OCID
Bureau of Reclamation

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL, SAMPLES, MANUFACTURER'S CERTIFICATES OF COMPLIANCE FOR REVIEW.

ONLY ONE SPECIFICATION SECTION NUMBER ALLOWED PER SUBMITTAL TRANSMITTAL.

Date: 5/07/2024

Submittal No.: 025

Section I (Contractor) **CONTRACTOR SHALL EXPLICITLY INDICATE ANY REQUESTED DEVIATIONS OR SUBSTITUTIONS FROM THE CONTRACT REQUIRMENTS.**

To:
Craig Ullmann & Steven Morris
Applegate Group
Tom Hook
Bureau of Reclamation
thook@usbr.gov

From:
Jaime Jordan, Asst. PM
Kissner G.C., Inc.
PO Box 682
Cedaredge, CO 81413
P: 970.835.7910
E:jjordan@kissnergen.com

Contract No.:

Previously Submitted on Transmittal No. _____

Project and Location:
Fruitgrowers Dam Outlet Gate Improvements
Fruitgrowers Reservoir
Orchard City, CO 81410

RSN No.	Description (Include Brand or Manufacturer's Name)	Action/ Informational	No. of Sets CM	No. of Sets BOR	Clause or Section Title	Initial or Resubmittal	Action Code*
01 78 30-1	Final As-Built Drawings	A	1	1	Project Record Documents	Initial	

Name: Jaime Jordan Jaime Jordan (Contractor Assistant Project Manager)

Contractor certifies he has reviewed the plans and specifications; the submittal is in accordance with the contract documents or deviations are clearly identified; individual product characteristics and assemblies have been coordinated with actual field conditions; systems are complete; system and system components can be installed and will function as intended.

Comments:

Date Received:

Reviewed By:

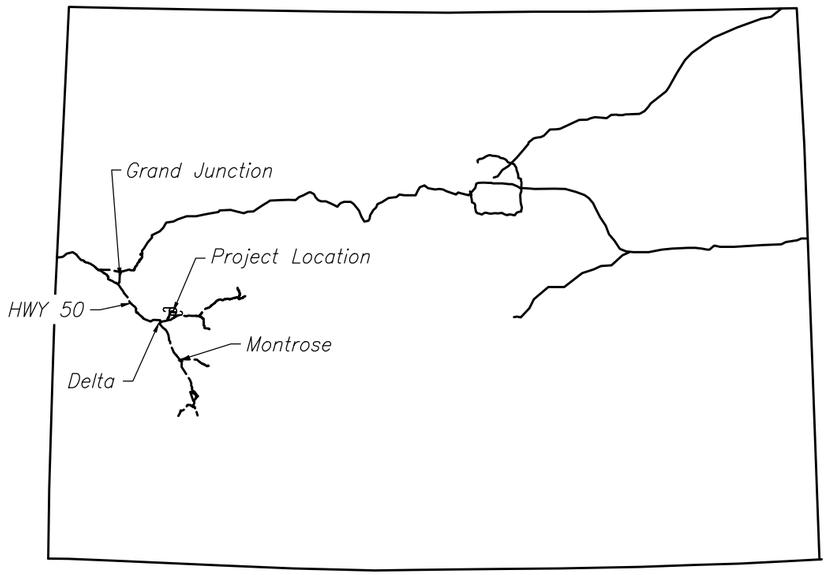
Signature: Approving Authority: CO - COR

Date:

Action Codes:
A - Approved
B - Approved With Comments - Resubmission Not Required
C – Rejected – See Comments, Resubmission Required
O - Other: _____

Approved by Kissner G.C., Inc. on 5/07/24
Jaime Jordan

KISSNER GENERAL CONTRACTORS, INC.



STATE OF COLORADO

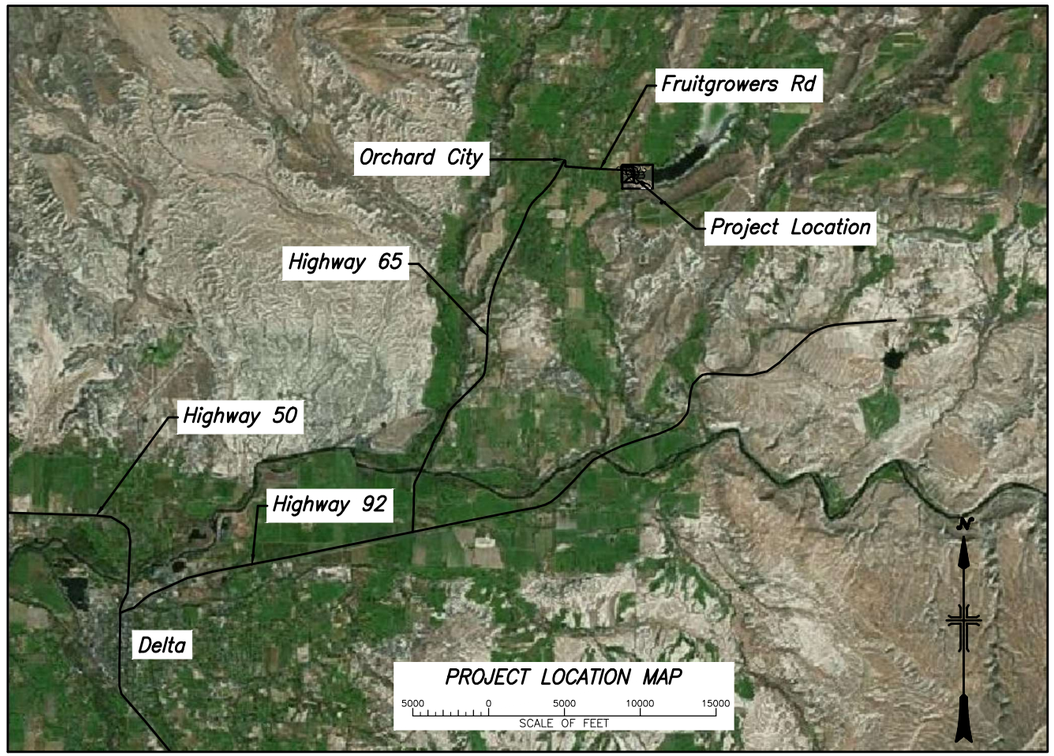


Table 52 00 00A - List of Drawings		
Sheet No.	**Drawing No.**	**Title**
1	270-417-249	Key Map – Location and Vicinity Maps and Drawing Index
General:		
2	270-417-250	Staging area and Access
3	270-417-251	General Site Plan
4	270-417-256	Gate House, Shaft & Gate Chamber Layout
5	270-417-254	Concrete Slab
6	270-417-255	Gate Equipment Building Elevations
7	270-417-257	Shaft Deck Frame Weldments
8	270-417-258	Shaft Deck Assembly
9	270-417-259	Ladder and Retactable Safety Line Tower
10	270-417-260	Ladder and Attach Details
11	270-417-261	Valves and Assembly Components
12	270-417-262	Circle Ditch Gate
13	270-417-263	Chamber Landing and Shaft Guide & Pipe Hangar Assemblies
14	270-417-264	Chamber Landing Frame Weldment Small
15	270-417-265	Chamber Landing Frame Weldment Large, Carrier & Spreader Connector
16	270-417-266	Chamber Landing Frame Connector Components
17	270-417-267	Guard Railings
18	270-417-268	Shaft Guide & Pipe Hangar Weldment
19	270-417-269	Chamber Chain Covers and Drive Assembly
20	270-417-270	Sprocket Cover Sheetmetal Components Top
21	270-417-271	Sprocket Cover Sheetmetal Components Bottom
22	270-417-272	Valve Actuator Assembly
23	270-417-273	Actuator Bracket Weldment
24	270-417-274	Actuator Support Weldment
25	270-417-275	Actuator Sheet Metal Covers
26	270-417-276	Top Inner Drive Shaft Weldments
27	270-417-277	Top Outer Drive Shaft Weldment
28	270-417-278	Outer Actuator Thrust Collar
29	270-417-279	Fasteners
30	270-417-280	Actuator Drive Shafts
31	270-417-281	Motorized Actuator Drive Shaft
Standard Drawings:		
32	40-D-60003	General Notes for Concrete Outline and Reinforcement
33	40-D-60004	Minimum Requirements for Detailing Reinforcement
Informational Drawings:		
34	270-D-55	General Plan and Sections
35	270-D-5	Plan, Profile, and Sections
36	270-D-7-1-01	Trashrack Structure Concrete Outline
37	270-D-8-1-02	Gate Chamber and Shaft Concrete Outline
38	270-D-33	Stilling Box - Concrete Outline
39	270-D-17	Gate Chamber Valves and Piping
40	270-417-2017	Pipe Repair
41	270-D-81	Miscellaneous Metalwork Installation
42	270-D-82	Grating - Ladder - Shaft Cover
43	270-D-121	Dam Modification General Plan and Sections
44	270-D-122	Dam Modification Stability Berm, Cofferdam, Dike and Roadway Ramp

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUITGROWERS PROJECT
COLORADO

FRUITGROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Thomas Hook
DRAWN
Matt Bryner
CHECKED
Joshua Dunham P.E.
TECH. APPR.
Mark Wernke P.E.
APPROVED
ADMIN APPROVAL -

GRAND JUNCTION, CO 2023-07-14

KEY MAP

270-417-249

SHEET 1

LAST SAVED DATE
2023-07-14
LAST SAVED BY
THOOK

CAD SYSTEM
AutoCAD Civil 3D (LMS TECH)
CAD FILENAME
270-417-249--251 SITE DRAWINGS.DWG

Staging Area and Access Map

60 0 60 120 180
SCALE OF FEET

NOTES:

1. Use of Fruitgrowers Road is subject to the requirements of Section 01 14 10 – Use of Site and Submittal 01 55 20 – Traffic Control Plan.
2. All or part of the staging areas shown in this drawing may be used at the Contractors discretion.
3. All Contractor use of the Staging Areas and Access Routes shall be in compliance with the Specifications.
4. Dam instrumentation may exist that is not shown on this drawing. Notify CM if unmarked instrumentation is discovered.
5. Dam instrumentation must not be disturbed.
6. Notify CM immediately if instrumentation is damaged or disturbed.

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FRUITGROWERS PROJECT
COLORADO

FRUITGROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Thomas Hook
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Matt Bryner
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TECH. APPR.
Mark Wernke P.E.
APPROVED
ADMIN APPROVAL -

GRAND JUNCTION, CO 2023-07-14

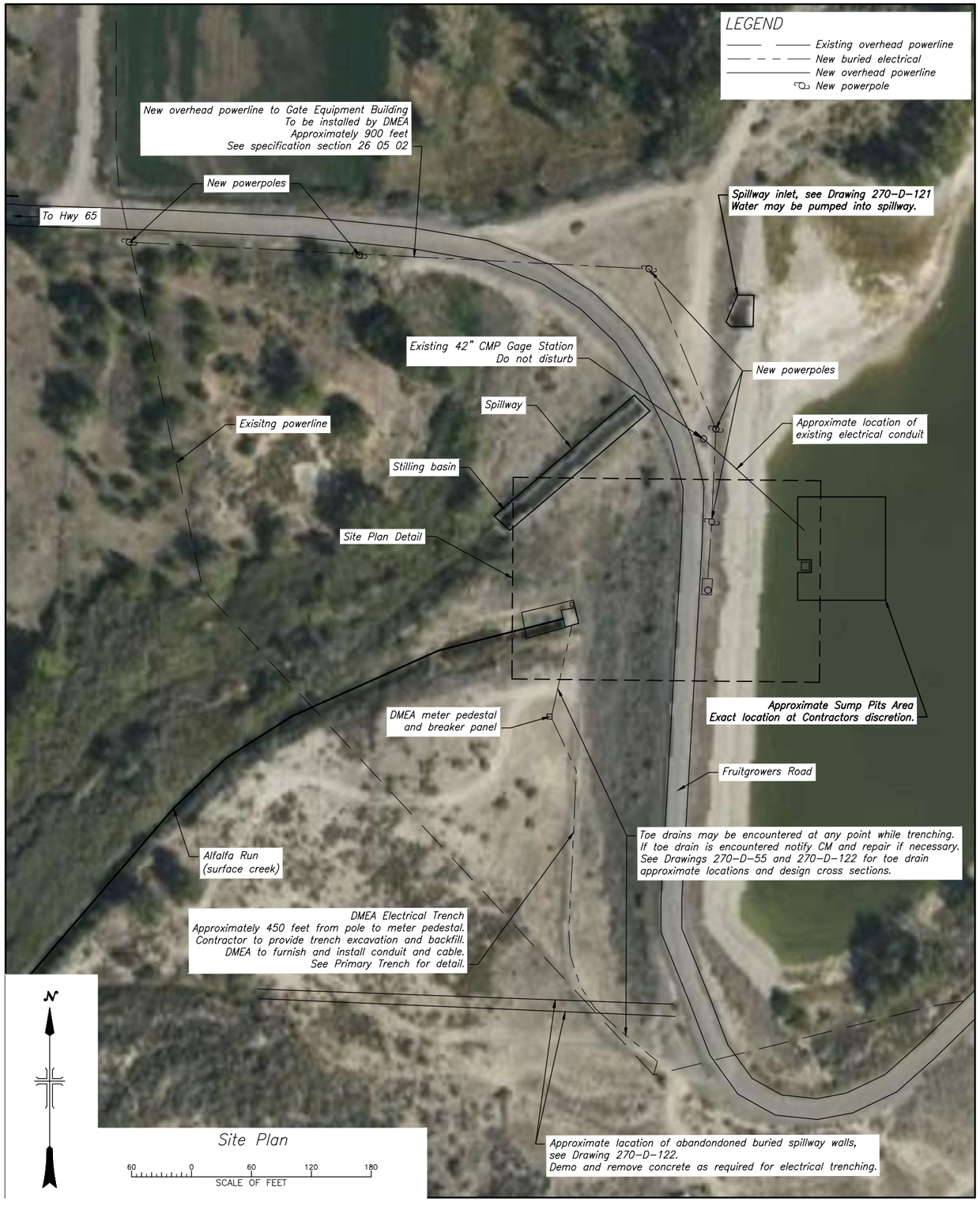
STAGING AREAS AND SITE ACCESS

270-417-250

SHEET 2

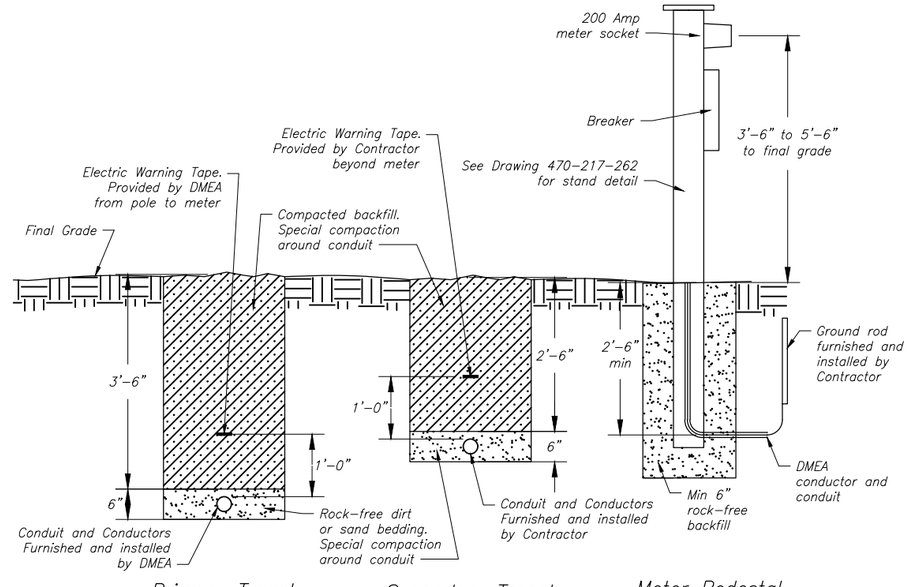
LAST SAVED DATE
2023-06-29
LAST SAVED BY
THOOK

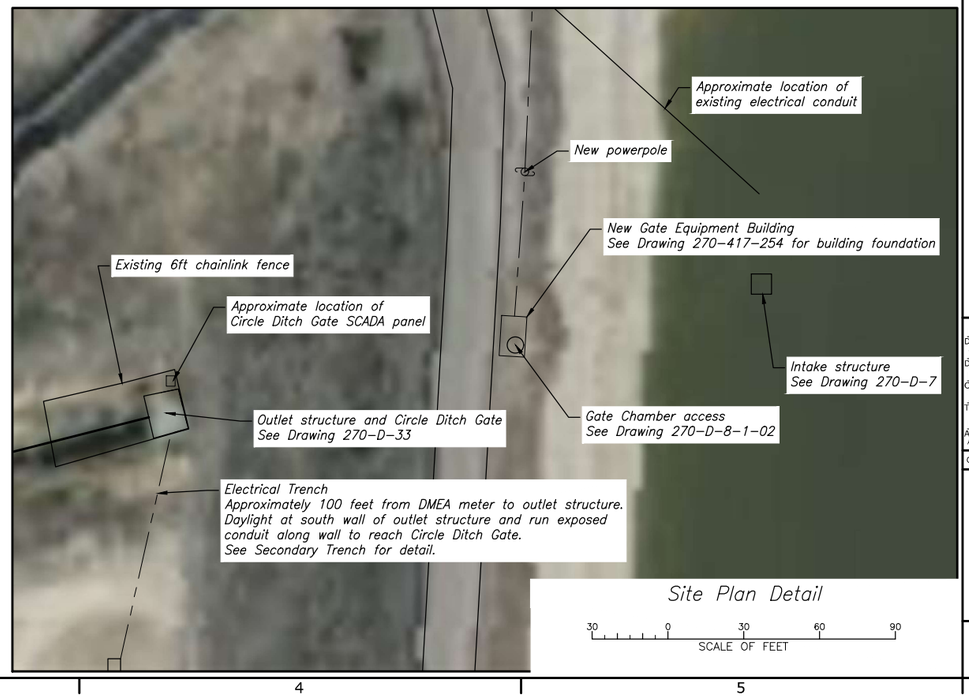
CAD SYSTEM
AUTOCAD MAP (LMS TECH)
AUTOCAD FILE NAME
270-417-249--251 SITE DRAWINGS.DWG



NOTES:

1. All locations shown are approximate. See other drawings for exact locations where applicable.
2. See Specification Section 31 03 33 Removal and Control of Water for water control details. See Specification Section 01 14 20 Reservoir, Spillway, and Outlet Works Operations for restrictions.
3. No excavation of the dam embankment for sump pits is permitted, see informational drawing 270-D-5 for embankment detail.
4. Provide a settling pond or take other measures as neccessary to maintain compliance with discharge permit.
5. Electrical
   - 5.1. Coordinate with DMEA to provide excavation for powerpoles, and trench when applicable.
   - 5.2. Contractor will provide riser from bottom of meter base to 18" below final grade, and slip joint above ground.
   - 5.3. The state electrical inspector must approve meter base before service will be energized by DMEA.
   - 5.4. Do not dig trench prior to being contacted by DMEA operations for scheduling.
   - 5.5. DMEA conduit will not be installed until an inspected and approved meter base is in place.





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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUITGROWERS PROJECT
COLORADO

FRUITGROWERS DAM

OUTLET GATE IMPROVEMENTS

DESIGNED	Matt Bryner
DRAWN	Thomas Hook
CHECKED	Matt Bryner
TECH. APPR.	Joshua Dunham P.E.
APPROVED	Mark Wernke P.E.
ADMIN APPROVAL	-
GRAND JUNCTION, CO	2023-07-14

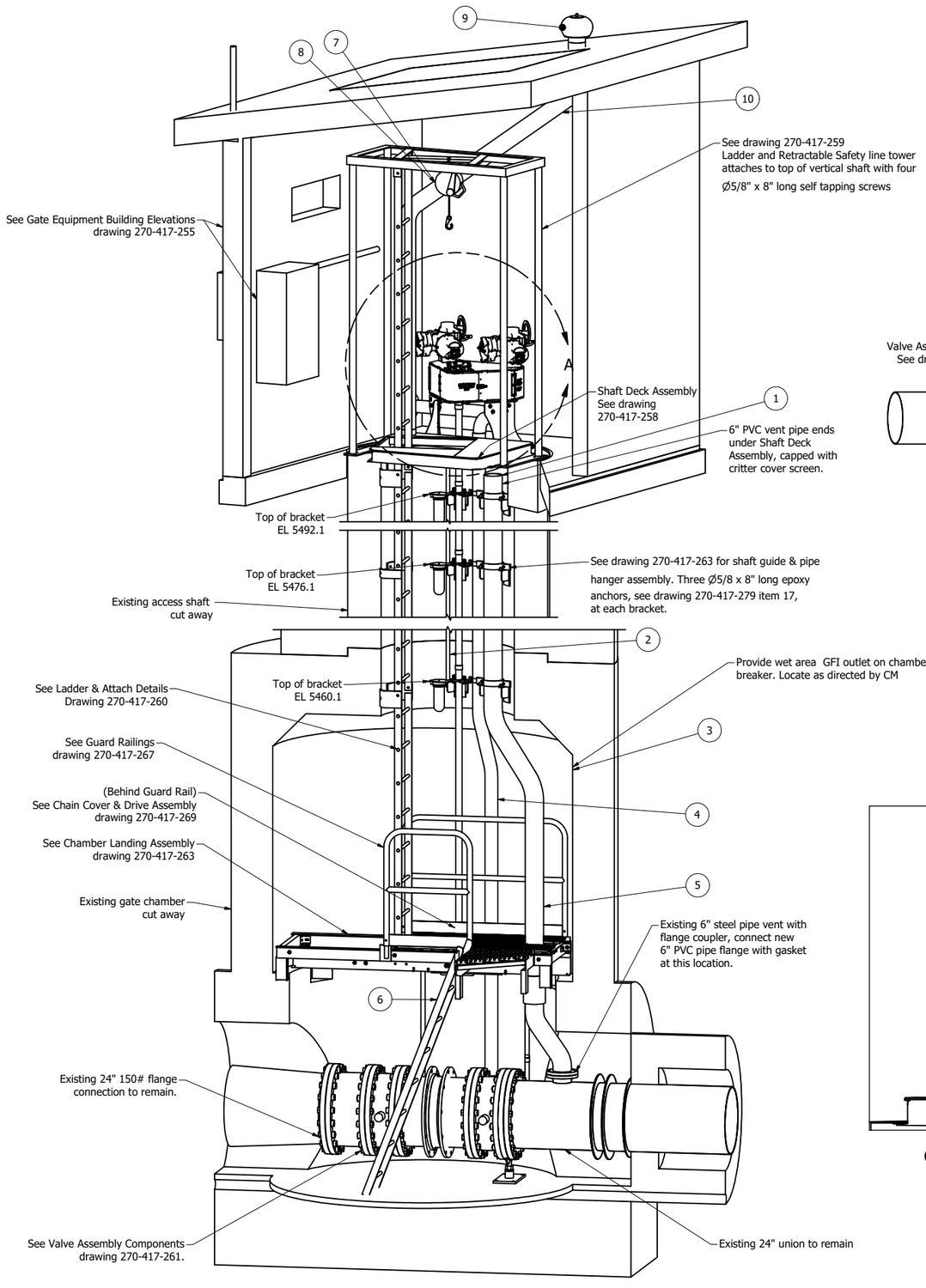
GENERAL SITE PLAN

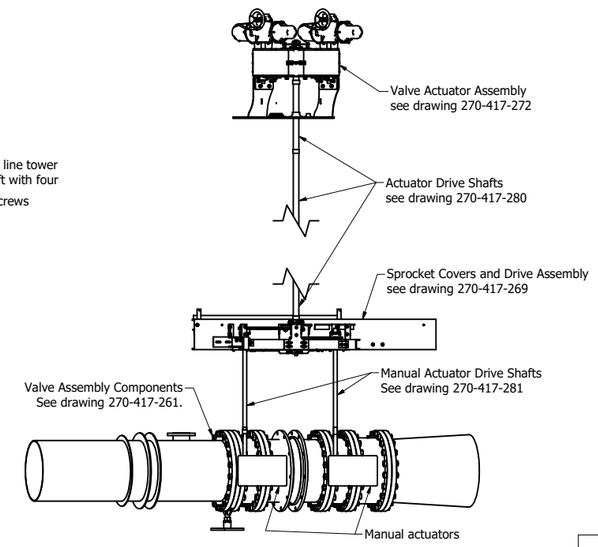
270-417-251

SHEET 2

LAST SAVED DATE
2023-06-29
LAST SAVED BY
THOOK

CAD SYSTEM
AUTOCAD MAP (LMS TECH)
AUTOCAD FILE NAME
270-417-249-251 SITE DRAWINGS.DWG



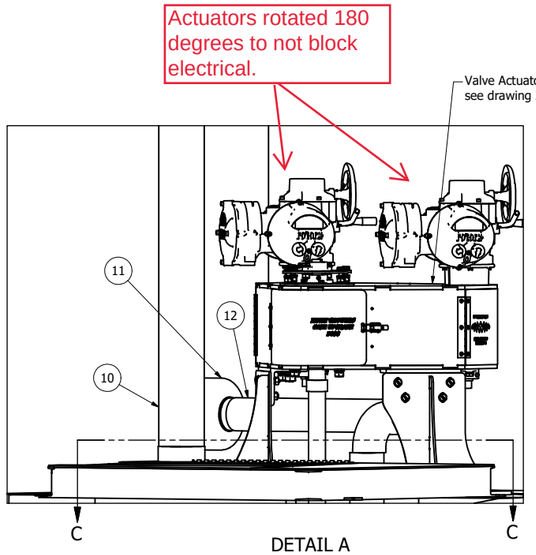


VALVE AND ACTUATOR ASSEMBLY
SCALE 1/30

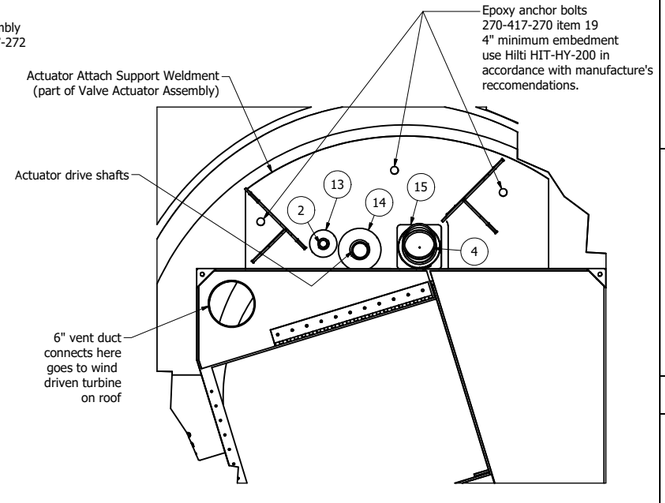
NOTES

1. Disassemble and remove existing 24" gates and operating equipment including all components in the access shaft and on top of the dam. This shall include all brackets attached to the vertical shaft walls.
2. Disassemble and remove all existing gate chamber platform components and support brackets.
3. Disassemble and remove all existing 6" ventilation pipe and support components.
4. Disassemble and remove all existing ladders and support components.
5. Disasssemble and remove any other items that are not specifically mentioned but which are not longer in use.
6. All embedded anchors shall be cut flush to chamber/shaft walls.
7. All the components above can be assumed to be coated with lead based paint and removal efforts must account for this unless the contractor at his own expense provides testing to show the components are not covered with lead based paint.
8. After demolition is complete all remaining steel/iron components shall be inspected for corrosion and/or other damage that may need to be addressed. Contractor must provide owner with a written assessment and photos of damage, or lack there of, on interior and exterior surfaces of remaining components.
9. All remaining metallic components must have lead based paint removed in accordance with specifications, surfaces shall then be prepared and re-coated in accordance with specifications 09 96 20.

PARTS LIST			
ITEM	QTY	DESCRIPTION	DRAWING NUMBER/REFERENCE
1	1	Critter cover screen	Wal-rich 2202056
2	70'	1" Schedule 80 PVC conduit and conductors	NA
3	1	wet area GFI outlet	NA
4	65'	schedule 40 PVC 4" forced air vent pipe	NA
5	50'	schedule 40, 6" PVC vent pipe to top of shaft	NA
6	1	8' fiberglass ladder	McMaster Carr 7742T51
7	1	Self retracting lifeline with rescue winch, 50' 310lb Wt.	Grainger 61DG05
8	2	Self retracting lifeline, 50' 310lb Wt.	Grainger 1XEU1/65FT
9	1	Wind driven turbine 6" vent	Grainger 2C528
10	20'	6" vent duct and fittings	NA
11	1	4" Inline duct fan	Grainger 6TWU6
12	8'	4" vent duct and fittings	NA
13	1	Shrink to fit grommet	McMaster Carr 5277T11
14	1	Shrink to fit grommet	McMaster Carr 5277T13
15	1	Roof pipe gasket	McMaster Carr 7503T3



DETAIL A
SCALE 1 / 10
(Ladder and Retractable Safety Line Tower not shown)
(Shaft Deck Lids not shown)



SECTION C-C
SCALE 1 / 10

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

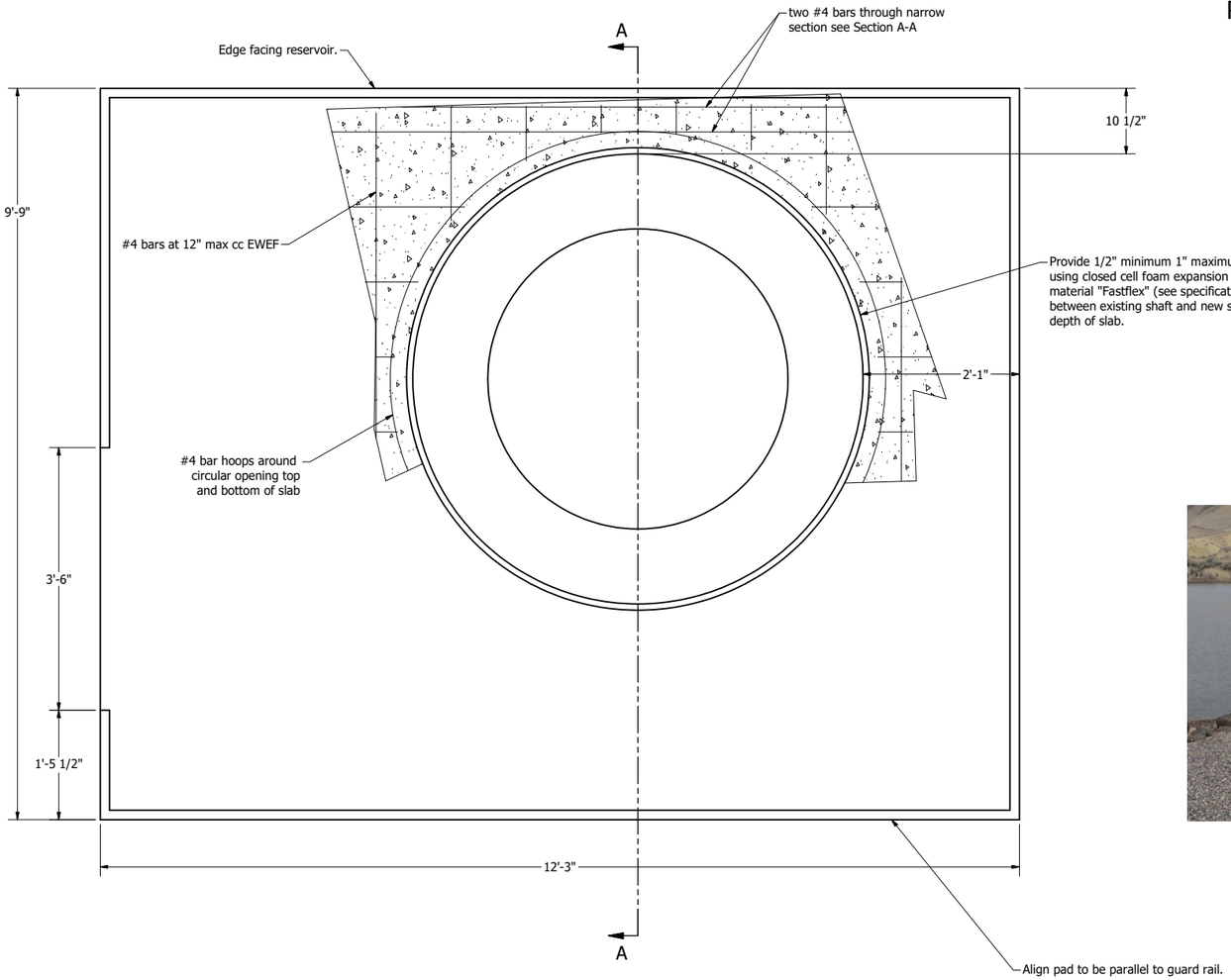
GRAND JUNCTION, COLORADO

GATE HOUSE, SHAFT & GATE CHAMBER LAYOUT

270-417-256

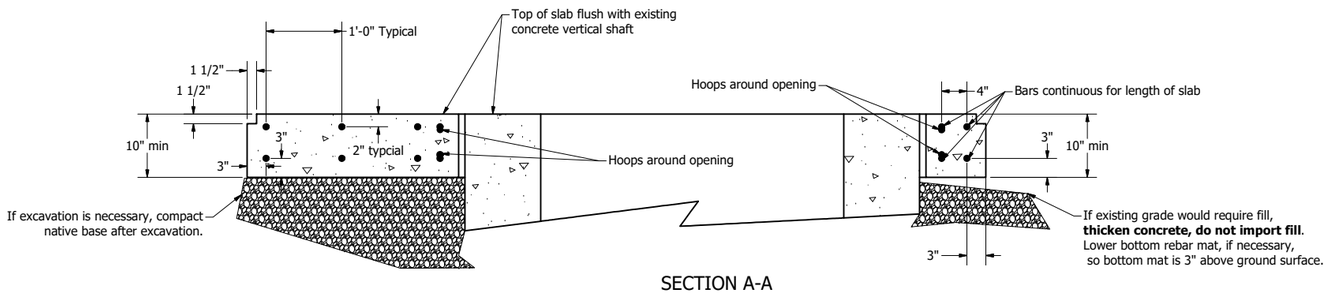
Notes

1. Place concrete on existing surface, excavate as necessary to ensure 10" minimum thickness. Excavated material shall be spread around work area. Do not use excavated material as fill.
2. If fill is needed thicken concrete as necessary, see detail.
3. Concrete shall be in accordance with specifications.



RESERVOIR

VIEW OF EXISTING VERTICAL SHAFT
(All metal components to be removed)



SECTION A-A

— BUREAU OF RECLAMATION —

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner	DESIGNED
Matt Bryner	DRAWN
Thomas Hook	CHECKED
Josua Dunham PE	TECH. APPR.
Mark Wernke PE	APPROVED

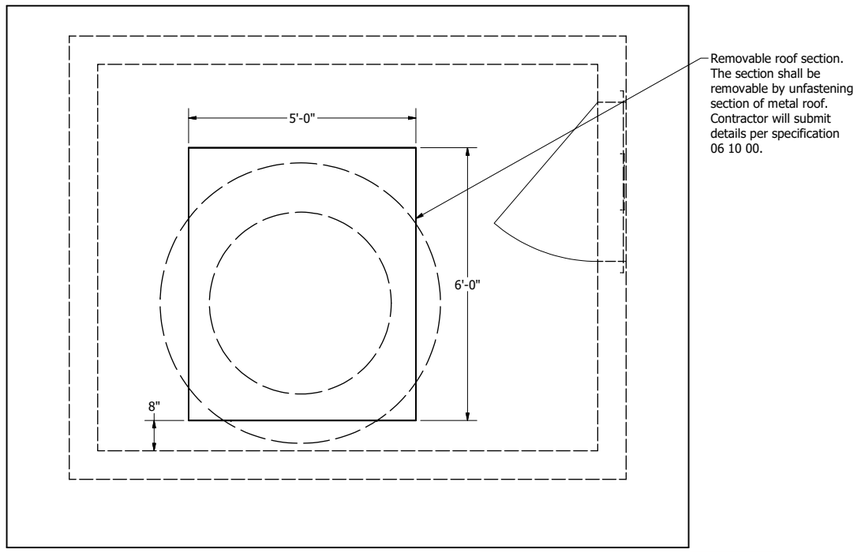
GRAND JUNCTION, COLORADO

CONCRETE SLAB

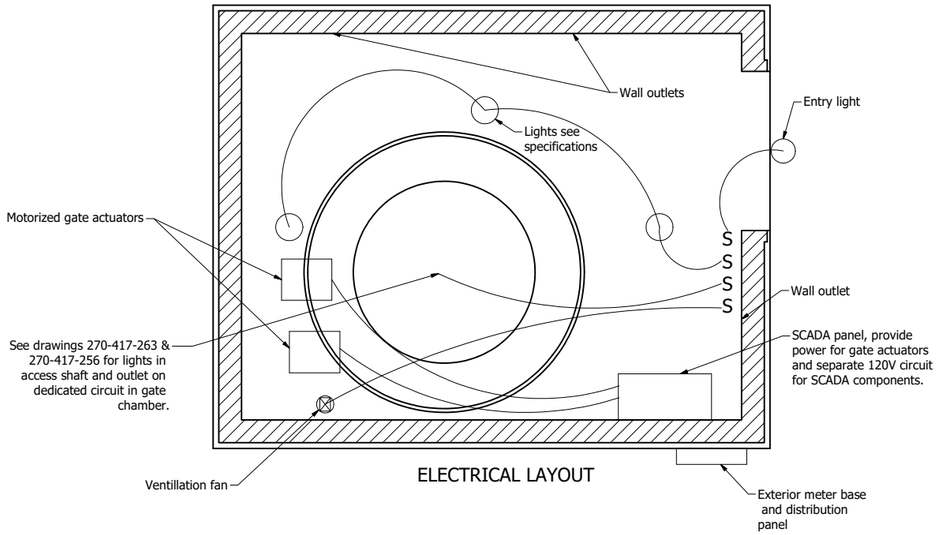
270-417-254

NOTES:

1. Colors for siding, roofing, trim, and doors shall be submitted for approval prior to material purchases.
2. Window shall be vinyl frame slider with screen.

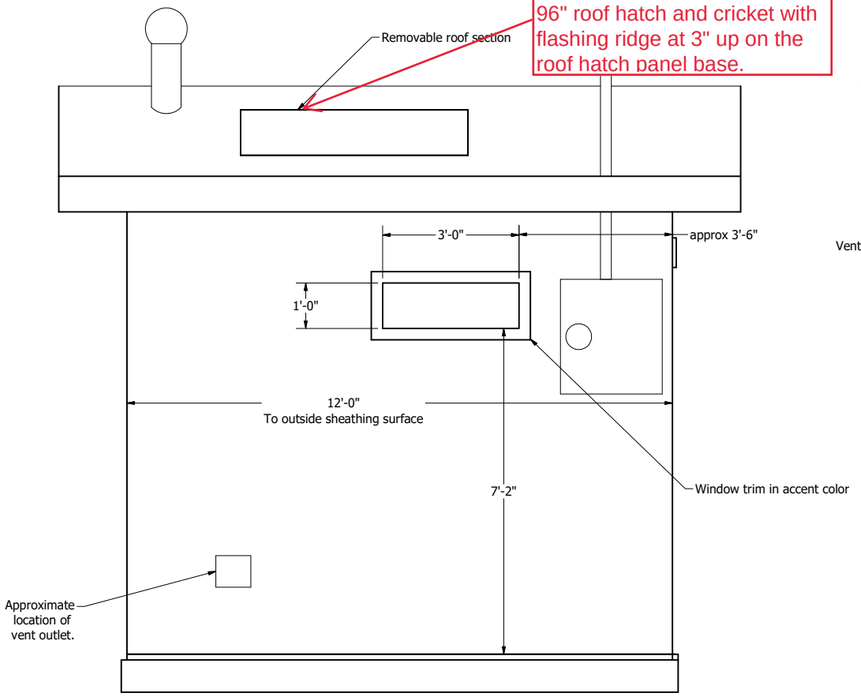


ROOF PLAN VIEW

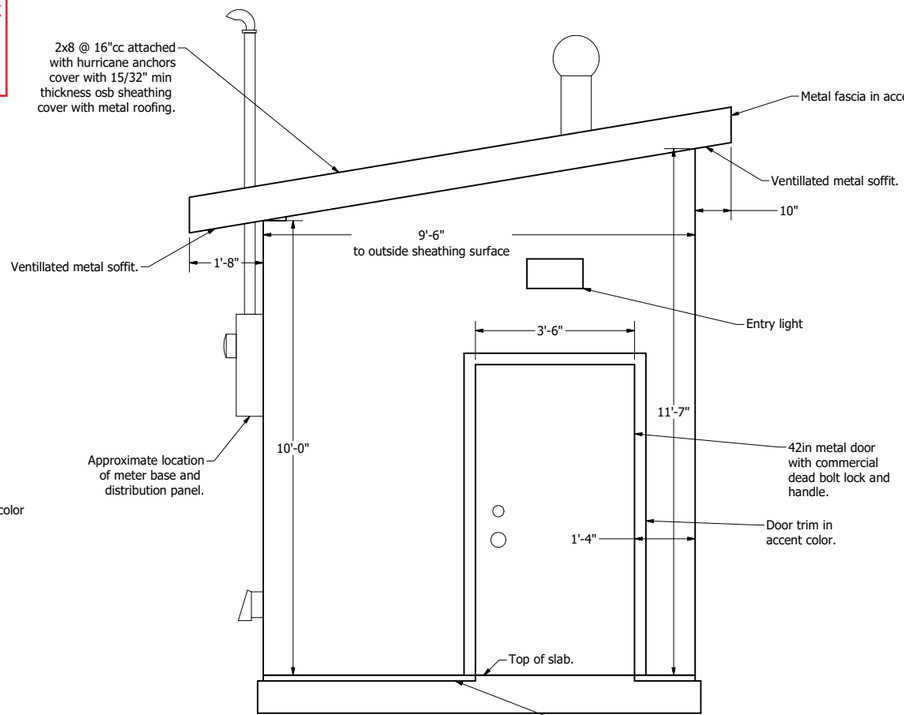


ELECTRICAL LAYOUT

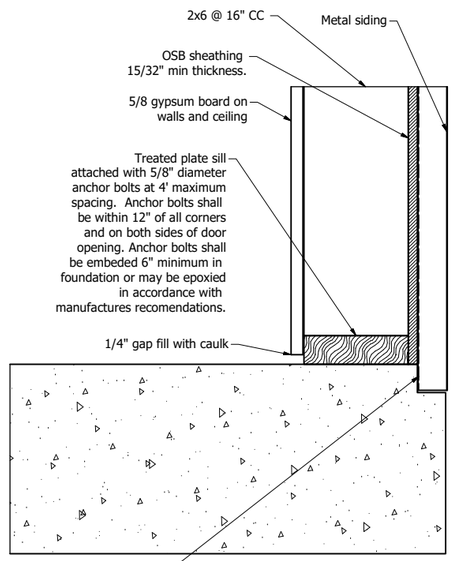
Removable roof section replaced with Dura-Hatch 72" x 96" roof hatch and cricket with flashing ridge at 3" up on the roof hatch panel base.



EAST ELEVATION
(metal siding not shown)
SCALE 1/20



NORTH ELEVATION
(metal siding not shown)
SCALE 1/20



WALL SECTION
SCALE 1 / 4

— BUREAU OF RECLAMATION —

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Joshua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

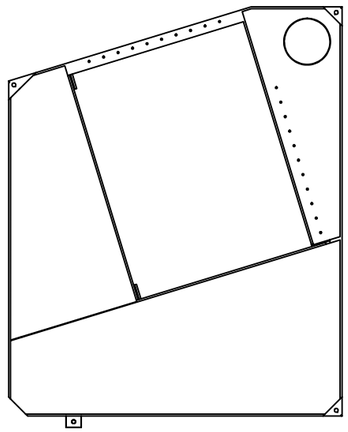
GATE EQUIPMENT BUILDING ELEVATIONS

270-417-255

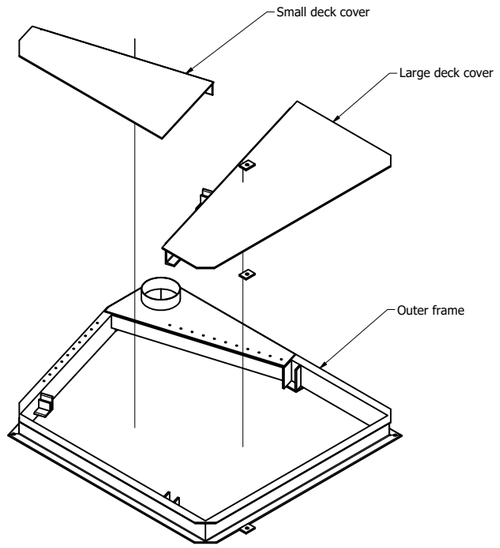
NOTES:

1. Weld in accordance with AWS D1.4.
2. Minimum size of welds is 1/8".
3. Remove all sharp edges and round corners.
4. Galvanize in accordance with specifications 09 96 20.
5. All materials shall be steel, A36 or A572 any grade.

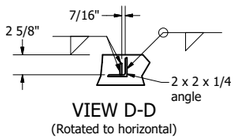
Used in Shaft Deck Assembly
see drawing 270-417-258



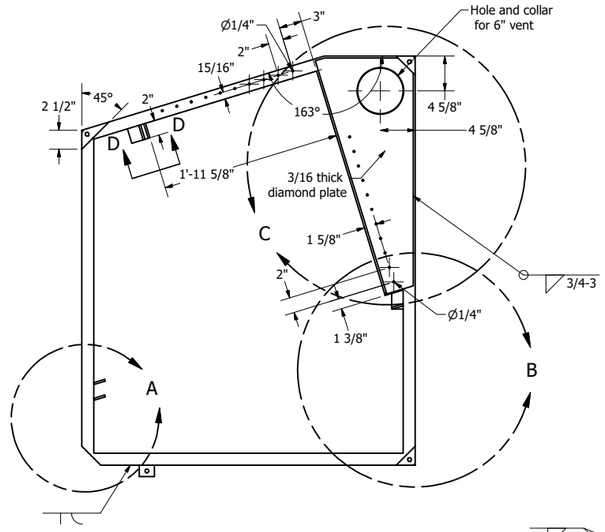
TOP VIEW ASSEMBLED SHAFT DECK

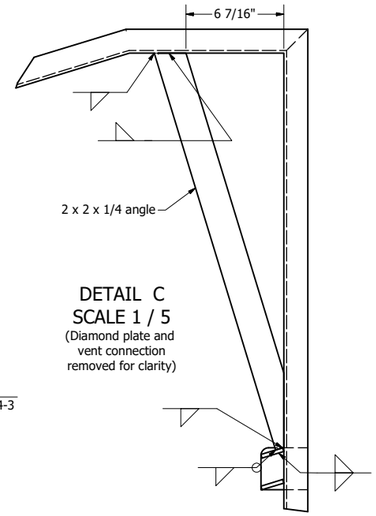


SHAFT DECK ASSY
EXPLODED

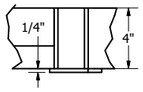


VIEW D-D
(Rotated to horizontal)

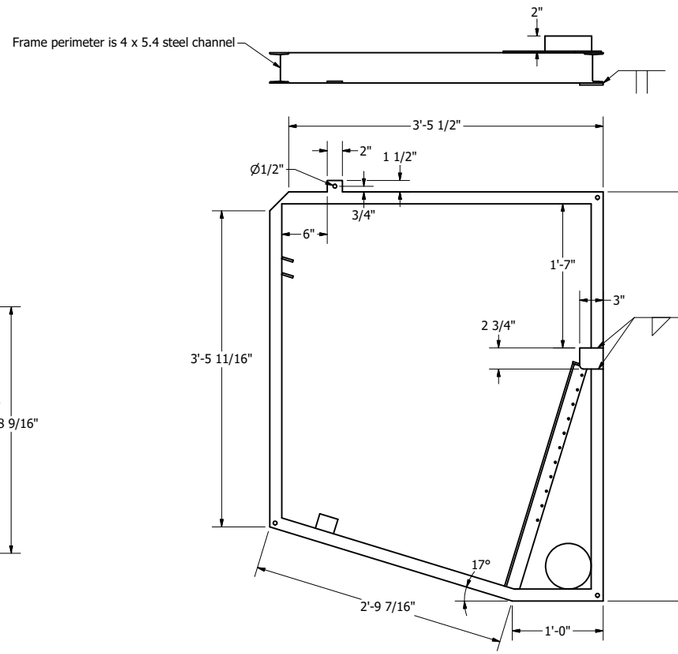


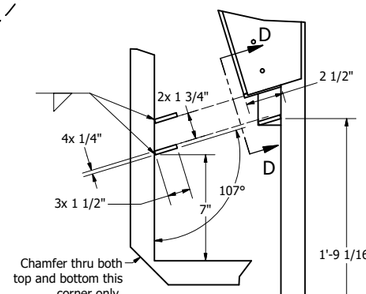


DETAIL C
SCALE 1 / 5
(Diamond plate and vent connection removed for clarity)

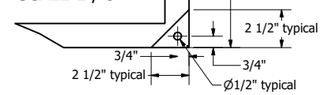


VIEW D-D
(Rotated to horizontal)

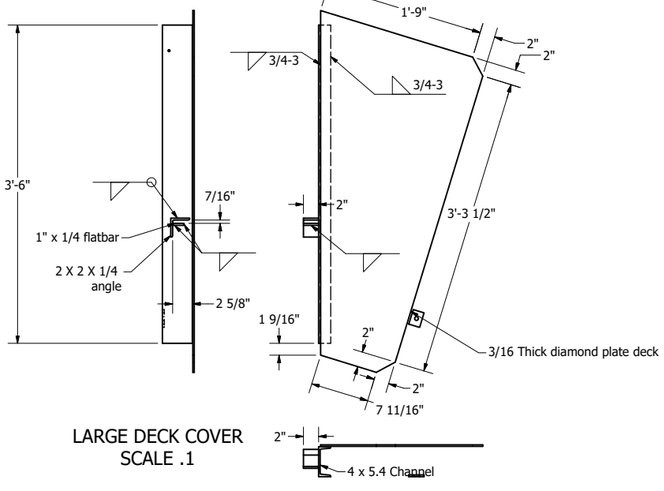




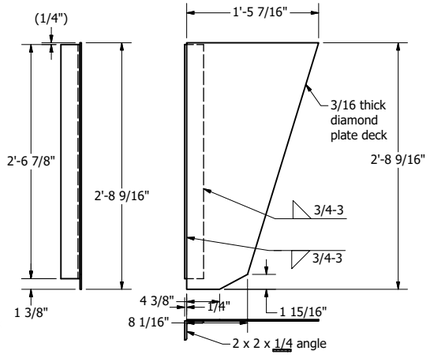
DETAIL A
SCALE 1 / 5



DETAIL B
SCALE 1 / 5



LARGE DECK COVER
SCALE .1



SMALL DECK COVER
SCALE .1

OUTER FRAME
SCALE .1

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

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FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

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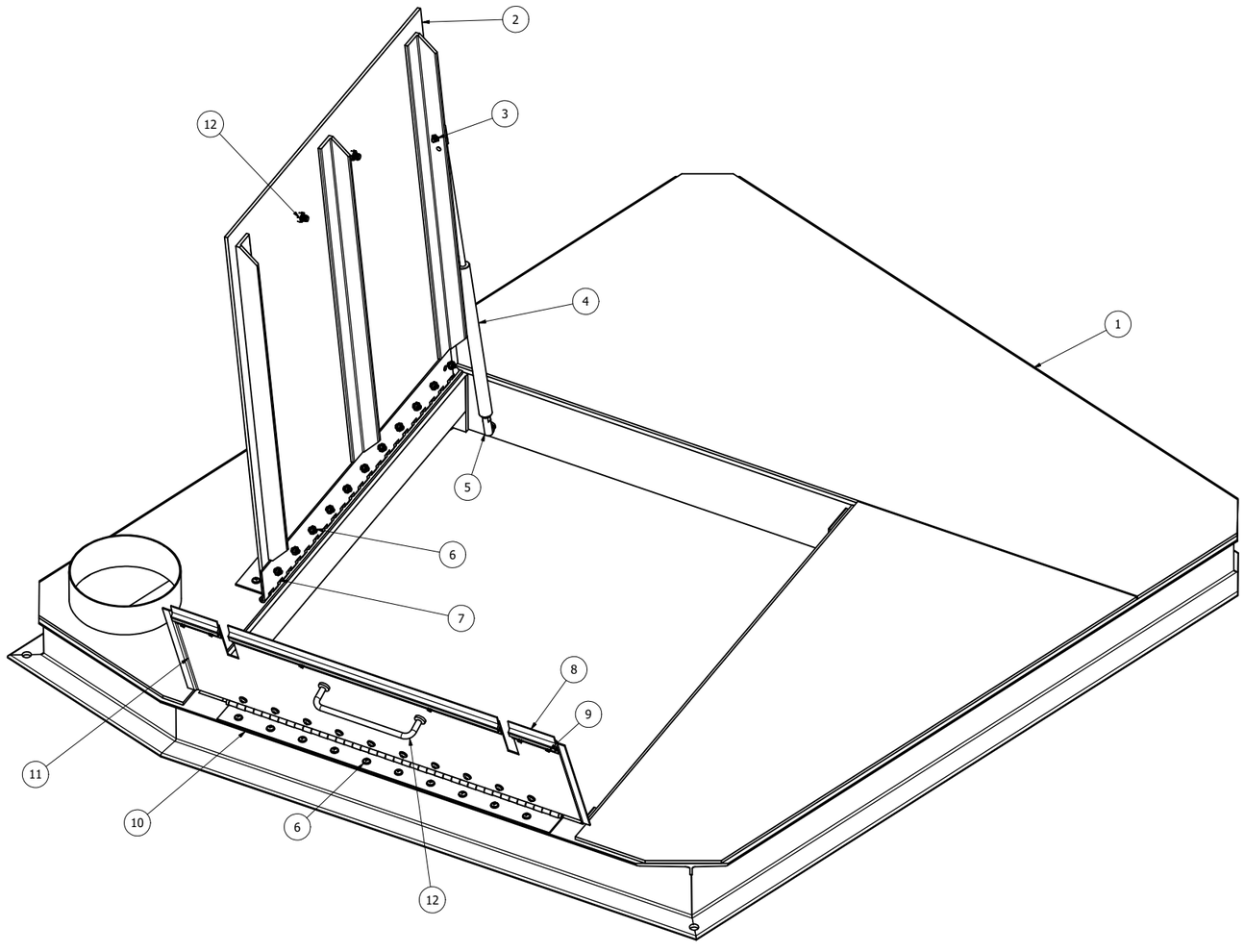
Joshua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

SHAFT DECK FRAME
WELDMENTS

270-417-257

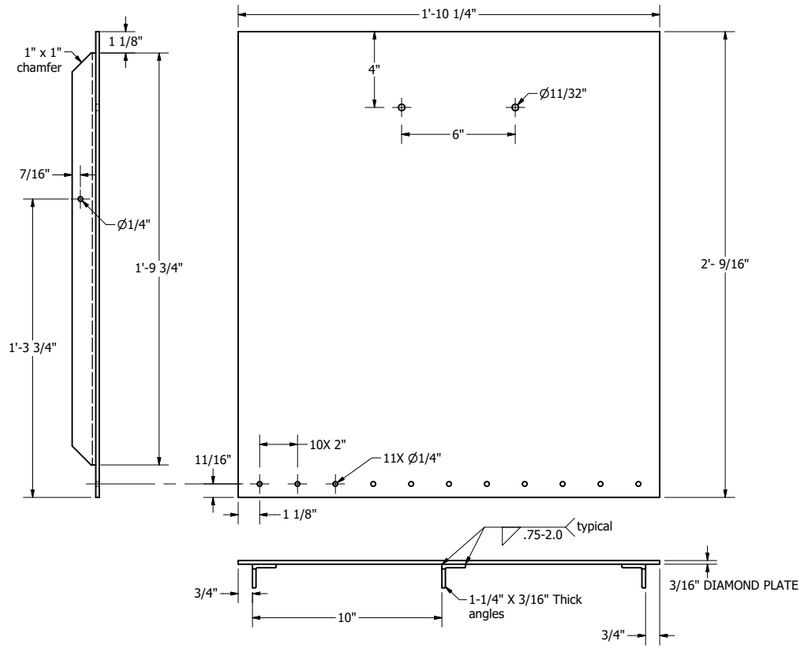


SHAFT DECK ASSEMBLY

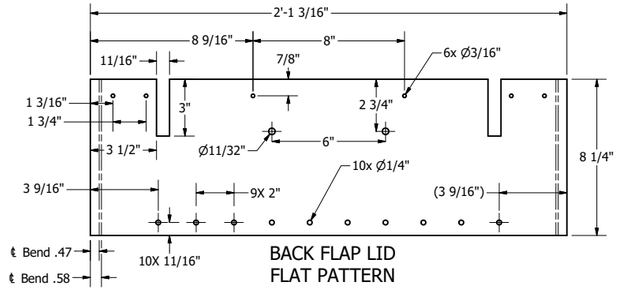
PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
1	1	Shaft Deck Weldments	270-417-257
2	1	Deck Hatch Lid	See Detail
3	2	Nut, 6MM, Nylock	McMaster Carr 90576A115
4	1	Gas Spring 18.62" length 8.27" stroke 100lb force	McMaster Carr 9416K376
5	2	Ball Joint Linkage, 6MM	McMaster Carr 6058K811
6	42	Bolt assembly #10 x 3/4" long	270-417-279 Item 2
7	1	Piano Hinge SS 4" width 0.09"thickness	McMaster Carr 1658A217
8	2	STEP AP203	McMastr Carr 1134A14
9	6	Bolt assembly #6 x 5/8" long	270-417-279 Item 1
10	1	Piano Hinge SS 3" width 0.09" thickness	McMaster Carr 1658A2
11	1	Back flap lid	See Detail
12	2	Pull handle, 6" SS 5/16-18, 1-1/2" tall	McMaster Carr 116655A32

NOTES:

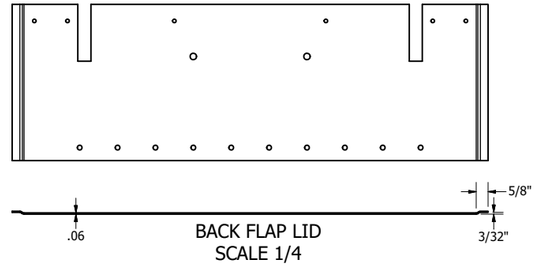
1. Weld in accordance with AWS D1.4.
2. Minimum size of welds is 1/8".
3. Remove all sharp edges and round corners.
4. Galvanize in accordance with specifications 09 96 20.
5. All materials shall be steel, A36 or A572 any grade.



DECK HATCH LID
SCALE 1/4



BACK FLAP LID
FLAT PATTERN



BACK FLAP LID
SCALE 1/4

— BUREAU OF RECLAMATION —

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
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Mark Wernke PE
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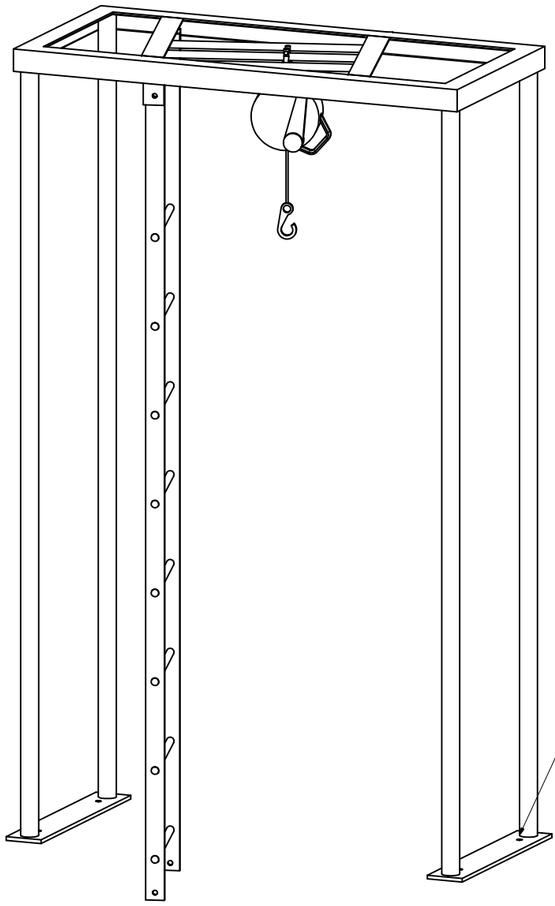
GRAND JUNCTION, COLORADO

SHAFT DECK ASSEMBLY

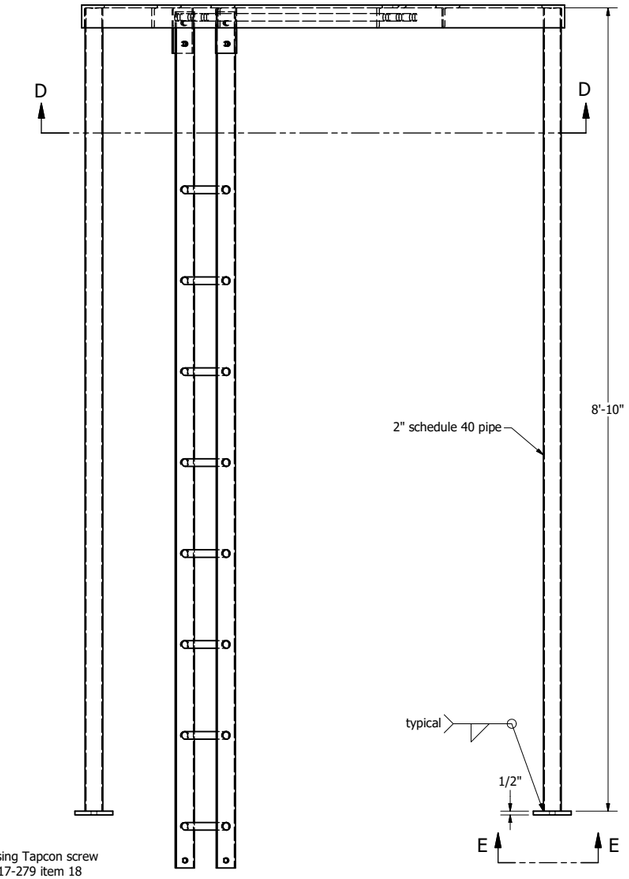
270-417-258

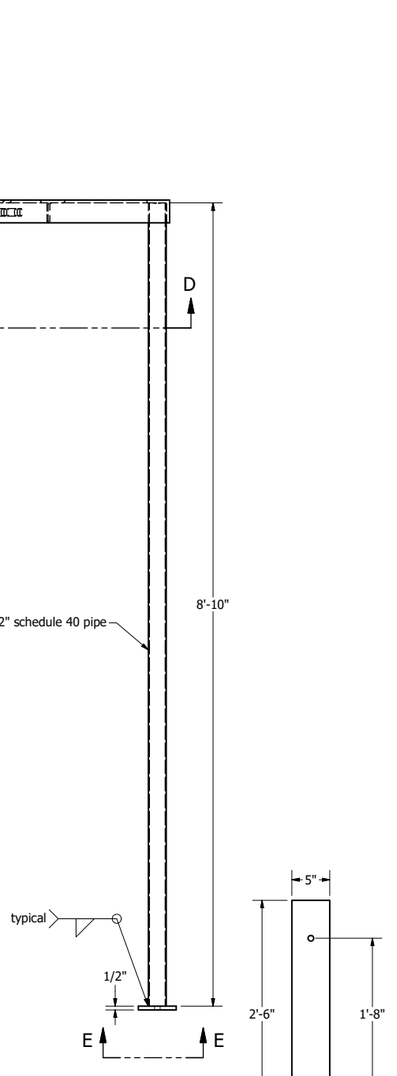
NOTES:

1. Weld in accordance with AWS D1.4.
2. Minimum size of welds is 1/8".
3. Remove all sharp edges and round corners.
4. Remove all weld spatter and grind as needed to provide smooth surface for surface finishing.
5. Galvanize in accordance with specifications 09 96 20.
6. All materials shall be steel, A36 or A572 any grade, 1018 round bar to ASTM a108.

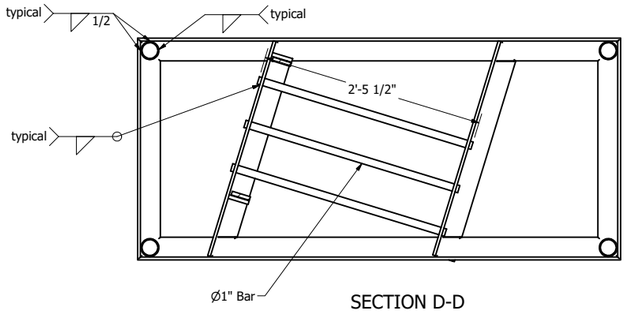


LADDER & RETRACTABLE SAFETY LINE ASSEMBLY ISO VIEW

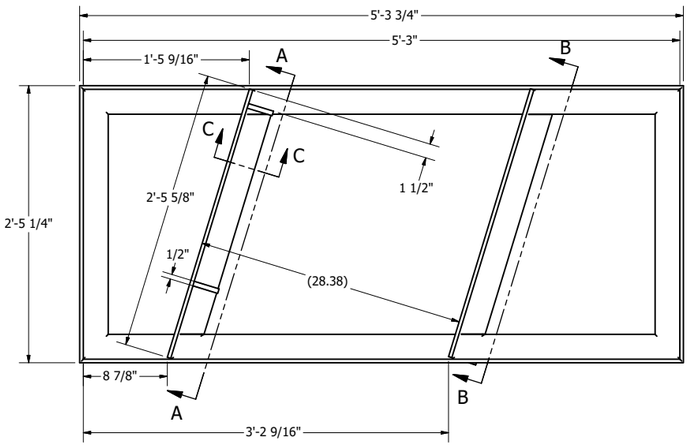




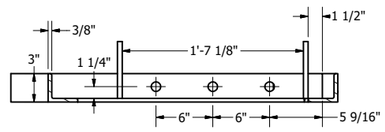
SECTION E-E
SCALE 1/10



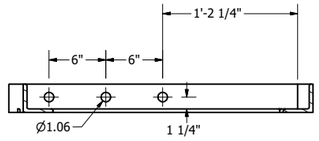
SECTION D-D
SCALE 1/10



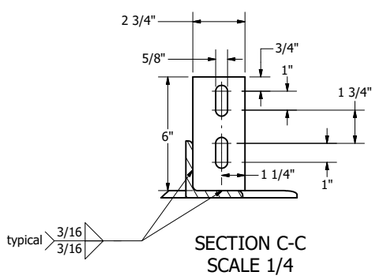
SECTION D-D
(Pipes, bars & ladder not shown)



SECTION A-A
(Rotated to horizontal)
SCALE 1/8



SECTION B-B
(Rotated to horizontal)
SCALE 1/8



SECTION C-C
SCALE 1/4

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner	DESIGNED
Matt Bryner	DRAWN
Thomas Hook	CHECKED
Josua Dunham PE	TECH. APPR.
Mark Wernke PE	APPROVED

GRAND JUNCTION, COLORADO

LADDER & RETRACTABLE SAFETY LINE TOWER

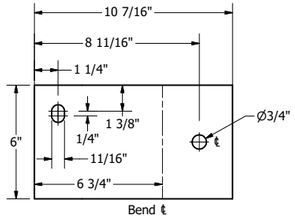
270-417-259

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

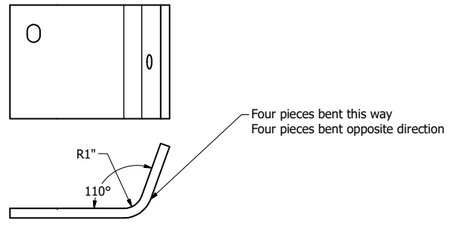
THIRD ANGLE PROJECTION

NOTES:

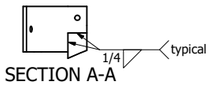
1. Weld in accordance with AWS D1.4.
2. Minimum size of welds is 1/8".
3. Remove all sharp edges and round corners.
4. Remove all weld spatter and grind as needed to provide smooth surface for surface finishing.
5. Galvanize in accordance with specifications 09 96 20.
6. All materials shall be steel, A36 or A572 any grade, 1018 round bar to ASTM a108, tubing shall be seamless 4130 to AMS-T6736 or low carbon steel to ASTM A513.



ATTACH/CONNECTOR BRACKET
FLAT PATTERN

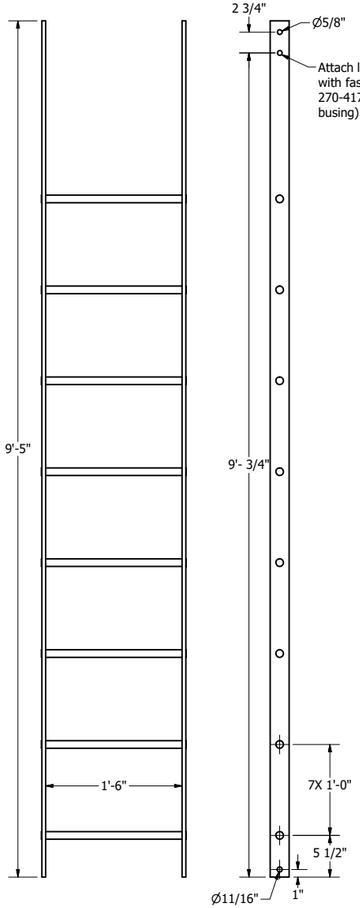


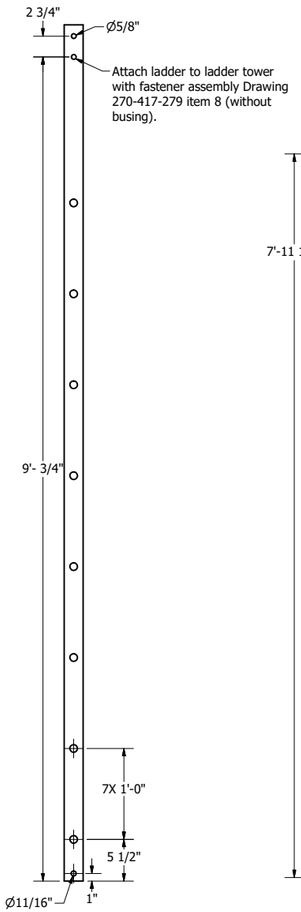
ATTACH/CONNECTOR BRACKET
SCALE 1/4



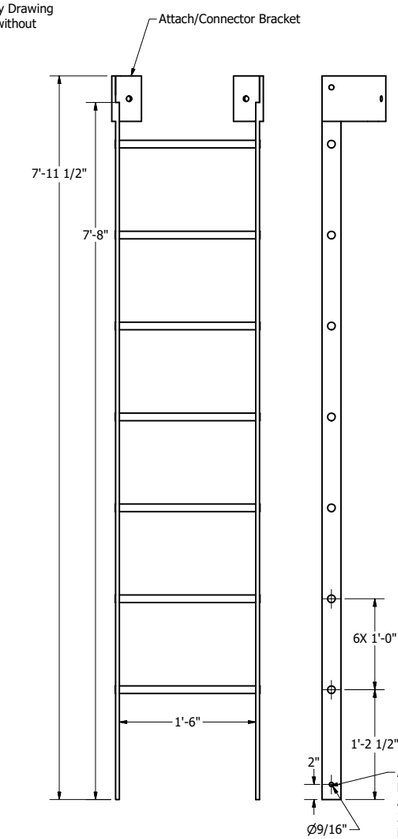
SECTION A-A

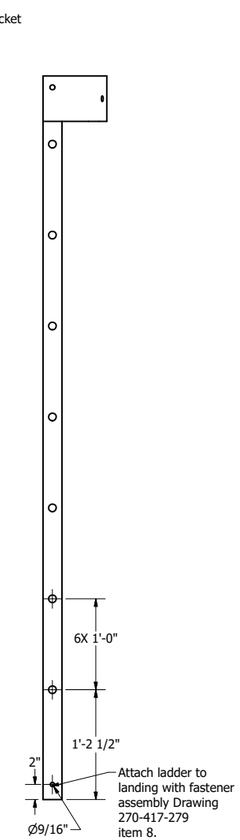
BUSHING, LADDER CONNECTION
SCALE 1/2



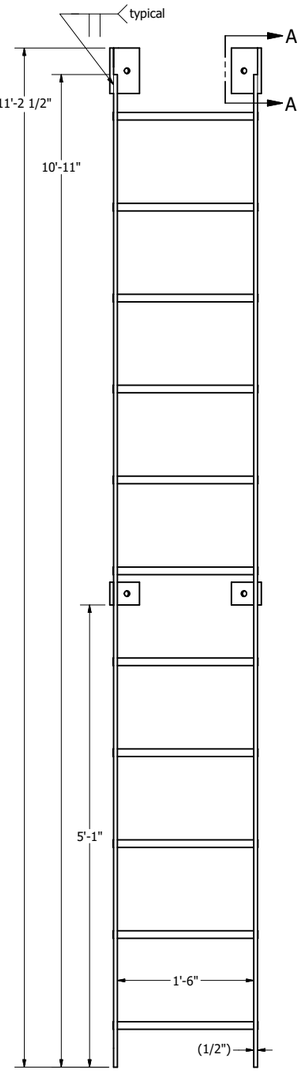


TOP DECK LADDER
SCALE 1/10

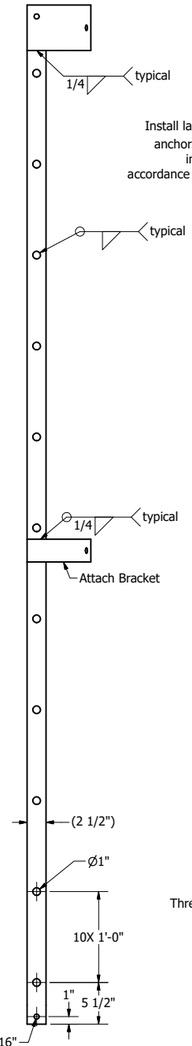


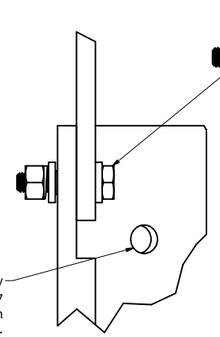


BOTTOM LANDING LADDER
SCALE 1 / 10

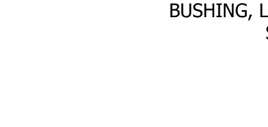


INTERMEDIATE SECTION LADDER
QUANTITY 3
SCALE 1/10

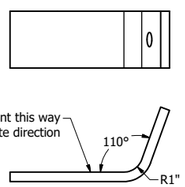




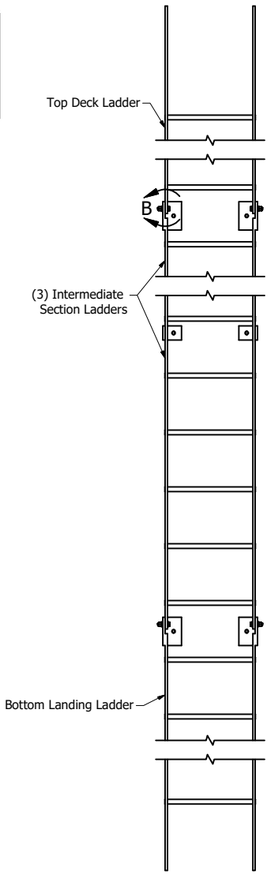
DETAIL B
SCALE 1/2



ATTACH BRACKET
FLAT PATTERN



ATTACH BRACKET
SCALE 1/4



BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
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Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

LADDER AND ATTACH DETAILS

270-417-260

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

NOTES:

1. This combination of components results in approximately 3/4" gap between extension flanges that will be covered by the bolted sleeve coupling. Contractor shall verify actual components sizes and adjust extension flange length to maintain gap as recommended by sleeve coupler manufacture.
2. All dimensions are inches. Contractor is responsible for field verification and shall adjust components to ensure proper assembly.

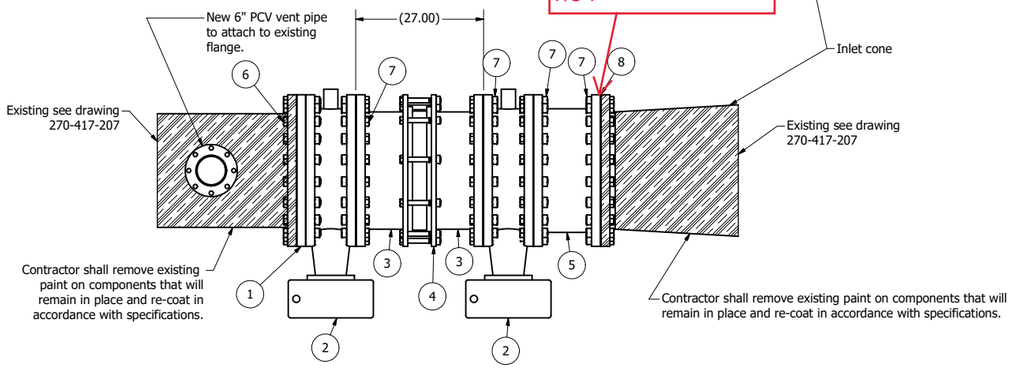
PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
1	1	Flange Support	See detail
2	2	Triple Offset Butterfly Valve, 24" with manual side actuator	See specifications 35 22 16
3	2	Extension Flange	See Detail
4	1	Bolted sleeve coupling 24"	See Specifications 35 22 16
5	1	24" Spool	See Detail
6	20	Bolt assembly 7"	270-417-279 item 21
7	80	Bolt assemly 5"	270-417-279 item 20
8	6	Gasket, 24" pipe flange	See specifications 35 22 16

Existing 6" flange connection.

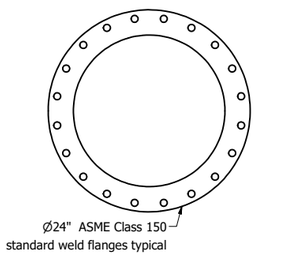
Remove lead based paint and recoat.

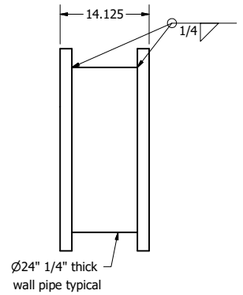
Remove lead based paint and recoat.

Existing flange drilled to 1-1/4" rather than 7/8".

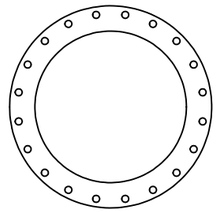


VALVE ASSEMBLY
EMERGENCY AND REGULATING GATES
TOP VIEW
SCALE 1/16

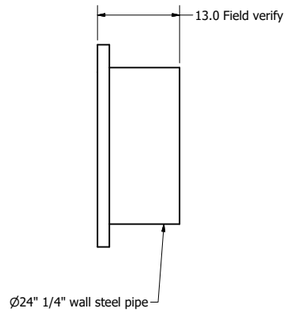


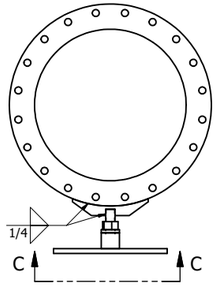


SPOOL 24"
SCALE 1/12

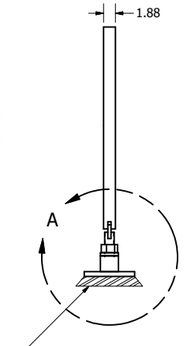


EXTENSION FLANGE
SCALE 1/12

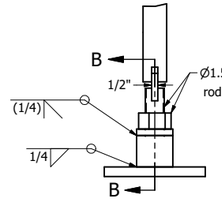




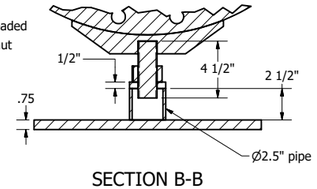
FLANGE SUPPORT
SCALE 1/12



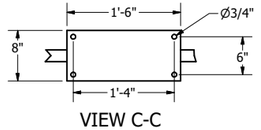
Attach to floor with Ø5/8 epoxy anchors see drawing 270-417-279 item 17 and pack with non-shrink grout.



DETAIL A
SCALE 1 / 6



SECTION B-B
SCALE 1 / 6



VIEW C-C
SCALE 1/12

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

ALWAYS THINK SAFETY

BUREAU OF RECLAMATION

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner DESIGNED
Matt Bryner DRAWN
Thomas Hook CHECKED
Josua Dunham PE TECH. APPR.
Mark Wernke PE APPROVED

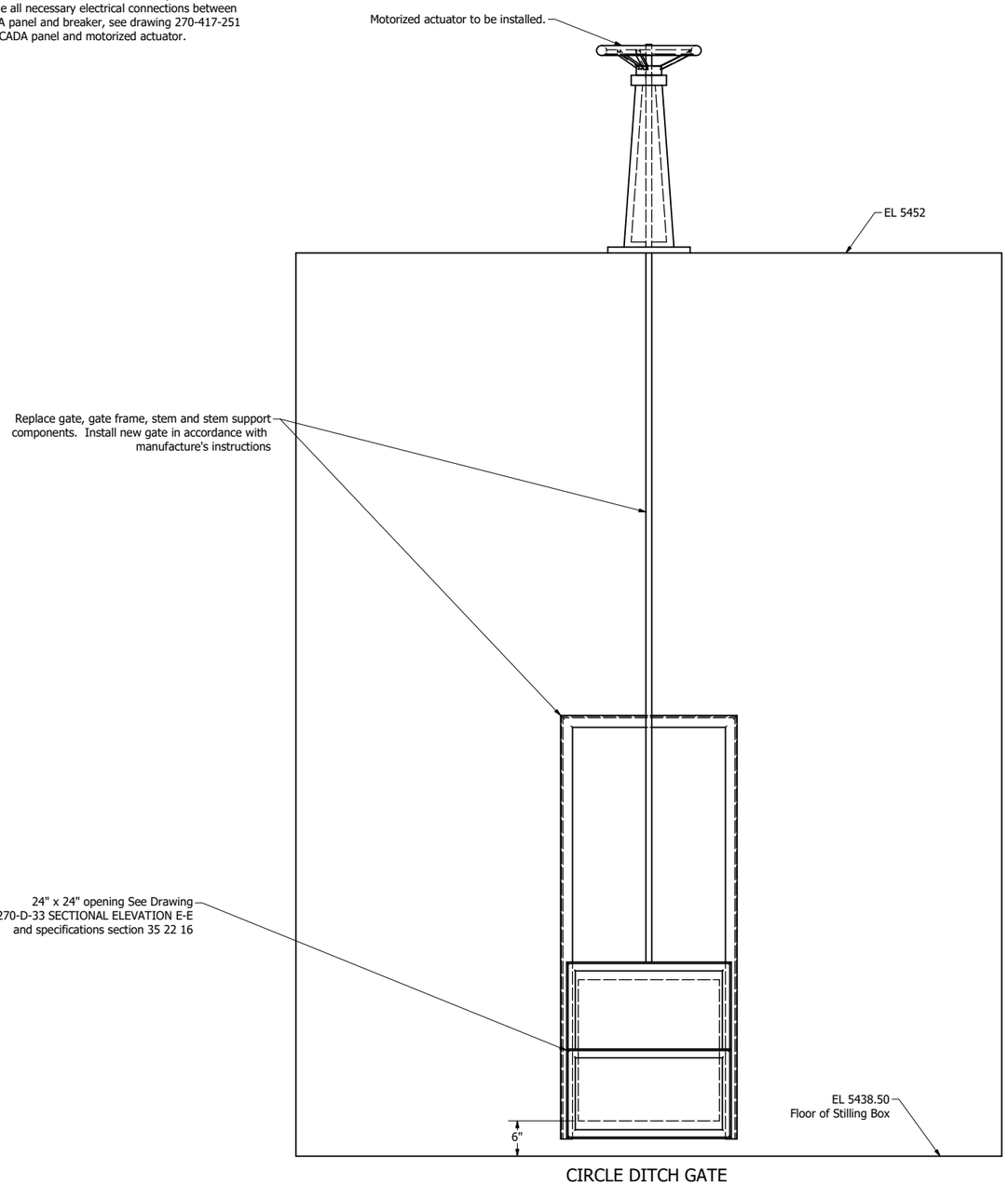
GRAND JUNCTION, COLORADO

VALVE AND ASSEMBLY COMPONENTS

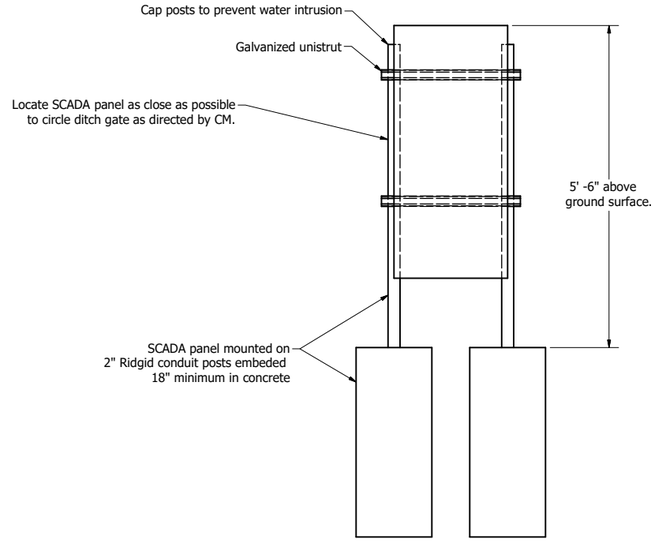
270-417-261

Notes

1. Motorized actuator shall be sized by manufacture and meet requirements in specifications.
2. Provide meter pedestal and breaker mounted on same pipe frame as shown for SCADA panel. Provide grounding andall other necessary devices as required by Delta Montrose Electical Association, state of Colorado electrical code and specifications.
3. Provide all necessary electrical connections between SCADA panel and breaker, see drawing 270-417-251 and SCADA panel and motorized actuator.



CIRCLE DITCH GATE
(Partial view of Stilling Box see drawing 270-D-33)
Optional Bid Item



BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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Matt Bryner
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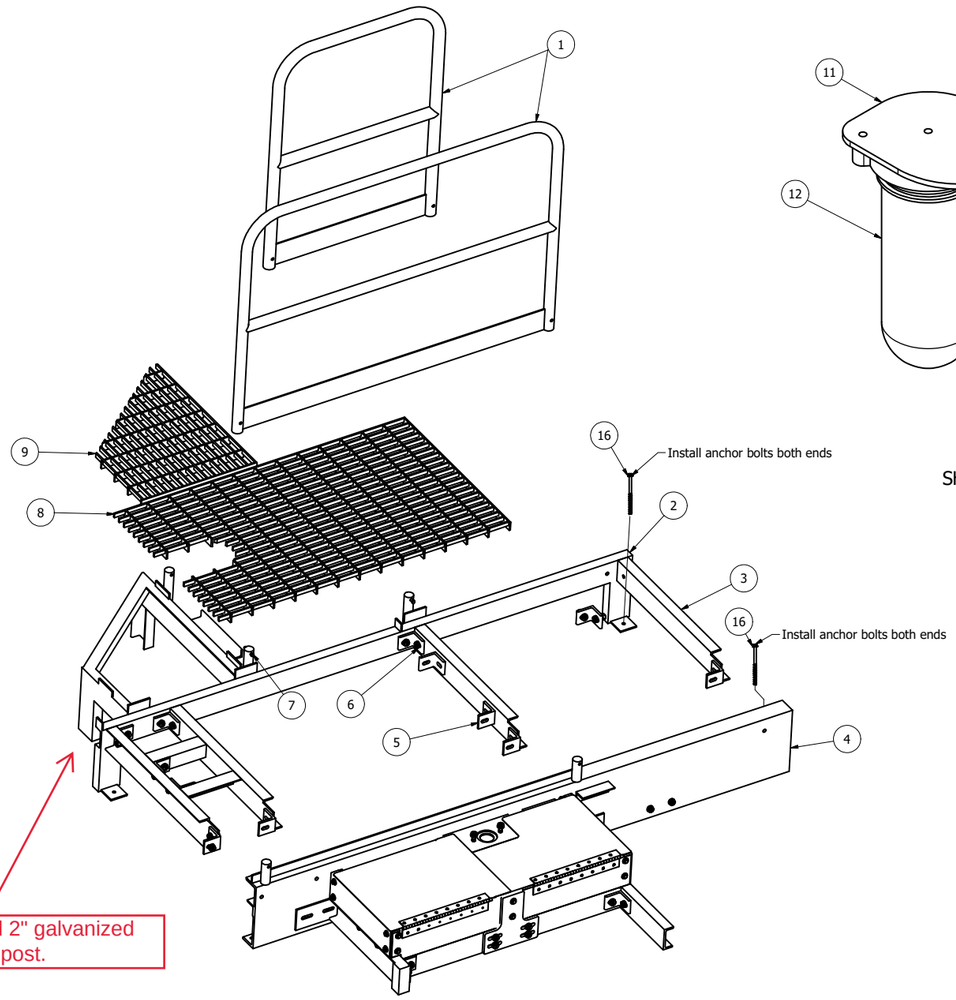
Mark Wernke PE
APPROVED

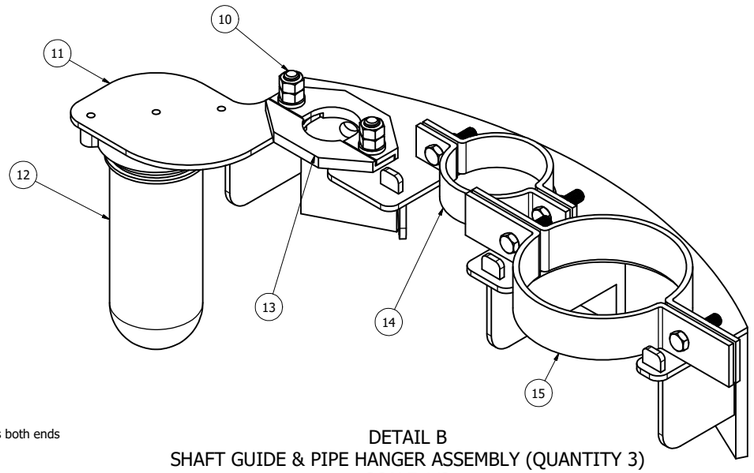
GRAND JUNCTION, COLORADO

CIRCLE DITCH GATE

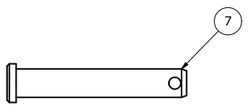
270-417-262



DETAIL A
CHAMBER LANDING ASSEMLY
SCALE 1 /12

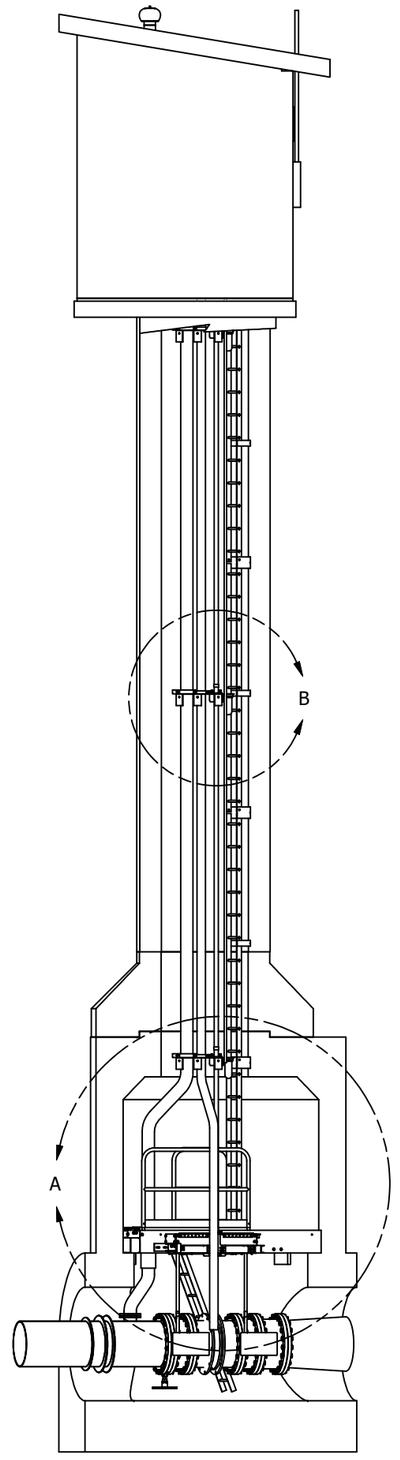


DETAIL B
SHAFT GUIDE & PIPE HANGER ASSEMBLY (QUANTITY 3)
SCALE 1/3



CLEVIS PIN
SCALE 1

TABLE			
ITEM	QTY	DESCRIPTION	DRAWING NUMBER/REFERENCE
1	set	Guard Railings	270-417-267
2	ea	Chamber Landing Frame Weldment Small	270-417-264
3	set	Chamber Landing Frame Connector Components	270-417-266
4	ea	Chamber Landing Frame Weldment Large & Carrier	270-417-265
5	12	Attach Clips	270-417-266
6	24	Bolt assembly, A325 1/2 dia 1.75 long	270-417-279 ITEM 7
7	4	Clevis Pin, 3/8 dia 2-1/4 long SS	McMaster Carr 92390A279
8	1	Fiberglass Bar Grating, 3' x 6'	McMaster Carr 6780T416
9	1	Fiberglass Bar Grating, 3' x 3'	McMaster Carr 6780T414
10	2	Bolt assembly, A325 1/2 dia 2.25 long	270-417-279 ITEM 16
11	3	Shaft Guide & Pipe Hanger Weldment	270-417-268
12	3	Light Fixture, vapor tight ceiling mount	Grainger 2PYJ1
13	6	Shaft guide, HDPE	270-417-268
14	3	Riser Clamp, 4" SS	McMaster Carr 2989T42
15	3	Riser Clamp, 6" SS	McMaster Carr 2989T19
16	4	Tapcon 3/8" dia 6" long	270-417-279 ITEM 18



BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

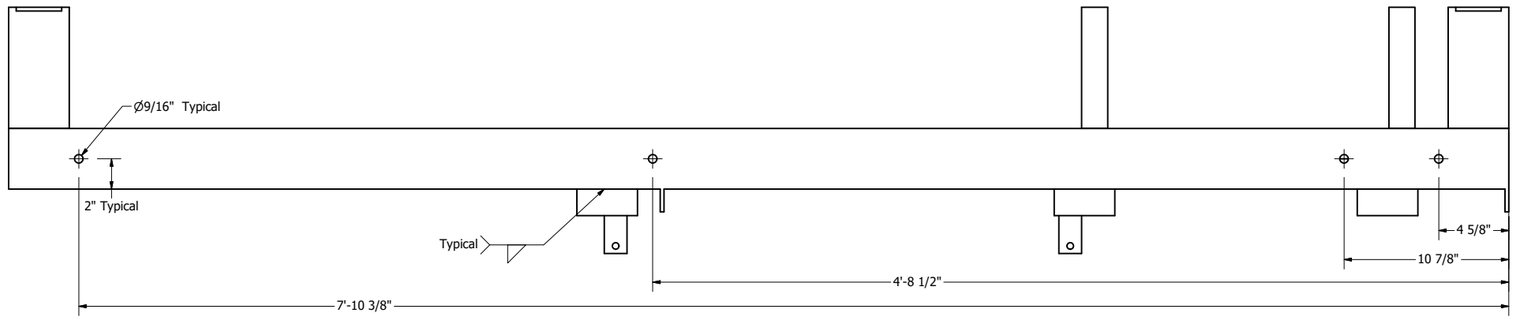
GRAND JUNCTION, COLORADO

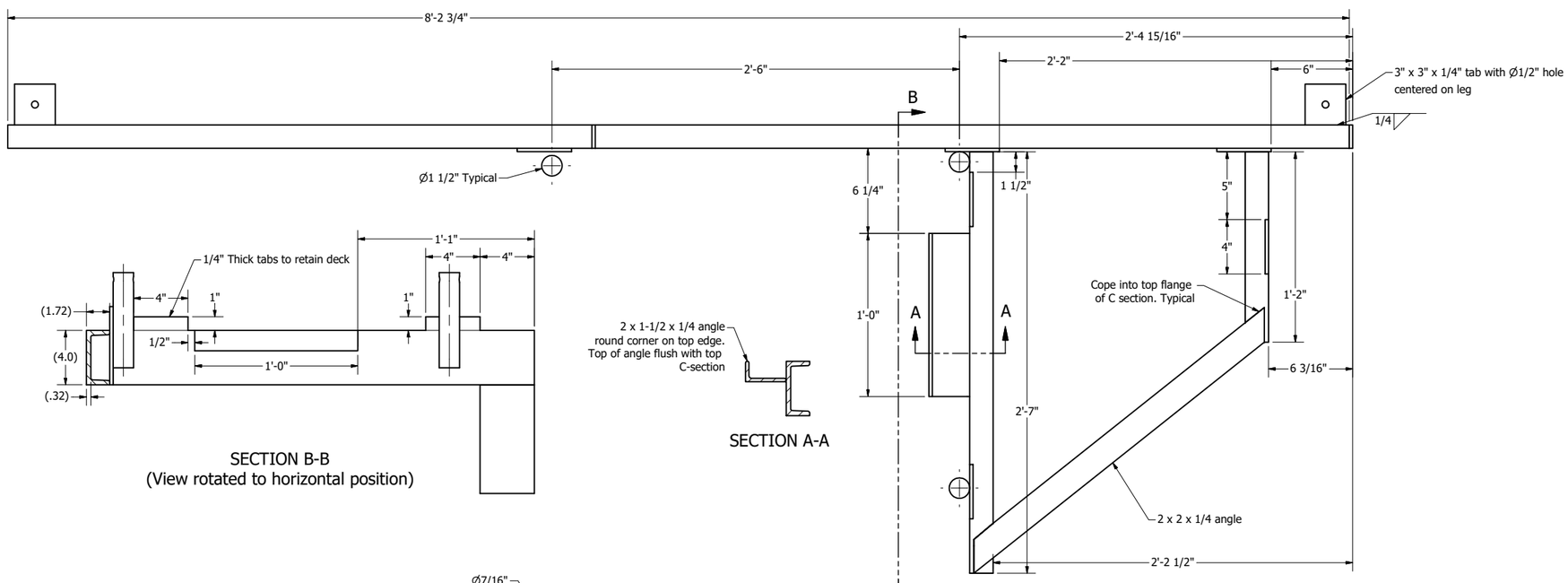
CHAMBER LANDING AND SHAFT GUIDE & PIPE HANGER ASSEMBLIES

270-417-263

NOTES:

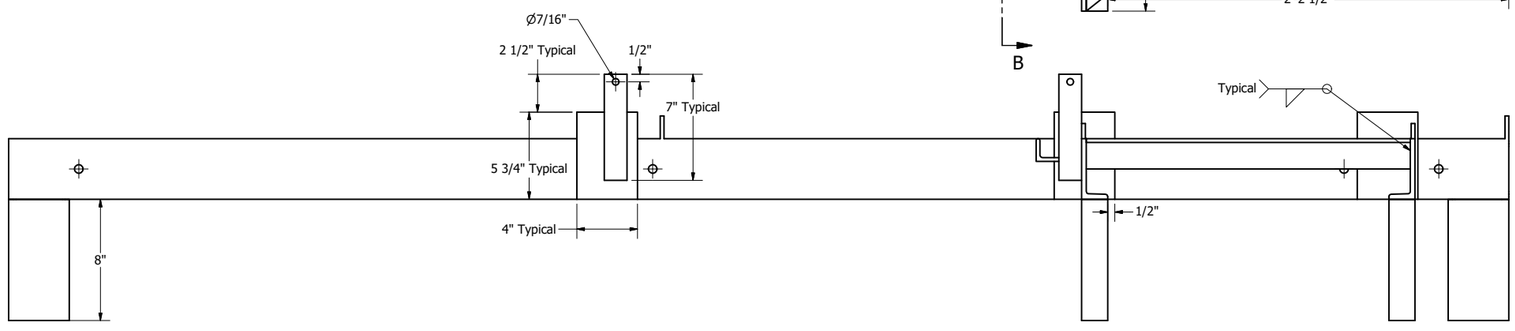
1. Material steel any grade, channel sections 4 x 7.25 lb.
2. Weld in accordance with AWS D1.4
3. Fully weld all accessible joints, fillet welds 1/8" minimum.
4. Galvanize in accordance with specification 09 96 20.

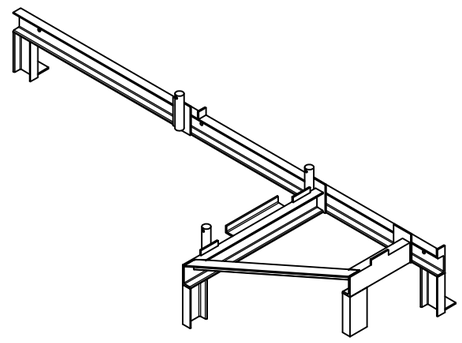




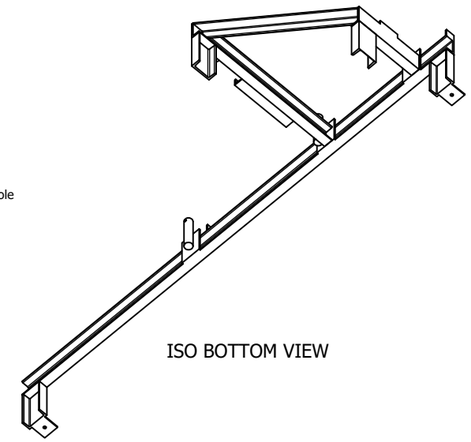
SECTION B-B
(View rotated to horizontal position)

SECTION A-A





ISO TOP VIEW



ISO BOTTOM VIEW

ALWAYS THINK SAFETY

BUREAU OF RECLAMATION

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

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APPROVED

GRAND JUNCTION, COLORADO

CHAMBER LANDING FRAME WELDMENT SMALL

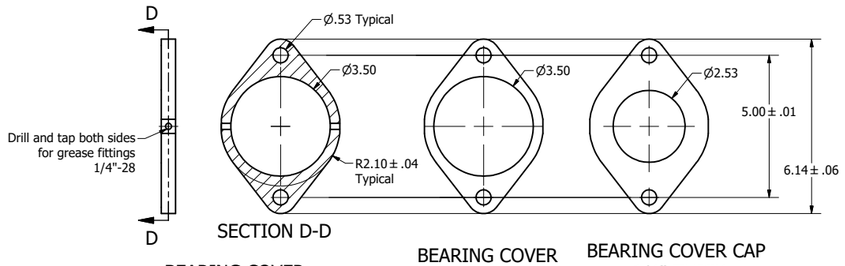
270-417-264

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

NOTES:

1. Unless otherwise noted fully weld all joints in accordance with AWS D1.4.
2. Minimum size of fillet welds is 3/16".
3. Remove all sharp edges and round corners.
4. All materials shall be steel, A36, A513, A500 or A572 any grade.
5. Flat pattern files for components will be provided upon request.
6. Galvanize in accordance with specifications 09 96 20.



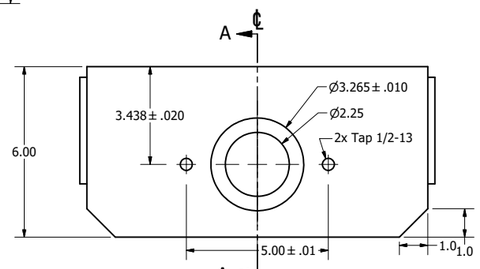
SECTION D-D

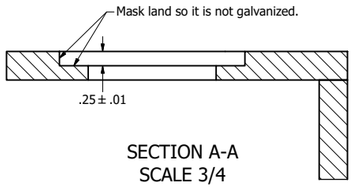
BEARING COVER 1/2" THICK

BEARING COVER 1/4" THICK SCALE 3/8

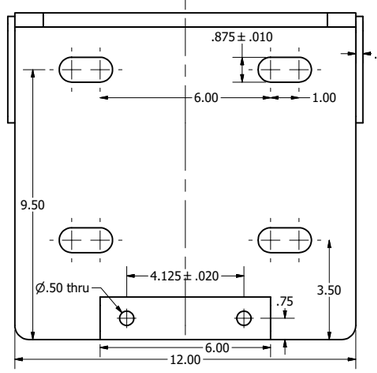
BEARING COVER CAP 1/4" THICK

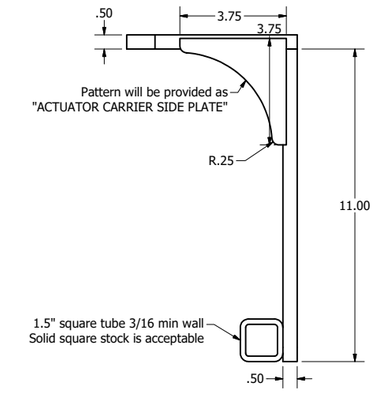
COMPONENTS USED IN CHIAN COVER ASSEMBLY SEE DRAWING 270-417-269





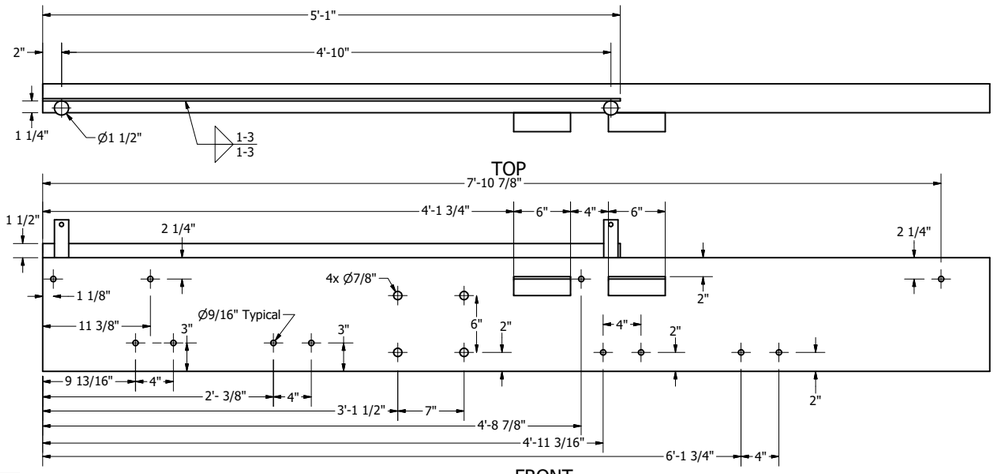
SECTION A-A
SCALE 3/4



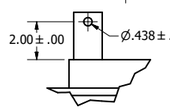


ACTUATOR CARRIER
SCALE 3/8

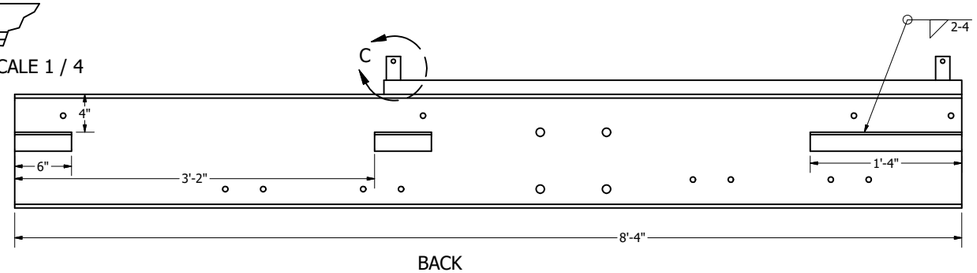
COMPONENT USED IN LANDING FRAME ASSEMBLY SEE DRAWING 270-417-266



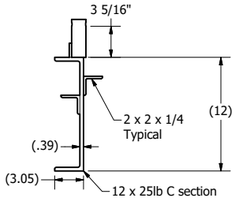
FRONT

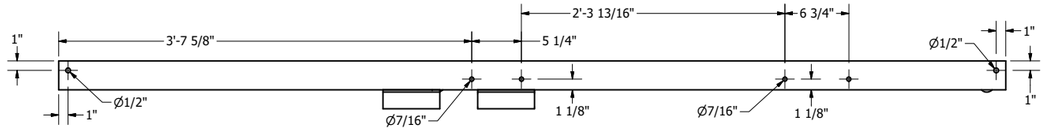


DETAIL C SCALE 1 / 4

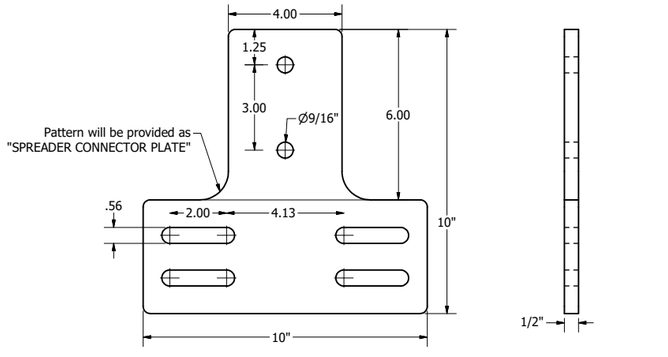


BACK





BOTTOM
CHAMBER LANDING FRAME WELDMENT LARGE
SCALE 1/8



SPREADER CONNECTOR PLATE
SCALE 3/8

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

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TECH. APPR.
Mark Wernke PE
APPROVED

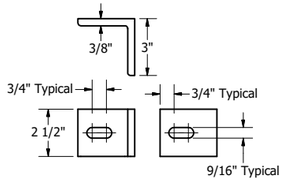
GRAND JUNCTION, COLORADO

CHAMBER LANDING FRAME WELDMENT LARGE, CARRIER & SPREADER CONNECTOR

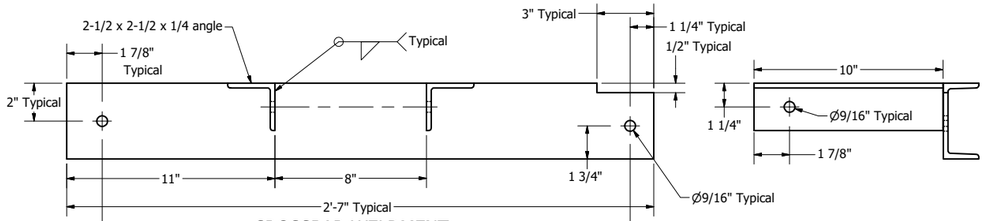
270-417-265

Notes:

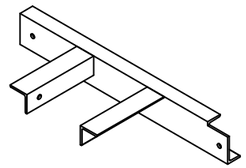
1. Fully weld all joints in accordance with AWS D1.4, minimum fillet size 3/16".
2. All components are steel, any grade.
3. All C sections 4 x 7.25 (4" x 1.721" x .321").
4. Remove all burrs and break sharp edges.
5. Galvanize all components in accordance with specifications 09 96 20.



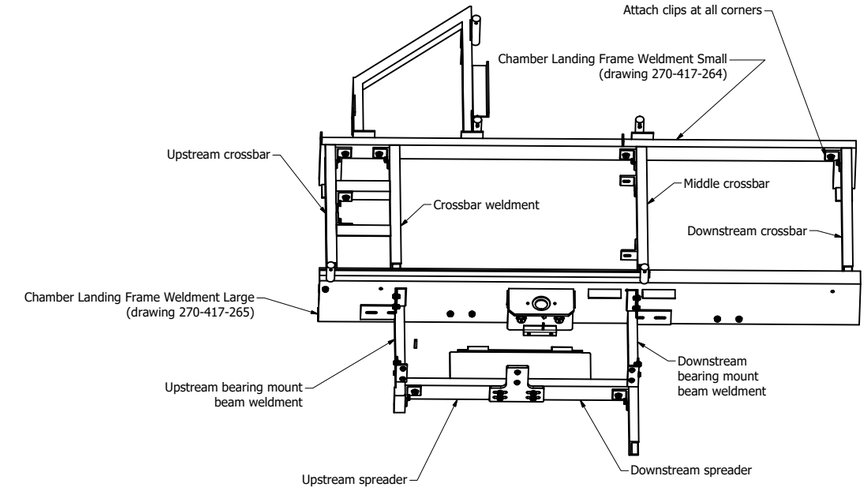
ATTACH ANGLE CLIP
(Quantitiy 14)
SCALE 1/4



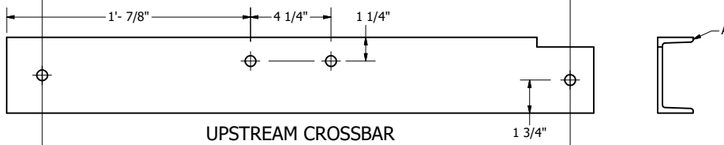
CROSSBAR WELDMENT
SCALE 1 / 4



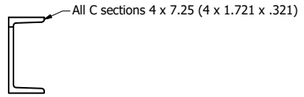
CROSSBAR WELDMENT ISO VIEW

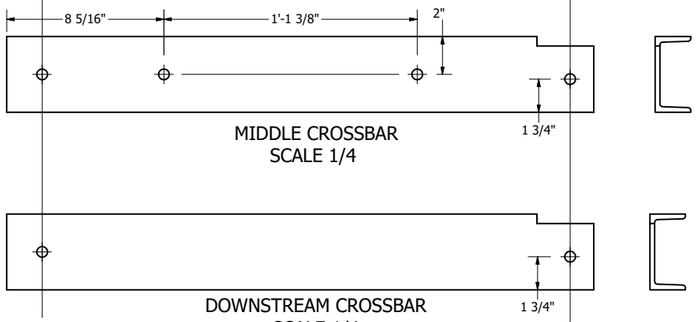


LANDING FRAME ASSEMBLY



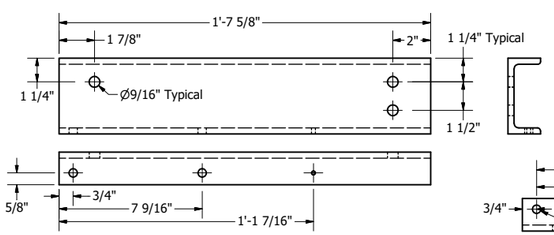
UPSTREAM CROSSBAR
SCALE 1/4



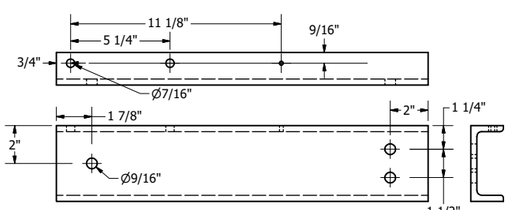


MIDDLE CROSSBAR
SCALE 1/4

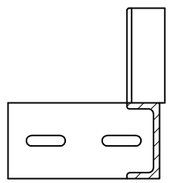
DOWNSTREAM CROSSBAR
SCALE 1/4



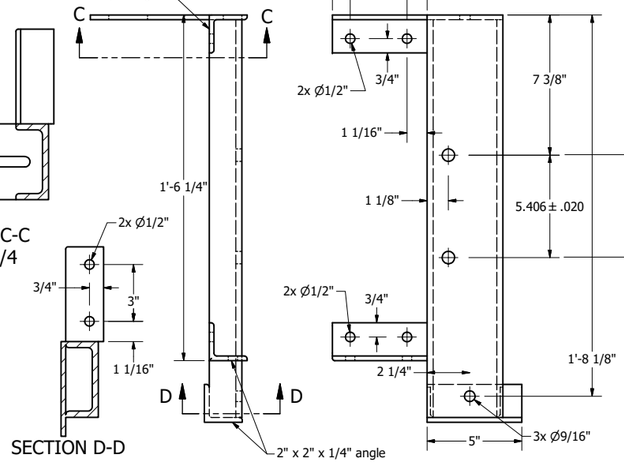
UPSTREAM SPREADER
SCALE 1/4



DOWNSTREAM SPREADER
SCALE 1/4

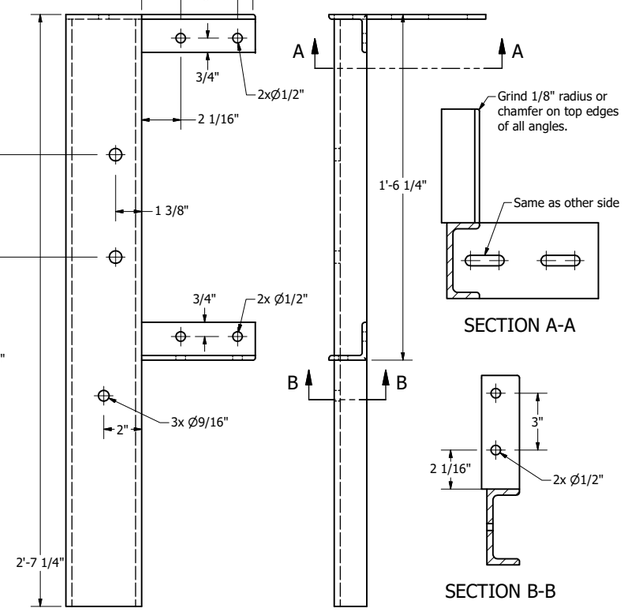


SECTION C-C
SCALE 1/4



SECTION D-D

UPSTREAM BEARING MOUNT BEAM WELDMENT
SCALE 1/4



SECTION A-A

SECTION B-B

DOWNSTREAM BEARING MOUNT BEAM WELDMENT
SCALE 1/4

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

— BUREAU OF RECLAMATION —

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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CHECKED
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TECH. APPR.
Mark Wernke PE
APPROVED

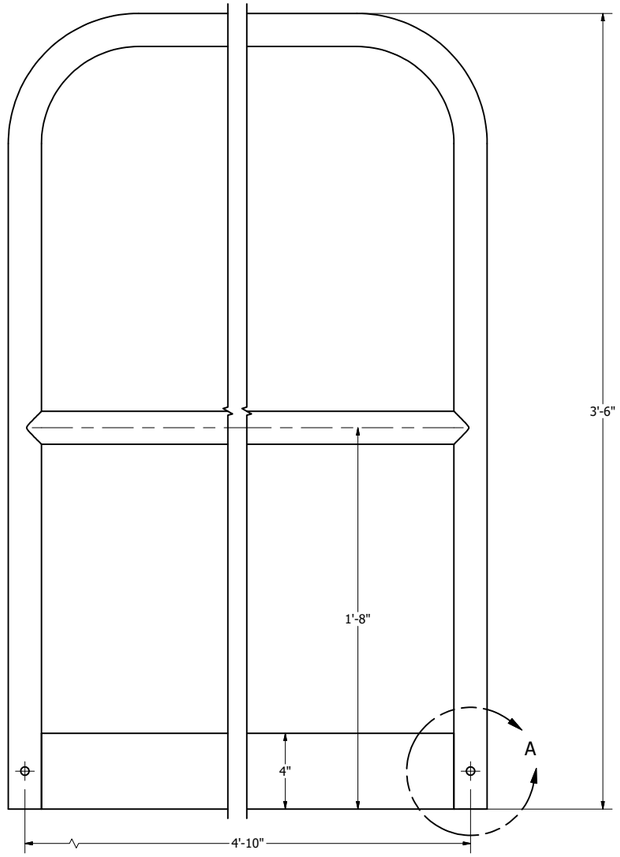
GRAND JUNCTION, COLORADO

CHAMBER LANDING
FRAME CONNECTOR
COMPONENTS

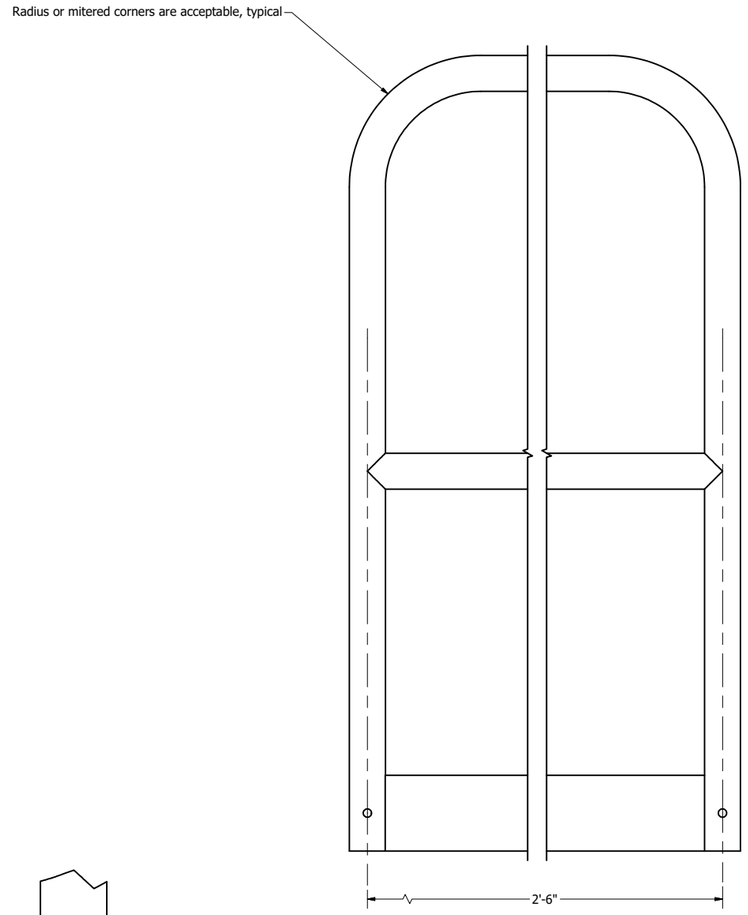
270-417-266

NOTES:

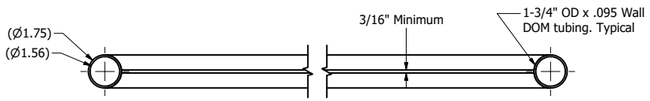
1. Fully weld all joints in accordance with AWS D1.4 or AWS D1.3.
2. Minimum size of fillet welds is 1/8".
3. Remove all sharp edges and round corners.
4. All materials shall be steel, A36, A513, A500 or A572 any grade.
5. Galvanize in accordance with specifications 09 96 20.
6. Tolerances are ± 1/4" except for overall length which must match mating part and hole locations.
7. Fabricated railings must fit assembly, test fit coated parts prior to shipping.



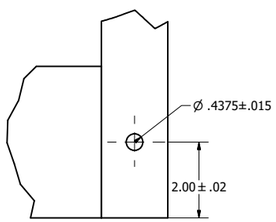
SAFETY RAIL LONG
SCALE 1/4



SAFETY RAIL SHORT
SCALE 1/4



TYPICAL BOTTOM VIEW



DETAIL A
SCALE 1 / 2
(Typical attach pin hole)

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
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FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

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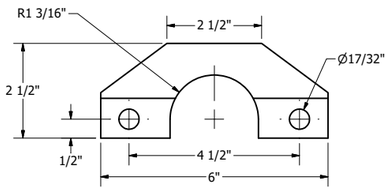
GRAND JUNCTION, COLORADO

GUARD RAILINGS

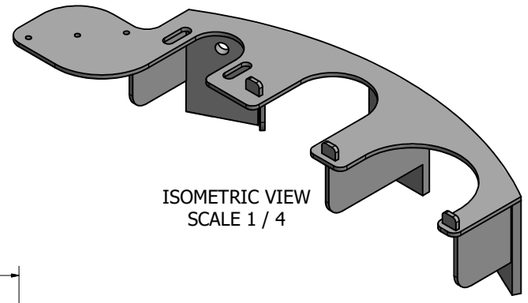
270-417-267

NOTES:

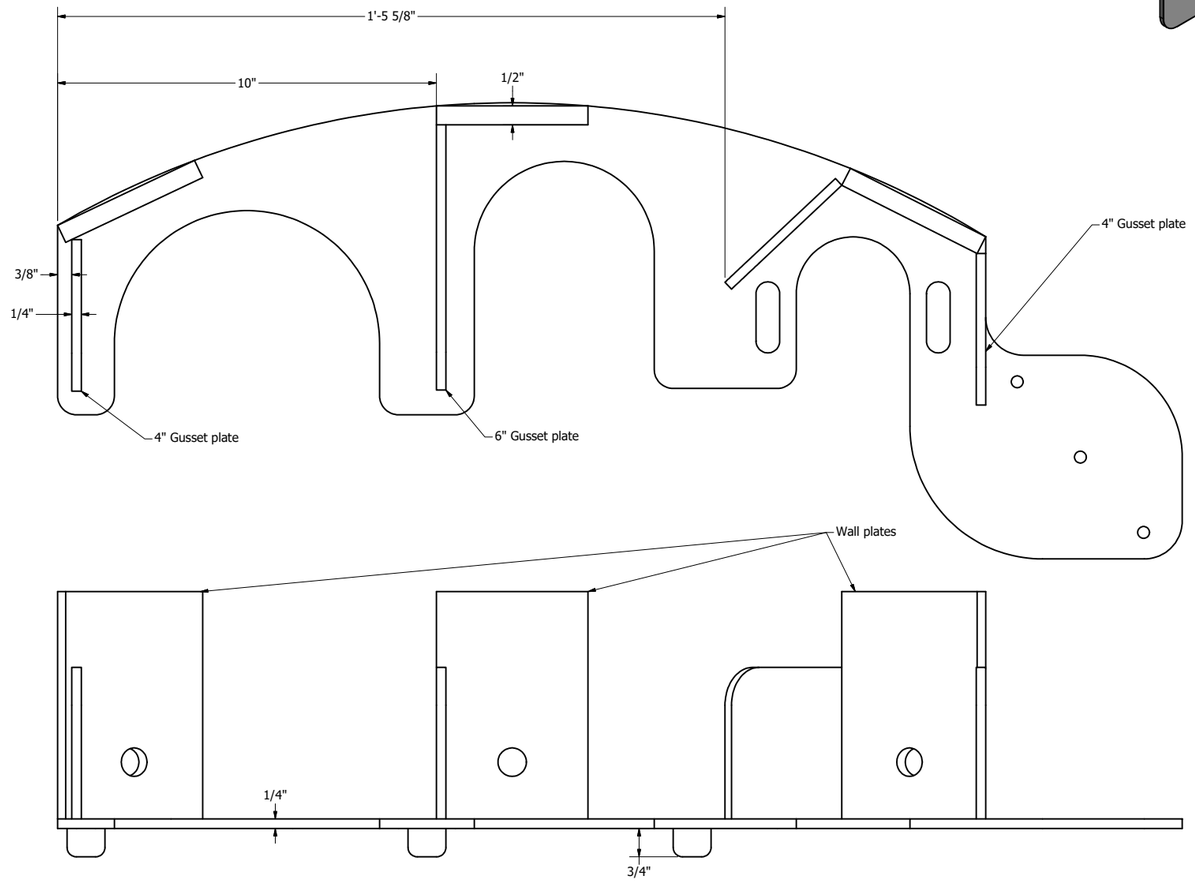
1. Fully weld all joints in accordance with AWS D1.4.
2. Minimum size of fillet welds is 3/16".
3. Remove all sharp edges and round corners.
4. All materials shall be steel, A36, A513, A500 or A572 any grade.
5. Flat pattern files for components will be provided upon request.
6. Galvanize in accordance with specifications 09 96 20.

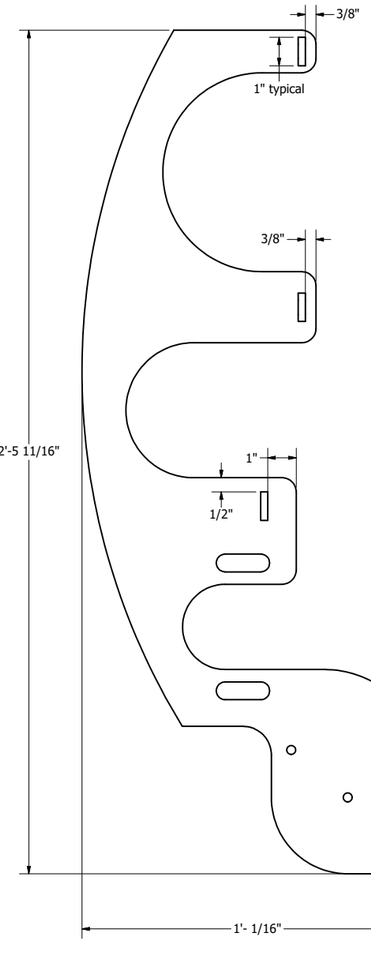


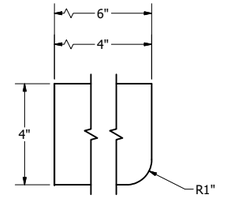
HDPE SHAFT GUIDE
SCALE 1/2



ISOMETRIC VIEW
SCALE 1 / 4







GUSSET PLATE
Quantity (3) 4" & (1) 6"
SCALE 1/3

WALL PLATE
Quantity 3
SCALE 1 :3

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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Matt Bryner
DRAWN
Thomas Hook
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Mark Wernke PE
APPROVED

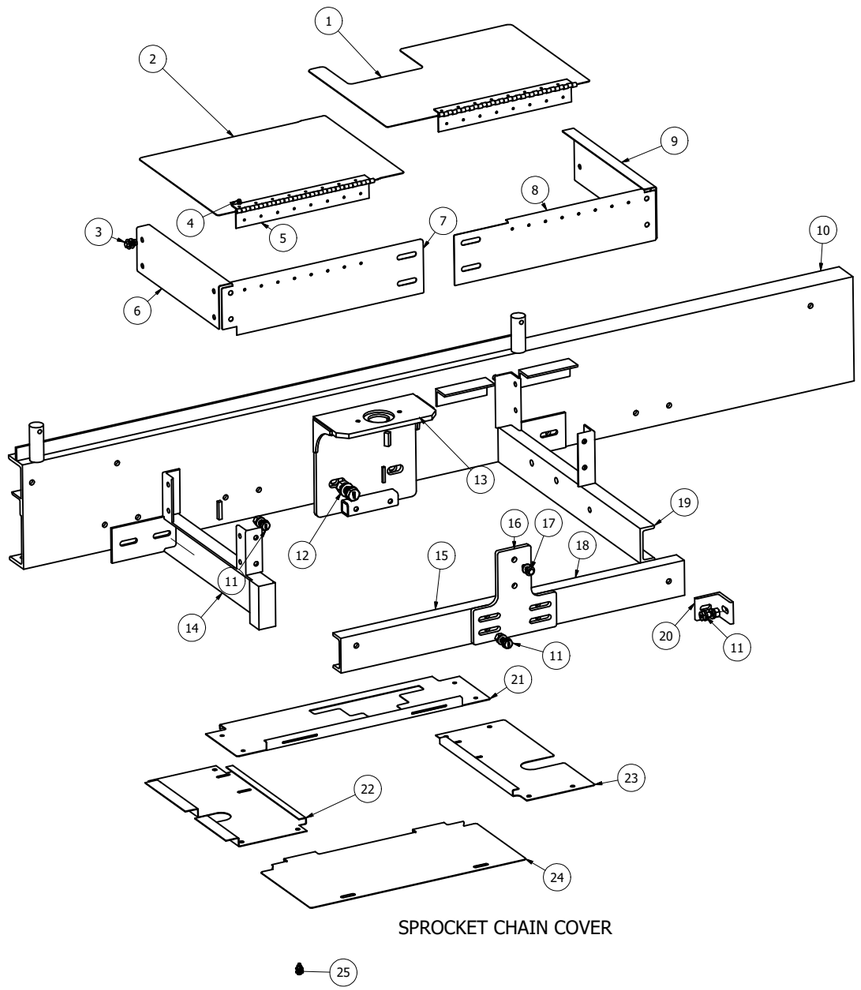
GRAND JUNCTION, COLORADO

SHAFT GUIDE & PIPE HANGAR WELDMENT

270-417-268

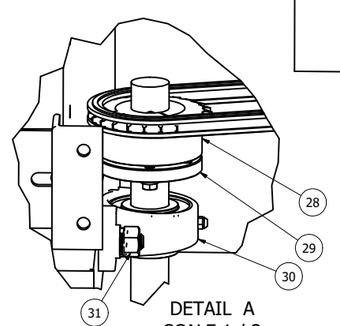
TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

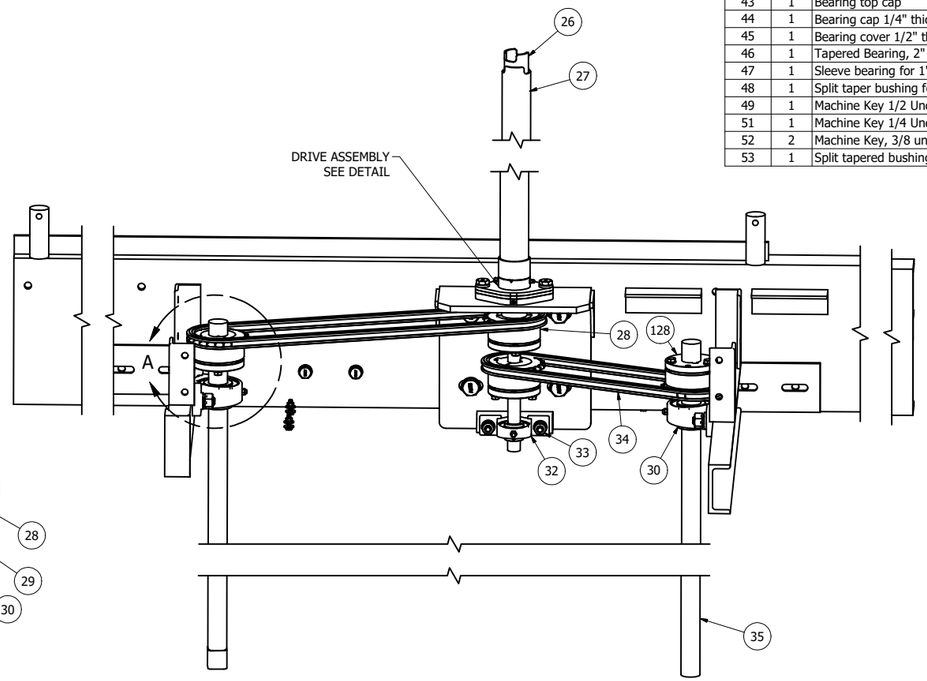


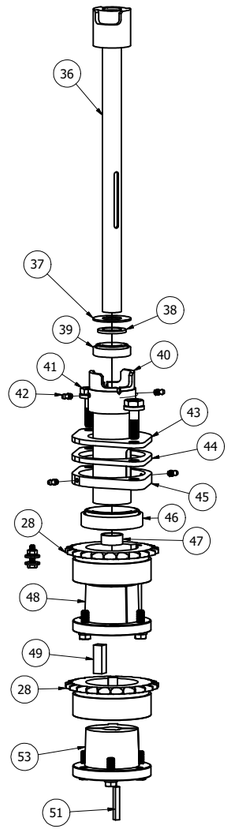
SPROCKET CHAIN COVER

PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
1	1	Sprocket cover lid downstream	270-417-270
2	1	Sprocket cover lid upstream	270-417-270
3	12	Bolt assembly 3/8 dia 1" long	270-417-279 ITEM 5
4	32	Bolt assembly #10 x 5/16" long	270-417-279 ITEM 3
5	2	Piano hinge .090 thick 2" x 16"	McMaster 1658A24
6	1	Sprocket cover end upstream	270-417-270
7	1	Sprocket cover center upstream	270-417-270
8	1	Sprocket cover center downstream	270-417-270
9	1	Sprocket cover end downstream	270-417-265
10	1	Chamber landing frame weldment large	270-417-265
11	12	Bolt assembly 1/2 dia 1.75" long	270-417-279 ITEM 7
12	4	Bolt assembly 3/4 dia 2.25" long	270-417-279 ITEM 13
13	1	Acturator Carrier	270-417-265
14	1	Upstream bearing mount beam weldment	270-417-264
15	1	Spreader Upstream	270-417-264
16	1	Spreader connector plate	270-417-265
17	2	Bolt assembly 3/8 dia 1.5" long	270-417-279 ITEM 6
18	1	Spreader Downstream	270-417-264
19	1	Downstream bearing mount beam weldment	270-417-264
20	2	Attach angle clip	270-417-264
21	1	Sprocket cover bottom pillowblock	270-417-271
22	1	Sprocket cover bottom end cap	270-417-271
23	1	Sprocket cover bottom front	270-417-271
24	1	Sprocket cover bottom access panel	270-417-271
25	13	Bolt assembly 1/4 dia 1" long	270-417-279 ITEM 4
26	1	Inner actuator drive tube 96"	270-417-280
27	1	Outer actuator drive tube 96"	270-417-280
28	2	Sprocket split taper bushing Q1 #50 chaing 23 tooth	McMaster Carr 1068N62
29	2	Bushing 1.5" dia shaft	McMaster Carr 9859T518
30	2	Mounted bearing 1.5"	McMaster Carr 6494K19
31	4	Bolt assembly 5/8 dia 2.25" long	270-417-279 ITEM 11
32	1	Mounted Bearing 1" shaft	McMaster Carr 6494K14
33	2	Bolt assembly 1/2" dia 3.75" long	270-417-279 ITEM 10
34	2	ANSI No 50 Roller chain	McMaster Carr 6261K175
35	1	Manual Actuator Drive Shaft	270-417-281
37	1	18-8 Stainless Steel .075" thick 2"OD 1"ID	McMaster Carr 96853A225
36	1	Bottom inner drive shaft weldment	270-417-276
38	1	316 SS shim .125" thick 1" ID 1-1/2" OD	McMaster Carr 97022A782
39	1	Tapered Bearing, 1"	McMaster Carr 5709K82
40	1	Actuator thrust collar	270-417-278
41	2	Bolt assembly 1/2 x 1.75" long	270-417-279 ITEM 15
42	4	Grease fitting	McMaster Carr 1095K44
43	1	Bearing top cap	270-417-265
44	1	Bearing cap 1/4" thick	270-417-265
45	1	Bearing cover 1/2" thick	270-417-265
46	1	Tapered Bearing, 2"	McMaster Carr 5709K91
47	1	Sleeve bearing for 1" shaft	McMaster Carr 6391K422
48	1	Split taper bushing for 2" shaft	McMaster Carr 9859T613
49	1	Machine Key 1/2 Undersized 1.5" long	McMaster Carr 98870A292
51	1	Machine Key 1/4 Undersized 1.75" long	McMaster Carr 98870A420
52	2	Machine Key, 3/8 undersize 2" long	McMaster Carr 98870A289
53	1	Split tapered bushing 1"	McMaster Carr 9859T513



DETAIL A
SCALE 1 / 3





DRIVE ASSEMBLY

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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Matt Bryner
DRAWN
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Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

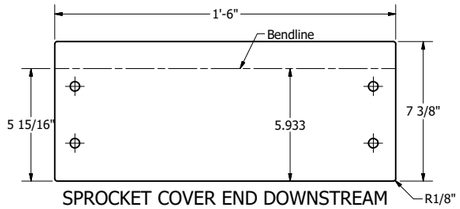
SPROCKET COVERS AND DRIVE ASSEMBLY

270-417-269

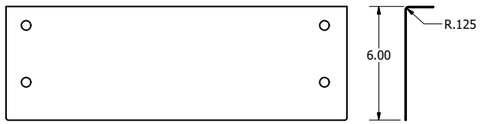
NOTES:

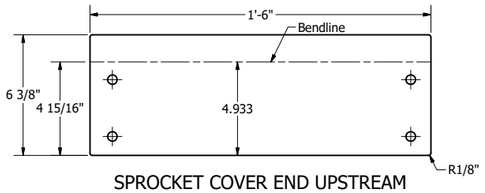
1. Remove all sharp edges and round corners.
2. All materials shall be 300 series stainless steel sheet .060" thick (16ga).
3. Flat pattern files for components will be provided upon request.
4. All bend radii are 2x material thickness.

All components used in Sprocket Covers and Drive Assembly drawing 270-417-269

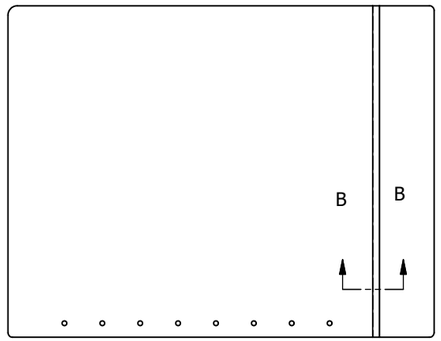


SPROCKET COVER END DOWNSTREAM
(Flat pattern)
SCALE 1 / 4



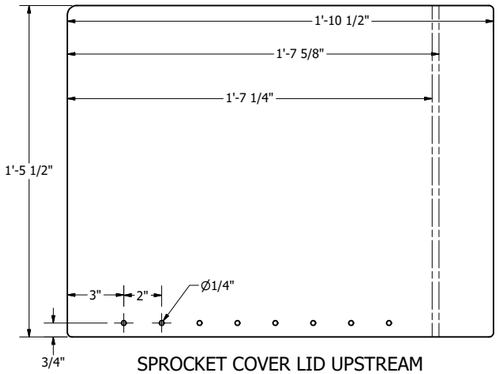


SPROCKET COVER END UPSTREAM
(Flat pattern)
SCALE 1 / 4

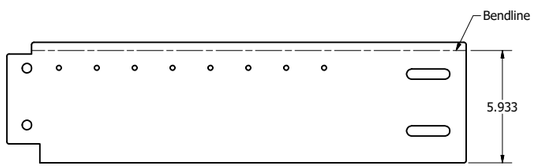


SPROCKET COVER LID UPSTREAM
SCALE 1 /4

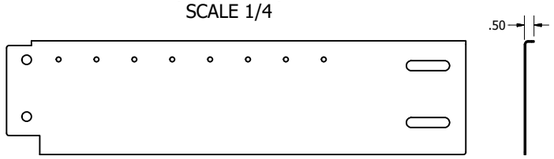
SECTION B-B
SCALE 1



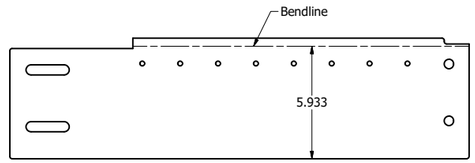
SPROCKET COVER LID UPSTREAM
FLAT PATTERN



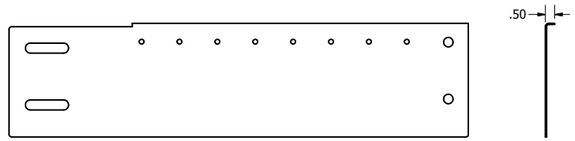
SPROCKET COVER CENTER UPSTREAM
(Flat pattern)
SCALE 1/4



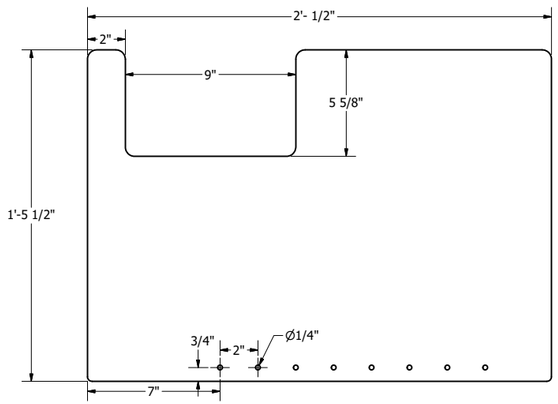
SPROCKET COVER CENTER UPSTREAM
SCALE 1/4



SPROCKET COVER CENTER DOWNSTREAM
(Flat Pattern)
SCALE 1/4



SPROCKET COVER CENTER DOWNSTREAM
SCALE 1/4



SPROCKET COVER LID DOWNSTREAM
SCALE 1/4

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner DESIGNED
Matt Bryner DRAWN
Thomas Hook CHECKED
Josua Dunham PE TECH. APPR.
Mark Wernke PE APPROVED

GRAND JUNCTION, COLORADO

SPROCKET COVER COMPONENTS TOP

270-417-270

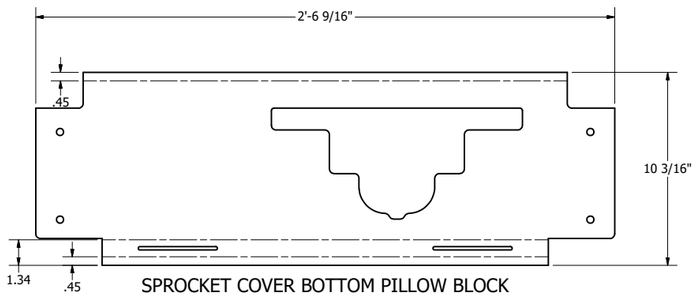
TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

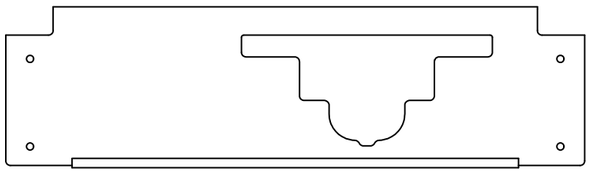
NOTES:

1. Remove all sharp edges and round corners.
2. All materials shall be 300 series stainless steel sheet .060" thick (16ga).
3. Flat pattern files for components will be provided upon request.
4. All bend radii are 2x material thickness.

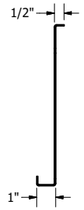
All components used in Sprocket Covers and Drive Assembly drawing 270-417-269

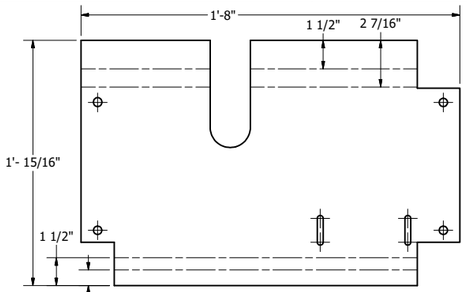


SPROCKET COVER BOTTOM PILLOW BLOCK
(Flat Pattern)
SCALE 1/4

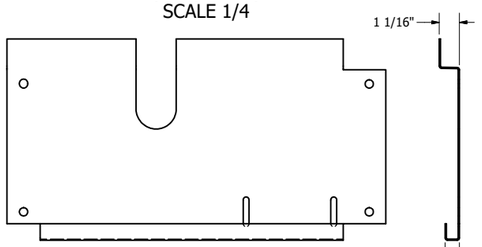


SPROCKET COVER BOTTOM PILLOW BLOCK
SCALE 1/4

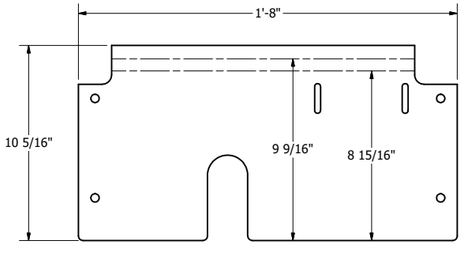




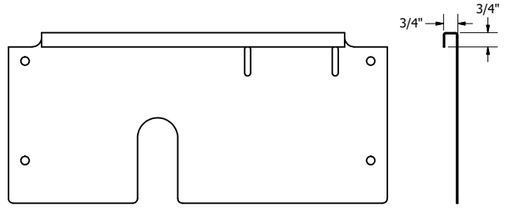
SPROCKET COVER BOTTOM END CAP
(Flat pattern)
SCALE 1/4



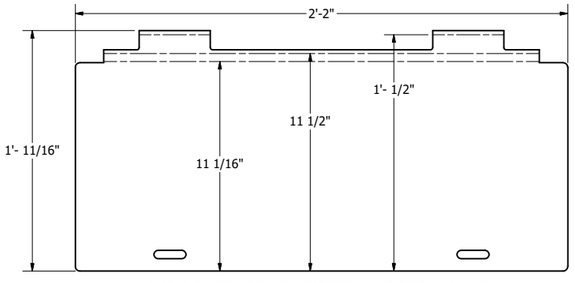
SPROCKET COVER BOTTOM END CAP
SCALE 1/4



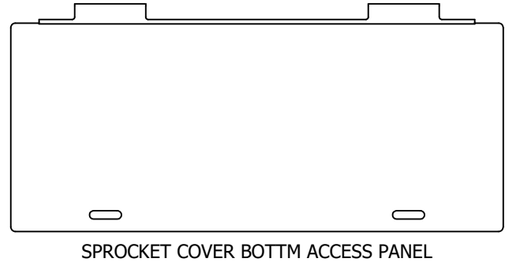
SPROCKET COVER BOTTOM FRONT
SCALE 1/4



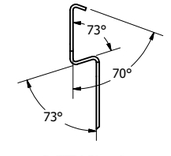
SPROCKET COVER BOTTOM FRONT
SCALE 1/4



SPROCKET COVER BOTTM ACCESS PANEL
(Flat pattern)
SCALE 1/4



SPROCKET COVER BOTTM ACCESS PANEL
SCALE 1/4



DETAIL A
SCALE 3/4

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

SPROCKET COVER COMPONENTS BOTTOM

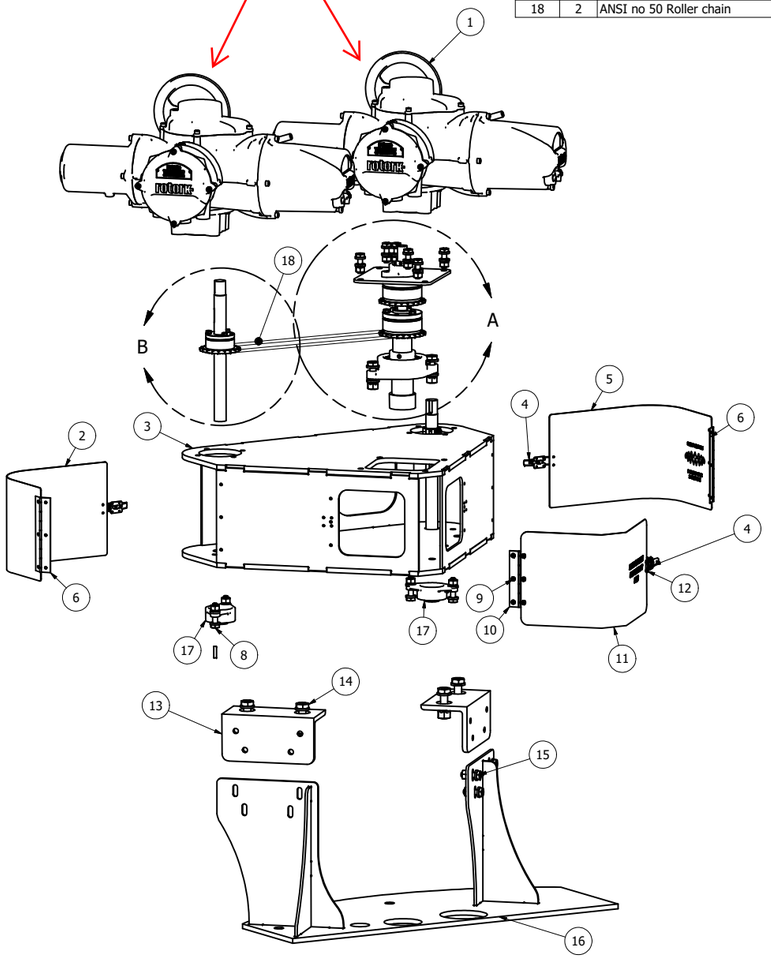
270-417-271

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

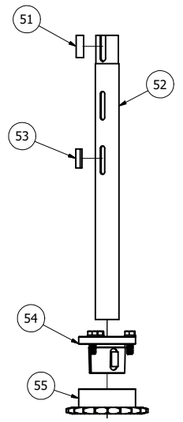
PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
1	2	Motorized actuator	See Specifications
2	1	Upstream corner cover	270-417-275
3	1	Actuator top bracket weldment	270-417-273
4	3	Latch	McMaster Carr 1889A43
5	1	Downstream corner cover	270-417-275
6	2	Piano hinge 8"	McMaster Carr 11555A63
7	1	Mounted Bearing 1"	McMaster Carr 5968K75
8	4	Bolt assembly 1/2 diameter, 2.25" long	270-417-263 ITEM 8
9	18	Bolt assembly #10 x 3/4" long	270-417-263 ITEM 2
10	1	Piano hinge 6"	McMaster Carr 11555A63
11	1	Actuator front cover	270-417-275
12	18	Bolt assembly #6 x 5/8" long	270-417-263 ITEM 1
13	1	Leg connector bracket	270-417-273
14	4	Bolt assembly 3/4 diameter 2.75" long	270-417-263 ITEM 14
15	8	Bolt assembly 1/2 diameter 1.75" long	270-417-263 ITEM 10
16	1	Actuator support weldment	270-417-274
17	2	Mounted Bearing 1-1/4"	McMaster Carr 5968K91
18	2	ANSI no 50 Roller chain	McMaster Carr 6261K175

Actuators rotated 180 degrees to not block electrical.



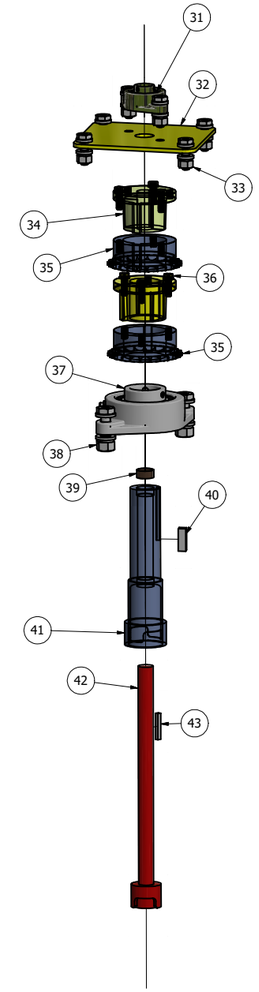
VALVE ACTUATOR ASSEMBLY
SCALE 1/8

PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
51	2	Machine Key 8mm x 7mm x 30mm	McMaster Carr 98870A766
52	2	Motorized Actuator Drive Shaft	270-417-281
53	2	Machine Key 1/4 x 1-1/4	McMaster Carr 98870A205
54	2	Split taper bushing P1 Style	McMaster Carr 9859T317
55	2	Sprocket 20 tooth for #50 chain	McMaster Carr 1068N58



DETAIL B
SCALE 1 /4

PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER
31	1	Mounted Bearing 1"	McMaster Carr 5968K75
32	1	Bearing mount plate	270-417-273
33	6	Bolt assembly 1/2 diameter 1.75" long	270-417-263 ITEM 7
34	1	Split tapered bushing 1"	McMaster Carr 9859T513
35	2	Sprocket #50 chain 23 tooth	McMaster Carr 1068N62
36	1	Split taper bushing for 2" shaft	McMaster Carr 9859T613
37	1	Mounted Bearing 2"	McMaster Carr 5968K83
38	2	Bolt assembly 5/8 diameter 2.5" long	270-417-263 ITEM 12
39	1	Sleeve bearing for 1" shaft	McMaster Carr 6391K422
40	1	Machine Key 1/2 Undersized 1.5" long	McMaster Carr 98870A292
41	1	Top Outer Drive Shaft Weldment	270-417-277
42	1	Top inner drive shaft weldment	270-417-276
43	1	Machine Key 1/4 Undersized 1.75" long	McMaster Carr 98870A420



DETAIL A
SCALE 1 / 4

— BUREAU OF —
RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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DRAWN
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CHECKED
Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

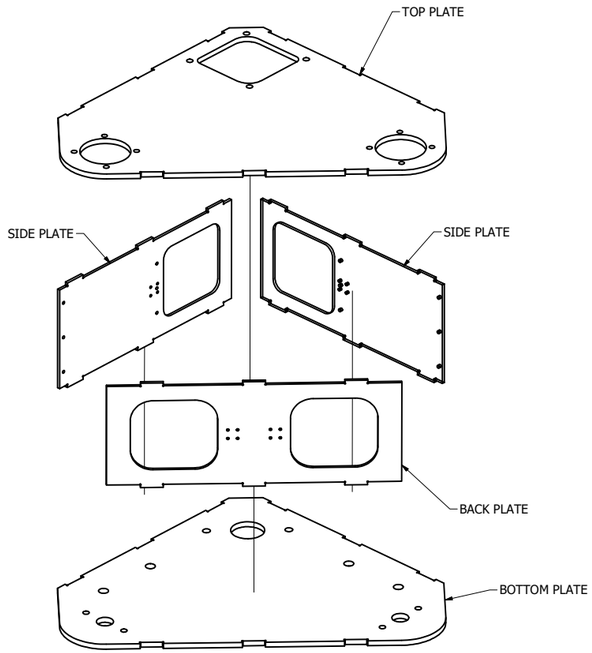
VALVE ACTUATOR ASSEMBLY

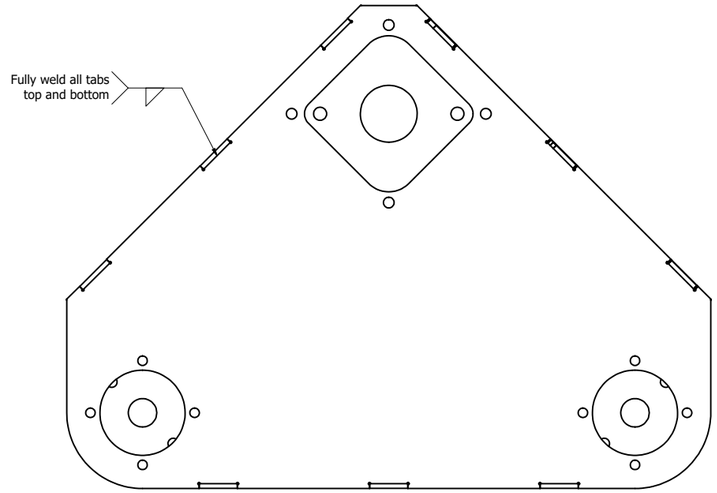
270-417-272

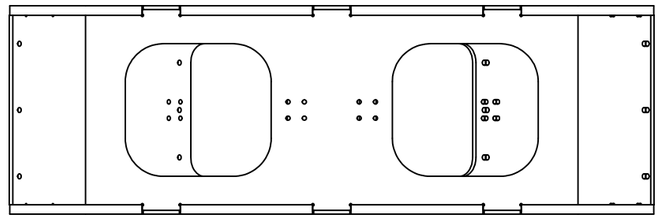
NOTES:

1. Weld in accordance with AWS D1.4.
2. Minimum size of welds is 3/16".
3. Remove all sharp edges and round corners.
4. Galvanize in accordance with specifications 09 96 20.
5. All materials shall be steel, A36 or A572 any grade.
6. Flat pattern files for components will be provided upon request.

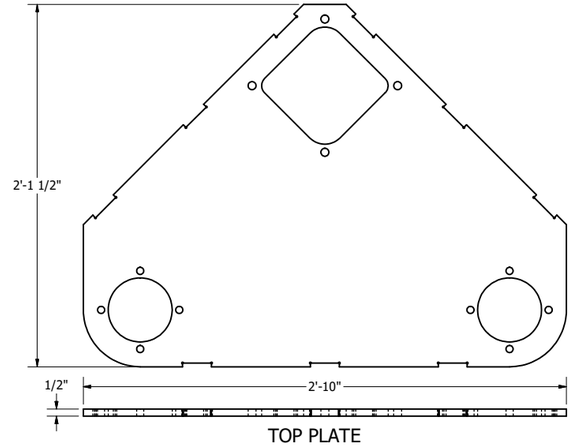
All components used in Valve Actuator Assembly drawing 270-417-272



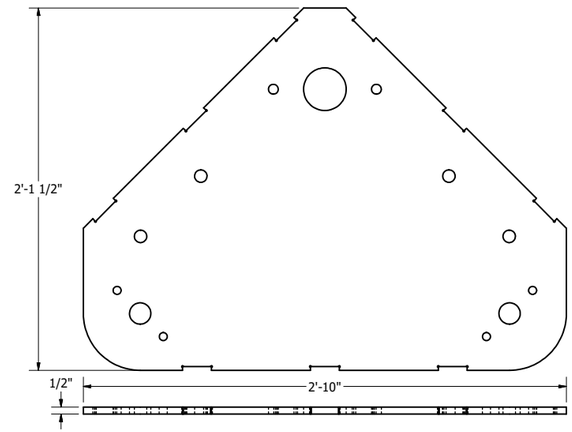




ACTUATOR BRACKET WELDMENT
SCALE 1/4

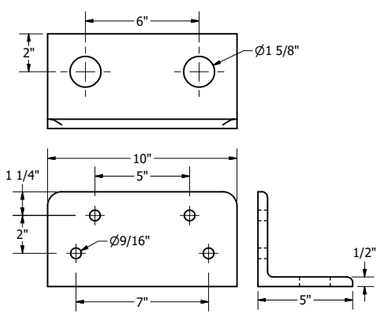


TOP PLATE
SCALE 3/16

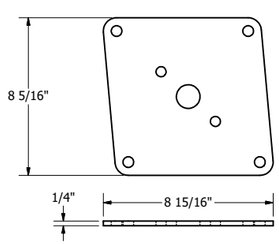


BOTTOM PLATE
SCALE 3/16

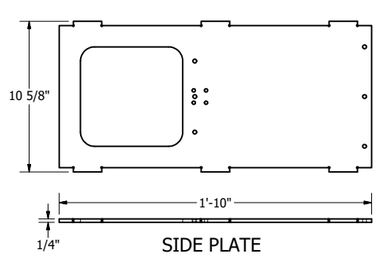
See page 270-417-282 for actuator adapter details.



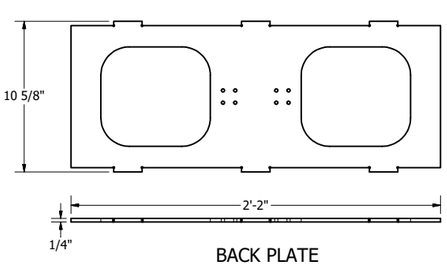
LEG CONNECTOR BRACKET
SCALE 1/4



BEARING MOUNT PLATE
SCALE 1 / 4



SIDE PLATE
SCALE 3/16



BACK PLATE
SCALE 3/16

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Joshua Dunham P.E.
TECH. APPR.
Mark Wernke P.E.
APPROVED

GRAND JUNCTION, COLORADO

ACTUATOR BRACKET WELDMENT

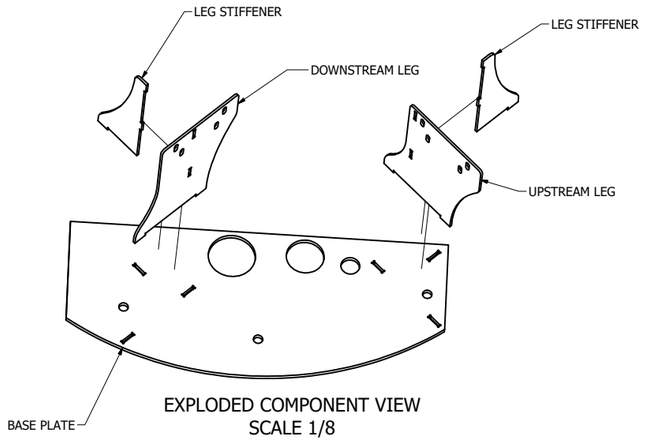
270-417-273

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

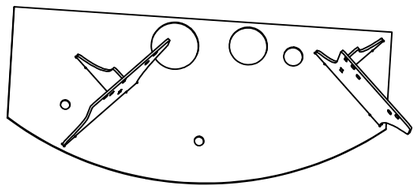
NOTES:

1. Weld in accordance with AWS D1.4.
2. Fully weld all tabs.
3. Remove all sharp edges and round corners.
4. Galvanize in accordance with specifications 09 96 20.
5. All materials shall be steel, A36 or A572 any grade.
6. Flat pattern files for components will be provided upon request.

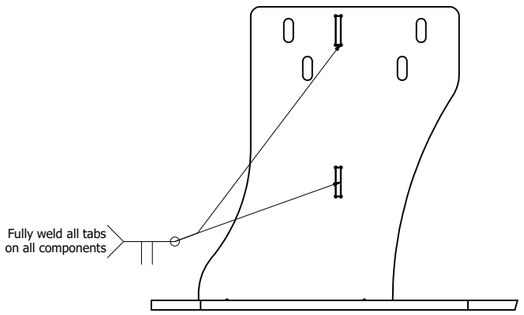
All components used in Valve Actuator Assembly drawing 270-417-272



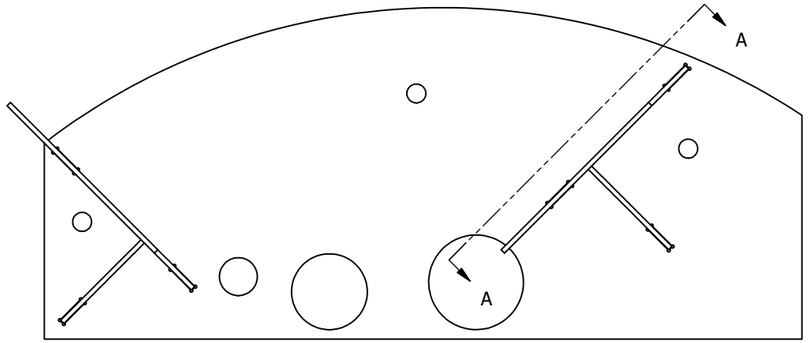
EXPLODED COMPONENT VIEW
SCALE 1/8

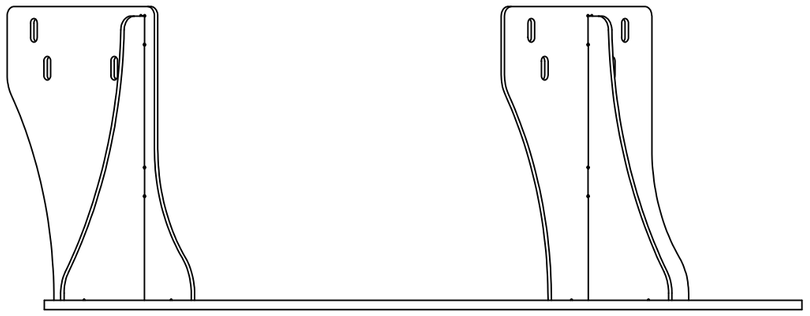


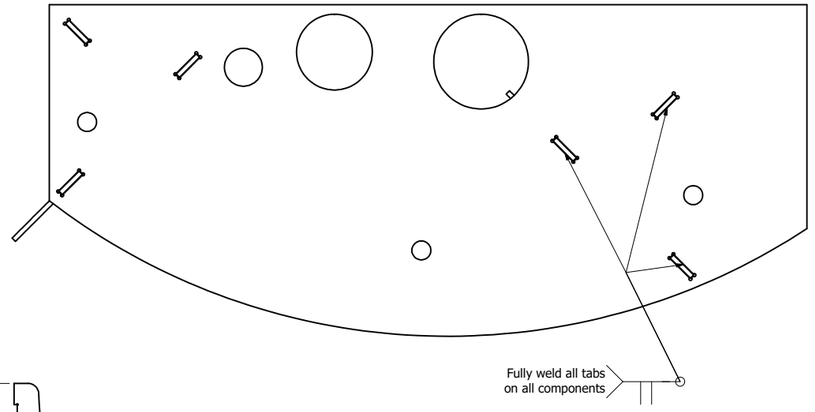
ASSEMBLY VIEW
SCALE 1/8

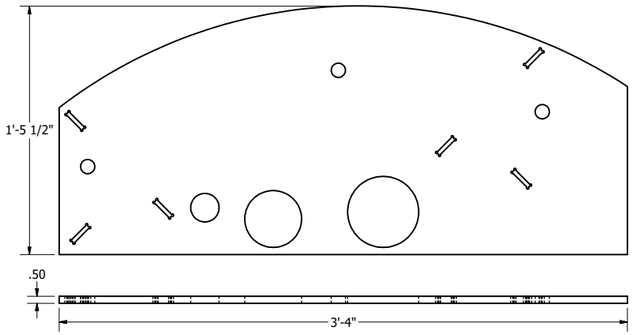


SECTION A-A
SCALE 1 / 4

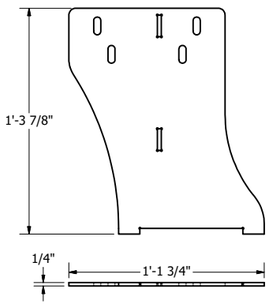




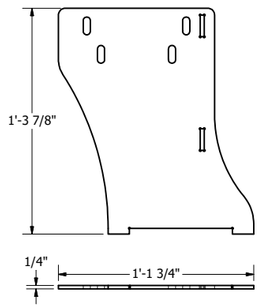




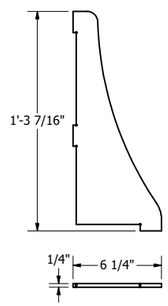
BASE PLATE
SCALE 3/16



DOWN STREAM LEG
SCALE 3/16



UP STREAM LEG
SCALE 3/16



LEG SIFFENER
SCALE 3/16

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

— BUREAU OF — RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECt
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Joshua Dunham P.E.
TECH. APPR.
Mark Wernke P.E.
APPROVED

GRAND JUNCTION, COLORADO

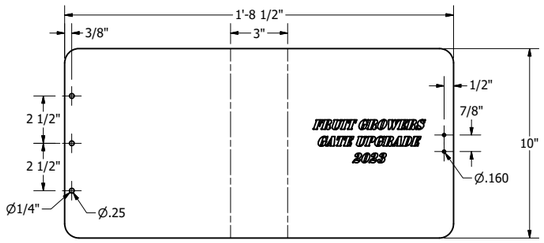
ACTUATOR SUPPORT WELDMENT

270-417-274

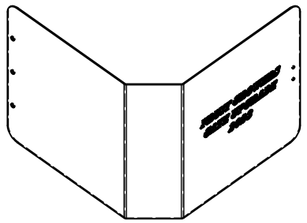
NOTES:

1. Remove all sharp edges and round corners.
2. All materials shall be 300 series stainless steel sheet .060" thick (16ga).
3. Flat pattern files for components will be provided upon request.
4. All bend radii are 2x material thickness, unless noted otherwise.

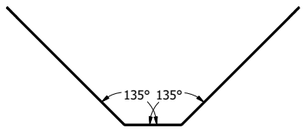
All components used in Valve Actuator Assembly drawing 270-417-272



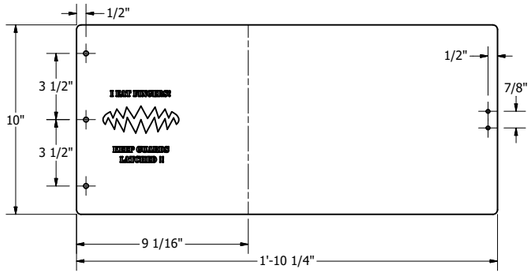
ACTUATOR FRONT COVER
(Flat pattern)
SCALE 1/4

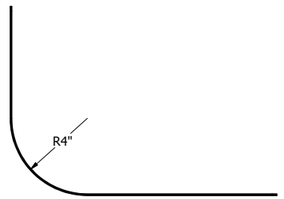


ISOMETRIC VIEW
SCALE 1/4

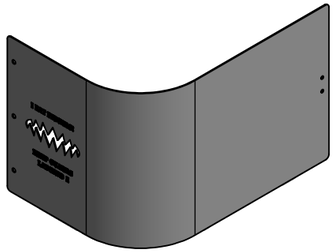


ACTUATOR FRONT COVER

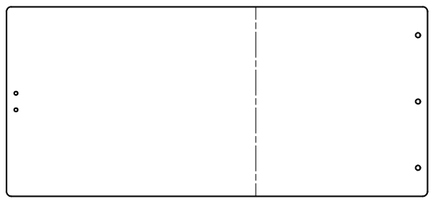


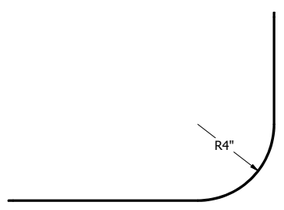


DOWNSTREAM CORNER COVER
SCALE 1/4

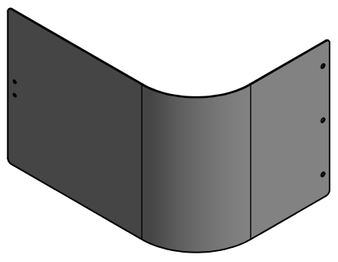


ISOMETRIC VIEW
SCALE 1/4





UPSTEAM CORNER COVER
(Mirrored part without warning lable)
SCALE 1 / 4



ISOMETRIC VIEW
SCALE 1 / 4

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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Mark Wernke PE
APPROVED

GRAND JUNCTION, COLORADO

ACTUATOR SHEET METAL COVERS

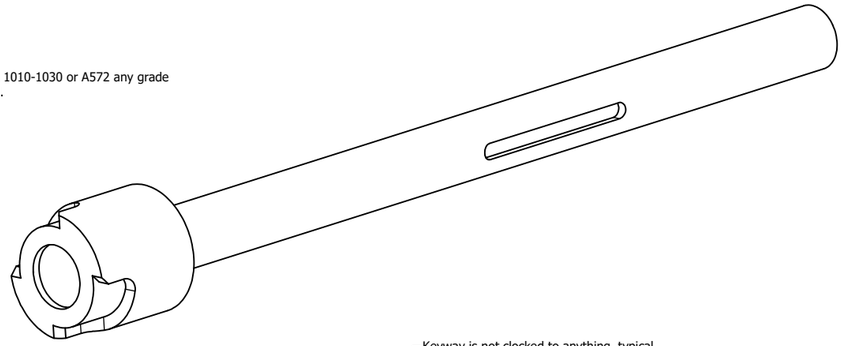
270-417-275

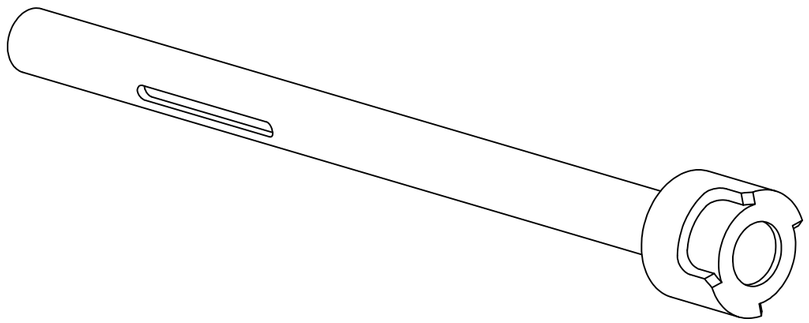
TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

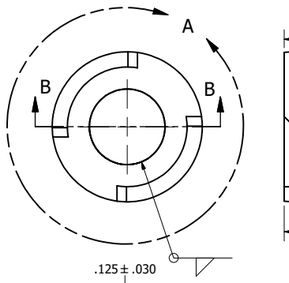
THIRD ANGLE PROJECTION

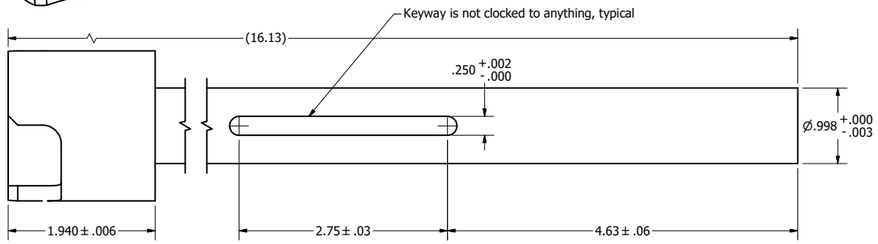
NOTES:

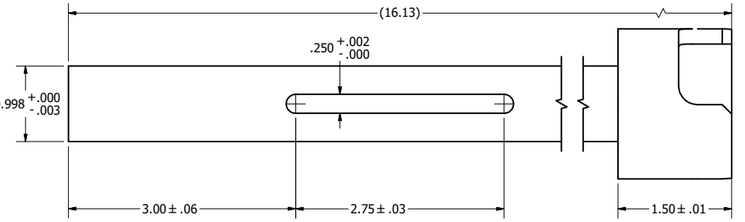
1. Weld in accordance with AWS D14.4.
2. Minimum size of welds is 1/8".
3. Remove all burrs and sharp edges.
4. All materials shall be steel, A36, A53, A500, 1010-1030 or A572 any grade
5. Inside radii .03 max unless otherwise noted.
6. Dimensions are inches.

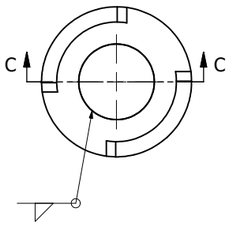










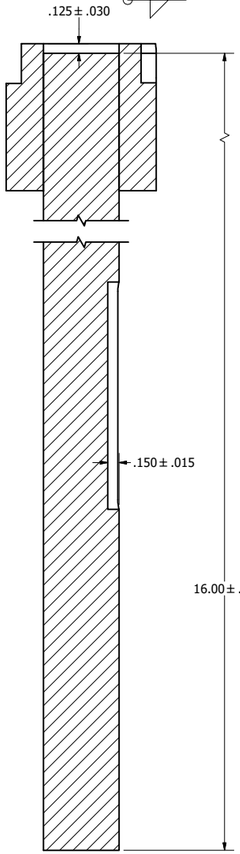


BOTTOM INNER DRIVE SHAFT WELDMENT
SCALE 1

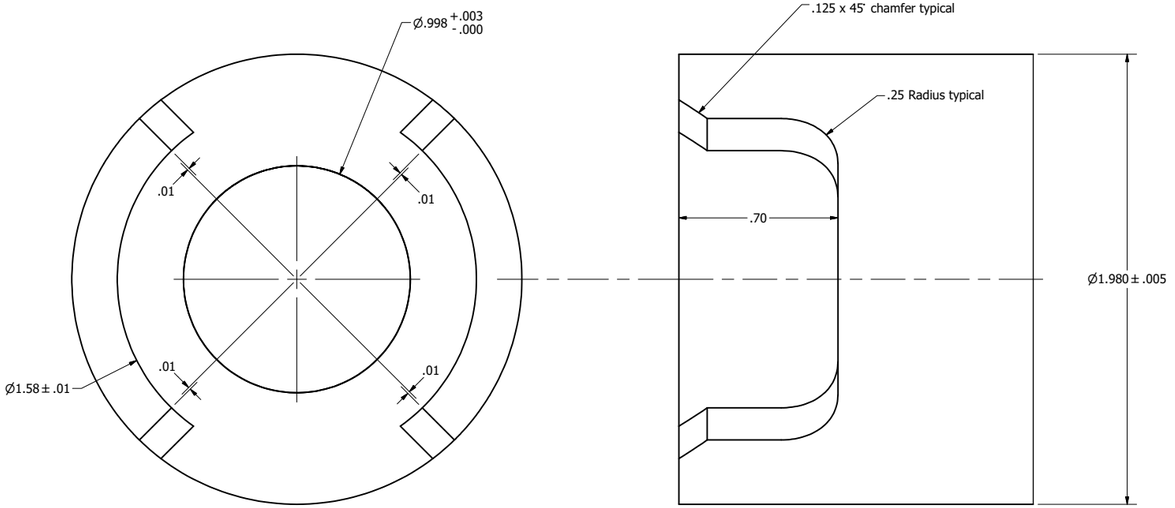
Component used in Sprocket Cover and Assembly see drawing 270-417-269

TOP INNER DRIVE SHAFT WELDMENT
SCALE 1

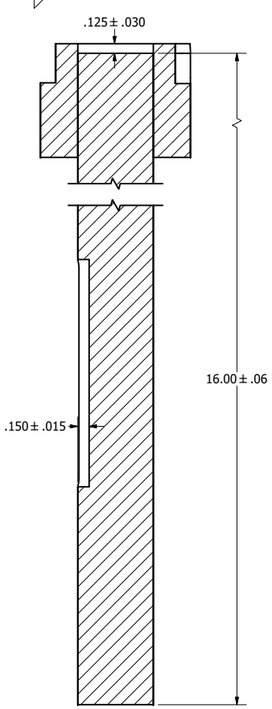
Component used in Valve Actuator Assembly see drawing 270-417-272



SECTION B-B
SCALE 1



DETAIL A
SCALE 3
(Rotated 45°)
TYPICAL LUG FEATURES



SECTION C-C
SCALE 1

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

BUREAU OF RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Joshua Dunham P.E.
TECH. APPR.
Mark Wernke P.E.
APPROVED

GRAND JUNCTION, COLORADO

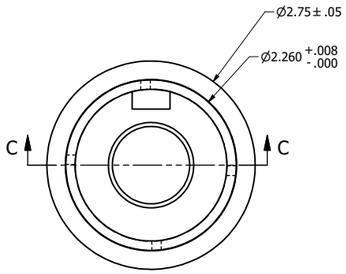
TOP INNER DRIVE SHAFT WELDMENTS

270-417-276

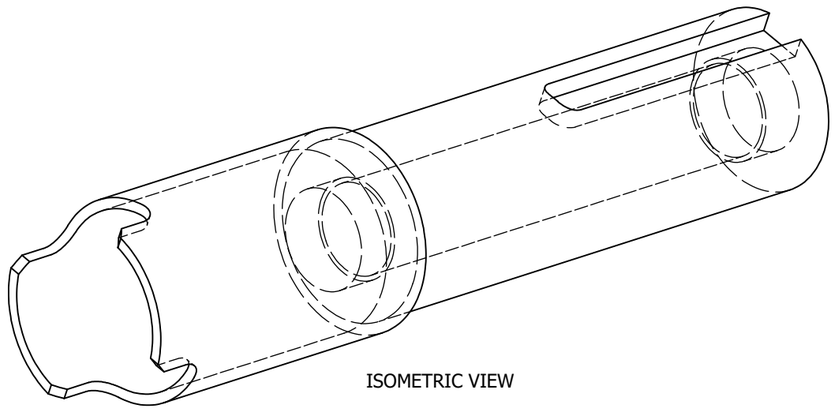
NOTES:

1. Weld in accordance with AWS D14.4.
2. Minimum size of welds is 1/8".
3. Remove all burrs and sharp edges.
4. All materials shall be steel, A36, A53, A500, 1018-30 or A572 any grade
5. Inside radii .03 max unless otherwise noted.
6. Dimensions are inches

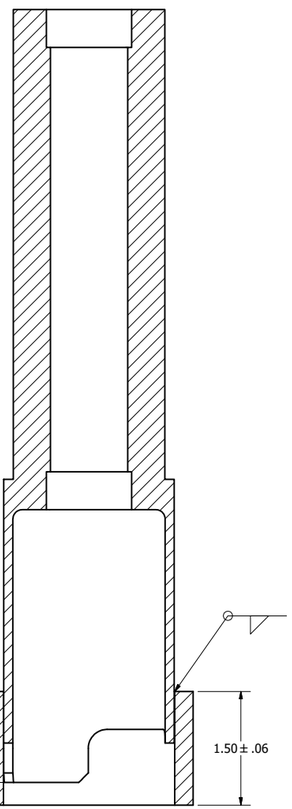
Component used in Valve Actuator Assembly
see drawing 270-417-272



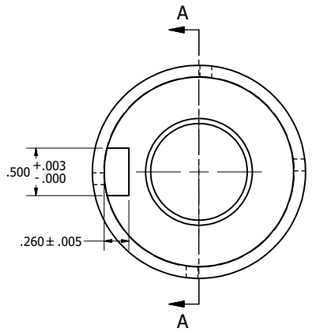
WELDMENT
SCALE 1

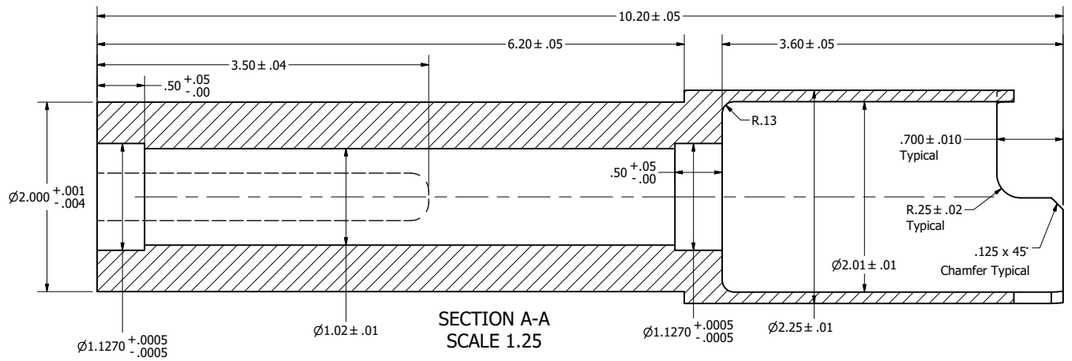


ISOMETRIC VIEW

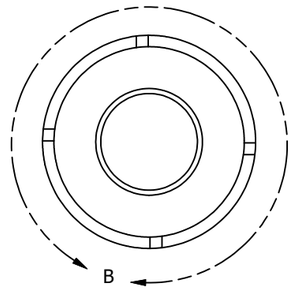


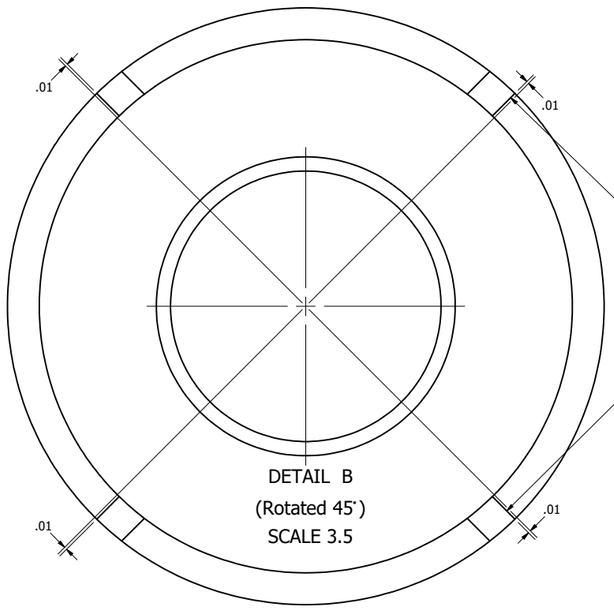
SECTION C-C
SCALE 1



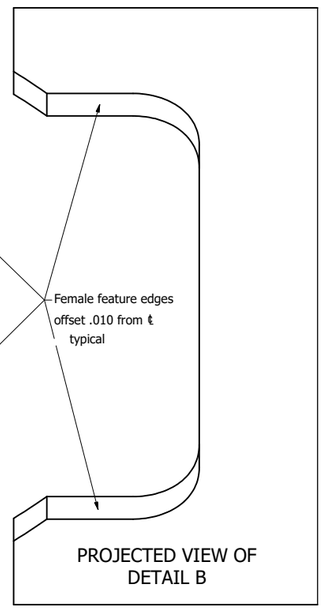


SECTION A-A
SCALE 1.25





DETAIL B
(Rotated 45°)
SCALE 3.5



PROJECTED VIEW OF
DETAIL B

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

— BUREAU OF —
RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM
OUTLET GATE IMPROVEMENTS

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Joshua Dunham P.E.
TECH. APPR.
Mark Wernke P.E.
APPROVED

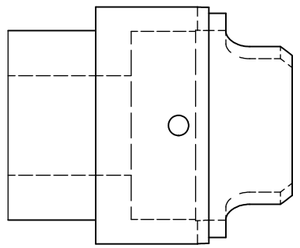
GRAND JUNCTION, COLORADO

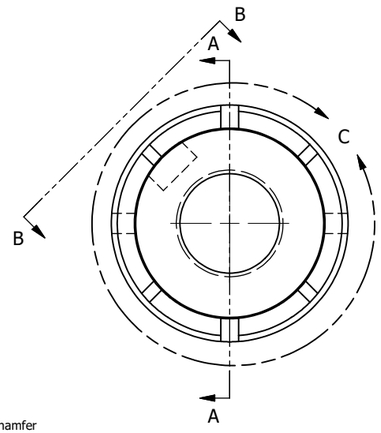
TOP OUTER DRIVE SHAFT
WELDMENT

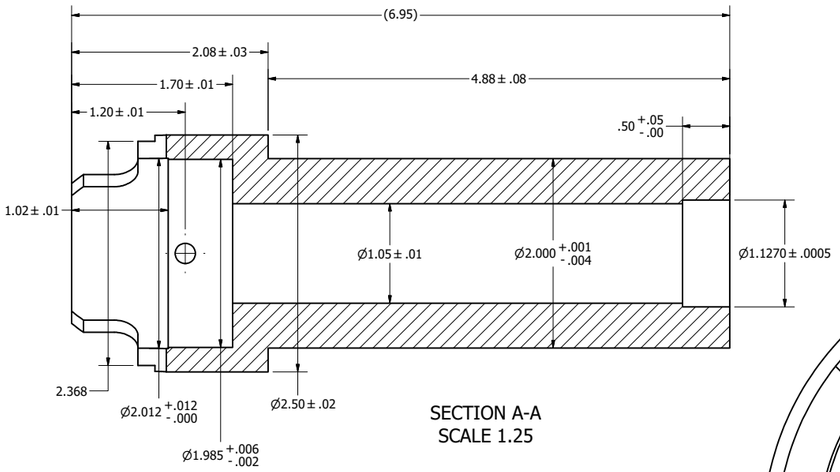
270-417-277

NOTES:

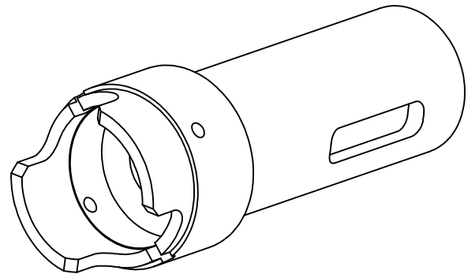
1. Remove all burrs and sharp edges.
2. All materials shall be steel, A36, A53, A500, 1010-1030 or A572 any grade.
3. Inside radii .03 max unless otherwise noted.
4. Dimesions are inches

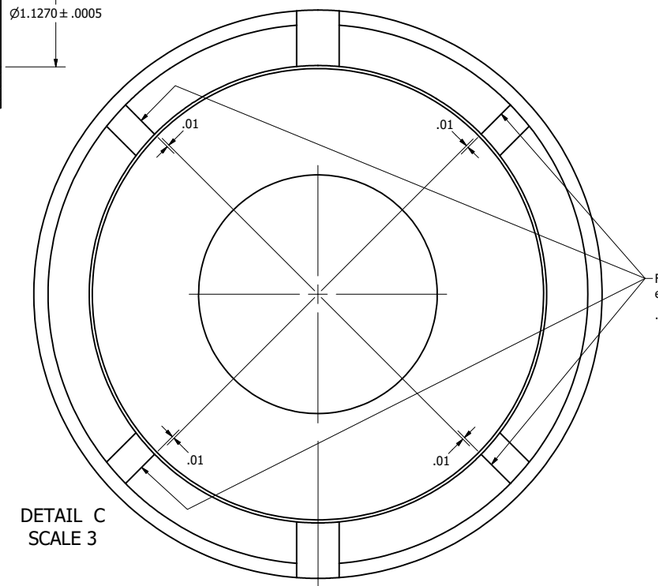




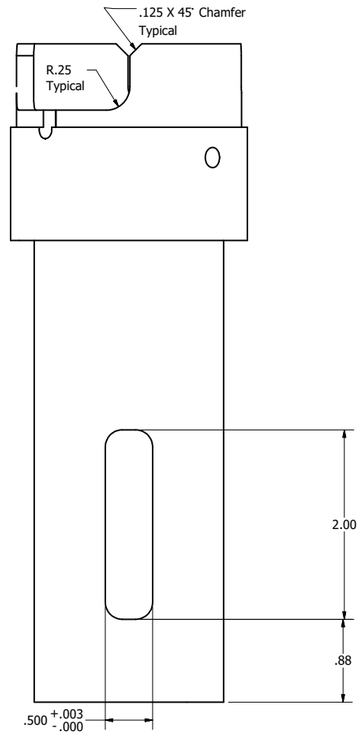


SECTION A-A
SCALE 1.25

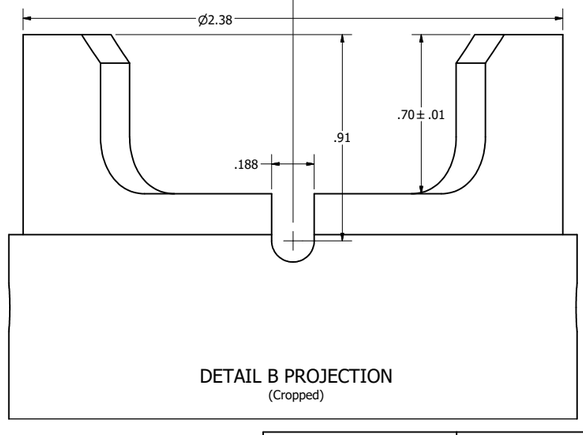




DETAIL C
SCALE 3



VIEW B-B
(View rotated to vertical position)



DETAIL B PROJECTION
(Cropped)

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

— BUREAU OF — RECLAMATION

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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Mark Wernke P.E.
APPROVED

GRAND JUNCTION, COLORADO

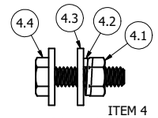
OUTER ACTUATOR THRUST COLLAR

270-417-278

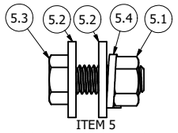
ITEM 1
Bolt assembly #6 x 5/8" long

ITEM 2
Bolt assembly #10 x 3/4" long

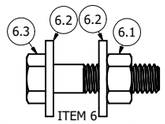
ITEM 3
Bolt assembly #10 x 5/16" long



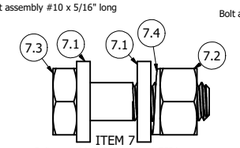
ITEM 4
Bolt assembly 1/4 diameter x 1" long



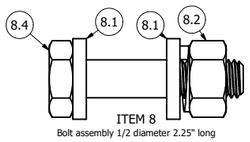
ITEM 5
Bolt assembly 3/8 diameter x 1" long



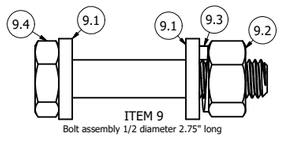
ITEM 6
Bolt assembly 3/8 diameter 1.5" long



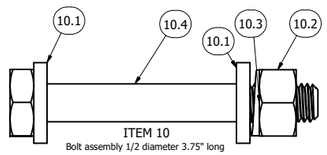
ITEM 7
Bolt assembly 1/2 diameter 1.75" long



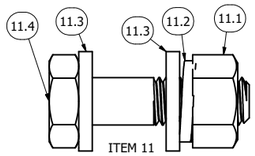
ITEM 8
Bolt assembly 1/2 diameter 2.25" long



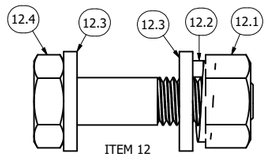
ITEM 9
Bolt assembly 1/2 diameter 2.75" long



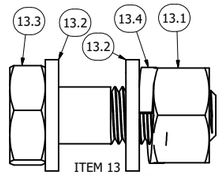
ITEM 10
Bolt assembly 1/2 diameter 3.75" long



ITEM 11
Bolt assembly 5/8 x 2.25" long

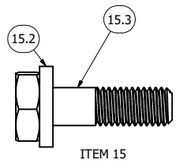


ITEM 12
Bolt assembly 5/8 diameter 2.5" long

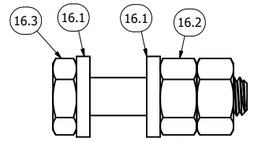


ITEM 13
Bolt assembly 3/4 diameter 2.25" long

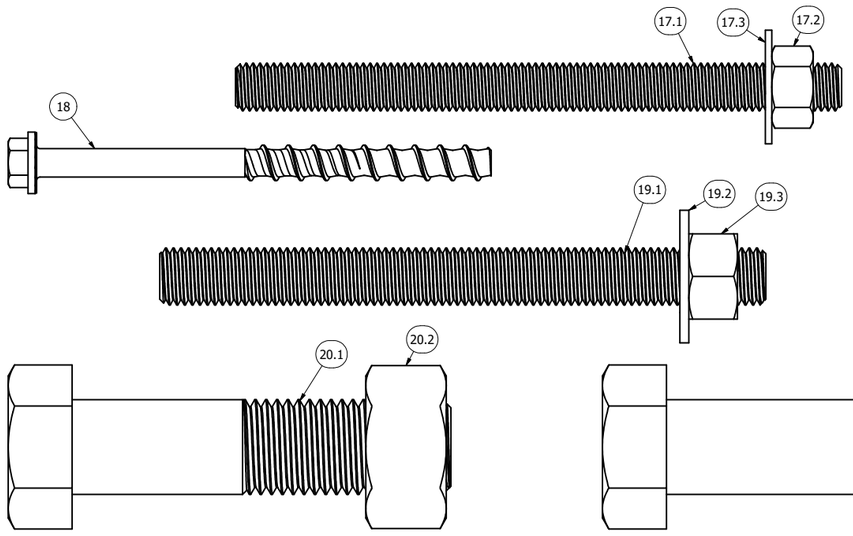
ITEM 14
Bolt assembly 3/4 diameter 2.75" long



ITEM 15
Bolt assembly 1/2 diameter 1.75" long



ITEM 16
Bolt assembly 1/2 diameter 2.25" long



PARTS LIST				PARTS LIST			
ITEM	QTY	DESCRIPTION	STOCK NUMBER	ITEM	QTY	DESCRIPTION	STOCK NUMBER
1	18	Bolt assembly #6 x 5/8" long		12	1	Bolt assembly 5/8 diameter 2.5" long	
1.1	1	#6 hex nut 18-8 SS	McMaster Carr 91841A007	12.1	1	5/8 nut ASTM A325	McMaster Carr 95025A410
1.2	1	#6 Socket head cap screw SS	McMaster Carr 92196A150	12.2	1	5/8 Lock washer, ASTM A325	McMaster Carr 95160A240
1.3	1	#6 washer SS	McMaster Carr 92141A008	12.3	2	Washer 5/8 ASTM A325	McMaster Carr 98119A035
2	18	Bolt assembly #10 x 3/4" long		12.4	1	Bolt 5/8 x 2.5" long ASTM A325	McMaster Carr 91571A270
2.1	1	#10 nut SS	McMaster Carr 91841A011	13	4	Bolt assembly 3/4 diameter 2.25" long	
2.2	1	#10 Phillips head screw SS	McMaster Carr 91772A245	13.1	1	3/4 Nut ASTM A325	McMaster Carr 91694A325
2.3	2	#10 washer SS	McMaster Carr 92141A011	13.2	2	3/4 Washer ASTM A325	McMaster Carr 98119A036
3	32	Bolt assembly #10 x 5/16" long		13.3	1	Bolt 3/4 diameter 2.25" long ASTM A325	McMaster Carr 91571A292
3.1	1	#10 nut SS	McMaster Carr 91841A011	13.4	1	3/4 Lock washer ASTM A325	McMaster Carr 95160A250
3.2	1	#10 Phillips head screw SS	McMaster Carr 91772A239	14	4	Bolt assembly 3/4 diameter 2.75" long	
4	12	Bolt assembly 1/4 diameter x 1" long		14.1	1	3/4 Nut ASTM A325	McMaster Carr 91694A325
4.1	1	1/4 nut, hot dipped galvanized	McMaster Carr 90371A029	14.2	2	3/4 Washer ASTM A325	McMaster Carr 98119A036
4.2	1	Lock washer 1/4, hot dipped galvanized	McMaster Carr 95160A210	14.3	1	3/4 Lock washer ASTM A325	McMaster Carr 95160A250
4.3	2	Washer 1/4, hot dipped galvanized	McMaster Carr 98970A129	14.4	1	Washer 3/4 oversized SS	McMaster Carr 91525A417
4.4	1	Bolt 1/4 x 1" long hot dipped galvanized	McMaster Carr 95373A142	14.5	1	Bolt 3/4 diameter 2.75" long ASTM A325	McMaster Carr 91571A296
5	12	Bolt assembly 3/8 diameter x 1" long		15	2	Bolt assembly 1/2 x 1.75" long	See Detail
5.1	1	Nut 1/4 hot dipped galvanized	McMaster Carr 90371A031	15.2	1	Washer 1/2, ASTM A325	McMaster Carr 98119A033
5.2	2	Washer 3/8, hot dipped galvanized	McMaster Carr 98970A131	15.3	1	Bolt 1/2 diameter 1.75" long, ASTM A325	McMaster Carr 91571A252
5.3	1	Bolt 3/8 x 1" long, hot dipped galvanized	McMaster Carr 95373A163	16	6	Bolt assembly 1/2 diameter, 2.25" long Double nut	
5.4	1	Lock washer 1/4, hot dipped galvanized	McMaster Carr 95160A220				
6	2	Bolt assembly 3/8 diameter 1.5" long		16.1	2	Washer 1/2, ASTM A325	McMaster Carr 98119A033
6.1	1	Nut 1/4 hot dipped galvanized	McMaster Carr 90371A031	16.2	2	Nut 1/2, ASTM A325	McMaster Carr 91694A315
6.2	2	Washer 3/8, hot dipped galvanized	McMaster Carr 98970A131	16.3	1	Bolt 1/2 diameter 2.25" long ASTM A325	McMaster Carr 91583A602
6.3	1	Bolt 3/8 x 1.5" long, hot dipped galvanized	McMaster Carr 95373A165	17	27	5/8" diameter epoxy anchor assembly	
7	44	Bolt assembly 1/2 diameter 1.75" long		17.1	1	Threaded Stud 5/8" diameter 8" long Stainless Steel	McMaster Carr 95412A824
7.1	2	Washer 1/2, ASTM A325	McMaster Carr 98119A033				
7.2	1	Nut 1/2, ASTM A325	McMaster Carr 91694A315	17.2	1	Nut 5/8-11 Stainless Steel	McMaster Carr 91845A325
7.3	1	Bolt 1/2 diameter 1.75" long, ASTM A325	McMaster Carr 91571A252	17.3	1	Washer 5/8 diameter Stainless Steel	McMaster Carr 92141A035
7.4	1	Lock washer 1/2, ASTM A325	McMaster Carr 95160A230	18	12	Tapcon 3/8 diameter 6" long	McMaster Carr 99795A289
8	24	Bolt assembly 1/2 diameter, 2.25" long	See detail	19	3	3/4" diameter epoxy anchor assembly	
8.1	2	Washer 1/2, ASTM A325	McMaster Carr 98119A033	19.1	1	Threaded Stud 3/4" diameter 6" long Stainless Steel	McMaster Carr 95412A863
8.2	1	Nut 1/2, ASTM A325	McMaster Carr 91694A315				
8.3	1	Lock washer 1/2, ASTM A325	McMaster Carr 95160A230	19.2	1	Washer 3/4" diameter Stainless Steel	McMaster Carr 92141A056
8.4	1	Bolt 1/2 diameter 2.25" long ASTM A325	McMaster Carr 91583A602	19.3	1	Nut 3/4-10 Stainless Steel	McMaster Carr 91845A330
9	1	Bolt assembly 1/2 diameter 2.75" long		20	80	Flange Bolt assembly 5" long	
9.1	2	Washer 1/2, ASTM A325	McMaster Carr 98119A033	20.1	1	Bolt 1.25" diameter 5" long	McMaster Carr 91283A252
9.2	1	Nut 1/2, ASTM A325	McMaster Carr 91694A315	20.2	1	1-1/4" diameter nut, Grade 5, zinc plated	McMaster Carr 95462A559
9.3	1	Lock washer 1/2, ASTM A325	McMaster Carr 95160A230	21	20	Flange Bolt assembly 5" long	
9.4	1	STEP AP203	McMaster Carr	21.1	1	1-1/4" diameter nut, Grade 5, zinc plated	McMaster Carr 95462A559
10	2	Bolt assembly 1/2 diameter 3.75" long		21.2	1	Bolt 1.25" diameter 7" long	McMaster Carr 91283A268
10.1	2	Washer 1/2, ASTM A325	McMaster Carr 98119A033				
10.2	1	Nut 1/2, ASTM A325	McMaster Carr 91694A315				
10.3	1	Lock washer 1/2, ASTM A325	McMaster Carr 95160A230				
10.4	1	STEP AP203	McMaster Carr				
11	4	Bolt assembly 5/8 x 2.25" long					
11.1	1	5/8 nut ASTM A325	McMaster Carr 95025A410				
11.2	1	5/8 Lock washer, ASTM A325	McMaster Carr 95160A240				
11.3	2	Washer 5/8 ASTM A325	McMaster Carr 98119A035				
11.4	1	Bolt 5/8 x 2.25" long	McMaster Carr 91583A612				

BUREAU OF RECLAMATION

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENT

Matt Bryner
DESIGNED
Matt Bryner
DRAWN
Thomas Hook
CHECKED
Josua Dunham PE
TECH. APPR.
Mark Wernke PE
APPROVED

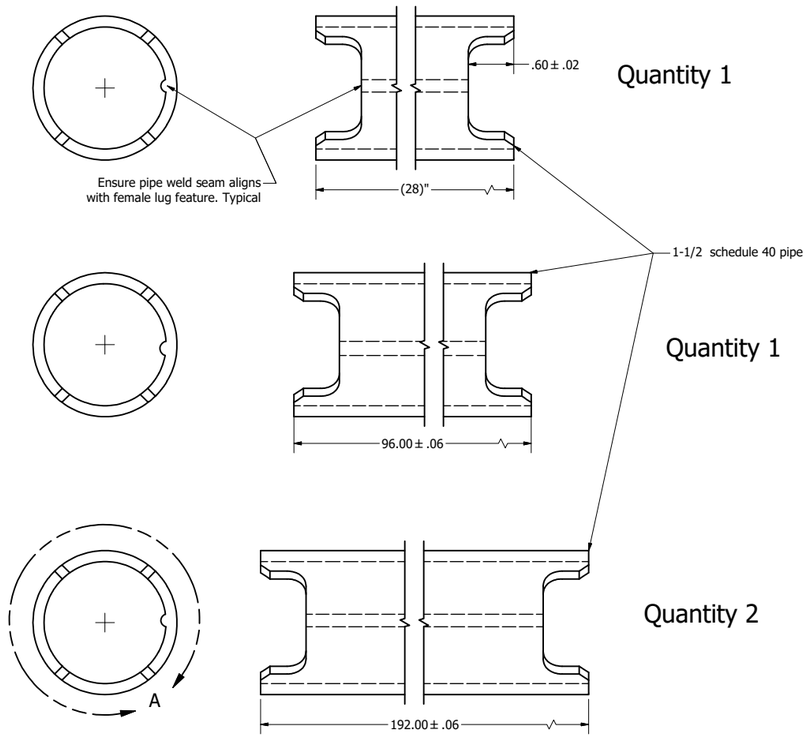
GRAND JUNCTION, COLORADO

FASTENERS

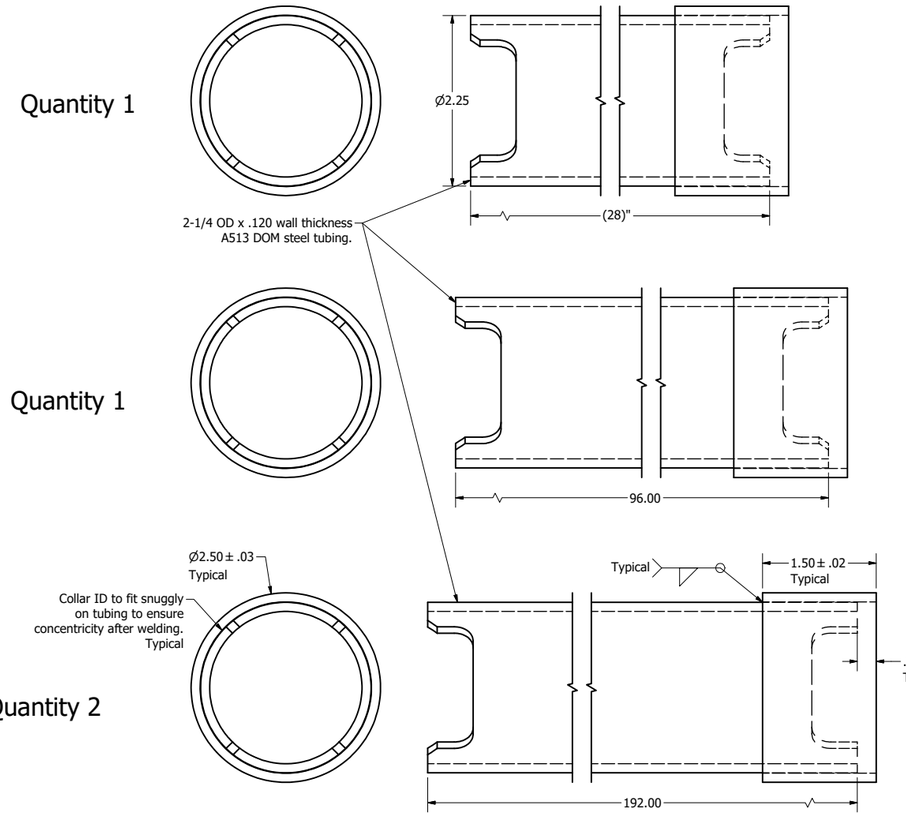
270-417-279

NOTES:

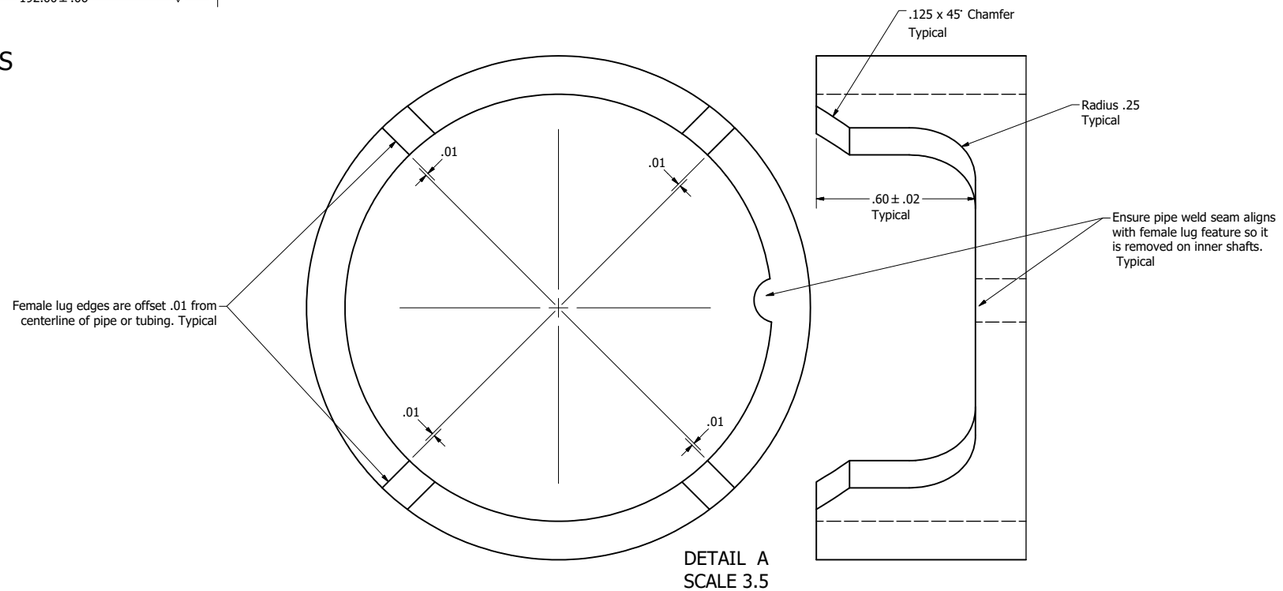
1. Weld in accordance with AWS D14.4
2. Remove all burrs and break sharp edges.
3. All materials shall be steel, A36, A500, A513, 1010-1030 or A572 any grade.
4. Galvanize in accordance with specifications 09 96 20.
5. There is no need to "clock" lug features on opposite ends of shafts.
6. Dimensions are inches.
7. Contractor must field verify dimensions for (28)" length components and adjust final length as needed.



INNER SHAFTS



OUTER SHAFTS



DETAIL A
SCALE 3.5
(Typical lug geometry for both inner and outer shafts)

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BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner
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APPROVED

GRAND JUNCTION, COLORADO

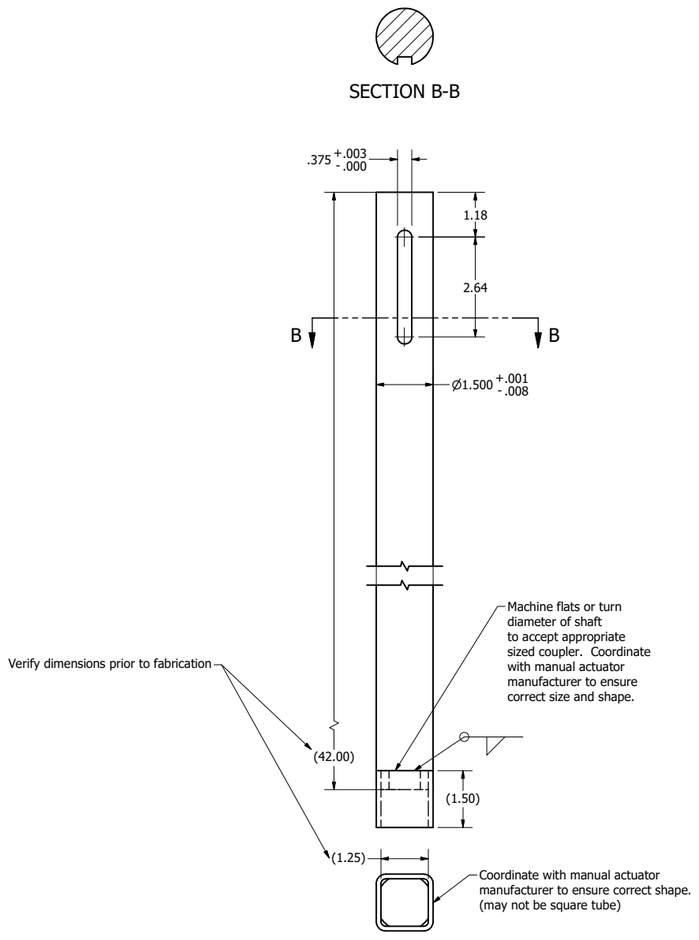
ACTUATOR DRIVE SHAFTS

THIRD ANGLE PROJECTION

270-417-280

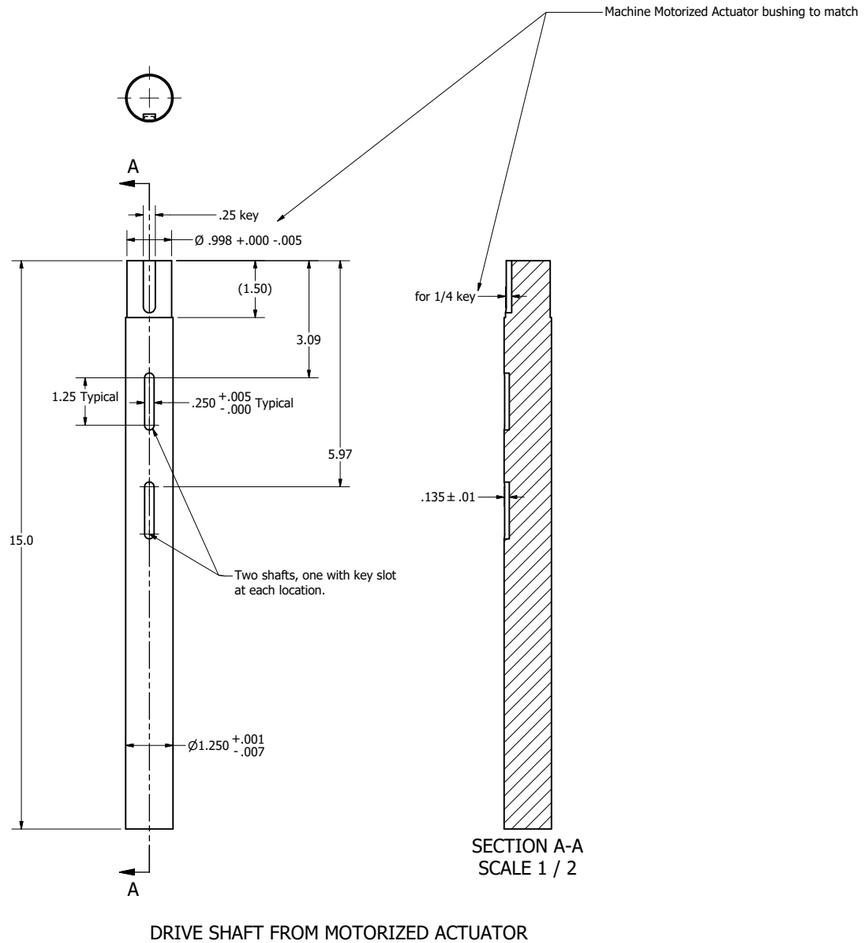
NOTES:

1. Remove all burrs and break sharp edges.
2. All materials shall be steel, A36, 1018-1045, 12L14 or 4130-40.
3. Inside radii .03 max unless otherwise noted.
4. Weld in accordance with AWS D 14.4.



MANUAL ACTUATOR DRIVE SHAFT
SCALE 1/2

Component used in Sprocket Cover and Assembly see drawing 270-417-269



DRIVE SHAFT FROM MOTORIZED ACTUATOR
SCALE 1 / 2

Component used in Valve Actuator Assembly see drawing 270-417-272

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FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Rev 001 23Jan2024 Changed dims on Shaft from motorized actuator

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Mark Wernke PE
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GRAND JUNCTION, COLORADO

MOTORIZED ACTUATOR DRIVE SHAFT

Added 1/23/24.

270-417-281

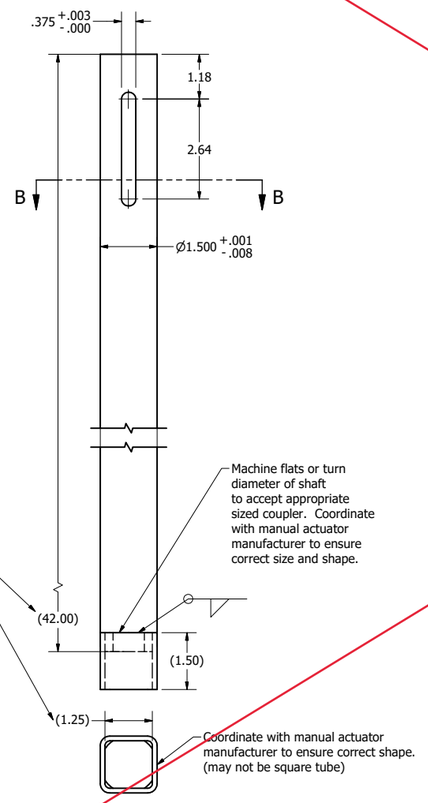
TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

NOTES:

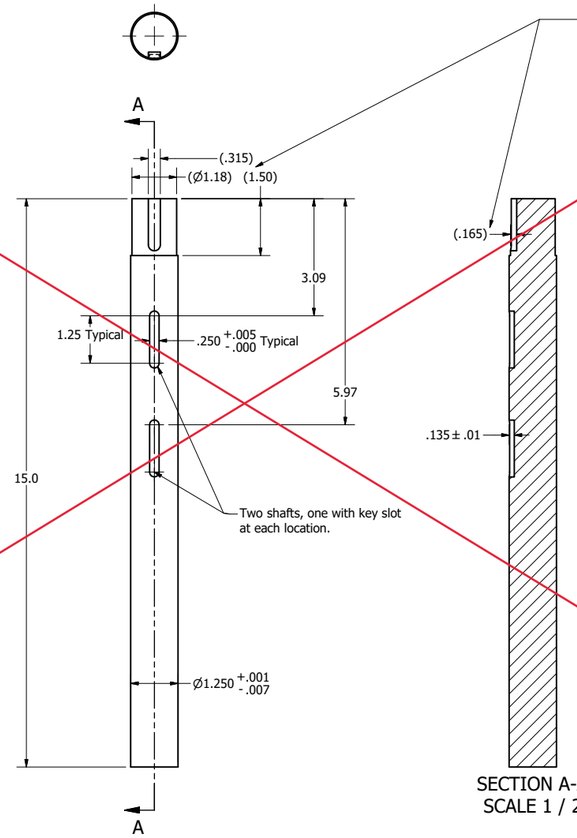
1. Remove all burrs and break sharp edges.
2. All materials shall be steel, A36, 1018-1045, 12L14 or 4130-40.
3. Inside radii .03 max unless otherwise noted.
4. Weld in accordance with AWS D 14.4.

SECTION B-B



MANUAL ACTUATOR DRIVE SHAFT
SCALE 1/2

Component used in Sprocket Cover and Assembly see drawing 270-417-269



DRIVE SHAFT FROM MOTORIZED ACTUATOR
SCALE 1 / 2

SECTION A-A
SCALE 1 / 2

Component used in Valve Actuator Assembly see drawing 270-417-272

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BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

OUTLET GATE IMPROVEMENTS

Matt Bryner	DESIGNED
Matt Bryner	DRAWN
Thomas Hook	CHECKED
Josua Dunham PE	TECH. APPR.
Mark Wernke PE	APPROVED

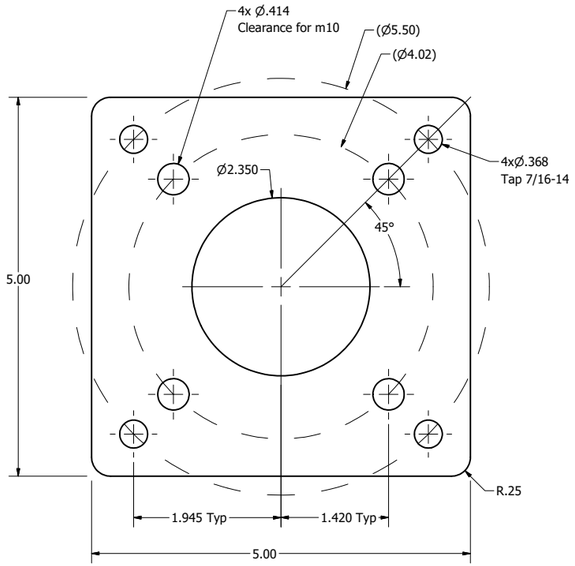
GRAND JUNCTION, COLORADO

MOTORIZED ACTUATOR DRIVE SHAFT

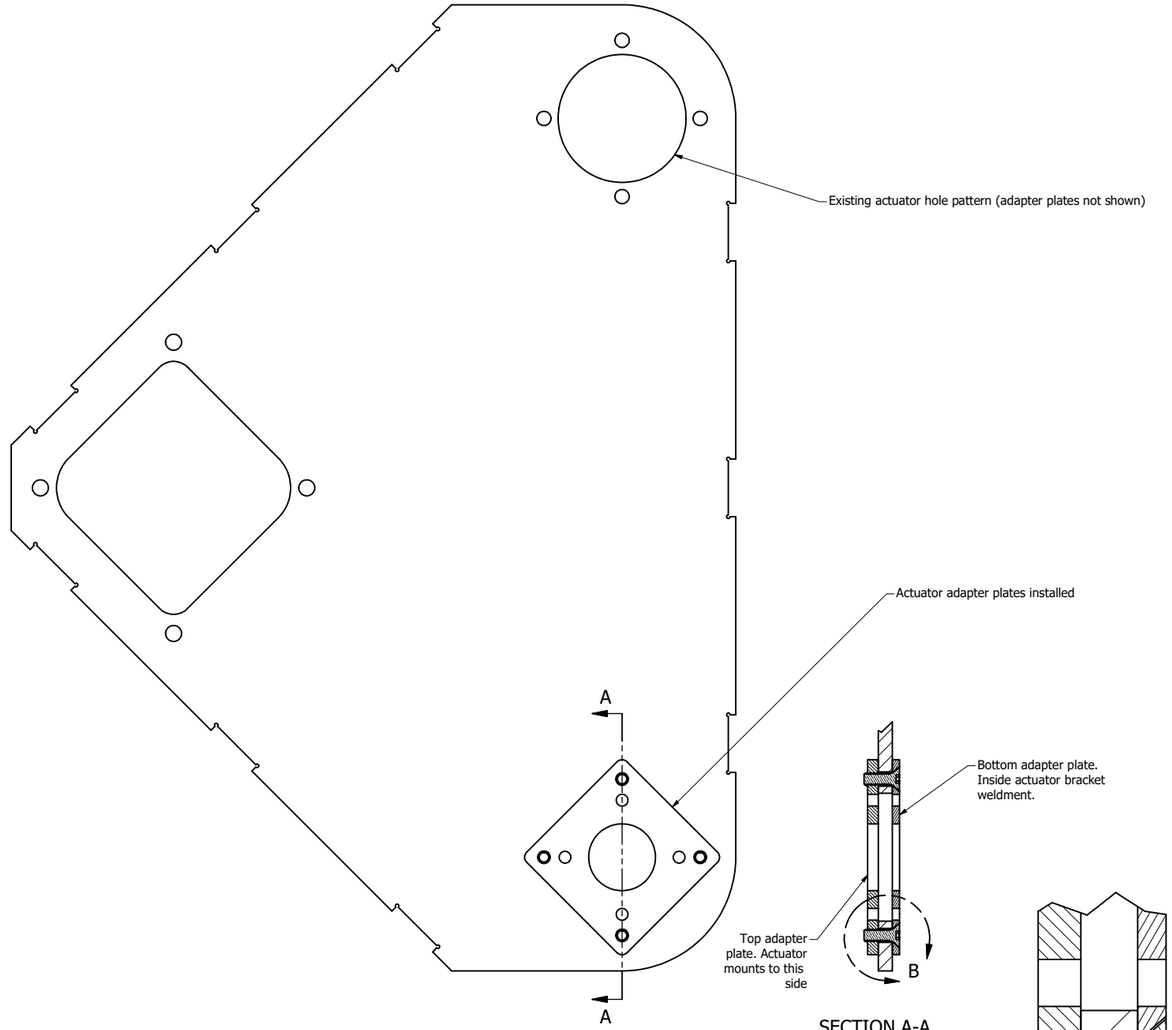
270-417-281

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

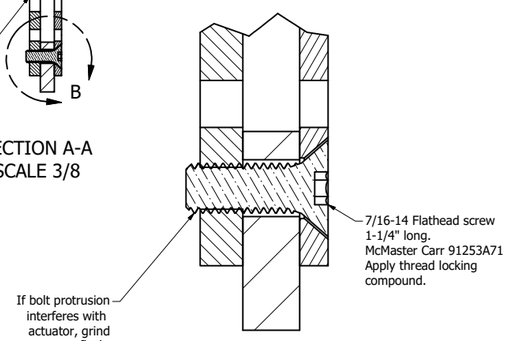
THIRD ANGLE PROJECTION



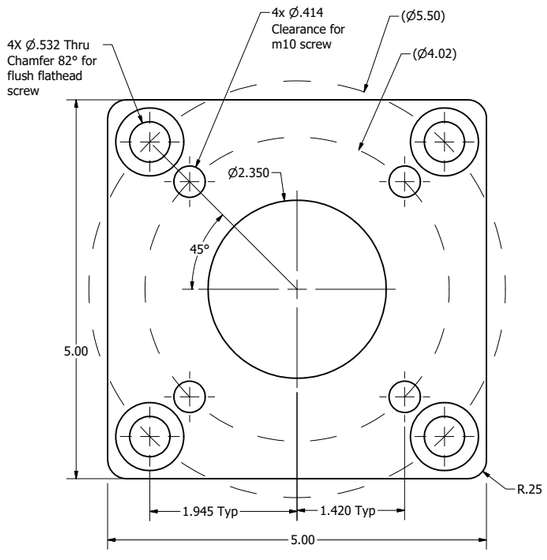
TOP ADAPTER PLATE QUANTITY 2
SCALE 1



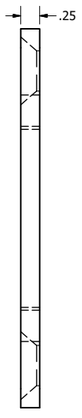
SECTION A-A
SCALE 3/8



DETAIL B
SCALE 1.5



BOTTOM ADAPTER PLATE QUANTITY 2
SCALE 1



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BUREAU OF RECLAMATION
FRUIT GROWERS DAM PROJECT
COLORADO

FRUIT GROWERS DAM

GATE UPGRADE

Matt Bryner
DESIGNED
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APPROVED

GRAND JUNCTION, COLORADO

ACTUATOR ADAPTER DETAILS

Added 1/23/24.

270-417-282

TOLERANCES (UNLESS NOTED OTHERWISE)
FRACTIONS ± 1/16
X.X± .06
X.XX ± .02
X.XXX± .01

THIRD ANGLE PROJECTION

ABBREVIATIONS

add'l = additional
bf = bottom face
bl = bottom layer
br = bottom row
CJ = Construction joint
℄ = Centerline
CL. = Centerline
clr. = clear
Cr.J = Contraction joint
Ct.J = Control joint
ctr. = center or centers
d_b = nominal diameter of reinforcing bar
Dwg. = Drawing
ec = each corner
ef = each face
EJ = Expansion joint
El. = Elevation
eq. = equal or equally
eq. spc. = equally spaced, equal spaces
er = each row
es = each side
ew = each way
ff = far face
fr = far row
fs = far side
HP = High point
if = inside face
ir = inside row
ℓ_d = development length
ℓ_{dh} = development length of standard hook
LP = Low point
ml = middle layer
mr = middle row
nf = near face
nr = near row
ns = near side
OCJ = Optional construction joint
of = outside face
or = outside row
spc. = spaced or spaces
Std. = Standard
tf = top face
tl = top layer
TOC = Top of concrete
tr = top row
TW = Tailwater
Typ. = Typical
uv = uniformly varying lengths of bars between lengths shown
VCJ = Vertical construction joint
WP = Working point
WS = Water surface, Waterstop

CONCRETE SYMBOLS

The different concrete placements are indicated by the following symbols:

Concrete - First stage
Concrete - Second stage
Concrete - Blockout
Concrete - Existing or in adjacent structures
Grout

NOTES TO DESIGNERS AND DETAILERS

1. Splice lengths shown in TABLES 3.0-60 thru 5.0-60 on 40-D-60004 are for Class B tension lap splices in accordance with ACI 318 and ACI 350. Assumed conditions for these tables in addition to the requirements shown on this drawing are uncoated reinforcement, normal weight concrete, and the transverse reinforcement index (K_{tr}) equal to zero. Splices or development lengths other than those shown in the tables must be detailed on the reinforcement specifications drawings.
2. Some factors which require additional consideration are: Beams or columns with ties, lightweight aggregate concrete, epoxy-coated reinforcement, excess reinforcement, bars in compression, bundled bars, and special seismic provisions.
3. The minimum centerline to centerline bar spacing requirements shown in TABLES 3.0-60 thru 5.0-60 on 40-D-60004 may not be applicable when using the provisions of ACI 350 Section 10.6 for distribution of flexural reinforcement to control flexural cracking.
4. Recalculation of lap splice lengths and development lengths by the designer may be required for changes in combinations of controlling variables per ACI 318 Section 25.4, or ACI 350 Section 12.2.
5. Lap splices and development lengths for horizontal bars in walls are designated as top bar splices and development lengths unless otherwise noted or detailed on the reinforcement specifications drawings.
6. Development lengths for deformed bars in tension terminating in a standard hook shall be calculated by the designer in accordance with ACI 318 Section 25.4.3.1 or ACI 350 Section 12.5. In cases where a restricted member thickness does not allow for the full development length of a standard hook, the designer shall use a reduced tensile capacity.

CONCRETE OUTLINE GENERAL NOTES

CHAMFER :
Chamfer edges of permanently exposed concrete surfaces, except slabs and top edges of curbs, with a 45° bevel, $\frac{3}{4}$" x $\frac{3}{4}$", unless otherwise shown on the specifications drawings.

CONCRETE PLACEMENT :
Before placing concrete, see specifications and manufacturer's drawings, for all embedded material which is required in the placement.

DIMENSIONS :
All dimensions to a joint are to the centerline of the joint unless otherwise shown.
Dimensions to beams, columns, and walls are from reference lines or other control points.
Beam and slab depths shall be measured from the top of the structural slab.
Dimensions given for the depth of recesses are from the surface of the structural concrete.
Thicknesses shown for walls and slabs placed against soil or rock are minimum dimensions.

EMBEDDED MATERIALS :
Before placing concrete, care shall be taken that all embedded items are in position and securely fastened in place. Anchor bolt locations and settings are shown on the structural steel, miscellaneous metal, concrete, and equipment drawings. Conduits and grounding cables are shown on the manufacturer's drawings and the electrical drawings. All projecting items, including waterstops, shall be supported and protected from damage and exposure.

FINISHES :
For location and classes of finishes for formed and unformed concrete surfaces, see the specifications drawings and/or paragraphs.

JOINTS :
All construction joints, identified as CJ, shall be provided where shown on the drawings. All optional construction joints, identified as OCJ, are to reduce the volume of placements or to facilitate construction. If optional joints are provided they shall be only at the locations shown. Relocation, addition, or elimination of construction joints will be subject to approval.

TOOLED EDGES :
Tool exposed edges of slabs and top edges of curbs to a radius of $\frac{1}{4}$", unless otherwise shown on the specifications drawings.

REINFORCEMENT GENERAL NOTES *(See Note 4)*

ACCESSORIES :
Bar supports, spacers, and other accessories are not shown on the design drawings. The recommendations of the ACI Detailing Manual-2004 (SP-66), or other approved supporting systems shall be used.

CODE AND DETAILING REFERENCES :
ACI Building Code Requirements for Structural Concrete (ACI 318-14).
ACI Detailing Manual-2004 (SP-66).
ACI Code Requirements for Environmental Engineering Concrete Structures (ACI 350-06).

COVER :
Place the reinforcement so that the clear distance between face of concrete and nearest reinforcement is 2" for #8 bars and smaller, and 3" for #9 bars thru #11 bars, unless otherwise shown on specifications drawings. Provide 3" clear distance from face of concrete for all bars when concrete exposure is cast against and permanently in contact with the ground. For corner bars cover, see ADDITIONAL REINFORCEMENT OPENINGS AND RECESSES, SECTION A-A on 40-D-60004. Clear distance is to the design dimension line.
Reinforcement parallel to construction joints shall have a minimum of 2" clear cover.

DIMENSIONS :
Dimensions are to the centerline of the bars except for embedment of hooks, which are dimensioned to the outside of the bar.
Clear cover dimensions are marked "clr." and are dimensioned to the outside of the bar.

PLACING :
Reinforcement at small openings (Max. 1'-6") in walls and slabs may be spread apart not more than 1.50 times the bar spacing.
Reinforcement shall be adjusted laterally to maintain a clear distance of at least 1" between the reinforcement and keys, waterstops, anchor bolts, form ties, conduits, and other embedded materials.
In heavily reinforced areas, relocation of the embedded material or cutting of reinforcement must be approved.
When bars are bent due to offsets less than 3" and recesses less than 3" deep, the slope of the inclined portion must not exceed 6 to 1.
Reinforcement parallel to anchor bolts or other embedded material shall be placed to maintain a clear distance of at least 1.33 times the maximum size aggregate.

PLAIN DOWELS :
Plain dowels across contraction joints shall be smooth bars uniformly coated with a film of oil before concrete placement.

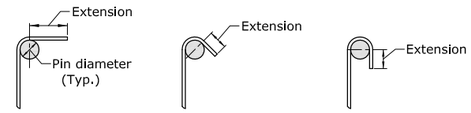
REINFORCEMENT DOWELS :
Unless otherwise shown, dowels indicated on the drawing, such as #8(d), shall be embedded a length equal to ℓ_d and shall have a projection equal to that required for lap splicing to a bar of the same diameter.

SPACING :
The first and last bars in walls and slabs, stirrups in beams, and ties in columns are to start and end at a maximum of one half of the adjacent bar spacing. The minimum edge spacing shall be $2.5d_b$. For #9 thru #11 bars where minimum centerline bar spacing is 6" and the lap splice lengths requiring staggered placement shown in TABLES 3.0-60 thru 5.0-60 on 40-D-60004 are used, the minimum edge spacing shall be 3".

SPLICES :
The minimum length of lap for splicing parallel bars in tension shall be as given in TABLES 3.0-60 thru 5.0-60 on 40-D-60004.
Staggered lap splices shall be separated to give 12 inches clear between ends of adjacent splices.
Bars spliced by noncontact lap splices shall not be spaced transversely farther apart than one-fifth the required lap splice length, nor 6" on centers.
When reinforcing bars of different size are to be spliced, splice length shall be the larger of ℓ_d of larger bar and tension lap splice length of smaller bar.
Splices are to be made so that the required clear distances to face of concrete will be maintained.

STANDARD HOOKS FOR DEVELOPMENT OF DEFORMED BARS IN TENSION :
90-degree bend plus $12d_b$ extension at free end of the bar.
180-degree bend plus $4d_b$ extension, but not less than $2\frac{1}{2}$", at the free end of the bar.

STANDARD HOOKS FOR STIRRUPS, TIES, AND HOOPS :
#5 bar and smaller, 90-degree bend plus $6d_b$ extension, but not less than 3", at the free end of the bar.
#6, #7, and #8 bars, 90-degree bend plus $12d_b$ extension at the free end of the bar.
#8 bars and smaller, 135-degree bend plus $6d_b$ extension, but not less than 3", at the free end of the bar.
#8 bars and smaller, 180-degree bend plus $4d_b$ extension, but not less than 2.5", at the free end of the bar.

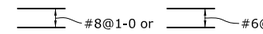


90-degree *135-degree* *180-degree*

TABLE OF PIN DIAMETERS (INCHES)

BAR NO.	3	4	5	6	7	8	9	10	11
Standard bends	$2\frac{1}{4}$	3	$3\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$	6	$9\frac{1}{2}$	$10\frac{3}{4}$	12
Stirrups, tie bends and hoops	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{4}$	6			

SYMBOLS :
Bars shown thus:



Indicate a group of the same size bars equally spaced.

An open circle at the end of a bar indicates a bend with the bar turned away from the observer.
A closed circle at the end of a bar indicates a bend with the bar turned towards the observer.

Splices shown thus ═══ indicate a lap splice, not a bend in the bar.

Mechanical splice
Headed deformed bar

NOTES

1. This drawing shall be used in conjunction with 40-D-60004.
2. For Minimum Requirements For Detailing Reinforcement, see 40-D-60004.
3. Unless otherwise shown on the concrete outline and/or reinforcement specifications drawings, the notes shown are minimum requirements and typical for all drawings that refer to this drawing.
4. Unless otherwise shown on the reinforcement specifications drawings or 40-D-60004, follow the recommendations established by the ACI Detailing Manual - 2004 (SP-66).
5. # Denotes reinforcement bar number.
6. Numerals in parentheses ( ) following notes, details, and section letters or numbers indicate the number of the drawing upon which the section or detail is indicated or shown. For example (60524) denotes drawing XXX-D-60524. The letters XXX shown here will be numbers denoting the project.

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STANDARD AND TYPICAL DESIGNS

CONCRETE OUTLINE AND REINFORCEMENT

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DENVER, CO 2016-09-23

GENERAL NOTES FOR CONCRETE OUTLINE AND REINFORCEMENT

40-D-60003

SHEET 1 OF 2

DATE AND TIME PLOTTED
SEPTEMBER 23, 2016 07:26
PLOTTED BY
RRODRIGUEZ

CAD SYSTEM
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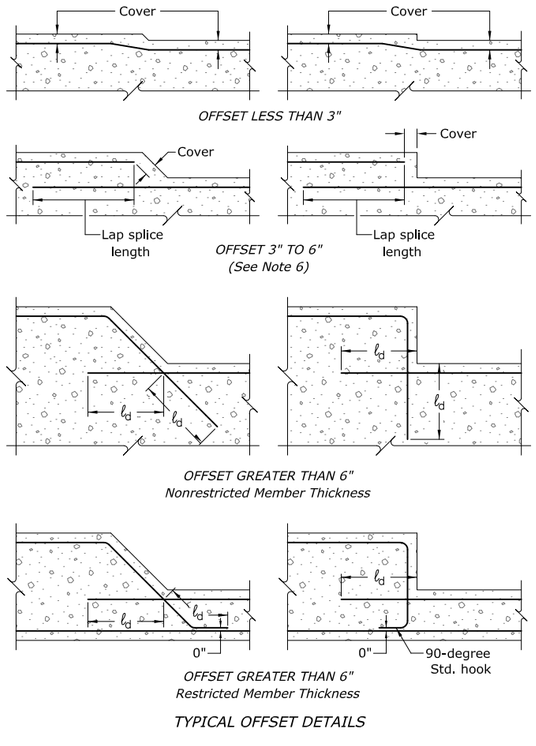
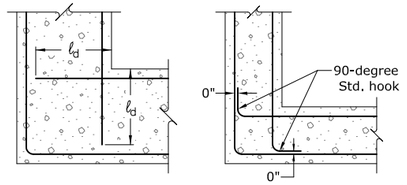
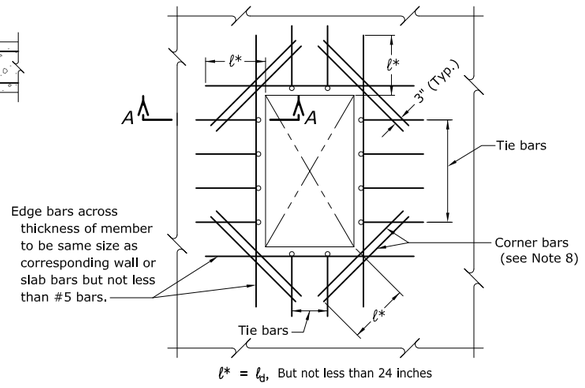
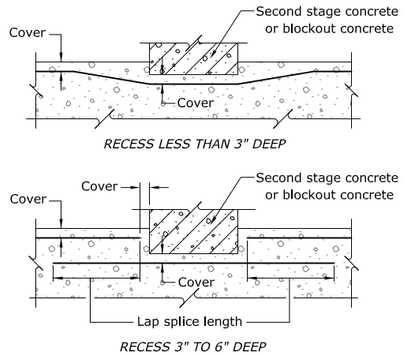


TYPICAL OFFSET DETAILS



TYPICAL CORNER DETAILS





TYPICAL BLOCKOUT RECESS DETAILS
(Second stage concrete shown)

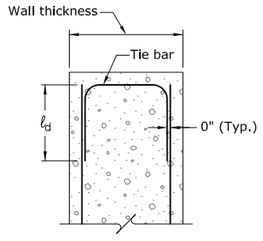
OPENINGS :
TABLE FOR ADDITIONAL REINFORCEMENT

MEMBER THICKNESS	TIE BARS	EDGE BARS	CORNER BARS
Less than 9"	None	1 - ctr.	2 - #4 ctr.
9" thru 1'-5"	None	2 - (1 ef)	4 - #4 (2 ef)
1'-6" thru 3'-0"	#4@1'-0"	3 - eq. spc.	4 - #4 (2 ef)
Over 3'-0"	#6@1'-0"	Spc. @ 1'-0"	4 - #4 (2 ef)

Omit edge and tie bars along sides of openings where opening dimension is less than 1'-6".
Omit corner bars at sides of openings adjacent to floors, walls, or beams.
Omit corner bars if both dimensions of opening are less than 1'-6".

RECESSES :
Use corner bars in face of recesses deeper than 4" if either dimension of recess is equal to or greater than 1'-6".

ADDITIONAL REINFORCEMENT AROUND OPENINGS AND RECESSES



TYPICAL TOP OF WALL DETAIL

For wall thickness less than 1'-6", tie bars not required.
For wall thickness 1'-6" and larger, tie bars to be #6@1'-0" unless otherwise shown on reinforcement specifications drawings.

f'c = 3,000 psi *TABLE 3.0-60* *fy = 60,000 psi*

Bar size No. *** IP (SM)	MINIMUM ℄ to ℄ BAR SPACING (INCHES)	LAP SPLICE LENGTH (INCHES)		DEVELOPMENT LENGTH ℓ_d (INCHES)	
		TOP BARS *	OTHER BARS	TOP BARS *	OTHER BARS
3 (10)	3	17	13	13	12
4 (13)	3	23	18	18	14
5 (16)	3.5	28	22	22	17
6 (19)	4	34	26	26	20
7 (22)	4.5	49	38	38	29
8 (25)	5	56	43	43	33
9 (29)	6	63	49	49	38
10 (32)	6.5	71	55	55	42
11 (36)	7.5	79	61	61	47
10 (32)	6	75**	58**	58	45
11 (36)	6	93**	71**	71	55

f'c = 4,000 psi *TABLE 4.0-60* *fy = 60,000 psi*

Bar size No. *** IP (SM)	MINIMUM ℄ to ℄ BAR SPACING (INCHES)	LAP SPLICE LENGTH (INCHES)		DEVELOPMENT LENGTH ℓ_d (INCHES)	
		TOP BARS *	OTHER BARS	TOP BARS *	OTHER BARS
3 (10)	3	15	12	12	12
4 (13)	3	20	15	15	12
5 (16)	3.5	25	19	19	15
6 (19)	4	29	23	23	18
7 (22)	4.5	43	33	33	25
8 (25)	5	49	37	37	29
9 (29)	6	55	42	42	33
10 (32)	6.5	62	47	47	37
11 (36)	7.5	68	53	53	41
10 (32)	6	65**	50**	50	39
11 (36)	6	80**	62**	62	48

f'c = 3,500 psi *TABLE 3.5-60* *fy = 60,000 psi*

Bar size No. *** IP (SM)	MINIMUM ℄ to ℄ BAR SPACING (INCHES)	LAP SPLICE LENGTH (INCHES)		DEVELOPMENT LENGTH ℓ_d (INCHES)	
		TOP BARS *	OTHER BARS	TOP BARS *	OTHER BARS
3 (10)	3	16	12	12	12
4 (13)	3	21	16	16	13
5 (16)	3.5	26	20	20	16
6 (19)	4	31	24	24	19
7 (22)	4.5	45	35	35	27
8 (25)	5	52	40	40	31
9 (29)	6	59	45	45	35
10 (32)	6.5	66	51	51	39
11 (36)	7.5	73	56	56	43
10 (32)	6	70**	54**	54	41
11 (36)	6	86**	66**	66	51

f'c = 4,500 psi *TABLE 4.5-60* *fy = 60,000 psi*

Bar size No. *** IP (SM)	MINIMUM ℄ to ℄ BAR SPACING (INCHES)	LAP SPLICE LENGTH (INCHES)		DEVELOPMENT LENGTH ℓ_d (INCHES)	
		TOP BARS *	OTHER BARS	TOP BARS *	OTHER BARS
3 (10)	3	14	12	12	12
4 (13)	3	19	14	14	12
5 (16)	3.5	23	18	18	14
6 (19)	4	28	21	21	17
7 (22)	4.5	40	31	31	24
8 (25)	5	46	35	35	27
9 (29)	6	52	40	40	31
10 (32)	6.5	58	45	45	35
11 (36)	7.5	64	50	50	38
10 (32)	6	61**	47**	47	37
11 (36)	6	76**	58**	58	45

f'c = 5,000 psi *TABLE 5.0-60* *fy = 60,000 psi*

Bar size No. *** IP (SM)	MINIMUM ℄ to ℄ BAR SPACING (INCHES)	LAP SPLICE LENGTH (INCHES)		DEVELOPMENT LENGTH ℓ_d (INCHES)	
		TOP BARS *	OTHER BARS	TOP BARS *	OTHER BARS
3 (10)	3	13	12	12	12
4 (13)	3	18	14	14	12
5 (16)	3.5	22	17	17	13
6 (19)	4	26	20	20	16
7 (22)	4.5	38	29	29	23
8 (25)	5	44	34	34	26
9 (29)	6	49	38	38	29
10 (32)	6.5	55	43	43	33
11 (36)	7.5	61	47	47	36
10 (32)	6	58**	45**	45	35
11 (36)	6	72**	55**	55	43

* Top bars are defined as horizontal reinforcement with a casting position of more than 12 inches of fresh concrete placed below the bar (see NOTES TO DESIGNERS AND DETAILERS, Note 5 on 40-D-60003).
** Splices must be staggered.
*** IP = Inch-pound bar size designation.
SM = Soft metric bar size designation.

NOTES

1. This drawing shall be used in conjunction with 40-D-60003.
2. For Concrete Outline General Notes and Reinforcement General Notes, see 40-D-60003.
3. For ABBREVIATIONS and CONCRETE SYMBOLS, see 40-D-60003.
4. For NOTES TO DESIGNERS AND DETAILERS, see 40-D-60003.
5. Unless otherwise shown on the reinforcement specifications drawings, the details shown are minimum requirements and typical for all reinforcement drawings that refer to this drawing.
6. This detail may not be appropriate for tension areas of shallow structural members. If in doubt, use detail for recess greater than 6".
7. TABLES 3.0-60 thru 5.0-60 generated using ACI 318 Eq. 25.4.2.3a and ACI 350 Eq. 12-1.
8. Development of diagonal corner bars in close proximity to another opening, wall or slab, will require bends or hooks.

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PEER REVIEWER - Plant Structures Group

DENVER, CO 2016-09-23

MINIMUM REQUIRMENTS FOR DETAILING REINFORCEMENT

40-D-60004

SHEET 2 OF 2

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