NOTES:

1. Protective cover shall be constructed prior to running heavy equipment over handed piles. The minimum covers are listed below:
   a) 3' for $R_0 \leq 18'$
   b) 3' for $18' < R_0 \leq 54'$
   c) 3' for $R_0 > 54'$

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.

3. Flexible or structure backfill shall be excavated by compacted earth backfill. The minimum excavation shall be 2'. If necessary, use 2:1 slope between the flexible or structure backfill and the excavation shall be stabilized to maintain the minimum 2' excavation.

LEGEND:

H = Overall diameter of pipe (Typ.)
B = Overall diameter of pipe
A = 3' min. for fill height less than 1'
    = 12' min. for fill height of 1' or more
T = Trench cover depth over pipe
W = 0.5 B, or 3', whichever is greater
E = Embankment
L = Backfill length measured from toe to toe of the 2:1 slope.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 1
NEW ROADWAY, TRENCH
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-01

/\ Richard L. Vandenklei 09/03/08
DESIGN STANDARD ENGINEER

/\ Mark A. Miller 09/04/08
HIGHWAY ENGINEER
INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 1
NEW ROADWAY, EMBANKMENT
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-02

1. Protective cover shall be constructed prior to running heavy equipment over backfilled pipes. The minimum covers are listed below:
   a1) 1'-0" for $B_e < 10'$
   a2) 3'-0" for 10' ≤ $B_e < 50'$
   a3) 6'-0" for $B_e ≥ 50'$

2. For backfill purposes, paved shoulders, curbs, and sidewalk 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 encased by compacted earth backfill. The minimum encasement shall be 2'-0". If necessary, the 2'-0" slope between the flowable or structure backfill and the encasement shall be stabilized to maintain the minimum 2'-0" encasement.
Existing Asphalt pavement to remain in place (typ.)

Saw Cut (typ.)

Geotextile if required

Replacement HMA Pavement

Profile Grade

ASPHALT REPLACEMENT PAVEMENT

NOTES:

1. Existing subgrade over this distance shall remain in place.
2. The minimum pavement sections shall be as follows:
   HMA: 165 #/yd 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 perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.

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

\[ B_c = \text{Overall diameter or span (in.)} \]

\[ H_c = \text{Overall diameter or rise (in.)} \]

\[ d = \text{Vertical distance from flowline to profile grade (ft)} \]

NOTES:
1. Existing utilities over this longitudinal distance shall remain in place.
2. The thickness of the replacement PCOP shall match that of the existing concrete pavement.
4. If underground are present, they shall be protected in accordance with the details shown on Standard Drawing E 718-UN06-01.
6. No new subbase type shall match the existing subbase type and thickness.

PCOP REPLACEMENT PAVEMENT

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

Bc = Overall diameter or span (in.)

Hc = Overall diameter or rise (in.)

d = Vertical distance from flowline to profile grade (ft)

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH
SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-04

Richard L. VanCleave 09/03/08
Design Standards Engineer

Mark R. Miller 09/04/08
Deputy Highway Engineer

NOTES:

1. Existing subgrade or fill shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. The minimum pavement thickness shall be as follows:
   - HMA: 1.65 @ 50°F HMA Surfacing, Type A, B, C or D on
     - Variables HMA Intermediates, Type A, B, C or D
5. If underdrains are present, they shall be performed in accordance with the details shown on Standard Drawing E 715-UNDR-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 placement (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 (in.)
\( H_c \) = 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 1/2' for $R_e \leq 15'$
   b. 2' for $15' < R_e \leq 54'$
   c. 3' for $R_e > 54'$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-18 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flexible or structure backfill shall be allowed by compacted earth backfill. The minimum embankment shall be 2' (if necessary the 2:1 slope between the flexible or structure backfill and the embankment shall be modified to maintain the minimum 2:1 embankment.)

LEGEND:
- $R_e$ = Overall diameter or rise (typ.)
- $B_e$ = Overall diameter or span
- $A$ = 8'' min. for fill height less than 16''
- $S_e$ = min. for fill height of 16'' or more
- $T_e$ = Trench cover depth over pipe
- $W = 0.3 B_e$ or 9'', whichever is greater
- $E$ = Embankment
- $L_e$ = Backfill length measured from toe to toe of the 2:1 slopes.

INDIANA DEPARTMENT OF TRANSPORTATION
PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE
SEPTEMBER 2008
STANDARD DRAWING NO. E 715-BKFL-06
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 Rk ≤ 18'
   b) 2' for 18' < Rk ≤ 54'
   c) 3' for Rk > 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.

3. Flexible or structure backfill shall be assessed by compacted earth backfill. The minimum assessment shall be 2 ft. If necessary, the 2:1 slope between the flexible or structure backfill and the assessment shall be modified to maintain the minimum 2 ft assessment.

LEGEND:

Hc = Overall diameter or rise (typ.)
Rk = Overall diameter or span
A = 8" min. for fill height less than 18" = 12" min. for fill height of 18" or more
Vc = 12" for Rk ≤ 18"
18" for Rk > 18"
W = 0.5 Rk or 5', whichever is greater
E = Embankment
Ls = 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 installed pipes. The minimum covers are listed below:
   a. 15" for $B_e < 10$
   b. 3" for $10 \leq B_e \leq 50$
   c. 4" for $B_e > 50$

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.

**LEGEND**

- $H_e$ = Overall diameter of pipe
- $B_e$ = Overall diameter of span
- $A$ = 6" min. for fill height less than 15'
- $22"$ min. for fill height of 15' or more
- $a_e$ = 12" for $B_e < 10$
- 18" for $B_e > 18$
- $T_c$ = Trench cover depth over pipe
- $W$ = 0.3 $a_e$ or 9", whichever is greater
- $L_e$ = Backfill length measured from toe to toe of the 2:1 slope.

**ELEVATION THRU MEDIAN STRIP**

**INFORMATION**

- **Standard Drawing No.:** E 715-BKFL-08
- **Date:** SEPTEMBER 2008
- **Drawn By:** Richard L. VanClouse
- **Approval:** Mark A. Miller

**STATE OF INDIANA DEPARTMENT OF TRANSPORTATION**

**PIPE BACKFILL METHOD 3**

**MEDIAN INSTALLATION, TRENCH**
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_w \leq 18' 
   b) 3' for \( 18' < B_w \leq 54' 
   c) 6' for \( B_w > 54' 

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

**LEGEND**
- \( B_w \): Overall diameter or rise (top)
- \( B_k \): Overall diameter or span
- \( A \): 48" min. for fill height less than 18'
- \( W \): 12" for \( B_k < 18' \)
- \( 18' \) for \( B_k > 18' \)
- \( W \): 0.3 \( B_k \) or 5", whichever is greater
- \( L_b \): Backfill length measured from toe to toe of the 2:1 slopes.

**SECTION F-F**
- Embankment to be constructed to this elevation prior to placing pipe
- 1:12 slope
- Ground line

**SECTION F-F**
- Embankment material
- Structure or flowable backfill as required
- 1:12 slope
- Original ground line and rock line

**ROCK FOUNDATION**

**INDIANA DEPARTMENT OF TRANSPORTATION**
**PIPE BACKFILL METHOD 1**
**MEDIAN INSTALLATION, EMBANKMENT**
**SEPTEMBER 2008**
**STANDARD DRAWING NO. E 715-BKFL-09**

**RICHARD L. VAN CHAMP**

**MARK M. MILLER**

**DESIGN ENGINEER**

**PROFESSIONAL ENGINEER**

**DESIGN STANDARDS ENGINEER**

**STATE OF**

**IN**

**DEPARTMENT OF TRANSPORTATION**

**INDEX PAGE**

**ELEVATION THRU MEDIAN STRIP**