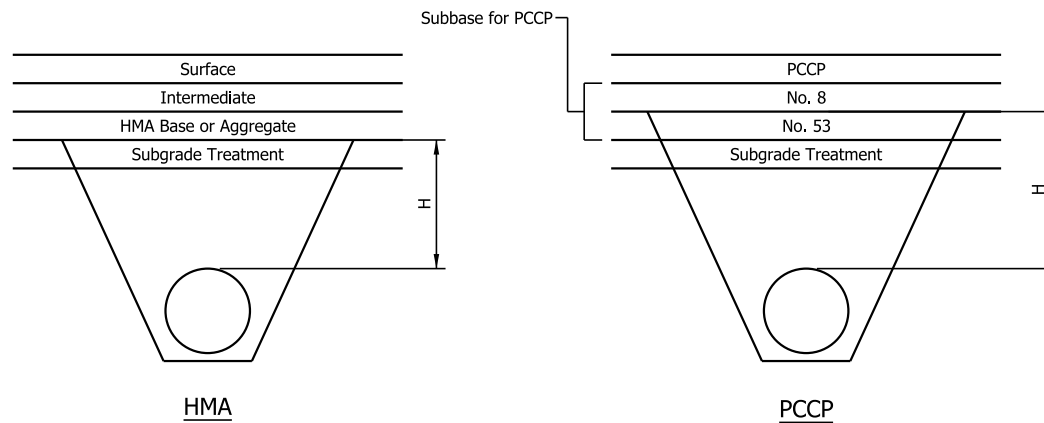


INDEX	
SHEET NO.	SUBJECT
01	Pipe Height of Cover Drawing Index and General Notes
02-04	2 2/3" x 1/2" Corrugated Aluminum Alloy Pipe and Pipe Arch Height of Cover Limits
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08-09	6" x 1" Corrugated Aluminum Alloy Pipe Height of Cover Limits
10-12	2 2/3" x 1/2" Corrugated Steel Pipe and Pipe Arch Height of Cover Limits
13-15	3" x 1" Corrugated Steel Pipe and Pipe Arch Height of Cover Limits
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18	3/4" x 3/4" x 7 1/2" Spiral Rib Steel Pipe Height of Cover Limits
19	Non-Reinforced Concrete Pipe Class 3 Height of Cover Limits
20-21	Polyethylene Pipe Height of Cover Limits
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23	Vitrified Clay Pipe Height of Cover Limits
24-25	Reinforced Concrete Pipe Height of Cover Limits

GENERAL NOTE:

- The tabulated cover depth H shall be measured from the top of the pipe to the bottom of the drainage No. 8 layer for PCCP and from the top of the pipe to the top of the subgrade treatment for HMA pavement.



INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS DRAWING INDEX AND GENERAL NOTES SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-01	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

2 2/3" x 1/2" CORRUGATED ALUMINUM ALLOY PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)

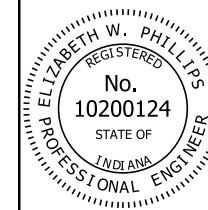
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.8	12	1.0	100.0	1.0	100.0	1.0	100.0				
1.2	15	1.0	100.0	1.0	100.0	1.0	100.0				
1.8	18	1.0	100.0	1.0	100.0	1.0	100.0				
2.4	21	1.0	88.5	1.0	100.0	1.0	100.0				
3.1	24	1.0	77.5	1.0	96.8	1.0	100.0	1.0	100.0		
4.0	27	1.0	68.8	1.0	86.0	1.0	100.0	1.0	100.0		
4.9	30	1.0	62.0	1.0	77.4	1.0	100.0	1.0	100.0		
5.9	33			1.0	64.5	1.0	90.4	1.0	100.0		
7.1	36			1.0	64.5	1.0	90.4	1.0	100.0		
9.6	42					1.0	77.4	1.0	99.7		
12.6	48					1.0	66.7	1.0	86.6	1.0	100.0
15.9	54					1.0	54.4	1.0	70.8	1.0	87.6
19.6	60							1.0	57.6	1.0	71.6
23.8	66									1.0	57.7
28.3	72									1.0	45.5

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-02



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

2 2/3" x 1/2" CORRUGATED ALUMINUM ALLOY PIPE (RIVETED)
HEIGHT OF COVER LIMITS (ft)

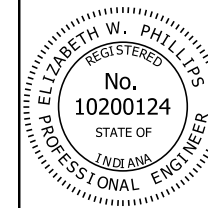
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.8	12	1.0	50.0	1.0	50.0	1.0	86.6				
1.2	15	1.0	40.0	1.0	40.0	1.0	69.3				
1.8	18	1.0	33.3	1.0	33.3	1.0	57.7				
2.4	21	1.0	28.5	1.0	28.5	1.0	49.5				
3.1	24	1.0	25.0	1.0	25.0	1.0	43.3	1.0	45.0		
4.0	27	1.0	22.2	1.0	22.2	1.0	38.5	1.0	40.0		
4.9	30	1.1	20.0	1.1	20.0	1.0	34.6	1.0	36.0		
5.9	33			1.2	16.6	1.0	28.8	1.0	30.0		
7.1	36			1.2	16.6	1.0	28.8	1.0	30.0		
9.6	42					1.0	50.0	1.0	52.3		
12.6	48					1.0	43.7	1.0	45.8	1.0	47.2
15.9	54					1.0	38.8	1.0	40.7	1.0	41.9
19.6	60							1.0	36.6	1.0	37.7
23.8	66									1.0	34.3
28.3	72									1.0	31.4

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-03



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**2 2/3" x 1/2" CORRUGATED ALUMINUM ALLOY PIPE-ARCH (RIVETED OR LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

CORNER RADIUS (in.)	SPAN (in.)	RISE (in.)	AREA (sft)	THICKNESS (in.)									
				0.060		0.075		0.105		0.135		0.164	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
3 (Min.) 3 1/2 (Typ.)	17	13	1.1	1.5	13.7	1.5	13.7	1.5	13.7				
3 (Min.) 4 1/8 (Typ.)	21	15	1.6	1.6	13.0	1.6	13.0	1.6	13.0				
3 (Min.) 4 7/8 (Typ.)	24	18	2.2	1.5	13.5	1.5	13.5	1.5	13.5				
3 (Min.) 5 1/2 (Typ.)	28	20	2.9	1.6	13.0	1.6	13.0	1.6	13.0	1.6	13.0		
3 (Min.) 6 7/8 (Typ.)	35	24	4.5			1.6	13.0	1.6	13.0	1.6	13.0		
3 1/2 (Min.) 8 1/4 (Typ.)	42	29	6.5			1.6	13.0	1.6	13.0	1.6	13.0		
4 (Min.) 9 5/8 (Typ.)	49	33	8.9			1.6	13.0	1.6	13.0	1.6	13.0		
5 (Min.) 11 (Typ.)	57	38	11.6					1.6	12.8	1.6	12.8	1.6	12.8
6 (Min.) 12 3/8 (Typ.)	64	43	14.7							1.6	12.8	1.6	12.8
7 (Min.) 13 3/4 (Typ.)	71	47	18.1									1.6	12.9

NOTES:

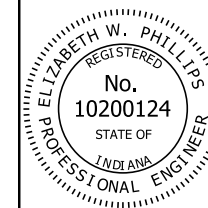
- Dual entries in the "Corner Radius" column such as 3 (Min.), 3 1/2 (Typ.), represent the following:
3 (Min.) = Minimum corner radius allowed by AASHTO M 196
3 1/2 (Typ.) = Corner radius typically available
- The tabulated cover heights reflect pipe-arches with typically available corner radii. If a pipe-arch with corner radii other than what is typically available is to be used, a specific design shall be performed to verify structural adequacy.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-04



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

3" x 1" CORRUGATED ALUMINUM ALLOY PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)

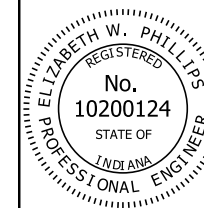
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
4.9	30	1.0	71.2	1.0	89.4	1.0	100.0	1.0	100.0		
5.9	33	1.0	59.3	1.0	74.5	1.0	100.0	1.0	100.0		
7.1	36	1.0	59.3	1.0	74.5	1.0	100.0	1.0	100.0		
9.6	42	1.0	50.8	1.0	63.8	1.0	89.1	1.0	100.0		
12.6	48	1.0	44.5	1.0	55.9	1.0	78.0	1.0	100.0	1.0	100.0
15.9	54	1.0	39.5	1.0	49.6	1.0	69.3	1.0	92.8	1.0	90.7
19.6	60	1.0	35.6	1.0	44.7	1.0	62.4	1.0	83.5	1.0	81.6
23.8	66	1.0	32.3	1.0	40.6	1.0	56.7	1.0	75.9	1.0	74.2
28.3	72			1.0	37.2	1.0	52.0	1.0	69.6	1.0	68.0
33.2	78			1.0	34.4	1.0	48.0	1.0	64.2	1.0	62.8
38.5	84					1.0	44.5	1.0	59.6	1.0	58.3
44.2	90					1.0	41.6	1.0	55.6	1.0	54.4
50.3	96					1.0	38.1	1.0	51.3	1.0	51.0
56.7	102							1.1	46.3	1.1	48.0
63.6	108							1.1	41.8	1.1	45.3
70.9	114									1.2	42.9
78.5	120									1.3	40.1

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017


STANDARD DRAWING NO. E 715-PHCL-05



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

3" x 1" CORRUGATED ALUMINUM ALLOY PIPE (RIVETED) HEIGHT OF COVER LIMITS (ft)											
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
4.9	30	1.0	36.6	1.0	45.5	1.0	62.2	1.0	93.3		
5.9	33	1.0	30.5	1.0	37.9	1.0	51.8	1.0	77.7		
7.1	36	1.0	30.5	1.0	37.9	1.0	51.8	1.0	77.7		
9.6	42	1.0	26.1	1.0	32.5	1.0	44.4	1.0	66.6		
12.6	48	1.0	22.9	1.0	28.4	1.0	38.8	1.0	58.3	1.0	75.6
15.9	54	1.1	20.3	1.0	25.3	1.0	34.5	1.0	51.8	1.0	67.2
19.6	60	1.1	18.3	1.0	22.7	1.0	31.1	1.0	46.6	1.0	60.5
23.8	66	1.2	16.6	1.1	20.7	1.0	28.2	1.0	42.4	1.0	55.0
28.3	72			1.1	18.9	1.0	25.9	1.0	38.8	1.0	50.4
33.2	78			1.2	17.5	1.0	23.9	1.0	35.8	1.0	46.5
38.5	84					1.0	22.2	1.0	33.3	1.0	43.2
44.2	90					1.1	20.7	1.0	31.1	1.0	40.3
50.3	96					1.1	19.4	1.0	29.1	1.0	37.8
56.7	102							1.1	27.4	1.1	35.6
63.6	108							1.1	25.9	1.1	33.6
70.9	114									1.2	31.8
78.5	120									1.3	30.2

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-06	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

**3" x 1" CORRUGATED ALUMINUM ALLOY PIPE-ARCH (RIVETED OR LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

CORNER RADIUS (in.)	SPAN (in.)	RISE (in.)	AREA (sft)	THICKNESS (in.)									
				0.060		0.075		0.105		0.135		0.164	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
8 (Min.) 18 3/4 (Typ.)	60	46	15.6			1.1	20.8	1.1	20.8	1.1	20.8	1.1	20.8
9 (Min.) 20 3/4 (Typ.)	66	51	19.3			1.1	20.9	1.1	20.9	1.1	20.9	1.1	20.9
12 (Min.) 22 7/8 (Typ.)	73	55	23.2			1.1	20.8	1.1	20.8	1.1	20.8	1.1	20.8
14 (Min.) 20 7/8 (Typ.)	81	59	27.4					1.2	17.1	1.2	17.1	1.2	17.1
14 (Min.) 22 5/8 (Typ.)	87	63	32.1					1.2	17.3	1.2	17.3	1.2	17.3
16 (Min.) 24 3/8 (Typ.)	95	67	37.0							1.2	17.1	1.2	17.1
16 (Min.) 26 1/8 (Typ.)	103	71	42.4							1.2	16.9	1.2	16.9
18 (Min.) 27 3/4 (Typ.)	112	75	48.0									1.3	16.5

NOTES:

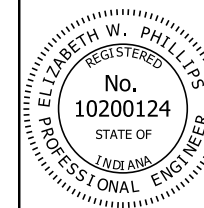
- Dual entries in the "Corner Radius" column such as 8 (Min.), 18 3/4 (Typ.), represent the following:
8 (Min.) = Minimum corner radius allowed by AASHTO M 196
18 3/4 (Typ.) = Corner radius typically available
- The tabulated cover heights reflect pipe-arches with typically available corner radii. If a pipe-arch with corner radii other than what is typically available is to be used, a specific design shall be performed to verify structural adequacy.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-07



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**6" x 1" CORRUGATED ALUMINUM ALLOY PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

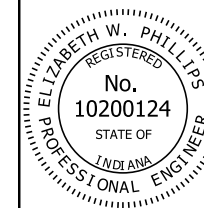
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12.6	48	1.0	38.7	1.0	48.4	1.0	67.8	1.0	87.2	1.0	100.0
15.9	54	1.0	34.4	1.0	43.0	1.0	60.2	1.0	77.5	1.0	94.8
19.6	60	1.0	31.0	1.0	38.7	1.0	54.2	1.0	69.7	1.0	85.3
23.8	66	1.0	28.1	1.0	35.2	1.0	49.3	1.0	63.4	1.0	77.5
28.3	72			1.0	32.2	1.0	45.2	1.0	58.1	1.0	71.1
33.2	78			1.0	29.7	1.0	41.7	1.0	53.6	1.0	65.6
38.5	84					1.0	38.7	1.0	49.8	1.0	60.9
44.2	90					1.0	36.1	1.0	46.5	1.0	56.8
50.3	96							1.0	43.6	1.0	53.3
56.7	102							1.1	40.0	1.1	49.0
63.6	108									1.1	44.5
70.9	114									1.2	40.3

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017


STANDARD DRAWING NO. E 715-PHCL-08



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

6" x 1" CORRUGATED ALUMINUM ALLOY PIPE (RIVETED) HEIGHT OF COVER LIMITS (ft)											
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.060		0.075		0.105		0.135		0.164	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12.6	48	1.0	22.2	1.0	26.3	1.0	38.7	1.0	49.8	1.0	60.4
15.9	54	1.1	19.7	1.0	23.4	1.0	34.4	1.0	44.3	1.0	53.7
19.6	60	1.2	17.7	1.1	21.1	1.0	31.0	1.0	39.8	1.0	48.3
23.8	66	1.3	16.1	1.1	19.1	1.0	28.1	1.0	36.2	1.0	43.9
28.3	72			1.2	17.5	1.0	25.8	1.0	33.2	1.0	40.2
33.2	78			1.3	16.2	1.0	23.8	1.0	30.6	1.0	37.1
38.5	84					1.0	22.1	1.0	28.4	1.0	34.5
44.2	90					1.1	20.6	1.0	26.5	1.0	32.2
50.3	96							1.0	24.9	1.0	30.2
56.7	102							1.1	23.4	1.1	28.4
63.6	108									1.1	26.8
70.9	114									1.2	25.4

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-09	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

2 2/3" x 1/2" CORRUGATED STEEL PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)

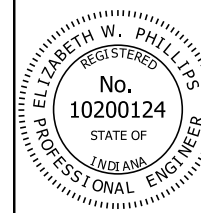
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.064		0.079		0.109		0.138		0.168	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.8	12	1.0	100.0	1.0	100.0						
1.2	15	1.0	100.0	1.0	100.0	1.0	100.0				
1.8	18	1.0	100.0	1.0	100.0	1.0	100.0				
2.4	21	1.0	100.0	1.0	100.0	1.0	100.0				
3.1	24	1.0	100.0	1.0	100.0	1.0	100.0				
4.0	27	1.0	94.7	1.0	100.0	1.0	100.0				
4.9	30	1.0	85.2	1.0	100.0	1.0	100.0	1.0	100.0		
5.9	33	1.0	71.0	1.0	88.7	1.0	100.0	1.0	100.0		
7.1	36	1.0	71.0	1.0	88.7	1.0	100.0	1.0	100.0	1.0	100.0
9.6	42	1.0	60.8	1.0	76.0	1.0	100.0	1.0	100.0	1.0	100.0
12.6	48	1.0	53.2	1.0	66.5	1.0	93.2	1.0	100.0	1.0	100.0
15.9	54			1.0	59.1	1.0	82.8	1.0	100.0	1.0	100.0
19.6	60					1.0	87.8	1.0	95.9	1.0	100.0
23.8	66							1.0	87.2	1.0	100.0
28.3	72							1.0	79.9	1.0	97.0
33.2	78									1.0	86.7
38.5	84									1.0	75.1

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-10



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

2 2/3" x 1/2" CORRUGATED STEEL PIPE (RIVETED)
HEIGHT OF COVER LIMITS (ft)

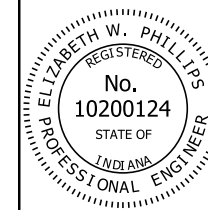
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.064		0.079		0.109		0.138		0.168	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0.8	12	1.0	92.7	1.0	100.0						
1.2	15	1.0	74.2	1.0	80.8	1.0	100.0				
1.8	18	1.0	61.8	1.0	67.4	1.0	86.6				
2.4	21	1.0	53.0	1.0	57.7	1.0	74.2				
3.1	24	1.0	46.3	1.0	50.5	1.0	65.0				
4.0	27	1.0	41.2	1.0	44.9	1.0	57.7				
4.9	30	1.0	37.1	1.0	40.4	1.0	52.0	1.0	54.4		
5.9	33	1.0	30.9	1.0	33.7	1.0	43.3	1.0	45.3		
7.1	36	1.0	30.9	1.0	33.7	1.0	43.3	1.0	45.3	1.0	47.4
9.6	42	1.0	34.2	1.0	47.3	1.0	74.2	1.0	77.7	1.0	81.4
12.6	48	1.0	30.0	1.0	41.3	1.0	65.0	1.0	68.0	1.0	71.2
15.9	54			1.0	36.7	1.0	57.7	1.0	60.4	1.0	63.3
19.6	60					1.0	52.0	1.0	54.4	1.0	57.0
23.8	66							1.0	49.4	1.0	51.8
28.3	72							1.0	45.3	1.0	47.5
33.2	78									1.0	43.8
38.5	84									1.0	40.7

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-11



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**2 2/3" x 1/2" CORRUGATED STEEL PIPE-ARCH (RIVETED OR LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

CORNER RADIUS (in.)	SPAN (in.)	RISE (in.)	AREA (sft)	THICKNESS (in.)									
				0.064		0.079		0.109		0.138		0.168	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
3 (Min.) 3 1/2 (Typ.)	17	13	1.1	1.5	13.7	1.5	13.7	1.5	13.7				
3 (Min.) 4 1/8 (Typ.)	21	15	1.6	1.6	13.0	1.6	13.0	1.6	13.0				
3 (Min.) 4 7/8 (Typ.)	24	18	2.2	1.5	13.5	1.5	13.5	1.5	13.5				
3 (Min.) 5 1/2 (Typ.)	28	20	2.9	1.6	13.0	1.6	13.0	1.6	13.0				
3 (Min.) 6 7/8 (Typ.)	35	24	4.5	1.6	13.0	1.6	13.0	1.6	13.0	1.6	13.0		
3 1/2 (Min.) 8 1/4 (Typ.)	42	29	6.5	1.6	13.0	1.6	13.0	1.6	13.0	1.6	13.0	1.6	13.0
4 (Min.) 9 5/8 (Typ.)	49	33	8.9			1.6	13.0	1.6	13.0	1.6	13.0	1.6	13.0
5 (Min.) 11 (Typ.)	57	38	11.6					1.6	12.8	1.6	12.8	1.6	12.8
6 (Min.) 12 3/8 (Typ.)	64	43	14.7					1.6	12.8	1.6	12.8	1.6	12.8
7 (Min.) 13 3/4 (Typ.)	71	47	18.1							1.6	12.9	1.6	12.9
8 (Min.) 15 1/8 (Typ.)	77	52	21.9									1.6	13.0
9 (Min.) 16 1/2 (Typ.)	83	57	26.0									1.5	13.2

NOTES:

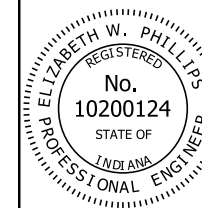
- Dual entries in the "Corner Radius" column such as 3 (Min.), 3 1/2 (Typ.), represent the following:
3 (Min.) = Minimum corner radius allowed by AASHTO M 196
3 1/2 (Typ.) = Corner radius typically available
- The tabulated cover heights reflect pipe-arches with typically available corner radii. If a pipe-arch with corner radii other than what is typically available is to be used, a specific design shall be performed to verify structural adequacy.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-12



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

3" x 1" CORRUGATED STEEL PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)

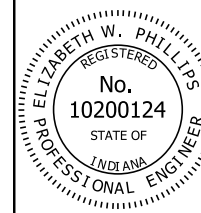
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.064		0.079		0.109		0.138		0.168	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
7.1	36	1.0	81.5								
9.6	42	1.0	69.9	1.0	87.4	1.0	100.0	1.0	100.0		
12.6	48	1.0	61.1	1.0	76.5	1.0	100.0	1.0	100.0		
15.9	54	1.0	54.3	1.0	68.0	1.0	95.3	1.0	100.0	1.0	100.0
19.6	60	1.0	48.9	1.0	61.2	1.0	85.8	1.0	100.0	1.0	100.0
23.8	66	1.0	44.5	1.0	55.6	1.0	78.0	1.0	100.0	1.0	100.0
28.3	72	1.0	40.7	1.0	51.0	1.0	71.5	1.0	92.0	1.0	100.0
33.2	78	1.0	37.6	1.0	47.0	1.0	66.0	1.0	84.9	1.0	100.0
38.5	84	1.0	34.9	1.0	43.7	1.0	61.2	1.0	78.8	1.0	96.5
44.2	90	1.0	32.6	1.0	40.8	1.0	57.2	1.0	73.6	1.0	90.1
50.3	96			1.0	38.2	1.0	53.6	1.0	69.0	1.0	84.4
56.7	102			1.1	36.0	1.1	50.4	1.1	64.9	1.1	79.5
63.6	108					1.1	47.6	1.1	61.3	1.1	75.1
70.9	114					1.2	45.1	1.2	58.1	1.2	71.1
78.5	120					1.3	42.9	1.3	55.2	1.3	67.5
86.6	126							1.3	52.5	1.3	64.3
95.0	132							1.4	50.2	1.4	61.4
103.9	138							1.4	48.0	1.4	58.7
113.1	144									1.5	56.3

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-13



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**3" x 1" CORRUGATED STEEL PIPE (RIVETED)
HEIGHT OF COVER LIMITS (ft)**

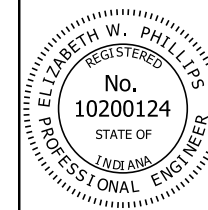
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.064		0.079		0.109		0.138		0.168	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
7.1	36	1.0	53.1								
9.6	42	1.0	45.5	1.0	56.6	1.0	84.1	1.0	100.0		
12.6	48	1.0	39.8	1.0	49.5	1.0	73.6	1.0	88.4		
15.9	54	1.0	35.4	1.0	44.0	1.0	65.4	1.0	78.6	1.0	87.2
19.6	60	1.0	31.8	1.0	39.6	1.0	58.8	1.0	70.7	1.0	78.5
23.8	66	1.0	28.9	1.0	36.0	1.0	53.5	1.0	64.3	1.0	71.4
28.3	72	1.0	26.5	1.0	33.0	1.0	49.0	1.0	58.9	1.0	65.4
33.2	78	1.0	24.5	1.0	30.5	1.0	45.2	1.0	54.4	1.0	60.4
38.5	84	1.0	22.7	1.0	28.3	1.0	42.0	1.0	50.5	1.0	56.1
44.2	90	1.1	21.2	1.0	26.4	1.0	39.2	1.0	47.1	1.0	52.3
50.3	96			1.0	24.7	1.0	36.8	1.0	44.2	1.0	49.0
56.7	102			1.1	23.3	1.1	34.6	1.1	41.6	1.1	46.2
63.6	108					1.1	32.7	1.1	39.3	1.1	43.6
70.9	114					1.2	30.9	1.2	37.2	1.2	41.3
78.5	120					1.3	29.4	1.3	35.3	1.3	39.2
86.6	126							1.3	33.7	1.3	37.4
95.0	132							1.4	32.1	1.4	35.7
103.9	138							1.4	30.7	1.4	34.1
113.1	144									1.5	32.7

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-14



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**3" x 1" CORRUGATED STEEL PIPE-ARCH (RIVETED OR LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

CORNER RADIUS (in.)	SPAN (in.)	RISE (in.)	AREA (sft)	THICKNESS (in.)									
				0.064		0.079		0.109		0.138		0.168	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
8 (Min.) 18 3/4 (Typ.)	60	46	15.6			1.1	20.8	1.1	20.8	1.1	20.8	1.1	20.8
9 (Min.) 20 3/4 (Typ.)	66	51	19.3			1.1	20.9	1.1	20.9	1.1	20.9	1.1	20.9
12 (Min.) 22 7/8 (Typ.)	73	55	23.2			1.1	20.8	1.1	20.8	1.1	20.8	1.1	20.8
14 (Min.) 20 7/8 (Typ.)	81	59	27.4			1.2	17.1	1.2	17.1	1.2	17.1	1.2	17.1
14 (Min.) 22 5/8 (Typ.)	87	63	32.1			1.2	17.3	1.2	17.3	1.2	17.3	1.2	17.3
16 (Min.) 24 3/8 (Typ.)	95	67	37.0			1.2	17.1	1.2	17.1	1.2	17.1	1.2	17.1
16 (Min.) 26 1/8 (Typ.)	103	71	42.4					1.2	16.9	1.2	16.9	1.2	16.9
18 (Min.) 27 3/4 (Typ.)	112	75	48.0					1.3	16.5	1.3	16.5	1.3	16.5
18 (Min.) 29 1/2 (Typ.)	117	79	59.2					1.2	16.8	1.2	16.8	1.2	16.8
18 (Min.) 31 1/4 (Typ.)	128	83	60.5							1.3	16.2	1.3	16.2
18 (Min.) 33 (Typ.)	137	87	67.4							1.3	16.0	1.3	16.0
18 (Min.) 34 3/4 (Typ.)	142	91	74.5									1.3	16.3

NOTES:

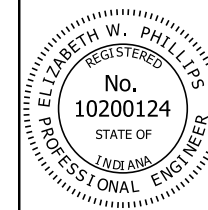
- Dual entries in the "Corner Radius" column such as 8 (Min.), 18 3/4 (Typ.), represent the following:
8 (Min.) = Minimum corner radius allowed by AASHTO M 196
18 3/4 (Typ.) = Corner radius typically available
- The tabulated cover heights reflect pipe-arches with typically available corner radii. If a pipe-arch with corner radii other than what is typically available is to be used, a specific design shall be performed to verify structural adequacy.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-15



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

5" x 1" CORRUGATED STEEL PIPE (LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)

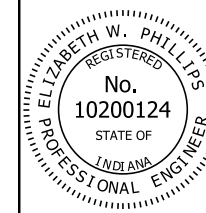
AREA (sft)	DIAMETER (in.)	THICKNESS (in.)									
		0.064		0.079		0.109		0.138		0.168	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
7.1	36			1.0	90.9	1.0	100.0				
9.6	42			1.0	77.9	1.0	100.0				
12.6	48	1.0	54.5	1.0	68.2	1.0	95.5	1.0	100.0		
15.9	54	1.0	48.5	1.0	60.6	1.0	84.9	1.0	100.0		
19.6	60	1.0	43.6	1.0	54.5	1.0	76.4	1.0	98.3		
23.8	66	1.0	39.7	1.0	49.6	1.0	69.5	1.0	89.4		
28.3	72	1.0	36.3	1.0	45.4	1.0	63.7	1.0	81.9	1.0	100.0
33.2	78	1.0	33.5	1.0	41.9	1.0	58.8	1.0	75.6	1.0	92.4
38.5	84	1.0	31.1	1.0	38.9	1.0	54.6	1.0	70.2	1.0	85.8
44.2	90	1.0	29.1	1.0	36.3	1.0	50.9	1.0	65.5	1.0	80.1
50.3	96			1.0	34.1	1.0	47.7	1.0	61.4	1.0	75.1
56.7	102			1.1	32.0	1.1	44.9	1.1	57.8	1.1	70.7
63.6	108					1.1	42.4	1.1	54.6	1.1	66.7
70.9	114					1.2	40.2	1.2	51.7	1.2	63.2
78.5	120					1.3	38.2	1.3	49.1	1.3	60.1
86.6	126							1.3	46.8	1.3	57.2
95.0	132							1.4	44.7	1.4	54.6
103.9	138							1.4	42.7	1.4	52.2
113.1	144									1.5	50.0

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-16



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

**5" x 1" CORRUGATED STEEL PIPE-ARCH (RIVETED OR LOCK SEAM)
HEIGHT OF COVER LIMITS (ft)**

CORNER RADIUS (in.)	SPAN (in.)	RISE (in.)	AREA (sft)	THICKNESS (in.)									
				0.064		0.079		0.109		0.138		0.168	
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
8 (Min.) 18 3/4 (Typ.)	60	46	15.6					1.1	20.8	1.1	20.8		
9 (Min.) 20 3/4 (Typ.)	66	51	19.3					1.1	20.9	1.1	20.9		
12 (Min.) 22 7/8 (Typ.)	73	55	23.2					1.1	20.8	1.1	20.8		
14 (Min.) 20 7/8 (Typ.)	81	59	27.4					1.2	17.1	1.2	17.1	1.2	17.1
14 (Min.) 22 5/8 (Typ.)	87	63	32.1					1.2	17.3	1.2	17.3	1.2	17.3
16 (Min.) 24 3/8 (Typ.)	95	67	37.0					1.2	17.1	1.2	17.1	1.2	17.1
16 (Min.) 26 1/8 (Typ.)	103	71	42.4					1.2	16.9	1.2	16.9	1.2	16.9
18 (Min.) 27 3/4 (Typ.)	112	75	48.0					1.3	16.5	1.3	16.5	1.3	16.5
18 (Min.) 29 1/2 (Typ.)	117	79	54.2					1.2	16.8	1.2	16.8	1.2	16.8
18 (Min.) 31 1/4 (Typ.)	128	83	60.5							1.3	16.2	1.3	16.2
18 (Min.) 33 (Typ.)	137	87	67.4							1.3	16.0	1.3	16.0
18 (Min.) 34 3/4 (Typ.)	142	91	74.5									1.3	16.3

NOTES:

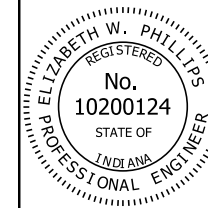
- Dual entries in the "Corner Radius" column such as 8 (Min.), 18 3/4 (Typ.), represent the following:
8 = Minimum corner radius allowed by AASHTO M 196
18 3/4 = Corner radius typically available
- The tabulated cover heights reflect pipe-arches with typically available corner radii. If a pipe-arch with corner radii other than what is typically available is to be used, a specific design shall be performed to verify structural adequacy.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017


STANDARD DRAWING NO. E 715-PHCL-17




/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

3/4" x 3/4" x 7 1/2" SPIRAL RIB STEEL PIPE HEIGHT OF COVER LIMITS (ft)						
DIAMETER (in.)	THICKNESS (in.)					
	0.064		0.079		0.109	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12	1.3	100.0	1.3	100.0	1.3	100.0
15	1.3	100.0	1.3	100.0	1.3	100.0
18	1.3	68.0	1.3	72.0	1.3	100.0
21	1.3	58.0	1.3	62.0	1.3	100.0
24	1.3	51.0	1.3	60.0	1.3	100.0
30	1.3	41.0	1.3	58.0	1.3	97.0
36	1.3	34.0	1.3	48.0	1.3	81.0
42	1.3	29.0	1.3	41.0	1.3	69.0
48	1.3	26.0	1.3	36.0	1.3	61.0
54	1.3	23.0	1.3	32.0	1.3	54.0
60			1.3	29.0	1.3	49.0
66			1.3	26.0	1.3	44.0
72			1.3	24.0	1.3	40.0
78					1.3	37.0
84					1.3	35.0
90					2.3	32.0
96					2.3	30.0
102					2.8	29.0
108					2.8	27.0

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-18	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

NON-REINFORCED CONCRETE PIPE CLASS 3 HEIGHT OF COVER LIMITS (ft)		
DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	1.3	14.1
15	1.4	13.1
18	1.5	12.8
21	1.5	13.4
24	1.5	13.5
27	1.6	12.1
30	1.8	10.7
33	1.9	9.8
36	2.1	9.0


INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-19	
	<u>/s/ Elizabeth W. Phillips</u> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<u>/s/ John Leckie</u> 04/10/17 CHIEF ENGINEER DATE

CORRUGATED POLYETHYLENE PIPE TYPE S HEIGHT OF COVER LIMITS (ft)			
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	12	2.0	22.0
15	15	2.0	22.0
18	18	2.0	20.0
21	21	2.0	19.0
24	24	2.0	19.0
30	30	2.0	17.0
36	36	2.0	17.0
42	42	2.0	17.0
48	48	2.0	15.0

NOTES:

1. The pay item diameter reflects the minimum required inside diameter.
2. Because the nominal size of smooth wall polyethylene pipe is based on the outside diameter, different dimension ratios may require different nominal diameters to satisfy the pay item diameter requirements.

SMOOTH WALL POLYETHYLENE PIPE HEIGHT OF COVER LIMITS (ft)									
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	DIMENSION RATIO (NOMINAL DIAMETER / WALL THICKNESS)							
		26		21		17		11	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12	13	2.0	40.0	2.0	57.0				
12	14					2.0	81.0		
15	18	2.0	40.0	2.0	57.0	2.0	81.0		
18	20	2.0	40.0	2.0	57.0	2.0	81.0		
18	22					2.0	81.0	2.0	100.0
21	24	2.0	40.0	2.0	57.0	2.0	81.0		
24	28	2.0	40.0	2.0	57.0	2.0	81.0		
27	32	2.0	40.0	2.0	57.0	2.0	81.0		
30	34	2.0	40.0	2.0	57.0	2.0	81.0		
36	42	2.0	40.0	2.0	57.0	2.0	81.0		

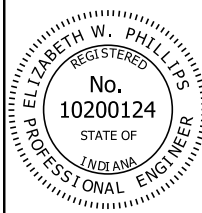
INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-20	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

NOTES:

1. The pay item diameter reflects the minimum required inside diameter.

PROFILE WALL (RIBBED) POLYETHYLENE PIPE HEIGHT OF COVER LIMITS (ft)			
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
18	18	2.0	18.0
21	21	2.0	22.0
24	24	2.0	21.0
27	27	2.0	24.0
30	30	2.0	22.0
33	33	2.0	23.0
36	36	2.0	25.0

PROFILE WALL (CLOSED) POLYETHYLENE PIPE HEIGHT OF COVER LIMITS (ft)			
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
18	18	2.0	47.0
21	21	2.0	38.0
24	24	2.0	42.0
27	27	2.0	40.0
30	23	2.2	38.0
33	33	2.4	45.0
36	36	2.6	30.0
42	42	3.0	29.0
48	48	3.5	30.0

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-21	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ John Leckie</i> 04/10/17 CHIEF ENGINEER DATE

PROFILE WALL POLYVINYL CHLORIDE PIPE
HEIGHT OF COVER LIMITS (ft)

DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	2.0	20.0
15	2.0	20.0
18	2.0	20.0
21	2.0	20.0
24	2.0	20.0
30	2.0	18.0
36	2.0	18.0
42	2.0	17.0
48	2.0	15.0

CORRUGATED POLYPROPYLENE PIPE
HEIGHT OF COVER LIMITS (ft)

DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	2.0	28.0
15	2.0	28.0
18	2.0	25.0
21	2.0	23.0
24	2.0	23.0
30	2.2	19.0
36	2.6	23.0
42	3.1	22.0
48	3.5	21.0

NOTE:

1. The pay item diameter reflects the minimum required inside diameter.

SMOOTH WALL POLYVINYL CHLORIDE PIPE
HEIGHT OF COVER LIMITS (ft)

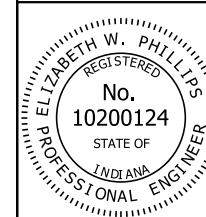
PAY ITEM DIAMETER (in.)	NOMINAL DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	12	2.0	64.0
15	15	2.0	64.0
18	18	2.0	61.0
21	21	2.0	61.0
24	24	2.0	61.0
27	27	2.0	61.0

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017


STANDARD DRAWING NO. E 715-PHCL-22



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

VITRIFIED CLAY PIPE, EXTRA STRENGTH HEIGHT OF COVER LIMITS (ft)		
DIAMETER (in.)	MINIMUM (ft)	MAXIMUM (ft)
12	1.2	16.0
15	1.4	14.0
18	1.4	13.0
21	1.4	14.0
24	1.4	15.0
27	1.5	14.0
30	1.6	13.0
33	1.5	13.0
36	1.5	14.0

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE HEIGHT OF COVER LIMITS	
SEPTEMBER 2017	
STANDARD DRAWING NO. E 715-PHCL-23	
	<i>/s/ Elizabeth W. Phillips</i> 03/27/17 <small>DESIGN STANDARDS ENGINEER DATE</small>
	<i>/s/ John Leckie</i> 04/10/17 <small>CHIEF ENGINEER DATE</small>

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

DIAMETER (in.)	STRENGTH CLASS / D-LOAD RATING							
	CLASS II: D _{0.01} = 1000		CLASS III: D _{0.01} = 1350		CLASS IV: D _{0.01} = 2000		CLASS V: D _{0.01} = 3000	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
12	1.0	12.0	1.0	17.0	1.0	25.0	1.0	38.0
15	1.0	13.0	1.0	17.0	1.0	26.0	1.0	39.0
18	1.0	13.0	1.0	17.0	1.0	26.0	1.0	40.0
21	1.0	13.0	1.0	17.0	1.0	26.0	1.0	40.0
24	1.0	13.0	1.0	17.0	1.0	26.0	1.0	40.0
27	1.0	13.0	1.0	17.0	1.0	26.0	1.0	40.0
30	1.0	13.0	1.0	17.0	1.0	26.0	1.0	40.0
33	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
36	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
42	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
48	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
54	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
60	1.0	12.0	1.0	17.0	1.0	26.0	1.0	40.0
66	1.0	12.0	1.0	17.0	1.0	26.0	1.0	39.0
72	1.0	12.0	1.0	17.0	1.0	25.0	1.0	39.0
78	1.0	12.0	1.0	17.0	1.0	25.0	1.0	39.0
84	1.0	12.0	1.0	16.0	1.0	25.0	1.0	39.0
90	1.0	12.0	1.0	16.0	1.0	25.0	1.0	39.0
96	1.0	11.0	1.0	16.0	1.0	25.0	1.0	39.0
102	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
108	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
114	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
120	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
126	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
132	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
138	1.0	9.0	1.0	16.0	1.0	25.0	1.0	39.0
144	1.0	9.0	1.0	15.0	1.0	25.0	1.0	39.0

NOTES:

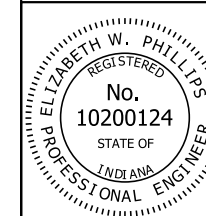
1. A special design in accordance with AASHTO LRFD Bridge Design Specifications, Section 12, is required for pipe diameters and heights of cover beyond those shown.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-24



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE

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

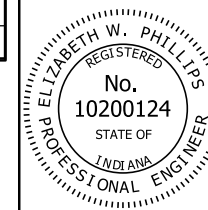
SPAN (in.)	RISE (in.)	AREA (sft)	STRENGTH CLASS / D-LOAD RATING									
			CLASS HE-A: D _{0.01} = 600		CLASS HE-I: D _{0.01} = 800		CLASS HE-II: D _{0.01} = 1000		CLASS HE-III: D _{0.01} = 1350		CLASS HE-IV: D _{0.01} = 2000	
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
23	14	1.8	1.3	4.0	1.0	8.0	1.0	11.0	1.0	20.0	1.0	100.0
30	19	3.3	1.1	5.0	1.0	7.0	1.0	10.0	1.0	16.0	1.0	47.0
34	22	4.1	1.0	5.0	1.0	8.0	1.0	11.0	1.0	17.0	1.0	48.0
38	24	5.1	1.0	5.0	1.0	8.0	1.0	11.0	1.0	18.0	1.0	49.0
42	27	6.3	1.0	6.0	1.0	9.0	1.0	12.0	1.0	19.0	1.0	50.0
45	29	7.4	1.0	6.0	1.0	9.0	1.0	12.0	1.0	19.0	1.0	45.0
49	32	8.8	1.0	6.0	1.0	9.0	1.0	12.0	1.0	19.0	1.0	45.0
53	34	10.2	1.0	6.0	1.0	9.0	1.0	12.0	1.0	20.0	1.0	44.0
60	38	12.9	1.0	5.0	1.0	8.0	1.0	10.0	1.0	15.0	1.0	26.0
68	43	16.6	1.0	6.0	1.0	8.0	1.0	10.0	1.0	15.0	1.0	27.0
76	48	20.5	1.0	6.0	1.0	8.0	1.0	11.0	1.0	16.0	1.0	28.0
83	53	24.8	1.0	6.0	1.0	9.0	1.0	11.0	1.0	16.0	1.0	29.0
91	58	29.5	1.0	6.0	1.0	9.0	1.0	12.0	1.0	17.0	1.0	29.0
98	63	34.6	1.1	6.0	1.1	9.0	1.1	12.0	1.1	17.0	1.1	29.0
106	68	40.1	1.2	6.0	1.2	9.0	1.2	12.0	1.2	17.0	1.2	30.0
113	72	46.1	1.2	7.0	1.2	9.0	1.2	12.0	1.2	18.0	1.2	30.0
121	77	52.4	1.3	7.0	1.3	9.0	1.3	12.0	1.3	18.0	1.3	30.0
128	82	59.2	1.4	7.0	1.4	10.0	1.4	13.0	1.4	18.0	1.4	30.0
136	87	66.4	1.5	7.0	1.5	10.0	1.5	13.0	1.5	18.0	1.5	31.0
143	92	74.0	1.5	7.0	1.5	10.0	1.5	13.0	1.5	18.0	1.5	31.0
151	97	82.0	1.6	7.0	1.6	10.0	1.6	13.0	1.6	19.0	1.6	31.0
166	106	99.2	1.7	7.0	1.8	10.0	1.8	13.0	1.8	19.0	1.8	31.0
180	116	118.6	1.8	7.0	1.9	10.0	1.9	13.0	1.9	19.0	1.9	31.0

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE HEIGHT OF COVER LIMITS

SEPTEMBER 2017

STANDARD DRAWING NO. E 715-PHCL-25



/s/ Elizabeth W. Phillips 03/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/10/17
CHIEF ENGINEER DATE