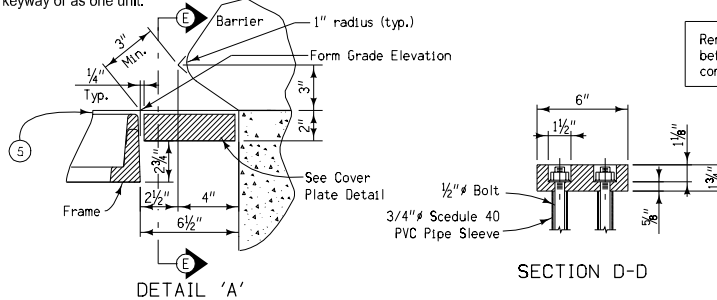


PLAN VIEW

- ① Trowel smooth and place 2 layers of 30 lb. roofing felt to prevent bond.
- ② Cast frame into Intake top. See Standard Road Plan RA-66D for frame and grate details.
- ③ 36" maximum concrete pipe.
- ④ If intake base is precast, it shall be placed on a 6" bed of sand. This bedding shall be compacted and provide uniform support for the entire area of the base and shall extend 12" outside the edge of the base.
- ⑤ Top elevation of grates shall be 1/4" below Form Grade Elevation.
- ⑥ Possible subdrain. See plans for location and elevation. See Standard Road Plan RF-19C for connection details.
- ⑦ Slope of top shall vary to match elevation of adjacent pavement.
- ⑧ Intake base may be cast in place or precast. If precast, the base and first wall section may be cast separately with a keyway or as one unit.



DETAIL 'A'

SECTION D-D

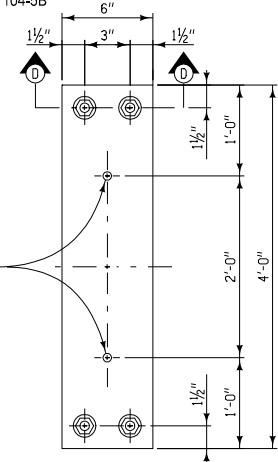
Remove cover plate before constructing concrete barrier.

Steps, when specified, shall meet the requirements of ASTM C478. The top step shall be located a maximum of 28" below the form grade elevation.

Contract Items:

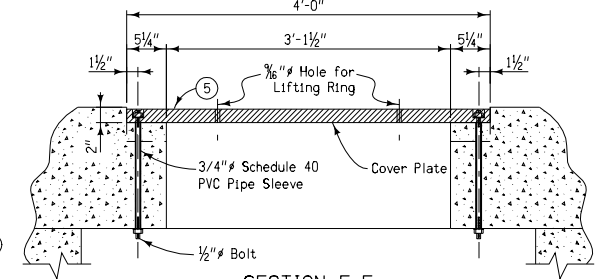
Barrier Intake, RA-48A

Tabulation: 104-5B

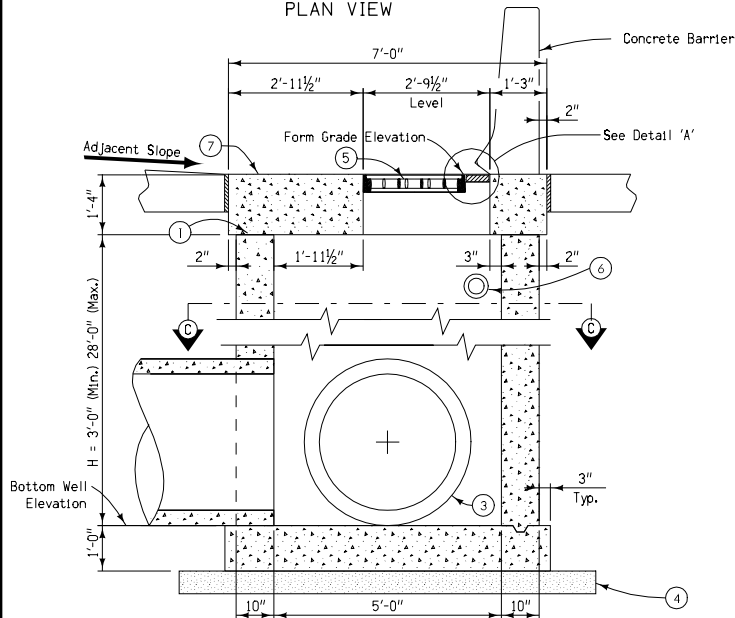


COVER PLATE DETAIL

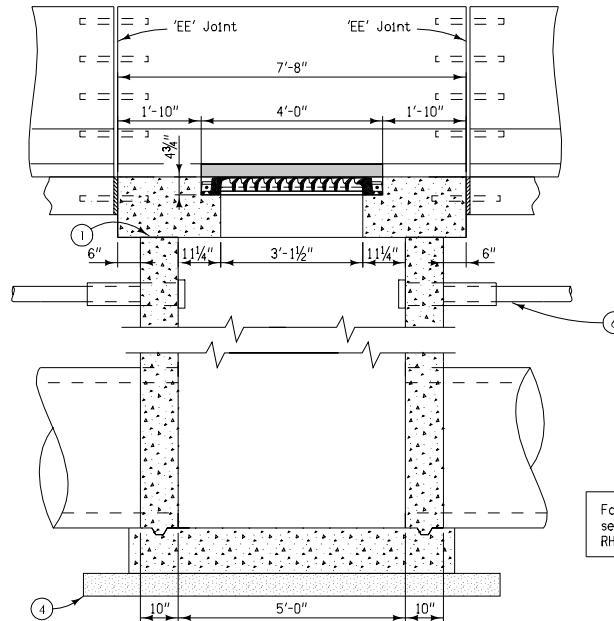
All Plate steel to be ASTM A36, galvanized after fabrication.



SECTION E-E



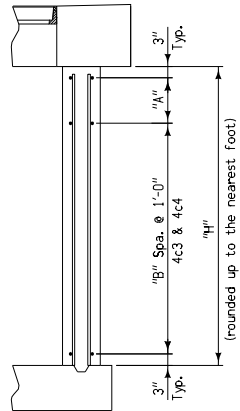
SECTION A-A



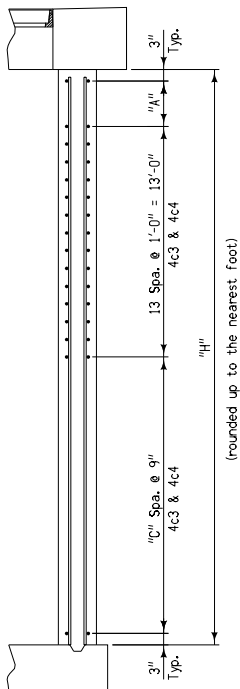
SECTION B-B

For joint details, see Standard Road Plans RH-50, RH-51, and RH-52.

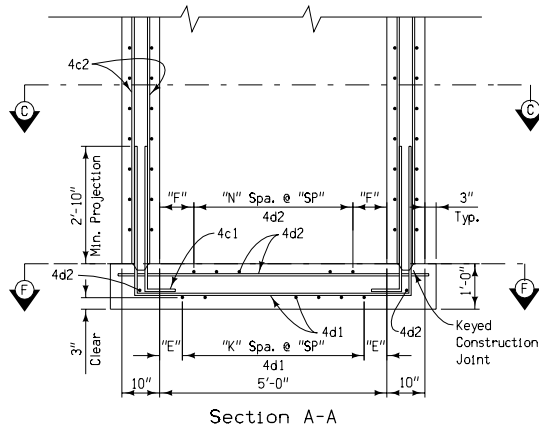
	REVISION
	NEW 10-17-06
<b>STANDARD ROAD PLAN</b>	<b>RA-48A</b>
	SHEET 1 of 4
REVISIONS: Replaces paren-number standards with one multi-page standard.	
<i>Deanna Marfeld</i> APPROVED BY DESIGN METHODS ENGINEER	
<b>SINGLE GRATE          BARRIER INTAKE, RECTANGULAR</b>	



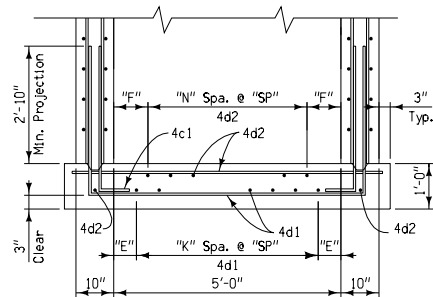
Part Section A-A  
(Where H = 3' to 14')



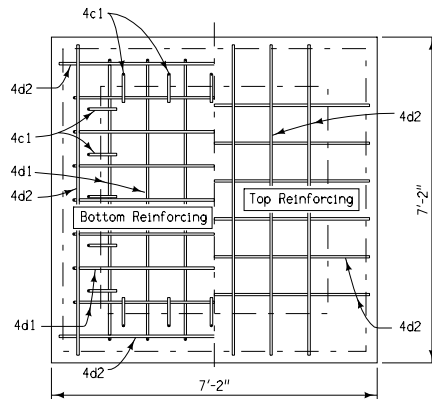
Part Section A-A  
(Where H = 15' to 28')



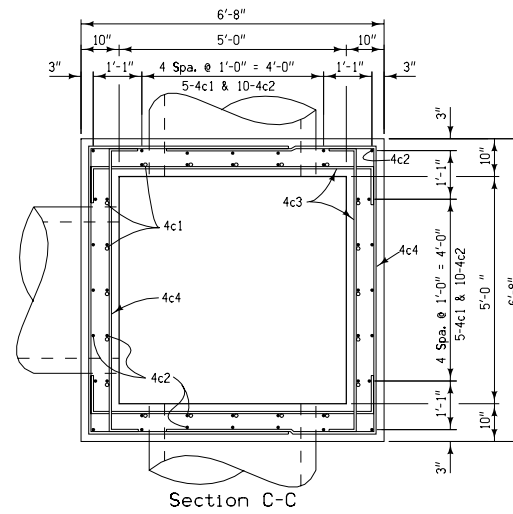
Section A-A



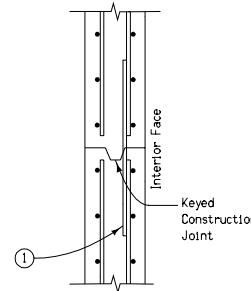
Section B-B



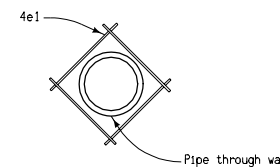
Section F-F



Section C-C



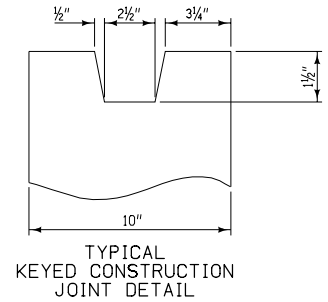
C.I.P. Wall Construction  
Joint Detail



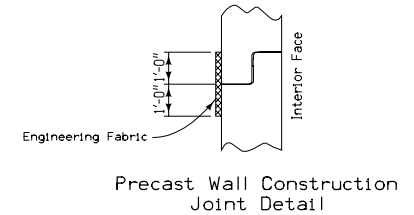
Pipe Reinforcing Detail

To Be Used At All Pipe Entrances ②

- ① One set of 4r1 x 3'-0" dowel bars @ 1'-0" spacing required in wall at any wall joints. 20 4r1 bars required per joint, total weight = 40 lbs.
- ② 4e1 bar length to be pipe diameter plus 12 inches. 4e1 bar to be placed inside of vertical reinforcing. Main reinforcing bars to be shifted as required for pipe entrance. Field cut bars to clear bottom of base 3" clear from bottom and 2" clear from walls. Eight 4e1 bars required per pipe entrance.



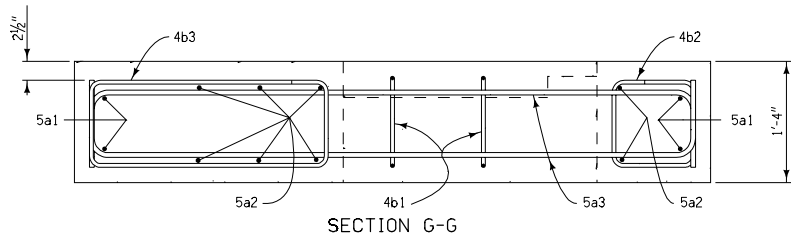
TYPICAL  
KEYED CONSTRUCTION  
JOINT DETAIL



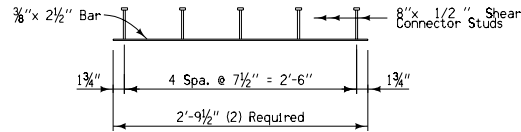
Precast Wall Construction  
Joint Detail

The clear distance from face of concrete to near edge or end of reinforcing bar to be 2" unless otherwise noted.

	REVISION
	NEW 10-17-06
<b>STANDARD ROAD PLAN</b>	<b>RA-48A</b>
REVISIONS: Replaces paren-number standards with one multi-page standard.	SHEET 2 of 4
<i>Deanna Marfield</i> APPROVED BY DESIGN METHODS ENGINEER	
<b>SINGLE GRATE BARRIER INTAKE, RECTANGULAR</b>	

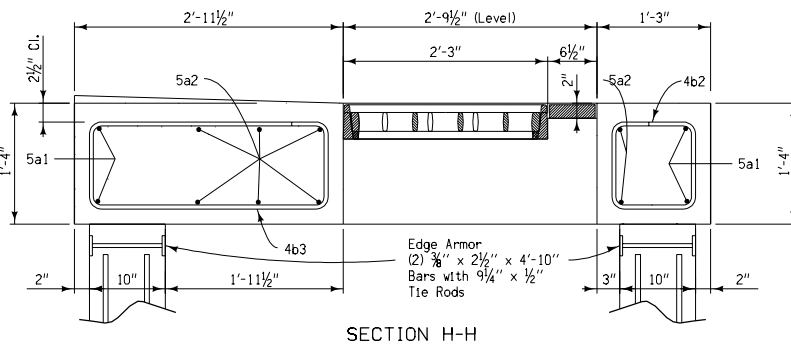


SECTION G-G

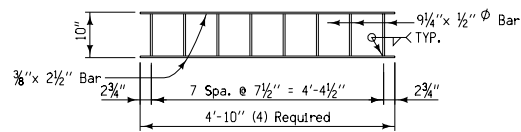


FRAME RING EDGE ARMOR DETAIL

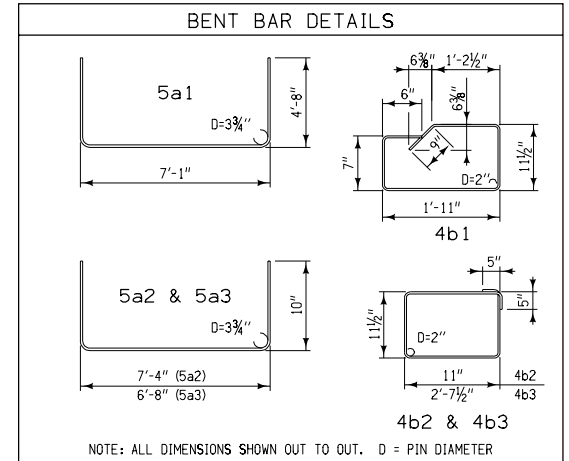
BILL OF REINFORCING STEEL						
ONE GRATE INTAKE LID - EPOXY COATED						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT (lb.)	
5a1	Lid, Exterior, Edge		4	16'-5"	68	
5a2	Lid, Interior, Longitudinal		8	9'-0"	75	
5a3	Lid, Interior, Transverse		8	8'-4"	70	
4b1	Lid Hoop		4	5'-11"	16	
4b2	Lid Hoop		3	4'-7"	9	
4b3	Lid Hoop		5	8'-0"	27	
EPOXY COATED REINFORCING STEEL - TOTAL					265	



SECTION H-H



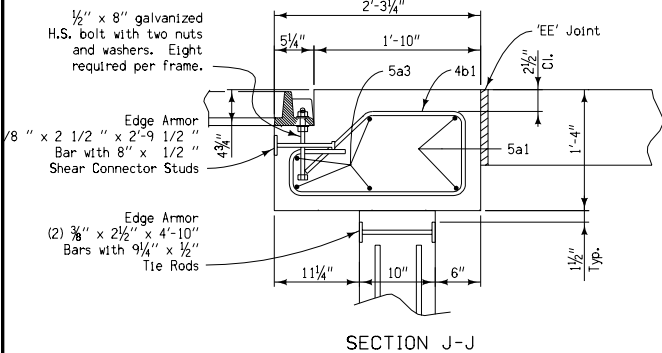
WALL EDGE ARMOR DETAIL  
All edge armor steel to be ASTM A36, hot dip galvanized after fabrication.



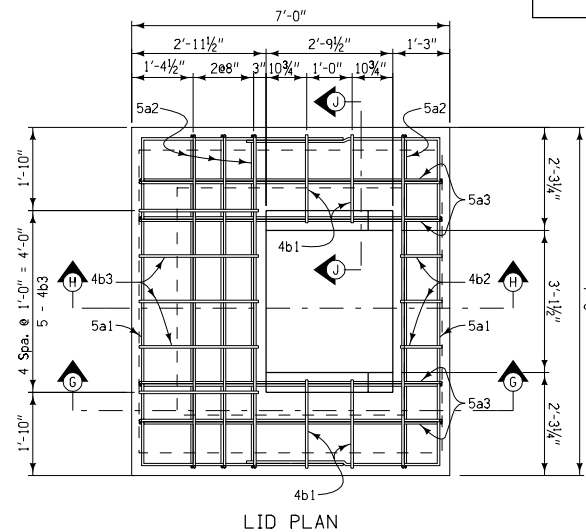
NOTE: ALL DIMENSIONS SHOWN OUT TO OUT. D = PIN DIAMETER

QUANTITY SUMMARY FOR ONE GRATE INTAKE LID		
Concrete	2.2	CY
Epoxy Coated Reinforcing Steel	265	LB

The clear distance from face of concrete to near edge or end of reinforcing bar to be 2" unless otherwise noted.



SECTION J-J



LID PLAN

	REVISION
	NEW 10-17-06
<b>STANDARD ROAD PLAN</b>	<b>RA-48A</b>
REVISIONS: Replaces paren-number standards with one multi-page standard. Changed Headed Anchors to Shear Connector Studs.	SHEET 3 of 4
<i>Deanna Maulfeld</i> APPROVED BY DESIGN METHODS ENGINEER	

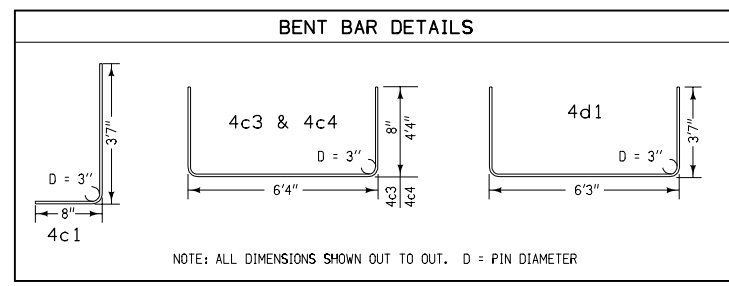
SINGLE GRATE  
BARRIER INTAKE, RECTANGULAR

VARIABLE DIMENSIONS AND QUANTITIES

Dimensions				Bar List												Quantities												
① "H" (Ft.)	② "A" (In.)	"E" (In.)	"F" (In.)	4c1		4c2		4c3 ③				4c4 ③				4d1				4d2				Concrete - Cu. Yds.				Steel ④
				NO.	L	NO.	L	No. of Spaces		NO.	L	No. of Spaces		NO.	L	SP	"K"	NO.	L	SP	"N"	NO.	L	BASE	LID	WALLS	TOTAL	TOTAL LBS.
								"B"	"C"			"B"	"C"															
3	6	3"	7 1/2"	20	4'-3"	--	--	2	--	16	7'-8"	2	--	8	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	2.2	6.3	682
4	6	3"	7 1/2"	20	4'-3"	44	3'-10"	3	--	20	7'-8"	3	--	10	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	2.9	7.0	835
5	6	3"	7 1/2"	20	4'-3"	44	4'-10"	4	--	24	7'-8"	4	--	12	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	3.6	7.7	905
6	6	3"	7 1/2"	20	4'-3"	44	5'-10"	5	--	28	7'-8"	5	--	14	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	4.3	8.4	974
7	6	3"	7 1/2"	20	4'-3"	44	6'-10"	6	--	32	7'-8"	6	--	16	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	5.0	9.1	1,045
8	6	3"	7 1/2"	20	4'-3"	44	7'-10"	7	--	36	7'-8"	7	--	18	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	5.8	9.9	1,114
9	6	3"	7 1/2"	20	4'-3"	44	8'-10"	8	--	40	7'-8"	8	--	20	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	6.5	10.6	1,185
10	6	3"	7 1/2"	20	4'-3"	44	9'-10"	9	--	44	7'-8"	9	--	22	15'-0"	9"	6	14	13'-5"	9"	5	16	6'-10"	1.9	2.2	7.2	11.3	1,254
11	6	2"	6"	20	4'-3"	44	10'-10"	10	--	48	7'-8"	10	--	24	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	7.9	12.0	1,351
12	6	2"	6"	20	4'-3"	44	11'-10"	11	--	52	7'-8"	11	--	26	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	8.6	12.7	1,422
13	6	2"	6"	20	4'-3"	44	12'-10"	12	--	56	7'-8"	12	--	28	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	9.4	13.5	1,492
14	6	2"	6"	20	4'-3"	44	13'-10"	13	--	60	7'-8"	13	--	30	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	10.1	14.2	1,562
15	9	2"	6"	20	4'-3"	44	14'-10"	13	1	64	7'-8"	13	1	32	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	10.8	14.9	1,632
16	12	2"	6"	20	4'-3"	44	15'-10"	13	2	68	7'-8"	13	2	34	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	11.5	15.6	1,701
17	6	2"	6"	20	4'-3"	44	16'-10"	13	4	76	7'-8"	13	4	38	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	12.2	16.3	1,812
18	9	2"	6"	20	4'-3"	44	17'-10"	13	5	80	7'-8"	13	5	40	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	13.0	17.1	1,882
19	12	2"	6"	20	4'-3"	44	18'-10"	13	6	84	7'-8"	13	6	42	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	13.7	17.8	1,952
20	6	2"	6"	20	4'-3"	44	19'-10"	13	8	92	7'-8"	13	8	46	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	14.4	18.5	2,062
21	9	2"	6"	20	4'-3"	44	20'-10"	13	9	96	7'-8"	13	9	48	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	15.1	19.2	2,132
22	12	2"	6"	20	4'-3"	44	21'-10"	13	10	100	7'-8"	13	10	50	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	15.8	19.9	2,202
23	6	2"	6"	20	4'-3"	44	22'-10"	13	12	108	7'-8"	13	12	54	15'-0"	8"	7	16	13'-5"	8"	6	18	6'-10"	1.9	2.2	16.6	20.7	2,312
24	9	2"	5 1/2"	20	4'-3"	44	23'-10"	13	13	112	7'-8"	13	13	56	15'-0"	7"	8	18	13'-5"	7"	7	20	6'-10"	1.9	2.2	17.3	21.4	2,410
25	12	2"	5 1/2"	20	4'-3"	44	24'-10"	13	14	116	7'-8"	13	14	58	15'-0"	7"	8	18	13'-5"	7"	7	20	6'-10"	1.9	2.2	18.0	22.1	2,479
26	6	2"	5 1/2"	20	4'-3"	44	25'-10"	13	16	124	7'-8"	13	16	62	15'-0"	7"	8	18	13'-5"	7"	7	20	6'-10"	1.9	2.2	18.7	22.8	2,589
27	9	2"	5 1/2"	20	4'-3"	44	26'-10"	13	17	128	7'-8"	13	17	64	15'-0"	7"	8	18	13'-5"	7"	7	20	6'-10"	1.9	2.2	19.4	23.5	2,660
28	12	2"	5 1/2"	20	4'-3"	44	27'-10"	13	18	132	7'-8"	13	18	66	15'-0"	7"	8	18	13'-5"	7"	7	20	6'-10"	1.9	2.2	20.2	24.3	2,729

The clear distance from face of concrete to near edge or end of reinforcing bar to be 2" unless otherwise noted.

- ① H = Wall height = form grade elevation (minus) bottom well elevation (minus) 1'-4", rounded up.
- ② A = First bar spacing at top of wall. Minimum spacing = 3". Maximum spacing = 12". Adjust as necessary.
- ③ See Section A-A on sheet 2 for spacing.
- ④ Quantity includes 265 lbs. for lid.



<p>Iowa Department of Transportation</p>	REVISION
	NEW 10-17-06
<b>STANDARD ROAD PLAN</b>	<b>RA-48A</b>
SHEET 4 of 4	
REVISIONS: Replaces paren-number standards with one multi-page standard.	
<p>APPROVED BY DESIGN METHODS ENGINEER</p>	
<p><b>SINGLE GRATE</b> <b>BARRIER INTAKE, RECTANGULAR</b></p>	