NOTES:

1. Protective cover shall be constructed prior to running heavy equipment over trench slopes. The minimum covers are listed below:
   a) 1.5' for B < 10'
   b) 1' for 10' < B < 15'
   c) 1' for B > 15'

2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.

3. Flowable or structure backfill shall be saturated by compacted earth backfill. The minimum saturation shall be 1.1. If necessary, use 3.5:1 slope between the flowable or structure backfill and the embankment shall be established to maintain the minimum 2:1 embankment.

LEGEND

H = Overall diameter of pipe (typ.)
B = Overall diameter of pipe
A = 5' min. for fill height less than 15'
   = 12' min. for fill height of 15' or more
T_c = Trench cover depth over pipe
W = 0.5 B, or 5', whichever is greater
E = Embankment
L_e = Backfill length measured from toe to toe of the 2:1 slope.
NOTES:
1. Protective cover shall be constructed prior to running heavy equipment over embankment piles. The minimum covers are listed below:
   a) 1.5' for R<sub>g</sub> ≤ 10'
   b) 3' for 10' < R<sub>g</sub> ≤ 15'
   c) 3.5' for R<sub>g</sub> > 15'
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowsheet or structure backfill shall be secured by compacted earth backfill. The minimum embankment shall be 2 ft. If necessary, use 3:1 slope between the flowsheet or structure backfill and the embankment shall be stabilized to maintain the minimum 2 ft. embankment.

LEGEND
- R<sub>G</sub> = Overall diameter or rise (Typ.)
- B<sub>E</sub> = Overall diameter or span
- A = 9' min. for fill height less than 10'
  = 12' min. for fill height of 10' or more
- V<sub>E</sub> = 12' for B<sub>E</sub> ≤ 15'
  = 18' for B<sub>E</sub> > 15'
- W = 0.25 B<sub>E</sub> or 3', whichever is greater
- L<sub>E</sub> = Backfill length measured from toe to toe of the 3:1 slopes.

SECTION B-B
- Plan grade
- Embankment material
- Geosynthetic if required
- Structure or flowable backfill as required
- 1:12 slope

SECTION B-B
ROCK FOUNDATION
- Original ground line and rock line
- Structure backfill
- Geosynthetic if required
- Construct embankment to this elevation prior to pipe installation

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 1
NEW ROADWAY, EMBANKMENT
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-02

Drawn and Designed: 09/03/08
Reviewed: 09/04/08
NOTES:
1. Existing subgrade over this distance shall remain in place.
2. The minimum pavement sections shall be as follows:
   HMA: 1.5 ft/200 ft HMA Surface, Type A, B, C or D on
   variable HMA Intermediate, Type A, B, C or D
3. If underdrains are present, they shall be preserved in accordance with
   the details shown on Standard Drawing E 715-UNDER-02.

L = Pay limits of pavement removal and pavement replacement (%);
   for crew pipe, measured along roadway centerline; for pipe parallel to
   roadway centerline, measured perpendicular to pipe centerline.

B_C = Overall diameter or span (ft.)
H_C = Overall diameter or rise (ft.)
d = Vertical distance from flowline to profile grade (%)
NOTES:

1. Existing subgrade over this distance shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. The minimum pavement sections shall be as follows:
   - HMA: 1.5" @lay HMA Surfacing, Type A, B, C, or D on variables HMA Intermediates, Type A, B, C, or D
5. If subbase is present, they shall be provided in accordance with the details shown on Standard Drawing E 715-HSBB-01.
7. New subbase type shall match the existing subbase type and thickness.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-05

COMPOSITE REPLACEMENT PAVEMENT

L = Pay limits of pavement removal and pavement replacement (ft);
   for cross pipe, measured along roadway centerline for pipe parallel to roadway centerline, measured perpendicular to pipe centerline.

b_c = Overall diameter or span (ft)

H_c = Overall diameter or rise (ft)

d = Vertical distance from baseline to profile grade (ft)
NOTES:
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a) 1.5' for \( B_e < 12' \)
   b) 3' for \( 12' < B_e < 24' \)
   c) 4' for \( B_e > 24' \)
2. For backfill purposes, paved shoulders, curbs, and skidways are considered pavement. See Standard Drawing E715-BKFL-18 for pavement limits when curbs, paved shoulders, or skidways are present.
3. Flexible or structure backfill shall be allowed by compacted earth backfill. The minimum embedment shall be 2 ft. If necessary, the 2:1 slope between the flexible or structure backfill and the embedment shall be modified to maintain the minimum 2 ft embedment.

LEGEND:
- \( D_e \): Overall diameter or rise (typ.)
- \( B_e \): Overall diameter or span
- \( A \): 6" min. for fill height less than 18''
- \( 12" \) min. for fill height of 18" or more
- \( T_e \): Trench cover depth over pipe
- \( W \): 0.3 \( B_e \) or 4", whichever is greater
- \( E \): Embedment
- \( L_e \): Backfill length measured from toe to toe of the 2:1 slopes.

INFORMATION:
PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-06

[Signatures]
**SECTION E-E**

**LEGEND**

- \( H_o \) = Overall diameter or rise (typ.)
- \( B_o \) = Overall diameter or span
- \( A \) = 6 ft. min. for fill height less than 15 ft.
  - 12 ft. min. for fill height of 15 ft. or more
- \( V_o \) = 12° for \( B_o \leq 18° \)
  - 18° for \( B_o > 18° \)
- \( T_o \) = Trench cover depth over pipe
- \( W \) = 0.3 \( B_o \) or 9 ft., whichever is greater
- \( L_f \) = Backfill length measured from toe to toe of the 1:12 slope.

**NOTES:**

1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   - a) 1.5' for \( B_o \leq 18° \)
   - b) 3' for \( 18° < B_o \leq 54° \)
   - c) 4' for \( B_o > 54° \)

2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.

**INFORMATION**

**INDIANA DEPARTMENT OF TRANSPORTATION**

**PIPE BACKFILL METHOD 3**

**MEDIAN INSTALLATION, TRENCH**

**SEPTEMBER 2008**

**STANDARD DRAWING NO. E 715-BKFL-08**

**IEEE**

**Richard L. Vancleve**

**DATE**

**Mark A. Miller**

**DATE**

**DESIGN STANDARDS ENGINEER**

**PROFESSIONAL ENGINEER**

**SHEET 1 OF 2**