



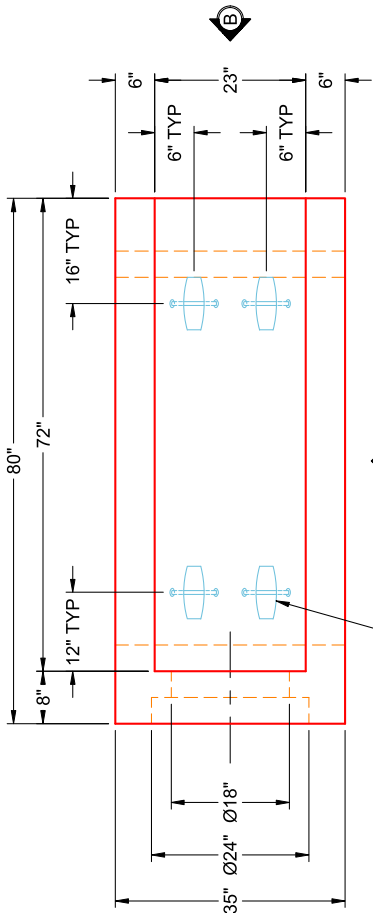
Structure ID: HW 3 (4)

P1 HWTDOT3-1TU18

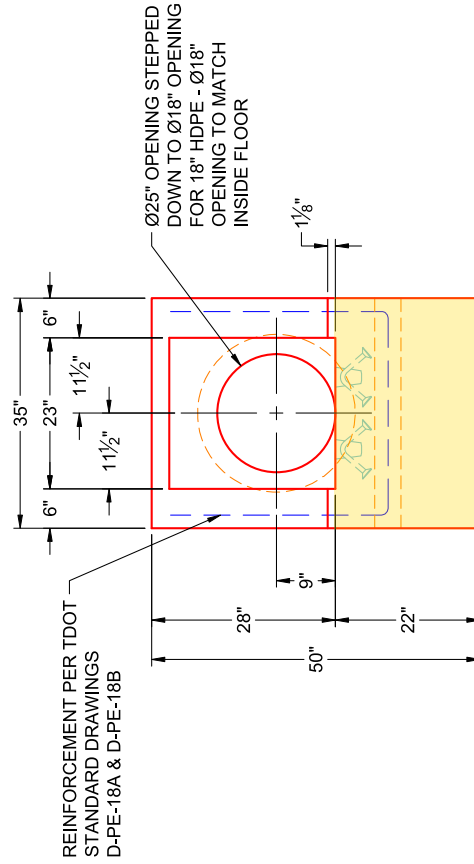
18" - HW TDOT 3:1 Type U Cross Drain Endwall F/F

GENERAL NOTES:

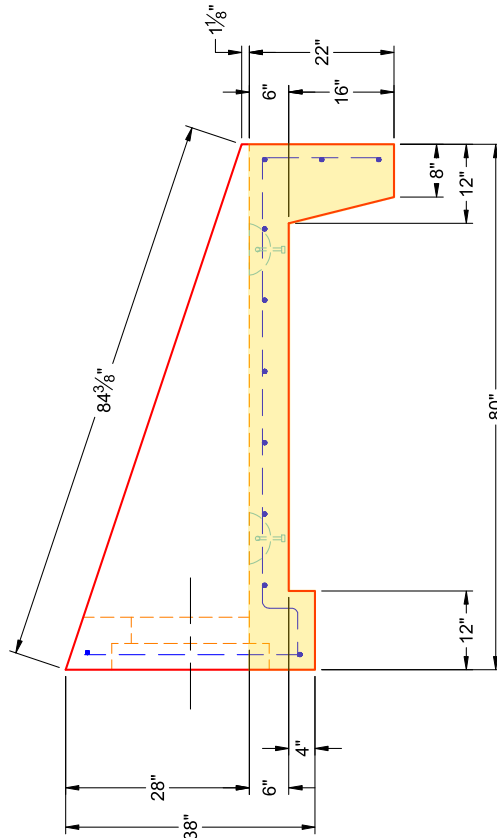
- PER TDOT D-PE-18 SPECIFICATIONS
- CONCRETE: 4,500 PSI AT 28 DAYS
- REINFORCEMENT: PER TDOT STANDARD DRAWINGS D-PE-18A & D-PE-18B
- WEIGHT: 3,375 LBS
 - FIRST POUR: 2,010 LBS
 - SECOND POUR: 1,365 LBS



**PLAN VIEW
(RIGHT SIDE UP)**



**VIEW B
(RIGHT SIDE UP)**



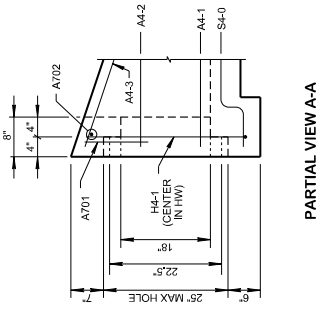
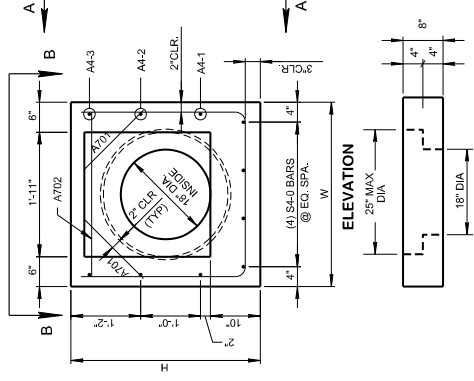
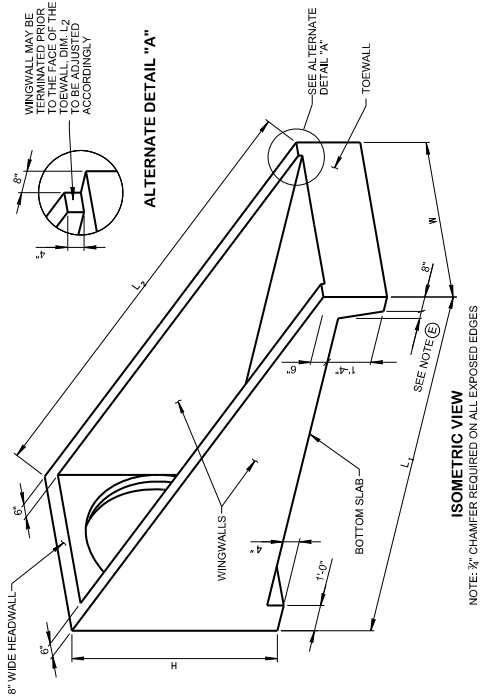
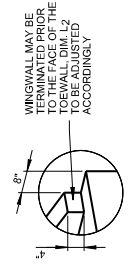
**VIEW A
(RIGHT SIDE UP)**

PRODUCTION WORK ORDER		PRODUCT I.D.:	HWTDOT3-1TU18
QUALITY CONTROL CHECKLIST		PRODUCT VIEW:	RIGHT SIDE UP
<input type="checkbox"/> ALL DIMENSIONS CORRECT.		PLANT:	BEAVER DAM, KY
<input type="checkbox"/> LIFTERS INSTALLED.		WEIGHT:	3,375 LBS
<input type="checkbox"/> OPENING CENTERED.		TOP SECTION JOINT:	N/A
<input type="checkbox"/> REINFORCING CORRECT.		BASE SECTION JOINT:	N/A
<input type="checkbox"/> SURFACE QUALITY ACCEPTABLE.		QC CHECK INITIALS:	
<input type="checkbox"/> EDGES CHAMFERED.			
<input type="checkbox"/> ALL PATCHWORK ACCEPTABLE.			
DESCRIPTION: 18" TDOT D-PE-18 TYPE "U" CROSS DRAIN EW 3:1		CUSTOMER:	PARKER EXCAVATING, LLC
CUSTOMER: GOVERNMENT CENTER		PROJECT:	GOVERNMENT CENTER
STRUCTURE: HW 3 (4)		ORDER NO.:	25-4566
PE: J.H. ROSS		DRAWING:	K. CARDWELL
DATE: 04/03/26		SCALE:	NTS
		PG.	1 OF 1

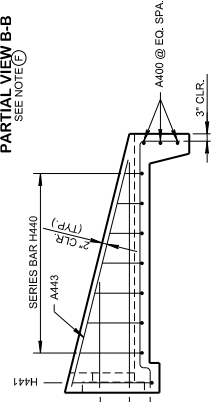


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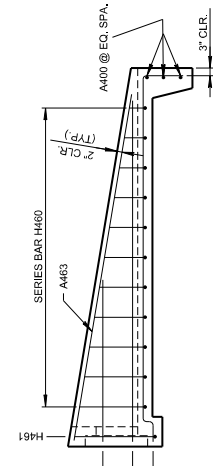
REV. 05-14-13 REVISED NOTES @ ADDED
 NOTE: @BANK @
 REV. 14-15: REINFORCED HOLE OPENING
 SIZE: ADDED STEPPED HOLE DETAIL
 VIEW, REINFORCED AND REINFORCED SHEET.



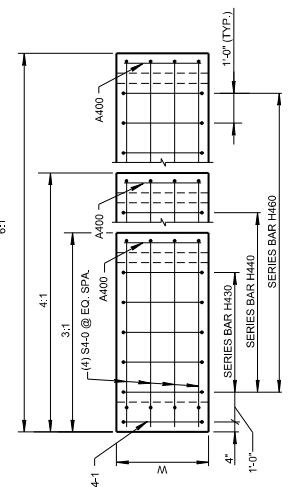
HEADWALL DETAILS
 NOTES: INSTALL BARS A701 AT 45°
 SEE GENERAL NOTES ③ & ④



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.



BOTTOM SLAB PLAN

SLOPE	CONCRETE ENDWALL DIMENSIONS				ESTIMATED QUANTITIES		
	H	L ₁	L ₂	W	CLASS "A" CONC. CU. YD.	STEEL BAR REINF. LB.	W
3:1	6'-8"	7'-0 3/4"	2'-11"	1'-0"	0.87	79	137
4:1	8'-8"	8'-11 1/2"	2'-11"	1'-0"	1.08	98	137
6:1	12'-8"	12'-10 1/2"	2'-11"	1'-0"	1.49	137	137

- GENERAL NOTES**
- ① REINFORCEMENT TO BE USED FOR ALL CAST-IN-PLACE AND ALL PRECAST CONCRETE ENDWALLS (TYPE "U") FOR CROSS DRAINING ONLY.
 - ② ENDWALL TO BE PLACED AT 90° SKEW TO CENTERLINE. SEE STD. DWG. D-PE-88 FOR SKEWED CONNECTION DETAIL WHEN APPLICABLE.
 - ③ CAST-IN-PLACE CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 611 AND/OR SPECIAL PROVISIONS.
 - ④ SEE STD. DWG. D-PE-88 FOR BILL OF STEEL & PRECAST NOTES.
 - ⑤ ** IN BAR DESIGNATION REPRESENTS 3, 4 OR 6 FOR 3:1, 4:1 OR 6:1 SLOPES, RESPECTIVELY.
 - ⑥ SPLICING OF REINFORCEMENT IS ACCEPTABLE PROVIDED THAT A MINIMUM 21" SPLICE LENGTH IS USED.
 - ⑦ TOEWALL BACK SLOPE MAY BE CONSTRUCTED VARIABLE FROM VERTICAL UP TO 15°.
 - ⑧ 90° STEPS ARE SHOWN ON THE STEPPED HOLE DETAIL, HOWEVER MINOR VARIATIONS OF THE TAPER ARE ACCEPTABLE.
 - ⑨ OPTIONAL STEPPED HOLE OR HOLE FORMERS ARE ALLOWED PROVIDED THE AMOUNT OF COVER BETWEEN THE PIPE OPENING AND A702 IS THE SAME OR GREATER THAN SHOWN ON THIS DRAWING.
 - ⑩ PAYMENT WILL BE MADE UNDER:
 - 611-07.54 18IN ENDWALL (CROSS DRAIN) 3:1 EACH
 - 611-07.55 18IN ENDWALL (CROSS DRAIN) 4:1 EACH
 - 611-07.56 18IN ENDWALL (CROSS DRAIN) 6:1 EACH
 - ⑪ THE CONTRACTOR MAY ELECT TO SUBSTITUTE AN APPROVED ALTERNATIVE DESIGN.
 - ⑫ DIMENSIONAL AND REINFORCING TO FINANCES WILL BE AS SHOWN IN STANDARD OPERATING PROCEDURE (SOP) 5-3.

6:1 WINGWALL ELEVATION
 NOTE: A-BARS IN HEADWALL NOT SHOWN FOR CLARITY.

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

STATE OF TENNESSEE
 STANDARD
 DEPARTMENT OF TRANSPORTATION
**TYPE "U"
 CROSS DRAIN
 ENDWALL
 FOR 18" PIPE**
 (FOR 3:1, 4:1 & 6:1 SLOPES)

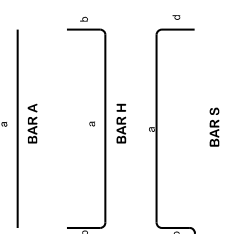
03-01-2012
 D-PE-16A

NOT TO SCALE

BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	3:1 WINGWALL SLOPE				4:1 WINGWALL SLOPE				5:1 WINGWALL SLOPE							
			BENDING DIMENSIONS			NO. REQ'D	BENDING DIMENSIONS			NO. REQ'D	BENDING DIMENSIONS			NO. REQ'D	LENGTH			
			a	b	c	d		a	b	c	d		a	b	c	d	LENGTH	
A400	TOEWALL	4	2'-7"	-	-	-	3	2'-7"	-	-	-	3	2'-7"	-	-	-	3	2'-7"
A431	WINGWALLS	4	5'-7"	-	-	-	2	5'-7"	-	-	-	2	5'-7"	-	-	-	2	5'-7"
A432	WINGWALLS	4	2'-7"	-	-	-	2	2'-7"	-	-	-	2	2'-7"	-	-	-	2	2'-7"
A433	WINGWALLS	4	6'-0"	-	-	-	2	6'-0"	-	-	-	2	6'-0"	-	-	-	2	6'-0"
A441	WINGWALLS	4	-	-	-	-	-	7'-5"	-	-	-	2	7'-6"	-	-	-	2	7'-6"
A442	WINGWALLS	4	-	-	-	-	-	3'-5"	-	-	-	2	3'-6"	-	-	-	2	3'-6"
A443	WINGWALLS	4	-	-	-	-	-	7'-11"	-	-	-	2	7'-11"	-	-	-	2	7'-11"
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	2	11'-5"	-	-	-	2	11'-5"
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	2	5'-5"	-	-	-	2	5'-5"
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	2	11'-10"	-	-	-	2	11'-10"
A701	HEADWALL	7	1'-4"	-	-	-	2	1'-4"	-	-	-	2	1'-4"	-	-	-	2	1'-4"
A702	HEADWALL	7	2'-7"	-	-	-	1	2'-7"	-	-	-	1	2'-7"	-	-	-	1	2'-7"
SERIES H430	BOTTOM SLAB & WINGWALL	4	2'-7"	*	-	-	1	25'-10"	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 1'-11 1/2" TO 0'-7 1/2" IN INCREMENTS OF 0'-4" (5 BARS)															
H431	BOTTOM SLAB & HEADWALL	4	2'-7"	2'-7 1/2"	-	-	1	7'-10"	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	2'-7"	*	-	-	1	36'-7 1/4"	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-0 1/2" TO 0'-6 1/2" IN INCREMENTS OF 0'-3" (7 BARS)															
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	2'-7"	2'-7 1/4"	-	-	1	7'-10 1/4"	-	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-2 1/2" TO 0'-4 1/2" IN INCREMENTS OF 0'-2" (11 BARS)															
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	1	7'-11 1/2"	-	-	-	-	-
S430	BOTTOM SLAB & TOEWALL	4	5'-7 1/2"	0'-4 1/2"	1'-5"	4	8'-1"	-	-	-	-	-	-	-	-	-	-	-
S440	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	7'-7 1/2"	0'-4 1/2"	0'-8"	1'-5"	4	10'-1"	-	-	-	-	-
S460	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			11'-7 1/2" 0'-4 1/2" 0'-8" 1'-5" 4 14'-1"															

REINFORCING STEEL LEGEND



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.

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 UNITS 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 PIPE OPENINGS FOR STEEL FABRICATOR TO MAINTAIN THE INTEGRITY OF THE STRUCTURE DURING HANDLING AND PLACEMENT SHALL BE THE RESPONSIBILITY OF THE STEEL FABRICATOR.
- CONCRETE FLOOR JOISTS PER SQUARE INCH MINIMUM AT 25 BARS.
REINFORCING STEEL: ASTM A615, F-60,000 POUNDS PER SQUARE INCH.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED



CROSS DRAIN ENDWALL FOR 18" PIPE, BILL OF STEEL AND PRECAST NOTES



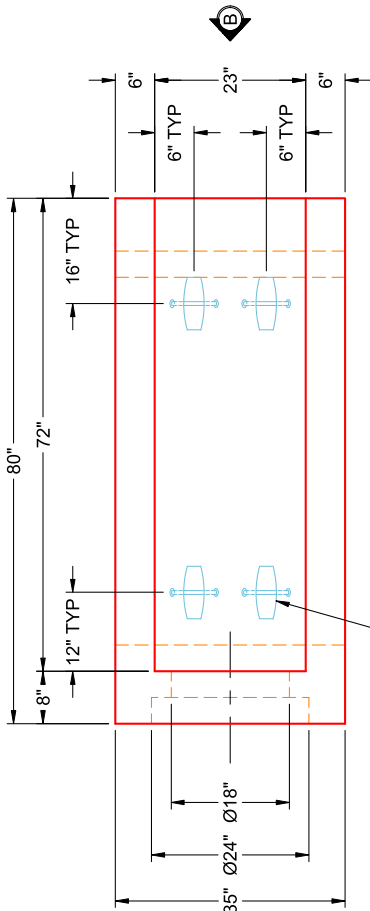
Structure ID: HW 3 (4)

P1 HWTDOT3-1TU18

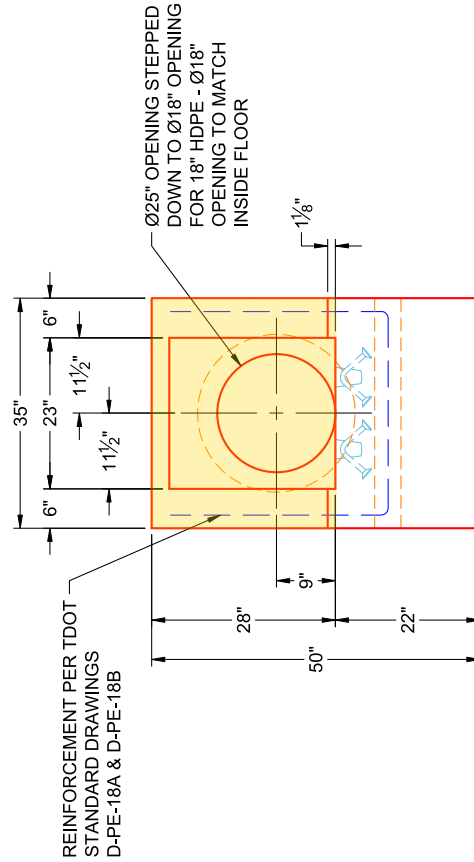
18" - HW TDOT 3:1 Type U Cross Drain Endwall F/F

GENERAL NOTES:

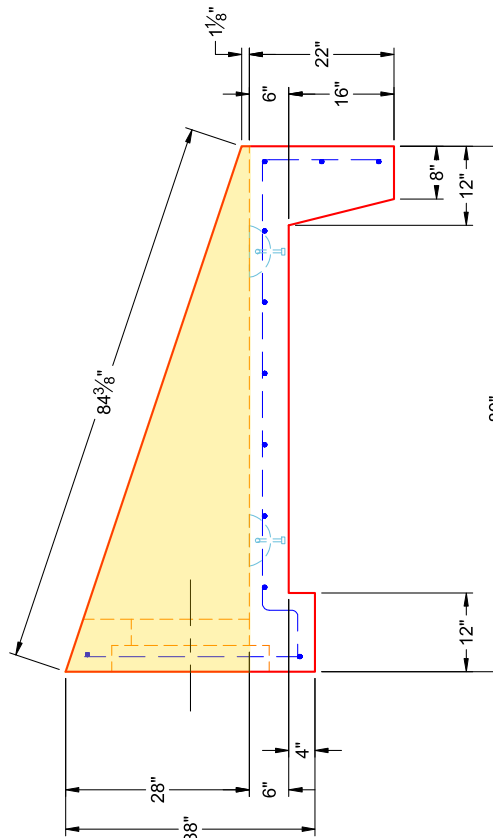
- PER TDOT D-PE-18 SPECIFICATIONS
- CONCRETE: 4,500 PSI AT 28 DAYS
- REINFORCEMENT: PER TDOT STANDARD DRAWINGS D-PE-18A & D-PE-18B
- WEIGHT: 3,375 LBS
 - FIRST POUR: 2,010 LBS
 - SECOND POUR: 1,365 LBS



**PLAN VIEW
(RIGHT SIDE UP)**



**VIEW B
(RIGHT SIDE UP)**



**VIEW A
(RIGHT SIDE UP)**

PRODUCTION WORK ORDER		PRODUCT I.D.: HWTDOT3-1TU18	DESCRIPTION: 18" TDOT D-PE-18 TYPE "U" CROSS DRAIN EW 3:1
QUALITY CONTROL CHECKLIST		PRODUCT VIEW: RIGHT SIDE UP	CUSTOMER: PARKER EXCAVATING, LLC
<input type="checkbox"/> ALL DIMENSIONS CORRECT.		PLANT: BEAVER DAM, KY	PROJECT: GOVERNMENT CENTER
<input type="checkbox"/> LIFTERS INSTALLED.		WEIGHT: 3,375 LBS	STRUCTURE: HW 3 (4)
<input type="checkbox"/> OPENING CENTERED.		TOP SECTION JOINT: N/A	ORDER NO: 25-4566
<input type="checkbox"/> REINFORCING CORRECT.		BASE SECTION JOINT: N/A	PE: J.H. ROSS
<input type="checkbox"/> SURFACE QUALITY ACCEPTABLE.		QC CHECK INITIALS:	DRAWING: K. CARDWELL
<input type="checkbox"/> EDGES CHAMFERED.			SCALE: NTS
<input type="checkbox"/> ALL PATCHWORK ACCEPTABLE.			PG. 1 OF 1
DATE: 04/03/26			

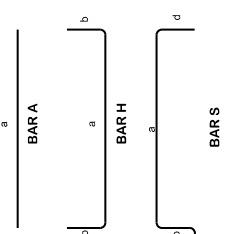


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BILL OF STEEL

CODE NO.	LOCATION	BAR SIZE	3:1 WINGWALL SLOPE				4:1 WINGWALL SLOPE				5:1 WINGWALL SLOPE							
			BENDING DIMENSIONS			NO. REQ'D	BENDING DIMENSIONS			NO. REQ'D	BENDING DIMENSIONS			NO. REQ'D	LENGTH			
			a	b	c	d		a	b	c	d		a	b	c	d		
A400	TOEWALL	4	2'-7"	-	-	-	3	2'-7"	-	-	-	3	2'-7"	-	-	-	3	2'-7"
A431	WINGWALLS	4	5'-7"	-	-	-	2	5'-7"	-	-	-	2	5'-7"	-	-	-	2	5'-7"
A432	WINGWALLS	4	2'-7"	-	-	-	2	2'-7"	-	-	-	2	2'-7"	-	-	-	2	2'-7"
A433	WINGWALLS	4	6'-0"	-	-	-	2	6'-0"	-	-	-	2	6'-0"	-	-	-	2	6'-0"
A441	WINGWALLS	4	-	-	-	-	-	7'-5"	-	-	-	2	7'-6"	-	-	-	2	7'-6"
A442	WINGWALLS	4	-	-	-	-	-	3'-5"	-	-	-	2	3'-6"	-	-	-	2	3'-6"
A443	WINGWALLS	4	-	-	-	-	-	7'-11"	-	-	-	2	7'-11"	-	-	-	2	7'-11"
A461	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A462	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A463	WINGWALLS	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A701	HEADWALL	7	1'-4"	-	-	-	2	1'-4"	-	-	-	2	1'-4"	-	-	-	2	1'-4"
A702	HEADWALL	7	2'-7"	-	-	-	1	2'-7"	-	-	-	1	2'-7"	-	-	-	1	2'-7"
SERIES H430	BOTTOM SLAB & WINGWALL	4	2'-7"	*	-	-	1	25'-10"	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 1'-11 1/2" TO 0'-7 1/2" IN INCREMENTS OF 0'-4" (5 BARS)															
H431	BOTTOM SLAB & HEADWALL	4	2'-7"	2'-7 1/2"	-	-	1	7'-10"	-	-	-	-	-	-	-	-	-	-
SERIES H440	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	2'-7"	*	-	-	-	1	36'-7 1/2"	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-0 1/2" TO 0'-5 1/2" IN INCREMENTS OF 0'-3" (7 BARS)															
H441	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	2'-7"	2'-7 1/2"	-	-	-	1	7'-10 1/2"	-	-	-	-
SERIES H460	BOTTOM SLAB & WINGWALL	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			* DIMENSION "b" VARIES FROM 2'-2 1/2" TO 0'-4 1/2" IN INCREMENTS OF 0'-2" (11 BARS)															
H461	BOTTOM SLAB & HEADWALL	4	-	-	-	-	-	-	-	-	-	-	1	7'-11 1/2"	-	-	-	-
S430	BOTTOM SLAB & TOEWALL	4	5'-7 1/2"	0'-4 1/2"	1'-5"	4	8'-1"	-	-	-	-	-	-	-	-	-	-	-
S440	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	7'-7 1/2"	0'-4 1/2"	0'-8"	1'-5"	4	10'-1"	-	-	-	-	-
S460	BOTTOM SLAB & TOEWALL	4	-	-	-	-	-	-	-	-	-	-	11'-7 1/2"	0'-4 1/2"	0'-8"	1'-5"	4	14'-1"

REINFORCING STEEL LEGEND



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.

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 UNITS 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 PIPE OPENINGS FOR STEEL FABRICATOR TO MAINTAIN THE INTEGRITY OF THE STRUCTURE DURING HANDLING AND PLACEMENT SHALL BE THE RESPONSIBILITY OF THE STEEL FABRICATOR.
- CONCRETE FILL FOR JOINTS PER SQUARE INCH MINIMUM AT 28 BARS REINFORCING STEEL. ASTM A615, F-60,000 POUNDS PER SQUARE INCH.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED



CROSS DRAIN ENDWALL FOR 18" PIPE, BILL OF STEEL AND PRECAST NOTES