9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

AREA (sft)	DIAMETER (in.)	THICKNESS (in.) 0.100 MIN.	0.100 MAX.	0.125 MIN.	0.125 MAX.	0.150 MIN.	0.150 MAX.	0.175 MIN.	0.175 MAX.	0.200 MIN.	0.200 MAX.
19.6	60	1.0	31.1	1.0	45.5	1.0	60.1	1.0	70.7	1.0	81.5
23.8	66	1.0	28.2	1.0	41.4	1.0	54.6	1.0	64.3	1.0	74.1
28.3	72	1.0	25.9	1.0	37.9	1.0	50.0	1.0	58.9	1.0	67.9
33.2	78	1.0	23.9	1.0	35.0	1.0	46.2	1.0	54.4	1.0	62.7
38.5	84	1.0	22.2	1.0	32.5	1.0	42.9	1.0	50.5	1.0	58.2
44.2	90	1.1	20.7	1.0	30.3	1.0	40.0	1.0	47.1	1.0	54.3
50.3	96	1.1	19.4	1.0	28.4	1.0	37.5	1.0	44.2	1.0	50.9
56.7	102	1.1	18.3	1.1	26.7	1.1	35.3	1.1	41.6	1.1	47.9
63.6	108	1.2	17.2	1.1	25.3	1.1	33.3	1.1	39.3	1.1	45.3
70.9	114	1.3	16.3	1.2	23.9	1.2	31.6	1.2	37.2	1.2	42.9
78.5	120	1.3	15.5	1.3	22.7	1.3	30.0	1.3	35.3	1.3	40.7
86.6	126	1.4	14.8	1.3	21.6	1.3	28.6	1.3	33.7	1.3	38.8
95.0	132	1.4	14.1	1.4	20.7	1.4	27.3	1.4	32.1	1.4	37.0
103.9	138	1.5	13.5	1.4	19.8	1.4	26.1	1.4	30.7	1.4	35.4
113.1	144	1.6	12.9	1.5	18.9	1.5	25.0	1.5	29.4	1.5	33.9
122.7	150			1.6	18.2	1.6	24.0	1.6	28.3	1.6	32.6
132.7	156			1.6	17.5	1.6	23.1	1.6	27.2	1.6	31.3
143.1	162					1.7	22.2	1.7	26.2	1.7	30.2
153.9	168					1.8	21.4	1.8	25.2	1.8	29.1
165.1	174					1.8	20.7	1.8	24.4	1.8	28.1
176.7	180							1.9	23.5	1.9	27.1
188.7	186							1.9	22.8	1.9	26.3
201.1	192									2.0	25.4
213.8	198									2.1	24.7
227.0	204									2.1	23.9
240.5	210										
254.5	216										
268.8	222										
283.5	228										

NOTE:

1. 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 717-PHCL-01**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoos Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

	AREA (sft.)	DIAMETER (in.)	THICKNESS (in.)										
			0.225		0.250								
			MIN.	MAX.	MIN.	MAX.							
	19.6	60	1.0	92.4	1.0	100.0							
	23.8	66	1.0	84.0	1.0	94.0							
	28.3	72	1.0	77.0	1.0	86.2							
	33.2	78	1.0	71.1	1.0	79.5							
	38.5	84	1.0	66.0	1.0	73.8							
	44.2	90	1.0	61.6	1.0	68.9							
	50.3	96	1.0	57.7	1.0	64.6							
	56.7	102	1.1	54.3	1.1	60.8							
	63.6	108	1.1	51.3	1.1	57.4							
	70.9	114	1.2	48.6	1.2	54.4							
	78.5	120	1.3	46.2	1.3	51.7							
	86.6	126	1.3	44.0	1.3	49.2							
	95.0	132	1.4	42.0	1.4	47.0							
	103.9	138	1.4	40.1	1.4	44.9							
	113.1	144	1.5	38.5	1.5	43.1							
	122.7	150	1.6	36.9	1.6	41.3							
	132.7	156	1.6	35.5	1.6	39.7							
	143.1	162	1.7	34.2	1.7	38.3							
	153.9	168	1.8	33.0	1.8	36.9							
	165.1	174	1.8	31.8	1.8	35.6							
	176.7	180	1.9	30.8	1.9	34.4							
	188.7	186	1.9	29.8	1.9	33.3							
	201.1	192	2.0	28.8	2.0	32.3							
	213.8	198	2.1	28.0	2.1	31.3							
	227.0	204	2.1	27.1	2.1	30.4							
	240.5	210	2.2	26.4	2.2	29.5							
	254.5	216	2.3	25.6	2.3	28.7							
	268.8	222			2.3	27.9							
	283.5	228			2.4	27.2							

NOTE:

1. 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 717-PHCL-02**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft.)	THICKNESS (in.)									
				0.100		0.125		0.150		0.175		0.200	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
31.75	6'-7	5'-8	29	1.0	23.6	1.0	26.7	1.0	26.7	1.0	26.7	1.0	26.7
31.75	6'-11	5'-9	31	1.0	22.4	1.0	25.4	1.0	25.4	1.0	25.4	1.0	25.4
31.75	7'-3	5'-11	34	1.1	21.4	1.0	24.2	1.0	24.2	1.0	24.2	1.0	24.2
31.75	7'-9	6'-0	36	1.1	20.0	1.0	22.7	1.0	22.7	1.0	22.7	1.0	22.7
31.75	8'-1	6'-1	39	1.1	19.2	1.1	21.7	1.1	21.7	1.1	21.7	1.1	21.7
31.75	8'-5	6'-3	41	1.1	18.4	1.1	20.9	1.1	20.9	1.1	20.9	1.1	20.9
31.75	8'-10	6'-4	44	1.2	17.6	1.1	19.9	1.1	19.9	1.1	19.9	1.1	19.9
31.75	9'-3	6'-5	47	1.2	16.8	1.2	19.0	1.2	19.0	1.2	19.0	1.2	19.0
31.75	9'-7	6'-6	49	1.3	16.2	1.2	18.3	1.2	18.3	1.2	18.3	1.2	18.3
31.75	9'-11	6'-8	52	1.3	15.6	1.2	17.7	1.2	17.7	1.2	17.7	1.2	17.7
31.75	10'-3	6'-9	55	1.3	15.1	1.3	17.1	1.3	17.1	1.3	17.1	1.3	17.1
31.75	10'-9	6'-10	58	1.4	14.4	1.3	16.3	1.3	16.3	1.3	16.3	1.3	16.3
31.75	11'-1	7'-0	61	1.5	14.0	1.4	15.8	1.4	15.8	1.4	15.8	1.4	15.8
31.75	11'-5	7'-1	64	1.5	13.6	1.4	15.4	1.4	15.4	1.4	15.4	1.4	15.4
31.75	11'-9	7'-2	67	1.5	13.2	1.5	14.9	1.5	14.9	1.5	14.9	1.5	14.9
31.75	12'-3	7'-3	70	1.6	12.6	1.5	14.3	1.5	14.3	1.5	14.3	1.5	14.3
31.75	12'-7	7'-5	73	1.7	11.7	1.6	13.9	1.6	13.9	1.6	13.9	1.6	13.9
31.75	12'-11	7'-6	77	1.7	11.3	1.6	13.6	1.6	13.6	1.6	13.6	1.6	13.6
31.75	13'-1	8'-2	83	1.7	11.2	1.6	13.4	1.6	13.4	1.6	13.4	1.6	13.4
31.75	13'-1	8'-4	86	1.7	11.2	1.6	13.4	1.6	13.4	1.6	13.4	1.6	13.4
31.75	13'-11	8'-5	90	1.9	10.4	1.7	12.0	1.7	12.0	1.7	12.0	1.7	12.0
31.75	14'-0	8'-7	94	1.9	10.3	1.8	11.9	1.8	11.9	1.8	11.9	1.8	11.9
31.75	13'-11	9'-5	101	1.9	10.4	1.7	12.0	1.7	12.0	1.7	12.0	1.7	12.0
31.75	14'-3	9'-7	105	1.9	10.1	1.8	11.7	1.8	11.7	1.8	11.7	1.8	11.7
31.75	14'-8	9'-8	109			1.8	11.3	1.8	11.3	1.8	11.3	1.8	11.3
31.75	14'-11	9'-10	114			1.9	11.1	1.9	11.1	1.9	11.1	1.9	11.1

NOTE:

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

2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. **E 717-PHCL-03**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoze Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	RISE (ft.-in.)	RISE (ft.-in.)	AREA (sft.)	THICKNESS (in.)									
				0.225		0.250							
				MIN.	MAX.	MIN.	MAX.						
31.75	6'-7	5'-8	29	1.0	26.7	1.0	26.7						
31.75	6'-11	5'-9	31	1.0	25.4	1.0	25.4						
31.75	7'-3	5'-11	34	1.0	24.2	1.0	24.2						
31.75	7'-9	6'-0	36	1.0	22.7	1.0	22.7						
31.75	8'-1	6'-1	39	1.1	21.7	1.1	21.7						
31.75	8'-5	6'-3	41	1.1	20.9	1.1	20.9						
31.75	8'-10	6'-4	44	1.1	19.9	1.1	19.9						
31.75	9'-3	6'-5	47	1.2	19.0	1.2	19.0						
31.75	9'-7	6'-6	49	1.2	18.3	1.2	18.3						
31.75	9'-11	6'-8	52	1.2	17.7	1.2	17.7						
31.75	10'-3	6'-9	55	1.3	17.1	1.3	17.1						
31.75	10'-9	6'-10	58	1.3	16.3	1.3	16.3						
31.75	11'-1	7'-0	61	1.4	15.8	1.4	15.8						
31.75	11'-5	7'-1	64	1.4	15.4	1.4	15.4						
31.75	11'-9	7'-2	67	1.5	14.9	1.5	14.9						
31.75	12'-3	7'-3	70	1.5	14.3	1.5	14.3						
31.75	12'-7	7'-5	73	1.6	13.9	1.6	13.9						
31.75	12'-11	7'-6	77	1.6	13.6	1.6	13.6						
31.75	13'-1	8'-2	83	1.6	13.4	1.6	13.4						
31.75	13'-1	8'-4	86	1.6	13.4	1.6	13.4						
31.75	13'-11	8'-5	90	1.7	12.0	1.7	12.0						
31.75	14'-0	8'-7	94	1.8	11.9	1.8	11.9						
31.75	13'-11	9'-5	101	1.7	12.0	1.7	12.0						
31.75	14'-3	9'-7	105	1.8	11.7	1.8	11.7						
31.75	14'-8	9'-8	109	1.8	11.3	1.8	11.3						
31.75	14'-11	9'-10	114	1.9	11.1	1.9	11.1						

NOTE:

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

2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. **E 717-PHCL-04**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft.)	THICKNESS (in.)									
				0.100		0.125		0.150		0.175		0.200	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
31.75	15-4	10-0	118			1.9	10.7	1.9	10.7	1.9	10.7	1.9	10.7
31.75	15-7	10-2	123			2.0	10.5	2.0	10.5	2.0	10.5	2.0	10.5
31.75	16-1	10-4	127			2.0	10.1	2.0	10.1	2.0	10.1	2.0	10.1
31.75	16-4	10-6	132					2.0	9.9	2.0	9.9	2.0	9.9
31.75	16-9	10-8	136					2.1	9.6	2.1	9.6	2.1	9.6
31.75	17-0	10-10	141					2.1	9.5	2.1	9.5	2.1	9.5
31.75	17-3	11-0	146					2.2	9.3	2.2	9.3	2.2	9.3
31.75	17-9	11-2	151							2.2	8.9	2.2	8.9
31.75	18-0	11-4	156							2.3	8.8	2.3	8.8
31.75	18-5	11-6	161							2.3	8.5	2.3	8.5
31.75	18-8	11-8	167							2.3	8.4	2.3	8.4
31.75	19-2	11-9	172									2.4	8.0
31.75	19-5	11-11	177									2.4	7.9
31.75	19-10	12-1	182									2.5	7.7
31.75	20-1	12-3	188									2.5	7.5
31.75	20-1	12-6	194										
31.75	20-10	12-7	199										
31.75	21-1	12-9	205										
31.75	21-6	12-11	211										
47.00	20-1	13-11	216										
47.00	20-7	14-3	224										
47.00	21-5	14-7	241										
47.00	21-11	14-11	254										
47.00	22-8	15-3	267										

NOTE:

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

2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. **E 717-PHCL-05**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN TMS FORMAT 11-15-99

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

/s/ Firoz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft)	THICKNESS (in.)									
				0.225		0.250							
				MIN.	MAX.	MIN.	MAX.						
31.75	15-4	10-0	118	1.9	10.7	1.9	10.7						
31.75	15-7	10-2	123	2.0	10.5	2.0	10.5						
31.75	16-1	10-4	127	2.0	10.1	2.0	10.1						
31.75	16-4	10-6	132	2.0	9.9	2.0	9.9						
31.75	16-9	10-8	136	2.1	9.6	2.1	9.6						
31.75	17-0	10-10	141	2.1	9.5	2.1	9.5						
31.75	17-3	11-0	146	2.2	9.3	2.2	9.3						
31.75	17-9	11-2	151	2.2	8.9	2.2	8.9						
31.75	18-0	11-4	156	2.3	8.8	2.3	8.8						
31.75	18-5	11-6	161	2.3	8.5	2.3	8.5						
31.75	18-8	11-8	167	2.3	8.4	2.3	8.4						
31.75	19-2	11-9	172	2.4	8.0	2.4	8.0						
31.75	19-5	11-11	177	2.4	7.9	2.4	7.9						
31.75	19-10	12-1	182	2.5	7.7	2.5	7.7						
31.75	20-1	12-3	188	2.5	7.5	2.5	7.5						
31.75	20-1	12-6	194	2.5	7.5	2.5	7.5						
31.75	20-10	12-7	199	2.6	7.1	2.6	7.1						
31.75	21-1	12-9	205	2.6	7.0	2.6	7.0						
31.75	21-6	12-11	211	2.7	6.7	2.7	6.7						
47.00	20-1	13-11	216			2.5	12.4						
47.00	20-7	14-3	224			2.6	12.1						
47.00	21-5	14-7	241			2.7	11.5						
47.00	21-11	14-11	254			2.7	11.2						
47.00	22-8	15-3	267			2.6	10.8						

NOTE:

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

2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. E 717-PHCL-06

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoze Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

6" x 2" STRUCTURAL PLATE STEEL PIPE (BOLTED)
HEIGHT OF COVER LIMITS (ft)

	AREA (sft)	DIAMETER (in.)	THICKNESS (in.)										
			0.111		0.140		0.170						
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.					
	19.6	60	1.0	47.7	1.0	68.8	1.0	90.0					
	23.8	66	1.0	43.4	1.0	62.6	1.0	81.8					
	28.3	72	1.0	39.8	1.0	57.4	1.0	75.0					
	33.2	78	1.0	36.7	1.0	52.9	1.0	69.2					
	38.5	84	1.0	34.1	1.0	49.2	1.0	64.2					
	44.2	90	1.0	31.8	1.0	45.9	1.0	60.0					
	50.3	96	1.0	29.8	1.0	43.0	1.0	56.2					
	56.7	102	1.1	28.1	1.1	40.5	1.1	52.9					
	63.6	108	1.1	26.5	1.1	38.2	1.1	50.0					
	70.9	114	1.2	25.1	1.2	36.2	1.2	47.3					
	78.5	120	1.3	23.8	1.3	34.4	1.3	45.0					
	86.6	126	1.3	22.7	1.3	32.8	1.3	42.8					
	95.0	132	1.4	21.7	1.4	31.3	1.4	40.9					
	103.9	138	1.4	20.7	1.4	29.9	1.4	39.1					
	113.1	144	1.5	19.9	1.5	28.7	1.5	37.5					
	122.7	150	1.6	19.1	1.6	27.5	1.6	36.0					
	132.7	156	1.6	18.3	1.6	26.4	1.6	34.6					
	143.1	162	1.7	17.6	1.7	25.5	1.7	33.3					
	153.9	168	1.8	17.0	1.8	24.6	1.8	32.1					
	165.1	174	1.8	16.4	1.8	23.7	1.8	31.0					
	176.7	180	1.9	15.9	1.9	22.9	1.9	30.0					
	188.7	186	1.9	15.4	1.9	22.2	1.9	29.0					
	201.1	192			2.0	21.5	2.0	28.1					
	213.8	198			2.1	20.8	2.1	27.2					
	227.0	204			2.1	20.2	2.1	26.4					
	240.5	210			2.2	19.6	2.2	25.7					
	254.5	216					2.3	25.0					
	268.8	222					2.3	24.3					
	283.5	228					2.4	23.0					
	298.6	234					2.4	7.0					
	314.2	240											
	330.1	246											
	346.4	252											

NOTE:

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

2. The tabulated plate thickness reflects the required thickness for top and side plates. Refer to 908.09 (a) for the required bottom plate thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. E 717-PHCL-07

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft)	THICKNESS (in.)									
				0.225		0.250							
				MIN.	MAX.	MIN.	MAX.						
31.75	15-4	10-0	118	1.9	10.7	1.9	10.7						
31.75	15-7	10-2	123	2.0	10.5	2.0	10.5						
31.75	16-1	10-4	127	2.0	10.1	2.0	10.1						
31.75	16-4	10-6	132	2.0	9.9	2.0	9.9						
31.75	16-9	10-8	136	2.1	9.6	2.1	9.6						
31.75	17-0	10-10	141	2.1	9.5	2.1	9.5						
31.75	17-3	11-0	146	2.2	9.3	2.2	9.3						
31.75	17-9	11-2	151	2.2	8.9	2.2	8.9						
31.75	18-0	11-4	156	2.3	8.8	2.3	8.8						
31.75	18-5	11-6	161	2.3	8.5	2.3	8.5						
31.75	18-8	11-8	167	2.3	8.4	2.3	8.4						
31.75	19-2	11-9	172	2.4	8.0	2.4	8.0						
31.75	19-5	11-11	177	2.4	7.9	2.4	7.9						
31.75	19-10	12-1	182	2.5	7.7	2.5	7.7						
31.75	20-1	12-3	188	2.5	7.5	2.5	7.5						
31.75	20-1	12-6	194	2.5	7.5	2.5	7.5						
31.75	20-10	12-7	199	2.6	7.1	2.6	7.1						
31.75	21-1	12-9	205	2.6	7.0	2.6	7.0						
31.75	21-6	12-11	211	2.7	6.7	2.7	6.7						
47.00	20-1	13-11	216			2.5	12.4						
47.00	20-7	14-3	224			2.6	12.1						
47.00	21-5	14-7	241			2.7	11.5						
47.00	21-11	14-11	254			2.7	11.2						
47.00	22-8	15-3	267			2.8	10.8						

NOTE:

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

2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. E 717-PHCL-06

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoze Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

6" x 2" STRUCTURAL PLATE STEEL PIPE (BOLTED)
HEIGHT OF COVER LIMITS (in.)

AREA (sft)	DIAMETER (in.)	THICKNESS (in.)							
		0.188		0.218		0.249		0.280	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
19.6	60	1.0	100.0	1.0	100.0	1.0	100.0	1.0	100.0
23.8	66	1.0	93.9	1.0	100.0	1.0	100.0	1.0	100.0
28.3	72	1.0	86.1	1.0	100.0	1.0	100.0	1.0	100.0
33.2	78	1.0	79.4	1.0	95.7	1.0	100.0	1.0	100.0
38.5	84	1.0	73.8	1.0	88.8	1.0	100.0	1.0	100.0
44.2	90	1.0	68.8	1.0	82.9	1.0	97.7	1.0	100.0
50.3	96	1.0	64.5	1.0	77.7	1.0	91.6	1.0	100.0
56.7	102	1.1	60.7	1.1	73.2	1.1	86.2	1.1	94.1
63.6	108	1.1	57.4	1.1	69.1	1.1	84.1	1.1	88.8
70.9	114	1.2	54.3	1.2	65.4	1.2	77.1	1.2	84.2
78.5	120	1.3	51.6	1.3	62.2	1.3	73.3	1.3	80.0
86.6	126	1.3	49.2	1.3	59.2	1.3	69.8	1.3	76.1
95.0	132	1.4	46.9	1.4	56.5	1.4	66.6	1.4	72.7
103.9	138	1.4	44.9	1.4	54.1	1.4	63.7	1.4	69.5
113.1	144	1.5	43.0	1.5	51.8	1.5	61.1	1.5	66.6
122.7	150	1.6	41.3	1.6	49.7	1.6	58.6	1.6	64.0
132.7	156	1.6	39.7	1.6	47.8	1.6	56.4	1.6	61.5
143.1	162	1.7	38.2	1.7	46.0	1.7	54.3	1.7	59.2
153.9	168	1.8	36.9	1.8	44.4	1.8	52.3	1.8	57.1
165.1	174	1.8	35.6	1.8	42.9	1.8	50.5	1.8	55.1
176.7	180	1.9	34.4	1.9	41.4	1.9	48.8	1.9	53.3
188.7	186	1.9	33.3	1.9	40.1	1.9	47.3	1.9	51.6
210.1	192	2.0	32.2	2.0	38.8	2.0	45.8	2.0	50.0
213.8	198	2.1	31.3	2.1	37.7	2.1	44.4	2.1	48.4
227.0	204	2.1	30.3	2.1	36.6	2.1	43.1	2.1	47.0
240.5	210	2.1	29.5	2.1	35.5	2.1	41.9	2.1	45.7
254.5	216	2.3	28.7	2.3	34.5	2.3	40.7	2.3	44.4
268.8	222	2.3	27.9	2.3	33.6	2.3	39.6	2.3	43.2
283.5	228	2.4	27.1	2.4	32.7	2.4	38.5	2.4	42.1
298.6	234	2.4	26.4	2.4	31.9	2.4	37.6	2.4	41.0
314.2	240	2.5	25.8	2.5	31.1	2.5	36.6	2.5	40.0
330.1	246	2.5	25.2	2.6	30.3	2.6	35.7	2.6	39.0
346.4	252			2.6	28.8	2.6	34.0	2.6	38.0

NOTE:

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

2. The tabulated thickness reflects the required thickness for top and side plates. Refer to 908.08 (a) for the required bottom plate thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. E 717-PHCL-08

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoos Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

6" x 2" STRUCTURAL PLATE STEEL PIPE-ARCH (BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft)	THICKNESS (in.)									
				0.111		0.140 thru 0.280							
				MIN.	MAX.	MIN.	MAX.						
18	6-1	4-7	22	1.3	16.4	1.3	16.4						
18	6-4	4-9	24	1.3	15.7	1.3	15.7						
18	6-9	4-11	26	1.4	14.8	1.4	14.8						
18	7-0	5-1	28	1.4	14.2	1.4	14.2						
18	7-3	5-3	31	1.5	13.7	1.5	13.7						
18	7-8	5-5	33	1.6	13.0	1.6	13.0						
18	7-11	5-7	35	1.6	12.6	1.6	12.6						
18	8-2	5-9	38	1.7	12.2	1.7	12.2						
18	8-7	5-11	40	1.8	11.6	1.8	11.6						
18	8-10	6-1	43	1.8	11.3	1.8	11.3						
18	9-4	6-3	46	2.0	10.7	2.0	10.7						
18	9-6	6-5	49	2.0	10.5	2.0	10.5						
18	9-9	6-7	52	2.1	10.2	2.1	10.2						
18	10-3	6-9	55	2.1	8.7	2.1	8.7						
18	10-8	6-11	58	2.1	8.3	2.1	8.3						
18	10-11	7-1	61	2.2	8.0	2.2	8.0						
18	11-5	7-3	64	2.3	7.5	2.3	7.5						
18	11-7	7-5	67	2.4	7.3	2.4	7.3						
18	11-10	7-7	71	2.5	7.1	2.5	7.1						
18	12-4	7-9	74	2.6	6.6	2.6	6.6						
18	12-6	7-11	78	2.7	6.5	2.7	6.5						
18	12-8	8-1	81	2.8	6.3	2.8	6.3						
18	12-10	8-4	85	2.8	6.2	2.8	6.2						
31	13-3	9-4	97	1.7	12.4	1.7	12.4						
31	13-6	9-6	102	1.7	12.1	1.7	12.1						
31	14-0	9-8	105	1.8	11.6	1.8	11.6						
31	14-2	9-10	109	1.8	11.5	1.8	11.5						
31	14-5	10-0	114	1.8	11.2	1.8	11.2						
31	14-11	10-2	118	1.9	10.8	1.9	10.8						

NOTE:

1. The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.
2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.
3. The tabulated plate thickness reflects the required thickness for top and side plates. Refer to 908.08 (a) for the required bottom plate thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. **E 717-PHCL-09**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Firoos Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98

6" x 2" STRUCTURAL PLATE STEEL PIPE-ARCH (BOLTED)
HEIGHT OF COVER LIMITS (ft.)

Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft)	THICKNESS (in.)									
				0.111		0.140 thru 0.280							
				MIN.	MAX.	MIN.	MAX.						
31	15-4	10-4	123	1.9	10.5	1.9	10.5						
31	15-7	10-6	127	2.0	10.3	2.0	10.3						
31	15-10	10-8	132	2.0	10.1	2.0	10.1						
31	16-3	10-10	137	2.0	9.7	2.0	9.7						
31	16-6	11-11	142	2.1	9.5	2.1	9.5						
31	17-0	11-2	146	2.1	9.2	2.1	9.2						
31	17-2	11-4	151	2.2	9.1	2.2	9.1						
31	17-5	11-6	157	2.2	8.9	2.2	8.9						
31	17-6	11-8	161	2.2	8.6	2.2	8.6						
31	18-1	11-10	167	2.3	8.5	2.3	8.5						
31	18-7	12-0	172	2.3	8.2	2.3	8.2						
31	18-9	12-2	177	2.3	8.0	2.3	8.0						
31	19-3	12-4	182			2.4	7.7						
31	19-6	12-6	188			2.4	7.6						
31	19-8	12-8	194			2.5	7.5						
31	19-11	12-10	200			2.5	7.4						
31	20-5	13-0	205			2.6	7.1						
31	20-7	13-2	211			2.6	7.0						

NOTE:

1. The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.
2. A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.
3. The tabulated plate thickness reflects the required thickness for top and side plates. Refer to 908.09 (a) for the required bottom plate thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

JANUARY 1998

STANDARD DRAWING NO. **E 717-PHCL-10**

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

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

/s/ Pirooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 1-02-98