

Job Name: 26-3603 - Murfreesboro Headwalls
Job Location: Murfreesboro, TN
Contractor: Bear Construction LLC

Plant: 100
9/22/2026 1:16:08 PM

Tech: Jared - F
PC: T. Ryan



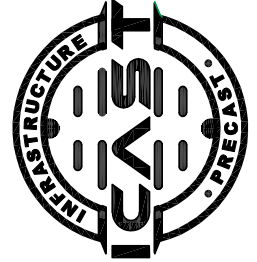
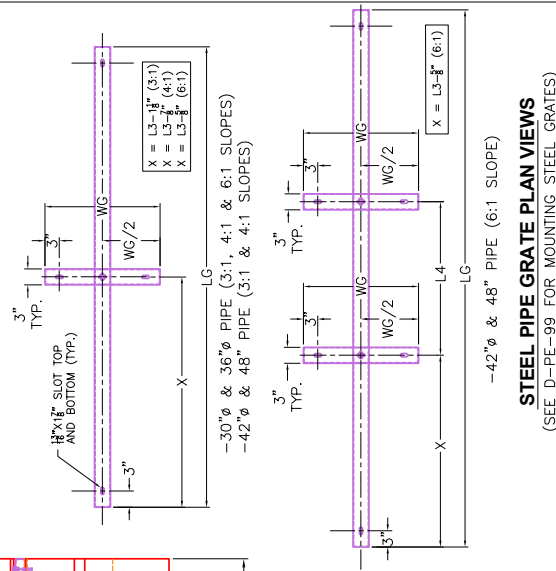
Structure ID: 1 - 1

P1 HWT DOT 6-1SA24

24" - HW TDOT 6:1 Type Safety Side Drain Endwall F/F

GENERAL NOTES

- DRAWING TO BE USED FOR ALL 12" THROUGH 48" SIDE DRAIN CONCRETE ENDWALLS.
- MANUFACTURING, FOR CROSS DRAINS ONLY.
- CONCRETE: $F_c = 4,500$ PSI @ 28 DAYS.
- REINFORCING STEEL: ASTM A615, $F_y=60,000$ PSI.
- SEE STD. DWGS. D-PE-15A, D-PE-18, D-PE-24A, D-PE-30A, D-PE-36A, D-PE-42A & D-PE-48A FOR BILL OF STEEL.
- SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.
- APPROPRIATE SIZING AND LOCATIONS OF THE LIFTING INSERTS WILL BE THE RESPONSIBILITY OF INFRASTRUCTURE PRECAST, INC.
- LIFTING INSERT POCKETS SHALL BE GROUTED ON SITE BY THE CONTRACTOR AFTER THE ENDWALL IS SET AS PER TDOT REQUIREMENTS.
- DIAGONAL AND REINFORCING TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 5-3.
- PIPE OPENINGS FOR HEADWALLS ARE BASED ON REINFORCED CONCRETE PIPE WITH TYPE "B" WALL AS PER AMERICAN CONCRETE PIPE ASSOCIATION (ACPA). OUTSIDE DIAMETER + 3" - 4".
- TOE WALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.



INFRASTRUCTURE PRECAST, INC.
981 WEST 7TH ST., BEAVER DAM, KY. 42320
PHONE: (270) 363-2238, FAX: (270) 298-7424

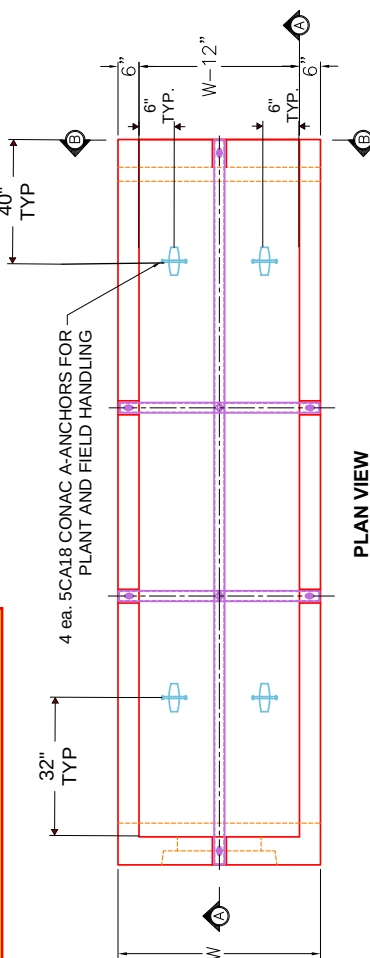
TDOT TYPE "U" CROSS DRAIN ENDWALL WITH STEEL
PIPE GRATE FOR 15" THROUGH 48" PIPES (3:1 SLOPE)

DRAWING NO.: ET-TDOT-202 DATE: 10-07-25

REVIEWED BY: J.H. ROSS, PE DRAWN BY: N. RICHARDS

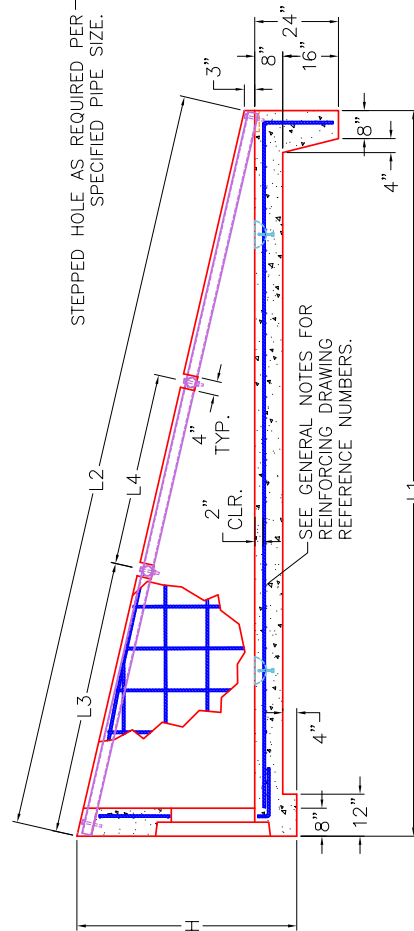
WEB: WWW.ICASTINC.COM SCALE: NTS

PLAN VIEW

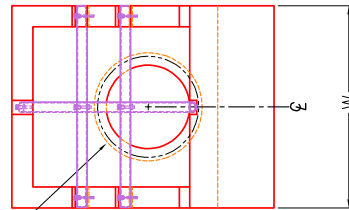


STEPPED HOLE AS REQUIRED PER
SPECIFIED PIPE SIZE.

SECTION A-A



ELEVATION B-B



DIMENSIONS & QUANTITIES FOR ONE ENDWALL 3:1

PIPE DIA. (D)	CONCRETE ENDWALL DIMENSIONS				GRATE DISPLACEMENT DIMENSIONS				STRUCT. STEEL	WEIGHT LBS.
	H	W	L1	L2	L3	L4	L5	L6		
15"	2'-11"	2'-8"	6'-0"	6'-3"	N/A	N/A	N/A	N/A	N/A	2,819
18"	3'-2"	2'-11"	6'-8"	7'-0"	N/A	N/A	N/A	N/A	N/A	3,406
24"	3'-9"	3'-6"	8'-5"	8'-10"	N/A	N/A	N/A	N/A	N/A	5,011
30"	4'-5"	4'-1"	10'-5"	10'-11"	N/A	N/A	N/A	N/A	N/A	7,204
36"	5'-0"	4'-8"	12'-2"	12'-9"	N/A	N/A	N/A	N/A	N/A	9,513
42"	5'-6"	5'-3"	13'-8"	14'-4"	N/A	N/A	N/A	N/A	N/A	11,862
48"	6'-1"	5'-10"	15'-5"	16'-3"	N/A	N/A	N/A	N/A	N/A	14,838

DIMENSIONS & QUANTITIES FOR ONE ENDWALL 4:1

PIPE DIA. (D)	CONCRETE ENDWALL DIMENSIONS				GRATE DISPLACEMENT DIMENSIONS				STRUCT. STEEL	WEIGHT LBS.
	H	W	L1	L2	L3	L4	L5	L6		
15"	2'-11"	2'-8"	8'-0"	8'-3"	N/A	N/A	N/A	N/A	N/A	3,484
18"	3'-2"	2'-11"	8'-8"	8'-11"	N/A	N/A	N/A	N/A	N/A	4,228
24"	3'-9"	3'-6"	11'-0"	11'-4"	N/A	N/A	N/A	N/A	N/A	6,303
30"	4'-5"	4'-1"	13'-8"	14'-1"	N/A	N/A	N/A	N/A	N/A	9,083
36"	5'-0"	4'-8"	16'-0"	16'-3"	N/A	N/A	N/A	N/A	N/A	12,058
42"	5'-6"	5'-3"	18'-0"	18'-3"	N/A	N/A	N/A	N/A	N/A	15,073
48"	6'-1"	5'-10"	20'-4"	20'-11"	N/A	N/A	N/A	N/A	N/A	18,910

DIMENSIONS & QUANTITIES FOR ONE ENDWALL 6:1

PIPE DIA. (D)	CONCRETE ENDWALL DIMENSIONS				GRATE DISPLACEMENT DIMENSIONS				STRUCT. STEEL	WEIGHT LBS.
	H	W	L1	L2	L3	L4	L5	L6		
15"	2'-11"	2'-8"	11'-2"	11'-3"	N/A	N/A	N/A	N/A	N/A	4,737
18"	3'-2"	2'-11"	12'-8"	12'-10"	N/A	N/A	N/A	N/A	N/A	5,833
24"	3'-9"	3'-6"	16'-2"	16'-4"	N/A	N/A	N/A	N/A	N/A	8,848
30"	4'-5"	4'-1"	20'-2"	20'-3"	N/A	N/A	N/A	N/A	N/A	12,880
36"	5'-0"	4'-8"	23'-8"	23'-11"	N/A	N/A	N/A	N/A	N/A	17,186
42"	5'-6"	5'-3"	26'-8"	27'-0"	N/A	N/A	N/A	N/A	N/A	21,532
48"	6'-1"	5'-10"	30'-2"	30'-7"	N/A	N/A	N/A	N/A	N/A	27,092

STEEL PIPE GRATE DIMENSIONS

PIPE DIA.	ALL SLOPES	3:1	4:1	6:1
15"	4'-1"	10'-10"	14'-0"	20'-4"
18"	4'-8"	12'-0"	16'-5"	23'-11"
24"	5'-3"	14'-3"	18'-0"	26'-11"
30"	5'-10"	16'-1"	20'-11"	30'-8"

NOTE:
JBS 24" TDOT 6:1 Safety side Drain
EW Grate Set supplied by ICAST

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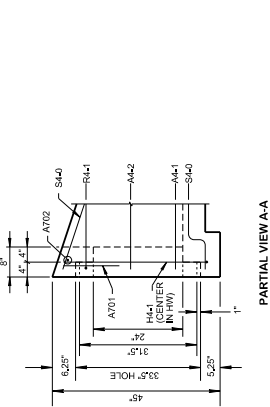


Structure ID: 1 - 1

P1 HWT DOT6-1SA24

24" - HW TDOT 6:1 Type Safety Side Drain Endwall

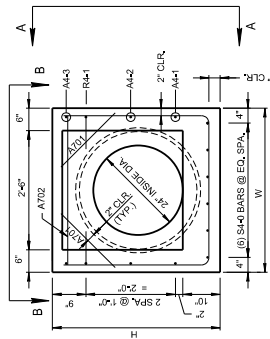
- REV. 4-4-13 REVISED NOTES.
ADDED NOTE (A) AND (C).
REV. 12-1-16 REVISED NOTES.
ADDED NOTE (B) AND (D).
HOLE DETAIL.
NOTE: (E) REV. 12-1-16 REVISED GENERAL.
REV. 7-27-17 MODIFIED GENERAL.
REV. 12-1-16 REVISED GENERAL.
REV. 12-1-16 REVISED A4, A5 AND
ELEVATION VIEWS REMOVED AND
REDRAWN SHEET.



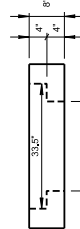
PARTIAL VIEW A-A

HEADWALL DETAILS

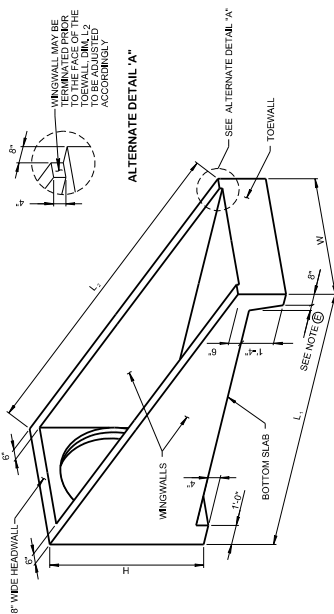
NOTE: INSTALL BARS A701 AT 45°.
SEE GENERAL NOTES (C) & (D).



ELEVATION

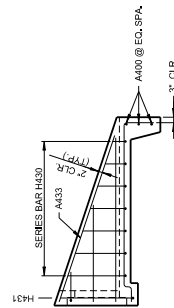


PARTIAL VIEW B-B
SEE NOTE (E)



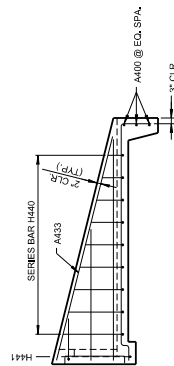
ISOMETRIC VIEW

NOTE: 1/2" CHAMFER REQUIRED ON ALL EXPOSED EDGES



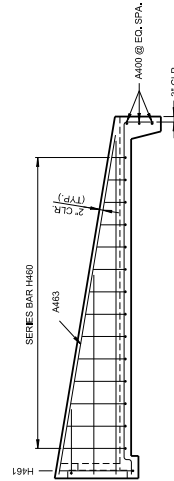
3:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



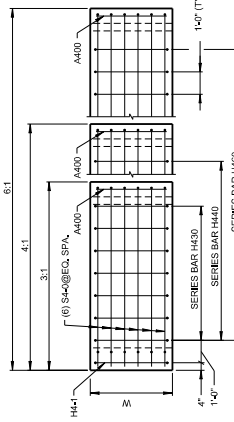
4:1 WINGWALL ELEVATION

NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



6:1 WINGWALL ELEVATION

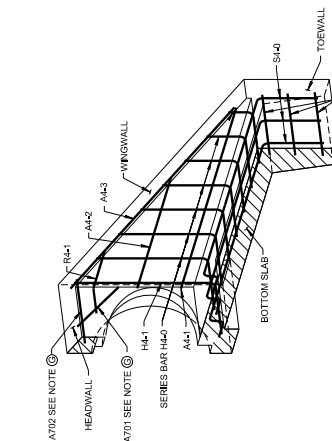
NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.



BOTTOM SLAB PLAN

SLOPE	CONCRETE ENDWALL DIMENSIONS				ESTIMATED QUANTITIES			
	H	L ₁	L ₂	W	CLASS "A" CONC. CU. YD.	STEEL BAR REIN. LB.	CLASS "A" CONC. CU. YD.	STEEL BAR REIN. LB.
3:1	8'-0"	11'-0"	8'-0"	3'-0"	1.28	124	1.28	124
4:1	3'-0"	11'-0"	11'-0"	3'-0"	1.01	153	1.01	153
6:1	18'-0"	18'-0"	18'-0"	3'-0"	2.26	215	2.26	215

DIMENSIONS AND QUANTITIES FOR ONE ENDWALL 24" PIPE



ISOMETRIC HALF-SECTION
SHOWING REINFORCEMENT
(3:1 SHOWN 4:1 & 6:1 SIMILAR)
SEE GENERAL NOTE (E)

- GENERAL NOTES**
- (A) DRAWING TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST CONCRETE STRUCTURES. THE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
- (B) SEE STD. DWG. DPE-248 FOR BILL OF STEEL & PRECAST NOTES.
- (C) *IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY. SEE STD. DWG. DPE-248.
- (D) SPACING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 27" SPACING LENGTH IS USED.
- (E) TOWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.
- (F) REINFORCEMENT SHALL BE PLACED AT 18" SKEW TO CENTERLINE. HOWEVER, MAXIMUM SPACING OF 24" IS ACCEPTABLE.
- (G) OPTIONAL STEEL BAR OR HOLE FORMERS ARE ALLOWED PROVIDED THE AMOUNT OF COVER BETWEEN THE PRECASTING AND BARS A701 AND A702 IS THE SAME OR GREATER THAN SHOWN ON THIS DRAWING.
- (H) PAYMENT WILL BE MADE UNDER:
- 611-7.27 24" ENDWALL (CROSS DRAIN) 3:1 EACH
611-7.28 24" ENDWALL (CROSS DRAIN) 4:1 EACH
611-7.29 24" ENDWALL (CROSS DRAIN) 6:1 EACH
- (I) THE CONTRACTOR MAY BE ELECT TO SUBSTITUTE AN APPROVED EQUIVALENT MATERIAL.
- (J) ALL DIMENSIONS AND TOLERANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 4.5.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DRAWING
TYPE "I" J
CROSS DRAIN
ENDWALL
FOR 24" PIPE
(FOR 3:1, 4:1 & 6:1 SLOPES)
03/01/2012
D-PE-24A

MINOR REVISION - FHWA
APPROVAL NOT REQUIRED

NOT TO SCALE

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P1 HWTDOT6-1SA24

24" - HW TDOT 6:1 Type Safety Side Drain Endwall

REV 06/26/19 REMAIN AND REDRAW SHEET.

BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	3:1 WINGWALL SLOPE						4:1 WINGWALL SLOPE						6:1 WINGWALL SLOPE					
			BENDING DIMENSIONS			NO. REQ'D	LENGTH	BENDING DIMENSIONS			NO. REQ'D	LENGTH	BENDING DIMENSIONS			NO. REQ'D	LENGTH			
a	b	c	d	a	b			c	d	a			b	c	d					
A400	TORWALL	4	3'-2"	-	-	-	3	3'-2"	3'-2"	-	-	-	3	3'-2"	3'-2"	-	-	-	3	3'-2"
A431	WINGWALLS	4	7'-4"	-	-	-	-	-	7'-4"	-	-	-	-	-	-	-	-	-	-	-
A432	WINGWALLS	4	4'-4"	-	-	-	2	4'-4"	-	-	-	-	-	-	-	-	-	-	-	-
A433	WINGWALLS	4	7'-10"	-	-	-	2	7'-10"	-	-	-	-	-	-	-	-	-	-	-	-
A441	WINGWALLS	4	-	-	-	-	-	-	9'-10"	-	-	-	2	9'-10"	-	-	-	-	-	-
A442	WINGWALLS	4	-	-	-	-	-	-	5'-10"	-	-	-	2	5'-10"	-	-	-	-	-	-
A443	WINGWALLS	4	-	-	-	-	-	-	10'-4"	-	-	-	2	10'-4"	-	-	-	-	-	-
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A701	HEADWALL	7	1'-8"	-	-	-	2	1'-8"	1'-8"	-	-	-	2	1'-8"	1'-8"	-	-	-	2	1'-8"
A702	HEADWALL	7	3'-2"	-	-	-	1	3'-2"	3'-2"	-	-	-	1	3'-2"	3'-2"	-	-	-	1	3'-2"
SERIES H430	BOTTOM SLAB & WINGWALL	4	3'-2"	*	-	-	1	43'-9"	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-6 1/2" TO 0'-6 1/2" IN INCREMENTS OF 0'-4" (7 BARS)																	
H431	BOTTOM SLAB & HEADWALL	4	3'-2"	3'-2 1/2"	-	-	1	9'-7"	-	-	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	3'-2"	*	-	-	1	58'-3 1/4"	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-7 1/2" TO 0'-7 1/2" IN INCREMENTS OF 0'-5" (9 BARS)																	
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	3'-2"	3'-2 1/2"	-	-	1	9'-7 1/4"	-	-	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-9 1/4" TO 0'-7 1/4" IN INCREMENTS OF 0'-2" (11 BARS)																	
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9'-8 1/2"
R431	WINGWALL & HEADWALL	4	1'-4"	0'-8"	-	-	2	2'-0"	-	-	-	-	-	-	-	-	-	-	-	-
R441	WINGWALL & HEADWALL	4	-	-	-	-	-	-	1'-10"	0'-0"	-	-	2	2'-0"	-	-	-	-	-	-
R461	WINGWALL & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3'-7"	-
S430	BOTTOM SLAB & TORWALL	4	7'-4 1/2"	0'-4 1/2"	0'-8"	1'-5"	6	9'-10"	-	-	-	-	-	-	-	-	-	-	-	-
S440	BOTTOM SLAB & TORWALL	4	-	-	-	-	-	-	9'-11 1/2"	0'-4 1/2"	0'-8"	1'-5"	5	12'-5"	-	-	-	-	-	-
S460	BOTTOM SLAB & TORWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15'-1 1/2"	0'-4'-8"	1'-5"
			* DIMENSION "b" VARIES FROM 2'-9 1/4" TO 0'-7 1/4" IN INCREMENTS OF 0'-2" (11 BARS)																	

PRECAST NOTES

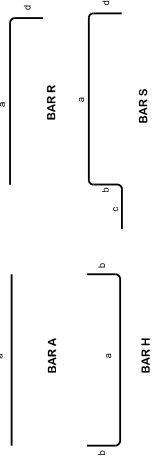
- PRECAST UNITS:
- THE CONTRACTOR MAY, WITH PERMISSION FROM THE ENGINEER, SUBSTITUTE PRECAST ENDWALLS FOR CAST-IN-PLACE ENDWALLS PROVIDED THAT:
- APPROPRIATE SIZING AND LOCATION OF THE LIFTING INSERTS SHALL BE THE RESPONSIBILITY OF THE FABRICATOR TO ASSURE BALANCED HANDLING DURING INSTALLATION OF THE PRECAST ENDWALL.
 - THE CONTRACTOR TO PATCH ALL LIFTING INSERT HOLES AND PLACE A MINIMUM OF ONE (1) INCH OF COVER OVER THE HARDWARE OF THESE DEVICES ON BOTH TOP AND BOTTOM SURFACES.
 - PAYMENT FOR PRECAST ENDWALLS BASED ON THE QUANTITIES FOR CAST-IN-PLACE ENDWALLS IS ACCEPTABLE.
 - PRECAST ENDWALL UNITS WHICH ARE DAMAGED DURING SHIPMENT OR INSTALLATION WILL BE REJECTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE THE DAMAGED ENDWALL UNITS AT HIS OWN EXPENSE.
 - PIPE OPENINGS FOR HEADWALLS ARE BASED ON REINFORCED CONCRETE PIPE WITH TYPE "B" WALL THICKNESS (ASHTO M170).
 - ADDITIONAL REINFORCING STEEL NECESSARY TO MAINTAIN THE INTEGRITY OF THE STRUCTURE DURING HANDLING AND PLACEMENT SHALL BE THE RESPONSIBILITY OF THE FABRICATOR.
- CONCRETE: Fc=4,500 POUNDS PER SQUARE INCH MINIMUM AT 28 DAYS.
REINFORCING STEEL: ASTM A615, Fy=60,000 POUNDS PER SQUARE INCH.

REINFORCING STEEL CODE

TYPE	SIZE	SERIES
A	5	06

DIMENSIONS SHOWN ON THIS SHEET ARE OUTSIDE TO OUTSIDE OF BAR, STANDARD C.R.S.I. HOOK DETAILS SHALL APPLY, EXCEPT AS NOTED.

REINFORCING STEEL LEGEND



NOT TO SCALE