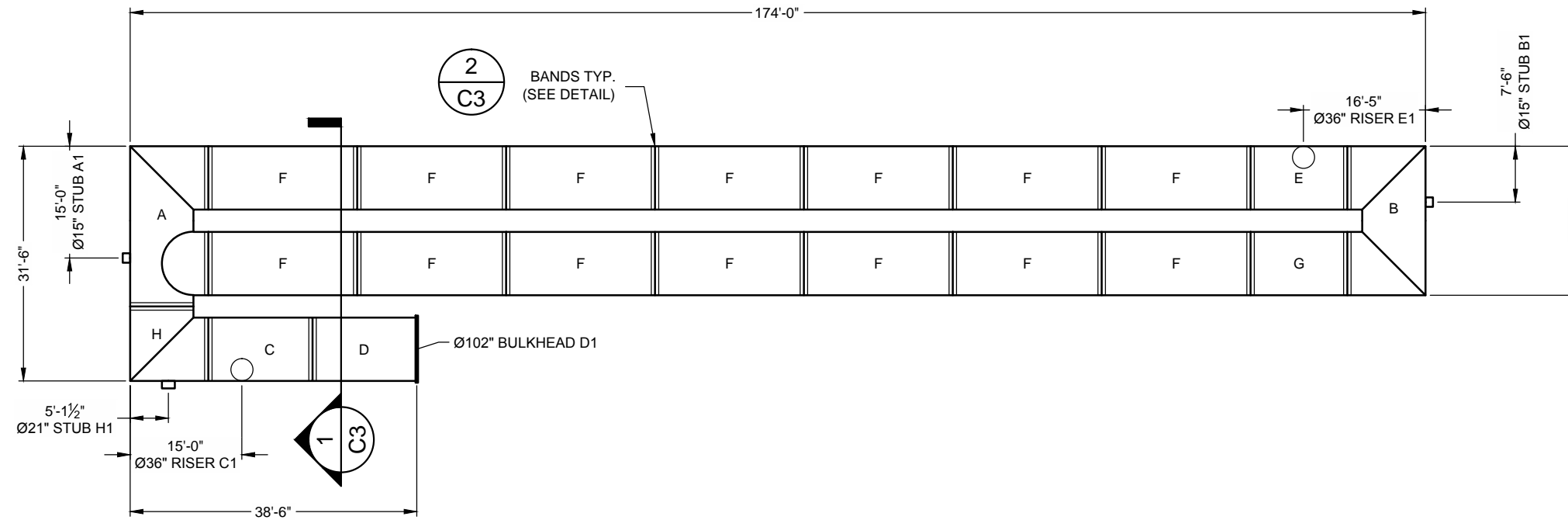


RISER INFORMATION		
PIECE	RIM ELEV.	SYSTEM INVERT
Ø36" RISER C1	483.50	471.00
Ø36" RISER E1	484.00	471.00

STUB INFORMATION		
PIECE	STUB INVERT	SYSTEM INVERT
Ø21" STUB A1	475.00	471.00
Ø15" STUB H1	471.00	471.00
Ø15" STUB B1	471.10	471.00



THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (8) PAGES INCLUDING THE FOLLOWING:

- VOLUME = 23,124 CF
- MAINLINE PIPE GAUGE = 14
- WALL TYPE = SOLID
- DIAMETER = 102"
- FINISH = ALT2
- CORRUGATION = 5X1

\_\_\_\_\_  
CUSTOMER

\_\_\_\_\_  
DATE

**ASSEMBLY**  
SCALE: 1" = 20'  
VOLUME: 23,124 CF  
LOADING: H20/H25  
SYSTEM INV = 471.0'

AS-BUILT

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*Maria L. Bouilla*  
WINKELMANN AND ASSOCIATES, INC.      10-19-2016  
DATE

**NOTES**

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE.
- ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2 2/3" x 1/2" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.

I:\02\CONTECH\CPI\COM\ROOT\MERLIN\PROJECT\ACTIVE\518660\518660-10-CMP\_DETENTION\DRAWINGS\CONTRACT\PRE 518660-010-CMP-CON.DWG 12/18/2015 3:02 PM

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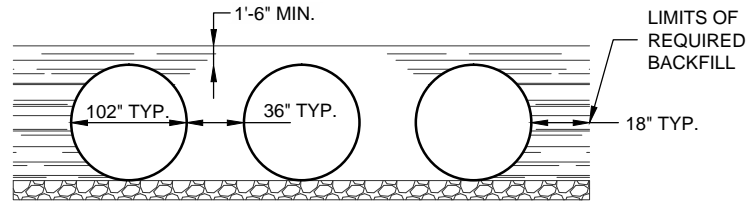
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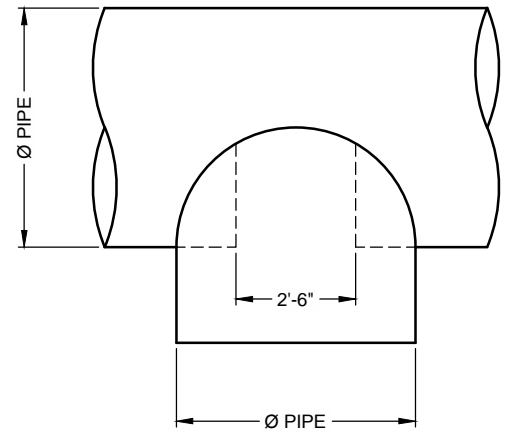
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CONTECH  
CONTRACT  
DRAWING

Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
KROGER SW574 - ROCKWALL, TX  
ROCKWALL, TX  
SITE DESIGNATION: EAST

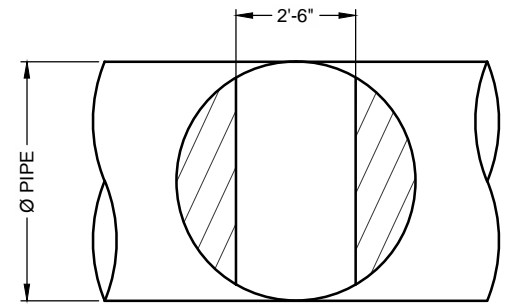
PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
SHEET NO.: C1 OF 8		



**TYPICAL SECTION VIEW**  
SCALE: N.T.S.



**PLAN**

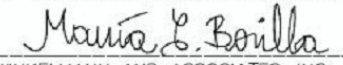


**FRONT**  
**TYPICAL MANWAY DETAIL**  
SCALE: N.T.S.

FABRICATION BoM									
FITTING	TYPE	QTY	Ø	CORRUGATION	GAUGE	FINISH	WALL TYPE	LENGTH	TOTAL
A	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23.5	23.5
A - TEE	TEE	1	102	5X1	14	ALT2	SOLID	6.25	6.25
A1	STUB	1	15	2 2/3X1/2	16	ALT2	SOLID	1.17	1.17
B	MANIFOLD - 2 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	24	24
B1	STUB	1	15	2 2/3X1/2	16	ALT2	SOLID	3.25	3.25
C	PIPE	1	102	5X1	14	ALT2	SOLID	14	14
C1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	8.25	8.25
C1A	LADDER	1		16		GALV			
D	PIPE	1	102	5X1	14	ALT2	SOLID	14	14
D1	BULKHEAD	1	102		12	ALT2	SOLID		
E	PIPE	1	102	5X1	14	ALT2	SOLID	13	13
E1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	8.75	8.75
E1A	LADDER	1		16		GALV			
F	PIPE	14	102	5X1	14	ALT2	SOLID	20	280
G	PIPE	1	102	5X1	14	ALT2	SOLID	13	13
H	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	12	12
H1	STUB	1	21	2 2/3X1/2	16	ALT2	SOLID	4.5	4.5
BAND	12 HUGGER	21	102	W/7" TECHCO WD	18	ALT2			
GASKETS	FLAT	21	102	12" WIDE					

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 WINKELMANN AND ASSOCIATES, INC.

10-19-2016  
 DATE

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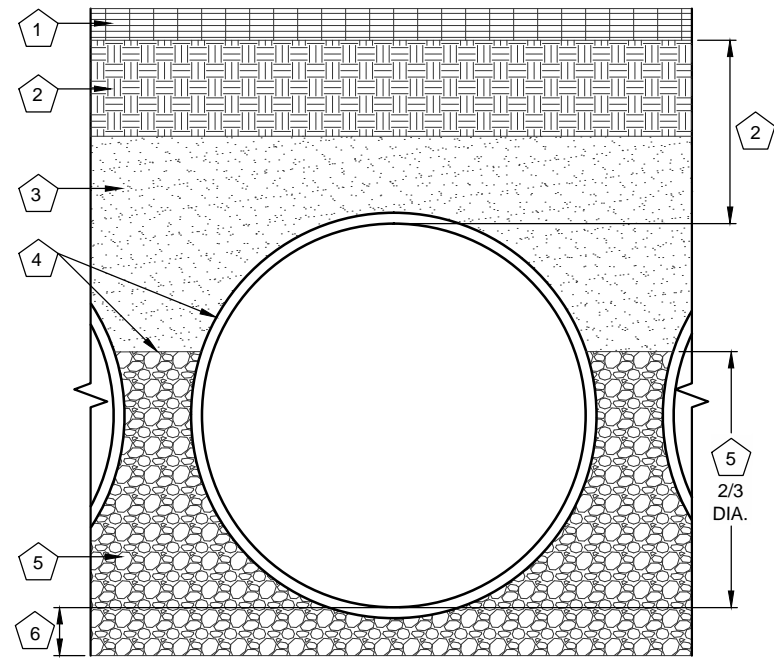
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 CONTRACT  
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Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
 KROGER SW574 - ROCKWALL, TX  
 ROCKWALL, TX  
 SITE DESIGNATION: EAST

PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
SHEET NO.: C2 OF 8		



1. RIGID OR FLEXIBLE PAVEMENT.
2. NORMAL ROADWAY EMBANKMENT FILL PLACED IN 8" LIFTS AND COMPACTED TO MIN. 90% STANDARD DENSITY PER AASHTO T-99.
3. SELECT BACKFILL TO 12" ABOVE PIPE.
4. CONTECH C40 NON-WOVEN GEOTEXTILE (RECOMMENDED, NOT PROVIDED BY CONTECH) TO PREVENT SOIL MIGRATION. SEE NOTES BELOW.
5. WELL GRADED CRUSHED STONE.
6. 6" WELL GRADED CRUSHED STONE BEDDING BELOW PIPE. (\*SEE NOTE BELOW ABOUT GEOTECHNICAL INSPECTIONS.)

**FOUNDATION/BEDDING PREPARATION**

PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE 6 INCHES OF A WELL-GRADED GRANULAR MATERIAL SHALL BE PLACED AS THE BEDDING.

\*GENERAL CONTRACTOR MUST PROVIDE CIVIL ENGINEER AND OWNER WITH GEOTECHNICAL INSPECTION REPORT FOR REVIEW AND ACCEPTANCE PRIOR TO PLACING THE BEDDING AND BACKFILL.

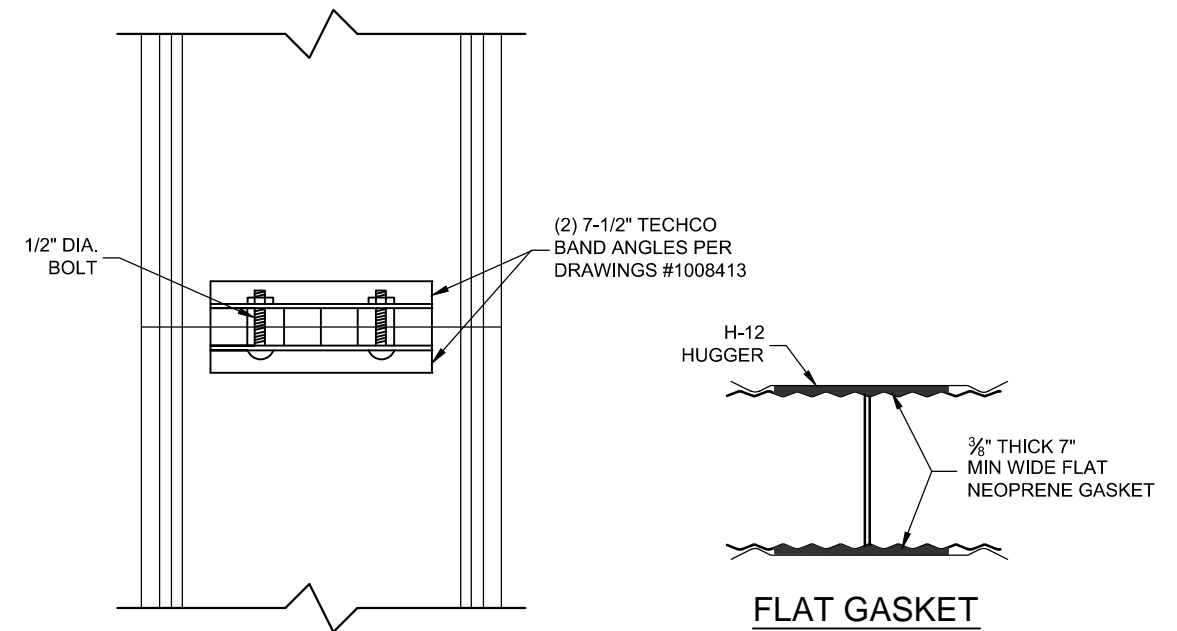
**BACKFILL**

THE SELECT BACKFILL SHALL BE AN A1, A2 OR A3 GRANULAR FILL PER AASHTO M-145 OR A WELL-GRADED GRANULAR FILL AS APPROVED BY THE ENGINEER (SEE INSTALLATION GUIDELINES). THE MATERIAL SHALL BE PLACED IN 8-INCH LOOSE LIFTS AND COMPACTED TO 90% AASHTO T99 STANDARD PROCTOR DENSITY. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

IF SOIL MIGRATION IS NOT A CONCERN, THEN GEOTEXTILE FABRIC WILL NOT BE REQUIRED.

**1 BACKFILL DETAIL (NON-PERFORATED)**  
**F2 SCALE: N.T.S.**



**CONNECTION DETAIL  
 SINGLE  
 7-1/2" TECHCO ANGLE**

**GENERAL NOTES**

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:  
 12" THRU 48" 1-PIECE  
 54" THRU 96" 2-PIECE  
 102" THRU 144" 3-PIECES
2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS
3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2 2/3" x 1/2". DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES

**2 H-12 HUGGER BAND DETAIL**  
**C3 SCALE: N.T.S.**

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*Maria L. Boilla* 10-19-2016  
 WINKELMANN AND ASSOCIATES, INC. DATE

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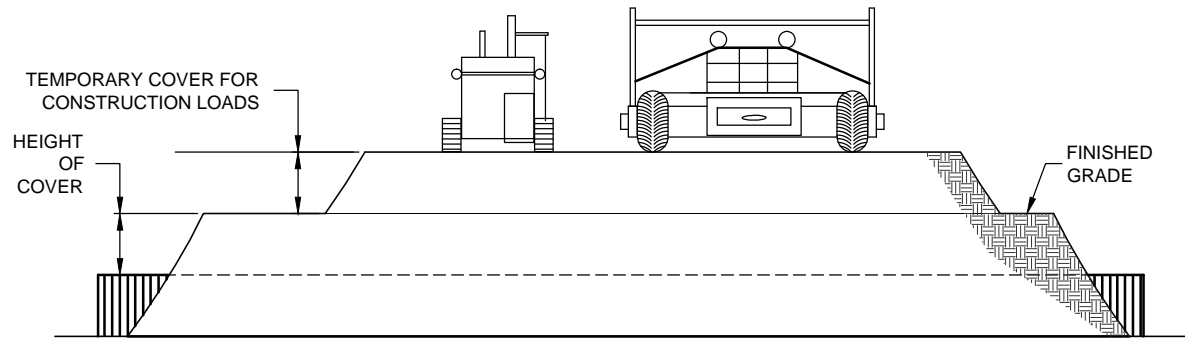
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CONTECH  
 CONTRACT  
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Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
 KROGER SW574 - ROCKWALL, TX  
 ROCKWALL, TX  
 SITE DESIGNATION: EAST

PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
SHEET NO.: <b>C3</b> OF <b>8</b>		

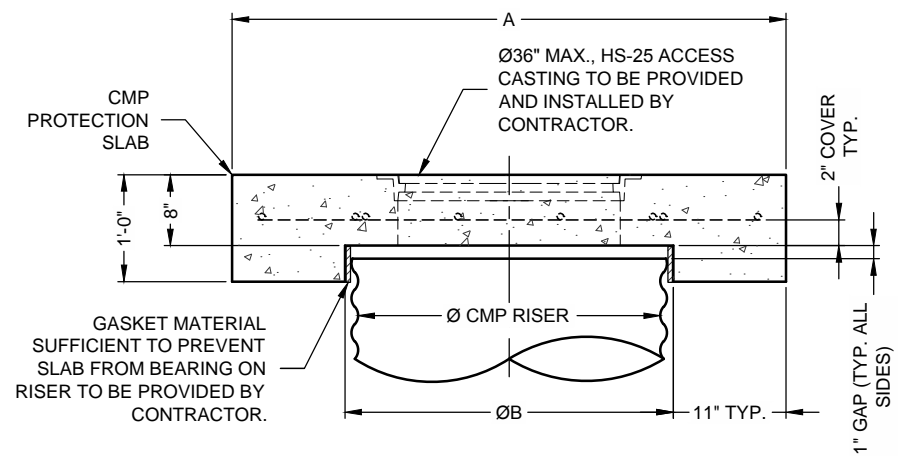


**CONSTRUCTION LOADS**

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

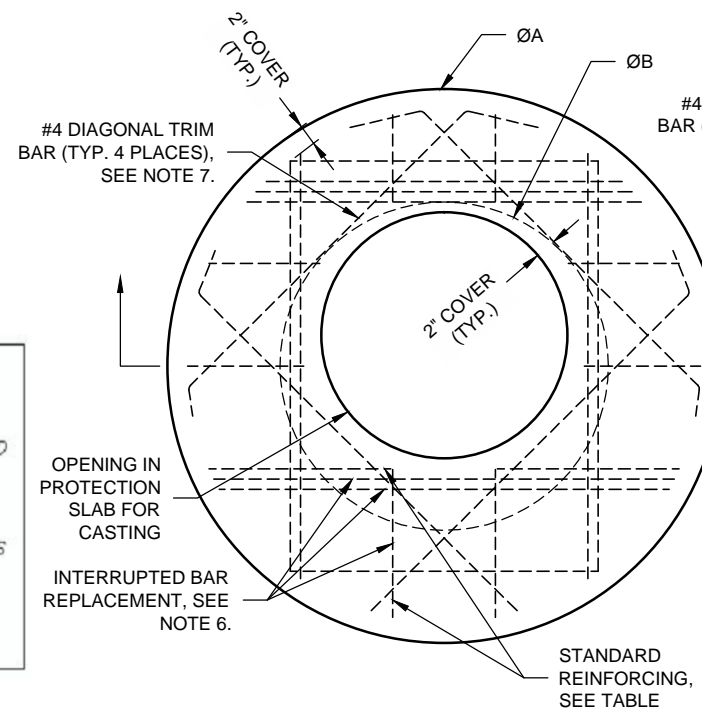
\*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.



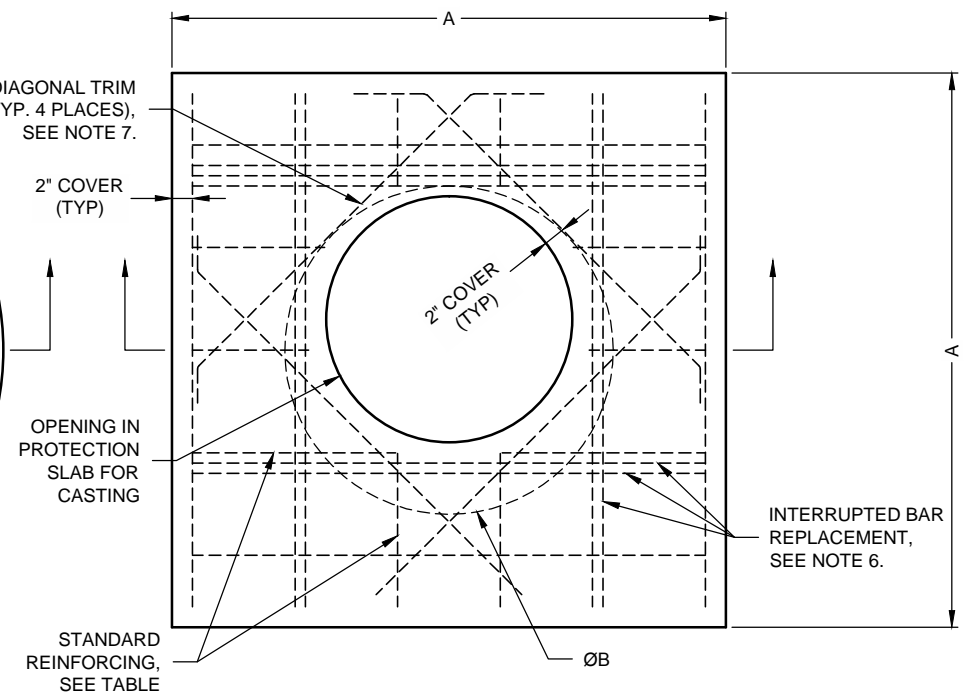
**SECTION VIEW**

Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 4' 4'x4'	26"	#5 @ 10" OCEW #5 @ 10" OCEW	2,540 1,900
30"	Ø 4'-6" 4'-6" x 4'-6"	32"	#5 @ 10" OCEW #5 @ 9" OCEW	2,260 1,670
36"	Ø 5' 5' x 5'	38"	#5 @ 9" OCEW #5 @ 8" OCEW	2,060 1,500
42"	Ø 5'-6" 5'-6" x 5'-6"	44"	#5 @ 8" OCEW #5 @ 8" OCEW	1,490 1,370
48"	Ø 6' 6' x 6'	50"	#5 @ 7" OCEW #5 @ 7" OCEW	1,210 1,270

\*\* ASSUMED SOIL BEARING CAPACITY



**ROUND OPTION PLAN VIEW**



**SQUARE OPTION PLAN VIEW**

**NOTES:**

- DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION AND ACI 350.
- DESIGN LOAD HS25.
- EARTH COVER = 1' MAX.
- CONCRETE STRENGTH = 4,000 psi
- REINFORCING STEEL = ASTM A615, GRADE 60.
- PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
- TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
- PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- DETAIL DESIGN BY DELTA ENGINEERS, ARCHITECTS AND LAND SURVEYORS, ENDWELL, NY.

**3 CONSTRUCTION L**  
**C4 SCALE: N.T.S.**

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*Maria L. Boilla*  
WINKELMANN AND ASSOCIATES, INC. 10-19-2016 DATE

**SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL**

**SCOPE**

THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

**MATERIAL**

THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

**PIPE**

THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

**HANDLING AND ASSEMBLY**

SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSIPA)

**INSTALLATION**

SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

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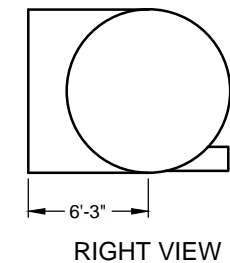
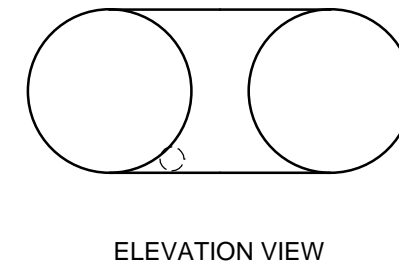
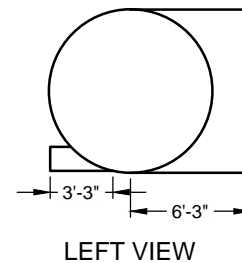
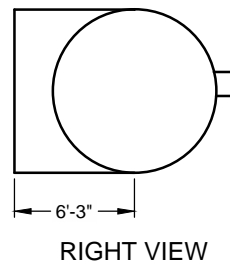
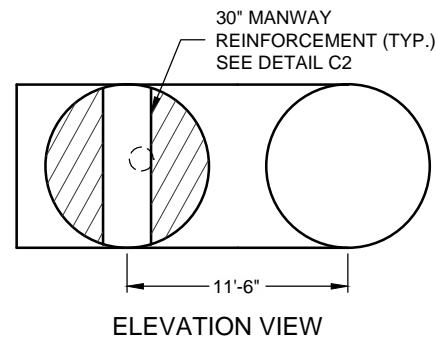
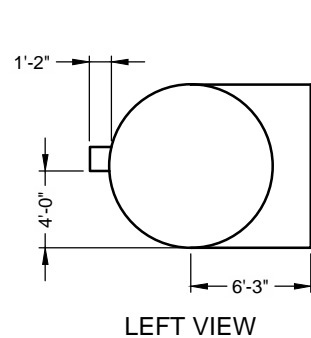
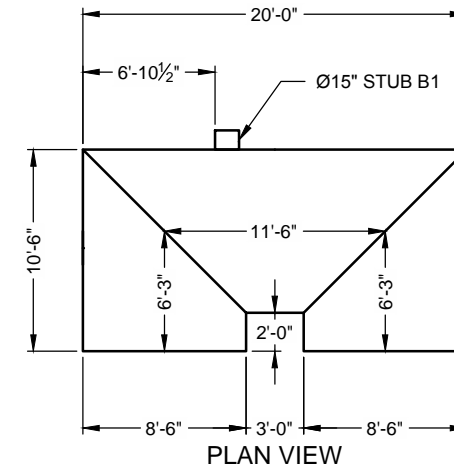
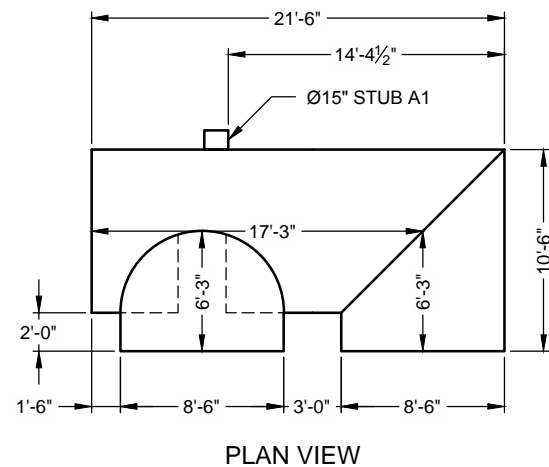
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ROCKWALL, TX  
SITE DESIGNATION: EAST

PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
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CHECKED:	APPROVED:	
SHEET NO.: C4 OF 8		



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**PART A**  
SCALE: 1"=10'

**PART B**  
SCALE: 1"=10'

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*Maurice L. Boilla* 10-19-2016  
WINKELMANN AND ASSOCIATES, INC. DATE

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Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
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ROCKWALL, TX  
SITE DESIGNATION: EAST

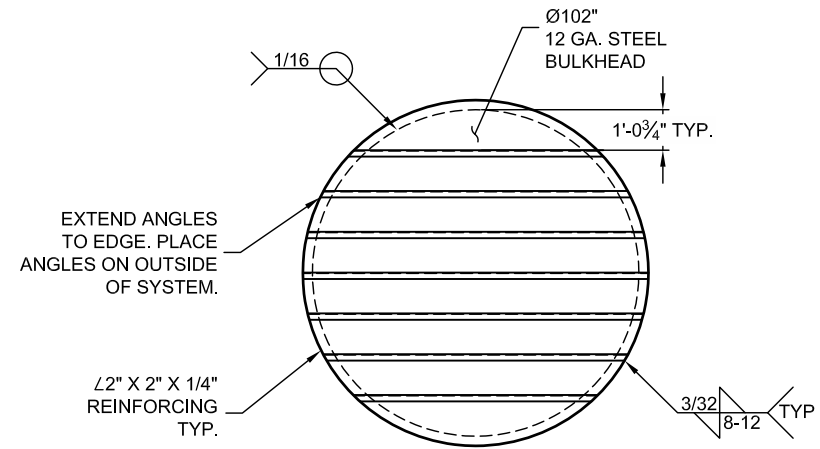
PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
SHEET NO.: F1 OF 8		

AS-BUILT

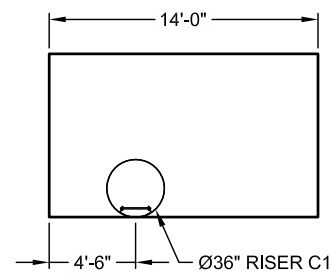
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*Maria L. Boilla*  
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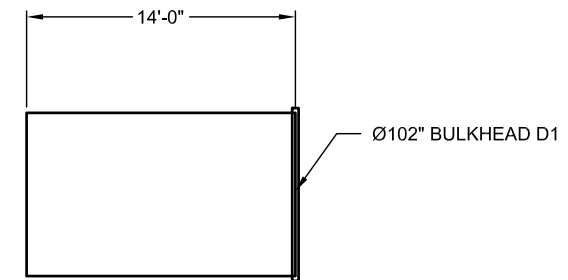
10-19-2016  
DATE



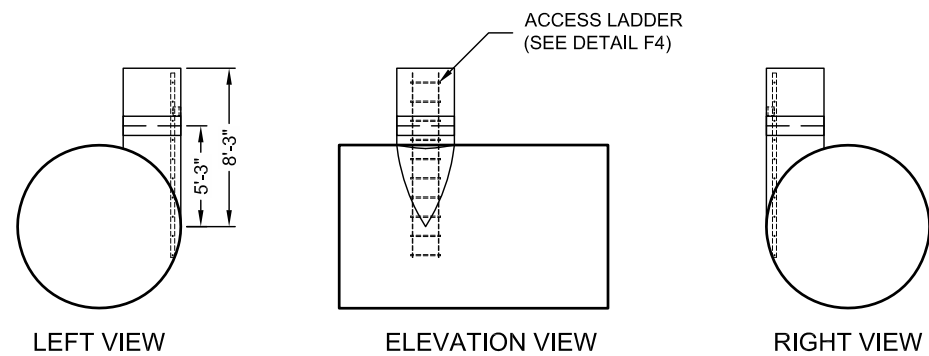
**BULKHEAD (D1)  
REINFORCEMENT DETAIL**



**PLAN VIEW**



**PLAN VIEW**



**PART C  
SCALE: 1"=10'**



**PART D  
SCALE: 1"=10'**

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INTENDED FOR PLANT USE

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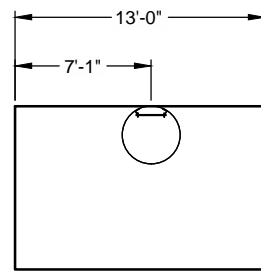
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DRAWING

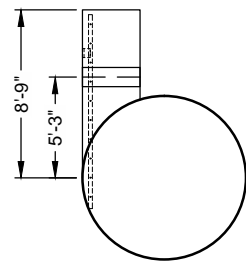
Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
KROGER SW574 - ROCKWALL, TX  
ROCKWALL, TX  
SITE DESIGNATION: EAST

PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
SHEET NO.: F2 OF 8		

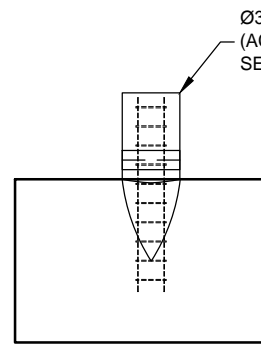
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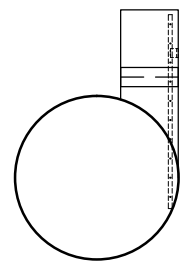
PLAN VIEW



LEFT VIEW

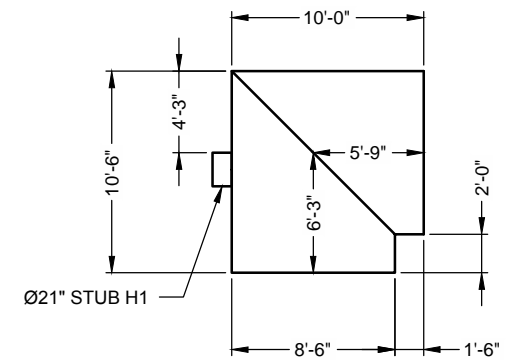


ELEVATION VIEW

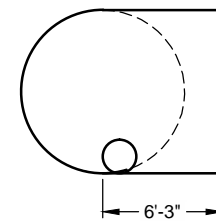


RIGHT VIEW

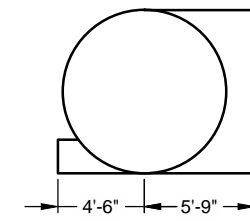
**PART E**  
SCALE: 1"=10'



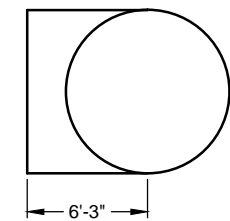
PLAN VIEW



LEFT VIEW



ELEVATION VIEW



RIGHT VIEW

**PART H**  
SCALE: 1"=10'

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*Maria L. Boilla*      10-19-2016  
WINKELMANN AND ASSOCIATES, INC.      DATE

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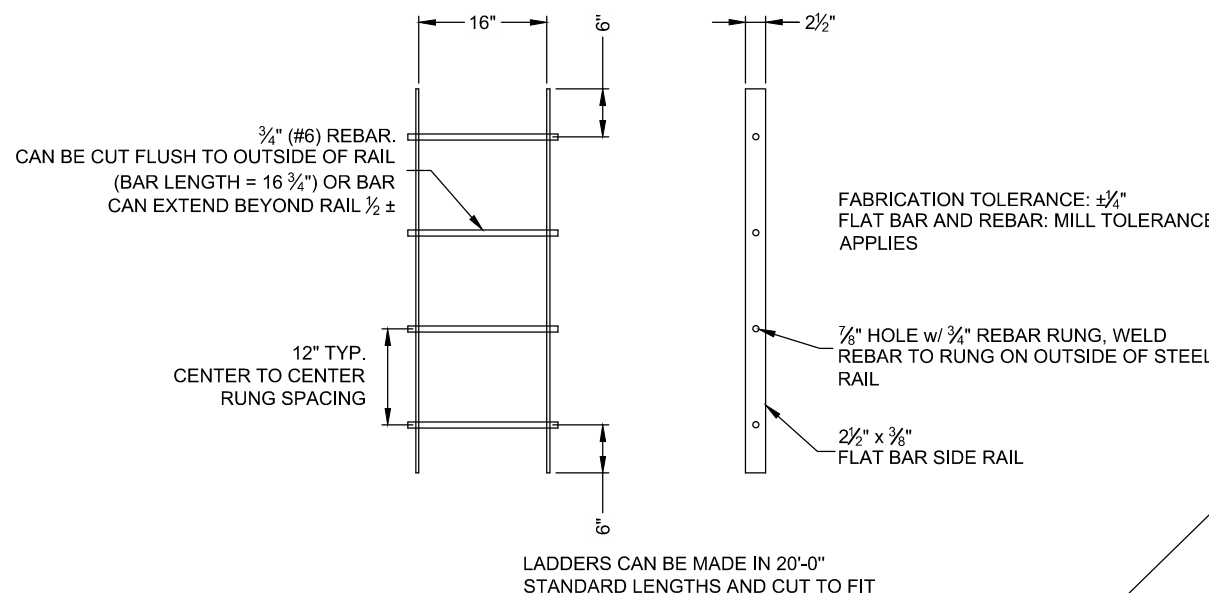
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Ø102" UNDERGROUND DETENTION SYSTEM - 518660-010  
KROGER SW574 - ROCKWALL, TX  
ROCKWALL, TX  
SITE DESIGNATION: EAST

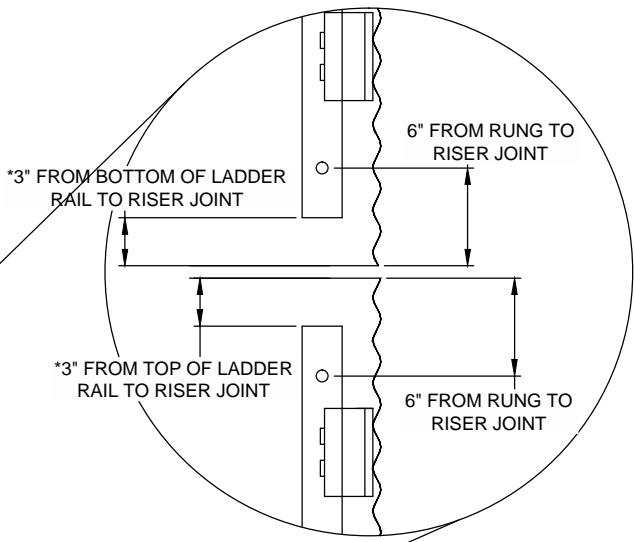
PROJECT No.: 518660	SEQ. No.: 010	DATE: 12/17/2015
DESIGNED: SDS	DRAWN: ASB	
CHECKED:	APPROVED:	
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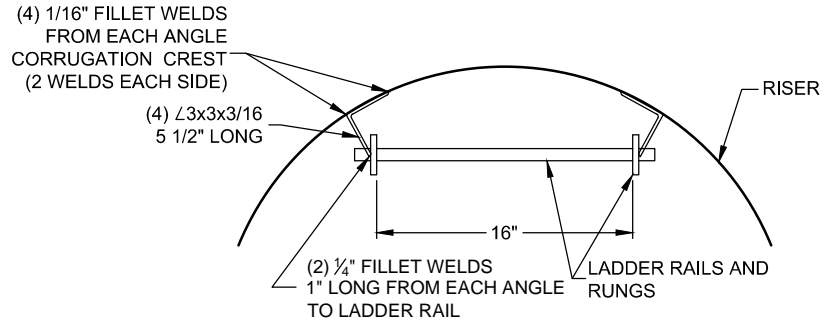


**STANDARD LADDER DETAIL**  
SCALE: N.T.S.

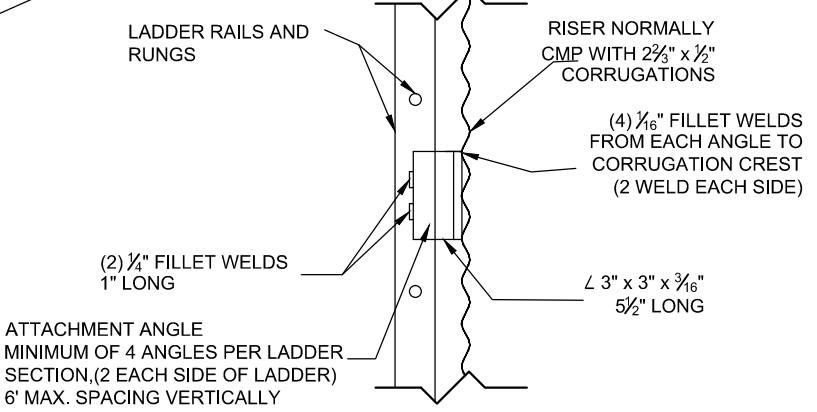
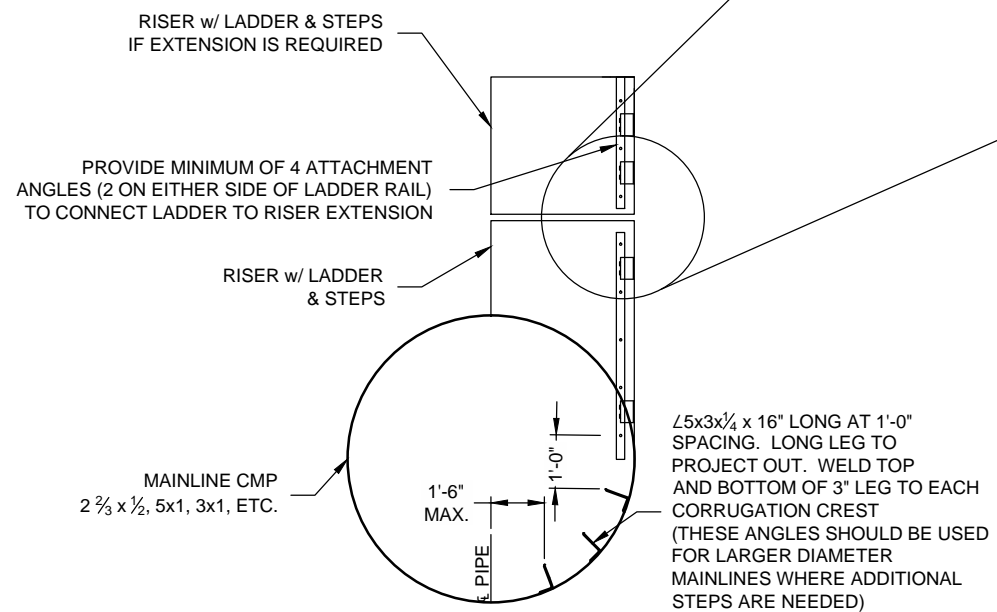
\*NOTE: WHEN RISER EXTENSIONS ARE USED, THE PLANT SHOULD CUT 3" FROM THE SIDE RAILS AS SHOWN



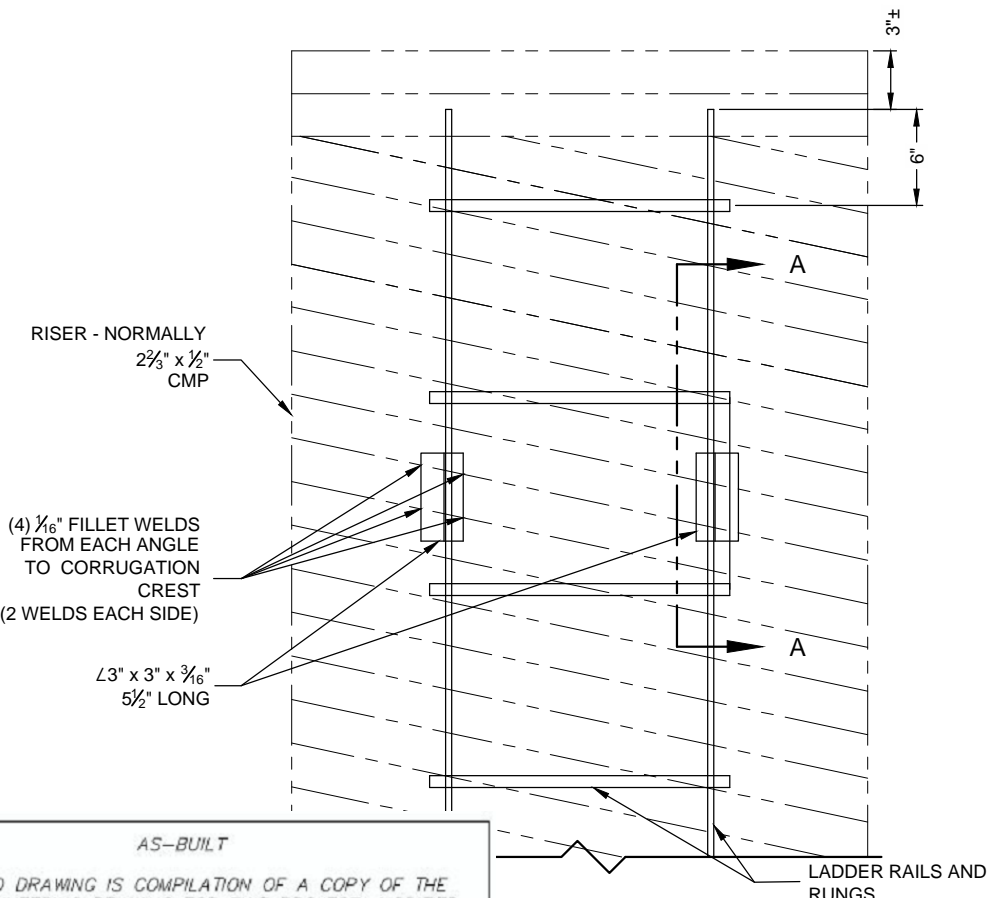
**SECTION A-A**



**PLAN**



**SECTION A-A**



**ELEVATION**

**NOTE:**  
THIS DRAWING IS INTENDED TO APPLY TO LADDERS INSTALLED IN RISERS HAVING A DIAMETER OF 30" OR LARGER. DUE TO SPACE CONSTRAINTS AND LIMITED ACCESSIBILITY, THE PRACTICALLY AND SUITABILITY OF UTILIZING RISERS SMALLER THAN 30" DIAMETER AND/OR INCORPORATING LADDERS IN THESE SMALLER DIAMETER RISERS SHOULD BE ADDRESSED BY THE OWNER AND PROJECT ENGINEER.

**5 RISER LADDER DETAIL**  
**F4** SCALE: N.T.S.

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SITE DESIGNATION: EAST

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