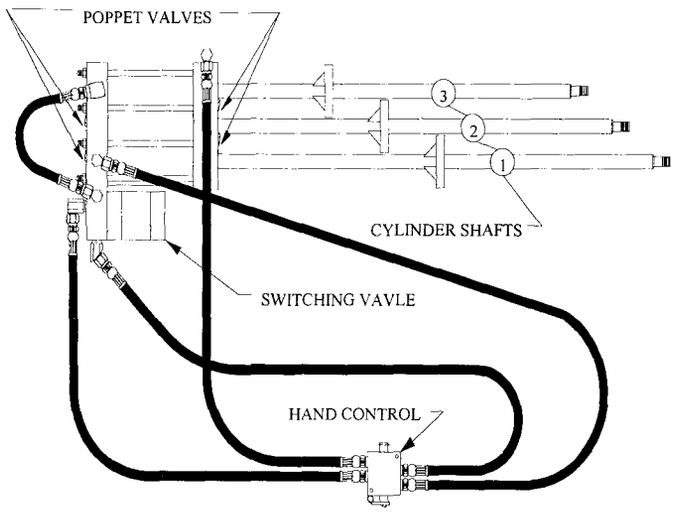
Remember - Experience has shown that nearly all problems originate with the wet kit.

CHECK THE SIMPLE THINGS FIRST!

PROBLEM: Unit does not operate or operates slow.

CHECK:
(A) PTO, is it fully engaged?
(B) OIL, is the oil reservoir full?
(C) QUICK CONNECTS, are they fully connected? Are they a matched set?
(D) PUMP, is the pump operating? Does it deliver 20-40 GPM at 2800-3000 PSI?
(E) RELIEF VALVE, is it set at 2800-3000 PSI?
(F) PLUMBING, is the entire system plumbed correctly?

3000 SERIES PLUMBING, (2-WAY)
BOTTOM VIEW



SYSTEM OPERATING LOGIC DESCRIPTION

Oklahoma Tire Feed System
Bristow, OK

April 5, 2017

The follow description is provided as a guide for programming the PLC used in the Oklahoma Tire Feed System. This description should be used in conjunction with the Device Diagram Drawing.

Trailer Tipper TT100 - Motor and Electrical Devices	
Device ID	**Device Description**
MAC-101	Hydraulic Pump Motor
HSH-101	Hydraulic Sump Heater
SOV-101	Tipper Raise Solenoid
SOV-102	Tipper Lower Solenoid
HSS-101	Tipper Pump Motor On/Off
PSS-101	Tipper Position Select Switch (Up / Stop / Down)
LSL-101	Hydraulic Sump Low Level Switch
TSL-101	Hydraulic Sump Low Temperature Switch
ZSS-101	Tipper Position Switch - Up
ZSS-102	Tipper Position Switch - Down
AMA-101	Audible Motion Alarm
ZSO-101	Position Switch for ball valve
PDS-101??	Pressure Differential Switch for filter

True = unblocked/no tires present. False=blocked/tires present.

Trailer Tipper - TT100 Control Logic Description

1. Trailer Tipper **TT100** tips trailers to feed tires into the Live Floor Hopper **LH200A**. Operation of the tipper is manual and is performed by an operator at the local tipper control panel.

2. Tipper **TT100** is raised by first turning the hydraulic pump on by starting motor **MAC-101.** This is done by pressing **HSS-101** ("ON" push-button). The operator must then rotate to up position **PSS-101** to energize **SOV-101,** which raises the tipper. **PSS-101** must be held in up position to continue raising the tipper, releasing **PSS-101** de-energizes **SOV-101**. When the tipper reached the upper limit switch **ZSH-101**, the **SOV-101** is de-energized and the control room displays the tipper in the upper position. Motion alarm **AMA-101** sounds while **SOV-101** is energized.

3. To lower the tipper, the operator must rotate to down position **PSS-102** to energize **SOV-102,** which lowers the tipper. **PSS-102** must be held in down position to continue lowering the tipper, releasing **PSS-102** de-energizes **SOV-102**. When the tipper reached the lower limit switch **ZSH-102**, the **SOV-102** is de-energized. Motion alarm **AMA-101** sounds while **SOV-102** is energized.

4. **MAC-101** continues running for 10 minutes from the last usage of any tipper control. After 10 minutes **MAC-101** is de-energized.

5. For pump protection, in order for **MAC-101** to run, normally-open position switch **ZSO-101** must be closed to indicate that the ball valve between the oil reservoir tank and the pump is fully open.

6. Differential Pressure Switch **PDS-101** provides an alarm signal to the control room when the tank oil filter needs replacing.

7. The sump heater **HSH-101** is energized locally by **TSL-101**.

Live Floor Hopper LH210 Motors and Electrical Devices	
Device ID	**Description**
HPM-201	Hydraulic Pump Motor Hopper TH210
HSS-201	Hand Select Switch (Auto / Off/ Manual) for Hopper TH210
HSH-201	Hydraulic Sump Heater
LSL-201	Hydraulic Sump Low Level Switch
TSL-201	Hydraulic Sump Low Temperature Switch
SOV-201	Solenoid Valve Hopper TH210
PES-201	Hopper TH210 Ingress PE Sensor – signals when tipped truck is empty
PES-202	Hopper TH210 Egress PE Sensor – signals tires need more advancement

True = unblocked/no tires present. False=blocked/tires present.

Live Floor Hopper LH210 Control Logic Description

1. Live Floor Hopper **LH210** provides active bulk storage. It is situated between the **TT-100** Trailer Tipper and the **TS-300** Tire Separator. Trailer Tipper **TT100** discharges tires into Hopper **LH210** Hopper and Hopper **LH210** discharges tires into Tire Separator **TS300**. Tire flow is controlled through the hopper by PE Sensors **PES-201, PES-202** and the Separator amperage level from the separator VFD-301**.**

2. Hopper **TH210** is activated for automatic operation by placing **HSS-201** in AUTO. Depending on the true/false state of sensors **PES-201, PES-202** and the amperage of **VFD-301**, hydraulic pump motor **HPM-201** is now able to start. When the true/false state of sensors **PES-201, PES-202** and **VFD-301** amperage meet conditions listed in "Hopper LH210 Logic" chart below, a three second delay will occur before energizing either solenoid valve **SOV-201**. The floor is idled by de-energizing **SOV-201**. After the solenoid valve has been de-energized for 60 seconds, **HPM-201** is automatically deactivated until the true/false state of sensors **PES-201, PES-202** and amperage of **VFD-301** are met.

Hopper LH200 Logic
Idle - Hopper LH200 is **idled** if MAC-301 amps are high and PES-202 is false
In Motion - Hopper LH220 is **in motion** if PES-202 is true or if MAC-301 amps are low.
MAC-301 / VFD-301 amps - This indicates the approximate level of tires in the Separator. The higher the tire level the higher the amps. Initial settings “might be” 6.5 amps as the low threshold and 8 amps as the high threshold. These two settings will need to be fine-tuned during the commissioning. When the low amps threshold is reached for x-amount of time (set initially at 5 seconds) the LH200 will run (SOV-201 is energized). When the high amps threshold is reach for x-amount of time, (set initially at 5 seconds) the LH200 will stop (SOV-201 is de-energized)

3. A starvation alarm is set to alert the system operator of a problem if floor egress limit **PES-202** is true for more than 120 seconds while the floor is running in automatic.

4. The sump heater, **HSH-201** is locally energized by **TSL-201**.

5. Hydraulic Sump Low Level Switch **LSL-201** sends alarm to control room (there is no control room).

6. Hand Select Switch (Auto-Off-Manual) **HSS-201** for Hopper **LH200** controls motor **MAC-201**.

7. Hand Jog Switch PB is for **HJS-201** for Hopper **LH200. HSS-201** must be in Manual to operate.

Tire Separator TS300 - Motor and Electrical Devices	
Device ID	**Description**
MAC-301	Separator Drive Motor
VFD-301	Variable Speed Controller
HSS-301	Hand Select Switch (Forward/Reverse/Off/Auto)
ZSS-301	Carriage Lock limit switch
ZSS-302	LH (East) Guard limit switch
ZSS-303	RH (West) Guard limit switch
SSZ-301	Zero Speed Switch

Tire Separator TS300 Control Logic Description

1. The tire separator **TS300** provides tires to separator discharge belt conveyor **BC400** from a bulk working pile in the separator hopper. Separator motor **SDM-301** starts two seconds after conveyor **BC400** starts in automatic and stops when conveyor **BC400** stops.

2. Motor **SDM-301** is variable speed and is adjustable from a minimum of 15 Hz (25% - regardless of below calculation) to a maximum of 60 Hz (100% speed). The speed set point is based on the level of tire accumulation on the Angled Accumulation Conveyor.

3. The VFD speed is 25% of maximum or the below calculation, which ever is higher:

This speed calculation section is likely not needed. The speed variations will likely be very simple as 50% and 100% and NOT dependant on the accumulation of the 5 sensors. We should discuss

$$VFD\_Speed\_\% = \frac{\left(1-\left(\frac{bs}{ts}\right)\right)+\left(\frac{sp}{mr}\right)}{2}\times 100$$

sp =	Set Point in Tons/Hour
mr =	Max Designed Feed Rate in Tons/Hour
bs =	Blocked Sensors
ts =	Total Sensor

There are 5 accumulation points (5 conveyor egress sensors) within the separation refinement system, therefore ts=5. They are:

PES-301, PES-401, PES-411, PES-421, PES-431
The false input signal from each sensor will be maintained for x-amount of time (likely 2-5 seconds) after the sensor becomes true.
Motor **SDM-301** is interlocked with the carriage limit switch **ZSS-301** and guard limit switches **ZSS-302** and **ZSS-303**. These switches indicate the proper position of the separator carriage and closure of the two rear service gates.

4. Speed switch **SSZ-301** provides a speed feedback signal at a rate of 16 pulses per revolution. These pulses are used to detect a stall by setting an alarm if a pulse is not seen within 4 seconds while the motor is running.

Refinement & Accumulation Conveyors (5) - Motors & Electrical Devices	
Device ID	**Description**
	Separator Discharge Belt Conveyor BC300
MAC-302	Belt Conveyor Motor
VFD-302	Variable Speed Controller
HSS-302	Hand Select Switch (Hand/Off/Auto)
PES-302	Belt Conveyor Egress Photo Switch
ZBD-301	Belt Drift Switch (left side)
ZBD-302	Belt Drift Switch (right side)
	Roller Conveyor RC401
MAC-401	Roller Conveyor #1 Motor
VFD-401	Variable Speed Controller
HSS-401	Hand Select Switch (Hand/Off/Auto)
PES-401	Egress Photo Switch
	Roller Conveyor RC411
MAC-411	Roller Conveyor #1 Motor
VFD-411	Variable Speed Controller
HSS-411	Hand Select Switch (Hand/Off/Auto)
PES-411	Egress Photo Switch
	Roller Conveyor RC421
MAC-421	Roller Conveyor #1 Motor
VFD-421	Variable Speed Controller
HSS-421	Hand Select Switch (Hand/Off/Auto)
PES-421	Egress Photo Switch
	Roller Conveyor RC431
MAC-431	Roller Conveyor #1 Motor
VFD-431	Variable Speed Controller
HSS-431	Hand Select Switch (Hand/Off/Auto)
PES-431	Egress Photo Switch

CSS-401	Conveyor Safety Lanyard
CSS-402	Conveyor Safety Lanyard
AMA-491	Audible Start-up Warning
VSS-491	Visual Auto-Start Warning

Separation Refinement Conveyors (5 total) Control Logic Description

Conveyors **BC-300** and **RC401** through **RC431** refine the tire separation from Separator **TS-300**. This is accomplished using a series of turns and an Angled Accumulation Conveyor as the tires are conveyed to the Existing Tire Belt Conveyor (**ETBC**). The follow operating description begins with the last conveyor, **RC431** and works backward toward the Separator **TS300.**

1. Conveyor **RC431** starts in automatic if **PES-431** is true or if **ETBC** is running in automatic. The speed of Conveyor **RC431** is synchronized with **ETBC. RC431** stops if **ETBC** is not running in automatic and **PES-431** is false.

2. Conveyor **RC421** starts in automatic if Conveyor **RC431** is running in automatic. The speed of **RC421** is dependent on whether **PES-421** is true or false for x-amount of time. If **PES-421** is false for x-amount of time or more (initially set at 4 seconds) **RC421** runs at the same speed as **RC431**. If **PES-421** is true for less than x-amount of time **RC421** runs at 100%.

3. Conveyor **RC411** starts in automatic if Conveyor **RC421** is running in automatic. **RC411** stops if **PES-411** is false for x-amount of time (initially set to 4 seconds). **RC411** restarts if **PES-421** is true for x-amount of time (initially set at 2 seconds).

4. Conveyor **RC401** starts in automatic if **PES-401** is true or if **PES-411** is true and **RC411** is running in automatic. Conveyor **RC401** stops if **RC411** is not running in automatic and **PES-411** is false.

5. Belt Conveyor **BC300** starts in automatic if **PES-301** is true or if **RC401** is running in automatic. Conveyor **BC300** stops if **RC401** is not running in automatic and **PES-301** is false.

SEW MOTOR DATA SHEETS

BDLR MOTOR (401)

Helical-worm gear motor
S47 DRN80M4

Speed [r/min]	: 1751 / 162
Total ratio [I]	: 10.80 / finite
No. of teeth nom./denominator	: 54/5
Ma max [Nm]	: 108
Ta max [lb-in]	: 960
Output torque [Nm]	: 40
Output torque [lb-in]	: 355
Service factor SEW-FB	: 2.70
Mounting position	: M1B Term.box.pos.[°] /
cable entry	: 180 (L) / normal
Lubricant / -volume [l]	: CLP 680 Miner.Oil / 0.35
Lubricant volume [US gal]	: 0.090
Corrosion protection	: Yes
Surface protection	: OS2 to technical data sheet 01802__94
Paint coat	: Top coat RAL5001 (green blue)
Output shaft end	: 1.000x1.97 inch
Design	: Foot-mounted version
Breather valve	: Nirosta type
Documentation no. A	: 21932786
Parts list	: 022521096
Motor power [kW]	: 0.75
Motor power [HP]	: 1.0
Motor frequency [Hz]	: 60
Cyclic duration factor S1-S10	: S1
Motor voltage [V] / conn. Type	: 230/460 double star/star
Rated current [A]	: 3.10 / 1.56
cos phi	: 0.70
Wiring diagram	: R76 / 680430506
Thermal cl.[°C]/Enclosure[IP]	: 155(F) / 65
Service factor motor	: 1.15
International efficiency class	: IE3
Efficiency	
At 50/75/100% Pn [%]	: 82.0 / 84.9 / 85.5
CE mark	: Yes

ANGULAR CONVEYOR MOTORS (411, 421, 431)

Helical-worm gear motor
S47 DRN90S4

Speed [r/min]	: 1762 / 163
Total ratio [I]	: 10.80 / finite
No. of teeth nom./denominator	: 54/5
Ma max [Nm]	: 108
Ta max [lb-in]	: 960
Output torque [Nm]	: 58
Output torque [lb-in]	: 515
Service factor SEW-FB	: 1.85
Mounting position	: M1B Term.box.pos.[°] /
cable entry	: 180 (L) / normal
Lubricant / -volume [l]	: CLP 680 Miner.Oil / 0.35
Lubricant volume [US gal]	: 0.090
Corrosion protection	: Yes
Surface protection	: OS2 to technical data sheet 01802__94
Paint coat	: Top coat RAL5001 (green blue)
Output shaft end	: 1.000x1.97 inch
Design	: Foot-mounted version
Breather valve	: Nirosta type
Documentation no. A	: 21932786
Parts list	: 022521096
Motor power [kW]	: 1.1
Motor power [HP]	: 1.5
Motor frequency [Hz]	: 60
Cyclic duration factor S1-S10	: S1
Motor voltage [V] / conn. type	: 230/460 double star/star
Rated current [A]	: 4.60 / 2.30
cos phi	: 0.69
Wiring diagram	: R76 / 680430506
Thermal cl.[°C]/Enclosure[IP]	: 155(F) / 65
Service factor motor	: 1.15
International efficiency class	: IE3
Efficiency	
at 50/75/100% Pn [%]	: 83.5 / 86.1 / 86.5
CE mark	: Yes

DISCHARGE BELT CONVEYOR MOTOR

Helical-worm gear motor
SA77/T DRN90L4

Speed [r/min]	: 1767 / 43
Total ratio [I]	: 41.07 / infinite
Ma max [Nm]	: 1100
Ta max [lb-in]	: 9740
Output torque [Nm]	: 295
Output torque [lb-in]	: 2610
Service factor SEW-FB	: 3.80
Mounting position	: M1A Term.box.pos.[°] /
cable entry	: 180 (L) / normal
Lubricant / -volume [l]	: CLP 680 Miner.Oil / 1.80
Lubricant volume [US gal]	: 0.48
Corrosion protection	: Yes
Surface protection	: OS2 to technical data sheet 01802__94
Paint coat	: Top coat RAL5001 (green blue)
Hollow shaft	: 2.000 inch Design
	: Hollow shaft
General access. Feature	: T with torque arm
Breather valve	: Nirosta type
Documentation no. A	: 21932786
Parts list	: 282571296
Order comments special design	: Torque arm fasteners per Assembly specification: 01 A06 09 12US
Motor power [kW]	: 1.5
Motor power [HP]	: 2.0
Motor frequency [Hz]	: 60
Cyclic duration factor S1-S10	: S1
Motor voltage [V] / conn. type	: 230/460 double star/star
Rated current [A]	: 6.00 / 3.00
cos phi	: 0.70
Wiring diagram	: R76 / 680430506
Thermal cl.[°C]/Enclosure[IP]	: 155(F) / 55
Service factor motor	: 1.15
International efficiency class	: IE3

SEPARATOR

Helical gear motor
R137 DRN132M4/DH

Speed [r/min]	: 1774 / 9.4
Total ratio [l]	: 188.45 / infinite
Ma max [Nm]	: 8000
Ta max [lb-in]	: 70800
Output torque [Nm]	: 7610
Output torque [lb-in]	: 67400
Service factor SEW-FB	: 1.05
Mounting position	: M1
Term.box.pos.[°] / cable entry	: 0 (R) / normal
Lubricant / -volume [l]	: CLP 220 Miner.Oil / 10.00
Lubricant volume [US gal]	: 2.65
Condensation drain hole	: DH - drain hole
Corrosion protection	: Yes
Surface protection	: OS2 to technical data sheet 01802__94
Paint coat	: Top coat RAL5001 (green blue)
Output shaft end	: 3.625x6.69 inch
Output oil seal	: 2 oil seals
Documentation no. A	: 21932786
Parts list	: 012560696
Motor power [kW]	: 7.5
Motor power [HP]	: 10
Motor frequency [Hz]	: 60
Cyclic duration factor S1-S10	: S1
Motor voltage [V] / conn. type	: 230/460 double star/star
Rated current [A]	: 26.50 / 13.30
cos phi	: 0.77
Wiring diagram	: R76 / 680430506
Thermal cl.[°C]/Enclosure[IP]	: 155(F) / 66
Service factor motor	: 1.15
International efficiency class	: IE3
Efficiency	
at 50/75/100% Pn [%]	: 91.1 / 91.9 / 91.7
CE mark	: Yes
Design specification	: USA (UR) /Canada (CSA)
EISA identification	: Yes, conform to EISA 2007
K.V.A.code	: K
Design	: NEMA A
Terminal box	: Terminal box lower part made of aluminum with tapped hole 1xNPT 1 1/4", 2xNPT 1/2"
CT speed range	: 300-1800rpm
Documentation no. A	: 22760253
Nameplate	: English / Imperial units
Nameplate position	: 270°
Opera.instr. A lang./quantity	: English
Commodity code	: 85015220