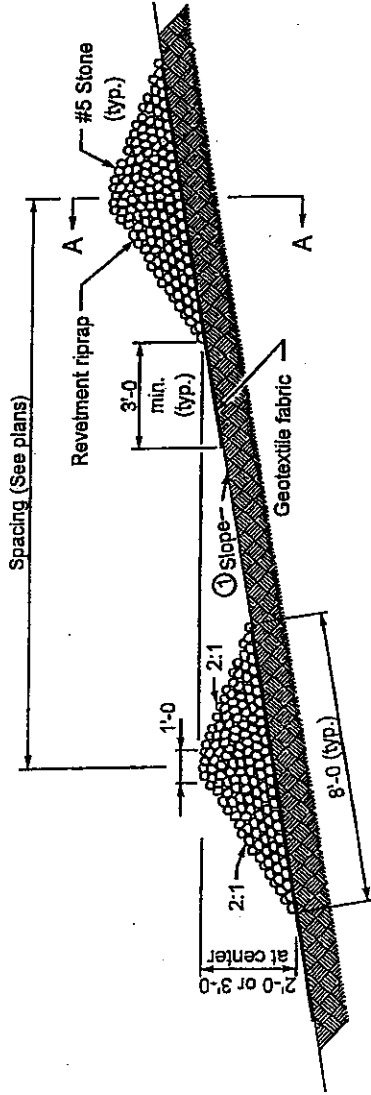
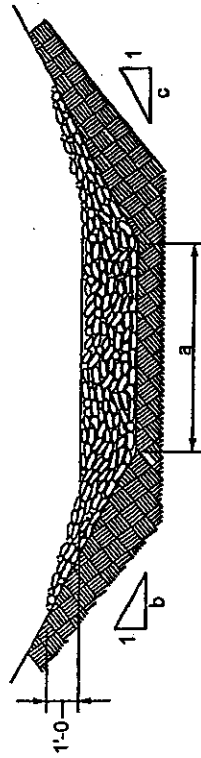


GENERAL NOTES

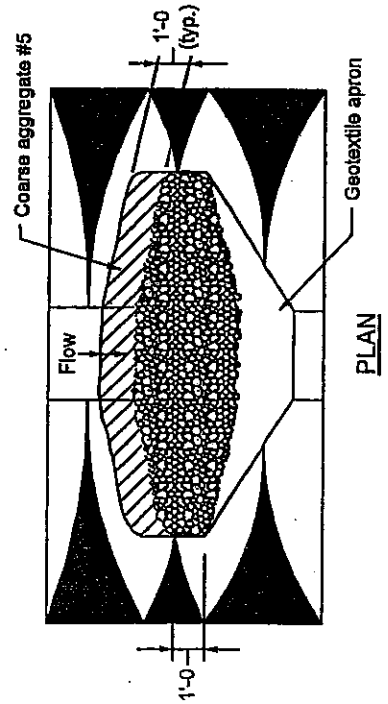
1. Riprap ditch check dams shall be spaced such that the top of the downstream check dam is at the same elevation as the toe of the adjacent upstream check dam.
2. The volume of coarse aggregate #5 is $1/27 [a + 3 (b + c)]$, cys.
3. The area of geotextile fabric is $1/9 [12 + 21 (b + c)]$, sqs.



ELEVATION



SECTION A-A

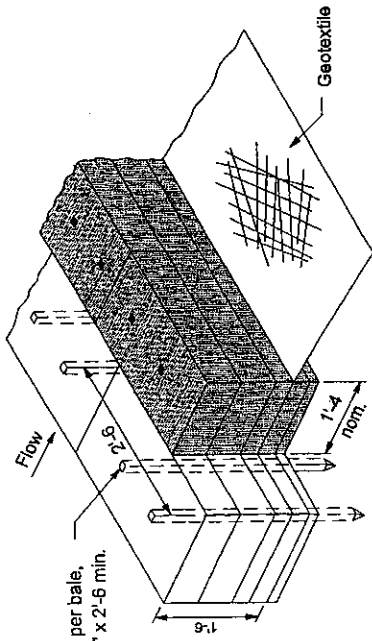


PLAN

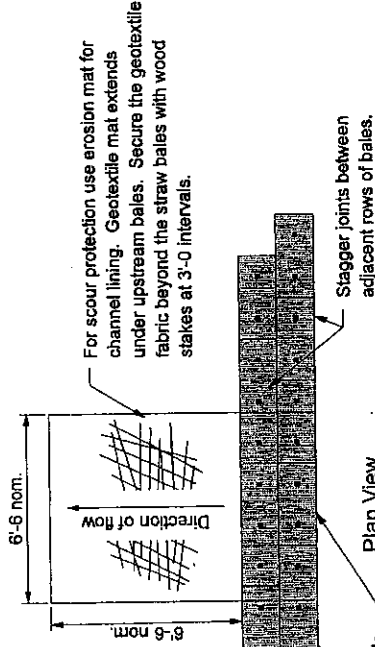
INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY CHECK DAM, REVETMENT RIPRAP	
MARCH 2003	
STANDARD DRAWING NO. E 205-TECD-01	
1/1 Richard L. Vogelsang DESIGN STANDARD ENGINEER	3-03-03 DATE
1/1 Richard K. Smedley CHIEF HIGHWAY ENGINEER	3-03-03 DATE
DESIGN STANDARD ENGINEER	

GENERAL NOTES

1. Ditch checks shall be spaced such that the top of the downstream check is at the same elevation as the toe of the adjacent upstream check.



2 wood stakes per bale, nominal 2" x 2" x 2'-6" min.

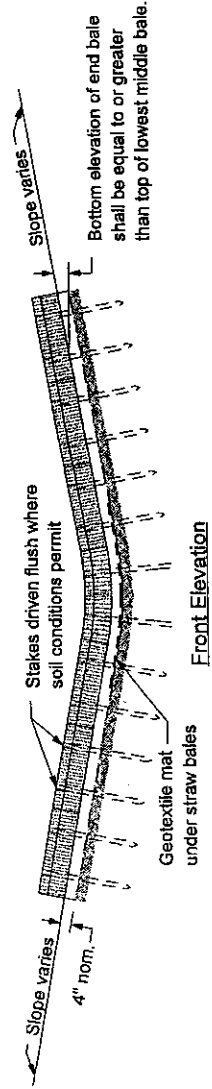


Stagger joints between adjacent rows of bales.

Plan View

Straw bales

Upstream edge of geotextile mat should be even with upstream edge of strawbales.



Stakes driven flush where soil conditions permit

4" nom.

Front Elevation

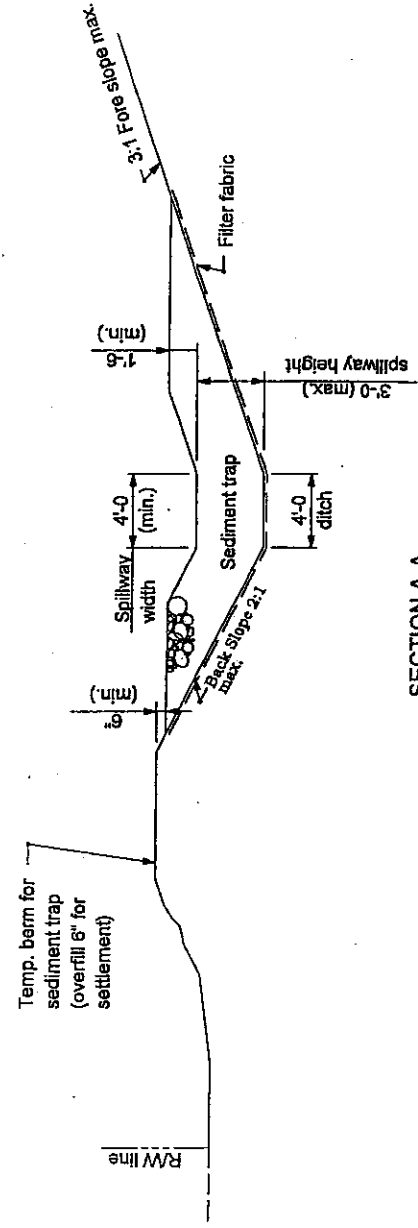
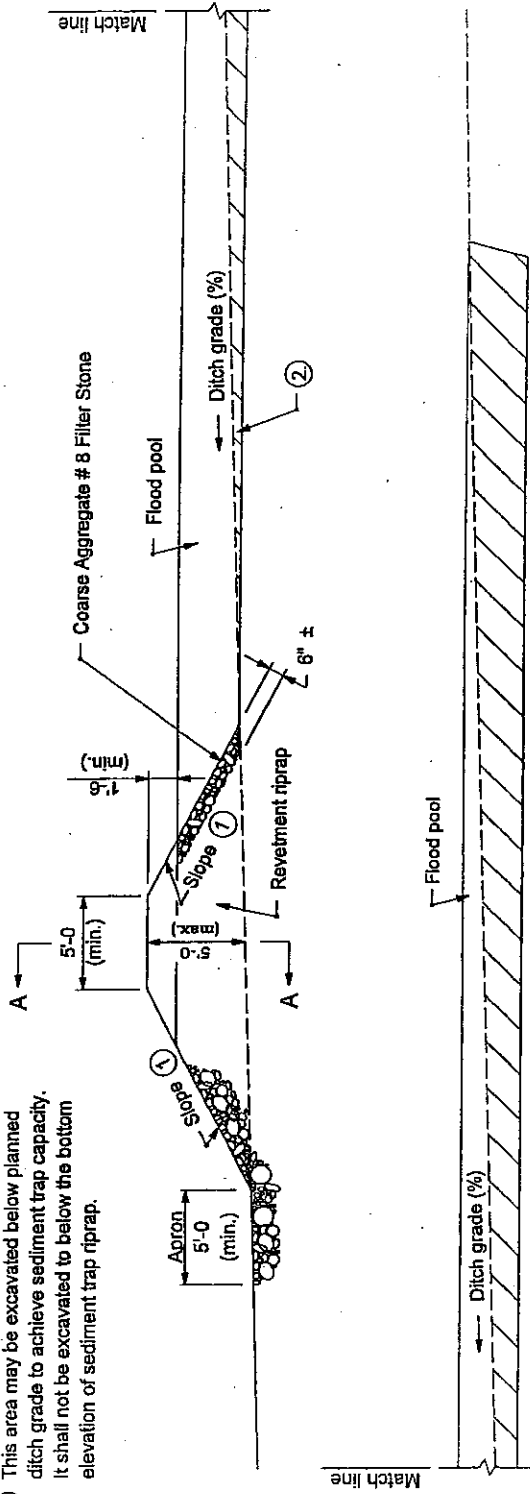
Bottom elevation of end bale shall be equal to or greater than top of lowest middle bale.

INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY CHECK DAM, STRAW BALES	
MARCH 2005	
STANDARD DRAWING NO. E 205-TECD-02	
	/s/ Richard L. Yurchak DESIGN STANDARD ENGINEER
	DATE 3-09-05
	/s/ Robert S. Smith CHIEF HIGHWAY ENGINEER
	DATE 3-09-05
DESIGN STANDARD ENGINEER	

NOTES

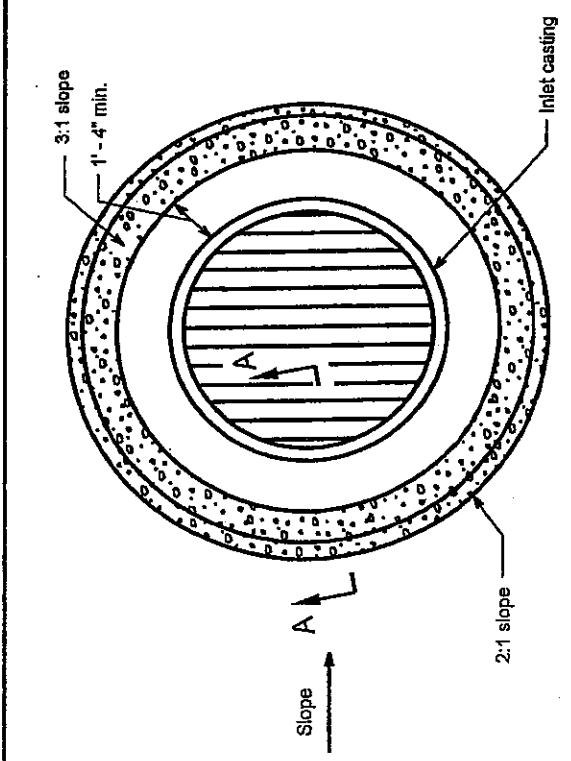
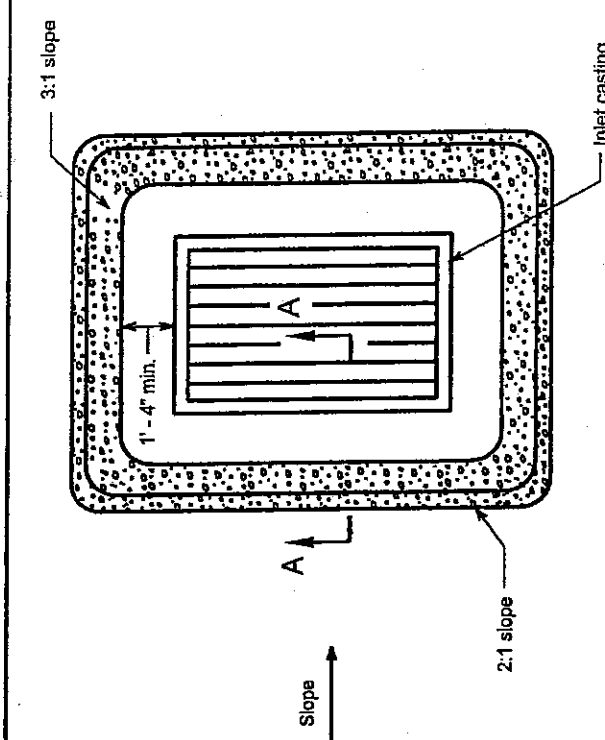
① Slope should be 3:1 maximum on the near side with respect to the direction of traffic while the far side slope may be 2:1 maximum.

② This area may be excavated below planned ditch grade to achieve sediment trap capacity. It shall not be excavated to below the bottom elevation of sediment trap riprap.



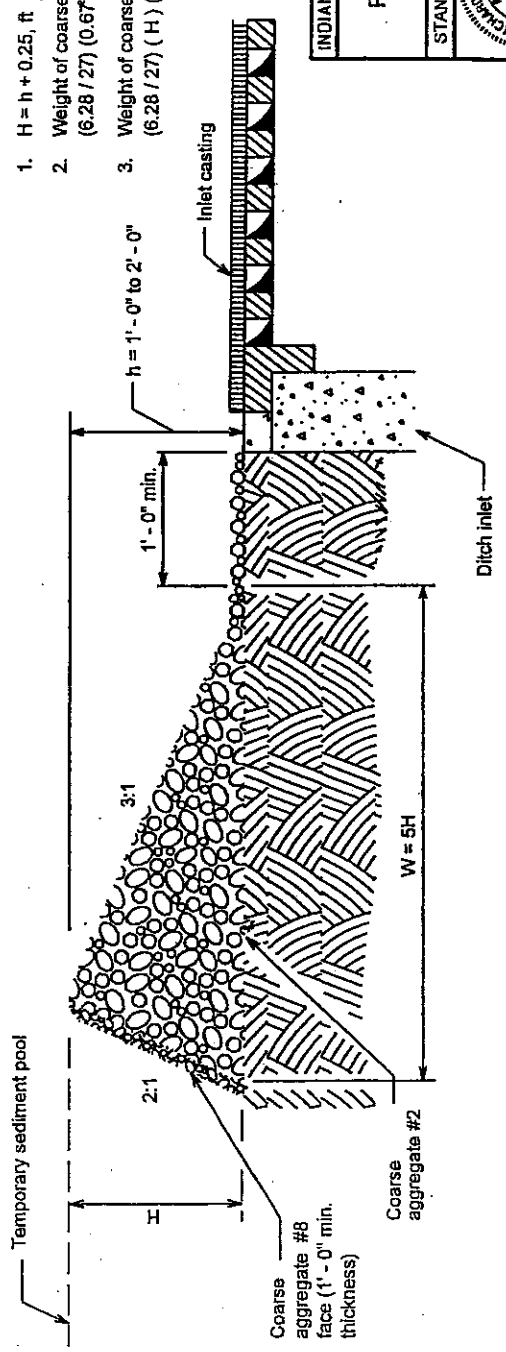
SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY SEDIMENT TRAP	
MARCH 2004	
STANDARD DRAWING NO. E 205-TECD-04	
	3-01-04 DATE DESIGN STANDARDS ENGINEER
	3-08-04 DATE CHIEF HIGHWAY ENGINEER DESIGN STANDARDS ENGINEER



GENERAL NOTES

1. $H = h + 0.25$, ft
2. Weight of coarse aggregate #2, Tons:
 $(6.28 / 27) (0.67 + 2.5H) (1 + 3H + 1/2 \text{ inlet width}) (0.6)$
3. Weight of coarse aggregate #8, Tons:
 $(6.28 / 27) (H) (1 + 4H + 1/2 \text{ inlet width}) (0.6)$

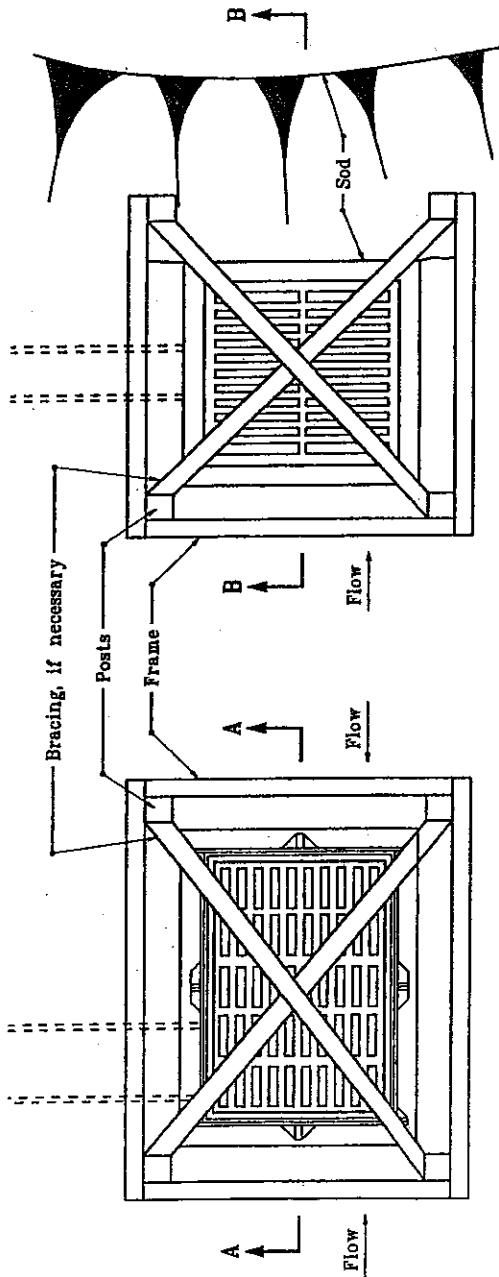


SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY DITCH INLET PROTECTION, GRAVEL RING	
MARCH 2002	
STANDARD DRAWING NO. E. 205-TEC1-01	
	3-04-02 DATE DESIGN STANDARD ENGINEER
	3-04-02 DATE CHIEF HIGHWAY ENGINEER

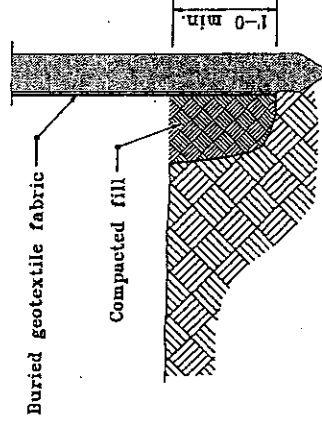
NOTES:

1. The frame shall be wrapped with one continuous piece of geotextile fabric, and a 2'-0" overlap shall be provided.

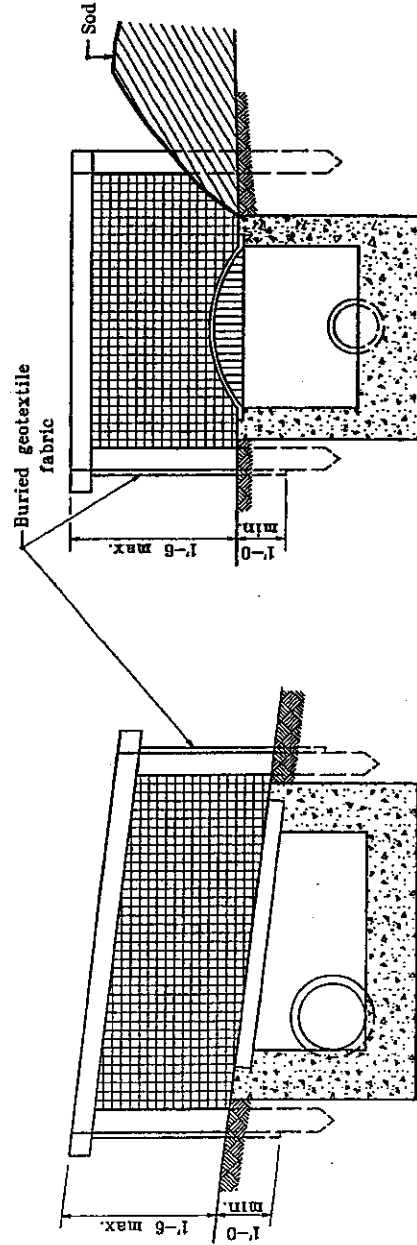


PLAN VIEW

PLAN VIEW



TRENCH DETAIL



SECTION A-A

SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION
**TEMPORARY DITCH INLET
 PROTECTION, GEOTEXTILE BOX**
 MARCH 2002
 STANDARD DRAWING NO. E 205-TECI-02

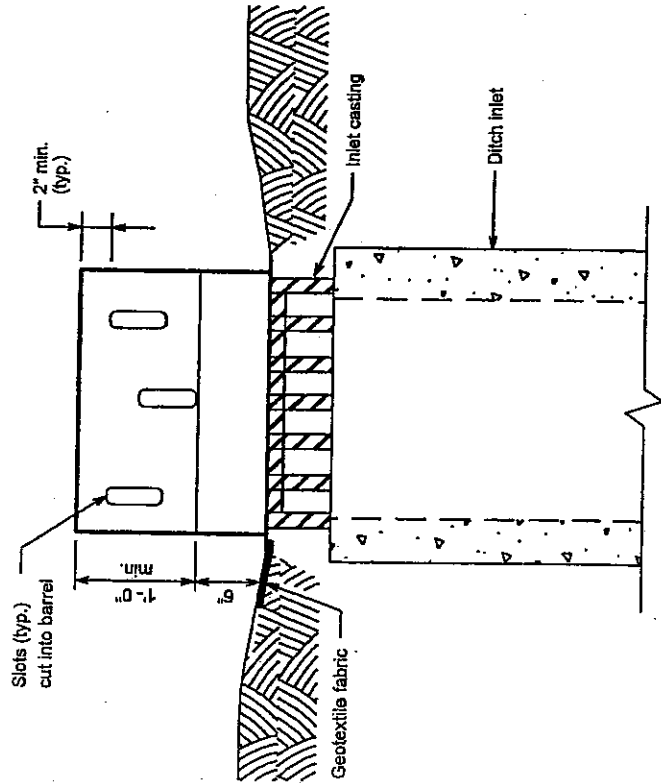
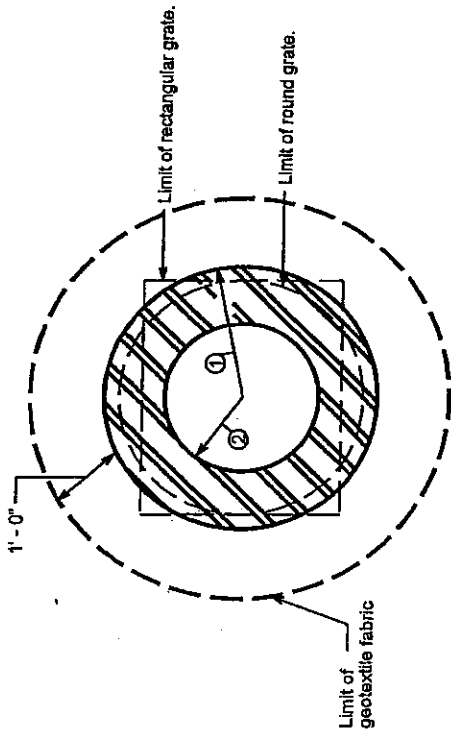
L. VAN CLEVE
 No. 9750
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

By: Richard L. VanCleave 3-01-02
 DESIGN STANDARD ENGINEER DATE

By: Richard Switzer 3-01-02
 CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES

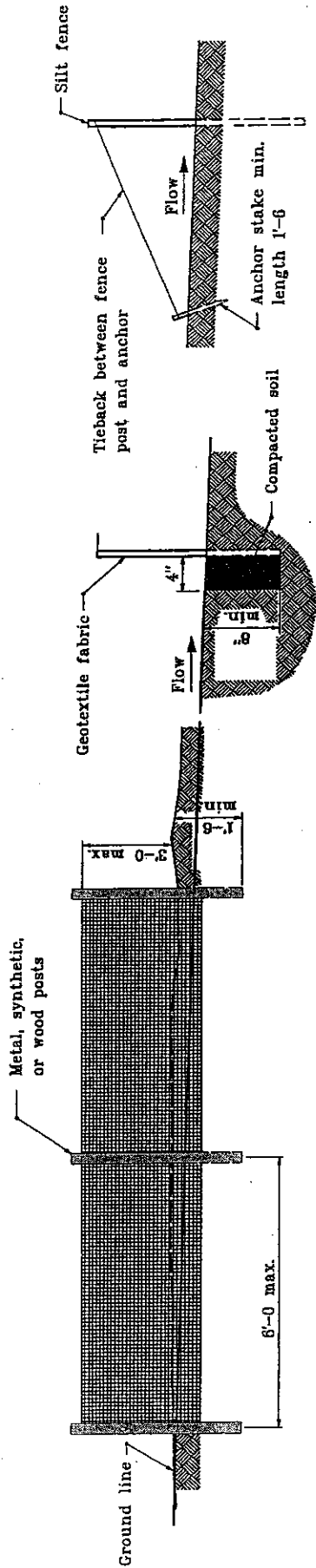
- ① Radius shall be equal to or greater than that of a round casing grate, or equal to, or greater than half of the longer length of a rectangular grate.
- ② Distance shall be greater than half of the radius of a round grate, or greater than one-quarter of the shorter length of a rectangular grate.
- 3 Slots shall be 5" min. height by 1" min. width.



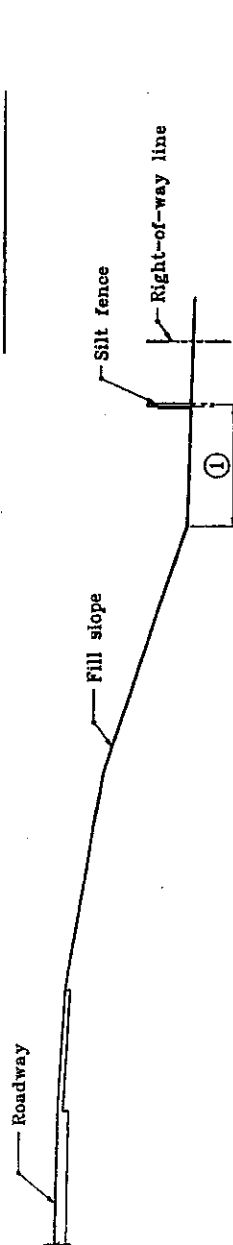
INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY DITCH INLET PROTECTION SLOTTED BARREL	
MARCH 2002	
STANDARD DRAWING NO. E 205-TECH-03	
	3-01-02 DATE DESIGN STANDARDS ENGINEER
	3-01-02 DATE CHIEF HIGHWAY ENGINEER

GENERAL NOTES

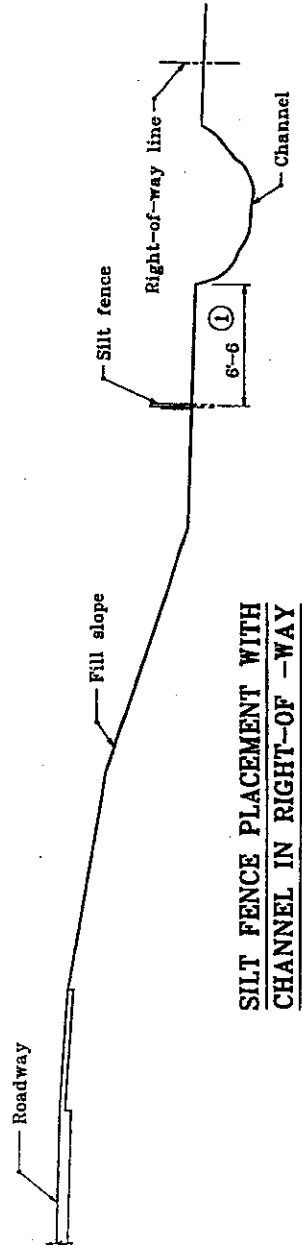
- ① Dimensions will vary based on right-of-way availability. Silt fence shall be placed as close as possible to edge of construction limits.
- ② The spacing of the tiebacks shall equal the spacing of the posts. Additional post depth or tiebacks may be required in unstable soils.



EMBEDMENT DETAIL



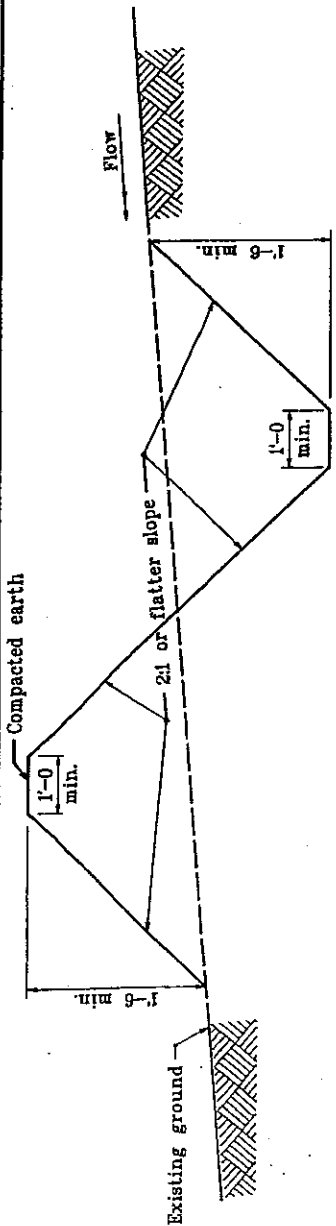
**SILT FENCE PLACEMENT
RELATIVE TO R/W LINE**



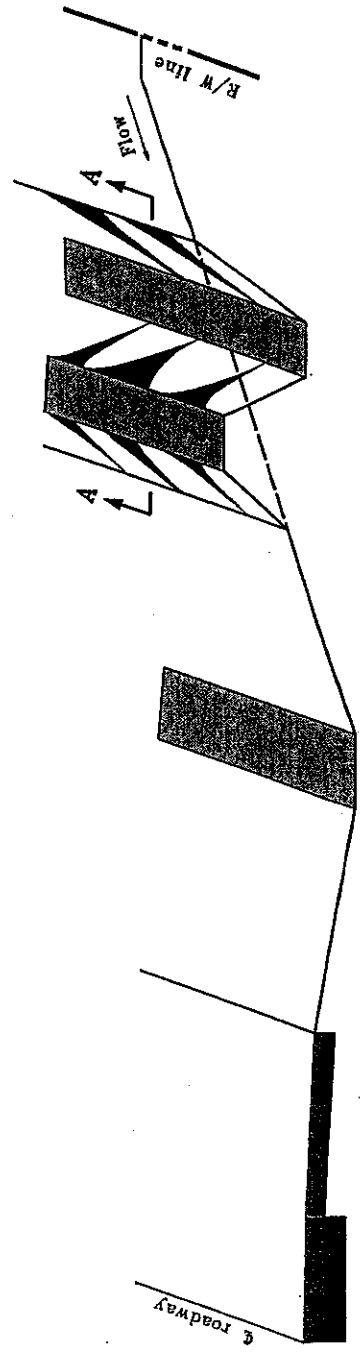
**SILT FENCE PLACEMENT WITH
CHANNEL IN RIGHT-OF-WAY**

② **TIEBACK DETAIL**

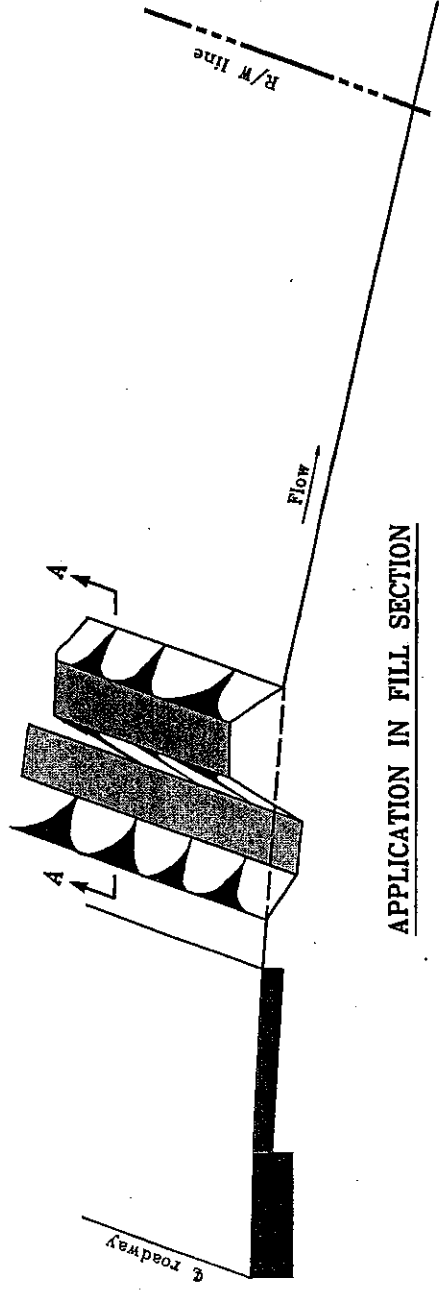
INDIANA DEPARTMENT OF TRANSPORTATION	
TEMPORARY SILT FENCE	
MARCH 2002	
STANDARD DRAWING NO. E 205-TECP-02	
RICHARD L. VANCLEAVE DESIGN STANDARD ENGINEER No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER	
RICHARD K. SWITZER CHIEF HIGHWAY ENGINEER DATE 9-01-02	



SECTION A-A



APPLICATION IN CUT SECTION



APPLICATION IN FILL SECTION

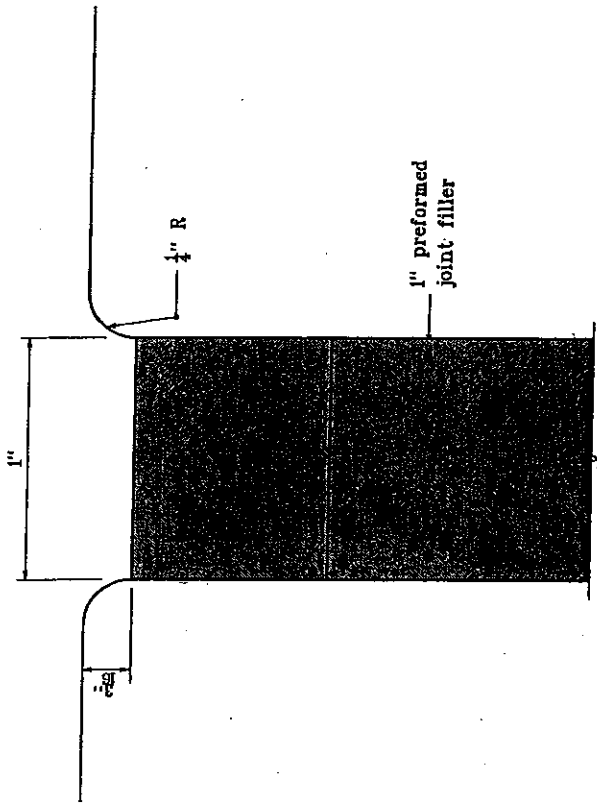
INDIANA DEPARTMENT OF TRANSPORTATION
TEMPORARY INTERCEPTOR DITCH
 MARCH 2002
 STANDARD DRAWING NO. E 205-TECS-01

L. VanCleave
 No. 9750
 STATE OF INDIANA
 REGISTERED PROFESSIONAL ENGINEER

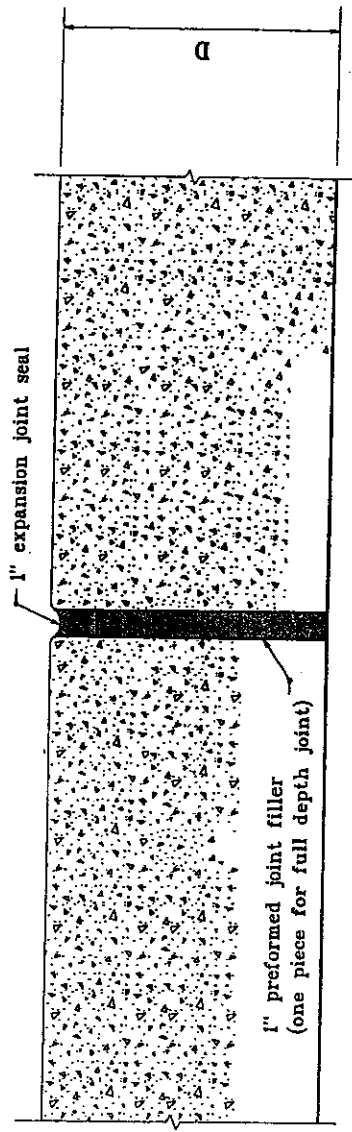
/s/ Richard L. VanCleave 3-01-02
 DESIGNER STANDARD ENGINEER DATE

/s/ Richard K. Smulzer 3-01-02
 CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARD PROJECT



SILICONE JOINT SEALANT

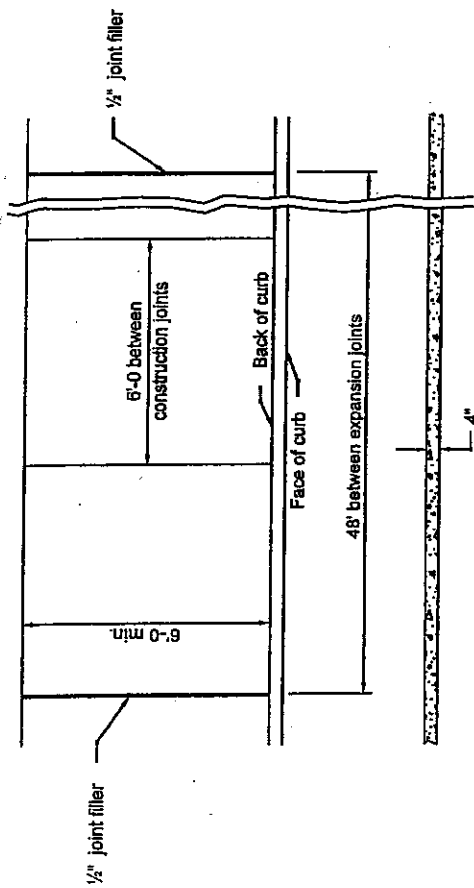


SECTION THROUGH JOINT

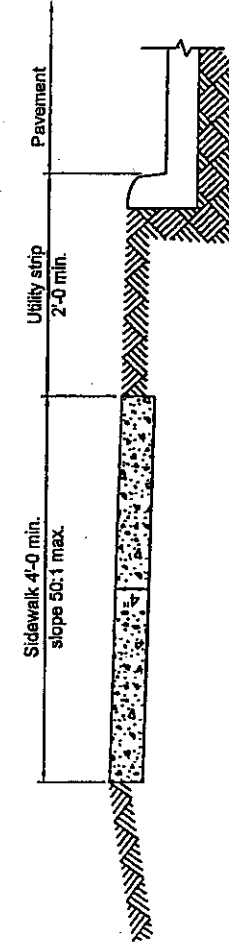
INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK
EXPANSION JOINT
 SEPTEMBER 1999
 STANDARD DRAWING NO. E 604-CCSJ-01

Professional Engineer Seal:
 ANTHONY L. USPENOVICH
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

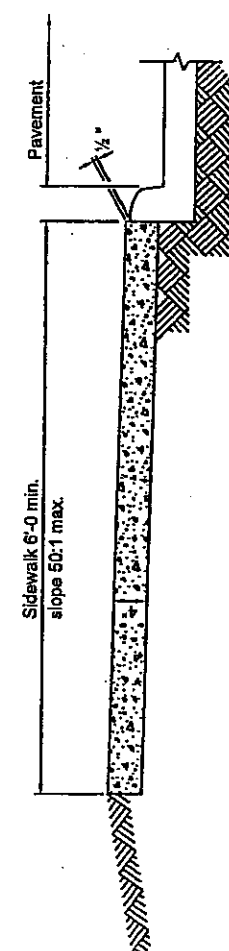
Design Engineer: /s/ Anthony L. Uspenovich, 9-01-99
 Chief Highway Engineer: /s/ Donald W. Lucier, 9-01-99



SIDEWALK



SECTION THROUGH SIDEWALK WITH UTILITY STRIP

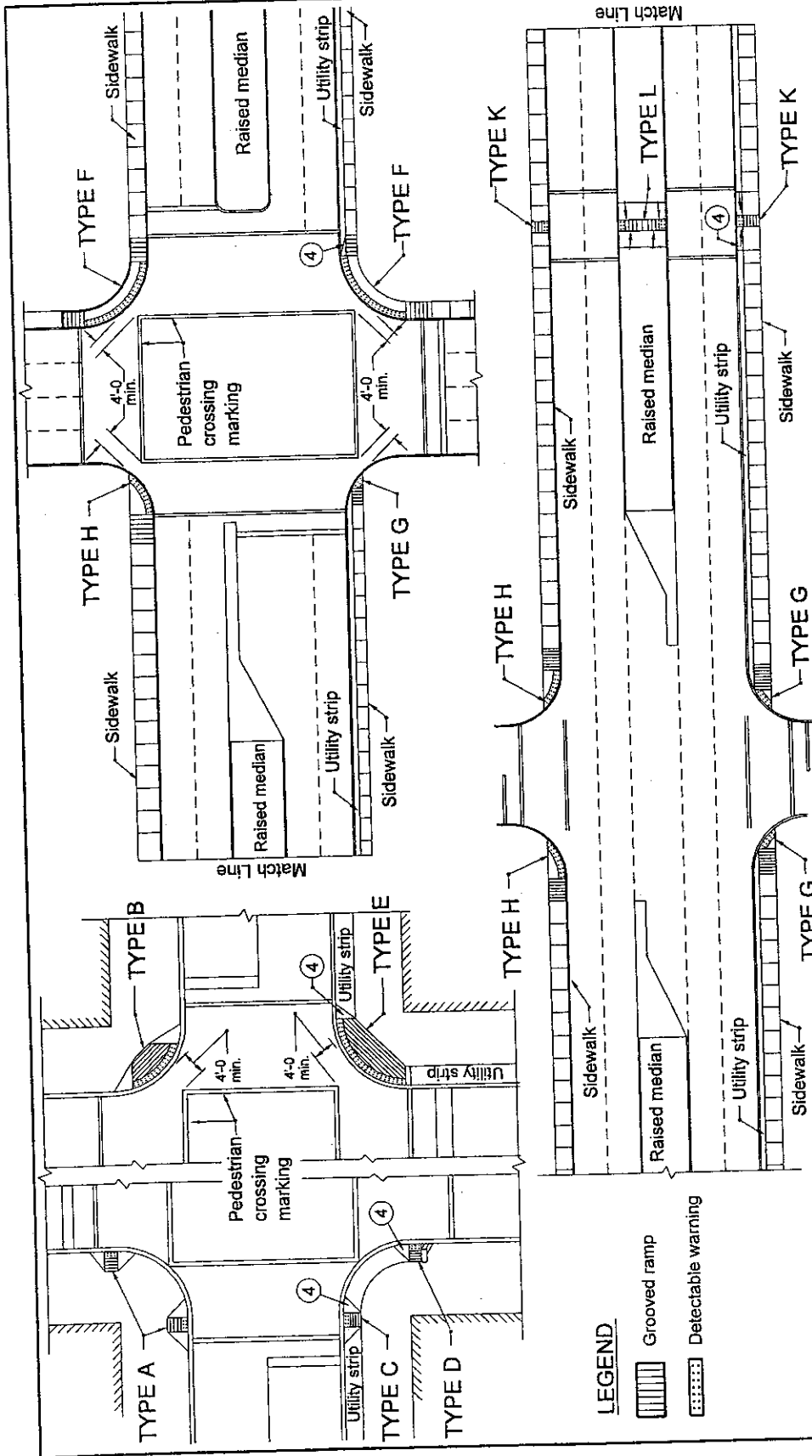


SECTION THROUGH SIDEWALK ADJACENT TO CURB



INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK DETAILS
 SEPTEMBER 2003
 STANDARD DRAWING NO. E 604-SDWK-01

Richard L. Veckhoff DESIGN STANDARD ENGINEER	9-02-03 DATE
Richard A. Smolzer CHIEF HIGHWAY ENGINEER	9-02-03 DATE

Professional Engineer Seal: RICHARD L. VECKHOFF, No. 9750, State of Indiana, Professional Engineer, License No. 10426, Expires 12/31/06.



LEGEND

-  Grooved ramp
-  Detectable warning

1. The curb ramp type includes the ramp and flared sides as indicated on the details. A level landing shall be provided at the high end of every curb ramp.
2. For details of sidewalk curb ramp types see Standard Drawings E 604-SWCR-03 to -11.
3. The curb ramps shall be placed within the marked crosswalk area.
4. Flared side of sidewalk curb ramp next to utility strip shall be sodded.
5. See Standard Drawing E 604-SWCR-02 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION
 LOCATION PLAN FOR
 SIDEWALK CURB RAMPS
 SEPTEMBER 2005
 STANDARD DRAWING NO. E 604-SWCR-01

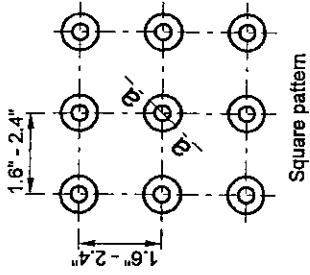
NO. 9750
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

/s/ Richard L. VonChapp
 DESIGN STANDARDS ENGINEER
 DATE 9-01-05

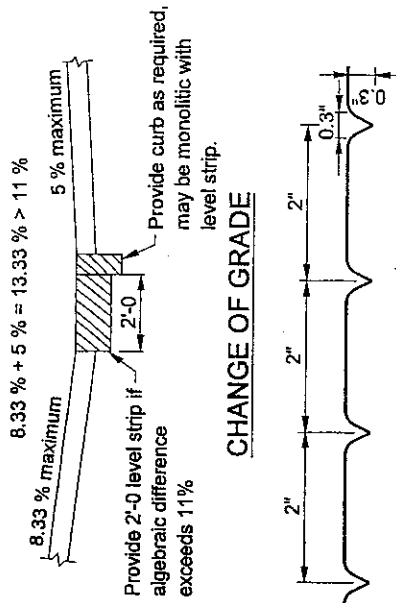
/s/ Richard K. Sawyer
 CHIEF HIGHWAY ENGINEER
 DATE 9-01-05

GENERAL NOTES:

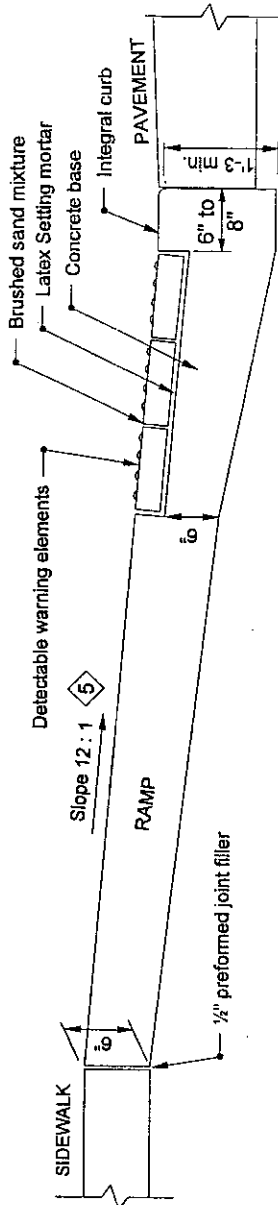
- 1 These dimensions are based on a 6 in. curb height. They shall be proportionally adjusted for other curb heights.
- 2 Where site infeasibility precludes construction to the width shown, such width may be decreased to a minimum of 3'-0".
- 3 The bottom edge of the curb ramp shall be flush with the edge of adjacent pavement and gutter line.
- 4 Landing areas at the top of curb ramps shall have maximum cross slope of 50 : 1 in any direction. When site infeasibility precludes a landing slope of 50 : 1 in any direction, the slope perpendicular to the curb face shall not exceed 50 : 1.
- 5 If site infeasibility precludes construction to the width shown, the landing width may be decreased to 3'-0" minimum. The running slope of the curb ramp may be steepened to a maximum of 10 : 1 for a maximum 6 in. rise.
- 6 Drainage inlets should be located uphill from curb ramps to prevent puddles at the path of travel.
- 7 See Standard Drawing E 604-SWCR-12 for improved access on narrow sidewalks.
- 8 Algebraic difference in grade between the base of curb ramp and the gutter shall be limited to less than 11%. If it is not practical, a 2'-0" wide level strip shall be provided. See detail sketch.
- 9 Minimum recommended width of curb ramp is 4'-0".



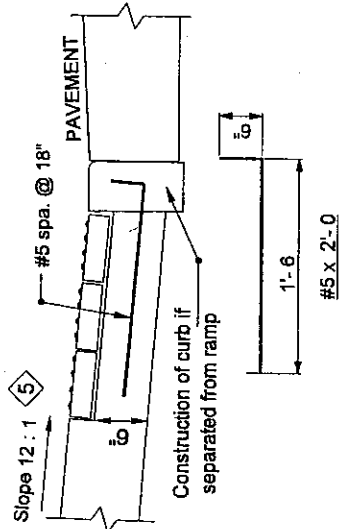
TRUNCATED DOMES USED IN DETECTABLE WARNINGS



DETAIL OF RAMP GROOVES



RAMP AND BRICK SURFACE CONSTRUCTION DETAIL

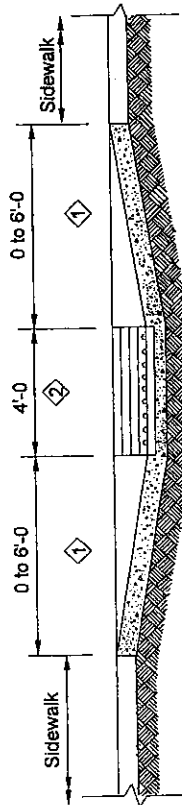
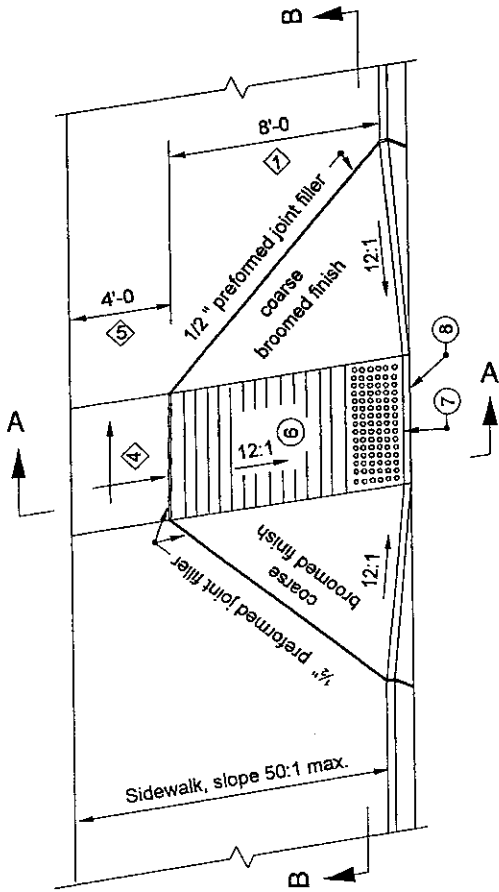


ALTERNATE CURB CONSTRUCTION

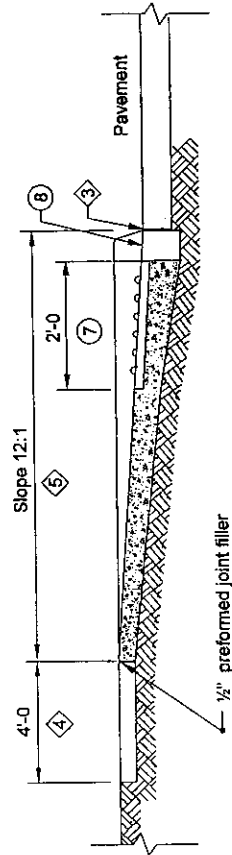
INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMPS GENERAL NOTES & DETAILS	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-02	
	9-0-05 DATE DESIGN STANDARDS ENGINEER
	9-0-05 DATE CHIEF HIGHWAY ENGINEER DESIGN STANDARDS ENGINEER

NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warning.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- 10. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
- 11. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.



SECTION B-B

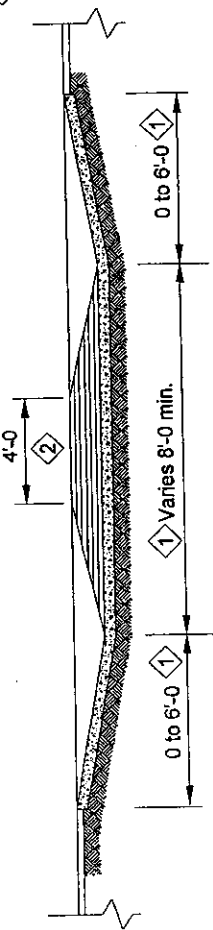
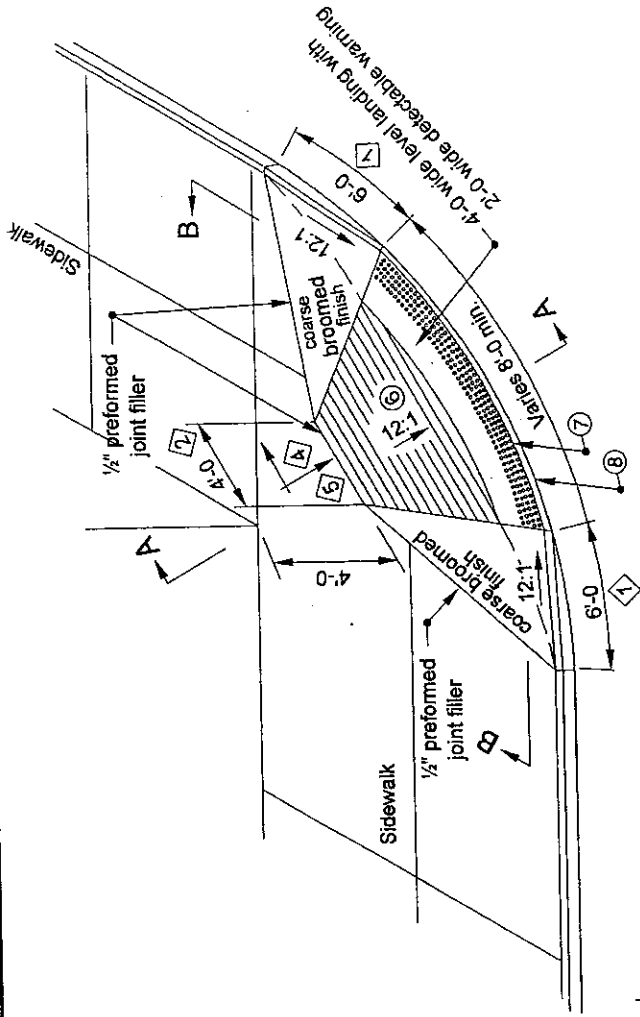


SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMP TYPE A	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-03	
	<i>/s/ Richard L. VanSlove</i> DESIGN STANDARDS ENGINEER DATE 9-01-05
	<i>/s/ Richard A. Smutzer</i> CHIEF HIGHWAY ENGINEER DATE 9-01-05

NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warnings.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- ⑨ See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- ⑩ See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.



SECTION B-B

Sidewalk, Slope 50:1 Max.

Variable slope 12:1

4'-0"

Level

2'-0"

2'-0"

4'-0"

Level

2'-0"

2'-0"

4'-0"

Level

2'-0"

2'-0"

4'-0"

Level

2'-0"

2'-0"

4'-0"

1/2" preformed joint filler

SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

**SIDEWALK CURB RAMP
TYPE B**

SEPTEMBER 2005

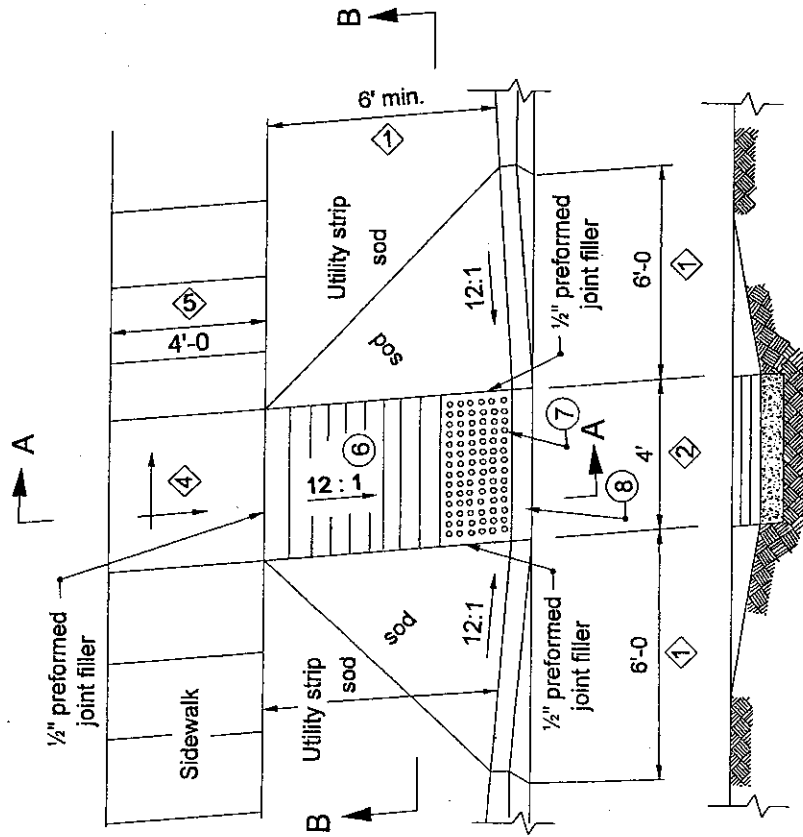
STANDARD DRAWING NO. E 604-SWCR-04

DESIGNED BY Richard L. VarChava	DATE 9-05-05
CHECKED BY Richard K. Smutzer	DATE 9-05-05
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER

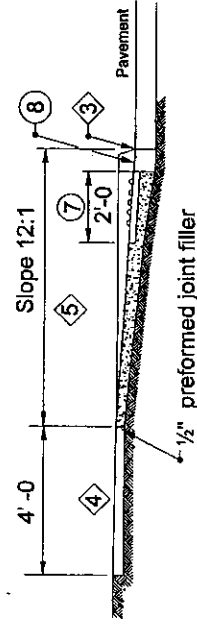
REGISTERED PROFESSIONAL ENGINEER
No. 9150
STATE OF INDIANA
L. VOORHEES

NOTES :

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warning surface.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- 9. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- 10. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.

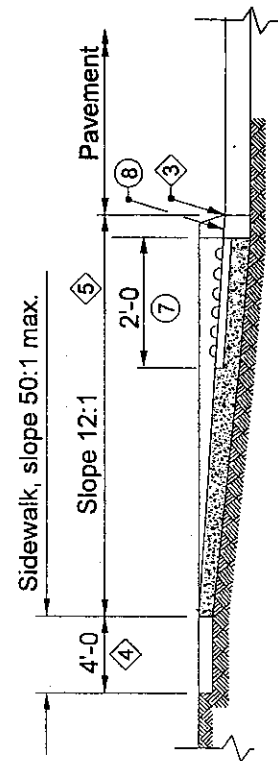
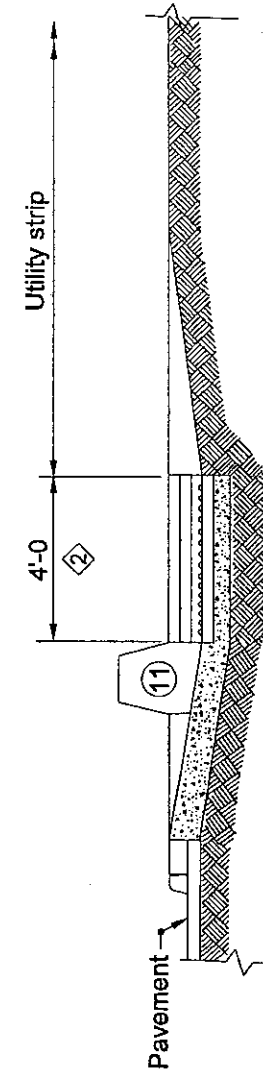
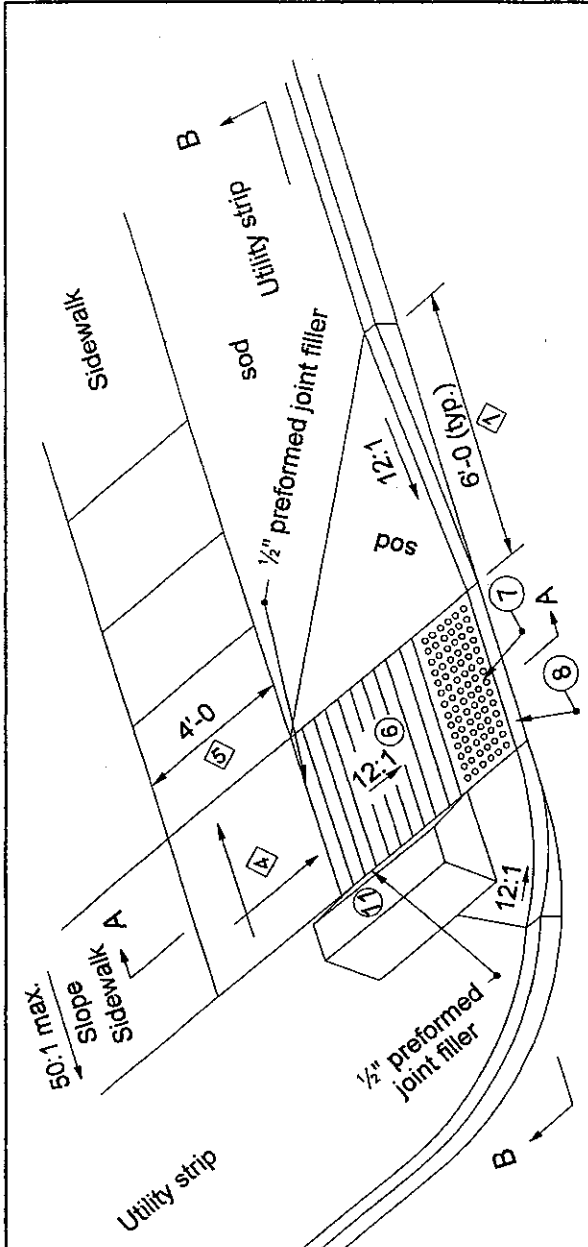


SECTION B-B



SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMPS TYPE C	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-05	
	/s/ Richard L. Voiklave DESIGN STANDARDS ENGINEER DATE 9-01-05
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER DATE 9-01-05



NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warnings.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- 9. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- 10. See Standard Drawing E 604-SWCR-01 and -02 for Plan Location and General Notes respectively.
- ⑪ Street furnishing such as planter, signal base, etc.

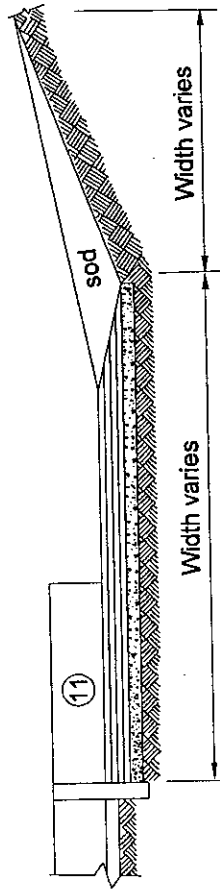
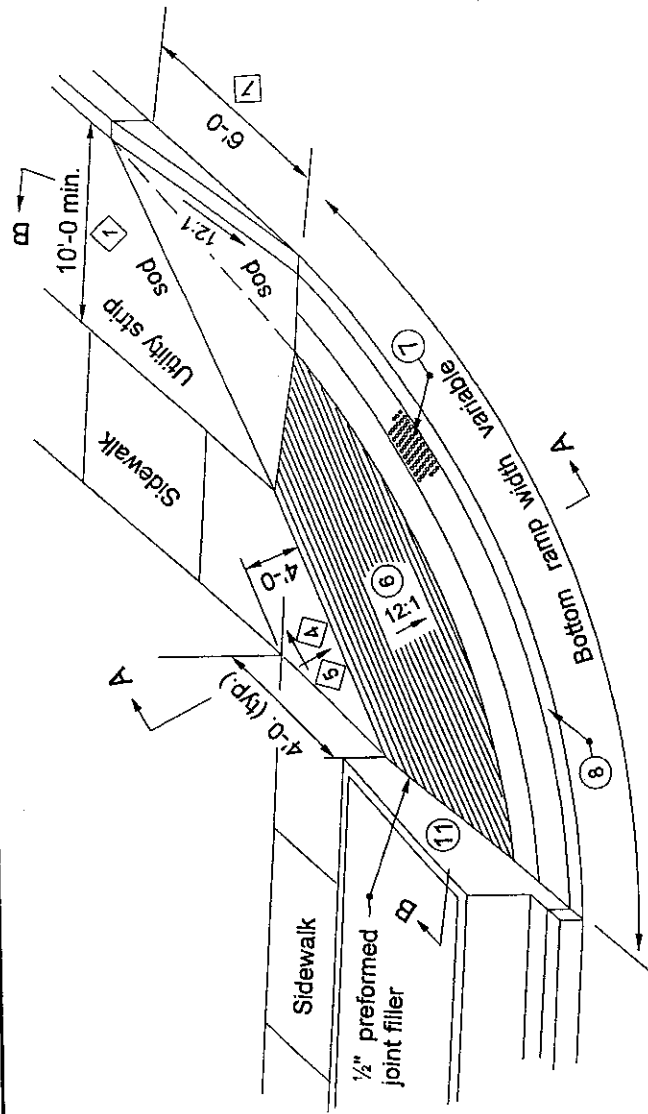
SECTION B-B

SECTION A-A

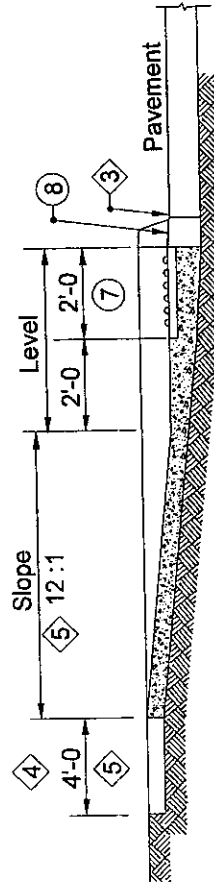
INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK RAMP CURB TYPE D	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-06	
	/s/ Richard L. Voelckers DESIGN STANDARD ENGINEER DATE 9/20/05
	/s/ Richard K. Switzer CHIEF HIGHWAY ENGINEER DATE 9/20/05

NOTES:

- (6) See Standard Drawing E 604-SWCR-02 for groove details.
- (7) See Standard Drawing E 604-SWCR-02 for details of detectable warning surface.
- (8) See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- 9. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- 10. See Standard Drawing E 604-SWCR-01 and -02 for Plan Location and General Notes respectively.
- (11) Street furnishing such as planter, signal base, etc.



SECTION B-B

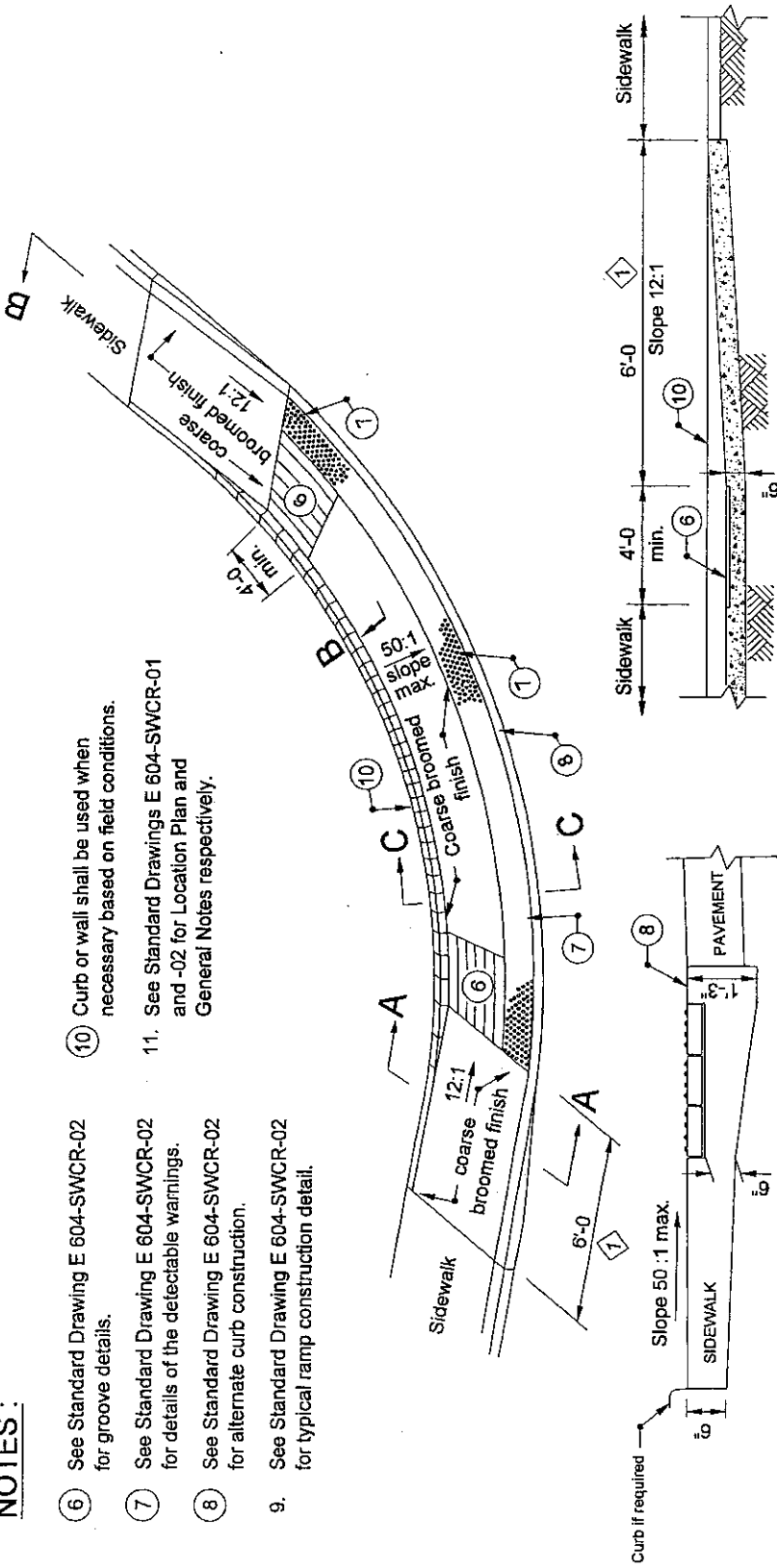


SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMPS TYPE E	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-07	
	/s/ Richard L. Vinciguerra DESIGN STANDARDS ENGINEER 9-01-05 DATE
	/s/ Richard K. Switzer CHIEF HIGHWAY ENGINEER 9-01-05 DATE
DESIGN STANDARDS ENGINEER	

NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warnings.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- 9. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- ⑩ Curb or wall shall be used when necessary based on field conditions.
- 11. See Standard Drawings E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.

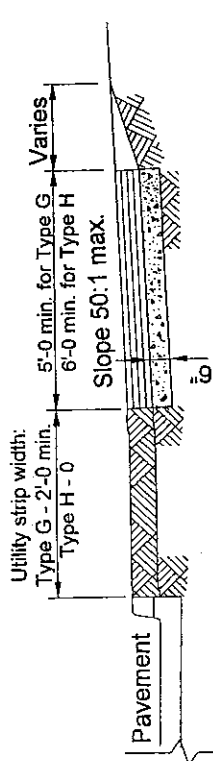


SECTION B-B

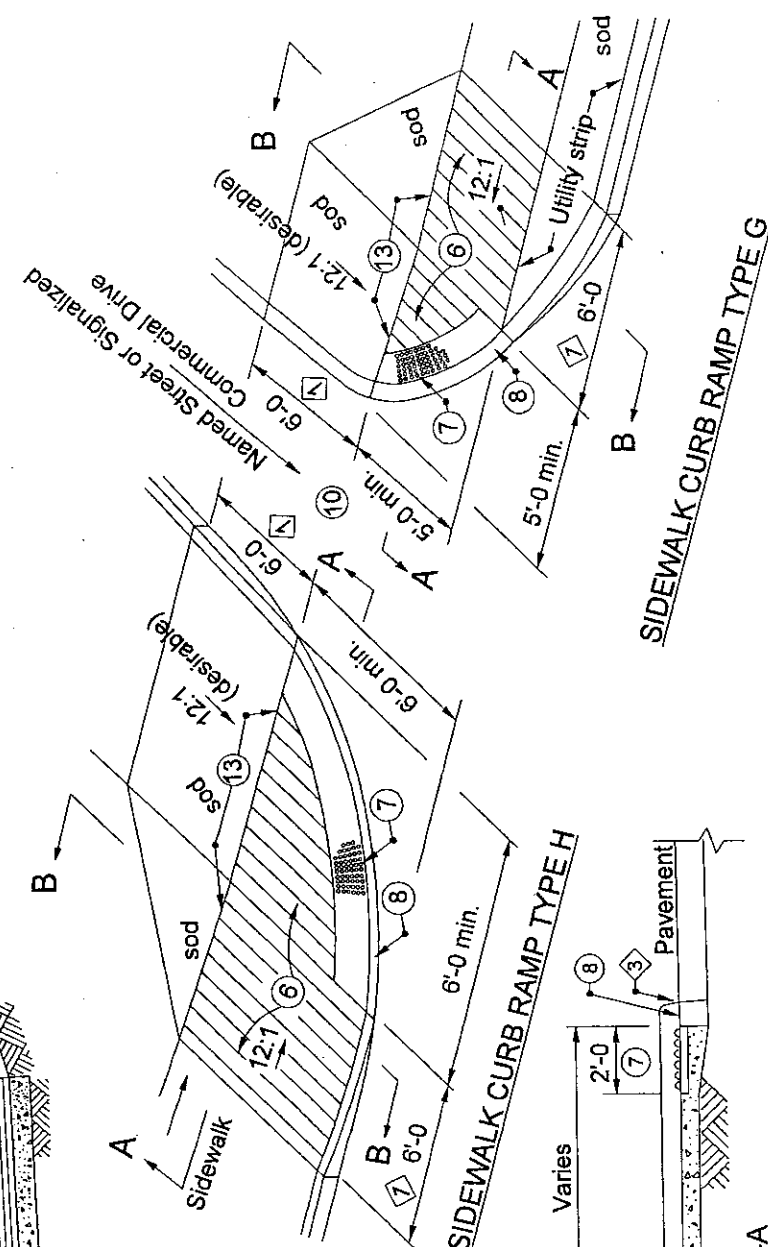
SECTION C-C

SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMPS TYPE F	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-08	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER 9-07-05 DATE
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER 9-07-05 DATE

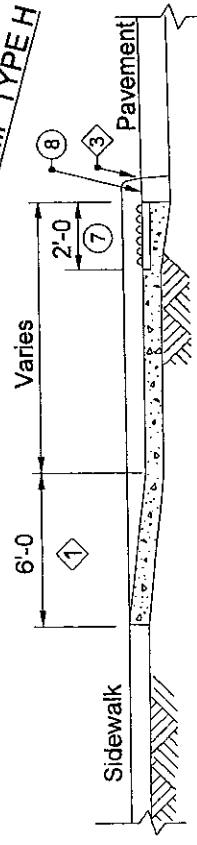


SECTION B-B



SIDEWALK CURB RAMP TYPE G

SIDEWALK CURB RAMP TYPE H



SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

**SIDEWALK CURB'S RAMP'S
TYPE G AND TYPE H**

SEPTEMBER 2005

STANDARD DRAWING NO. E 604-SWCR-09

NO. 9750

STATE OF INDIANA

REGISTERED PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DATE 9-01-05

DESIGN STANDARDS ENGINEER

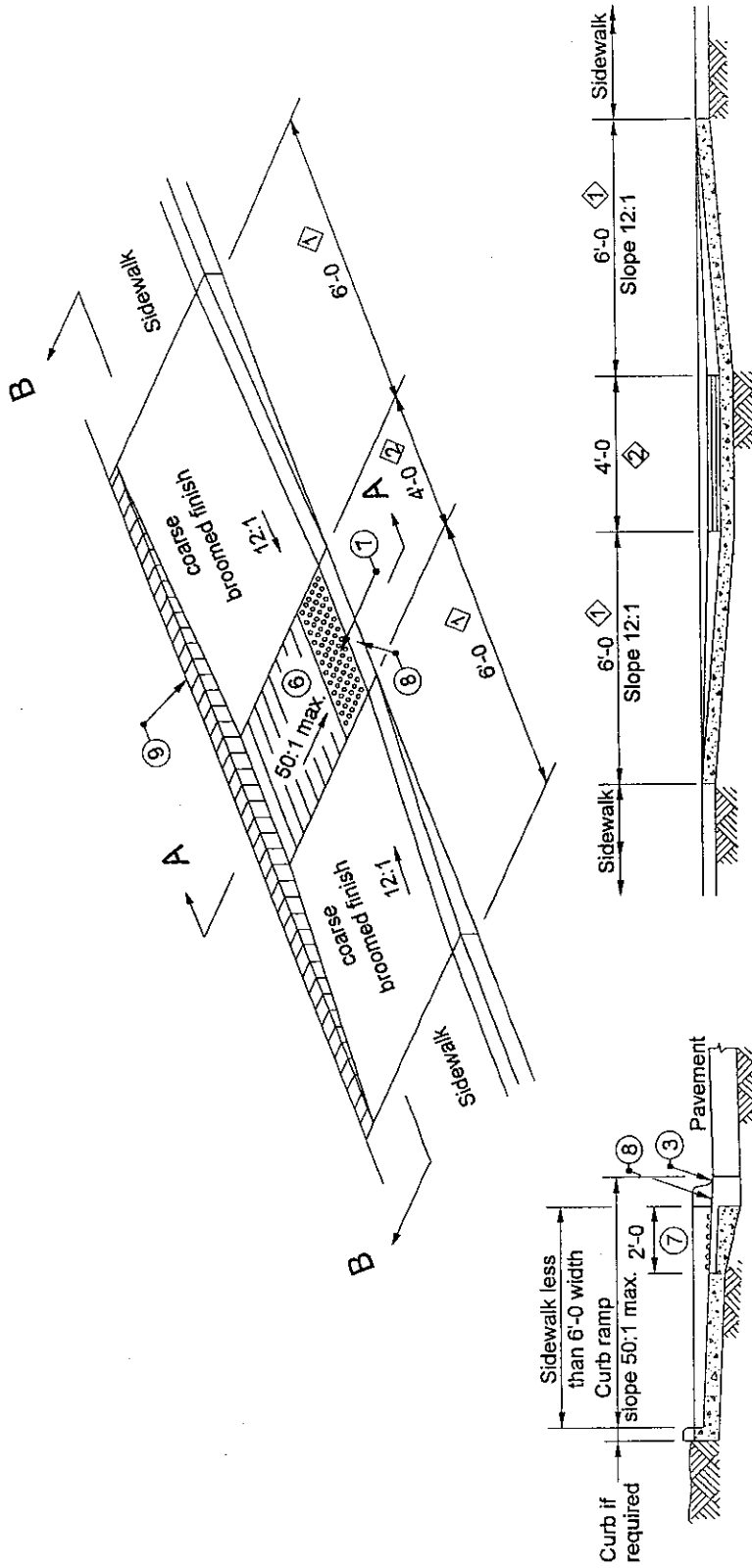
DATE 9-01-05

DESIGN STANDARDS ENGINEER

DATE 9-01-05

NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawings E 604-SWCR-02 for details of the detectable warning surface.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- ⑩ Sidewalk across approach shall be sloped at 50:1 maximum transversely.
- 11. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- 12. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
- ⑬ Vertical face curb optional.



SECTION A-A

SECTION B-B

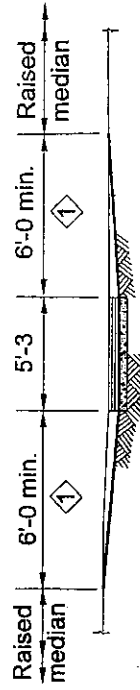
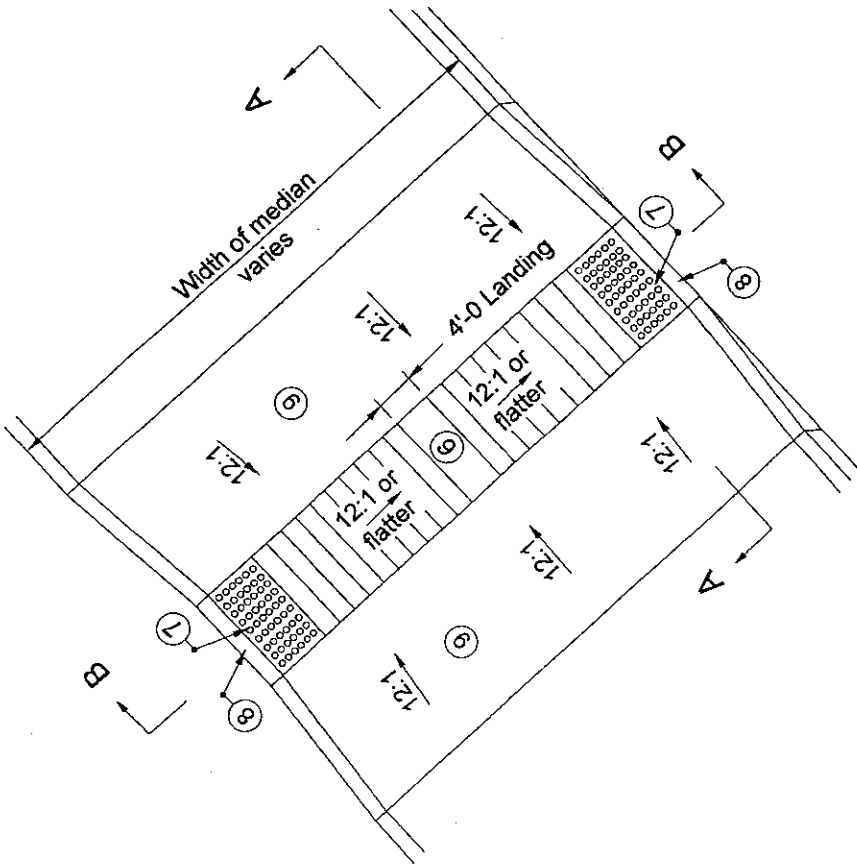
NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of detectable warnings surface.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- ⑨ Curb optional. Shall be used when necessary based on field conditions.
- 10. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.
- 11. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.

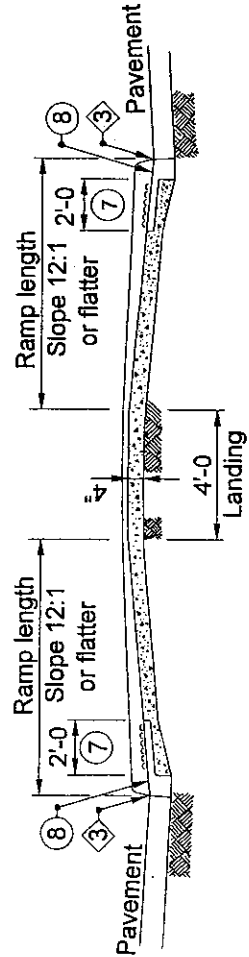
INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMP TYPE K	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-10	
	<i>/s/ Richard L. VanChene</i> DESIGN STANDARDS ENGINEER DATE 9-29-05
	<i>/s/ Richard K. Smutzer</i> BRIEF HIGHWAY ENGINEER DATE 9-29-05

NOTES:

- ⑥ See Standard Drawing E 604-SWCR-02 for groove details.
- ⑦ See Standard Drawing E 604-SWCR-02 for details of the detectable warnings.
- ⑧ See Standard Drawing E 604-SWCR-02 for alternate curb construction.
- ⑨ Match material in place or in plans for median.
- 10. See Standard Drawing E 604-SWCR-02 for typical ramp construction details.
- 11. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
- 12. Ramp cross slope 50:1 desirable or match grade of roadway.
- 13. Detectable warnings are not required where the roadway crossing is controlled by traffic signals timed to provide full width street crossing by pedestrians.

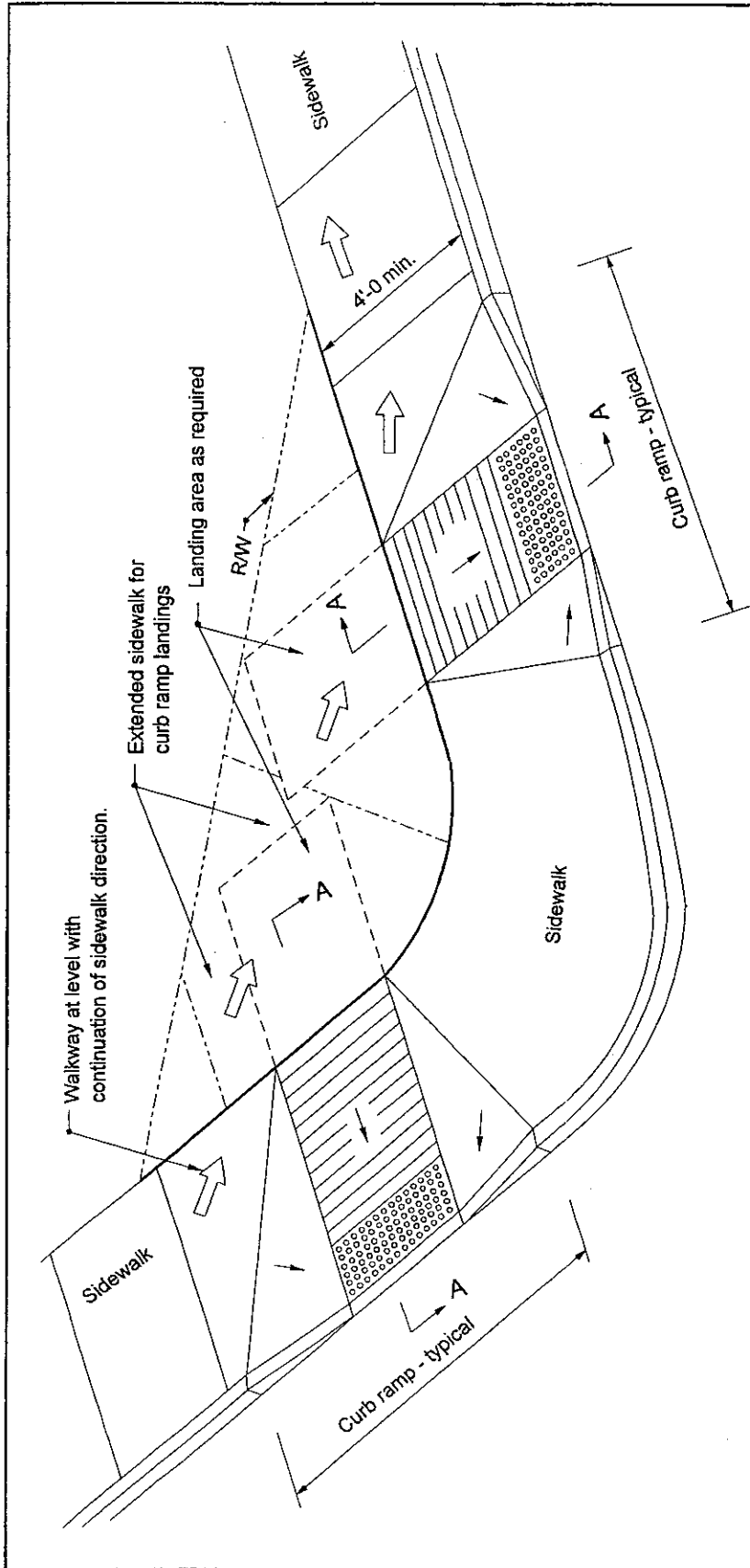


SECTION A-A



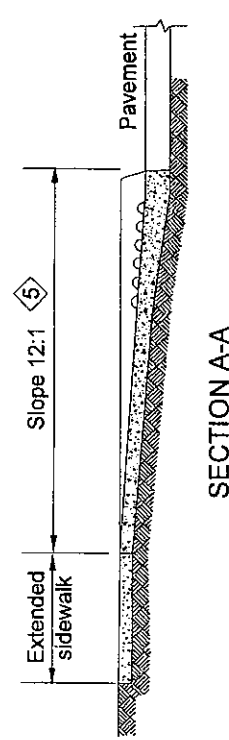
SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMPS TYPE L	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-11	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE 9-01-05
	/s/ Richard L. Smutzer CHIEF HIGHWAY ENGINEER DATE 9-01-05



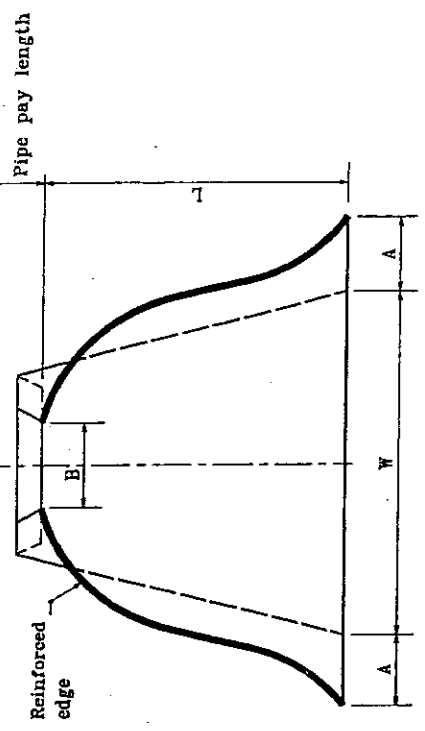
NOTES:

1. Additional right-of-way to widen sidewalks if applicable to improve accessibility on narrow sidewalks.
2. See Standard Drawing E 604-SWCR-02 and -03 to -11 for General Notes and typical curb ramps details respectively.

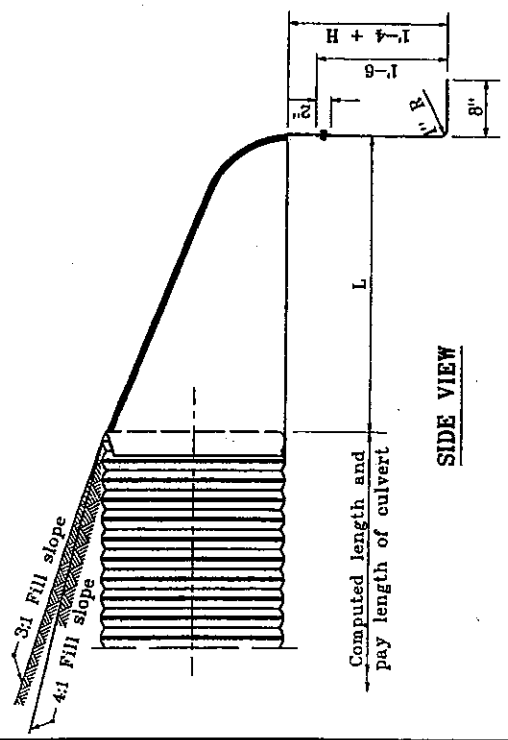


INDIANA DEPARTMENT OF TRANSPORTATION	
SIDEWALK CURB RAMP'S IMPROVED ACCESS	
SEPTEMBER 2005	
STANDARD DRAWING NO. E 604-SWCR-12	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE 9-0-05
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER DATE 9-0-05

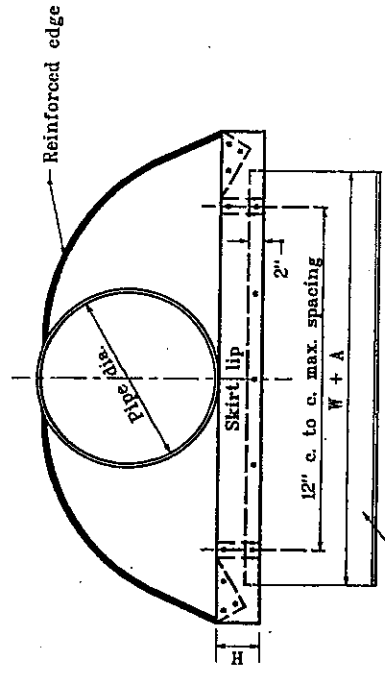
PIPE DIA.	END SECTION THICK. (in.)	DIMENSIONS					APPROX. SLOPE	BODY
		A	B	H	L	W		
12	.064	6	6	6	21	24	2 1/2:1	1 Pc.
15	.064	7	8	6	26	30	2 1/2:1	1 Pc.
18	.064	8	10	6	31	36	2 1/2:1	1 Pc.
21	.064	9	12	6	36	42	2 1/2:1	1 Pc.
24	.064	10	13	6	41	48	2 1/2:1	1 Pc.
30	.079	12	16	8	51	60	2 1/2:1	1 Pc.
36	.079	14	19	9	60	72	2 1/2:1	2 Pc.



PLAN VIEW



SIDE VIEW



END VIEW

INDIANA DEPARTMENT OF TRANSPORTATION

METAL PIPE END SECTION

JANUARY 1998

STANDARD DRAWING NO. E 715-MPES-01

DETAILS PLACED IN THIS FORMAT 11-15-93

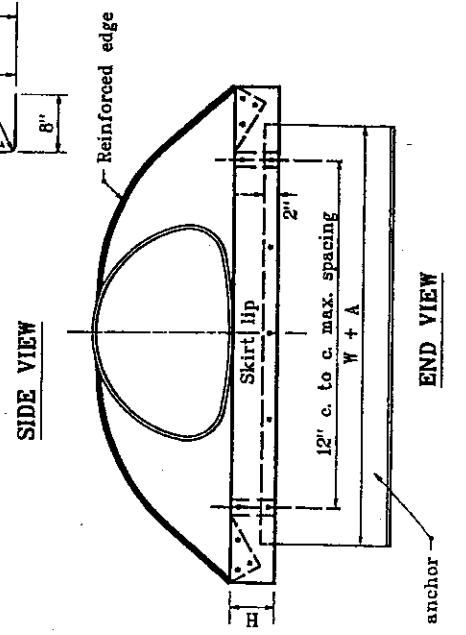
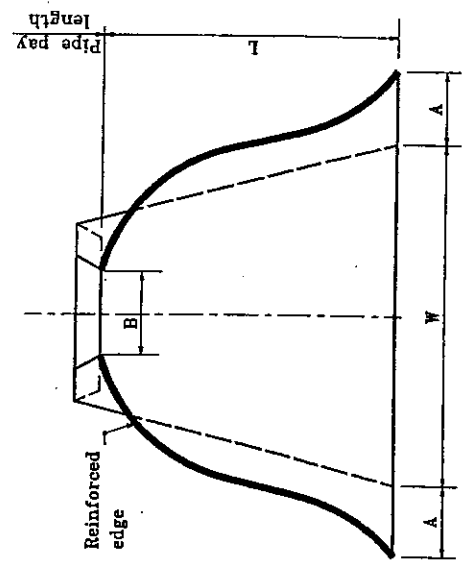
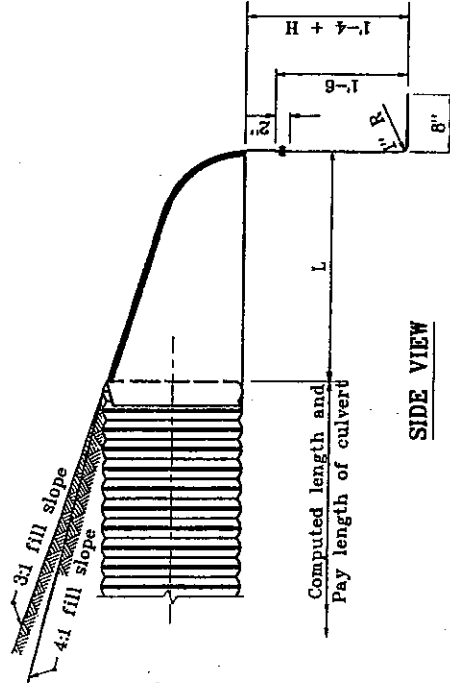
L. URENOVICH
 NO. 18035
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

10/ Anthony L. Urenovich 11-15-93
 DESIGN STANDARDS ENGINEER DATE

11/ F. Peter Zandt 11-15-98
 CHIEF HIGHWAY ENGINEER DATE

GENERALLY APPROVED 1-02-98

PIPE-ARCH DIMENSIONS		END SECTION THICK. (in.)	DIMENSIONS					APPROX. SLOPE	BODY
SPAN	RISE		A	B	H	L	W		
		(in.)	(Max.)	(±1")	(±1 1/2")	(±2")			
17	13	.064	7	9	6	19	30	2 1/2:1	1 Pc.
21	15	.064	7	10	6	23	36	2 1/2:1	1 Pc.
24	18	.064	8	12	6	28	42	2 1/2:1	1 Pc.
28	20	.064	9	14	6	32	48	2 1/2:1	1 Pc.
35	24	.079	10	16	8	39	60	2 1/2:1	1 Pc.
42	29	.079	12	18	9	46	75	2 1/2:1	1 Pc.



INDIANA DEPARTMENT OF TRANSPORTATION
METAL PIPE ARCH
END SECTION
 JANUARY 1998
 STANDARD DRAWING NO. E 715-MPES-02
 DETAILS PLACED IN THE FORMAT 11-95-99

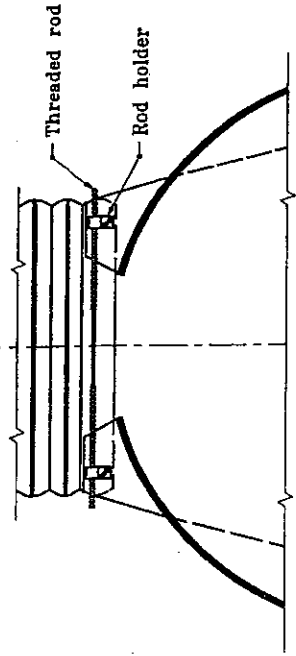
DESIGNER: *L. URBANOVICH*
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

DESIGNED BY: *L. Urbanovich* 11-95-99
 DESIGN STANDARD ENGINEER DATE

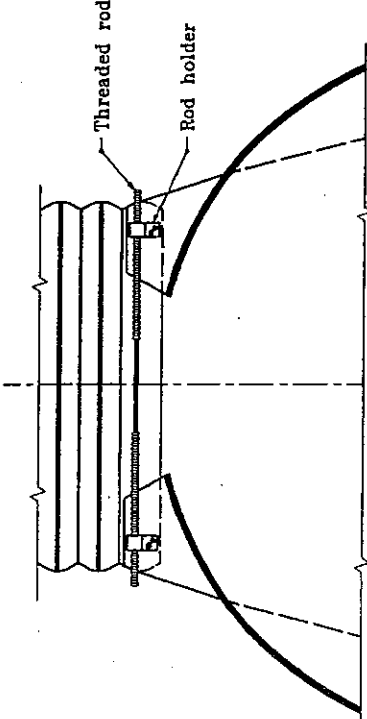
APPROVED BY: *F. Zarnadi* 11-95-99
 CHIEF HIGHWAY ENGINEER DATE
 ORIGINALLY APPROVED 1-92-98
 DESIGN STANDARD ENGINEER

PLAN VIEW

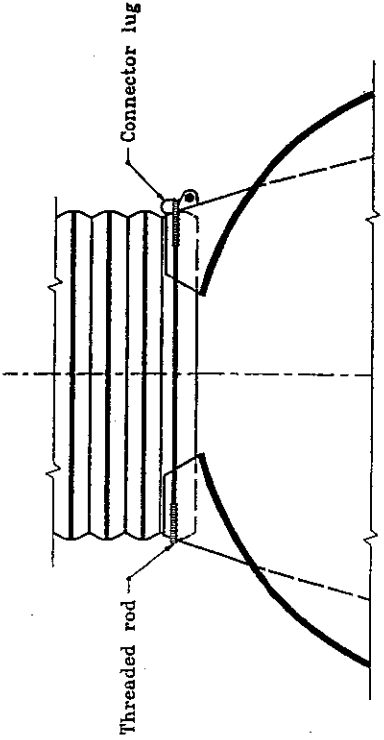
END VIEW



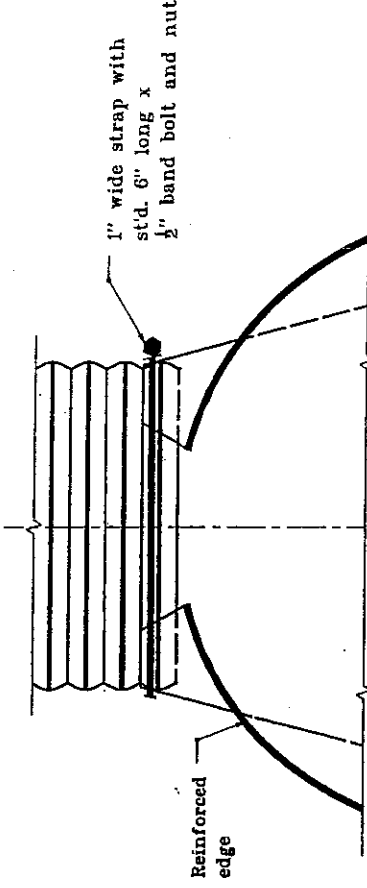
TYPE 1
FOR 17" x 13" THROUGH 42" x 29" ONLY



TYPE 4
FOR 30" THROUGH 36" ONLY



TYPE 3
FOR 12" THROUGH 24" ONLY

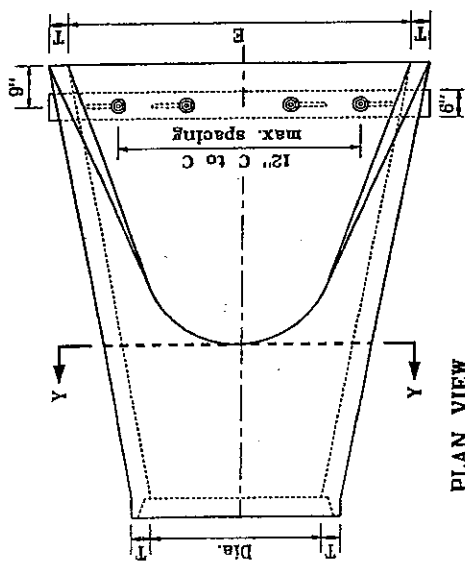


ALTERNATE TYPE 3
FOR 12" THROUGH 24" ONLY

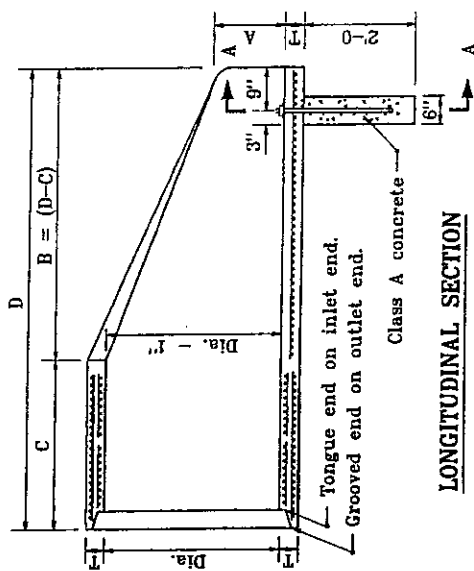
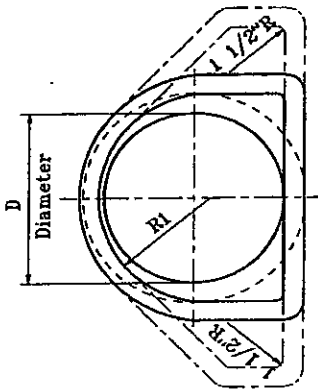
1" wide strap with
std. 6" long x
1/2" band bolt and nut

Reinforced
edge

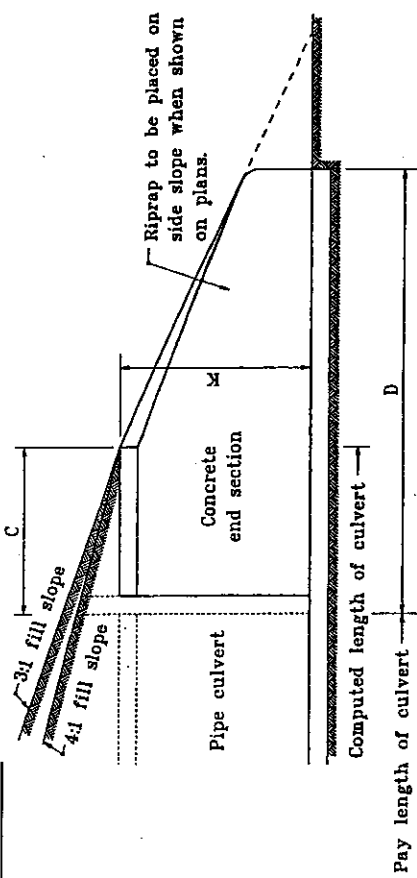
INDIANA DEPARTMENT OF TRANSPORTATION	
METAL PIPE	
END SECTION CONNECTIONS	
JANUARY 1998	
STANDARD DRAWING NO. E 715-MPES-03	
DETAILS PLACED IN THE FORMAT 7-27-99	
/s/ Anthony L. Uremovich 7-27-99 DESIGN STANDARD ENGINEER DATE	
/s/ Kinross Zetardi 7-27-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 1-02-98	



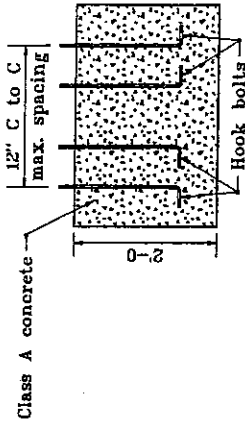
SECTION Y-Y



LONGITUDINAL SECTION



SLOPE DETAIL



SECTION A-A

Concrete Pipe Toe Anchor

TABLE OF DIMENSIONS

DIA.	T (min.)	A (±1")	C (±1")	D (±1")	E (±1")	K	R1	R2	APPROX. WEIGHT, lb.
12"	2"	5"	4'-3"	6'-2"	2'-0"	1.3	10 1/2"	9"	800
15"	2 1/2"	7"	4'-0"	6'-3"	2'-6"	1.5	12 1/2"	11"	1100
18"	2 3/4"	11"	4'-1"	6'-2"	3'-0"	1.8	15 1/2"	12"	1300
21"	2 3/4"	11"	3'-6"	6'-3"	3'-6"	2.1	16 1/2"	13"	1500
24"	3"	1'-0"	2'-8"	6'-3"	4'-0"	2.3	18 3/8"	14"	1800
27"	3 1/4"	1'-1"	2'-5"	6'-3"	4'-6"	2.6	19 3/8"	14 1/2"	2100
30"	3 1/2"	1'-2"	1'-10"	6'-3"	5'-0"	2.9	18 1/2"	15"	2400
33"	3 3/4"	1'-3"	3'-6"	8'-3"	5'-6"	3.1	23 3/4"	17 1/2"	4100
36"	4"	1'-5"	3'-1"	8'-3"	6'-0"	3.4	24 3/8"	20"	4200

INDIANA DEPARTMENT OF TRANSPORTATION
PRECAST CONCRETE
END SECTION
 MAY 1938

STANDARD DRAWING NO. E 715-PCES-01

DETAILS PLACED IN THE COMPANY 11-5-39

L. UREKOWICZ
 No. 18035
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

AUTHORITY L. UREKOWICZ 11-5-39
 DESIGN STANDARDS ENGINEER DATE
 /s/ Fyodor Zelandt 11-5-39
 CHIEF HIGHWAY ENGINEER DATE
 ORIGINALLY APPROVED 5-0-38

PROFILE WALL POLYVINYL CHLORIDE PIPE HEIGHT OF COVER LIMITS (ft.)		
DIAMETER (in.)	MINIMUM (ft.)	MAXIMUM (ft.)
12	2.0	35.3
15	2.0	34.2
18	2.0	34.0
21	2.0	33.0
24	2.0	31.0
27	2.0	30.0
30	2.0	29.0
36	2.0	27.0

SMOOTH WALL POLYVINYL CHLORIDE PIPE HEIGHT OF COVER LIMITS (ft.)			
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	MINIMUM (ft.)	MAXIMUM (ft.)
12	12	2.0	64.0
15	15	2.0	64.0
18	18	2.0	61.0
21	21	2.0	61.0
24	24	2.0	61.0
27	27	-2.0	61.0

NOTE:

1. The tabulated cover depths shall be measured from the bottom of the concrete or asphalt pavement to the top of the pipe.
2. The pay item diameter reflects the minimum required inside diameter.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

MAY 1999

STANDARD DRAWING NO. E 715-PHCL-19

DETAILS PLACED IN THE FORM BY 11-18-98

No. 18095
STATE OF INDIANA
Professional Engineer

A/ Anthony L. Irsanovich 11-15-99
DESIGN ENGINEER DATE

A/ Fawaz Zaidi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN APPROVED 5-03-99

**REINFORCED CONCRETE CIRCULAR PIPE
HEIGHT OF COVER LIMITS (ft.)**

Strength Class/D-load Rating

DIAMETER (in.)	Class II: D _{0.01} = 1000		Class II: D _{0.01} = 1250		Class III: D _{0.01} = 1350		Class III: D _{0.01} = 1500		Class III: D _{0.01} = 1750		Class IV: D _{0.01} = 2000	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
	12	1.4	6.0	1.1	10.0	1.1	12.0	1.0	15.0	1.0	24.0	1.0
15	1.1	8.0	1.0	12.0	1.0	14.0	1.0	19.0	1.0	35.0	1.0	100.0
18	1.0	9.0	1.0	14.0	1.0	17.0	1.0	22.0	1.0	52.0	1.0	100.0
21	1.0	10.0	1.0	15.0	1.0	18.0	1.0	24.0	1.0	84.0	1.0	100.0
24	1.0	11.0	1.0	17.0	1.0	20.0	1.0	26.0	1.0	85.0	1.0	100.0
27	1.0	10.0	1.0	13.0	1.0	15.0	1.0	19.0	1.0	26.0	1.0	42.0
30	1.0	10.0	1.0	14.0	1.0	16.0	1.0	20.0	1.0	28.0	1.0	44.0
33	1.0	10.0	1.0	15.0	1.0	17.0	1.0	20.0	1.0	29.0	1.0	45.0
36	1.0	11.0	1.0	15.0	1.0	17.0	1.0	21.0	1.0	29.0	1.0	45.0
42	1.0	11.0	1.0	16.0	1.0	18.0	1.0	22.0	1.0	30.0	1.0	44.0
48	1.0	12.0	1.0	17.0	1.0	19.0	1.0	22.0	1.0	30.0	1.0	43.0
54	1.0	12.0	1.0	17.0	1.0	19.0	1.0	23.0	1.0	31.0	1.0	42.0
60	1.0	10.0	1.0	13.0	1.0	14.0	1.0	17.0	1.0	21.0	1.0	26.0
66	1.0	10.0	1.0	14.0	1.0	15.0	1.0	17.0	1.0	21.0	1.0	26.0
72	1.0	11.0	1.0	14.0	1.0	15.0	1.0	18.0	1.0	22.0	1.0	27.0
78	1.0	11.0	1.0	14.0	1.0	16.0	1.0	18.0	1.0	22.0	1.0	27.0
84	1.0	11.0	1.0	15.0	1.0	16.0	1.0	19.0	1.0	23.0	1.0	28.0
90	1.0	11.0	1.0	15.0	1.0	16.0	1.0	19.0	1.0	23.0	1.0	28.0
96	1.0	11.0	1.0	15.0	1.0	17.0	1.0	19.0	1.0	23.0	1.0	28.0
102	1.1	12.0	1.1	15.0	1.1	17.0	1.1	19.0	1.1	24.0	1.1	29.0
108	1.2	12.0	1.2	15.0	1.2	17.0	1.2	20.0	1.2	24.0	1.2	29.0
114	1.2	12.0	1.2	16.0	1.2	17.0	1.2	20.0	1.2	24.0	1.2	29.0
120	1.3	12.0	1.3	16.0	1.3	17.0	1.3	20.0	1.3	24.0	1.3	29.0
126	1.4	12.0	1.4	16.0	1.4	18.0	1.4	20.0	1.4	24.0	1.4	29.0
132	1.4	12.0	1.4	16.0	1.4	18.0	1.4	20.0	1.4	25.0	1.4	29.0
138	1.5	12.0	1.5	16.0	1.5	18.0	1.5	20.0	1.5	25.0	1.5	29.0
144	1.5	12.0	1.5	16.0	1.5	18.0	1.5	20.0	1.5	25.0	1.5	29.0

NOTE:

- The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE HEIGHT OF COVER LIMITS
JANUARY 1998

STANDARD DRAWING NO. E 715-PHCL-21
DETAILS PLACED IN THIS FORMAT 11-15-98

No. 18095
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Anthony L. Drzymala 11-15-98
DESIGN STANDARDS ENGINEER DATE

/s/ F. Prof. Zetzel 11-15-98
CHECK HIGHWAY ENGINEER DATE

GENERALLY APPROVED 1-12-98

**REINFORCED CONCRETE CIRCULAR PIPE
HEIGHT OF COVER LIMITS (ft.)**

Strength Class/D-load Rating

DIAMETER (in.)	Class IV: $P_{0.01} = 2250$				Class IV: $P_{0.01} = 2500$				Class IV: $P_{0.01} = 2750$				Class V: $P_{0.01} = 3000$				Class V: $P_{0.01} = 3250$			
	MIN.		MAX.		MIN.		MAX.		MIN.		MAX.		MIN.		MAX.		MIN.		MAX.	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
15	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
18	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
21	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
24	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
27	1.0	92.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
30	1.0	100.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
33	1.0	89.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
36	1.0	79.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
42	1.0	68.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
48	1.0	61.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
54	1.0	57.0	1.0	100.0	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5	1.0	100.5
60	1.0	30.0	1.0	100.0	1.0	45.0	1.0	45.0	1.0	45.0	1.0	45.0	1.0	45.0	1.0	45.0	1.0	45.0	1.0	45.0
66	1.0	31.0	1.0	100.0	1.0	46.0	1.0	46.0	1.0	46.0	1.0	46.0	1.0	46.0	1.0	46.0	1.0	46.0	1.0	46.0
72	1.0	32.0	1.0	37.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0
78	1.0	32.0	1.0	39.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0
84	1.0	33.0	1.0	39.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0
90	1.0	33.0	1.0	40.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0
96	1.0	33.0	1.0	40.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0	1.0	47.0
102	1.1	34.0	1.1	40.0	1.1	47.0	1.1	47.0	1.1	47.0	1.1	47.0	1.1	47.0	1.1	47.0	1.1	47.0	1.1	47.0
108	1.2	34.0	1.2	40.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0
114	1.2	34.0	1.2	40.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0	1.2	47.0
120	1.3	34.0	1.3	40.0	1.3	47.0	1.3	47.0	1.3	47.0	1.3	47.0	1.3	47.0	1.3	47.0	1.3	47.0	1.3	47.0
126	1.4	34.0	1.4	40.0	1.4	47.0	1.4	47.0	1.4	47.0	1.4	47.0	1.4	47.0	1.4	47.0	1.4	47.0	1.4	47.0
132	1.4	34.0	1.4	40.0	1.4	46.0	1.4	46.0	1.4	46.0	1.4	46.0	1.4	46.0	1.4	46.0	1.4	46.0	1.4	46.0
138	1.5	34.0	1.5	40.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0
144	1.5	34.0	1.5	40.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0	1.5	46.0

NOTE:

1. The tabulated cover depths shall be measured from the bottom of the bituminous or concrete pavement to the top of the pipe.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE HEIGHT OF COVER LIMITS
JANUARY 1998

STANDARD DRAWING NO. E 715-PHCL-22
DETAILS PLACED IN THIS FORMAT 11-15-98

No. 18095
REGISTERED PROFESSIONAL ENGINEER
ANTHONY L. UREMOWICZ

/s/ Anthony L. Uremowicz 11-15-98
DESIGN STANDARD ENGINEER DATE

/s/ Eugene Zandi 11-15-98
CHECK ACCOUNTANT DATE

DESIGN STANDARD ENGINEER
SPECIALLY APPROVED 11-15-98

**REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE
HEIGHT OF COVER LIMITS (ft.)**

SPAN (in.)	RISE (in.)	AREA (sqft)	Strength Class/D-load Rating											
			Class HE-A: D _{0.01} = 800		Class HE-I: D _{0.01} = 800		Class HE-II: D _{0.01} = 1000		Class HE-III: D _{0.01} = 1350		Class HE-IV: D _{0.01} = 2000			
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
23	14	1.8	4.0	8.0	1.0	11.0	1.0	20.0	1.0	20.0	1.0	100.0		
30	19	3.3	5.0	7.0	1.0	10.0	1.0	16.0	1.0	16.0	1.0	47.0		
34	22	4.1	5.0	8.0	1.0	11.0	1.0	17.0	1.0	17.0	1.0	48.0		
38	24	5.1	5.0	8.0	1.0	11.0	1.0	18.0	1.0	18.0	1.0	49.0		
42	27	6.3	6.0	9.0	1.0	12.0	1.0	19.0	1.0	19.0	1.0	50.0		
45	29	7.4	6.0	9.0	1.0	12.0	1.0	19.0	1.0	19.0	1.0	45.0		
49	32	8.8	6.0	9.0	1.0	12.0	1.0	19.0	1.0	19.0	1.0	45.0		
53	34	10.2	6.0	9.0	1.0	12.0	1.0	20.0	1.0	20.0	1.0	44.0		
60	38	12.9	5.0	8.0	1.0	10.0	1.0	15.0	1.0	15.0	1.0	26.0		
68	43	16.6	6.0	8.0	1.0	10.0	1.0	15.0	1.0	15.0	1.0	27.0		
76	48	20.5	6.0	8.0	1.0	11.0	1.0	16.0	1.0	16.0	1.0	28.0		
83	53	24.8	6.0	9.0	1.0	11.0	1.0	16.0	1.0	16.0	1.0	29.0		
91	58	29.5	6.0	9.0	1.0	12.0	1.0	17.0	1.0	17.0	1.0	29.0		
98	63	34.6	6.0	9.0	1.0	12.0	1.0	17.0	1.0	17.0	1.0	29.0		
106	68	40.1	6.0	9.0	1.0	12.0	1.0	17.0	1.0	17.0	1.0	29.0		
113	72	46.1	7.0	9.0	1.0	12.0	1.0	18.0	1.0	18.0	1.0	30.0		
121	77	52.4	7.0	9.0	1.0	12.0	1.0	18.0	1.0	18.0	1.0	30.0		
128	82	59.2	7.0	9.0	1.0	12.0	1.0	18.0	1.0	18.0	1.0	30.0		
136	87	66.4	7.0	10.0	1.0	13.0	1.0	18.0	1.0	18.0	1.0	30.0		
143	92	74.0	7.0	10.0	1.0	13.0	1.0	18.0	1.0	18.0	1.0	31.0		
151	97	82.0	7.0	10.0	1.0	13.0	1.0	18.0	1.0	18.0	1.0	31.0		
166	106	99.2	7.0	10.0	1.0	13.0	1.0	18.0	1.0	18.0	1.0	31.0		
180	116	136.6	7.0	10.0	1.0	13.0	1.0	18.0	1.0	18.0	1.0	31.0		

NOTE:

- The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE HEIGHT OF COVER LIMITS
JANUARY 1996

STANDARD DRAWING NO. E 715-PHCL-23

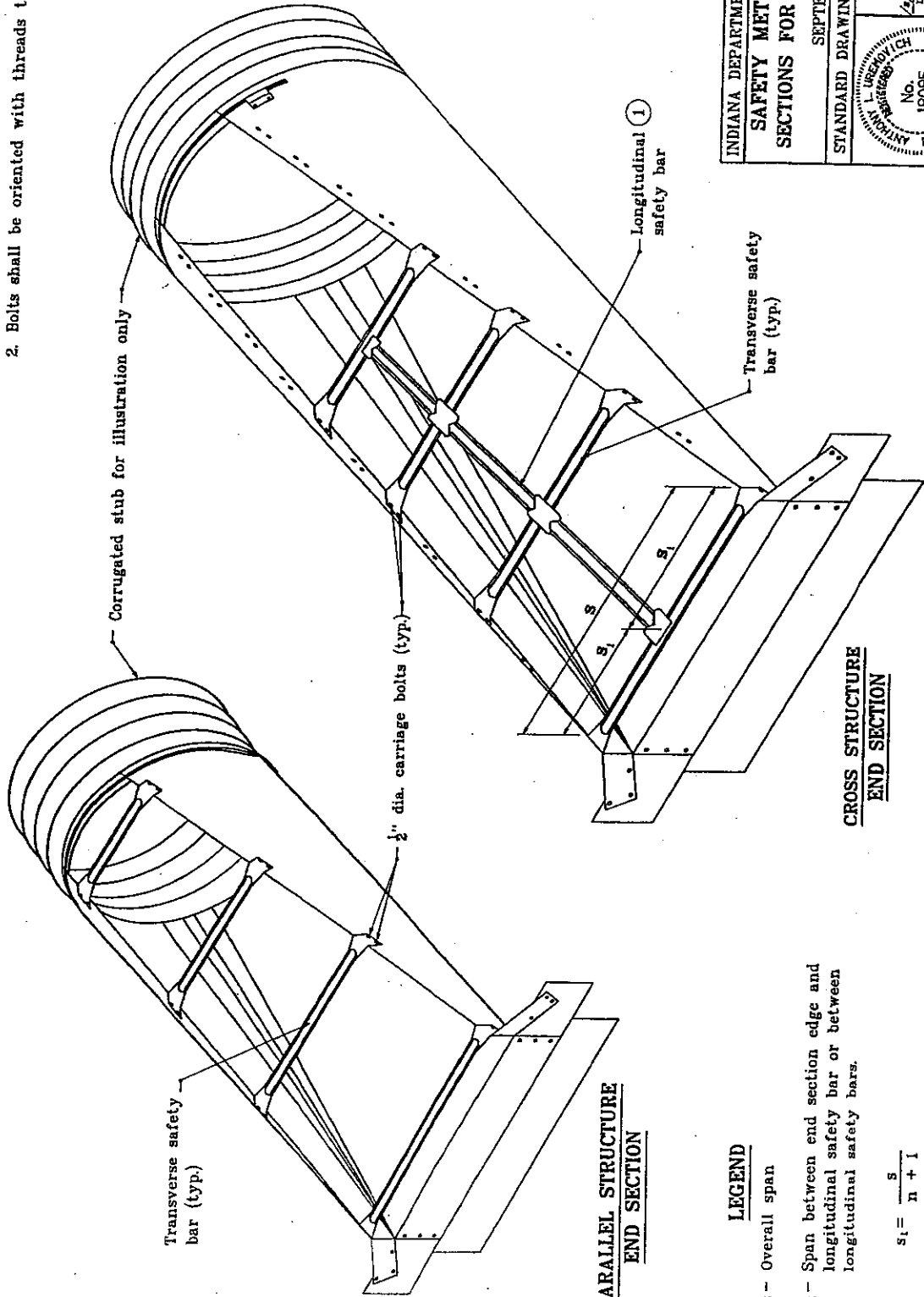
DETAILS PLACED IN THIS FORM 11-15-59

L. UREKHOVICH
REGISTERED PROFESSIONAL ENGINEER
No. 18055
STATE OF INDIANA

/s/ F. Ross Zetler
CHIEF HIGHWAY ENGINEER
DATE 11-15-99
ORIGINALLY APPROVED 1-12-96

GENERAL NOTES

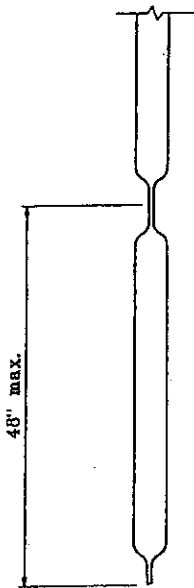
- 1 Longitudinal safety bar shall be welded to transverse bars. For cross structure and section, if S (2'-6, no longitudinal safety bar is required. If S) 2'-6, longitudinal safety bar(s) shall be provided so S₁ (2'-6.
- 2 Bolts shall be oriented with threads to inside of end section.



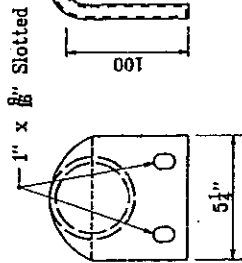
LEGEND

- s - Overall span
 - s₁ - Span between end section edge and longitudinal safety bar or between longitudinal safety bars.
- $$s_1 = \frac{s}{n + 1}$$
- where n = Number of longitudinal safety bars

INDIANA DEPARTMENT OF TRANSPORTATION	
SAFETY METAL CULVERT END SECTIONS FOR CORRUGATED PIPE	
SEPTEMBER 2000	STANDARD DRAWING NO. E 715-SMES-01
/s/ Anthony L. Uremovich 9-01-00 DESIGN STANDARDS ENGINEER DATE	
/s/ Bruce Zaricki 9-01-00 CHIEF DESIGN ENGINEER DATE	



LONGITUDINAL SAFETY BAR DETAIL

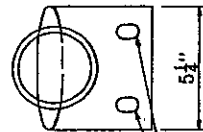


1" x 5/8" Slotted

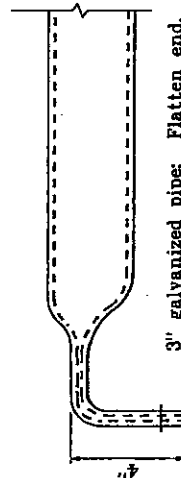


3" galvanized pipe: Flatten end, then bend outside 4" to match end section sides.

OR



1" x 5/8" Slotted



3" galvanized pipe: Flatten end, then bend outside 4" to match end section sides.

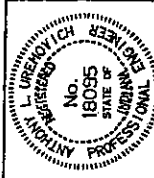
TRANSVERSE SAFETY BAR DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION
**SAFETY METAL CULVERT END
 SECTIONS FOR CORRUGATED PIPE**

JANUARY 1980

STANDARD DRAWING NO. E 715-SMES-02

DETAILS PLACED IN THIS FORMAT 7-27-99



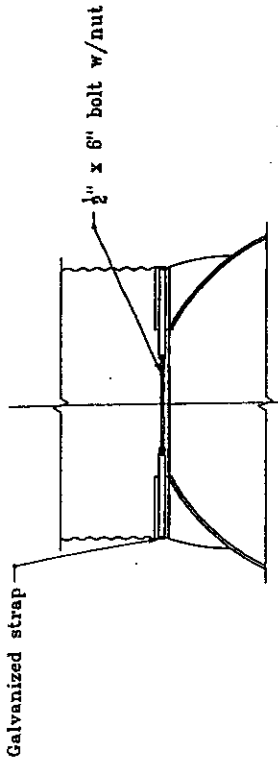
Anthony L. Urepaucha 7-27-99
 DESIGN ENGINEER DATE

By: Eugene Zentel 7-27-99
 CIVIL ENGINEER DATE
 ORIGINALLY APPROVED

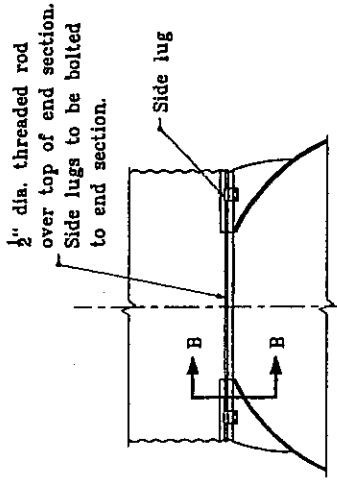
DESIGN ENGINEER

GENERAL NOTES

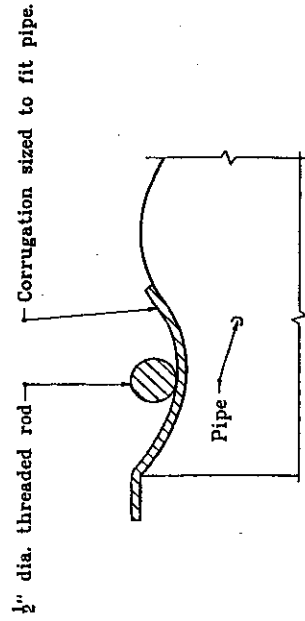
1. For circular pipe diameters through 24", attach end section to pipe with type 1 connector. For all other sizes, attach end section to pipe with type 2 connector.



TYPE 1 CONNECTOR DETAIL
Through 24" dia.



TYPE 2 CONNECTOR DETAIL
For all circular pipes larger than 24"
and all pipe-arches



SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END
SECTIONS FOR CORRUGATED PIPE

JANUARY 1998

STANDARD DRAWING NO.E 715-SMES-03

DETAILS PLACED IN THIS FORMAT 7-27-98

1/2 Anthony L. Urazovich 7-27-98
DESIGN STANDARDS ENGINEER DATE

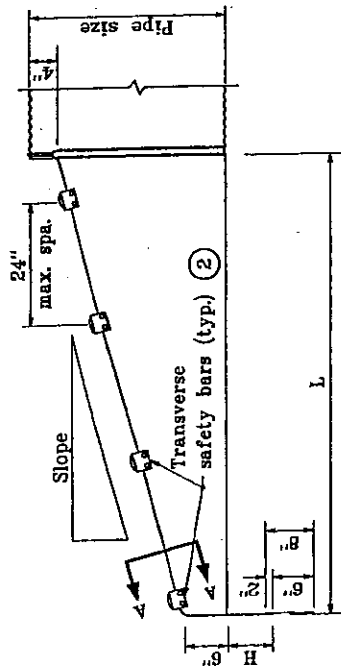
1/3 Fyodor Zaitsev 7-27-98
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 1-02-98



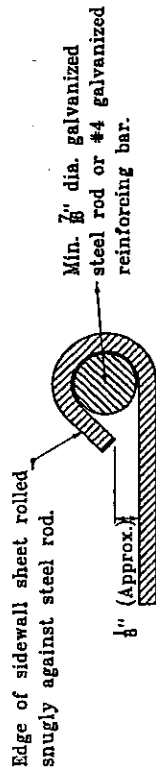
DESIGN STANDARDS ENGINEER

GENERAL NOTES

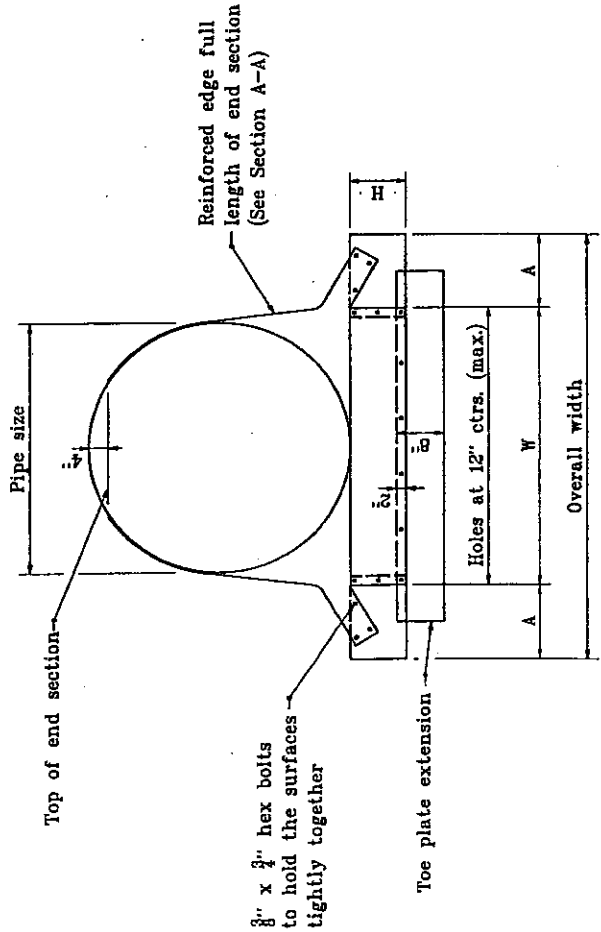
1. See Standard Drawing E 715-SMES-06 for variable dimensions.
- ② Transverse safety bars shall be schedule 40 galvanized steel pipe. Pipe shall be galvanized after forming. Number of bars required will vary depending on the length of the end sections.
3. The toe plate extension shall be the same thickness as the end section. The dimension shall be the end section overall width less 8".



SIDE ELEVATION OF PARALLEL STRUCTURE END SECTION



SECTION A-A



INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR CORRUGATED PIPE
 JANUARY 1998
 STANDARD DRAWING NO. E 715-SMES-04

DETAILS PLACED IN THIS FORMAT 7-27-95

/s/ Anthony L. Uremowich 7-27-95
 DESIGN STANDARDS ENGINEER DATE

/s/ Floyd Zentgraf 7-27-95
 CHIEF HIGHWAY ENGINEER DATE

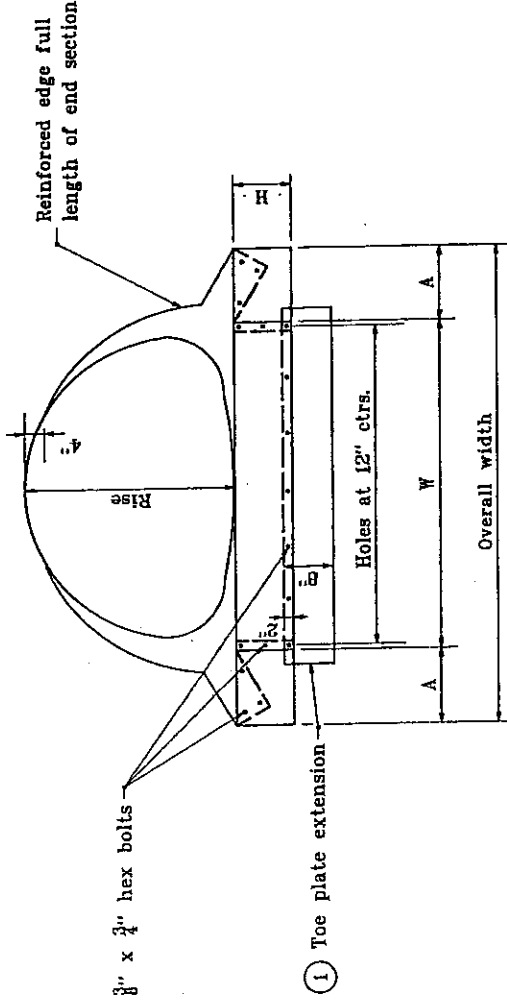
ORIGINALLY APPROVED 1-02-90

DESIGN STANDARDS ENGINEER

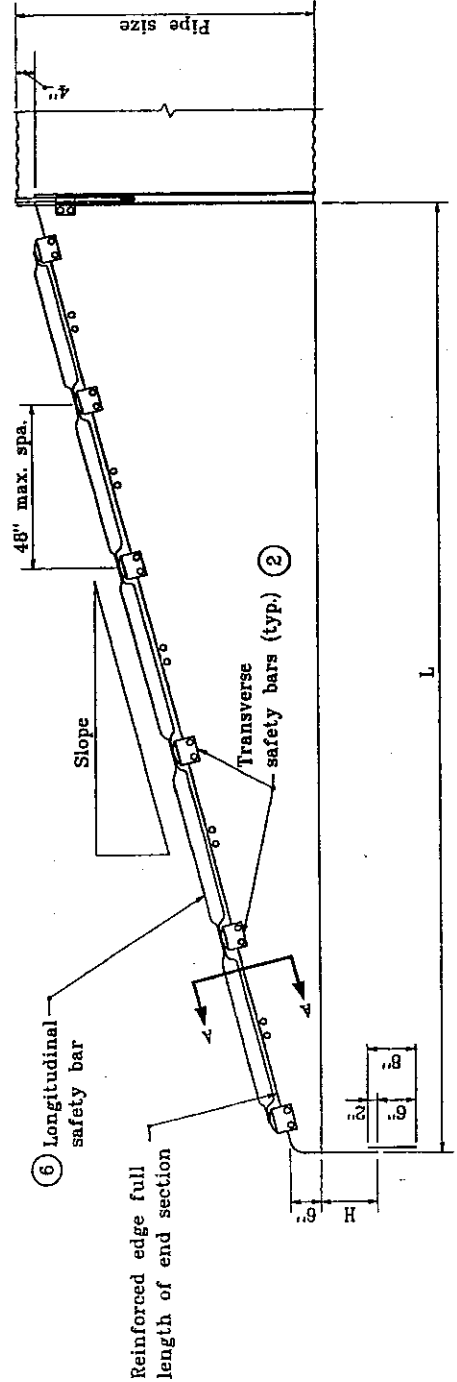
INDIANA PROFESSIONAL ENGINEERS
 No. 18095
 STATE OF INDIANA

GENERAL NOTES

- ① Toe plate extension shall be the same thickness as the end section. Dimension shall be overall width less 6".
- ② Transverse safety bars shall be Schedule 40 galvanized steel pipe. Pipe shall be galvanized after forming. Number of bars required will vary depending on the length of the end sections.
- ③ Slotted holes for safety bar attachment shall be provided for all end sections.
- ④ See Standard Drawing E 715-SMES-04 for Section A-A.
- ⑤ See Standard Drawing E 715-SMES-06 for variable dimensions.
- ⑥ See Standard Drawing E 715-SMES-01 for warrant of longitudinal safety bar.



FRONT VIEW



SIDE ELEVATION FOR CROSS STRUCTURE END SECTION

INDIANA DEPARTMENT OF TRANSPORTATION
**SAFETY METAL CULVERT END
 SECTIONS FOR CORRUGATED PIPE**

JANUARY 1998
 STANDARD DRAWING NO. E 715-SMES-05
 DETAILS PLACED IN THE FORMAT 7-27-99



1/4/98 Steve Bernick
 CHIEF HIGHWAY ENGINEER
 ORIGINALLY APPROVED
 DATE 7-27-99
 1-02-98

Pipe Dia.	Min. Thick.	Dimensions, in.				L Dimensions			
		A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
15	.064	8	6	37	37	4:1	20	6:1	30
18	.064	8	6	40	40	4:1	32	6:1	48
21	.064	8	6	43	43	4:1	44	6:1	66
24	.064	8	6	46	46	4:1	56	6:1	84
30	.109	12	9	60	60	4:1	80	6:1	120
36	.109	12	9	66	66	4:1	104	6:1	156
42	.109	16	12	80	80	4:1	128	6:1	192
48	.109	16	12	86	86	4:1	152	6:1	228
54	.109	16	12	92	92	4:1	176	6:1	264
60	.109	16	12	66	98	4:1	200	6:1	300

Equiv. Dia. (in.)	Span		Min. Thick in.	Dimensions, in.				L Dimensions			
	Rise	Span		A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
18	21	15	.064	8	6	27	43	4:1	20	6:1	30
21	24	18	.064	8	6	30	46	4:1	32	6:1	48
24	28	20	.064	8	6	34	50	4:1	40	6:1	60
30	35	24	.079	12	9	41	65	4:1	56	6:1	84
36	42	29	.109	12	9	48	72	4:1	76	6:1	114
42	49	33	.109	16	12	55	87	4:1	92	6:1	138
48	57	38	.109	16	12	63	95	4:1	112	6:1	168
54	64	43	.109	16	12	70	102	4:1	132	6:1	198
60	71	47	.109	16	12	77	109	4:1	148	6:1	222
72	83	57	.109	16	12	89	121	4:1	188	6:1	282

INDIANA DEPARTMENT OF TRANSPORTATION

SAFETY METAL CULVERT END SECTIONS FOR CORRUGATED PIPE

JANUARY 1998

STANDARD DRAWING NO. E 715-SMES-06

DETAILS PLACED IN THIS FORMAT 11-15-98

L. URENOY
No. 18095
STATE OF INDIANA
PROFESSIONAL ENGINEER

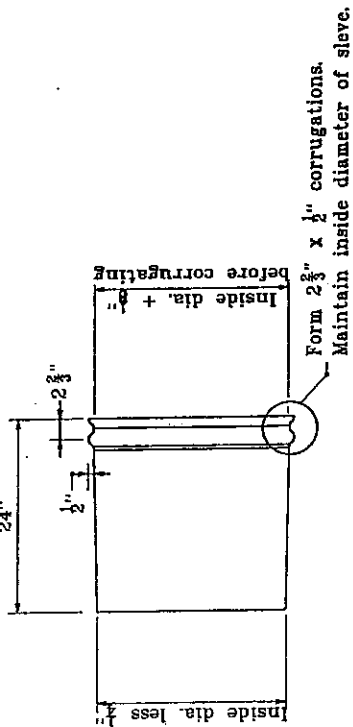
1/8/ Fyroz Zaidi
CHIEF HIGHWAY ENGINEER

11-15-98
DATE

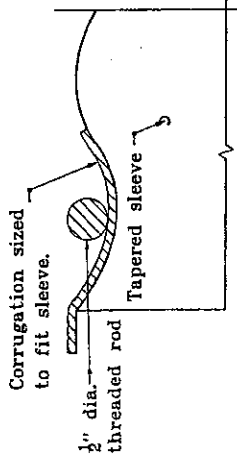
DESIGN STANDARDS ENGINEER

GENERAL NOTES

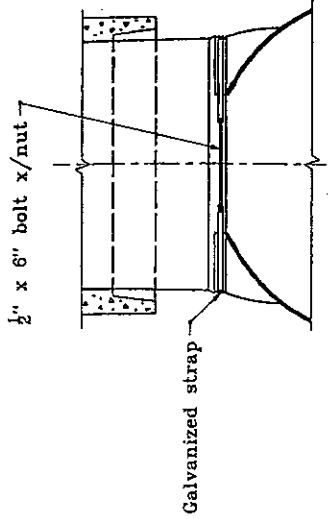
1. For circular pipe diameters through 24", attach end section to pipe with type 1 connector. For all other sizes, attach end section to pipe with type 2 connector.



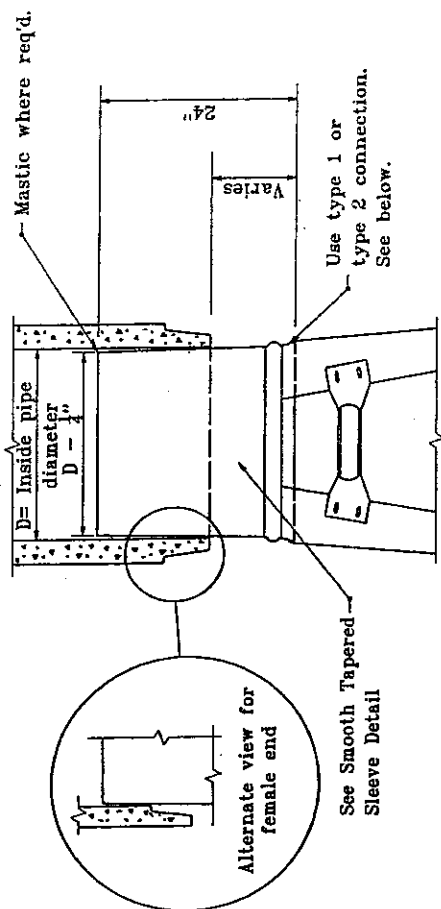
SMOOTH TAPERED SLEEVE DETAIL



SECTION B-B

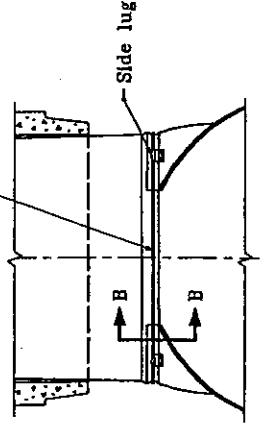


TYPE 1 CONNECTOR DETAIL
for all circular pipes through 24"



TAPERED SLEEVE FOR ATTACHING STEEL END SECTION TO SMOOTH INTERIOR PIPE

1/2" dia. threaded rod over top of end section. Side lugs to be bolted to end section.

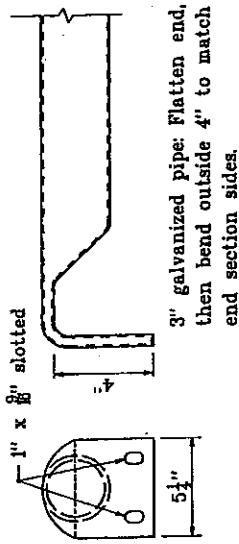


TYPE 2 CONNECTOR DETAIL
all circular pipes larger than 24" and all horizontal elliptical pipes

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR SMOOTH PIPE
JANUARY 1938
STANDARD DRAWING NO. E 715-SMES-08
DETAILS PLACED IN THIS FORMAT 7-27-59

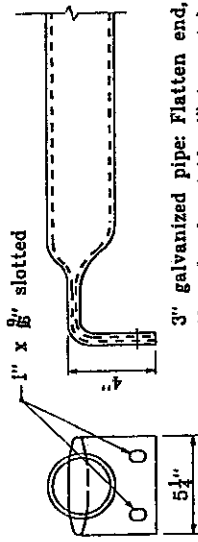
ANTHONY L. DRENNICH
REGISTERED PROFESSIONAL ENGINEER
No. 18095
STATE OF INDIANA
DATE 7-27-59
DESIGN STANDARD ENGINEER

W. P. Woods, Jr.
CHIEF HIGHWAY ENGINEER
DATE 1-02-56
ORIGINALLY APPROVED



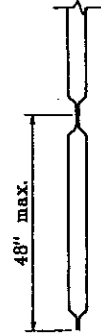
3" galvanized pipe: Flatten end, then bend outside 4" to match end section sides.

OR



3" galvanized pipe: Flatten end, then bend outside 4" to match end section sides.

TRANSVERSE SAFETY BAR DETAILS



LONGITUDINAL SAFETY BAR DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR SMOOTH PIPE
 JANUARY 1998
 STANDARD DRAWING NO. E 715-SMES-09

DETAILS PLACED IN THIS FORMAT 7-27-99

1/s/ Anthony L. Uremovitch 7-27-99
 DESIGN STANDARDS ENGINEER

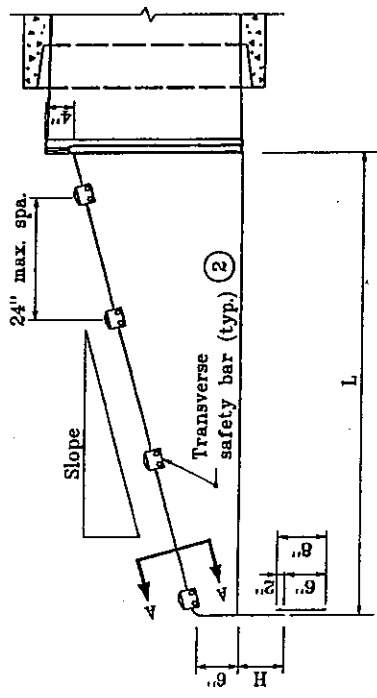
1/s/ Elyse Zaradi 7-27-99
 CHECK ENGINEER

1-02-98
 GRANULY APPROVED

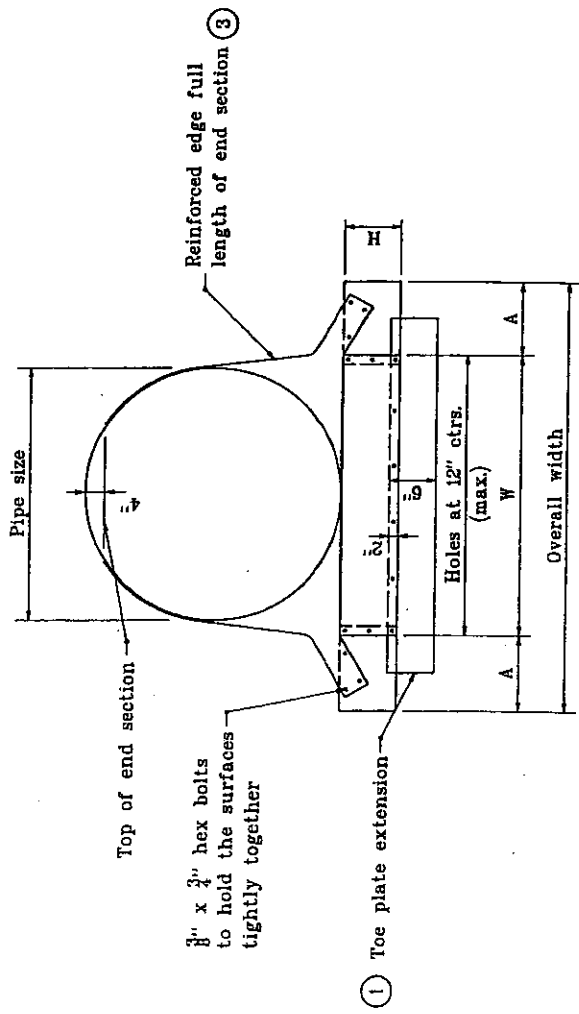
ANTHONY L. UREMOWICH
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

GENERAL NOTES

- ① Toe plate extension is to be the same thickness as the end section. Dimension shall be end section overall width less 6".
- ② Transverse safety bars shall be Schedule 40 galvanized steel pipe. Pipe to be galvanized after forming. Number of bars req'd will vary depending on the length of the end section.
- ③ See Standard Drawing E 715-SMES-11 for Section A-A.
- 4. See Standard Drawing E 715-SMES-12 for variable dimensions.



SIDE ELEVATION OF PARALLEL STRUCTURE END SECTION

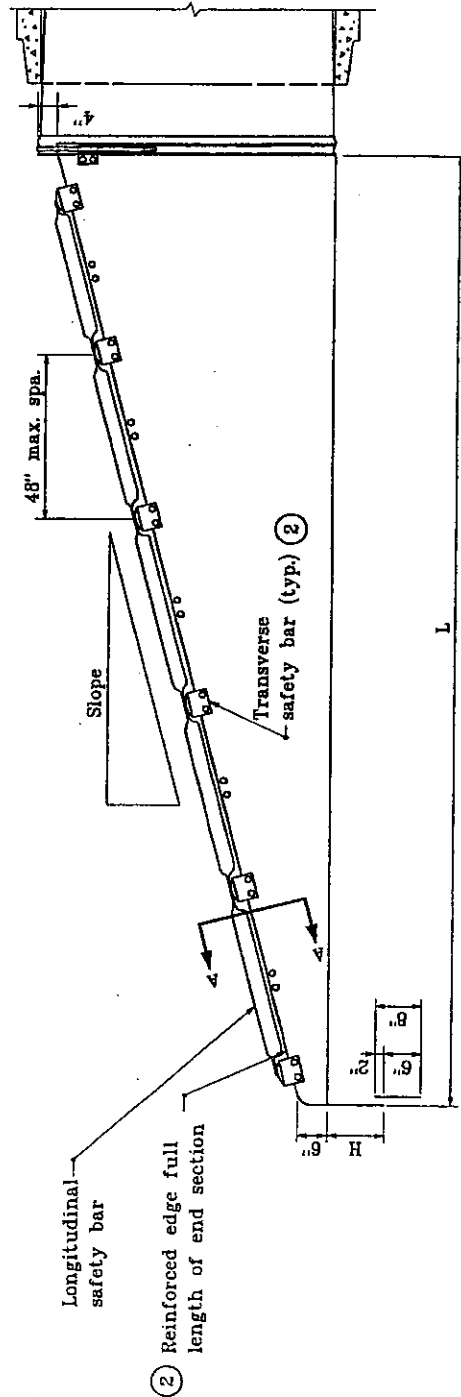
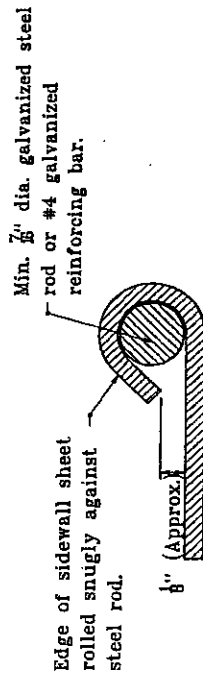


FRONT VIEW

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR SMOOTH PIPE
 JANUARY 1998
 STANDARD DRAWING NO. E 715-SMES-10
 DETAILS PLACED IN THIS FORMAT 7-27-98
 L. URENOVICH
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER
 /s/ Anthony J. Dymowski 7-27-99
 DESIGN STANDARD ENGINEER DATE
 /s/ Frank Zandi 7-27-99
 CHIEF HIGHWAY ENGINEER DATE
 CREANALLY APPROVED
 DESIGN STANDARD ENGINEER 1-02-98

GENERAL NOTES

- ① Toe plate extension is to be the same thickness as the end section. Dimensions shall be overall width less 6", by 8" high.
- ② Transverse safety bars shall be Schedule 40 galvanized steel pipe. Pipe to be galvanized after forming. Number of bars req'd. will vary depending on the length of the end section.
3. Slotted holes for safety bar attachment shall be provided for all end sections.
4. See Standard Drawing E 715-SMES-12 for variable dimensions.
- ⑤ See Standard Drawing E 715-SMES-07 for warrant of longitudinal safety bar.



SIDE ELEVATION FOR CROSS STRUCTURE END SECTION

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR SMOOTH PIPE

JANUARY 1990

STANDARD DRAWING NO. E 715-SMES-11

DETAILS PLACED IN THIS FORMAT 7-27-99

L. Uremovich
 DESIGN STANDARDS ENGINEER DATE

A. F. Vooz Zandi
 CHIEF HIGHWAY ENGINEER DATE
 PROBABLY APPROVED 1-02-98



DESIGN STANDARDS PROJECT

SAFETY METAL END SECTIONS FOR CIRCULAR PIPES										
Pipe Dia. (in.)	Min. Thick.	Dimensions, in.			L Dimensions			Length (in.)	Slope	Length (in.)
		A	H	W	Overall Width	Slope	Length (in.)			
15	.064	8	6	21	37	4:1	20	6:1	30	
18	.064	8	6	24	40	4:1	32	6:1	48	
21	.064	8	6	27	43	4:1	44	6:1	66	
24	.064	8	6	30	46	4:1	56	6:1	84	
27	.109	12	9	33	57	4:1	68	6:1	102	
30	.109	12	9	36	60	4:1	80	6:1	120	
33	.109	12	9	39	63	4:1	92	6:1	138	
36	.109	12	9	42	66	4:1	104	6:1	156	
42	.109	16	12	48	80	4:1	128	6:1	192	
48	.109	16	12	54	86	4:1	152	6:1	228	
54	.109	16	12	60	92	4:1	176	6:1	264	
60	.109	16	12	66	98	4:1	200	6:1	300	

SAFETY METAL END SECTIONS FOR HORIZONTAL ELLIPTICAL PIPE											
Equiv. Dia. (in.)	Dimensions (inches)		Min. Thick.	Dimensions (inches)				L Dimension			
	Span	Rise		in.	A	H	W	Overall Width	Slope	Length (in.)	Slope
18	23	14	.064	8	6	29	45	4:1	16	6:1	24
24	30	19	.064	8	6	36	52	4:1	36	6:1	54
27	34	22	.079	12	9	40	64	4:1	48	6:1	72
30	38	24	.079	12	9	44	68	4:1	56	6:1	84
33	42	27	.109	12	9	48	72	4:1	68	6:1	102
36	45	29	.109	16	12	51	83	4:1	76	6:1	114
42	53	34	.109	16	12	59	91	4:1	96	6:1	144
48	60	38	.109	16	12	66	98	4:1	112	6:1	168
54	68	43	.109	16	12	74	106	4:1	132	6:1	198
60	76	48	.109	16	12	80	112	4:1	152	6:1	228

INDIANA DEPARTMENT OF TRANSPORTATION
SAFETY METAL CULVERT END SECTIONS FOR SMOOTH PIPE
 JANUARY 1998
 STANDARD DRAWING NO. E 715-SMES-12

DETAILS PLACED IN THE FORMAT 11-15-98



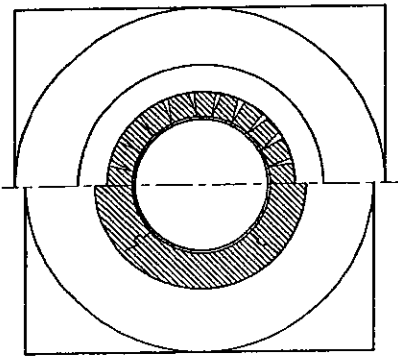
1/s/ Anthony L. Urekovich, 11-15-98
 DESIGN STANDARDS ENGINEER DATE

1/s/ F. P. Zerkel, 11-15-98
 CHIEF DESIGN ENGINEER DATE
 UNOFFICIALLY APPROVED

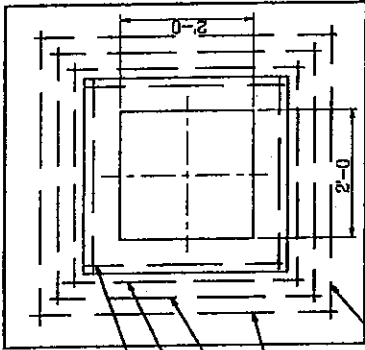
DESIGN STANDARDS ENGINEER

GENERAL NOTES

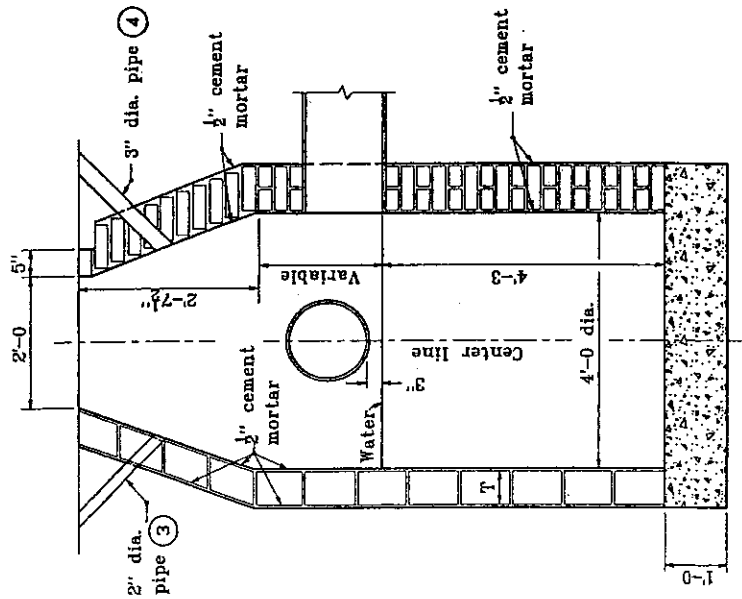
1. Brick, block, or concrete may be used.
2. Precast catch basin type W may be substituted for catch basin type A.
3. 2" dia. pipe drain from bottom of curb to inlet. Aggregate to be placed around inlet end of pipe.
4. 3" dia. pipe to be kept open for drainage of subgrade or base until surface is placed.
5. Reinforcement required if Dim. A < 2'-6". Reinforcement not required if Dim. A \geq 2'-6".



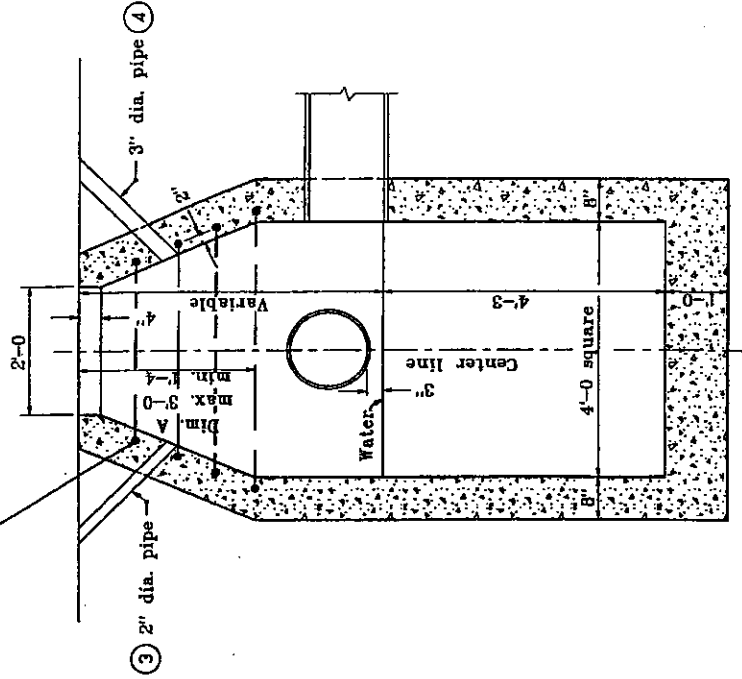
- #5 x 3'-0"
- #5 x 3'-6"
- #5 x 4'-0"
- #5 x 4'-6"



#5 ea. layer

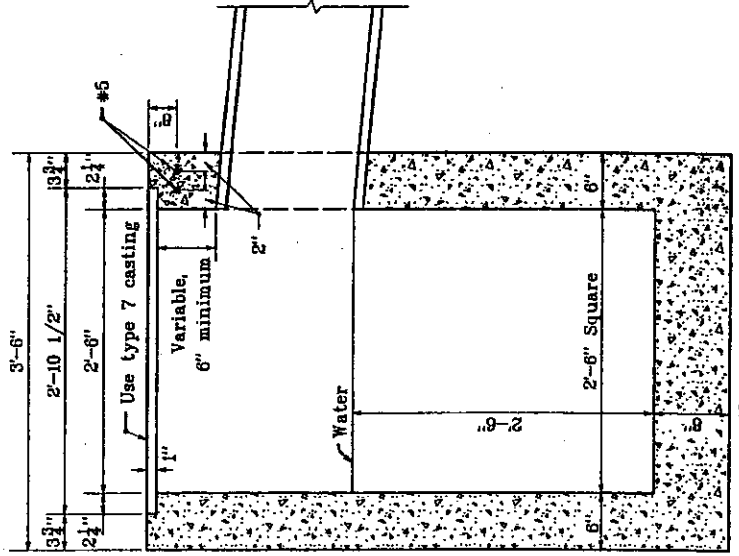
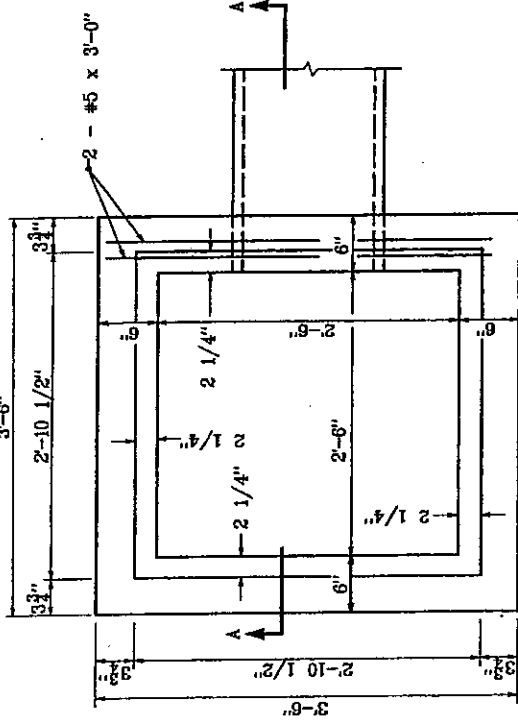


BRICK OR BLOCK



CONCRETE

INDIANA DEPARTMENT OF TRANSPORTATION
CATCH BASIN
TYPE A
 SEPTEMBER 1997
 STANDARD DRAWING NO. E 720-CBST-01
 DETAILS PLACED IN THE FORMAT 11-15-99
 No. 18095
 INDIANAPOLIS, INDIANA
 PROFESSIONAL ENGINEER
 DATE
 /s/ Anthony L. Dremowitch, 11-15-99
 DESIGN STANDARD ENGINEER
 DATE
 /s/ Frank Zenda, 11-15-99
 CHIEF HIGHWAY ENGINEER
 DATE
 ORIGINALLY APPROVED
 DESIGN STANDARD ENGINEER



INDIANA DEPARTMENT OF TRANSPORTATION
CATCH BASIN
 TYPE E
 SEPTEMBER 1997

STANDARD DRAWING NO. E 720-CBST-03

DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremowitch 11-15-99
 DESIGN STANDARDS ENGINEER DATE

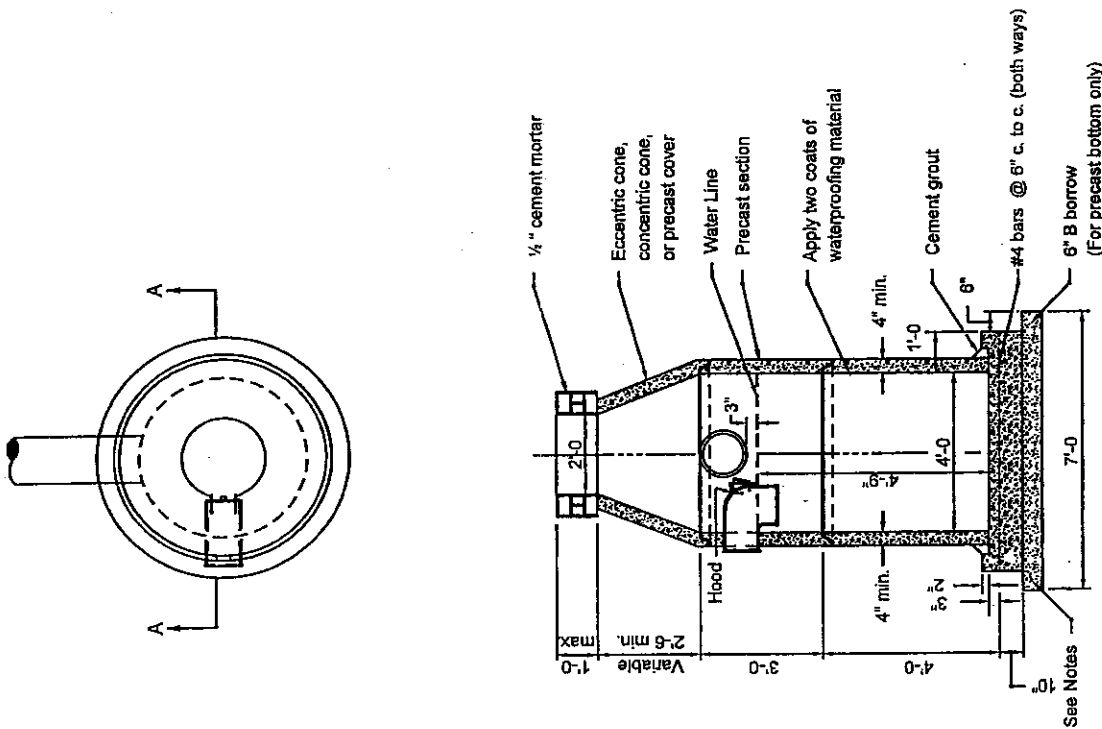
/s/ FAYOOS ZEINAD 11-15-99
 CIVIL HIGHWAY ENGINEER DATE

APPROVED BY APPROVED
 DATE

ANTHONY L. UREMOWITCH
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

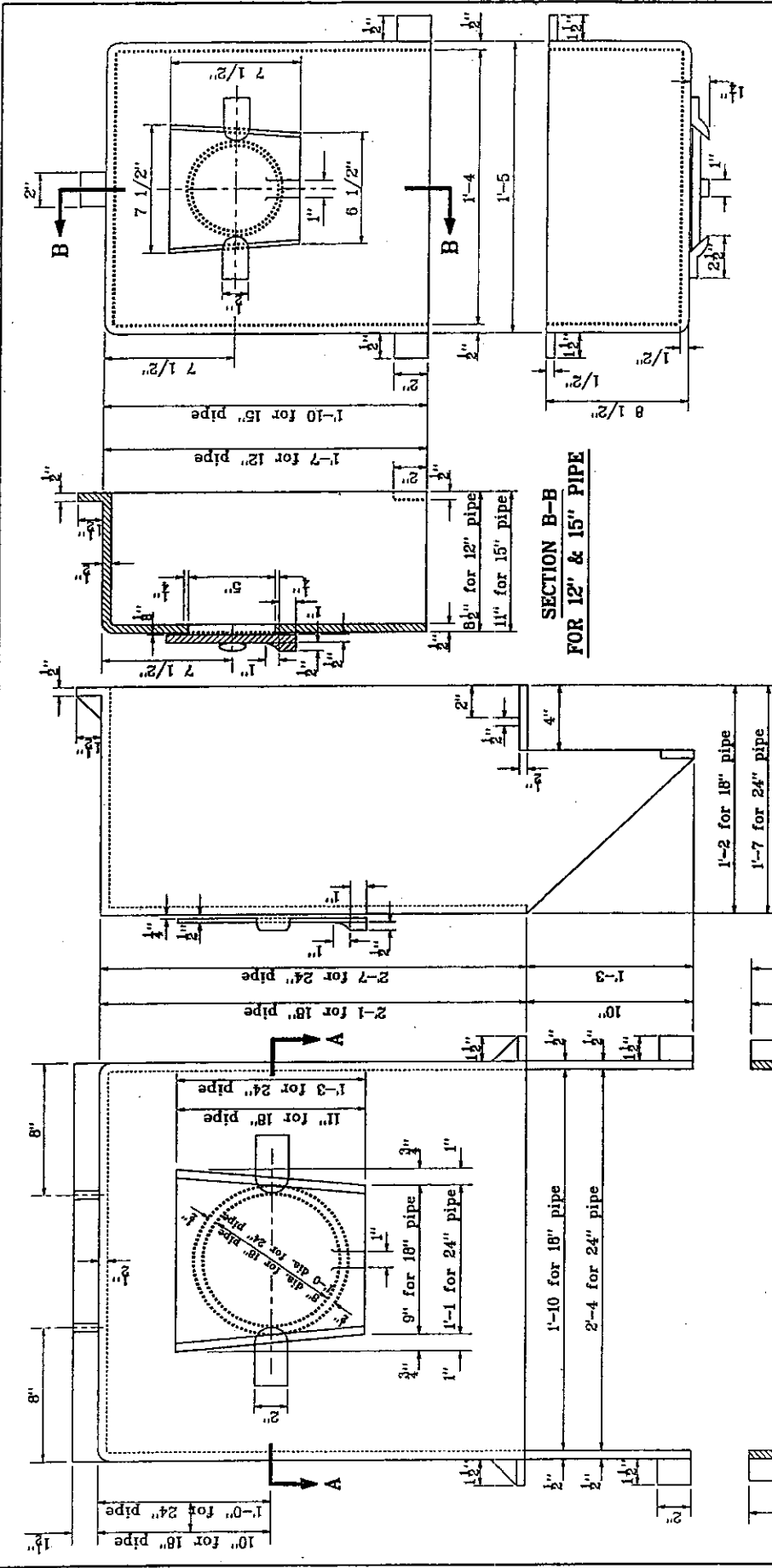
NOTES:

1. Concentric concrete section will not be permitted on any manhole that will be under the jurisdiction of the Indianapolis Sanitary District
2. The contractor will be permitted to substitute precast catch basin type "W" for catch basin type "A".



INDIANA DEPARTMENT OF TRANSPORTATION	
CATCH BASIN TYPE W	
SEPTEMBER 2003	
STANDARD DRAWING NO. E 720-CBST-08	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE 9-02-03
	/s/ Richard A. Smutzer CHIEF HIGHWAY ENGINEER DATE 9-02-03

SECTION A-A



GENERAL NOTES

1. Hoods may be cast in one piece or may be built up of electrically welded 1/2" steel plates. All hoods shall be gas tight. Steel hoods shall be painted with waterproofing asphalt.
2. Hoods shall be omitted on earth ditch type catch basin unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION

CATCH BASIN HOOD

MAY 1998

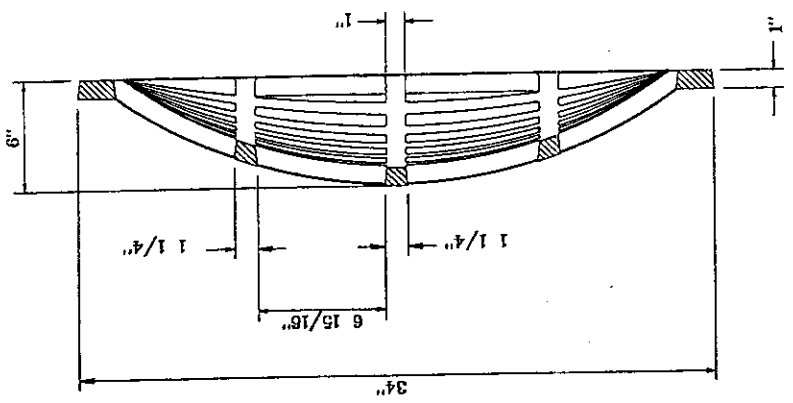
STANDARD DRAWING NO. E 720-CBST-09

DETAILS PLACED IN THE FORMAT 11-5-98

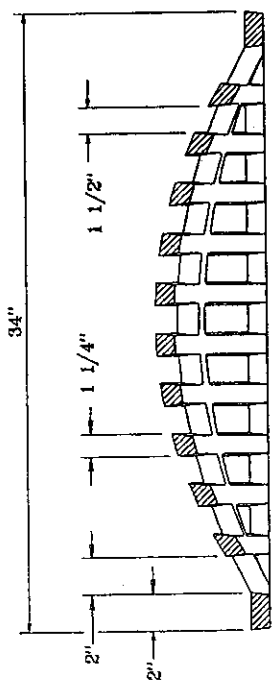
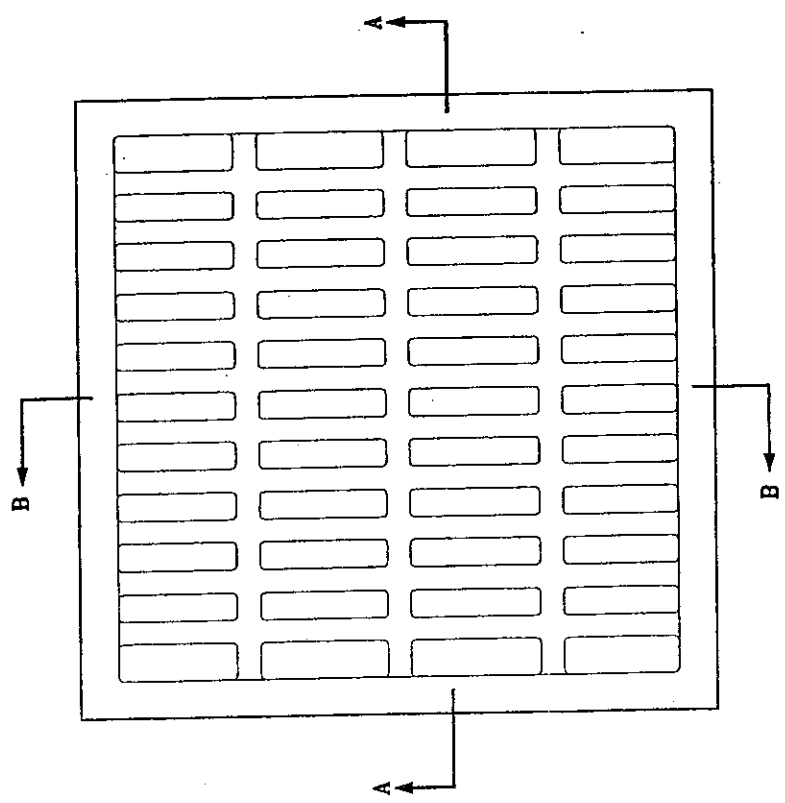
L. URENOVICH
 REGISTERED PROFESSIONAL ENGINEER
 NO. 18055
 STATE OF INDIANA
 DESIGN STANDARDS ENGINEER DATE

1/19 FIVEZE ZANDS
 CHIEF HIGHWAY DESIGNER DATE 11-5-98

DESIGN STANDARDS ENGINEER
 ORIGINALLY APPROVED 5-01-98



SECTION B-B



SECTION A-A

EARTH DITCH CASTING TYPE 7

INDIANA DEPARTMENT OF TRANSPORTATION
**EARTH DITCH
 CASTING TYPE 7**
 SEPTEMBER 1998
 STANDARD DRAWING NO. E 720-EDCA-01

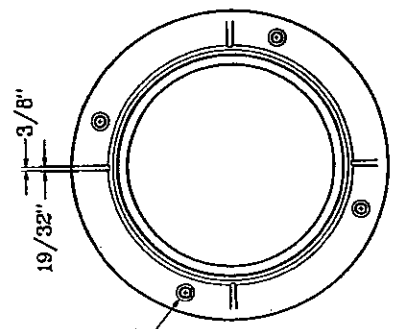
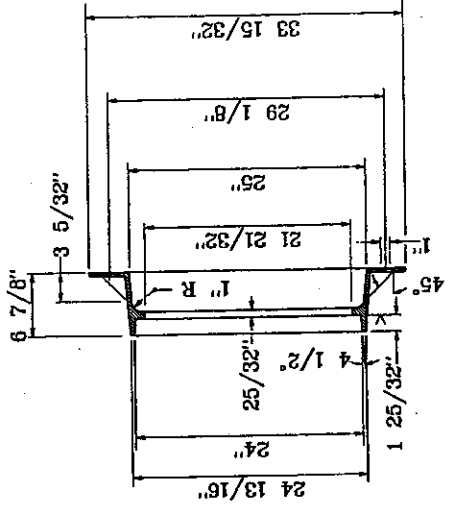
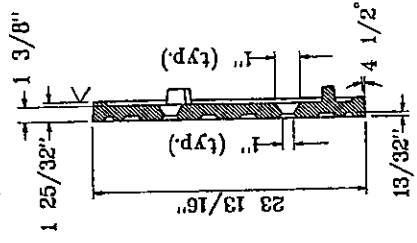
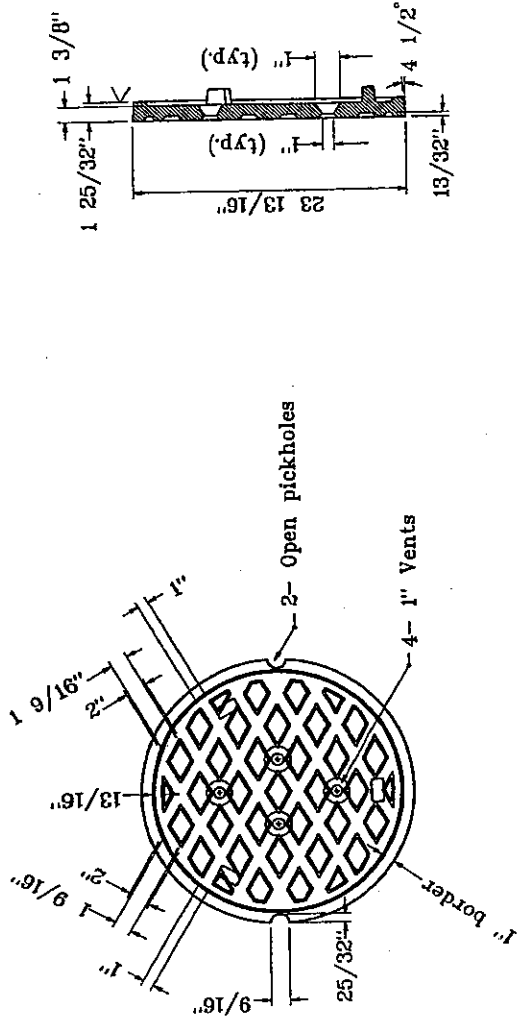
DETAILS PLACED IN THE FORMAT 11-15-99

ANTHONY J. KOTLOWSKI
 LICENSED PROFESSIONAL ENGINEER
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL SEAL

/s/ Anthony J. Kotowski 11-15-99
 DESIGN PROFESSIONAL ENGINEER DATE

/s/ Fyvor Zandl 11-15-99
 CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 5-01-90
 DISTRICT STANDARDS ENGINEER



1" dia. anchor bolt holes on a 29 1/8" dia. b.c. 4 reqd.

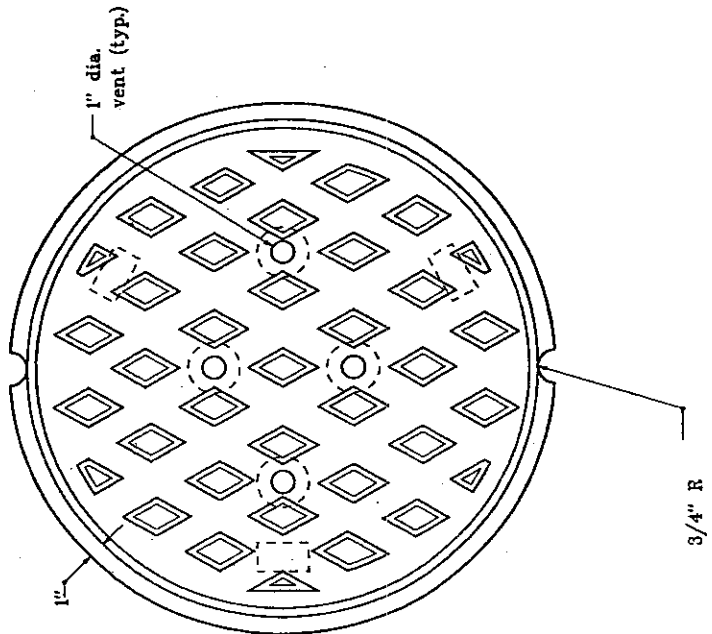
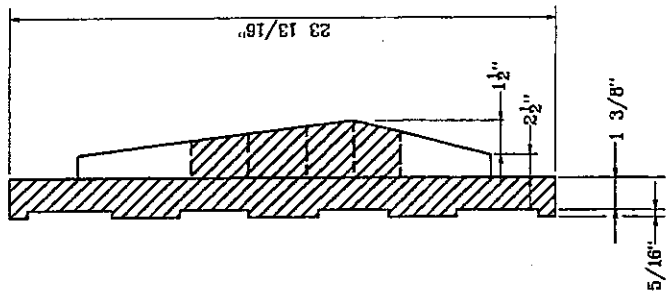
INDIANA DEPARTMENT OF TRANSPORTATION
MANHOLE CASTING
TYPE 4 RING AND COVER
 SEPTEMBER 1998
 STANDARD DRAWING NOE 720-MHCA-02

DETAILS PLACED IN THIS FORMAT 11-15-98

1/2 Anthony L. Uffendach 11-05-98
 DESIGNER
 DESIGNER ENGINEER CIVIL

1/2 Myron Zaitik 11-15-98
 CHIEF HIGHWAY ENGINEER
 OFFICERALLY APPROVED DATE 9-01-98

REGISTERED PROFESSIONAL ENGINEER
 STATE OF INDIANA
 No. 18095
 ANTHONY L. UFFENDACH



INDIANA DEPARTMENT OF TRANSPORTATION
MANHOLE CASTING TYPE 4
 ALTERNATE COVER
 SEPTEMBER 1998
 STANDARD DRAWING NO.E 720-MHCA-03

DETAILS PLACED IN THIS FORMAT 11-15-99

1/2 Anthony L. Urzyczyn, P.E. 11-15-99
 DESIGN TRANSPORTATION ENGINEER DATE

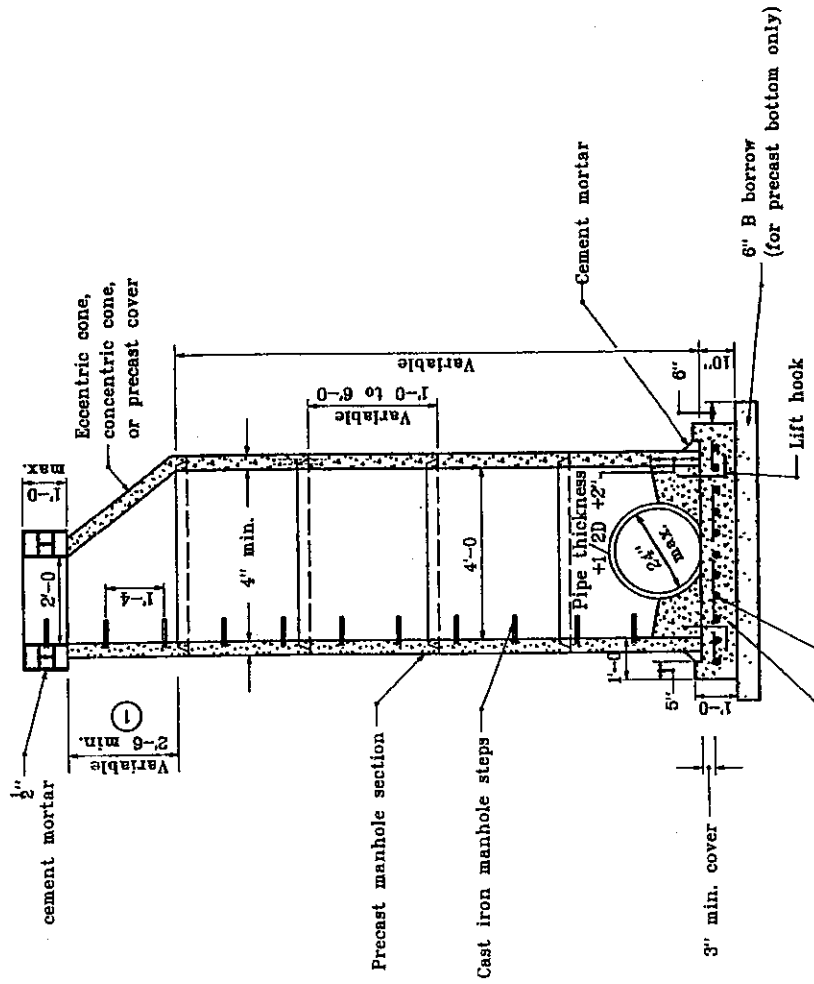
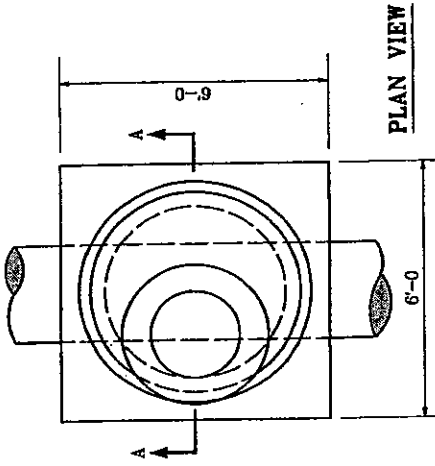
1/4 Pyros Zandi, P.E. 11-15-99
 CHIEF RECORDING ENGINEER DATE

1/4 Pyros Zandi, P.E. 11-15-99
 DESIGN STANDARDS ENGINEER DATE

18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

GENERAL NOTES

- ① For eccentric and concentric cone heights see cone heights table on Standard Drawing E 720-MHST-08.



INDIANA DEPARTMENT OF TRANSPORTATION

MANHOLE TYPE C

SEPTEMBER 1997

STANDARD DRAWING NO. E 720-MHST-02

DETAILS PLACED IN THE FORMAT 11-15-99

L. UREDOVICH
REGISTERED PROFESSIONAL ENGINEER
NO. 18055
STATE OF INDIANA

1/5/ Anthony L. Uredovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

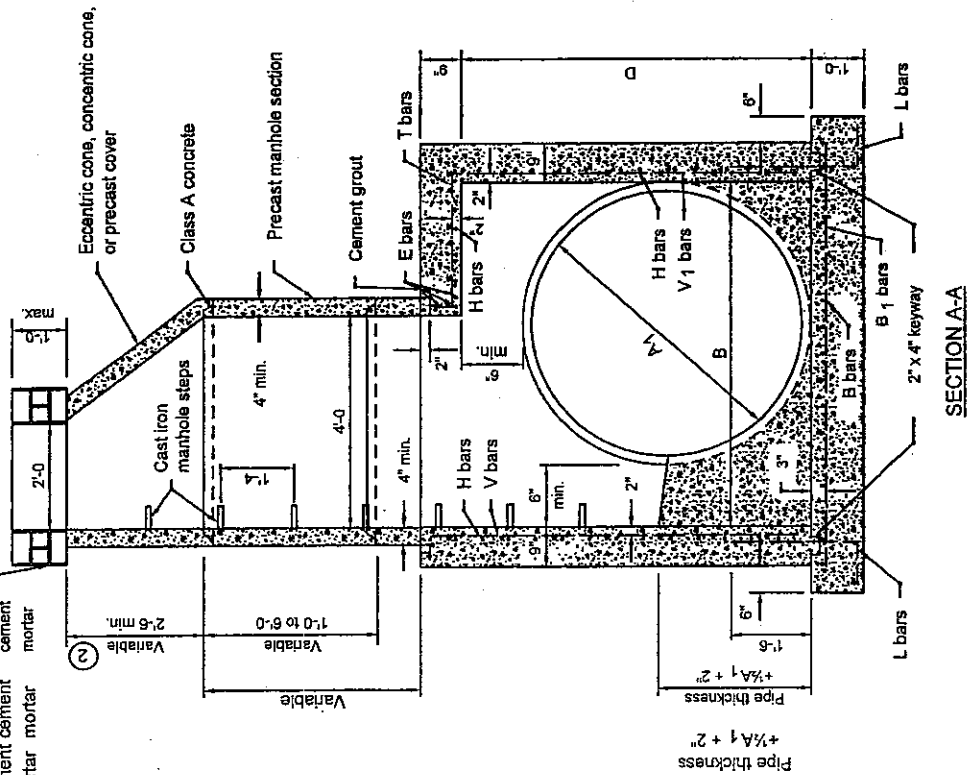
1/9/ F. P. Zandi 11-15-98
CHIEF PROJECT ENGINEER DATE

DESIGN STANDARDS ENGINEER
ORIGINALLY APPROVED 9-22-97

Class A concrete
#4 @ 6" c. to c. both ways

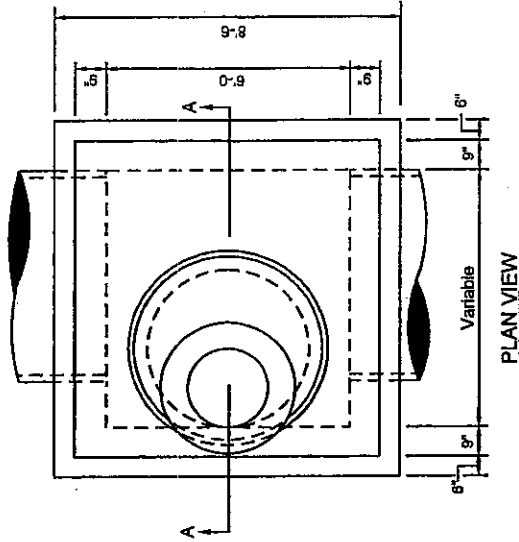
MANHOLE DIMENSIONS		
TYPE	A-1 PIPE SIZE DIA. (in)	B AND D
D	27 to 42	4'-9"
E	48 to 60	6'-6"
F	66 to 84	8'-10"
G	90 to 108	11'-2"

$\frac{1}{2}$ " cement mortar
 $\frac{1}{2}$ " cement mortar
 $\frac{1}{2}$ " cement mortar
 $\frac{1}{2}$ " cement mortar



NOTES

1. Manhole type H, J, K, L, M, or N, may be substituted for manhole type C, D, E, or F for comparable pipe sizes. See Standard Drawing E 720-MHST-05 for manholes type H, J, K, L, M, and N details.
2. For eccentric and concentric cone heights see Cone Heights Table on Standard Drawing 720-MHST-08.
3. See Standard Drawing 720-MHST-10 for Reinforcing Steel for Manholes table.



INDIANA DEPARTMENT OF TRANSPORTATION
MANHOLES
 TYPE D, E, F, AND G
 SEPTEMBER 2003
 STANDARD DRAWING NO. E 720-MHST-04

/s/ Richard L. VanCleave
 DESIGN STANDARDS ENGINEER
 DATE 9-02-03

/s/ Richard K. Smutzer
 CHIEF HIGHWAY ENGINEER
 DATE 9-02-03

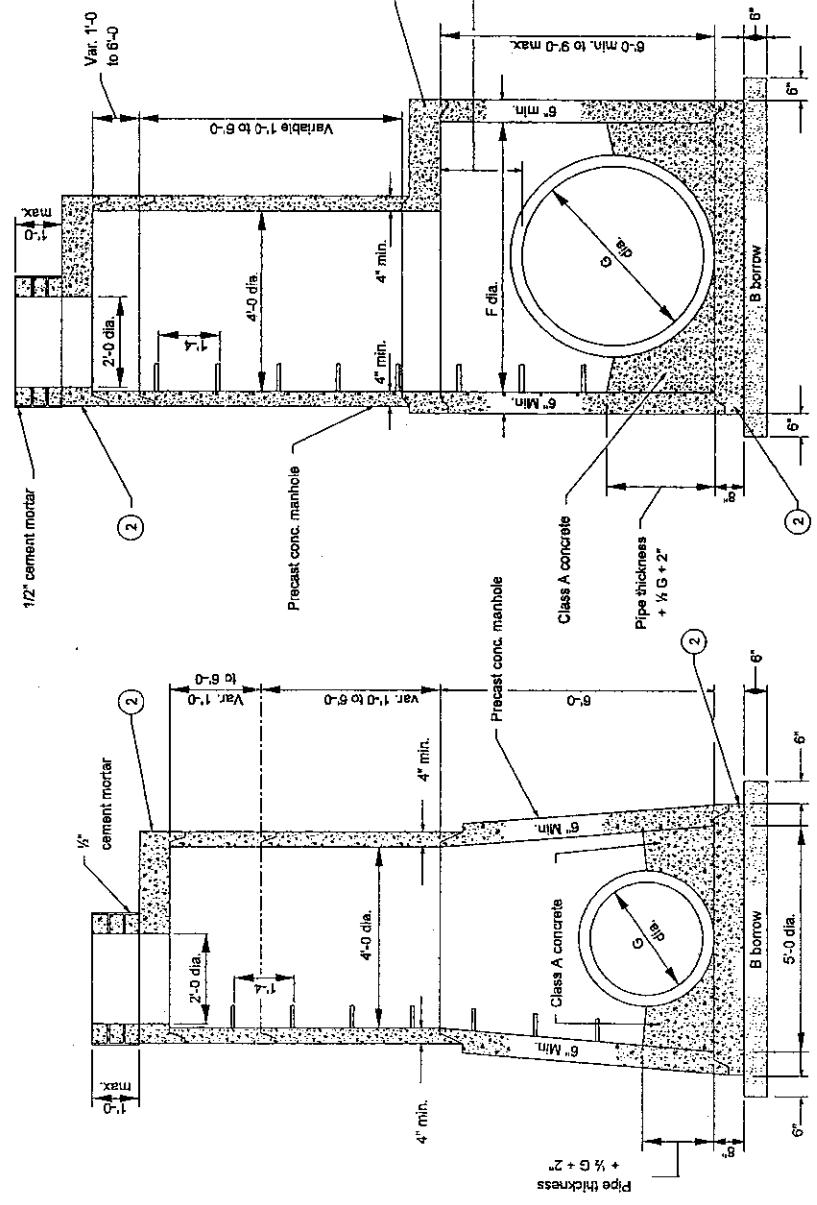
RICHARD L. VANCELEAVE
 NO. 9750
 STATE OF INDIANA
 LICENSED PROFESSIONAL ENGINEER
 DESIGN STANDARDS ENGINEER

MANHOLE PIPE SIZES

Type	G (in.)	F (ft. in.)	Maximum Pipe Size Rt. Δ to Mainline (in.)	Maximum Pipe Size for Mainline (in.)
H	24 to 36	—	30	36
J	24 to 36	5'-0"	30	36
K	36 to 48	6'-0"	36	48
L	48 to 54	8'-0"	48	54
M	54 to 72	8'-6"	66	72
N	72 to 84	9'-0"	72	84

NOTES

- Drop pipe may be used with manholes Type H, J, K, L, M, or N. Such manhole shall be referred to as drop manholes type H, J, K, L, M, or N. For details of construction see Standard Drawing E 720-MHST-03.
- See Standard Drawing E 720-MHST-06 for Details A, B, and C.
- Manholes type C, D, E, or F, may be substituted for manholes type H, J, K, L, M, or N, for comparable pipe sizes. See Standard Drawings E 720-MHST-02 and -04 for manholes type D, E, F, and G details..

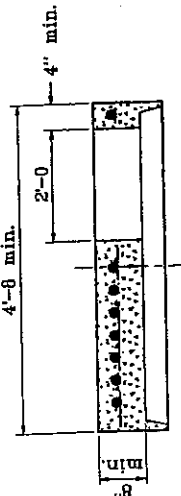


INDIANA DEPARTMENT OF TRANSPORTATION
MANHOLES
TYPE H, J, K, L, M, AND N
 SEPTEMBER 2006
 STANDARD DRAWING NO. E 720-MHST-05

Richard L. Vandervoort
 DESIGN STANDARDS ENGINEER
 DATE 9-0-06

Richard K. Smutzer
 CHIEF HIGHWAY ENGINEER
 DATE 9-0-06

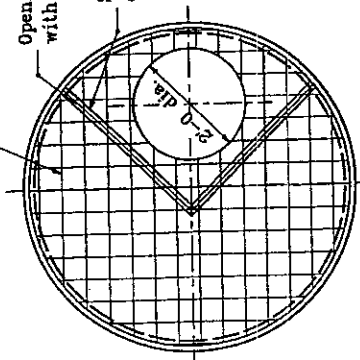
INDIANA ENGINEERING BOARD
 NO. 9750
 STATE OF INDIANA
 REGISTERED PROFESSIONAL ENGINEER
 LICENSE NO. 12503



Min. steel area $0.12 \text{ in}^2 / \text{ft}$ of width in both directions.

Opening additionally reinforced with equivalent of $0.20 \text{ in}^2 / \text{ft} @ 90^\circ$

Straight rods, min length = dia. of opening plus 2".



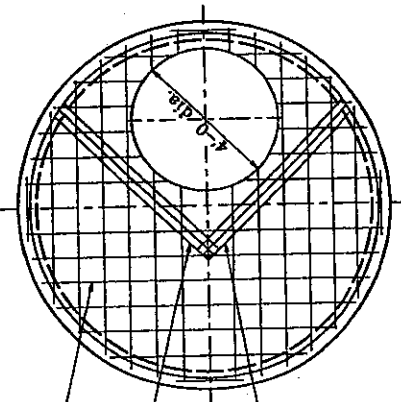
DETAIL A

COVER CAP FOR PRECAST CONCRETE MANHOLE SECTION

Min. steel area $0.12 \text{ in}^2 / \text{ft}$ of width in both directions.

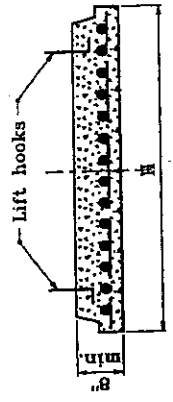
Opening additionally reinforced with equivalent of $0.20 \text{ in}^2 / \text{ft} @ 90^\circ$

Straight rods, min length = dia. of opening plus 2".

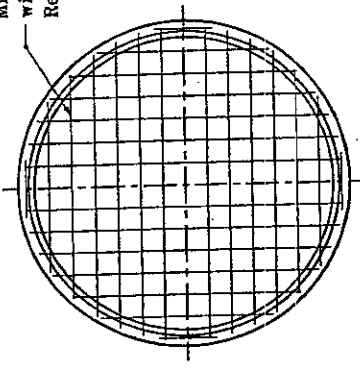


DETAIL B

REDUCER CAP FOR PRECAST MANHOLE SECTION (5'-0 to 9'-0 DIA.)



Min. steel area $0.12 \text{ in}^2 / \text{ft}$ of width in both directions.
Rebar or wire mesh equivalent.



DETAIL C

BASE FOR PRECAST CONCRETE MANHOLE SECTIONS (5'-0 to 9'-0 DIA.)

Section Dia.	H
5'-0	6'-0
6'-0	7'-2
8'-0	9'-6
8'-6	10'-0
9'-0	10'-8

Section Dia.	D
5'-0	6'-0
6'-0	7'-2
8'-0	9'-6
8'-6	10'-0
9'-0	10'-8

INDIANA DEPARTMENT OF TRANSPORTATION
PRECAST CONCRETE MANHOLE SECTIONS
APRIL 1995

STANDARD DRAWING NO. E 720-MHST-06
DETAILS PLACED IN THIS FORM 11-15-93

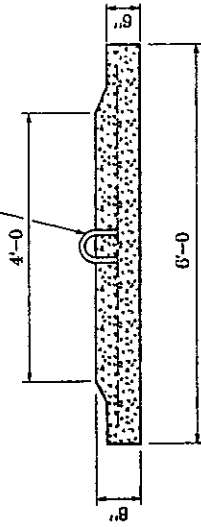
L. URBANOWSKI
No. 18095
STATE OF INDIANA
REGISTERED PROFESSIONAL ENGINEER

1/ Anthony L. Urbanowicz 11-15-93
REGISTERED PROFESSIONAL ENGINEER DATE

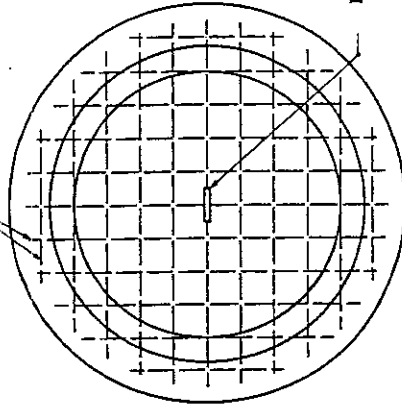
3/ Forodes Zantet 11-15-93
CITY HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 4-09-95

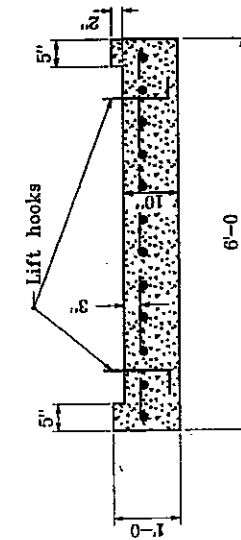
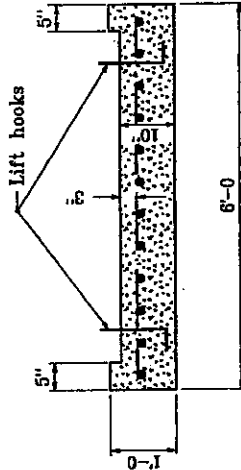
Lifting ring (1/2" cable)
 tied to wire fabric.
 To be cut off in field.



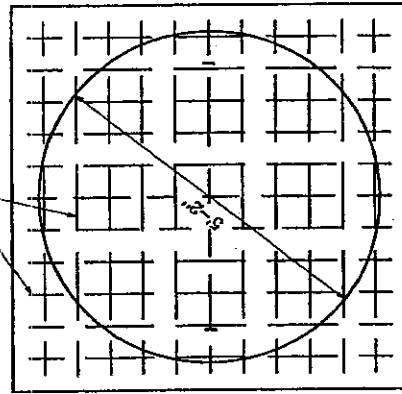
Pipe mesh-welded wire
 fabric (W-12 min.)



Lifting ring

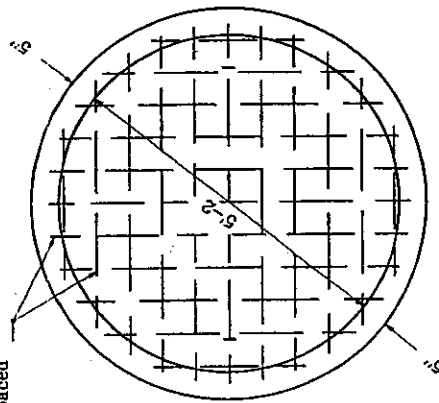


#4 x 5'-6
 spaced 6" c. to c.



SQUARE

#4 bars spaced
 6" c. to c.



ROUND

ROUND ALTERNATE

INDIANA DEPARTMENT OF TRANSPORTATION

**PRECAST MANHOLE
 BOTTOM SECTION**

SEPTEMBER 1997

STANDARD DRAWING NO. E 720-MHST-07

DETAILS PLACED IN THE FORMAT 11-15-99

INDIANA DEPARTMENT OF TRANSPORTATION
 No. 18095
 DATE 11-15-99
 PROJECT CANAL

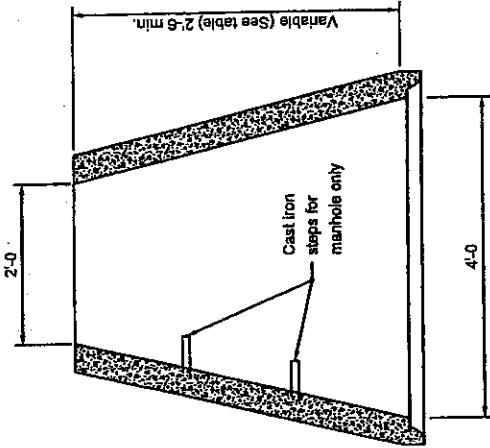
/s/ Anthony L. Uremovic, 11-15-99
 DESIGN STANDARDS ENGINEER DATE

/s/ Feroze Zandi, 11-15-99
 CHIEF HIGHWAY ENGINEER DATE
 ORIGINALLY APPROVED 9-01-97

DESIGN STANDARDS ENGINEER

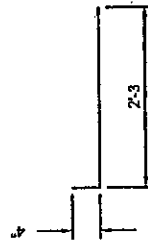
NOTES

- The concentric concrete section will not be permitted for manholes which are under the jurisdiction of the Indianapolis Sanitary District.

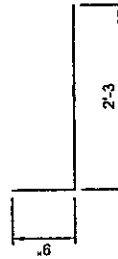


CONE HEIGHTS	
ECCENTRIC	CONCENTRIC
2'-6	2'-6
3'-0	3'-0
3'-2	3'-2
3'-6	4'-0

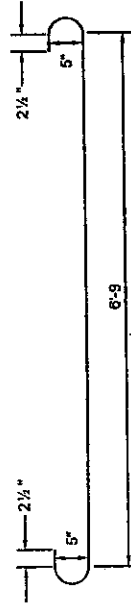
CONCENTRIC CONE



L BARS



H BARS



H BARS

INDIANA DEPARTMENT OF TRANSPORTATION

MANHOLE BARS AND
CONCENTRIC CONE

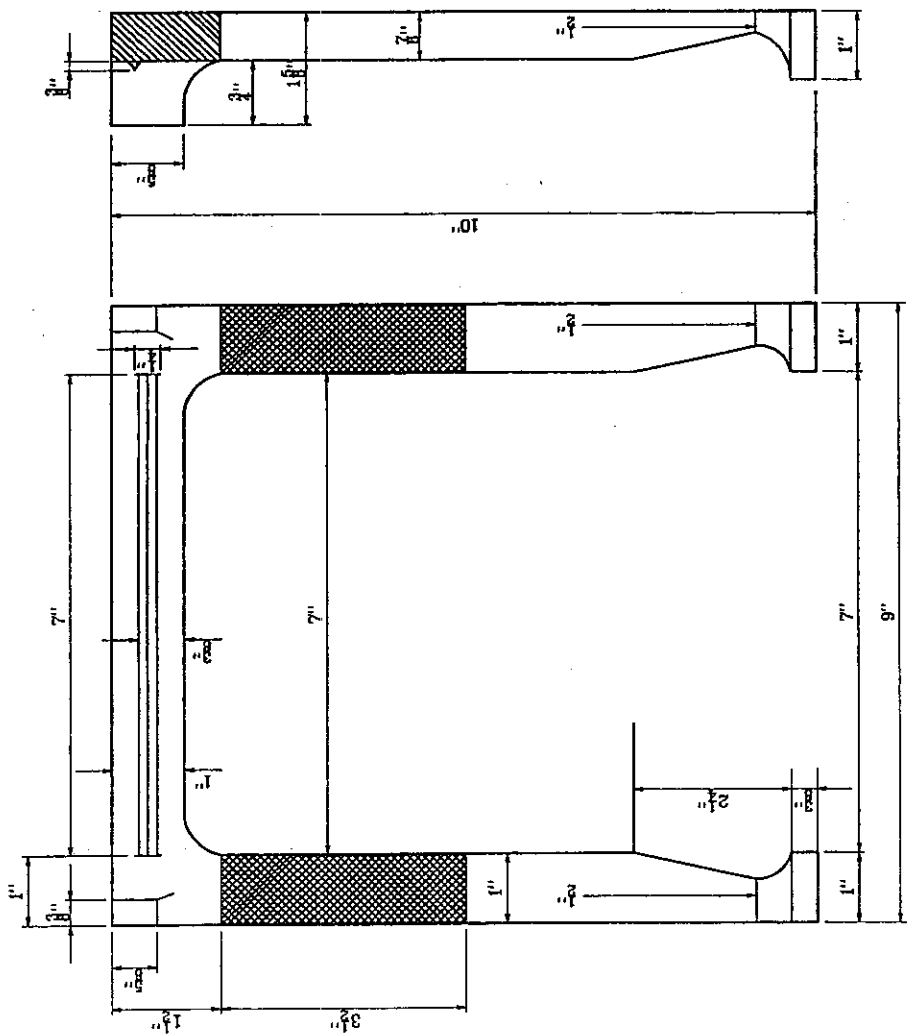
SEPTEMBER 2003

STANDARD DRAWING NO. E 720-MHST-08

Professional Engineer Seal for Richard L. Voelckle, No. 9750, State of Indiana. The seal is circular with the text 'RICHARD L. VOELCKLE', 'No. 9750', 'STATE OF INDIANA', and 'PROFESSIONAL ENGINEER' around the perimeter.

/s/ Richard L. Voelckle
DESIGN STANDARD ENGINEER
9-02-03
DATE

/s/ Richard K. Smitzer
CHIEF HIGHWAY ENGINEER
9-02-03
DATE



INDIANA DEPARTMENT OF TRANSPORTATION

MANHOLE STEP

APRIL 1995

STANDARD DRAWING NO. E 720-MHST-09

DETAILS PLACED IN THE FORMAT 11-15-99

ANTHONY J. WRECHOWICZ
 No. 18095
 STATE OF INDIANA
 PROFESSIONAL ENGINEER

1/4/ Anthony L. Dzwonkova 11-15-99
 DESIGNER STANDARDS ENGINEER DATE

1/4/ Fritous Zandi 11-15-99
 CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 4-03-95
 DESIGN STANDARDS ENGINEER

REINFORCING STEEL FOR MANHOLES

Bars	Manhole Type D			Manhole Type E			Manhole Type F			Manhole Type G		
	Length	No.	Spa. Size	Length	No.	Spa. Size	Length	No.	Spa. Size	Length	No.	Spa. Size
B	8'-0"	10	9"	8'-0"	12	9"	8'-0"	16	9"	8'-0"	19	9"
B1	6'-9"	12	9"	8'-6"	12	9"	11'-0"	12	9"	13'-3"	12	9"
E	7'-3"	3	2"	7'-3"	3	2"	7'-3"	3	2"	7'-3"	3	2"
H	8'-6"	22	6"	8'-6"	33	6"	8'-6"	41	6"	8'-6"	58	6"
L	3'-0"	16	12"	3'-0"	16	12"	3'-0"	16	12"	3'-0"	16	12"
T	1'-3"	16	6"	3'-0"	16	6"	5'-3"	16	6"	7'-6"	16	6"
V	5'-0"	16	6"	6'-8"	16	6"	9'-0"	16	6"	11'-6"	16	6"
V1	4'-9"	16	6"	6'-6"	16	6"	8'-8"	16	6"	11'-3"	16	6"

INDIANA DEPARTMENT OF TRANSPORTATION

TABLE OF REINFORCING STEEL FOR MANHOLES

SEPTEMBER 1937

STANDARD DRAWING NO. E 720-MHST-10

DETAILS PLACED IN THIS FORM 11-18-36



Anthony L. Urzowski
DESIGN STANDARDS ENGINEER

1/1 Firouz Zandi
CHIEF HIGHWAY ENGINEER
DATE 11-25-36
ORIGINALLY APPROVED 9-22-37

DESIGN STANDARDS ENGINEER