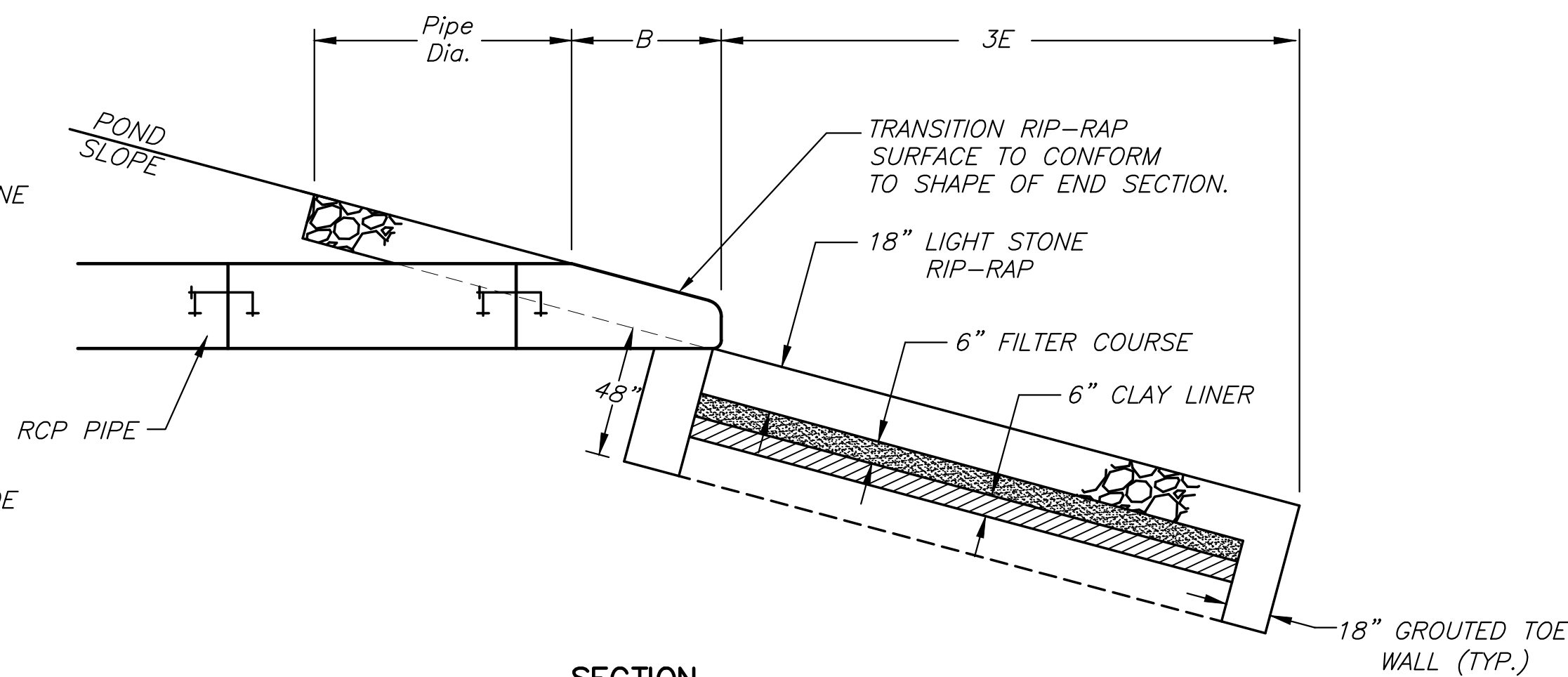
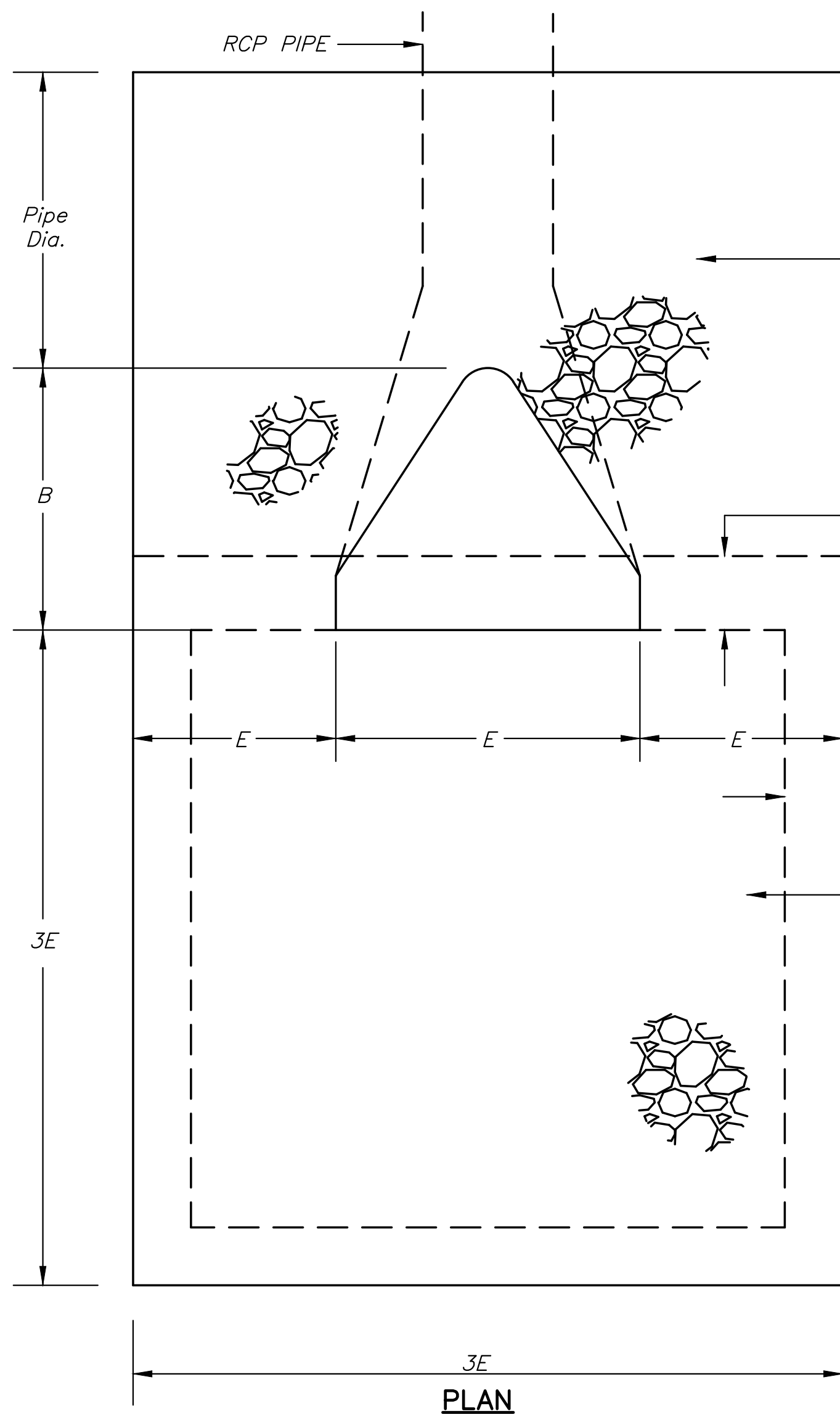
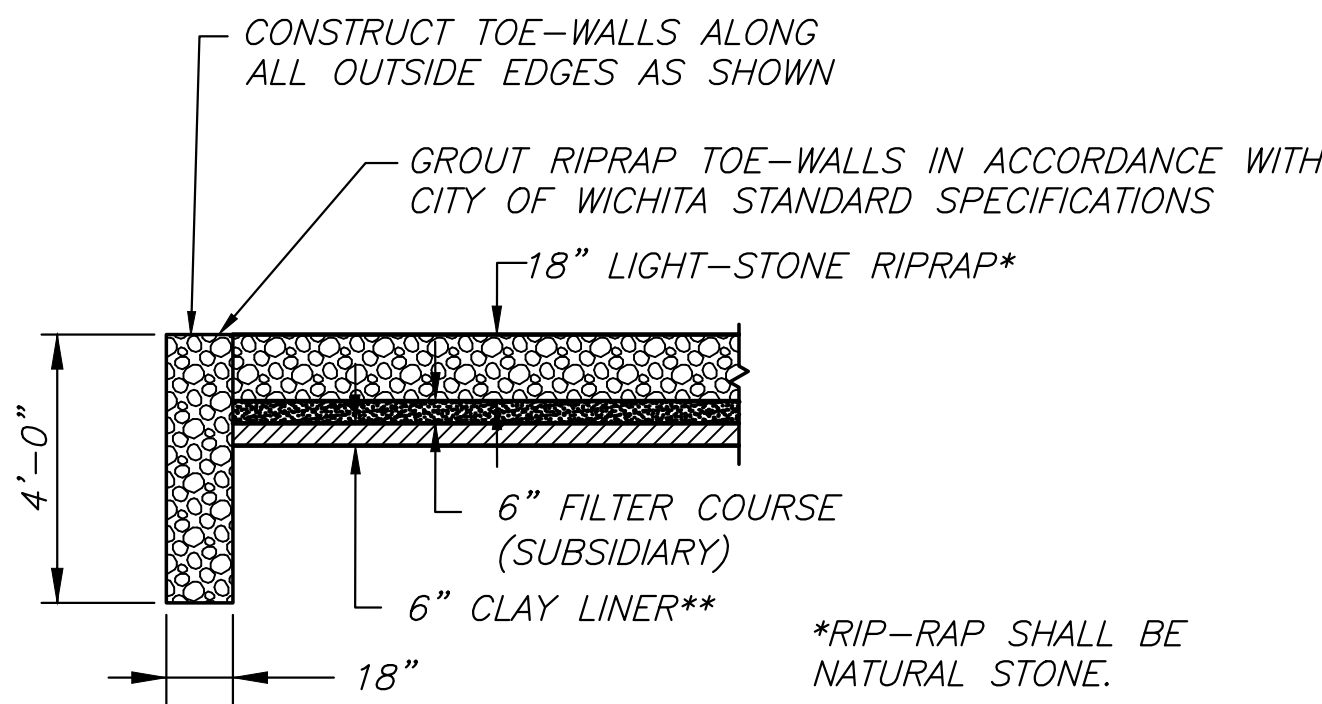




SECTION



RIPRAP DETAIL

*RIP-RAP SHALL BE NATURAL STONE.

**CLAY LINER (PI=30), MOISTURE CONDITION & COMPACT TO 95% STD. DENSITY

NOTES:

FILTER COURSE, GROUTED TOE WALL AND CLAY LINER SUBSIDIARY TO "RIP RAP, LIGHT STONE".

TIES ARE SUBSIDIARY TO STORM SEWER PIPE.

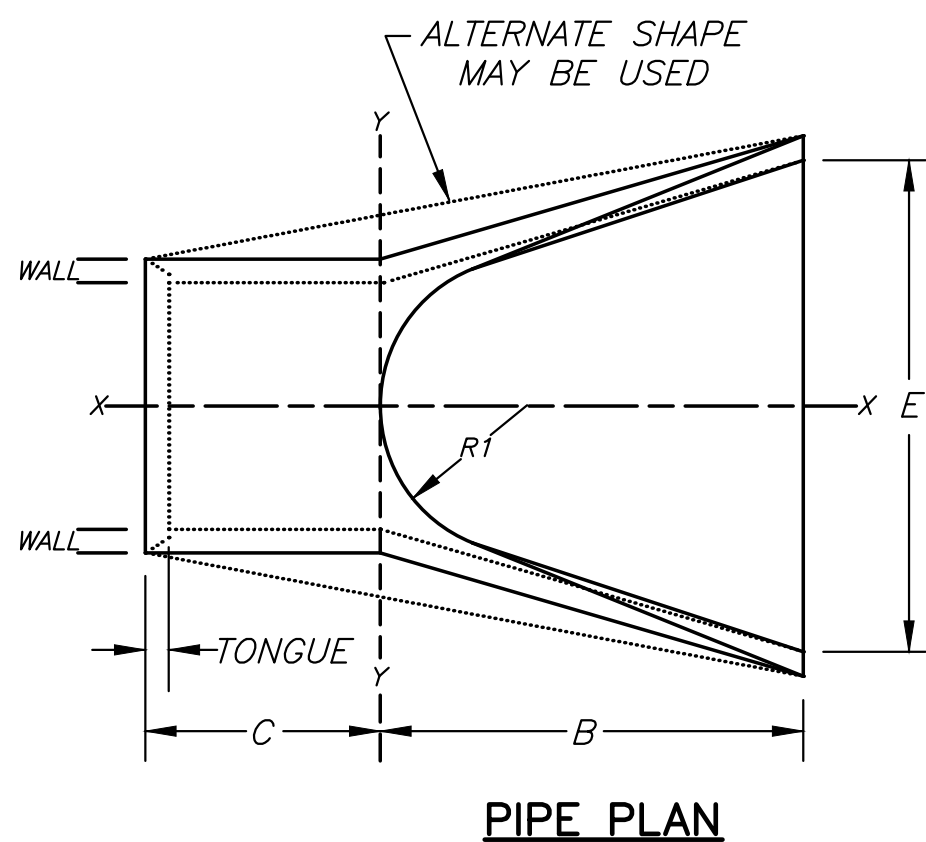
TIE RODS SHALL BE GALVANIZED OR POWER WASHED AND DIPPED IN AN APPROVED ZINC RICH EPOXY PRIME PAINT AFTER FABRICATION.

RIP-RAP DIMENSIONS AT PIPE INLETS AND OUTLETS MAY BE ADJUSTED TO FIT ACTUAL FIELD CONDITIONS IF APPROVED BY THE ENGINEER.

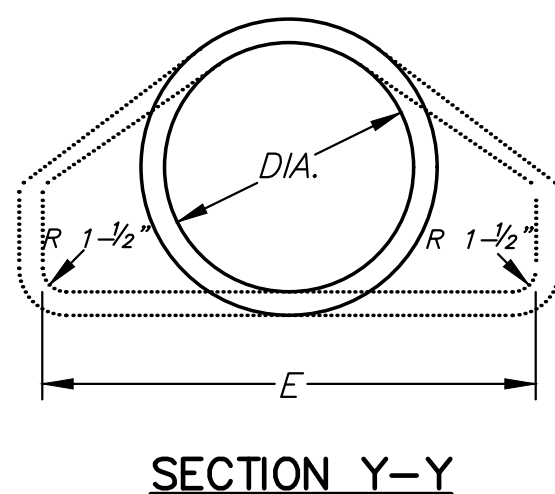
TIES TO BE USED ONLY TO HOLD PIPE SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

CONNECT END SECTION AND PIPE SECTIONS WITH PIPE TIES A MINIMUM OF 2 JOINTS FROM THE END SECTION.

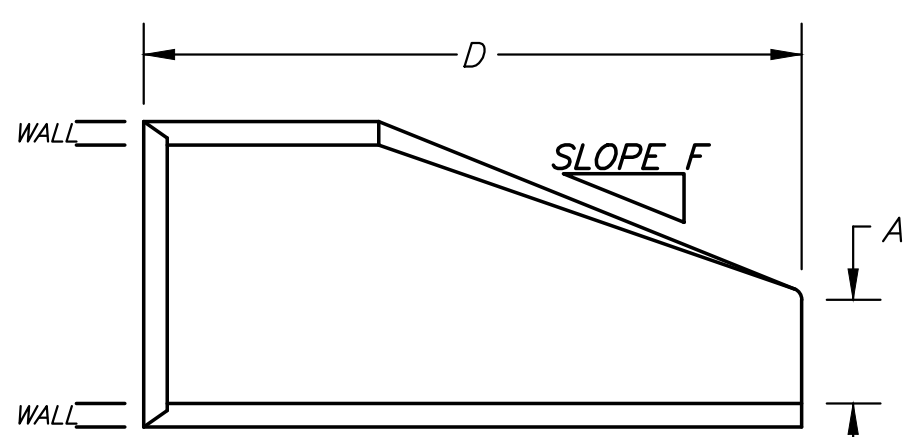
- TIE ROD THREADS SHALL PROJECT TO THE INSIDE OF PIPE EXCEPT AS NOTED IN PLANS.
- TIE ROD THREADS SHALL BE RECESSED WHEN PIPE IS USED AS CATTLE PASS OR PEDESTRIAN TRAIL.
- TIES MAY BE COMPLETED WITH U-BOLT TIES, SINGLE CONNECTION TIES (AS SHOWN) OR DOUBLE CONNECTION TIES.



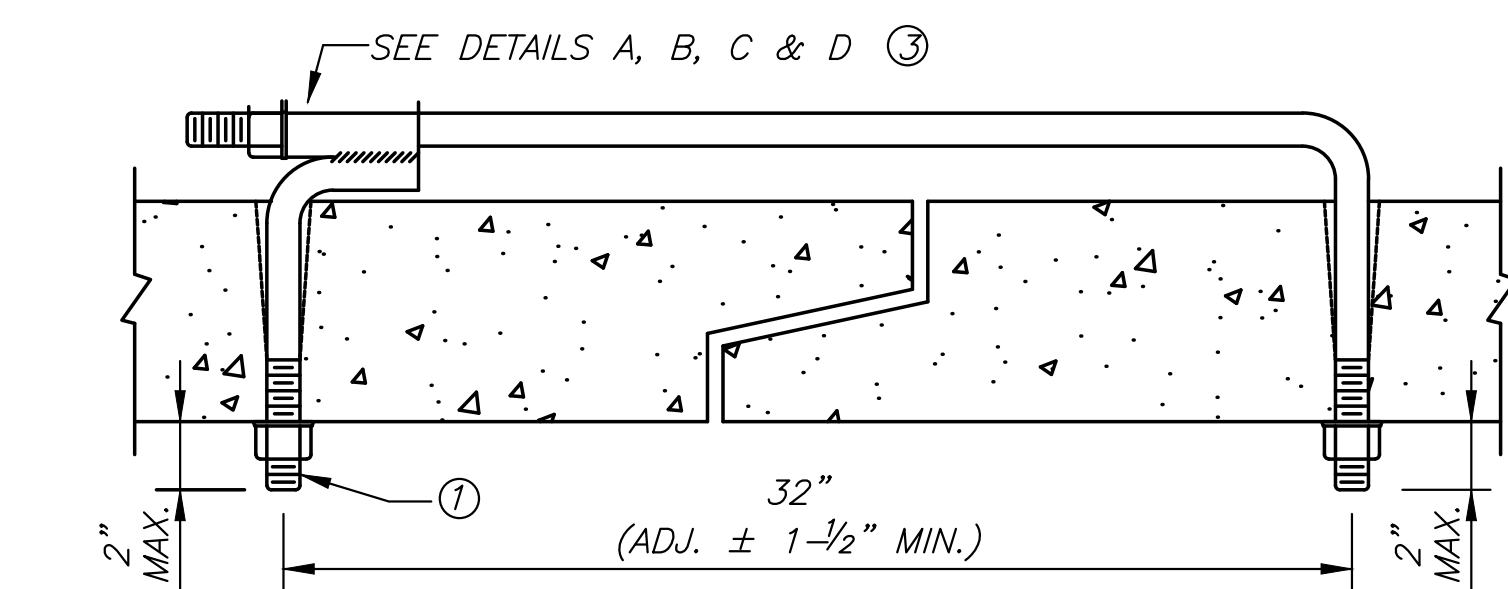
PIPE PLAN



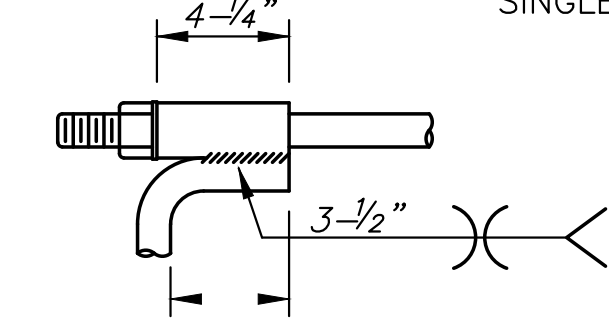
SECTION Y-Y



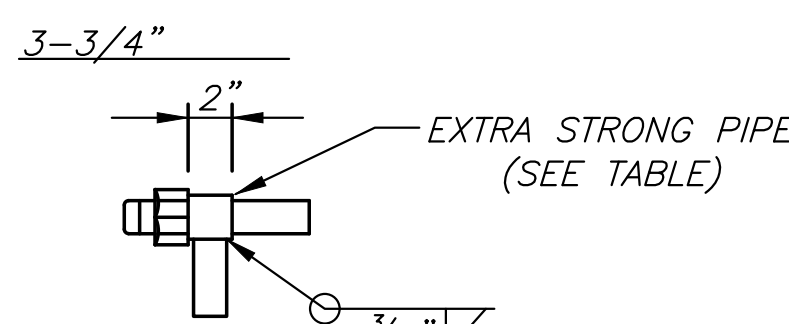
SECTION X-X



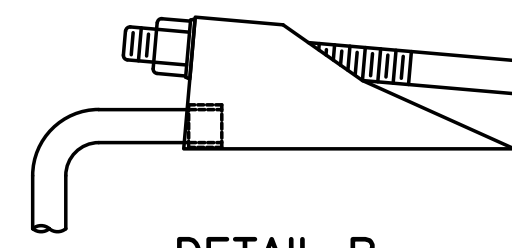
DETAIL A



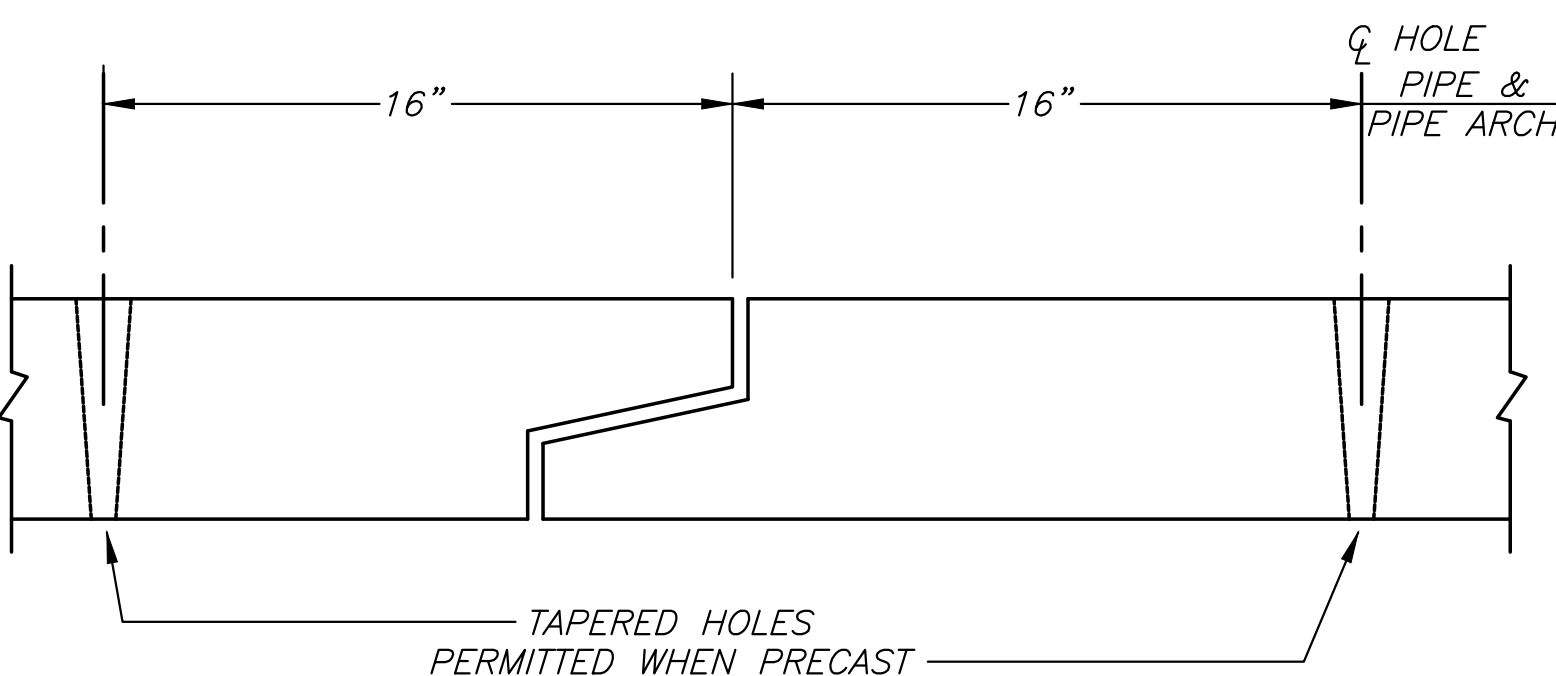
DETAIL B



DETAIL C



DETAIL D



HOLES SHALL BE CAST OR DRILLED 16" FROM CENTERLINE OF JOINTS FOR BOX CULVERTS, AS SHOWN ABOVE, UNLESS FORMS ARE SET UP FOR 16" SPACING FROM OUTSIDE OF JOINT.

PIPE SIZE (INCHES)	ROD THREAD DIA.
12 - 27	5/8"
30 - 66	3/4"
72 - 108	1"

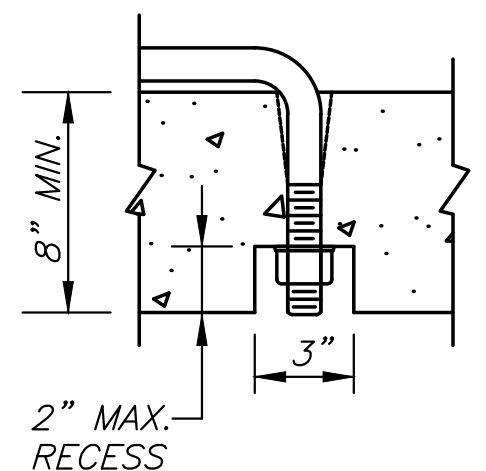
ROD THREAD DIA.	EXTRA STRONG PIPE INSIDE DIA.
5/8"	3/4"
3/4"	1"
1"	1-1/4"

PIPE SIZE LISTED IS INSIDE DIA. OF ROUND PIPE OR EQUIVALENT DIA. OF PIPE ARCH.

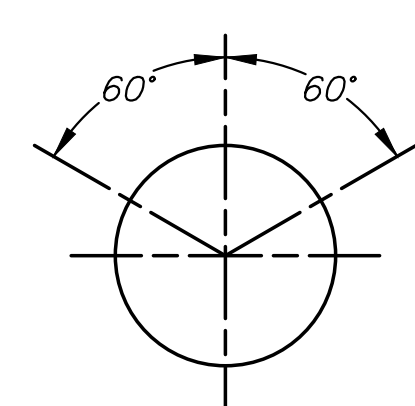
DIAM.	A	B	C	D	E	F	R1	TONGUE	WALL
12"	4"	2' 0"	4' 0-7/8"	6' 0-7/8"	2' 0"	3:1	9"	1-1/2"	2"
15"	6"	2' 3"	3' 10"	6' 1"	2' 6"	3:1	11"	2"	2 1/4"
18"	9"	2' 3"	3' 10"	6' 1"	3' 0"	3:1	12"	2-1/2"	2 1/2"
24"	9-1/2"	3' 7-1/2"	2' 6"	6' 1-1/2"	4' 0"	3:1	14"	2-1/2"	3"
30"	1' 0"	4' 6"	1' 7-3/4"	6' 1-3/4"	5' 0"	3:1	15"	3"	3-1/2"
36"	1' 3"	5' 3"	1' 10-3/4"	8' 1-3/4"	6' 0"	3:1	20"	3-1/2"	4"
42"	1' 9"	5' 3"	2'-11"	8' 2"	6' 6"	3:1	22"	3-3/4"	4-1/2"
48"	2' 0"	6' 0"	2' 2"	8' 2"	7' 0"	3:1	22"	4-1/4"	5"
54"	2' 3"	5' 5"	2' 11"	8' 4"	7' 6"	3:1	24"	4-3/4"	5-1/2"
60"	2' 6"	5' 0"	3' 3"	8' 3"	8' 0"	2.4:1	24"	5"	6"
66"	2' 0"	6' 6"	1' 9"	8' 3"	8' 6"	2:1	24"	5-1/2"	7"
72"	2' 0"	6' 6"	1' 9"	8' 3"	9' 0"	2:1	24"	6"	7-1/2"

END AREA SQ.FT.	ROUND EQUIV.	SPAN	RISE	WALL	A	B	C	D	E	R1	R2	R3	R4
3.3	24"	30"	19"	3 1/4"	8-1/2"	3' 3"	2' 9"	6' 0"	4' 0"	8-1/4"	26-1/4"	3"	7"
4.1	27"	34"	22"	3 1/2"	9"	3' 10"	2' 2"	6' 0"	4' 6"	9-1/4"	29-17/32"	3"	8"
5.1	30"	38"	24"	3 3/4"	9-1/2"	4' 6"	1' 6"	6' 0"	5' 0"	10-1/4"	32-3/4"	3"	9"
6.3	33"	42"	27"	3 3/4"	10-3/8"	4' 9"	1' 3"	6' 0"	5' 6"	11-7/16"	36-3/16"	3"	10-1/2"
7.4	36"	45"	29"	4 1/2"	11 1/4"	5' 0"	3' 0"	6' 0"	6' 0"	12-1/4"	39-1/4"	3"	12"

TONGUE LENGTHS BASED ON QUINN STANDARD



OPTIONAL RECESS DETAIL ②



ROUND PIPE