ALLOWABLE STRUCTURE & FRAME COMBINATIONS

STRUCTURE TYPE	FRAME NUMBER											
	3	6	11	16	22	MANHOLE	F1	F2	F3	10PCB	11PCB	12PCB
A	0103					0132						
B	0203	0206	0211			0232						
C	0303	0306	0311			0332						
D	0403	0406	0411			0432						
E	0503					0532						
F	0603	0606	0611			0632	0671		0673	0690	0691	
G	0703	0706	0711	0716	0722	0732	0771	0772	0773	0790	0791	
H	0803	0806	0811	0816	0822	0832	0871	0872		0890	0891	
I	0903					0932						0992
J	1003	1006	1011	1016	1022	1032	1071	1072		1090		
K	1103	1106	1111	1116	1122	1132	1171	1172		1190	1191	1192
L	1203	1206	1211	1216	1222	1232	1271	1272		1290	1291	1292
M	1303					1332						1392
N	1403	1406	1411	1416	1422	1432	1471	1472	1473	1490	1491	
O	1503	1506	1511	1516	1522	1532	1571	1572	1573	1590	1591	1592
P	1603	1606	1611	1616	1622	1632	1671	1672	1673	1690	1691	1692
Q								1772				
R									1873			
S			1911							1990		
T				2016							2091	
U					2122							2192

NOTES:
1. PAY ITEM CODES (XXYY) SHOWN IN THIS TABLE INDICATE ALLOWABLE STRUCTURE AND FRAME COMBINATIONS AND ARE TO BE USED TO SPECIFY THE STRUCTURE TYPE (XX) AND THE FRAME NUMBER (YY) CODING FOR THE PAY ITEM NUMBER(S) FOR RECTANGULAR DRAINAGE STRUCTURES (ITEM 604.30XXYY).
   EXAMPLE: RECTANGULAR STRUCTURE TYPE G & WELDED FRAME #6 = 0706
   ITEM 604.300706 - RECTANGULAR DRAINAGE STRUCTURE TYPE G WITH WELDED FRAME TYPE 6
2. A BLANK ENTRY INDICATES THAT THE STRUCTURE AND FRAME COMBINATION ARE NOT STANDARD AND USE WOULD REQUIRE A SPECIAL DESIGN.

GENERAL NOTES:

1. RECTANGULAR DRAINAGE STRUCTURES MAY BE CAST-IN-PLACE OR PRECAST UNITS. ROUND DRAINAGE STRUCTURES SHALL BE PRECAST, ONLY. CONTRACTORS SHALL SUBMIT WORKING DRAWINGS FOR REVIEW AND APPROVAL OF ANY DEVIATION TO THE DRAINAGE STRUCTURES AS SHOWN IN THE STANDARD SHEETS OR CONTRACT DOCUMENTS, OTHER THAN MINOR CHANGES APPROVED BY THE ENGINEER.
2. SEE CONTRACT DOCUMENTS FOR SELECTED DRAINAGE STRUCTURE TYPES AND LOCATIONS, ELEVATIONS, SELECTED FRAME AND GRATE TYPES, AND LOCATIONS OF DRAINAGE STRUCTURES WITH SCOOPS, FORMED INVERTS, OR SUMPS AND DRAINS.
3. WHEN DRAINAGE STRUCTURES MAY BE SUBJECTED TO HIGHWAY LOADS AND PIPE ENTRIES PROVIDE FOR LESS THAN 8" BETWEEN THE TOP OF THE UPPERMOST PIPE OPENING AND THE TOP OF THE RISER, SEE NOTE 1 ON SHEET 6.
4. WHEN SITE CONDITIONS REQUIRE A DRAINAGE STRUCTURE TO BE INSTALLED TO A DEPTH GREATER THAN THAT SHOWN IN THE CONTRACT DOCUMENTS, AN INSTALLATION TOLERANCE OF 8" IS PERMITTED WITHOUT A REQUIRED INCREASE IN WALL THICKNESS OR REINFORCING STEEL AS SHOWN IN THE RECTANGULAR DRAINAGE STRUCTURE REINFORCEMENT TABLE ON SHEET 2.

STRUCTURE SIZES & PAY ITEM CODES

STRUCTURE TYPE	INSIDE WALL DIMENSIONS		PAY ITEM XX CODE
	WIDTH	LENGTH	
A	36"	36"	01
B	48"	36"	02
C	60"	36"	03
D	80"	36"	04
E	36"	48"	05
F	48"	48"	06
G	60"	48"	07
H	80"	48"	08
I	36"	60"	09
J	48"	60"	10
K	60"	60"	11
L	80"	60"	12
M	36"	80"	13
N	48"	80"	14
O	60"	80"	15
P	80"	80"	16
Q*	**	**	17
R*	**	**	18
S*	**	**	19
T*	**	**	20
U*	**	**	21

NOTES:
* STRUCTURE TYPES Q, R, S, T, & U DO NOT HAVE TOP SLABS. SEE SHEET 6 FOR DETAILS.
** SEE SHEET 6 FOR PRECAST AND CAST-IN-PLACE INSIDE WALL DIMENSIONS FOR STRUCTURE TYPES Q, R, S, T, & U.

FRAME SIZES & PAY ITEM CODES

FRAME TYPE	FRAME NUMBER	OUTSIDE FRAME DIMENSIONS		PAY ITEM YY CODE
		WIDTH	LENGTH	
WELDED	3	$23\frac{15}{16}$"	$37\frac{1}{2}$"	03
	6	$26\frac{7}{16}$"	$27\frac{1}{2}$"	06
	11	$28\frac{15}{16}$"	$37\frac{1}{2}$"	11
	16	$31\frac{7}{16}$"	$47\frac{1}{2}$"	16
	22	$38\frac{15}{16}$"	$42\frac{1}{2}$"	22
CAST STEEL OR IRON	MANHOLE	---		32
	F1	$39\frac{1}{4}$" MIN.	$35\frac{1}{4}$" MIN.	71
	F2	$39\frac{1}{4}$" MIN.	$45\frac{1}{4}$" MIN.	72
	F3	$39\frac{1}{4}$" MIN.	$55\frac{1}{4}$" MIN.	73
PARALLEL BAR	10PCB	$24\frac{7}{8}$"	$38\frac{1}{2}$"	90
	11PCB	$27\frac{3}{8}$"	$48\frac{1}{2}$"	91
	12PCB	$34\frac{7}{8}$"	$43\frac{1}{2}$"	92

NOTES:
1. SEE STANDARD SHEETS § 655 FOR FRAMES, GRATES, AND COVERS.

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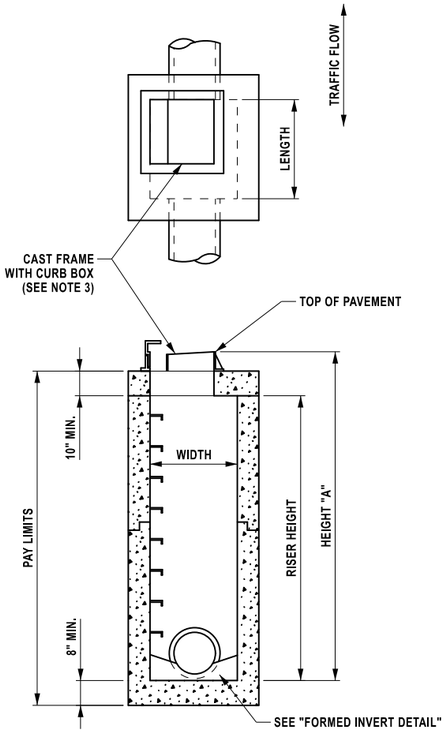
DRAINAGE STRUCTURES
(SHEET 1 OF 6)

APPROVED MAY 01, 2026
DEPUTY CHIEF ENGINEER
(DESIGN)

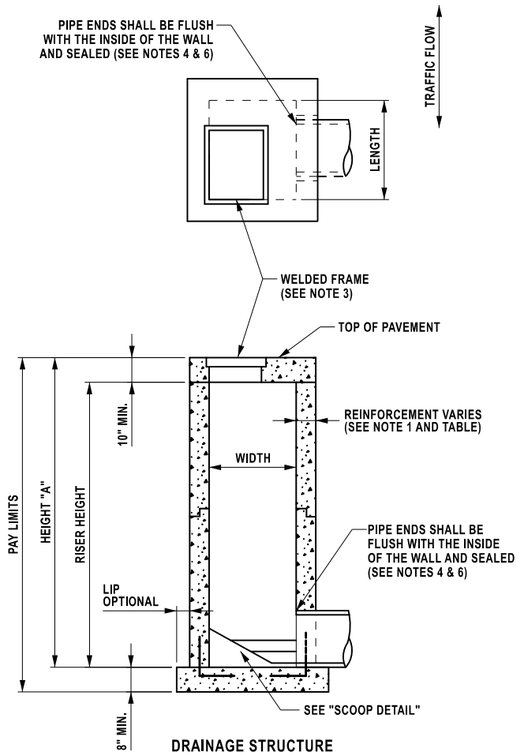
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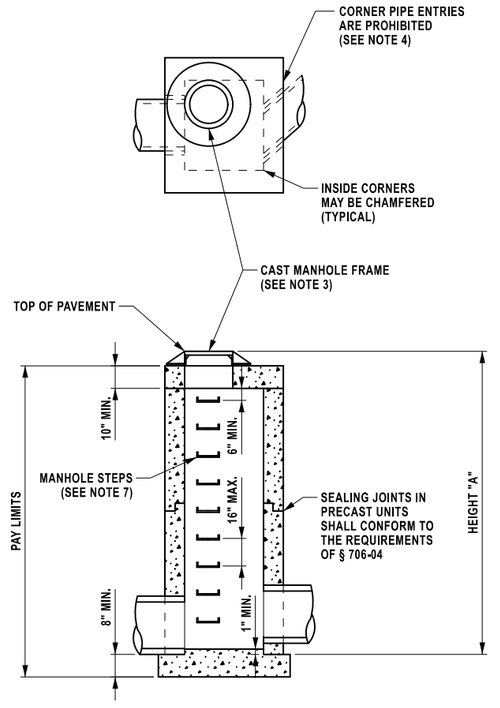
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DRAINAGE STRUCTURE TYPE A THROUGH P
SHOWN WITH CURB BOX, FORMED INVERT, AND A MONOLITHICALLY CAST FLOOR SLAB



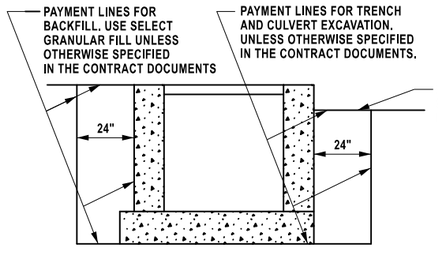
DRAINAGE STRUCTURE TYPE A THROUGH P
SHOWN WITH WELDED FRAME, SCOOP, AND INTEGRAL FLOOR SLAB



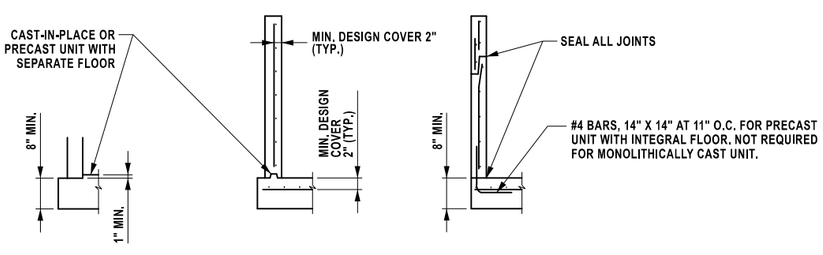
DRAINAGE STRUCTURE TYPE A THROUGH P
SHOWN WITH MANHOLE FRAME AND SEPARATE FLOOR SLAB

NOTES:

1. REINFORCEMENT:
   BAR REINFORCEMENT FOR DRAINAGE STRUCTURES (CAST-IN-PLACE OR PRECAST) INDICATED FOR THE TOP SLABS, RISERS, AND FLOOR SLABS SHALL BE GRADE 60. WIRE FABRIC FOR CONCRETE REINFORCEMENT SHALL MEET THE REQUIREMENTS OF § 709-02. RISER REINFORCEMENT SHALL BE PLACED WITH A MINIMUM DESIGN COVER OF 2" AND A MAXIMUM COVER OF 4" FROM THE INSIDE FACE OF THE DRAINAGE STRUCTURE. THE REINFORCEMENT SHALL EXTEND COMPLETELY AROUND THE DRAINAGE STRUCTURE RISER AND SHALL BE LAPPED AND TIED IN ACCORDANCE WITH § 706-04. FLOOR SLAB REINFORCEMENT SHALL BE PLACED ABOVE THE MIDPOINT OF THE SLAB AND SHALL HAVE A MINIMUM DESIGN COVER OF 2".
2. FORMED INVERTS, SCOOPS, AND SUMPS AND DRAINS:
   FORMED INVERTS, SCOOPS, AND SUMPS AND DRAINS SHALL BE PROVIDED IN DRAINAGE STRUCTURES WHEN SPECIFIED IN THE CONTRACT DOCUMENTS AND SHALL BE INCLUDED IN THE PRICE BID FOR THE DRIANAGE STRUCTURE. WHEN USED, FORMED INVERTS AND SCOOPS SHALL BE FLUSH WITH THE FLOW LINE OF THE OUTLET PIPE OF THE DRAINAGE STRUCTURE. WHEN NON-ROUND PIPES ARE USED, THE FORMED INVERT DETAIL AND SCOOP DETAIL SHALL BE MODIFIED TO MATCH THE SHAPE OF THE OUTLET PIPE.
3. FRAMES AND GRATES:
   SEE STANDARD SHEETS § 655 FOR DETAILS ON FRAMES AND GRATES. FRAMES AND GRATES SHALL BE INSTALLED SO THAT THE LENGTH OF THE GRATE IS PARALLEL TO THE SURFACE FLOW.
4. WALL OPENINGS:
   RECTANGULAR DRAINAGE STRUCTURES SHOWN ON THESE STANDARD SHEETS SHALL NOT HAVE CORNER PIPE ENTRIES. IF PIPE ALIGNMENT WOULD REQUIRE A CORNER ENTRY, A ROUND DRAINAGE STRUCTURE OR A SPECIAL DRAINAGE STRUCTURE IS REQUIRED. ALL WALL OPENINGS SHALL BE FORMED COMPLETELY THROUGH THE WALL SECTION. CIRCULAR WALL OPENINGS SHALL BE FORMED FOR EACH CIRCULAR PIPE ENTERING PERPENDICULAR TO THE WALL. WHEN NON-ROUND PIPES ARE SPECIFIED, OR ROUND PIPE ENTRIES ARE SKEWED, RECTANGULAR OPENINGS MAY BE USED. THE CLEARANCE BETWEEN THE OUTSIDE OF THE PIPE AND WALL OPENING SHALL BE A MINUMUM OF 2" AND A MAXIMUM OF 3". THIS CLEARANCE SHALL BE MEASURED BETWEEN THE OUTSIDE OF THE PIPE AND NEAREST POINT ON THE WALL OPENING.
5. FLOOR SLABS:
   MONOLITHIC AND INTEGRAL FLOOR SLABS MAY HAVE A MAXIMUM VERTICAL DRAFT OF ½" ON ALL INTERIOR DIMENSIONS TO FACILITATE FORM REMOVAL. FOR WALL OPENINGS THAT EXTEND THE FULL WIDTH OR LENGTH OF THE STRUCTURE, THE MINIMUM CLEARANCE BETWEEN THE OUTSIDE OF THE PIPE AND THE WALL OPENING SHALL BE 1½".
6. FINISHING PIPE ENTRIES:
   THE BELLS OF CONCRETE PIPE SHALL BE CUT OFF AT EVERY PIPE ENTRY WHERE THE BELL ENTERS A DRAINAGE STRUCTURE. CONNECTIONS BETWEEN THE DRAINAGE STRUCTURE AND PIPE SHALL BE MADE BY USING A RESILIENT CONNECTOR MEETING THE REQUIREMENTS OF ASTM C1478, OR BY FILLING THE SPACE AROUND EACH PIPE WITH CONCRETE GROUTING MATERIAL OR CONCRETE REPAIR MATERIAL. IN INSTANCES OF LARGE SPACES AROUND PIPES, CONCRETE PAVERS, COMPLETELY EMBEDDED IN GROUT OR CONCRETE REPAIR MATERIAL, MAY BE USED.
7. STEPS:
   MANHOLE STEPS SHALL BE REQUIRED IN ALL DRAINAGE STRUCTURES WITH A HEIGHT "A" GREATER THAN 4'-0".
8. DRAINAGE STRUCTURES SHALL BE INSTALLED WITH THE DRAINAGE STRUCTURE LENGTH PARALLEL TO THE TRAFFIC FLOW.

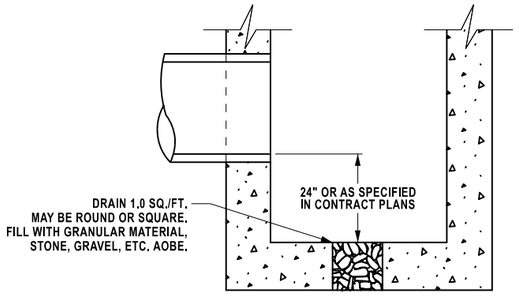


EXCAVATION AND BACKFILL LIMITS AND MATERIALS

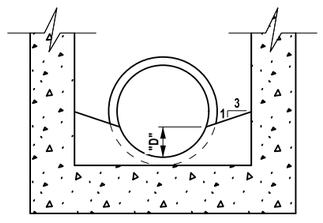


DRAINAGE STRUCTURE REINFORCING DETAILS
SEE NOTE 1 AND TABLE "RECTANGULAR DRAINAGE STRUCTURE REINFORCMENT"

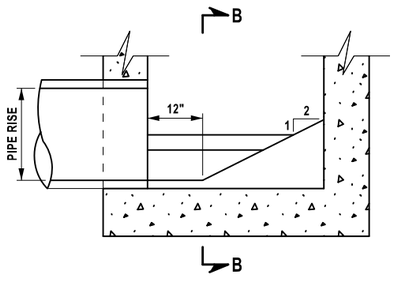
RECTANGULAR DRAINAGE STRUCTURE REINFORCEMENT		
HEIGHT "A"	WALL THICKNESS	RISER REINFORCEMENT (SEE NOTE 1)
UP TO 7'-0"	8"	UNREINFORCED
7'-0" TO 14'-0"	8"	6"X6"- W8.5 X W8.5 OR #3 BARS AT 8" BOTH HORIZ. AND VERT.
14'-0" TO 21'-0"	8"	4"X4"- W8.5 X W8.5 OR #3 BARS AT 5" BOTH HORIZ. AND VERT.
		FLOOR SLAB REINFORCEMENT (SEE NOTE 1)
UP TO 7'-0"		6"X6"- W11 X W11 OR #3 BARS AT 5" IN BOTH DIRECTIONS
7'-0" TO 14'-0"		4"X4"- W11 X W11 OR #3 BARS AT 4" IN BOTH DIRECTIONS
14'-0" TO 21'-0"		4"X4"- W14 X W14 OR #3 BARS AT 3" IN BOTH DIRECTIONS



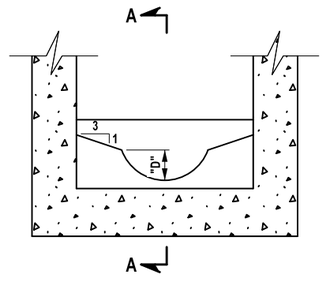
SUMP AND DRAIN DETAIL
(SEE NOTE 2)



FORMED INVERT DETAIL
¼ PIPE RISE < "D" < ⅓ PIPE RISE
(SEE NOTE 2)



SECTION A-A



SECTION B-B

SCOOP DETAIL
¼ PIPE RISE < "D" < ⅓ PIPE RISE
(SEE NOTE 2)

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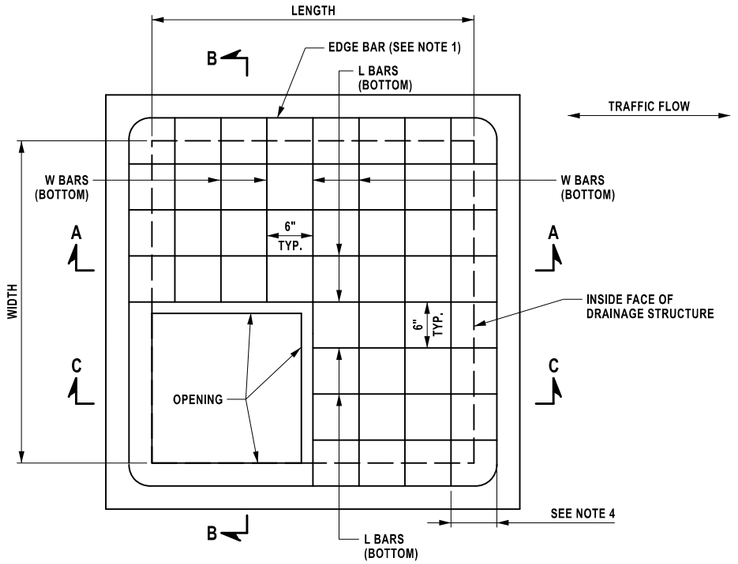
DRAINAGE STRUCTURES (SHEET 2 OF 6) RECTANGULAR DRAINAGE STRUCTURES

APPROVED MAY 01, 2026
DEPUTY CHIEF ENGINEER (DESIGN)

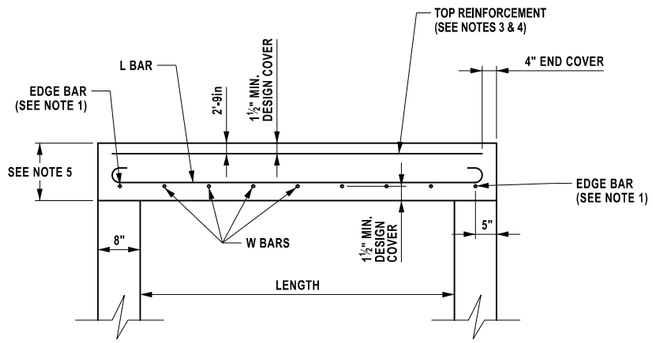
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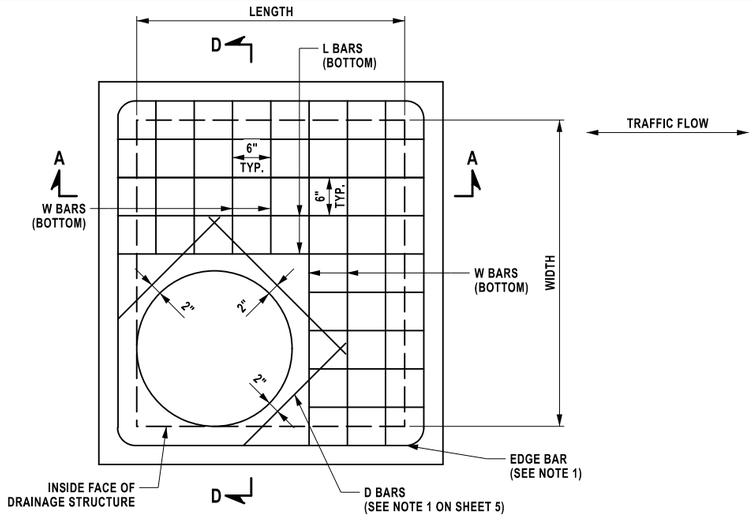
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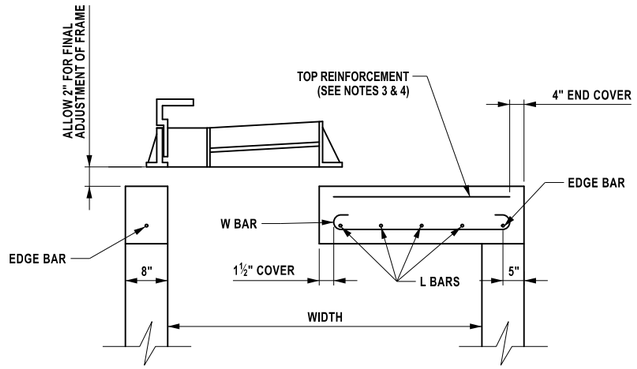
TOP SLAB BAR LAYOUT
FOR WELDED, PARALLEL BAR, AND CAST FRAMES
SEE SHEET 5 FOR TOP SLAB DIMENSIONS



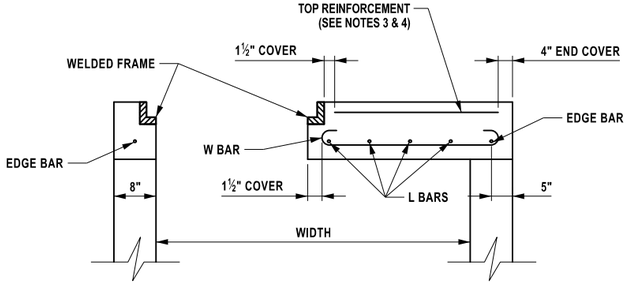
SECTION A-A
ALL TYPES OF FRAMES



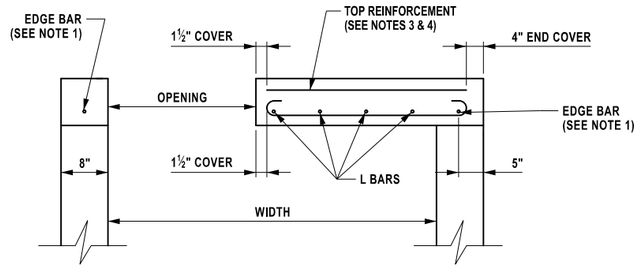
TOP SLAB BAR LAYOUT
FOR ROUND MANHOLE COVER
SEE SHEET 5 FOR TOP SLAB DIMENSIONS



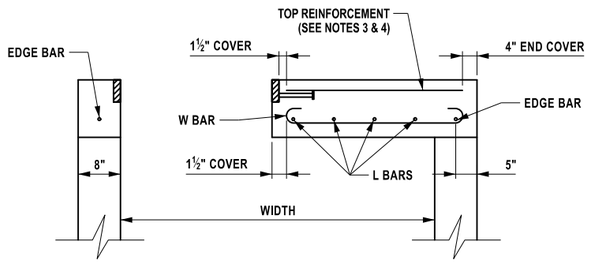
SECTION B-B
CAST FRAME



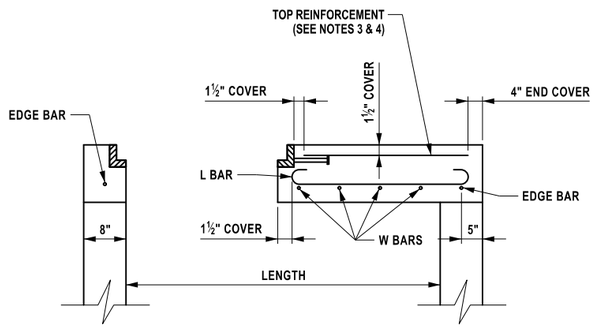
SECTION B-B
WELDED FRAME



SECTION D-D



SECTION B-B
PARALLEL BAR FRAME



SECTION C-C
PARALLEL BAR FRAME

NOTES:

1. EDGE BARS SHALL BE PLACED 5" FROM THE OUTSIDE FACE OF THE STRUCTURE WALL.
2. ALL W AND L BARS SHALL BE EVENLY SPACED AT APPROXIMATELY 6" SO THAT THE DISTANCE BETWEEN THE LAST W OR L BAR AND THE ADJACENT EDGE BAR SHALL NOT EXCEED 10".
3. TOP SLABS FOR TYPE A, B, C, D, E, F, G, I, J, AND K, DRAINAGE STRUCTURES ARE REINFORCED WITH #6 HOOKED BARS ON THE BOTTOM, AND 6X6, W6 X W6 FABRIC ON THE TOP.
4. TOP SLABS FOR TYPE H, L, M, N, O, AND P DRAINAGE STRUCTURES ARE REINFORCED WITH #7 HOOKED BARS ON THE BOTTOM, AND 6X6, W5XW5 FABRIC ON THE TOP. THE CONTRACTOR HAS THE OPTION OF USING #6 HOOKED BARS AND A BAR SPACING OF 5" WHEN THIS OPTION IS USED. THE MAXIMUM DISTANCE BETWEEN THE LAST W OR L BAR AND THE EDGE BAR SHALL NOT EXCEED 8".
5. SEE SHEET 5 FOR TOP SLAB DIMENSIONS.

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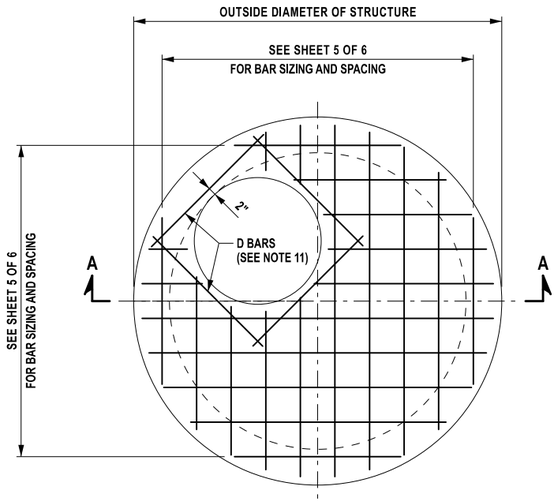
DRAINAGE STRUCTURES
(SHEET 3 OF 6)
TOP SLABS FOR
RECTANGULAR DRAINAGE STRUCTURES

APPROVED MAY 01, 2026
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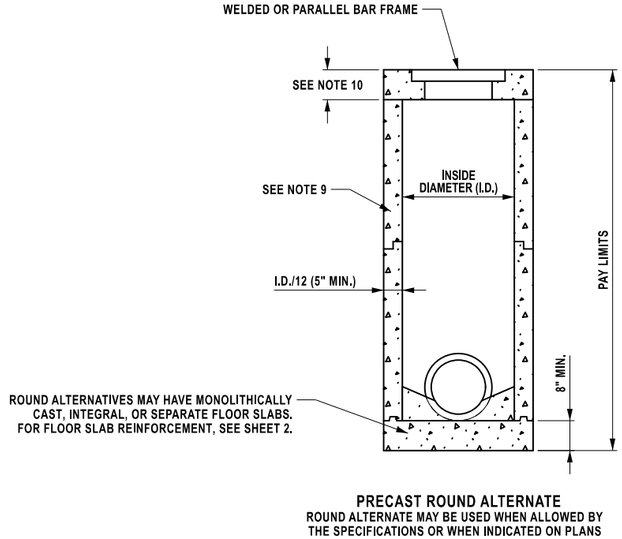
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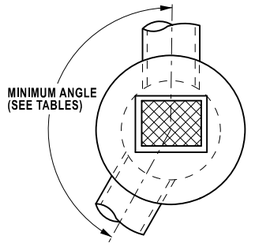
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TOP SLAB BAR LAYOUT
ROUND DRAINAGE STRUCTURE
SEE SHEET 5 OF 6 FOR TOP SLAB DIMENSIONS

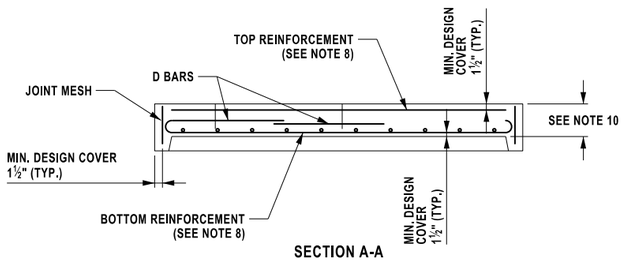


PRECAST ROUND ALTERNATE
ROUND ALTERNATE MAY BE USED WHEN ALLOWED BY THE SPECIFICATIONS OR WHEN INDICATED ON PLANS

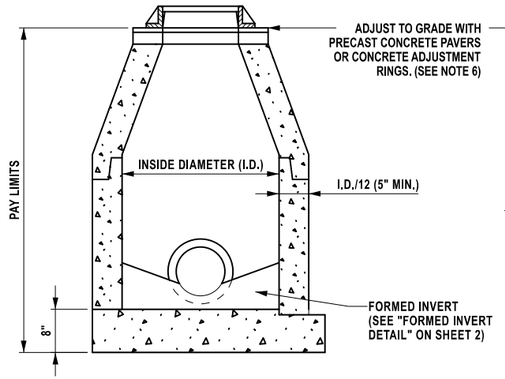


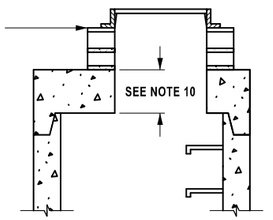
SELECTION TABLES FOR ALTERNATE ROUND DRAINAGE STRUCTURES

METAL PIPES		STRUCTURE INSIDE DIAMETER				
		48"	60"	72"	84"	96"
CMP ARCH SPAN AND RISE	ROUND INSIDE DIAMETER	MINIMUM ANGLE BETWEEN PIPE ENTRIES (NOTE 5)				
	12"	68	54	45	38	34
	15"	76	60	50	43	37
17" X 13"		82	64	53	45	40
	18"	85	67	55	47	41
		91	71	59	50	43
21" X 15"	21"	94	73	60	51	45
24" X 18"	24"	103	80	66	56	49
28" X 20"		116	89	73	62	54
	30"	124	94	76	65	56
35" X 24"		145	106	86	72	63
	36"	152	110	88	74	64
42" X 29"	42"		128	101	84	72
	48"		153	115	95	81
49" X 33"			158	117	96	82
	54"			132	106	90
57" X 38"				141	112	94
60" X 46"				150	117	98
	60"			154	119	100
64" X 43"					129	107
	66"				134	110
71" X 47"					151	120
	72"				155	122



SECTION A-A





PRECAST ROUND ALTERNATE
ALTERNATE FLOOR SLABS SHOWN

SELECTION TABLES FOR ALTERNATE ROUND DRAINAGE STRUCTURES

CONCRETE OR POLYETHYLENE PIPES		STRUCTURE INSIDE DIAMETER				
		48"	60"	72"	84"	96"
RCP H.E. RISE X SPAN	ROUND INSIDE DIAMETER	MINIMUM ANGLE BETWEEN PIPE ENTRIES (NOTE 5)				
	12"	84	63	50	41	35
	15"	94	70	56	46	39
	18"	104	78	62	51	43
	21"	115	85	68	56	48
	24"	127	93	74	61	52
	27"	141	102	81	67	57
	30"	157	111	87	72	61
19" X 30"		157	112	88	73	62
	34"		121	95	78	66
22" X 34"			125	97	80	68
	36"		133	102	84	71
24" X 38"			140	106	87	74
27" X 42"			156	115	94	79
	42"		164	119	96	81
29" X 45"				130	104	87
	48"			140	110	92
32" X 49"				145	113	94
34" X 53"				166	123	101
	54"			175	126	104
	60"				147	117

NOTES:

1. THE INSIDE DIAMETER OF THE ROUND UNIT SHALL NOT BE LESS THAN THE LARGEST INSIDE WALL DIMENSION OF THE SPECIFIED RECTANGULAR UNIT IT REPLACES. THE STRUCTURE SHALL BE LARGE ENOUGH TO HAVE THE SPECIFIED GRATE FIT WITHIN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE.
2. THE VALUES LISTED IN THE SELECTION TABLES ARE BASED ON THE CENTERLINE OF ALL PIPES INTERSECTING AT THE CENTER OF THE ROUND ALTERNATE.
3. THE ANGLE BETWEEN ADJACENT PIPE ENTRIES SHALL NOT BE LESS THAN THE MINIMUM SHOWN IN THE TABLE ABOVE. WHEN THE ADJACENT PIPES HAVE DIFFERENT SIZES, THE MINIMUM ANGLE SHALL BE THE VALUE FOR THE LARGER OF THE TWO PIPES.
4. THE SUM OF THE MINIMUM ANGLES BETWEEN PIPES AT THE SAME LEVEL SHALL NOT BE MORE THAN 360 DEGREES. THEY SHALL BE REGARDED AS BEING AT THE SAME LEVEL IF THEIR RISES OVERLAP.
5. A BLANK (NO ENTRY) IN TABLE INDICATES THAT THE STRUCTURE IS TOO SMALL FOR PIPE OF THAT SIZE.
6. TOP SLAB AND FRAME ADJUSTMENT A MINIMUM OF ½" OF BEDDING SHALL BE PLACED BETWEEN RISERS AND PRECAST TOP SLABS. GRADE ADJUSTMENT FOR TOP SLABS AND FRAMES OF UP TO 2½" SHALL BE MADE WITH BEDDING MATERIAL MEETING THE REQUIREMENTS OF CONCRETE GROUTING MATERIALS OR CONCRETE REPAIR MATERIAL. GRADE ADJUSTMENT FOR TOP SLABS AND/OR FRAMES AND GRATES OF UP TO 6" SHALL BE MADE WITH A COMBINATION OF PRECAST CONCRETE PAVERS AND BEDDING MATERIALS. GRADE ADJUSTMENT FOR TOP SLABS AND/OR FRAMES AND GRATES OF UP TO 1'-0" SHALL BE MADE WITH CAST-IN-PLACE CONCRETE OR A COMBINATION OF PRECAST CONCRETE ADJUSTMENT ELEMENTS AND BEDDING MATERIALS. ALTERNATELY, GRADE ADJUSTMENTS FOR FRAMES AND GRATES OF UP TO 2" MAY BE MADE WITH RECYCLED RUBBER ELEMENTS OR UP TO 3" WITH HDPE ELEMENTS. RECYCLED RUBBER AND HDPE ELEMENTS SHALL BE PRODUCTS APPROVED BY THE MATERIALS BUREAU AND SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
7. CORBELED OR CONICAL RISER SECTIONS AND FLAT SLAB REDUCERS:
   ROUND PRECAST DRAINAGE STRUCTURES OR MANHOLES (WHEN ALLOWED OR SPECIFIED) MAY BE FITTED WITH CONCENTRIC OR ECCENTRIC CONICAL SECTIONS TO REDUCE THEIR DIAMETERS, PROVIDED THE USE OF SUCH DEVICES IS COMPATIBLE WITH THE DRAINAGE SYSTEM DESIGN. THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS FOR REVIEW AND APPROVAL OF FLAT SLAB REDUCERS FOR ROUND OR RECTANGULAR STRUCTURES. A WALL SECTION WITH A HEIGHT LESS THAN 6" BETWEEN THE TOP OF THE HIGHEST PIPE ENTRY AND THE BOTTOM OF A CONICAL SECTION OR FLAT SLAB REDUCER SHALL NOT BE PERMITTED.
8. TOP SLABS FOR ROUND DRAINAGE STRUCTURES OR MANHOLES ARE REINFORCED WITH EITHER #7 OR #8 HOOKED BARS (SEE TABLE ON SHEET 5) ON THE BOTTOM, AND 6X6, W6 X W6 FABRIC ON THE TOP.
9. COVER REQUIREMENTS FOR TOP SLAB: 2" FOR TOP REINFORCEMENT, 1 1/2" FOR BOTTOM REINFORCEMENT AND EDGE REINFORCEMENT OF SLAB, 1/2" IN JOINTS.
10. SEE TABLES ON SHEET 5 FOR FOR TOP SLAB THICKNESSES ON ROUND DRAINAGE STRUCTURES OR MANHOLES.
11. SEE NOTE 1 ON SHEET 5 FOR D BAR REQUIREMENTS.

PRECAST ROUND MANHOLES

ITEM	TYPE	CIRCUMFERENTIAL STEEL - SQUARE INCHES PER VERTICAL FOOT	INSIDE DIAMETER (IN)
604.4048	48	0.12	48
604.4060	60	0.15	60
604.4072	72	0.18	72
604.4084	84	0.21	84
604.4096	96	0.24	96

NEW YORK STATE | **Department of Transportation**

U.S. CUSTOMARY STANDARD SHEET

DRAINAGE STRUCTURES
(SHEET 4 OF 6)
ROUND DRAINAGE STRUCTURES

APPROVED MAY 01, 2026
DEPUTY CHIEF ENGINEER
(DESIGN)

ISSUED UNDER EI 26-003

604-02

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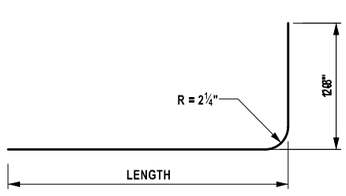
BOTTOM REINFORCEMENT							
RECTANGULAR TOP SLAB WITH CORNER OPENING							
STRUCTURE TYPE	⊥ TO TRAFFIC	∥ TO TRAFFIC	REINFORCING ⊥ TO TRAFFIC	REINFORCING ∥ TO TRAFFIC	ADDITIONAL REINFORCEMENT (SEE NOTE 1)		SLAB THICKNESS (IN)
	OUTSIDE WIDTH (IN)	OUTSIDE LENGTH (IN)	BAR SIZE & SPACING	BAR SIZE & SPACING	NO. OF BARS	BAR SIZE	
A	52	52	#6 @ 6"	#6 @ 6"	3	#6	10
B	64	52	#6 @ 6"	#6 @ 6"	3	#6	10
C	76	52	#6 @ 6"	#6 @ 6"	3	#6	10
D	96	52	#6 @ 6"	#6 @ 6"	3	#6	10
E	52	64	#6 @ 6"	#6 @ 6"	3	#6	10
F	64	64	#6 @ 6"	#6 @ 6"	3	#6	10
G	76	64	#6 @ 6"	#6 @ 6"	3	#6	10
H	96	64	#7 @ 6"	#7 @ 6"	3	#6	10
I	52	76	#6 @ 6"	#6 @ 6"	3	#6	10
J	64	76	#6 @ 6"	#6 @ 6"	3	#6	10
K	76	76	#6 @ 6"	#6 @ 6"	3	#6	10
L	96	76	#7 @ 6"	#7 @ 6"	3	#6	10
M	52	96	#7 @ 6"	#7 @ 6"	3	#6	10
N	64	96	#7 @ 6"	#7 @ 6"	3	#6	10
O	76	96	#7 @ 6"	#7 @ 6"	3	#6	10
P	96	96	#7 @ 6"	#7 @ 6"	3	#6	10

BOTTOM REINFORCEMENT							
RECTANGULAR TOP SLAB WITH RELOCATED/SPECIAL OPENING							
STRUCTURE TYPE	⊥ TO TRAFFIC	∥ TO TRAFFIC	REINFORCING ⊥ TO TRAFFIC	REINFORCING ∥ TO TRAFFIC	ADDITIONAL REINFORCEMENT (SEE NOTE 1)		SLAB THICKNESS (IN)
	OUTSIDE WIDTH (IN)	OUTSIDE LENGTH (IN)	BAR SIZE & SPACING	BAR SIZE & SPACING	NO. OF BARS	BAR SIZE	
A	52	52	#7 @ 5" or #8 @ 7"	#7 @ 6" or #8 @ 7"	3	#6	12
B	64	52	#7 @ 5" or #8 @ 6"	#7 @ 6" or #8 @ 7"	3	#6	12
C	76	52	#7 @ 4" or #8 @ 5"	#7 @ 6" or #8 @ 7"	3	#6	12
D	96	52	#7 @ 4" or #8 @ 5"	#7 @ 6" or #8 @ 7"	3	#6	12
E	52	64	#7 @ 5" or #8 @ 7"	#7 @ 6" or #8 @ 7"	3	#6	12
F	64	64	#7 @ 5" or #8 @ 6"	#7 @ 5" or #8 @ 6"	3	#6	12
G	76	64	#7 @ 4" or #8 @ 5"	#7 @ 5" or #8 @ 6"	3	#6	12
H	96	64	#7 @ 4" or #8 @ 5"	#7 @ 5" or #8 @ 6"	3	#6	12
I	52	76	#7 @ 5" or #8 @ 7"	#7 @ 4" or #8 @ 5"	3	#6	12
J	64	76	#7 @ 5" or #8 @ 6"	#7 @ 4" or #8 @ 5"	3	#6	12
K	76	76	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	3	#6	12
L	96	76	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	3	#6	12
M	52	96	#7 @ 5" or #8 @ 7"	#7 @ 4" or #8 @ 5"	3	#6	12
N	64	96	#7 @ 5" or #8 @ 6"	#7 @ 4" or #8 @ 5"	3	#6	12
O	76	96	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	3	#6	12
P	96	96	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	3	#6	12

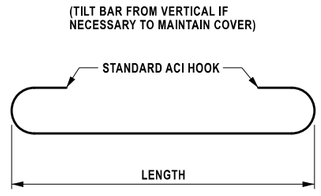
1. REINFORCING PERPENDICULAR (⊥) TO TRAFFIC SHALL BE THE FIRST LAYER OF BOTTOM MAT. REINFORCING PARALLEL (∥) TO TRAFFIC TO BE SECOND LAYER OF BOTTOM MAT. DRAWING SUBMISSIONS FOR DRAINAGE STRUCTURES WITH A TOP SLAB SHALL INDICATE THE DIRECTION OF THE TRAFFIC FLOW.
2. RECTANGULAR OPENINGS FOR RECTANGULAR DRAINAGE STRUCTURES SHALL TYPICALLY BE FLUSH WITH THE INSIDE WALL OF RECTANGULAR DRAINAGE STRUCTURES (ALONG THE SIDE PARALLEL TO THE FLOW LINE) TO ALLOW FOR ACCESS TO A LADDER OR STEPS.

BOTTOM REINFORCEMENT			
CIRCULAR MANHOLE TOP SLAB			
MANHOLE TYPE	REINFORCING ⊥ TO TRAFFIC	REINFORCING ∥ TO TRAFFIC	SLAB THICKNESS (IN)
	BAR SIZE & SPACING	BAR SIZE & SPACING	
48	#7 @ 5" or #8 @ 6"	#7 @ 5" or #8 @ 6"	11
60	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	11
72	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	12
84	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	13
96	#7 @ 4" or #8 @ 5"	#7 @ 4" or #8 @ 5"	14

1. SLABS REQUIRING RECESSED GRATES SHALL BE 10" THICK (MINIMUM). REINFORCEMENT (2 MATS) SHALL BE PROVIDED IN THE TOP AND BOTTOM OF THE SLAB. BOTTOM REINFORCEMENT OF THE SLAB SHALL BE HOOKED.
2. CIRCULAR OPENINGS SHALL TYPICALLY HAVE ONE EDGE FLUSH TO THE INSIDE WALL TO ALLOW FOR ACCESS TO A LADDER.



TYPICAL EDGE BAR



TYPICAL W BAR OR L BAR

1. THE LENGTH OF BARS SHALL BE DETERMINED BASED ON REINFORCEMENT COVERAGE REQUIREMENTS.

NOTES:

1. D BARS ARE REQUIRED AS SHOWN ON THE "TOP SLAB BAR LAYOUT FOR ROUND MANHOLE COVER" DETAIL ON SHEET 3, D BARS AROUND THE OPENING SHALL MATCH THE AREA OF REINFORCEMENT THAT WOULD HAVE BEEN PRESENT WITHIN THE OPENING. D BARS SHALL BE STRAIGHT AND OF THE SAME SIZE AS THE HOOKED BARS USED. "TOP SLAB BAR LAYOUT FOR ROUND DRAINAGE STRUCTURE" DETAIL ON SHEET 4 OF 6.
2. SEE SHEET 1 FOR ALLOWABLE DRAINAGE STRUCTURE AND FRAME COMBINATIONS.

NEW YORK STATE | Department of Transportation

U.S. CUSTOMARY STANDARD SHEET

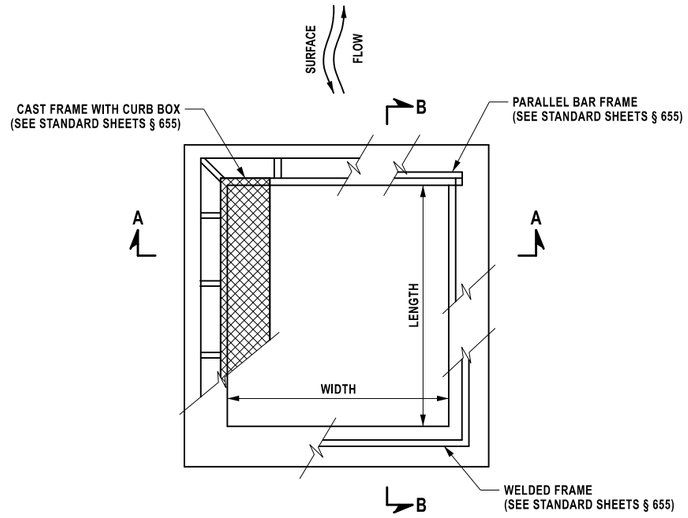
DRAINAGE STRUCTURES
(SHEET 5 OF 6)
TOP SLAB REINFORCEMENT

APPROVED MAY 01, 2026
DEPUTY CHIEF ENGINEER
(DESIGN)

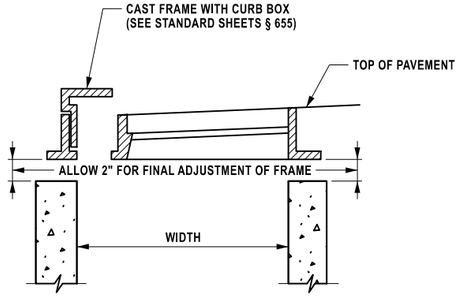
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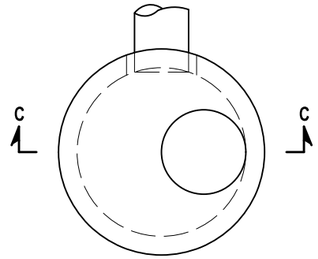
RECTANGULAR DRAINAGE STRUCTURE
TYPE Q, R, S, T, AND U



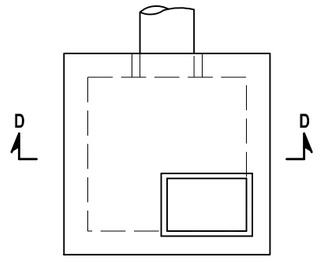
SECTION A-A
RECTANGULAR DRAINAGE STRUCTURE
TYPE Q AND R

NOTES:

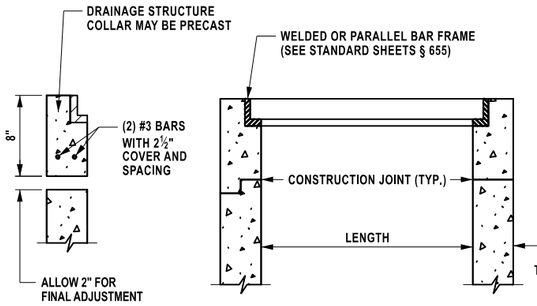
1. WHEN DRAINAGE STRUCTURES MAY BE SUBJECTED TO HIGHWAY LOADS AND PIPE LOCATIONS PROVIDE FOR 4" TO 8" BETWEEN THE TOP OF THE UPPERMOST PIPE OPENING AND THE TOP OF THE RISER, ADD (2) #3 BARS TO RIBAND. WHEN DRAINAGE STRUCTURES MAY BE SUBJECTED TO HIGHWAY LOADS AND PIPE LOCATIONS PROVIDE FOR LESS THAN 4" BETWEEN THE TOP OF THE UPPERMOST PIPE OPENING AND THE TOP OF THE RISER, THE INVERTED DOGHOUSE DETAIL SHALL BE USED SUBJECT TO APPROVAL FROM THE OFFICE OF STRUCTURES.
2. PIPE OPENINGS IN DRAINAGE STRUCTURE WALLS UTILIZING AN INVERTED DOGHOUSE SHALL BE LIMITED TO (2) OPENINGS PER DRAINAGE STRUCTURE AND BE LOCATED ON OPPOSING WALLS. THE INVERTED DOGHOUSE SHALL NOT BE LOCATED UNDER THE TOP SLAB OPENING.
3. SEE NOTE 6 ON SHEET 2 REGARDING REQUIREMENTS FOR FINISHING PIPE ENTRIES.
4. SEE NOTE 6 ON SHEET 4 REGARDING REQUIREMENTS FOR GRADE ADJUSTMENTS BETWEEN RISERS, TOP SLABS, AND FRAMES.



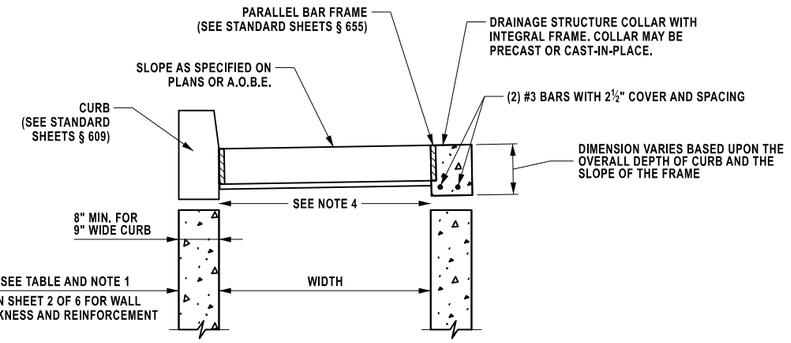
INVERTED DOGHOUSE FOR
ROUND DRAINAGE STRUCTURES
(SEE NOTES 1 & 2)



INVERTED DOGHOUSE FOR
RECTANGULAR DRAINAGE STRUCTURES
(SEE NOTES 1 & 2)



SECTION B-B
RECTANGULAR DRAINAGE STRUCTURE
TYPE S, T, AND U

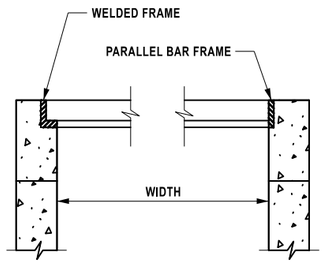


SECTION A-A
RECTANGULAR DRAINAGE STRUCTURE
WITH COLLAR AND CURB
TYPE S, T, AND U
FOR USE WITH PARALLEL BAR FRAMES, ONLY

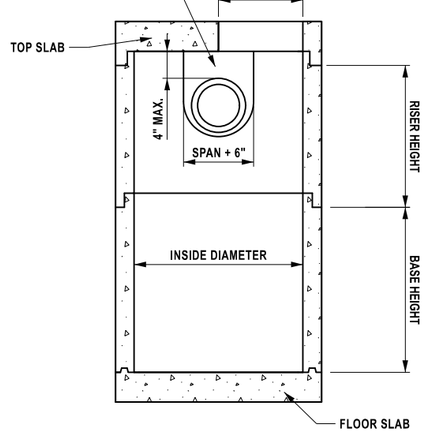
RECTANGULAR DRAINAGE STRUCTURE						
(TYPES Q THRU U)			INSIDE DIMENSIONS			
			PRECAST**		CAST IN PLACE	
ITEM	TYPE	FRAME	WIDTH	LENGTH	WIDTH	LENGTH
604.301772	Q	F2*	34"	36"	33"	36½"
604.301873	R	F3*	34"	46"	33"	46½"
604.301911	S	11	24"	32"	24"	32½"
604.301990	S	10PCB	24"	32"	24"	32½"
604.302016	T	16	26"	42"	26½"	42½"
604.302091	T	11PCB	26"	42"	26½"	42½"
604.302122	U	22	34"	38"	34"	37½"
604.302192	U	12PCB	34"	38"	34"	37½"

* SEE CONTRACT DOCUMENTS FOR GRATE AND CURB BOX TYPE

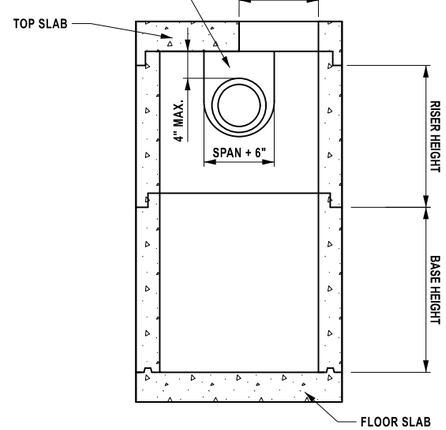
** PRECAST TYPES S, T, AND U REQUIRE THE FRAME TO BE CAST INTO A SEPARATE COLLAR. THE FRAME COLLAR SHALL HAVE INSIDE DIMENSIONS AS SHOWN FOR "CAST-IN-PLACE" IN THIS TABLE, OUTSIDE DIMENSIONS TO MATCH THE PRECAST RISER, AND SHALL BE 8" HIGH MIN.



SECTION A-A
RECTANGULAR DRAINAGE STRUCTURE
TYPE S, T, AND U



SECTION C-C
(SPAN REPRESENTS THE OUTER SPAN OR OUTER DIAMETER OF THE PIPE)
(SEE NOTES 1 & 2)



SECTION D-D
(SPAN REPRESENTS THE OUTER SPAN OR OUTER DIAMETER OF THE PIPE)
(SEE NOTES 1 & 2)

NEW YORK STATE | **Department of Transportation**

U.S. CUSTOMARY STANDARD SHEET

DRAINAGE STRUCTURES
(SHEET 6 OF 6)
RECTANGULAR DRAINAGE STRUCTURES
WITHOUT TOP SLABS & MISCELLANEOUS DETAILS

APPROVED MAY 01, 2026
DEPUTY CHIEF ENGINEER
(DESIGN)

ISSUED UNDER EI 26-003

604-02

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