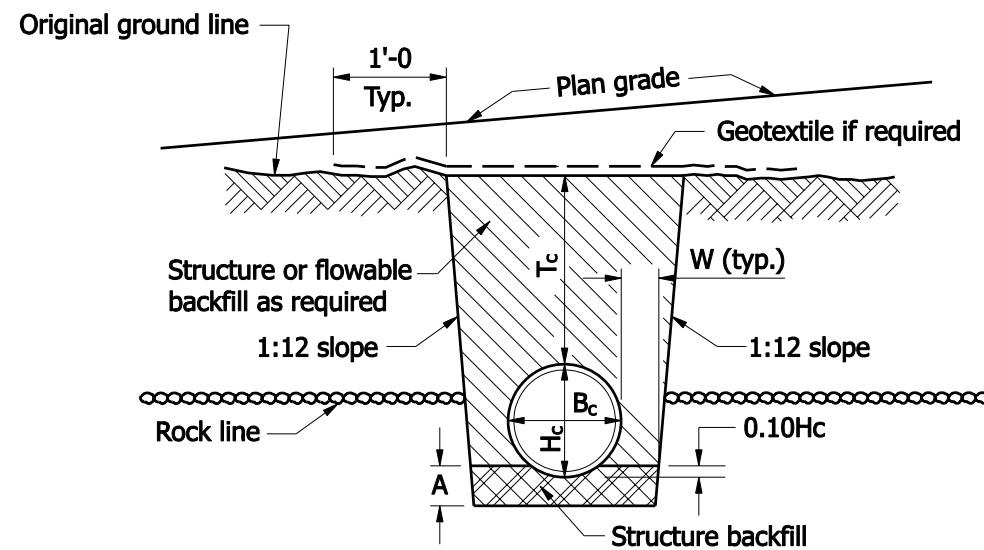


SECTION A-A



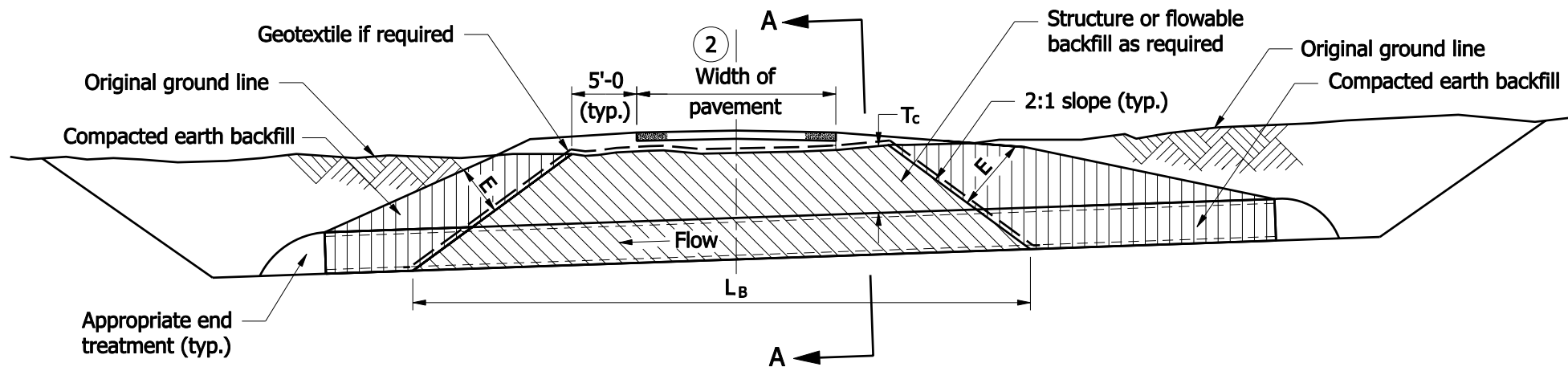
SECTION A-A
ROCK FOUNDATION

LEGEND

- H_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- T_c = Trench cover depth over pipe
- W = $0.3 B_c$ or 9", whichever is greater
- E = Encasement
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.

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 $B_c \leq 18"$
 - b.) 3' for $18" < B_c \leq 54"$
 - c.) 4' for $B_c > 54"$
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. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.



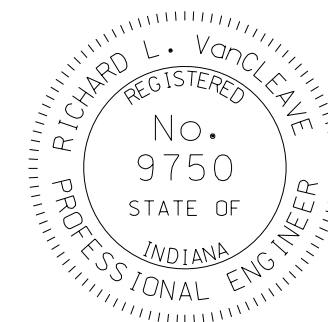
ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
NEW ROADWAY, TRENCH

SEPTEMBER 2008

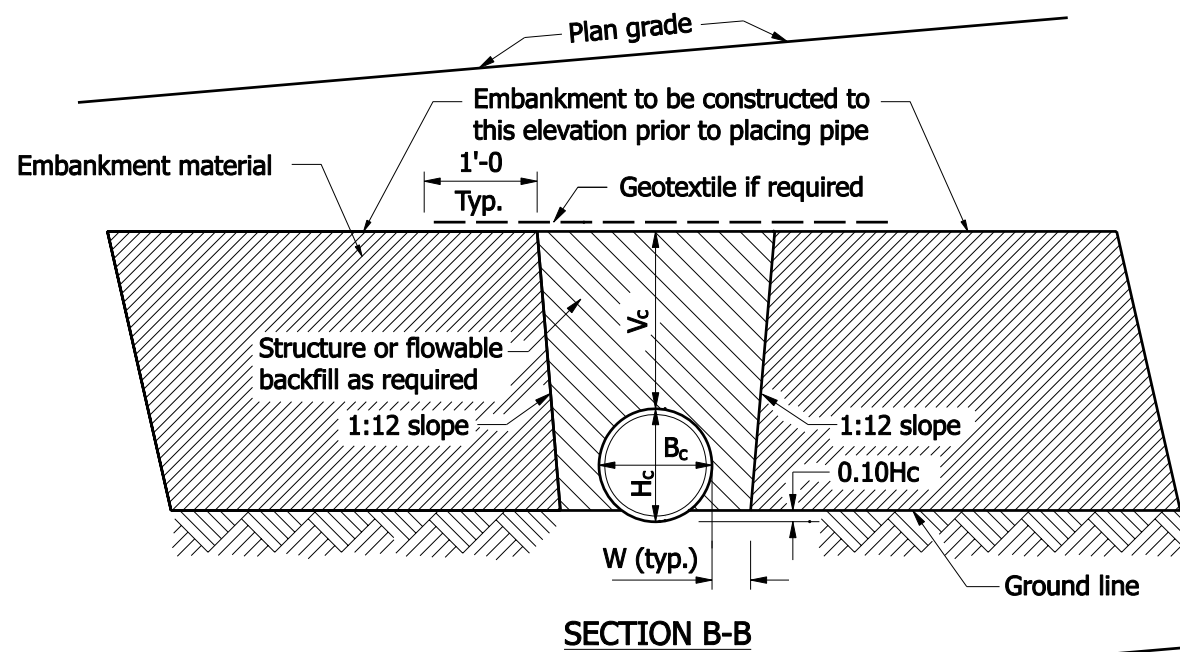
STANDARD DRAWING NO. E 715-BKFL-01



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

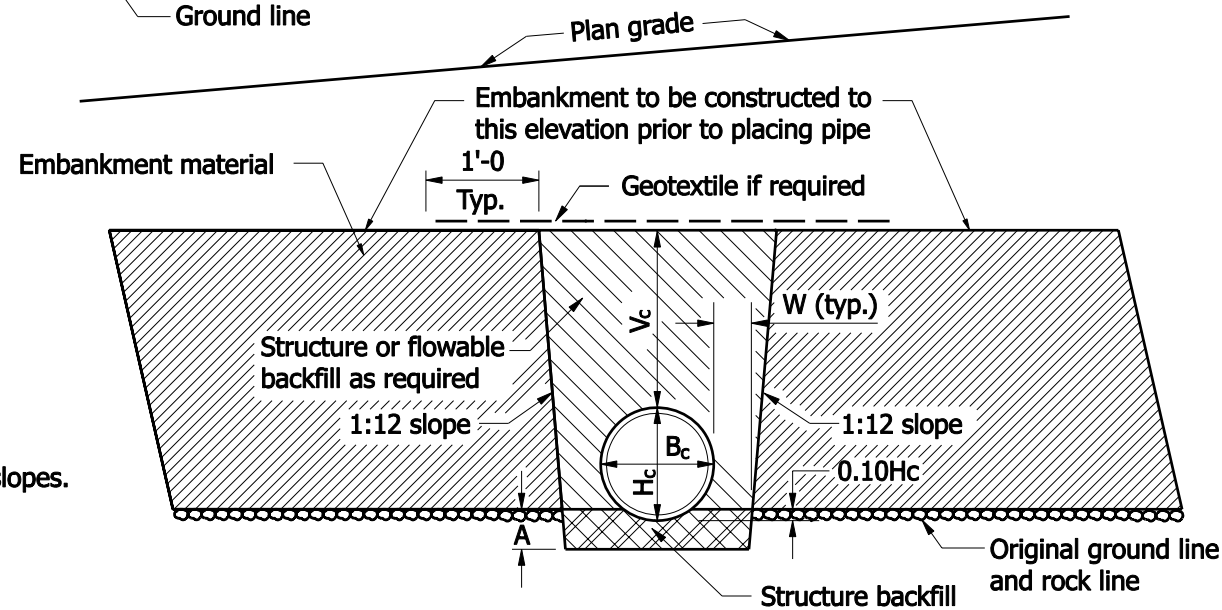
/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



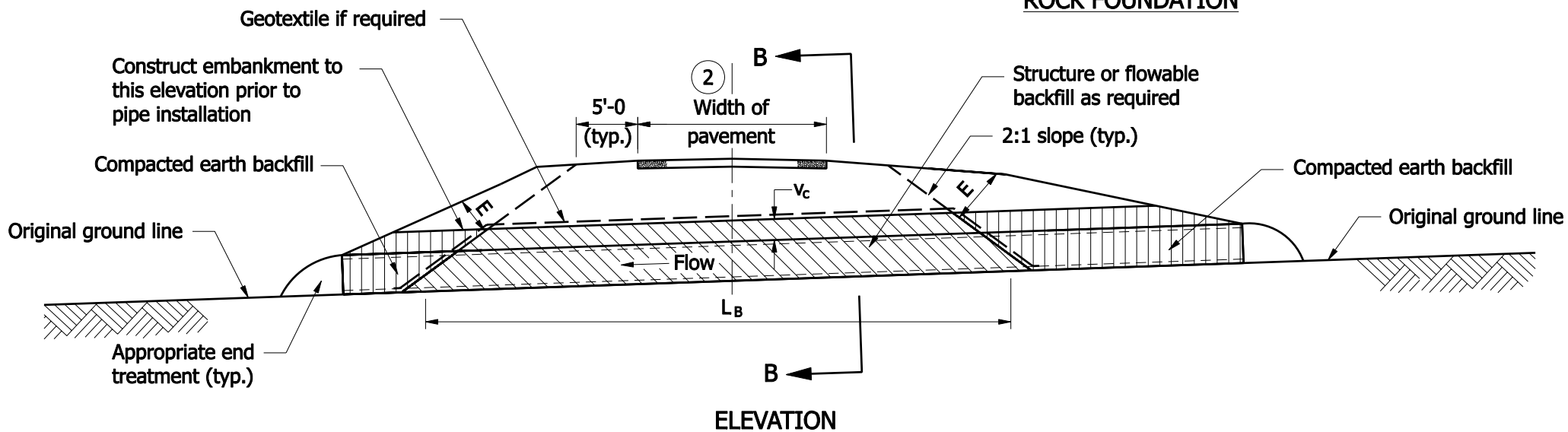
SECTION B-B

LEGEND

- H_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- V_c = 12" for $B_c \leq 18"$
18" for $B_c > 18"$
- W = $0.3 B_c$ or 9", whichever is greater
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.



SECTION B-B
ROCK FOUNDATION



ELEVATION

NOTES :

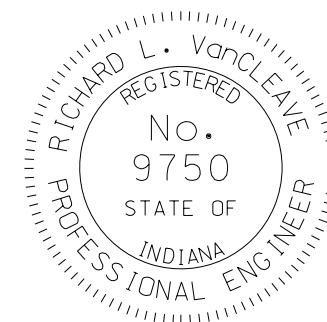
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
 - a.) 1.5' for $B_c \leq 18"$
 - b.) 3' for $18" < B_c \leq 54"$
 - c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
NEW ROADWAY, EMBANKMENT

SEPTEMBER 2008

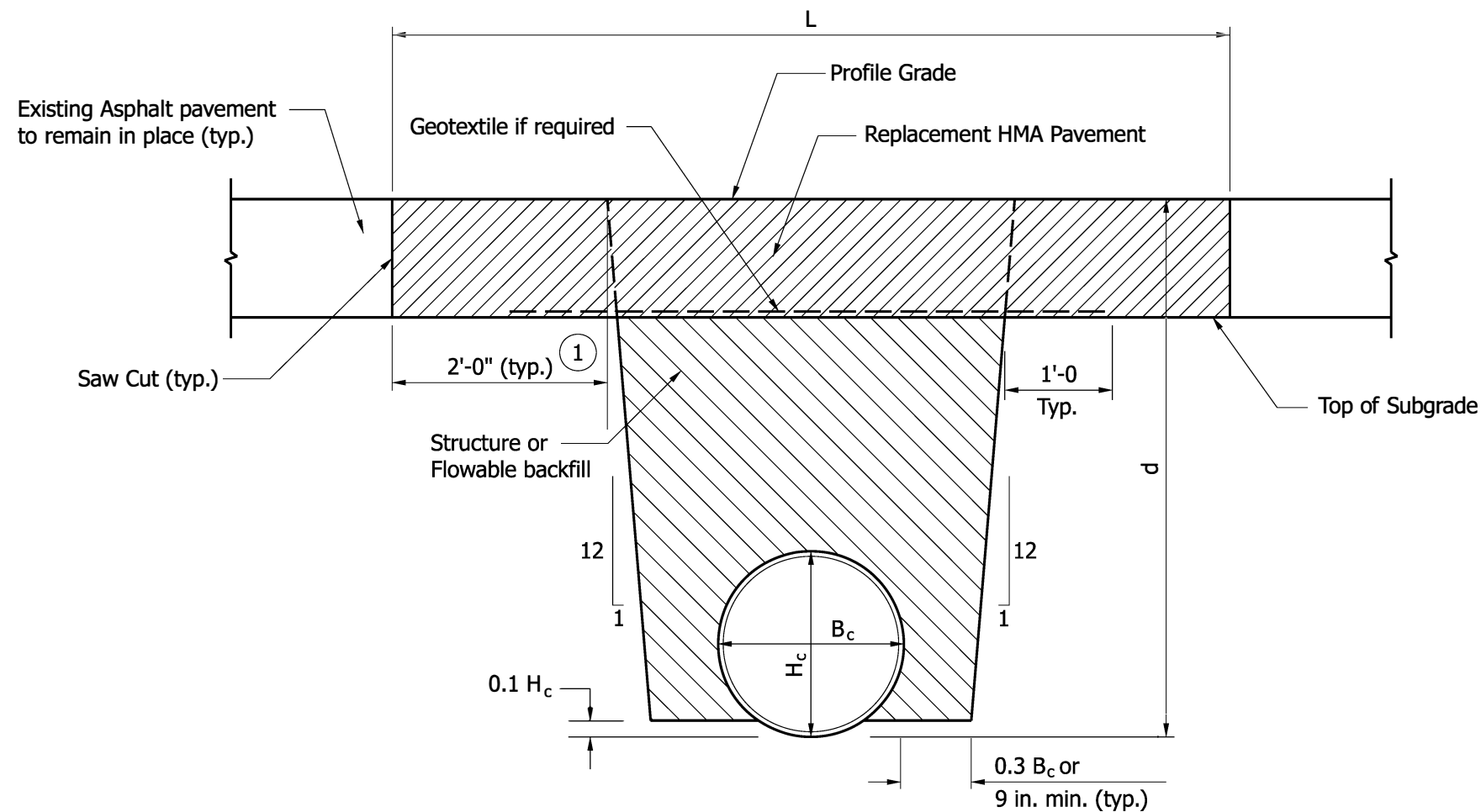
STANDARD DRAWING NO. E 715-BKFL-02



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



- 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 (in.)
- H_c = Overall diameter or rise (in.)
- d = Vertical distance from flowline to profile grade (ft)

ASPHALT REPLACEMENT PAVEMENT

NOTES :

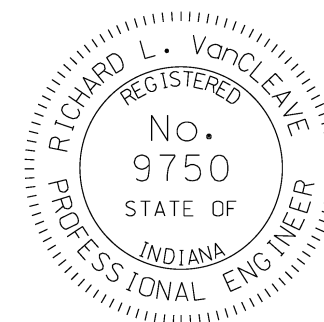
- ① Existing subgrade over this distance shall remain in place.
2. The minimum pavement sections shall be as follows:
HMA: 165 #/syd HMA Surface, Type A,B,C or D on variable HMA Intermediate, Type A, B, C or D
3. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.
4. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

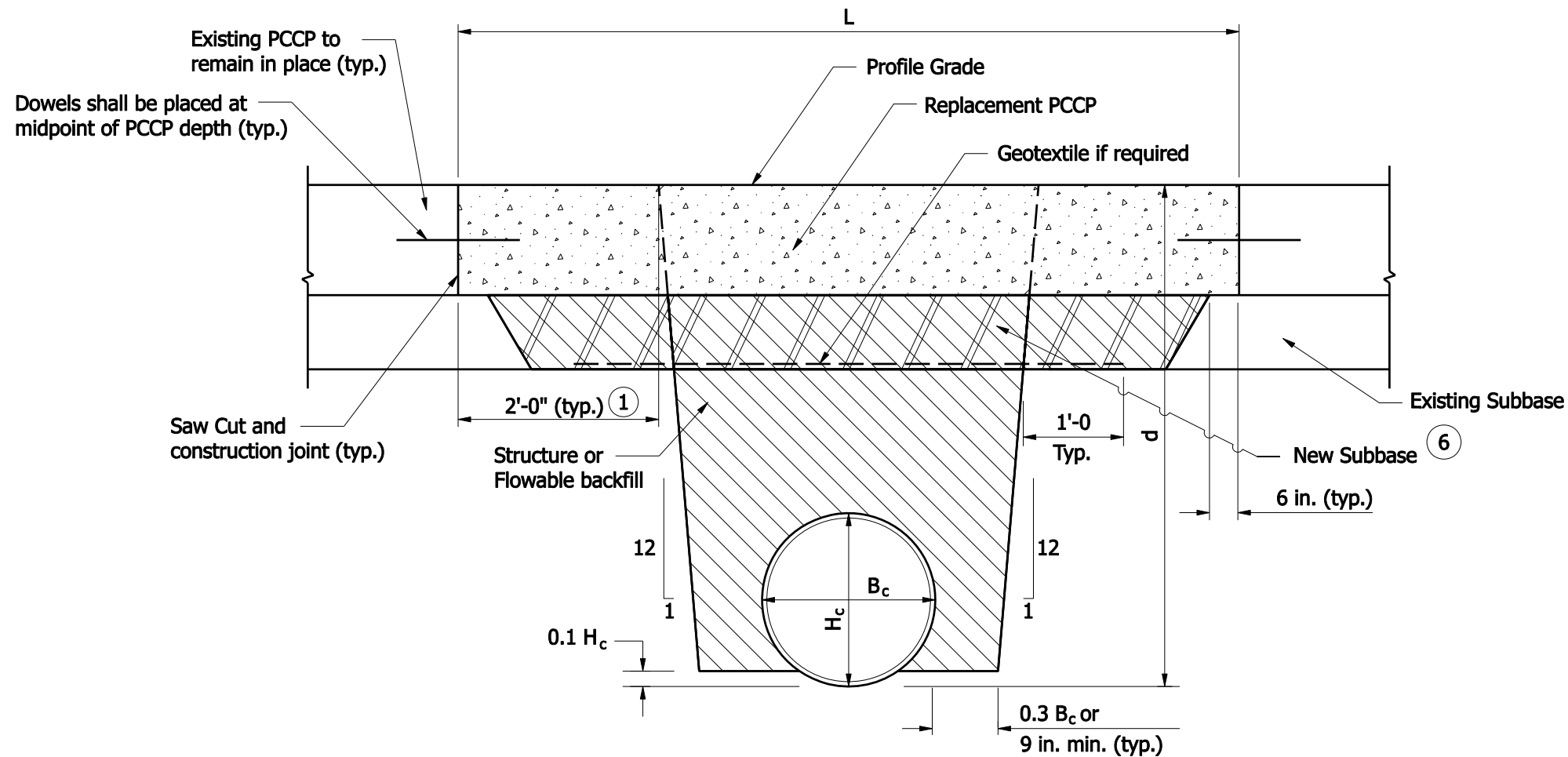
STANDARD DRAWING NO. E 715-BKFL-03



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



- 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 (in.)
- H_c = Overall diameter or rise (in.)
- d = Vertical distance from flowline to profile grade (ft)

PCCP REPLACEMENT PAVEMENT

NOTES :

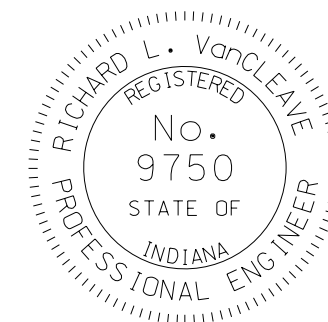
- ① Existing subgrade over this longitudinal distance shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. See Standard Drawing series 506-CCPP for concrete patching details.
4. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.
5. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.
- ⑥ New subbase type shall match the existing subbase type and thickness.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

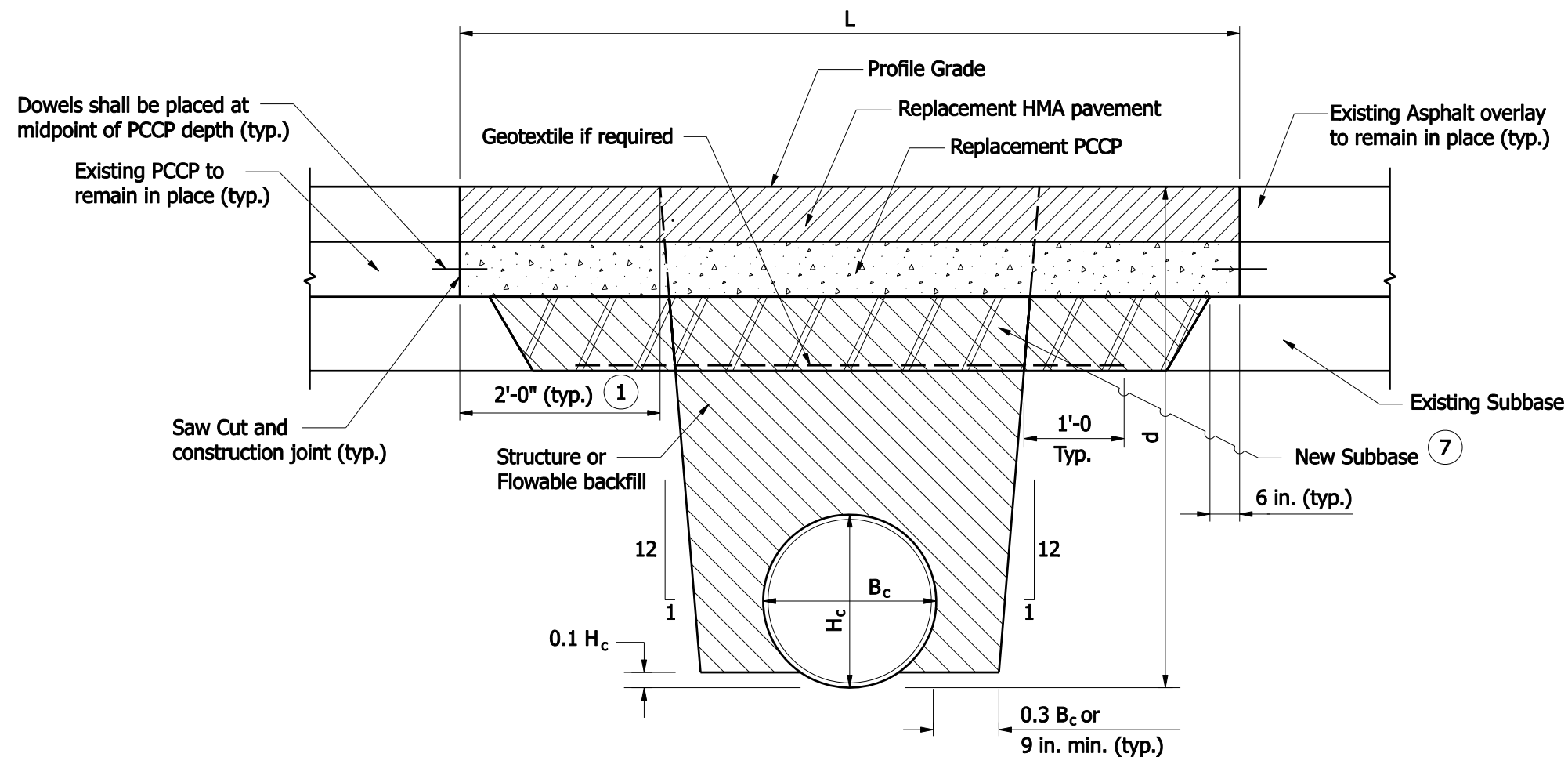
STANDARD DRAWING NO. E 715-BKFL-04



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



- 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 (in.)
- H_c = Overall diameter or rise (in.)
- d = Vertical distance from flowline to profile grade (ft)

COMPOSITE REPLACEMENT PAVEMENT

NOTES :

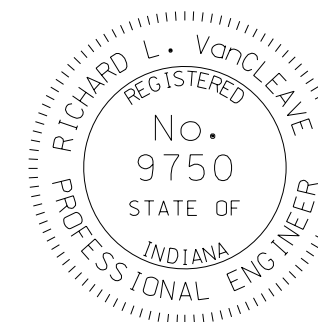
- 1 Existing subgrade over this distance shall remain in place.
2. The thickness of the replacement PCCP shall match that of the existing concrete pavement.
3. The minimum pavement sections shall be as follows:
HMA: 165 #/syd HMA Surface, Type A,B,C or D on variable HMA Intermediate, Type A, B, C or D
4. See Standard Drawing series 506-CCPP for concrete patching details.
5. If underdrains are present, they shall be perpetuated in accordance with the details shown on Standard Drawing E 718-UNDR-01.
6. See Standard Drawing E 715-BKFL-01 for pipe backfill trench elevation view.
- 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

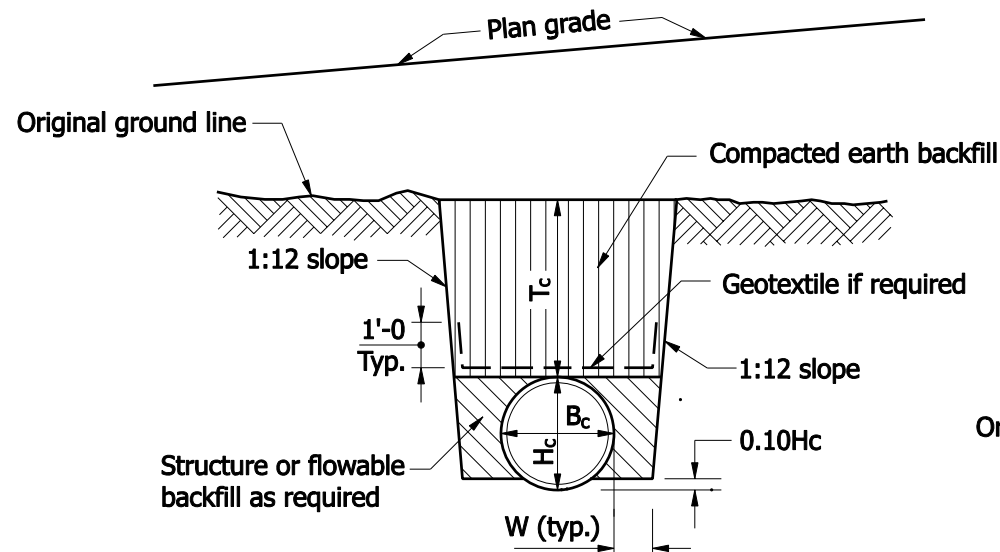
STANDARD DRAWING NO. E 715-BKFL-05



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

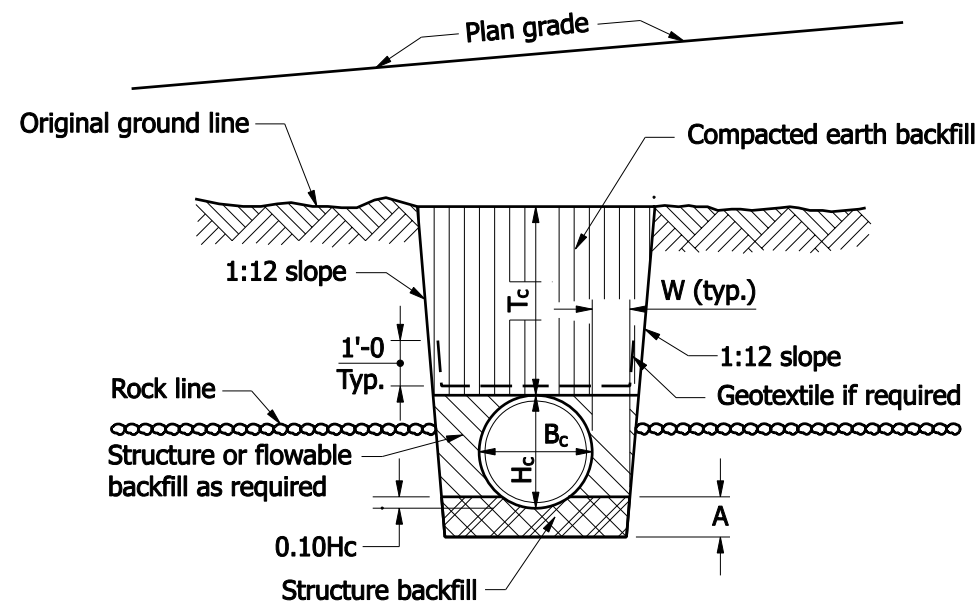
/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



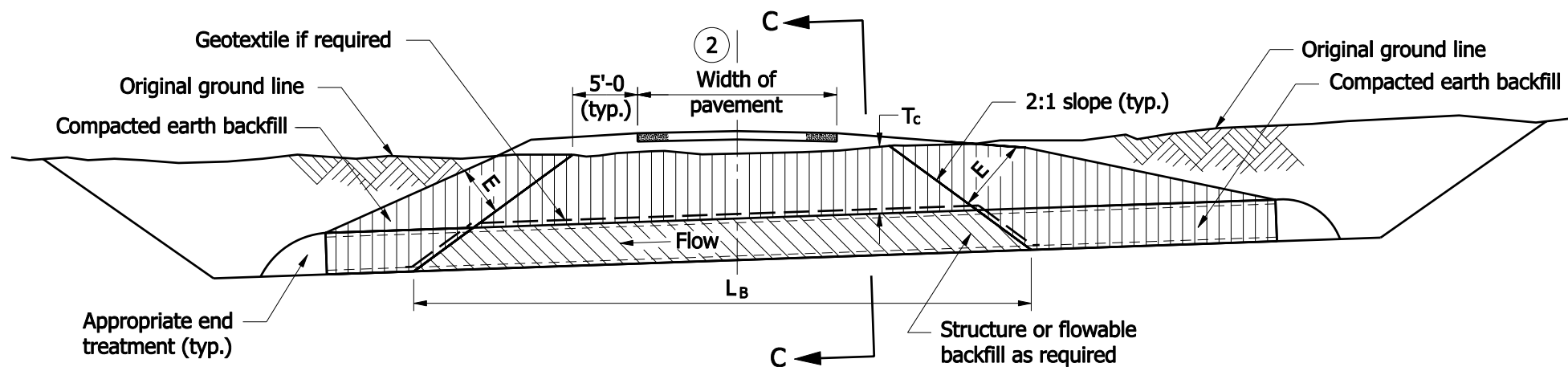
SECTION C-C

LEGEND

- H_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- T_c = Trench cover depth over pipe
- W = $0.3 B_c$ or 9", whichever is greater
- E = Encasement
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.



SECTION C-C
ROCK FOUNDATION



ELEVATION

NOTES :

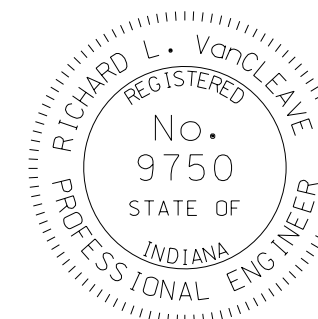
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
 - a.) 1.5' for $B_c \leq 18"$
 - b.) 3' for $18" < B_c \leq 54"$
 - c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Flowable or structure backfill shall be encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE

SEPTEMBER 2008

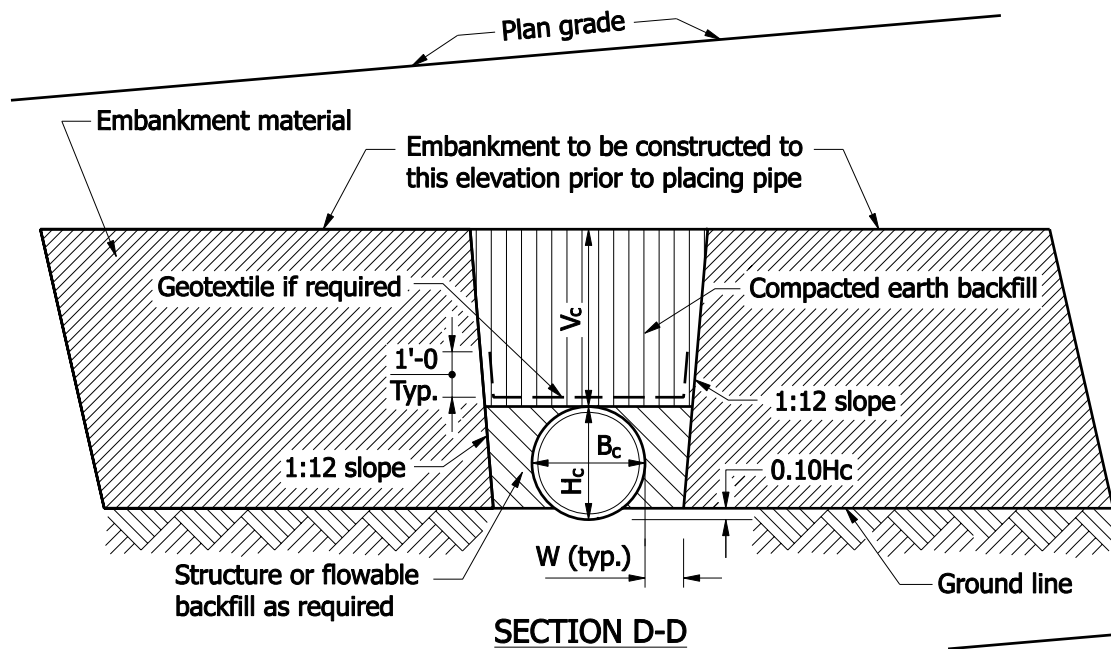
STANDARD DRAWING NO. E 715-BKFL-06



DESIGN STANDARDS ENGINEER

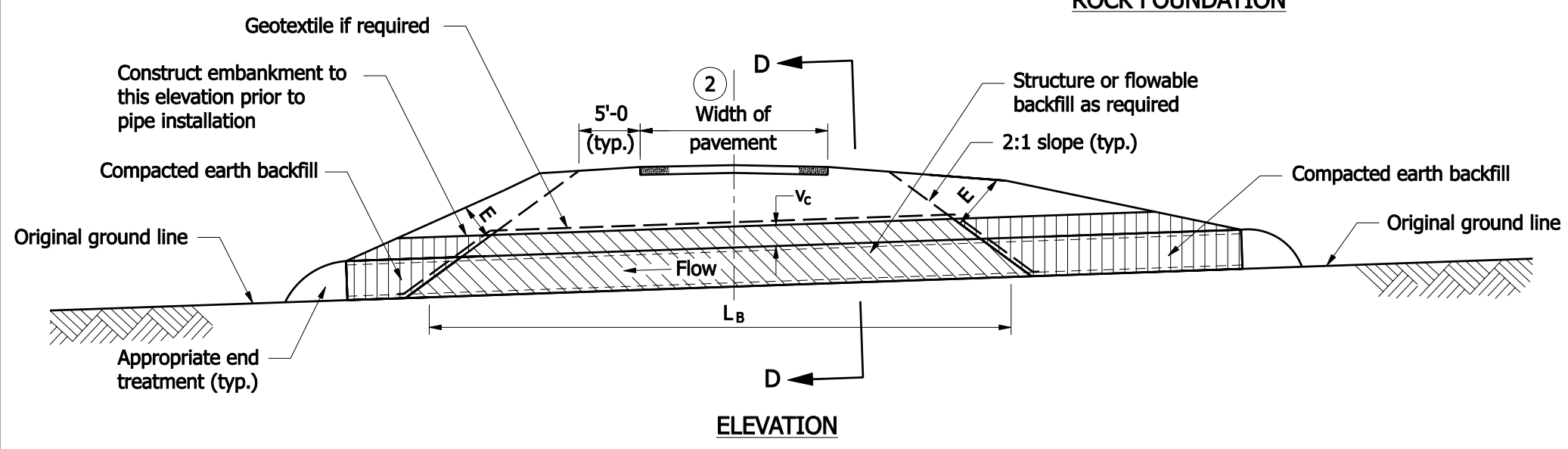
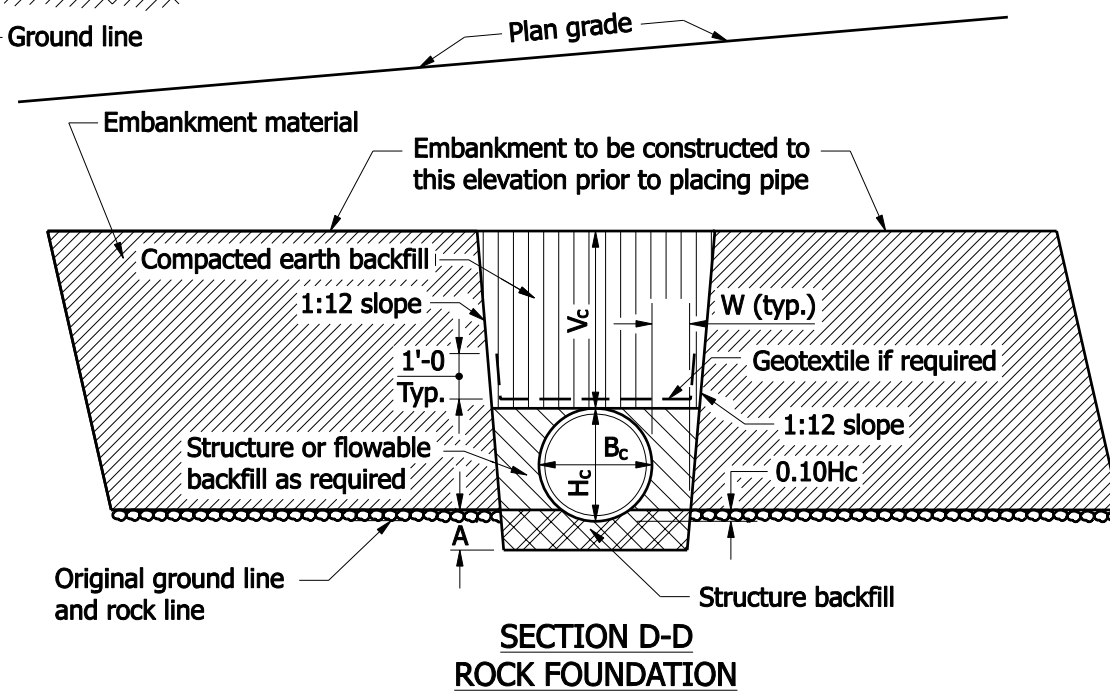
/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/08
CHIEF HIGHWAY ENGINEER DATE



LEGEND

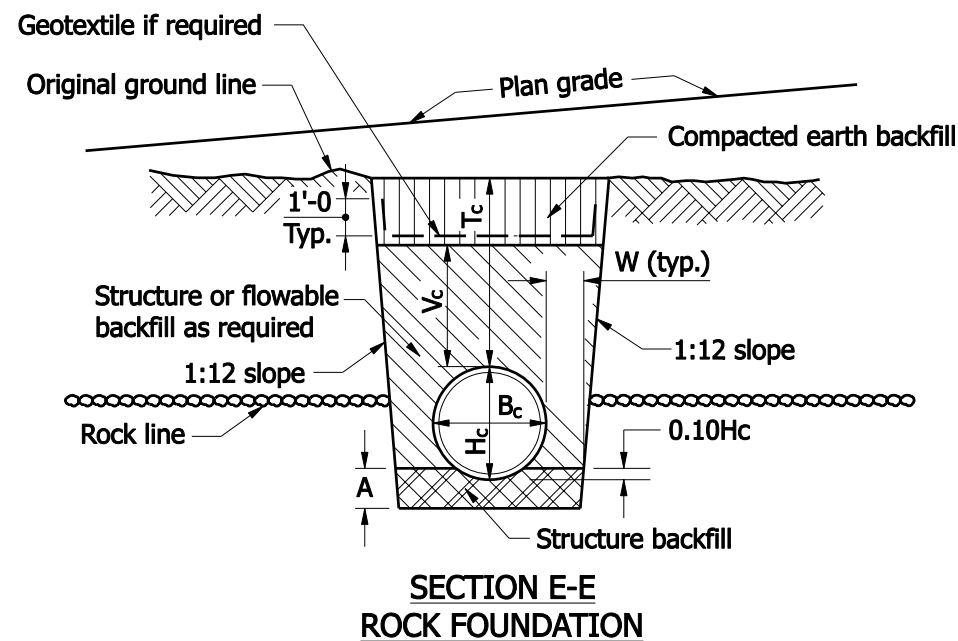
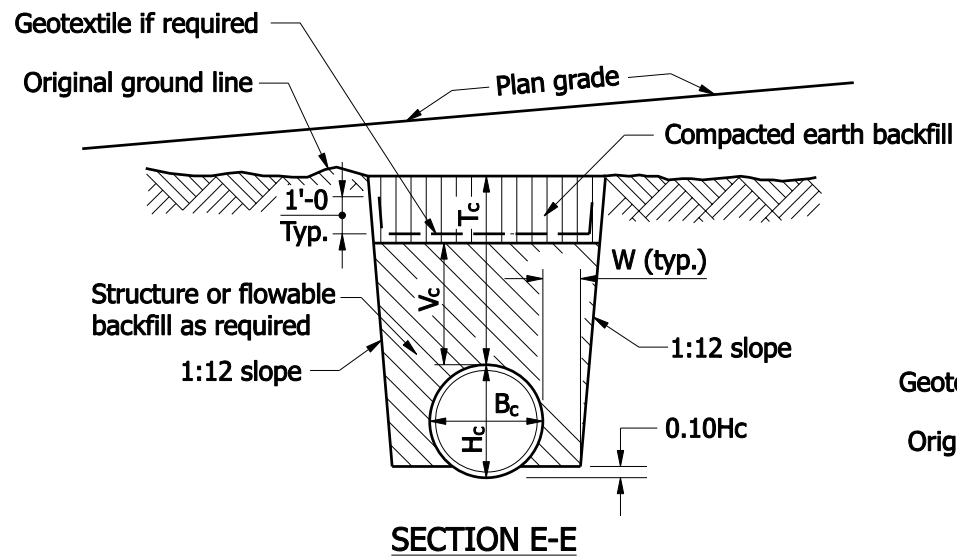
- H_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- V_c = 12" for $B_c \leq 18"$
18" for $B_c > 18"$
- W = $0.3 B_c$ or 9", whichever is greater
- E = Encasement
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.



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 $B_c \leq 18"$
 - b.) 3' for $18" < B_c \leq 54"$
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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 encased by compacted earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slope between the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.

INDIANA DEPARTMENT OF TRANSPORTATION											
PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE											
SEPTEMBER 2008											
STANDARD DRAWING NO. E 715-BKFL-07											
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;"><i>/s/ Richard L. VanCleave</i></td> <td style="width: 20%; text-align: right;">09/02/08</td> </tr> <tr> <td>DESIGN STANDARDS ENGINEER</td> <td style="text-align: right;">DATE</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td><i>/s/ Mark A. Miller</i></td> <td style="text-align: right;">09/02/08</td> </tr> <tr> <td>CHIEF HIGHWAY ENGINEER</td> <td style="text-align: right;">DATE</td> </tr> </table>	<i>/s/ Richard L. VanCleave</i>	09/02/08	DESIGN STANDARDS ENGINEER	DATE			<i>/s/ Mark A. Miller</i>	09/02/08	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. VanCleave</i>	09/02/08										
DESIGN STANDARDS ENGINEER	DATE										
<i>/s/ Mark A. Miller</i>	09/02/08										
CHIEF HIGHWAY ENGINEER	DATE										
DESIGN STANDARDS ENGINEER											

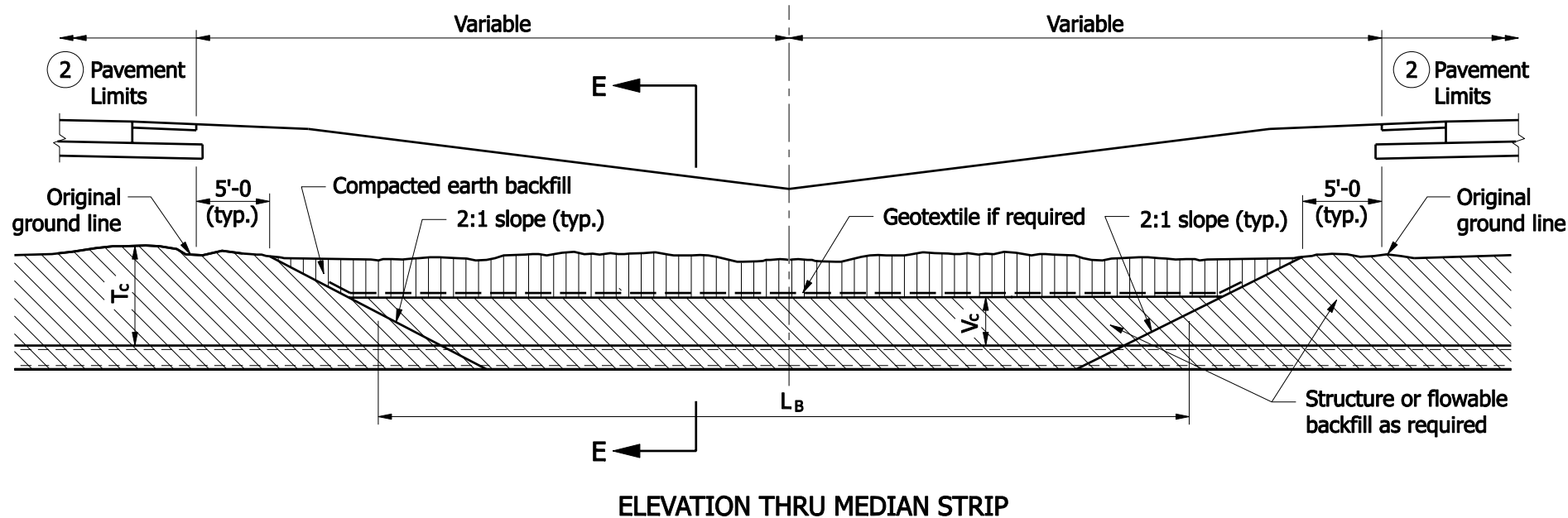


LEGEND

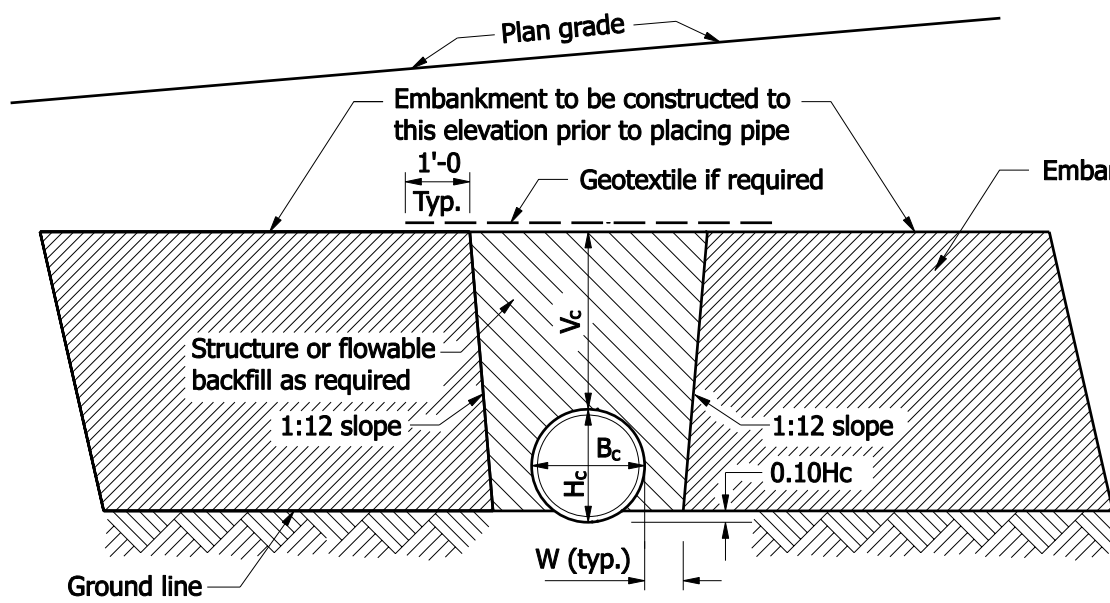
- H_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- V_c = 12" for $B_c \leq 18"$
18" for $B_c > 18"$
- T_c = Trench cover depth over pipe
- W = 0.3 B_c or 9", whichever is greater
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.

NOTES :

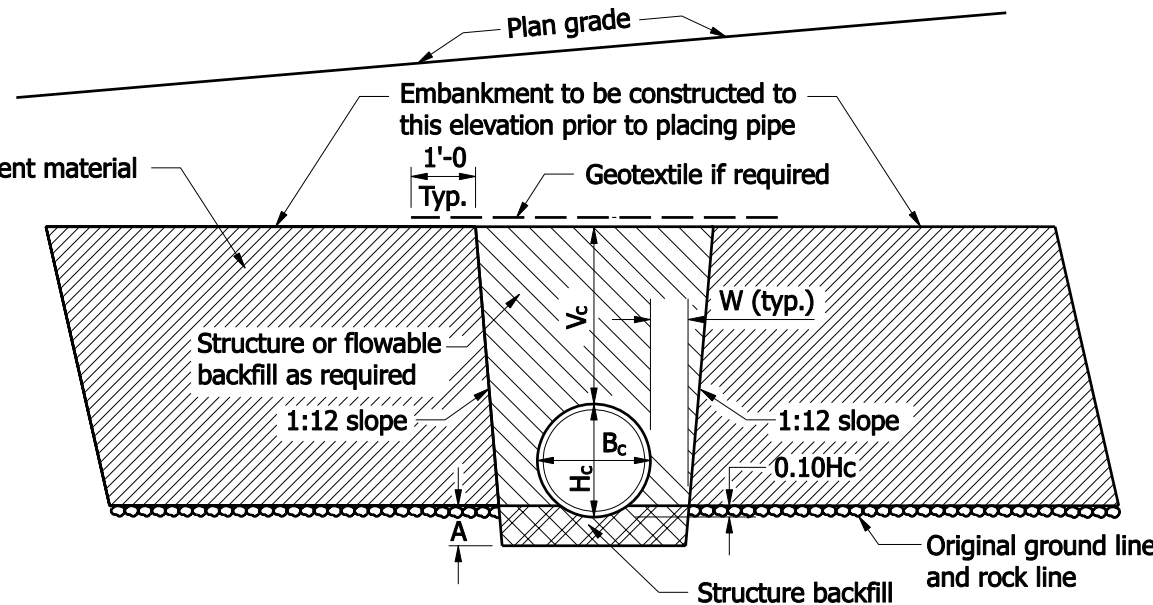
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
 - a.) 1.5' for $B_c \leq 18"$
 - b.) 3' for $18" < B_c \leq 54"$
 - c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.



INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL METHOD 3 MEDIAN INSTALLATION, TRENCH	
SEPTEMBER 2008	
STANDARD DRAWING NO. E 715-BKFL-08	
	<p><i>/s/ Richard L. VanCleave</i> 09/02/08 DESIGN STANDARDS ENGINEER DATE</p> <p><i>/s/ Mark A. Miller</i> 09/02/08 CHIEF HIGHWAY ENGINEER DATE</p>
DESIGN STANDARDS ENGINEER	



SECTION F-F

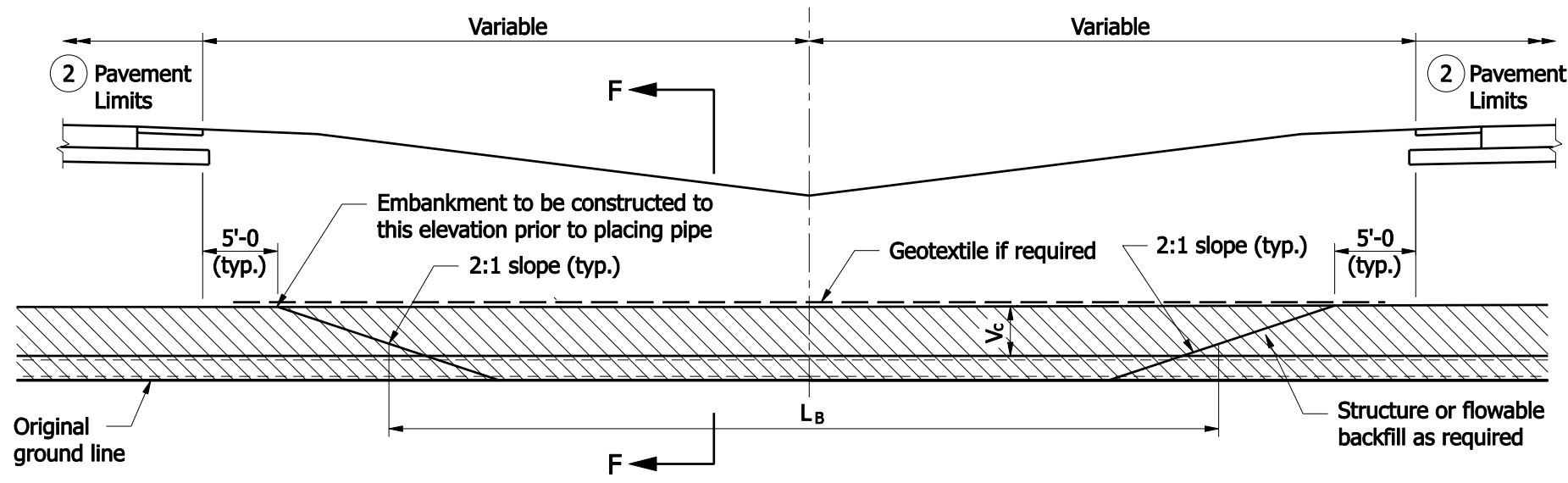


SECTION F-F
ROCK FOUNDATION


- NOTES :**
- Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
 - 1.5' for $B_c \leq 18"$
 - 3' for $18" < B_c \leq 54"$
 - 4' for $B_c > 54"$
 - 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_c = Overall diameter or rise (typ.)
- B_c = Overall diameter or span
- A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
- V_c = 12" for $B_c \leq 18"$
= 18" for $B_c > 18"$
- W = $0.3 B_c$ or 9", whichever is greater
- L_B = Backfill length measured from toe to toe of the 2:1 slopes.



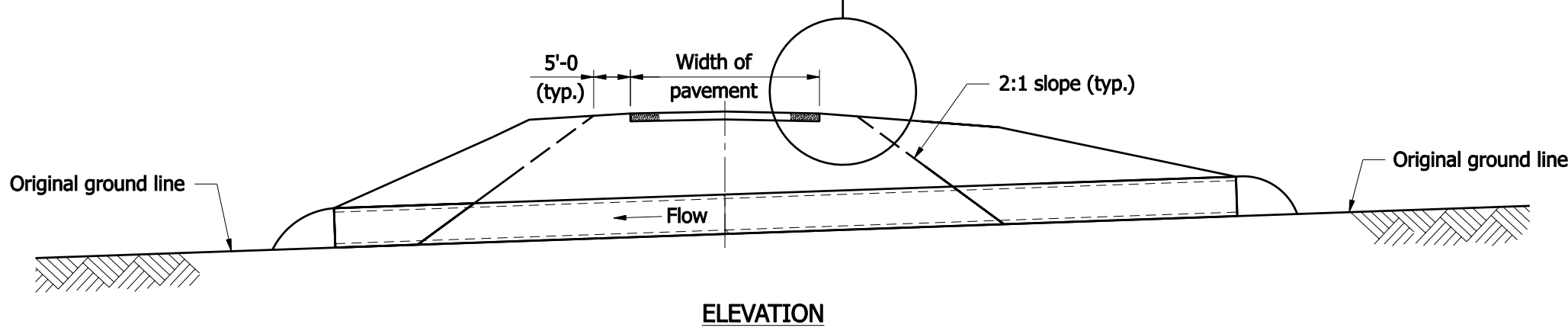
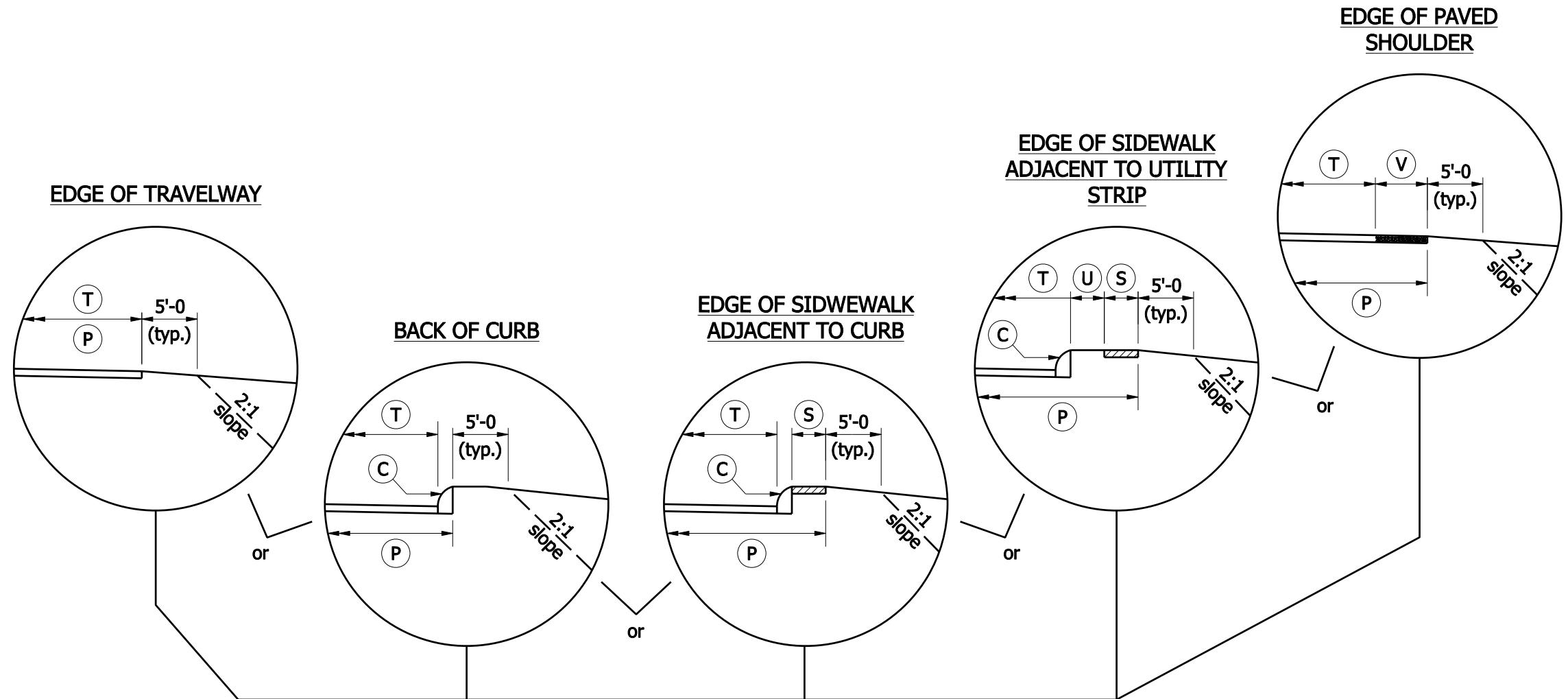
ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION									
PIPE BACKFILL METHOD 1 MEDIAN INSTALLATION, EMBANKMENT									
SEPTEMBER 2008									
STANDARD DRAWING NO. E 715-BKFL-09									
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; width: 80%;"><i>/s/ Richard L. Van Cleave</i></td> <td style="border-bottom: 1px solid black; width: 20%; text-align: right;"><i>09/02/08</i></td> </tr> <tr> <td style="font-size: small;">DESIGN STANDARDS ENGINEER</td> <td style="font-size: small; text-align: right;">DATE</td> </tr> <tr> <td style="border-bottom: 1px solid black;"><i>/s/ Mark A. Miller</i></td> <td style="border-bottom: 1px solid black; text-align: right;"><i>09/02/08</i></td> </tr> <tr> <td style="font-size: small;">CHIEF HIGHWAY ENGINEER</td> <td style="font-size: small; text-align: right;">DATE</td> </tr> </table>	<i>/s/ Richard L. Van Cleave</i>	<i>09/02/08</i>	DESIGN STANDARDS ENGINEER	DATE	<i>/s/ Mark A. Miller</i>	<i>09/02/08</i>	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. Van Cleave</i>	<i>09/02/08</i>								
DESIGN STANDARDS ENGINEER	DATE								
<i>/s/ Mark A. Miller</i>	<i>09/02/08</i>								
CHIEF HIGHWAY ENGINEER	DATE								
DESIGN STANDARDS ENGINEER									

LEGEND

- (C) Curb
- (P) Pavement Limits *
- (S) Sidewalk
- (T) Travel Lane
- (U) Utility Strip
- (V) Paved Shoulder

* For backfill placement and computation



INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL LIMIT DETERMINATION	
SEPTEMBER 2007	
STANDARD DRAWING NO. E 715-BKFL-10	
	<p><i>/s/ Richard L. VanCleave</i> 09/04/07 DESIGN STANDARDS ENGINEER DATE</p> <p><i>/s/ Mark A. Miller</i> 09/04/07 CHIEF HIGHWAY ENGINEER DATE</p>
DESIGN STANDARDS ENGINEER	