

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

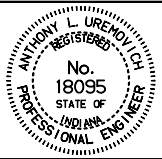
	AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
			0.100		0.125		0.150		0.175		0.200	
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
	19.6	60	1.0	31.1	1.0	45.5	1.0	60.1	1.0	70.7	1.0	81.5
	23.8	66	1.0	28.2	1.0	41.4	1.0	54.6	1.0	64.3	1.0	74.1
	28.3	72	1.0	25.9	1.0	37.9	1.0	50.0	1.0	58.9	1.0	67.9
	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:

- 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

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

DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 1-02-98

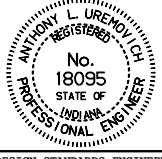
**9" x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)**

	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:

- 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**

	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	
DESIGN STANDARDS ENGINEER	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:

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

	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	
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED	1-02-98

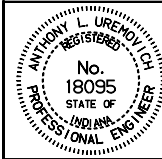
**9' x 2½" STRUCTURAL PLATE ALUMINUM ALLOY PIPE-ARCH (STEEL BOLTED)
HEIGHT OF COVER LIMITS (ft.)**

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:

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

	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.)**

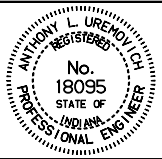
Rc (in.)	SPAN (ft.-in.)	RISE (ft.-in.)	AREA (sft)	THICKNESS (in.)									
				0.100		0.125		0.150		0.175		0.200	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
31.75	15-4	10-0	118			1.9	10.7	1.9	10.7	1.9	10.7	1.9	10.7
31.75	15-7	10-2	123			2.0	10.5	2.0	10.5	2.0	10.5	2.0	10.5
31.75	16-1	10-4	127			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.

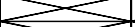
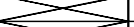
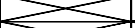
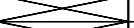
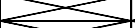
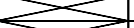
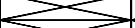
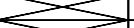
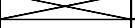
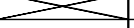
INDIANA DEPARTMENT OF TRANSPORTATION
**PIPE HEIGHT OF
COVER LIMITS**
JANUARY 1998
STANDARD DRAWING NO. **E 717-PHCL-05**

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

DESIGN STANDARDS ENGINEER 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:

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

DETAILS PLACED IN THIS FORMAT 11-15-99

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

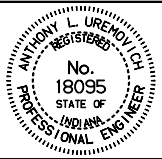
	AREA (sft)	DIAMETER (in.)	THICKNESS (in.)											
			0.111		0.140		0.170							
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.						
	19.6	60	1.0	47.7	1.0	68.8	1.0	90.0						
	23.8	66	1.0	43.4	1.0	62.6	1.0	81.8						
	28.3	72	1.0	39.8	1.0	57.4	1.0	75.0						
	33.2	78	1.0	36.7	1.0	52.9	1.0	69.2						
	38.5	84	1.0	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:

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

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

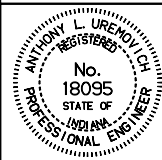
DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 1-02-98

**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:

- The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.
- 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	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz 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 908.09 (a) for the required bottom plate thickness.

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
JANUARY 1998	
STANDARD DRAWING NO. E 717-PHCL-09	
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
DESIGN STANDARDS ENGINEER	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:


- The tabulated cover depths shall be measured from the bottom of the asphalt or concrete pavement to the top of the pipe.
- A specific design shall be performed for structures with corner radii other than those tabulated above to determine the appropriate cover depth limits.
- 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

	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