INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N758 CM
Indianapolis, Indiana 46204

PHONE: (317) 232-5502
www.in.gov/indot

Eric Holcomb, Governor
Mike Smith, Commissioner

APPROVED MINUTES

February 17, 2022 Standards Committee Meeting

March 31, 2022

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes from the February 17, 2022 Standards Committee Meeting

The Standards Committee meeting was called to order by Mr. Pankow, Chair, at 09:03 a.m. on February 17, 2022, and was held virtually via *Teams* (Microsoft application). The meeting was adjourned at 9:35 a.m.

The following committee members were in attendance:

Gregory Pankow, Chairman, Director, Construction Management
John Wooden, Contract Administration Division (item 3)
Dave Boruff, Traffic Engineering
Peter White, Bridge Engineering
Joseph Novak, Construction Management
Kumar Dave, Pavement Engineering
Matt Beeson*, Materials and Tests Division
Michael Koch, District Construction, Fort Wayne District
Mark Orton, Highway Engineering
Kurt Pelz, Construction Technical Support
Anne Rearick, Engineering and Asset Management

**Proxy* for Jim Reilman

Also, presence of the following throughout the meeting was captured by the *Microsoft Teams*:

Bazlamit, Subhi, INDOT
Blanchard, Jacob, INDOT
Fisher, Steve, INDOT
Harris, Tom, INDOT
McNutt, Donald, guest
Mouser, Elizabeth, INDOT
Nelson, Mike, INDOT
Osborn, Dan, ICI

Awwad, Nathan, INDOT	Patterson, Patrick, INDOT
Rearick, Anne, INDOT	Susong, John, guest
Duncan, Thomas, FHWA	Hauser, Derrick, INDOT
Ritter, John, INDOT	Podorvanova, Lana, INDOT
Fegan, Roland, INDOT	Jacobs, David, INDOT
Smart, Steve, guest	Trammell, Scott, INDOT
Camarata, Rebecca, INDOT	Bowen, Alisa, INDOT

The following items were discussed:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

1. *Approval of the Minutes from the January 20, 2022 meeting*

Mr. Pankow requested a motion to approve the Minutes from the January 20, 2022 meeting.

Motion: Mr. Novak
Second: Mr. Koch
Ayes: 9
Nays: 0

ACTION: PASSED AS SUBMITTED

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

Mr. Beeson addressed the proposed editorial revisions to the Recuring Special Provision (RSP) 703-R-724, which were explained by Mr. Nelson. The committee members concurred with those editorial revisions as shown:

"The upper layer *and lower layer* of reinforcing bars in *RCBAs and* bridge floors shall be tied or fastened at ~~such intervals as necessary~~*a minimum of every other intersection of the longitudinal and transverse bars* ~~*and the lower layer of reinforcing bars in RCBAs and bridge floors shall be tied or fastened at a minimum of every other intersection of the longitudinal and transverse bars*~~ to prevent an upward or a lateral movement of a bar from the planned position."

NEW BUSINESS

(No items were listed)

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS PROPOSED ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

Item No. 1 (2022 SS) Mr. Reilman pg 5

2022 Standard Specifications:

714.11	Method of Measurement
714.12	Basis of Payment

Recurring Special Provision:

715-R-732	PIPE CULVERTS, AND STORM AND SANITARY SEWERS
918-M-060	GEOSYNTHETIC MATERIALS

Standard Drawings:

E 715-BKFL-01	PIPE BACKFILL METHOD 1 NEW ROADWAY, TRENCH
E 715-BKFL-02	PIPE BACKFILL METHOD 1 NEW ROADWAY, EMBANKMENT
E 715-BKFL-03	PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH
E 715-BKFL-04	PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH
E 715-BKFL-05	PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH
E 715-BKFL-06	PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE
E 715-BKFL-07	PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE
E 715-BKFL-08	PIPE BACKFILL METHOD 3 MEDIAN INSTALLATION, TRENCH
E 715-BKFL-09	PIPE BACKFILL METHOD 1 MEDIAN INSTALLATION, EMBANKMENT
E 715-BKFL-10	PIPE BACKFILL LIMIT DETERMINATION

ACTION: WITHDRAWN

Item No. 2 (2022 SS) Mr. White pg 36

Standard Drawings:

E 707-BPBF-01	FABRICATION TOLERANCES PRESTRESSED BOX BEAM
E 707-BPBF-02	FABRICATION TOLERANCES PRESTRESSED I BEAM
E 707-BPBF-03	FABRICATION TOLERANCES PRESTRESSED BULB-TEE BEAM
E 707-BPBF-04	FABRICATION TOLERANCES GENERAL NOTES

ACTION: PASSED AS SUBMITTED

Item No. 3 (2022 SS) Mr. White pg 47

Standard Specifications:

707.02	Materials
707.03	General Requirements
707.08	Handling and Shipping
707.09	Placing Structural Members
707.12	Basis of Payment

ACTION: PASSED AS REVISED

cc: Committee Members
FHWA
ICI

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Currently the Standard Drawing Series 715-BKFL only shows the geotextile capping structure backfill of pipes to prevent infiltration.

PROPOSED SOLUTION: Infiltration can occur anywhere around the structure backfill, therefore for, in most locations, structure backfill should be lined and capped. Have all type 1, 2, 3, and 4 structure backfill for pipes lined and capped with geotextile. Where flowable fill is used in lieu of structure backfill geotextile will not be required. In addition, all the geotextile material to be used to line and cap a pipe will be paid for as Geotextile for Pipes.

APPLICABLE STANDARD SPECIFICATIONS: 714.11, 714.12, 715, Table 918.02(b)

APPLICABLE STANDARD DRAWINGS: 715-BKFL series

APPLICABLE DESIGN MANUAL SECTION: 17-3.0

APPLICABLE SECTION OF GIFE: Section 4

APPLICABLE RECURRING SPECIAL PROVISIONS: 715-R-732

PAY ITEMS AFFECTED: adding a pay item, Geotextile for Pipes

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad hoc with Materials and Test (Jim Reilman), Engineering (Nayyar Siddiki), Construction (Tyler Kovacs)

IF APPROVED AS RECURRING SPECIAL PROVISION OR PLAN DETAILS, PROPOSED BASIS FOR USE:

IMPACT ANALYSIS (attach report):

Submitted By: Jim Reilman for Katherine Smutzer

Title: State Materials Engineer

Organization: INDOT, Division of Materials & Tests

Phone Number: 317-522-9692

Date:

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections?
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

- Construction costs? Yes
- Construction time? No
- Customer satisfaction? Yes
- Congestion/travel time? No
- Ride quality? Yes

Will this proposal reduce operational costs or maintenance effort? Yes

Will this item improve safety:

- For motorists? Yes
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? Yes
- Design process? No

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? Yes

Is this proposal needed for compliance with:

- Federal or State regulations? No
- AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda:

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

SECTION 714 - REINFORCED CONCRETE BOX STRUCTURES
714.11 Method of Measurement
714.12 Basis of Payment
715-R-732 PIPE CULVERTS, AND STORM AND SANITARY SEWERS
918-M-060 GEOSYNTHETIC MATERIALS

714-X-xxx REINFORCED CONCRETE BOX STRUCTURES

(Adopted xx-xx-22)

The Standard Specifications are revised as follows:

SECTION 714, BEGIN LINE 359, INSERT AS FOLLOWS:

Riprap and ~~G~~*g*eotextile ~~and~~*for* riprap will be measured in accordance with 616.12. *Geotextile for pipe will be measured in accordance with 715.13.* Structure backfill will be measured in accordance with 211.09. Flowable backfill will be measured in accordance with 213.08. Field drilled holes will be measured in accordance with 702.27.

SECTION 714, BEGIN LINE 386, INSERT AS FOLLOWS:

Riprap and ~~G~~*g*eotextile *f*or riprap will be paid for in accordance with 616.13. *Geotextile for pipe will be paid for in accordance with 715.14.* Structure backfill will be paid for in accordance with 211.10. Flowable backfill will be paid for in accordance with 213.09. Field drilled holes will be paid for in accordance with 702.28.

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

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715-R-732 PIPE CULVERTS, AND STORM AND SANITARY SEWERS

(Revised 07-15-21)

The Standard Specifications are revised as follows:

SECTION 715, BEGIN LINE 24, DELETE AND INSERT AS FOLLOWS:

Materials shall be in accordance with the following:

B Borrow	~~211~~*904.06**
Concrete	702
Flowable Backfill	213
Geotextiles	918.02*(b)*
Pipe Joint Sealant	907.11
Reinforcing Bars	910.01
Rubber Type Gaskets	907.13
Straps, Hook Bolts, and Nuts	908.12
Structure Backfill	904

** B borrow consisting of ACBF or GBF shall not be used within 2 ft of the free water level.*

The maximum particle size of backfill material for corrugated pipe shall be less than 1/2 the corrugation depth.

SECTION 715, BEGIN LINE 334, DELETE AND INSERT AS FOLLOWS:

715.09 Backfilling

All pipe trenches shall be backfilled with structure backfill ~~or flowable backfill~~. Structure backfill shall be placed in accordance with 211. ~~Flowable backfill shall be placed in accordance with 213.07 as shown on the plans or as directed~~*Structure backfill nominal sizes 2 in. and 1 1/2 in. shall not be used as pipe backfill on any pipe with exterior ribs, corrugations, or other profile.*

The backfill shall be wrapped with geotextile of the types specified as shown on the plans. Backfill shall be placed by spreading dumped material over previously placed material with light equipment in such a manner as to prevent damage to the geotextile. Overlaps shall be at least 3 ft wide.

A geotextile shall be placed between the top of the structure backfill and the bottom of the subgrade treatment when the backfill material and the subgrade treatment material is different.

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

SECTION 714 - REINFORCED CONCRETE BOX STRUCTURES
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Damaged geotextile shall be repaired or replaced as directed. Damaged geotextile may be patched by placing a piece of the same geotextile over the damaged area. Overlaps shall be at least 3 ft wide.

If a pipe is to be backfilled using one of the flowable backfill options, design calculations shall be submitted in accordance with 105.02, either proving the pipe will not float or detailing the methods to be taken to prevent the pipe from floating during installation of the flowable backfill. Prior to placing *one of the* flowable backfill *options for structure backfill*, all standing water shall be removed from the trench. If ~~the~~ water cannot be removed from the trench, *one of the non-flowable* structure backfill *options* shall be used ~~in lieu of flowable~~*to* backfill to an elevation 2 ft above the ~~ground~~water. The remainder of the trench shall be backfilled as shown on the plans.

Where material other than structure backfill is allowed and used for backfilling, it shall be of such nature that compacts readily. The portion around and for 6 in. above the top of the pipe shall be free from large stones. The material shall be placed in layers not exceeding 6 in. loose measurement, and each layer shall be compacted thoroughly by means of mechanical tamps.

Whenever a fine aggregate or dense graded backfill is placed on top of a coarse graded backfill, geotextile, in accordance with 918.02(a), Type 2A shall be used between the different backfill materials.

Backfill for slotted drain pipe and slotted vane drain pipe shall consist of class A concrete on both sides of the pipe. During the backfilling and paving operations, the slot shall be covered to prevent infiltration of material into the pipe.

All pipes, except underdrains, will be visually inspected for acceptance a minimum of 30 days after the completion of backfill operations. Pipes that cannot be visually inspected shall be video inspected for acceptance using equipment in accordance with 718.07. The Engineer will determine the sections of pipe to be video inspected.

For pipes that were video inspected, a copy of the video inspection shall be provided in a format acceptable to the Engineer. The video inspection shall be provided prior to performing the mandrel testing or if mandrel testing is not required, prior to acceptance of the pipe.

Type 3 pipes in accordance with 715.02(c) are excluded from the mandrel testing and video inspection requirements.

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

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For pipe not requiring mandrel testing that is determined to be unacceptable by the Engineer, the unacceptable pipe shall be replaced between the nearest pipe joints or to the nearest structure, or a remediation plan shall be prepared by a professional engineer and submitted to the Engineer for final determination.

After the visual or video inspection, the Contractor shall check pipe deflection by performing a mandrel test as directed on pipes manufactured from materials listed in the following table. The Engineer will determine the runs of pipe installations to be mandrel tested with a minimum of 10% of the total length of each material to be inspected.

Pipes Require~~d~~*ing* ~~to Be~~ Mandrel Teste~~d~~*ing*	
Pipe Material	Standard Specifications
Corrugated Polyethylene Pipe*	907.17(b)
Corrugated Polypropylene Pipe	907.19
Profile Wall Polyethylene Pipe	907.20
Smooth Wall Polyethylene Pipe	907.21
Profile Wall PVC Pipe*	907.22
Smooth Wall PVC Pipe	907.23
** When used as underdrain pipe, mandrel testing will not be required.*	

The mandrel shall have a minimum of nine arms or prongs and a diameter that is 95% of the nominal pipe diameter. The Contractor shall provide a proving ring that is 95% of the nominal pipe diameter for each mandrel.

The Contractor shall pull the mandrel through the pipe by hand. If the mandrel does not pass through the pipe, the Contractor shall measure and report the minimum diameter of the deficient pipe to the Engineer.

If the minimum diameter of the deficient pipe is between 92.5% and 95.0% of the nominal pipe diameter, the Contractor shall provide an evaluation of the deficient pipe prepared by a professional engineer. The evaluation shall consider the severity of the deflection and its effects on structural integrity, environmental conditions, and the design service life of the pipe. A report summarizing the evaluation and including the professional engineer's recommendation for acceptance, remediation, or replacement of the pipe shall be submitted to the Engineer for final determination.

If the minimum diameter of the deficient pipe is equal to or less than 92.5% of the nominal pipe diameter, the deficient pipe shall either be replaced or a remediation plan

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

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shall be prepared by a professional engineer and submitted to the Engineer for final determination.

The deficient pipe shall be replaced if the professional engineer's remediation plan recommends replacement of the pipe or if the pipe has been damaged.

Deficient pipe shall at a minimum be replaced between the nearest pipe joints or to the nearest structure. Replaced or remediated pipe sections shall be mandrel tested a minimum of 30 days after the completion of backfill operations.

~~Commercial and private drive pipes are excluded from the mandrel testing and video inspection requirements.~~

~~Where material other than structure backfill or flowable backfill is allowed and used for backfilling, it shall be of such nature that compacts readily. That portion around and for 6 in. above the top of the pipe shall be free from large stones. This material shall be placed in layers not to exceed 6 in., loose measurement, and each layer compacted thoroughly by means of mechanical tamps. Where coarse aggregate is used for structure backfill, geotextile shall be installed.~~

~~An adequate earth cover, as shown on the plans, shall be placed over the structure before heavy equipment is operated over it.~~

~~Backfill for slotted drain pipe and slotted vane drain pipe shall consist of class A concrete on both sides of the pipe. During the backfilling and paving operations, the slot shall be covered to prevent infiltration of material into the pipe.~~

SECTION 715, BEGIN LINE 529, DELETE AND INSERT AS FOLLOWS:

Video inspection for pipe will be measured by the linear foot as determined by the electronic equipment.

~~Geotextile used to wrap~~*for* backfill material will not be measured for payment. *Geotextiles, of the types specified on the plans, used to wrap structure backfill material and geotextile placed between the top of the structure backfill material and the bottom of the subgrade treatment will be measured by the square yard.*

SECTION 715, BEGIN LINE 569, DELETE AND INSERT AS FOLLOWS:

For structures for which the plans show pipes of differing sizes for smooth, semi-smooth or corrugated interiors, and either the semi-smooth or the corrugated interior alternate is installed, payment for pipe backfill will be made based on the neat line

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

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dimensions shown on the plans for the smooth interior alternate.

Geotextiles, of the types specified on the plans, used to wrap structure backfill material and geotextile placed between the top of the structure backfill material and the bottom of the subgrade treatment will all be paid for at the contract unit price per square yard, as Geotextile for Pipes.

Grated box end sections will be paid for at the contract unit price per each for the specified type, surface slope, and pipe size.

Video inspections for pipe will be paid for at the contract unit price per linear foot completed.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Concrete Anchor, _____ in. (diameter)	EACH
Concrete Anchor, Min. Area ____ sq ft	EACH
Geotextile for Pipes, ____ (type), _____ sq yd	*SYS*
Grated Box End Section, ____ (type), ____ (slope), _____ in. (diameter)	EACH
Grated Box End Section, ____ (type), ____ (slope), Min. Area ____ sq ft	EACH

SECTION 715, BEGIN LINE 667, DELETE AND INSERT AS FOLLOWS:

The cost of concrete, grating, pipe tubing, reinforcing bars, aggregate leveling bed, hardware cloth, and necessary incidentals, for construction of grated box end sections will be included in the cost of the grated box end section.

Geotextile required ~~for coarse aggregate~~*to be placed on top of the* structure backfill material*, if not shown on the plans or otherwise specified,* will not be paid for separately. The cost of the geotextile shall be included in the cost of the structure backfill.

The cost of providing video inspection equipment, technician, and a copy of the video inspection shall be included in the cost of video inspection for pipe.

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

SECTION 714 - REINFORCED CONCRETE BOX STRUCTURES
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(Note: Only affected section shown..
This RSP has Basis for Use: "Required for all contracts, **except** mowing, herbicide, sweeping, light bulb replacement or tree removal/trimming."
)

918-M-060 GEOSYNTHETIC MATERIALS

(Adopted 05-20-21)

The Standard Specifications are revised as follows:

SECTION 918, BEGIN LINE 35, DELETE AND INSERT AS FOLLOWS:

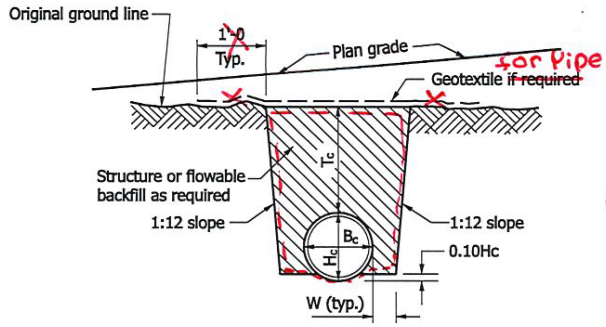
(b) Geotextile Properties for *Pipe,* Underdrains, *Subsurface Drains,* and ~~Drainage~~*Filtration* Applications

		Requirements[1] [2]				
Test	Method, ASTM	Type 1A	Type 1B	Type 2A	Type 2B	Type 3
Grab Tensile Strength, min.	D4632	80 lb	200 lb	160 lb	200 lb	200 lb
Grab Elongation	D4632	> 50%	< 50%	> 50%	< 50%	< 50%
CBR Puncture Strength, min.	D6241	175 lb	600 lb	410 lb	750 lb	1,100 lb
Deterioration in Tensile Strength due to UV Degradation 500 hrs, min.	D4355 D6637	70% strength retained	70% strength retained	70% strength retained	70% strength retained	90% strength retained
Apparent Opening Size, AOS	D4751	≤ No. 50 sieve, for soils ≥ 40% passing the No. 200 sieve	≤ No. 40 sieve, for soils < 40% passing the No. 200 sieve	≤ No. 70 sieve, for soils ≥ 40% passing the No. 200 sieve	≤ No. 30 sieve, for soils < 40% passing the No. 200 sieve	≤ No. 40 sieve
Permittivity	D4491	≥ 1.2 sec^{-1}	≥ 2.1 sec^{-1}	≥ 0.8 sec^{-1}	≥ 0.9 sec^{-1}	0.90 sec^{-1}

Notes:
(1) All values are minimum average roll values (MARV) as determined in accordance with ASTM D4354 in the weaker principal direction, except AOS size is based on maximum average roll value.
(2) Type 3 value is a maximum average roll value (Max ARV) as determined in accordance with ASTM D4354.

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

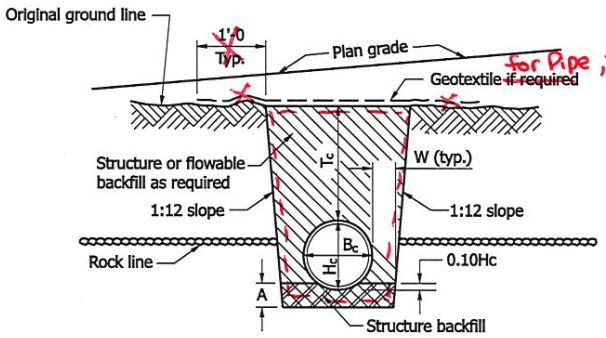
E 715-BKFL-01 PIPE BACKFILL METHOD 1 NEW ROADWAY, TRENCH (shown markups)



SECTION A-A

LEGEND

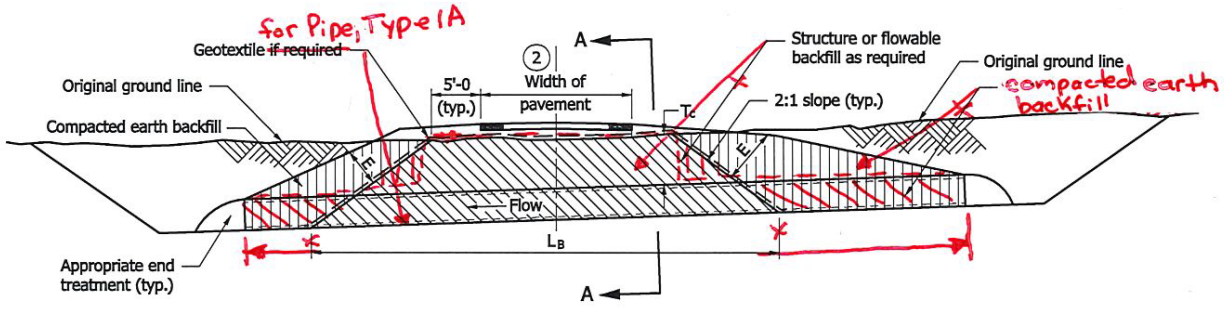
H_c = Overall diameter or rise (typ.)
B_c = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
T_c = Trench cover depth over pipe
W = 0.3 B_c or 9", whichever is greater
E = Encasement
L_B = Backfill length measured from toe to toe of the 2:1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



SECTION A-A
ROCK FOUNDATION

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.
4. Where flowable fill is used in lieu of Structure backfill geotextile is not required.



ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
NEW ROADWAY, TRENCH

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

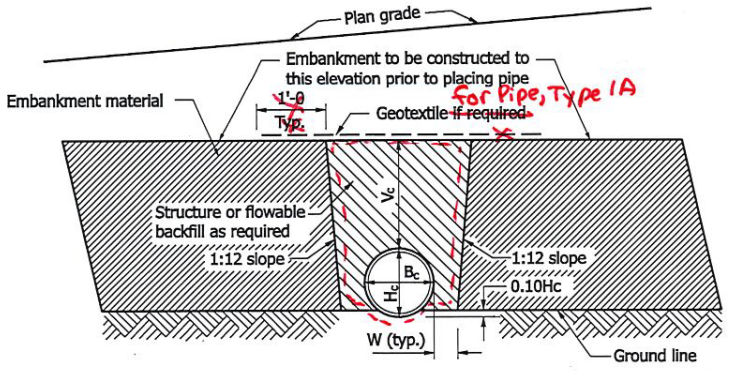
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

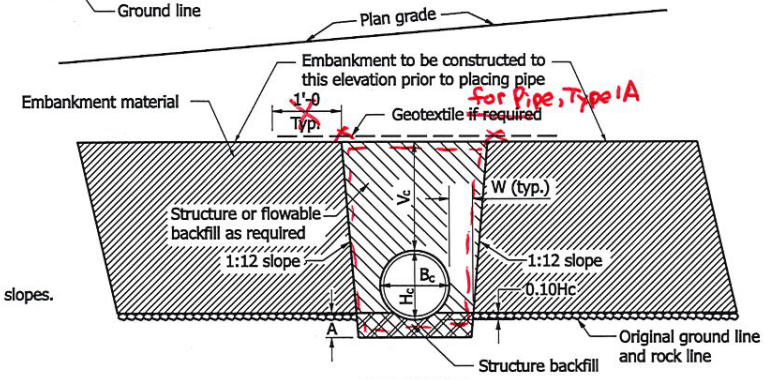
E 715-BKFL-02 PIPE BACKFILL METHOD 1 NEW ROADWAY, EMBANKMENT (shown markups)



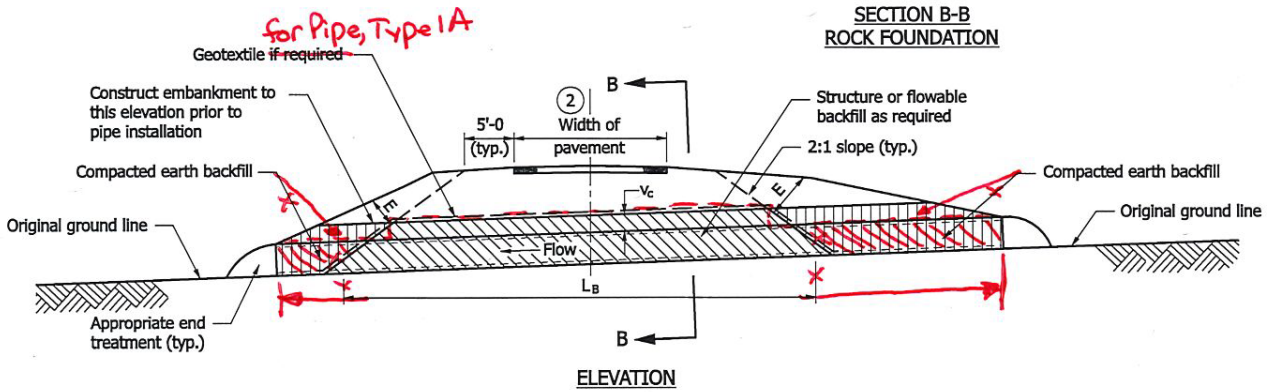
SECTION B-B

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.

4. Where flowable fill is used in lieu of Structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
NEW ROADWAY, EMBANKMENT

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

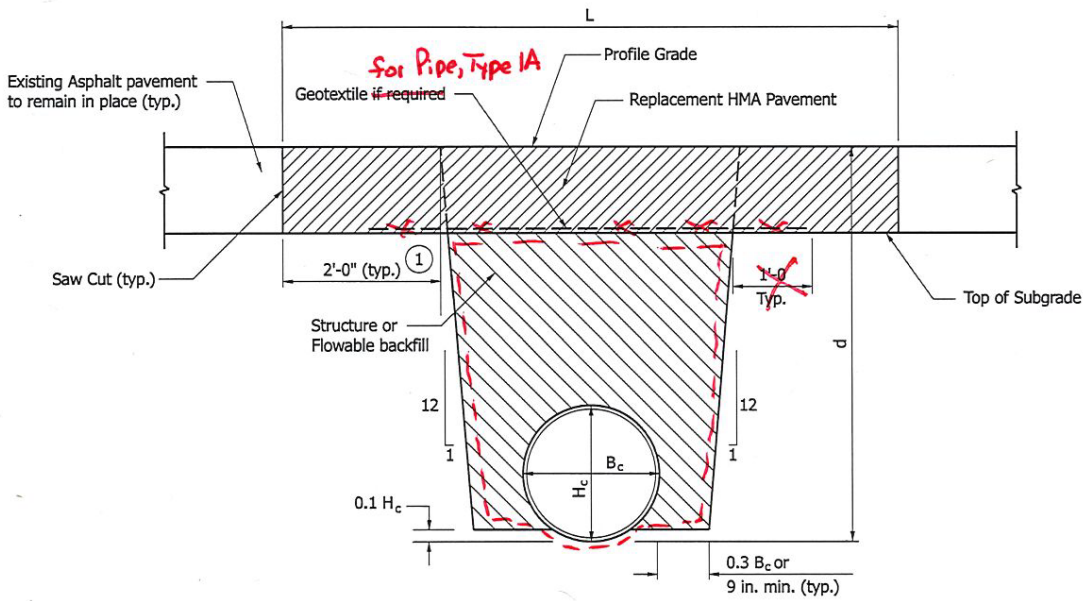
/s/ Richard L. VanCleave 09/02/08
DESIGN STANDARDS ENGINEER DATE

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

Item No. 1 (2022 SS) (contd.)
Mr. Reilman
Date: 2/17/22

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-03 PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH (shown markups)



L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular 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.
5. where flowable fill is used in lieu of structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-03

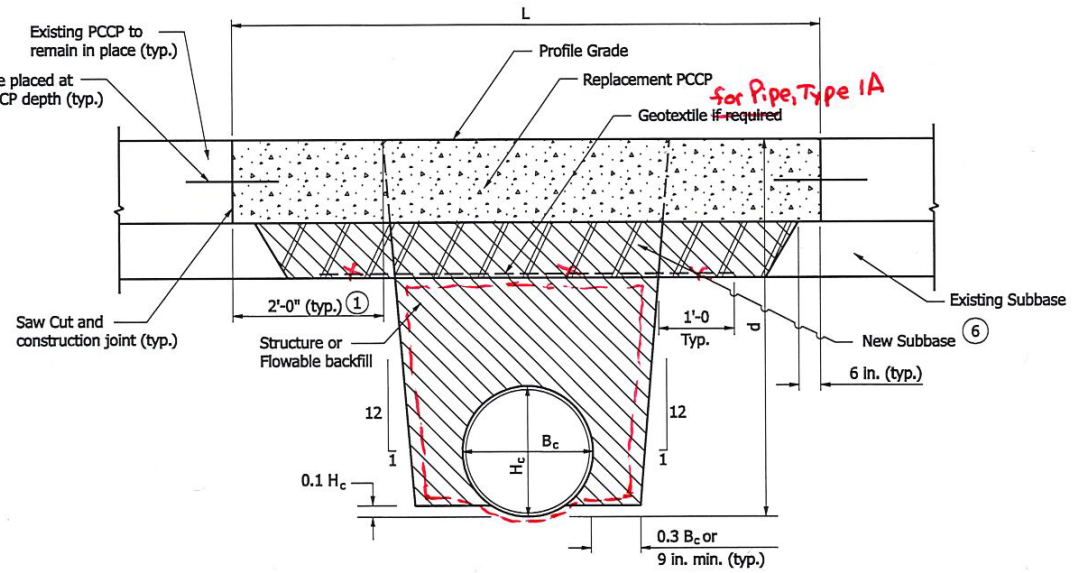
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-04 PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH (shown markups)



L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular 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.
7. Where flowable fill is used in lieu of structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

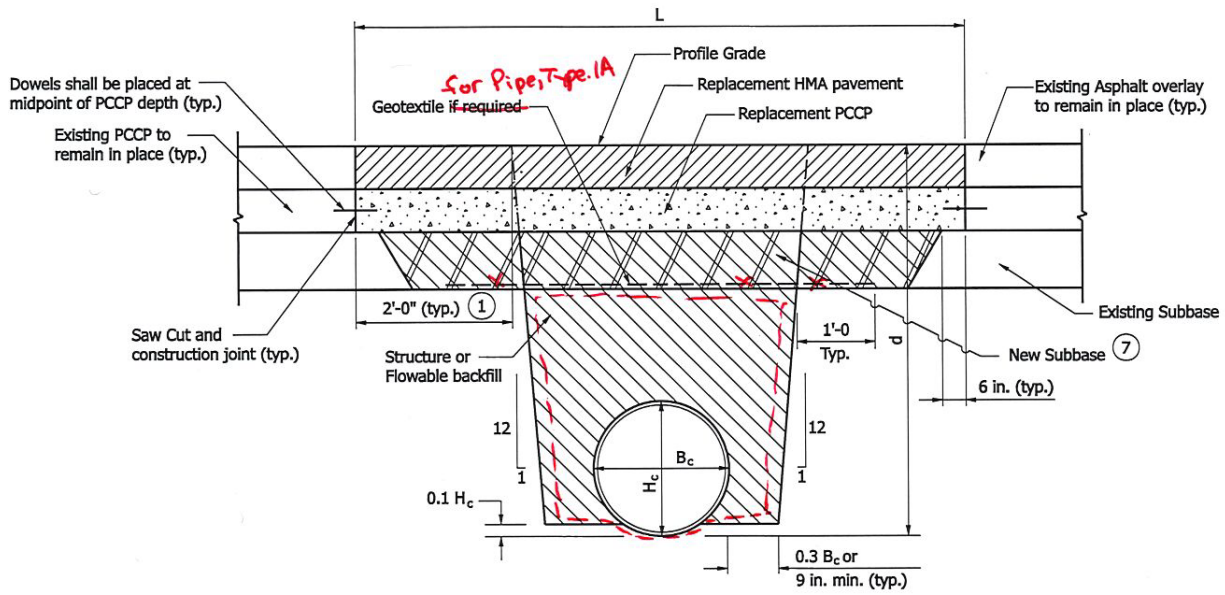
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-05 PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH (shown markups)



L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular 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.
8. Where flowable fill is used in lieu of Structure backfill geotextile is not require

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

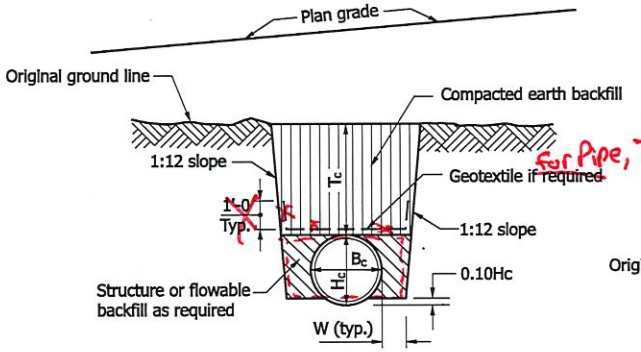
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

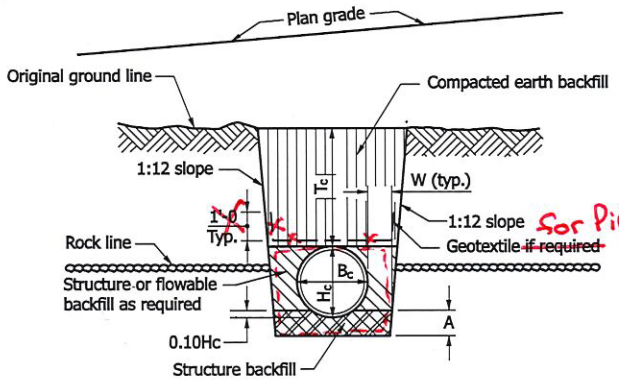
E 715-BKFL-06 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (shown markups)



SECTION C-C

LEGEND

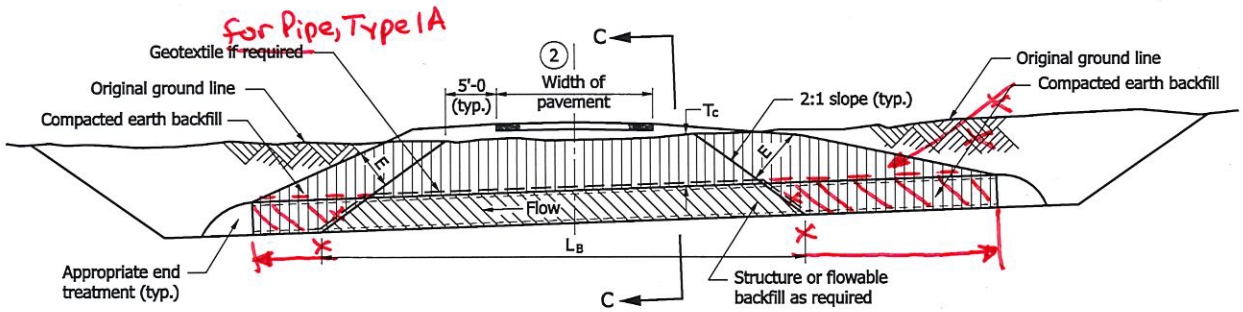
H_c = Overall diameter or rise (typ.)
B_c = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
T_c = Trench cover depth over pipe
W = 0.3 B_c or 9", whichever is greater
E = Encasement
L_B = Backfill length measured from toe to toe of the 2:1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



SECTION C-C
ROCK FOUNDATION

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.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required.



ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-06

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

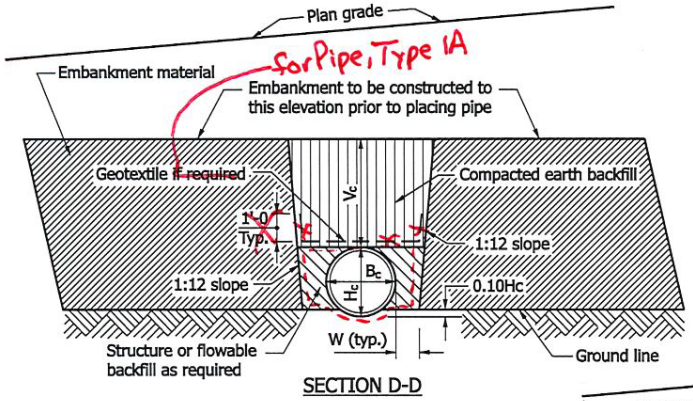
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/02/0
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/02/0
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

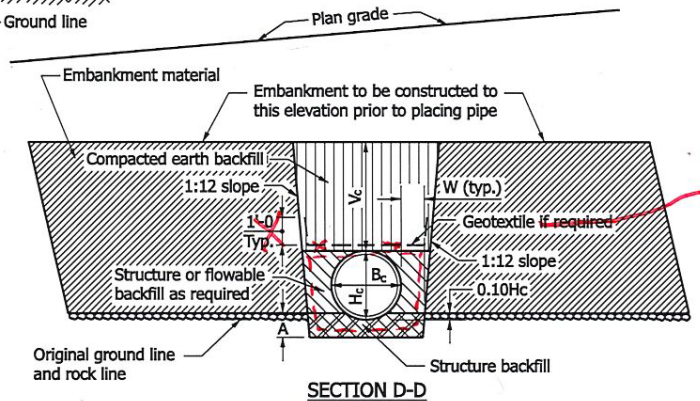
E 715-BKFL-07 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (shown markups)



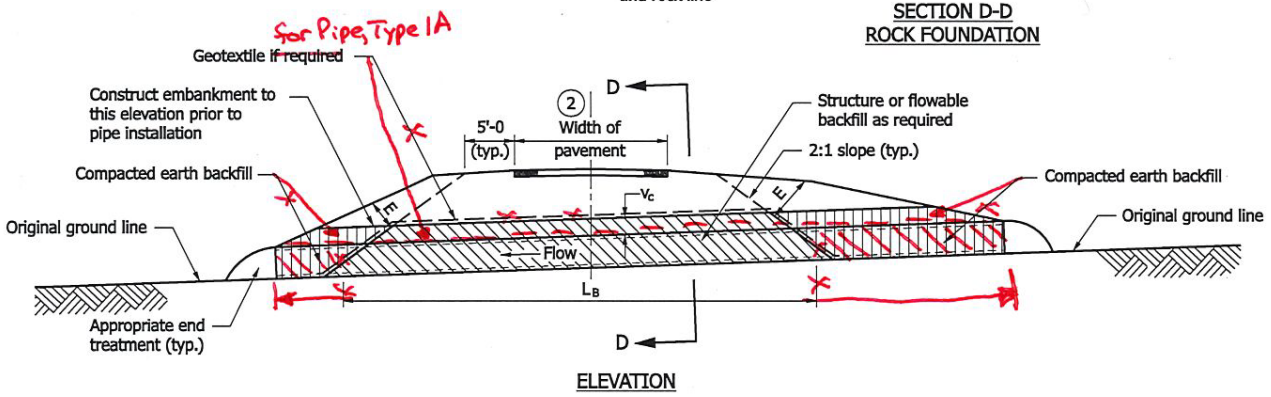
SECTION D-D

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.



SECTION D-D
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.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-07

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

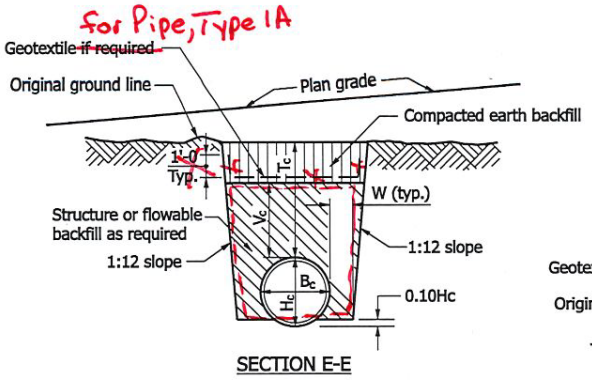
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

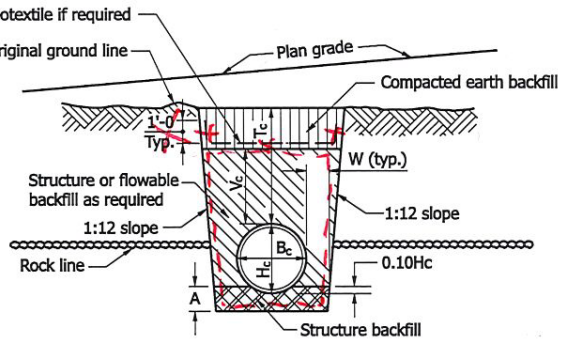
E 715-BKFL-08 PIPE BACKFILL METHOD 3 MEDIAN INSTALLATION, TRENCH (shown markups)



SECTION E-E

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.



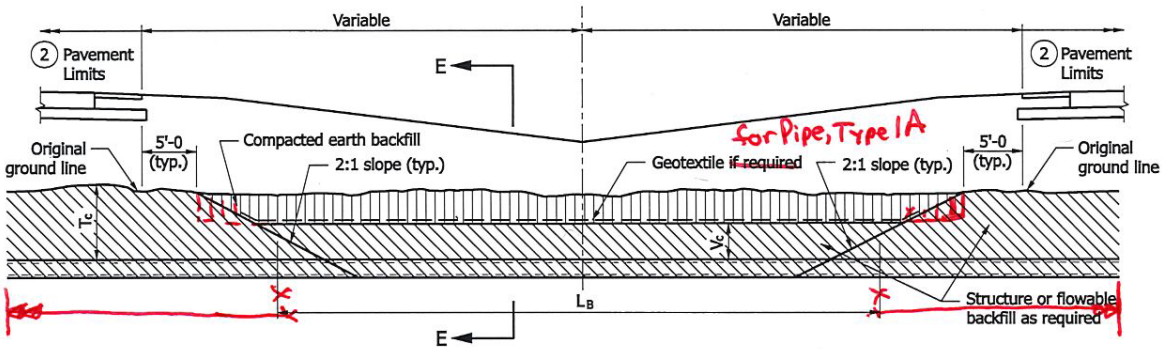
SECTION E-E
ROCK FOUNDATION

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.

4. Where flowable fill is used in lieu of structure backfill geotextile is not required.

3. See Note #3 on sheet 715-BKFL-07



ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 3
MEDIAN INSTALLATION, TRENCH

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-08

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

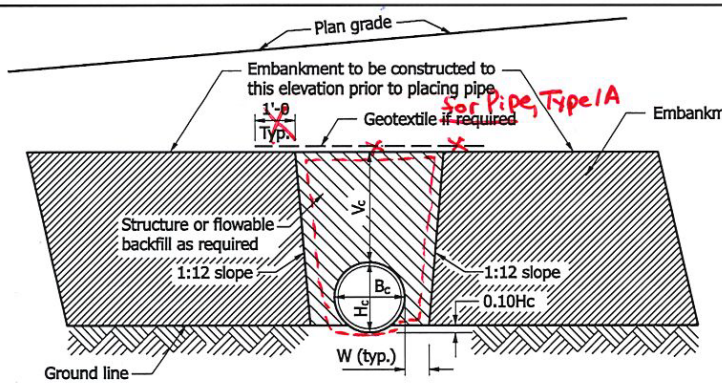
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-09 PIPE BACKFILL METHOD 1 MEDIAN INSTALLATION, EMBANKMENT (shown markups)



SECTION F-F

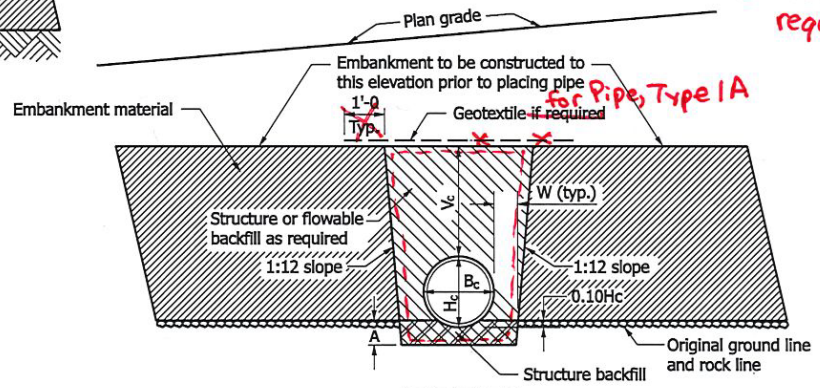
NOTES :

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.

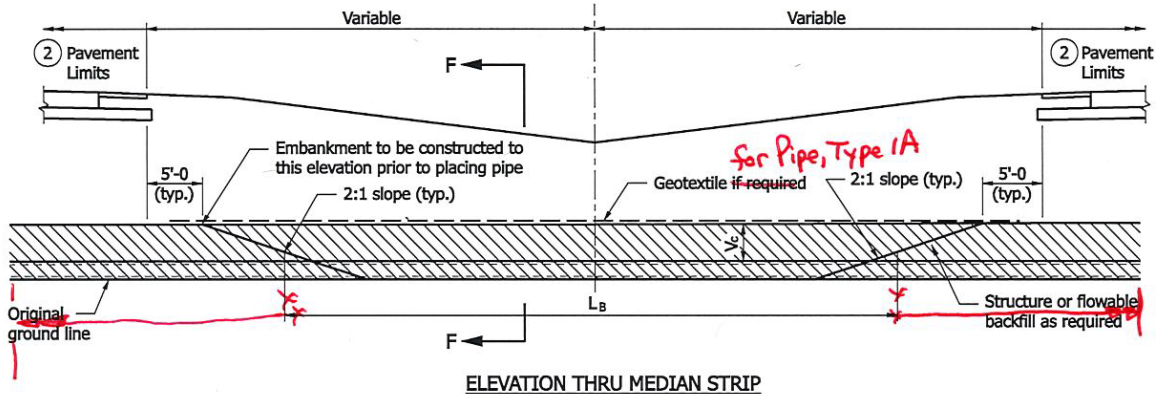
3. Where flowable fill is used in lieu of structure backfill geotextile is not required.

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 F-F
ROCK FOUNDATION



ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
MEDIAN INSTALLATION, EMBANKMENT

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-09

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

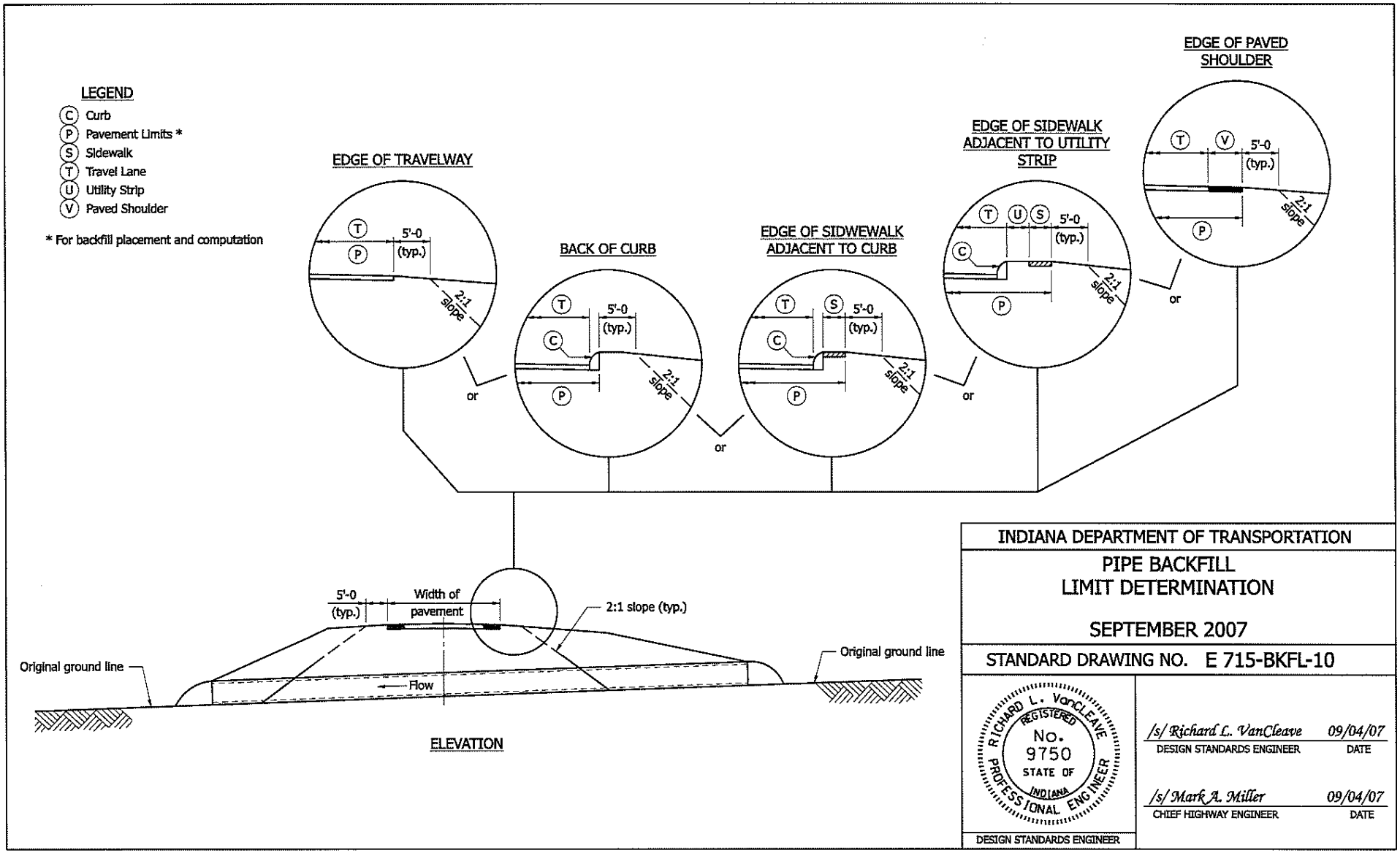
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-10 PIPE BACKFILL LIMIT DETERMINATION (proposed no changes to this sheet)



INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL
LIMIT DETERMINATION

SEPTEMBER 2007

STANDARD DRAWING NO. E 715-BKFL-10

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

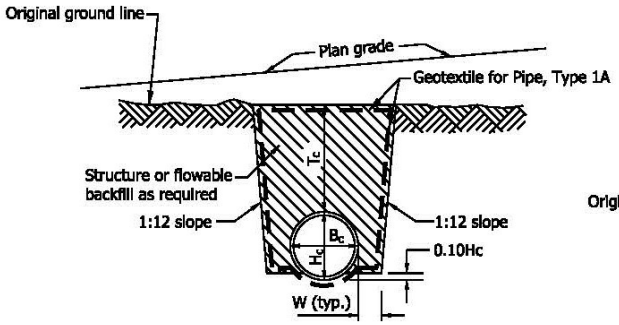
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/04/07
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/04/07
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

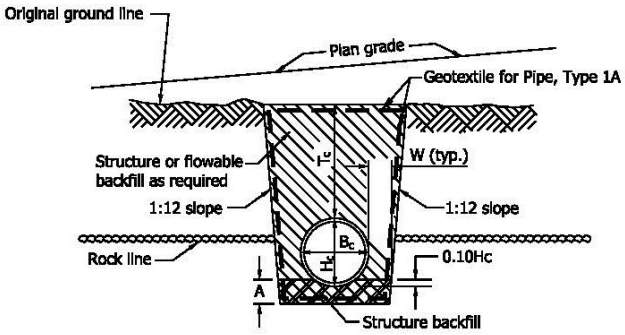
E 715-BKFL-01 PIPE BACKFILL METHOD 1 NEW ROADWAY, TRENCH (proposed DRAFT)



SECTION A-A

LEGEND

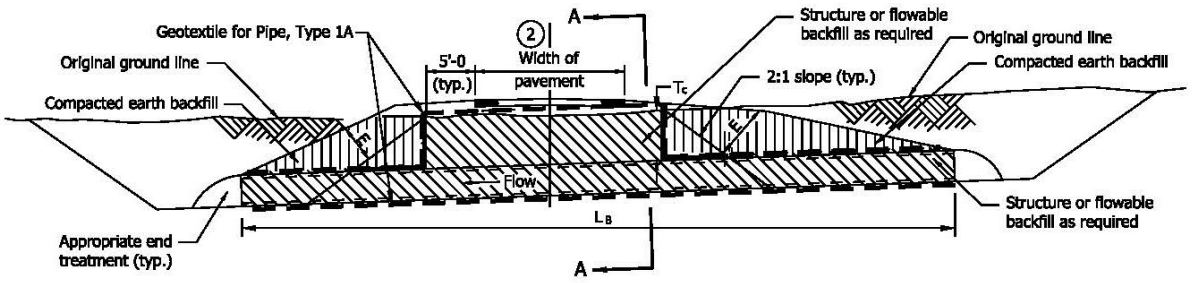
H_c = Overall diameter or rise (typ.)
B_c = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
T_c = Trench cover depth over pipe
W = 0.3 B_c or 9", whichever is greater
E = Encasement
L_B = Backfill length measured from toe to toe of the 2:1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



SECTION A-A
ROCK FOUNDATION

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.
4. Where flowable fill is used in lieu of structure backfill geotextitle is not required.

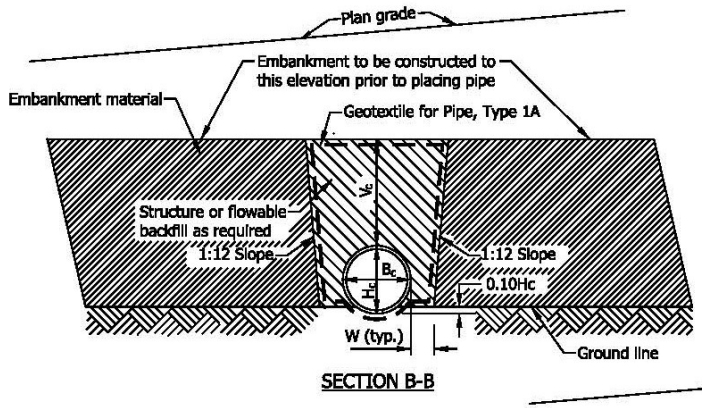


ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL METHOD 1 NEW ROADWAY, TRENCH SEPTEMBER 2008	
STANDARD DRAWING NO. E 715-BKFL-01	
	09/02/08 DESIGN STANDARDS ENGINEER — DATE
	09/02/08 CHIEF HIGHWAY ENGINEER — DATE
DESIGN STANDARDS ENGINEER	

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

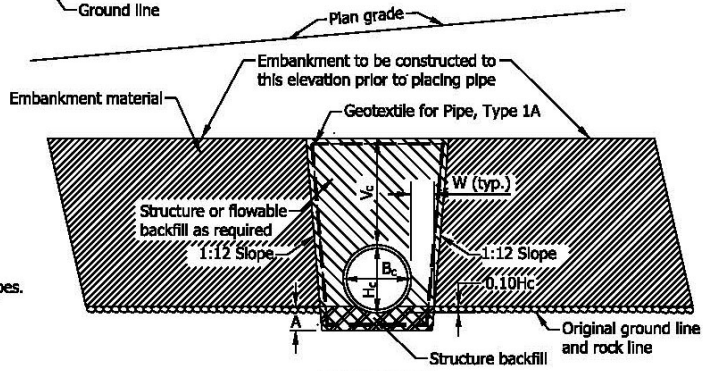
E 715-BKFL-02 PIPE BACKFILL METHOD 1 NEW ROADWAY, EMBANKMENT (proposed DRAFT)



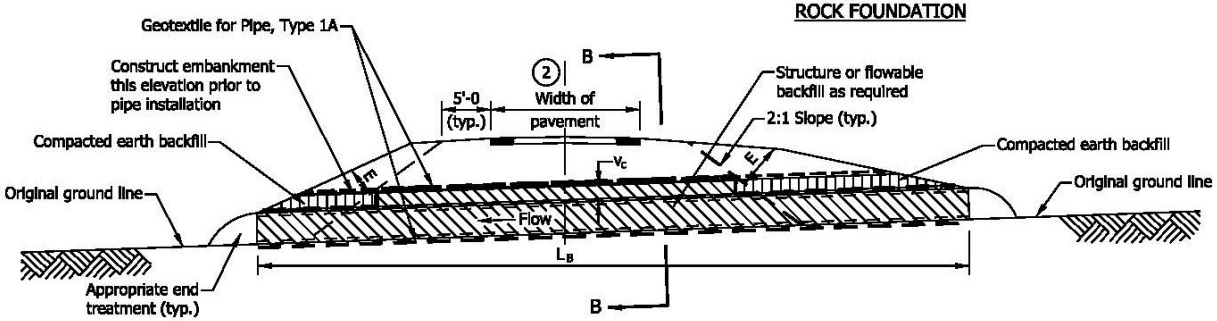
SECTION B-B

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.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
NEW ROADWAY, EMBANKMENT

SEPTEMBER 2008

STANDARD DRAWING NO. E 715-BKFL-02

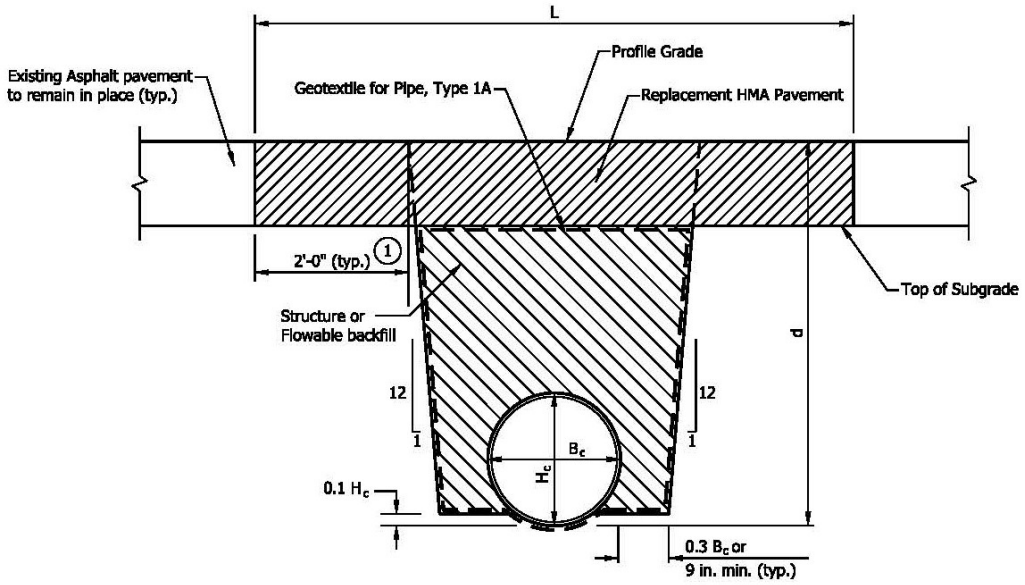
DETAILS PLACED IN THIS FORMAT mm/dd/yy

09/02/08
DESIGN STANDARDS ENGINEER DATE

09/02/08
CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-03 PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH (proposed DRAFT)



L = Pay limits of pavement removal and pavement replacement (ft); for cross pipe, measured along roadway centerline; for pipe parallel to roadway centerline, measured prependicular 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.
5. Where flowable fill is used in lieu of structure backfill geotextile is not require

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
EXISTING ROADWAY, TRENCH

SEPTEMBER 2008

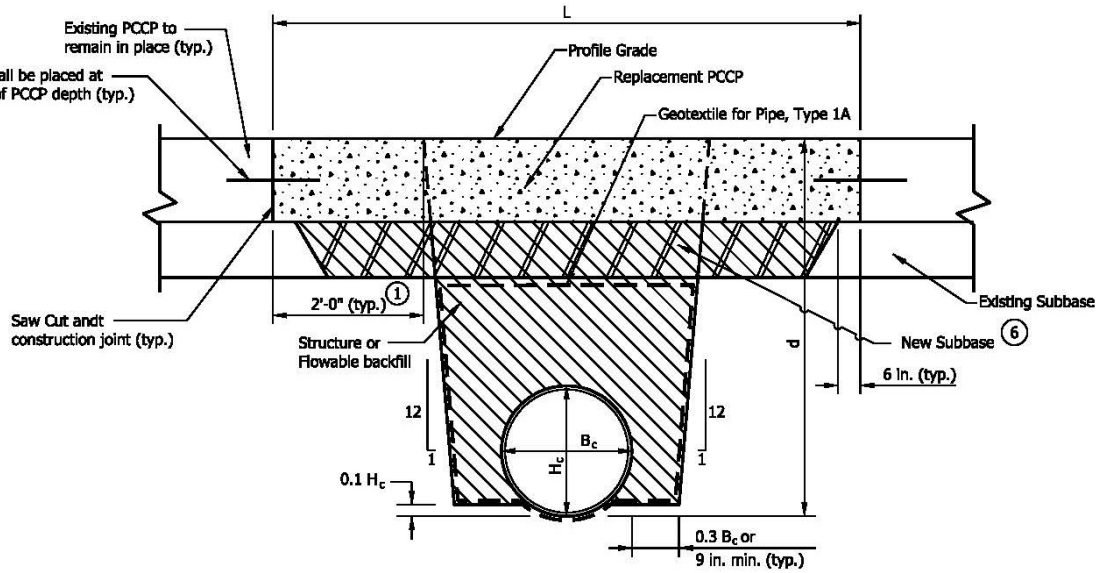
STANDARD DRAWING NO. E 715-BKFL-03

09/02/08
DESIGN STANDARDS ENGINEER DATE

09/02/08
CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-04 PIPE BACKFILL METHOD 1 NEW ROADWAY, EMBANKMENT (proposed DRAFT)



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

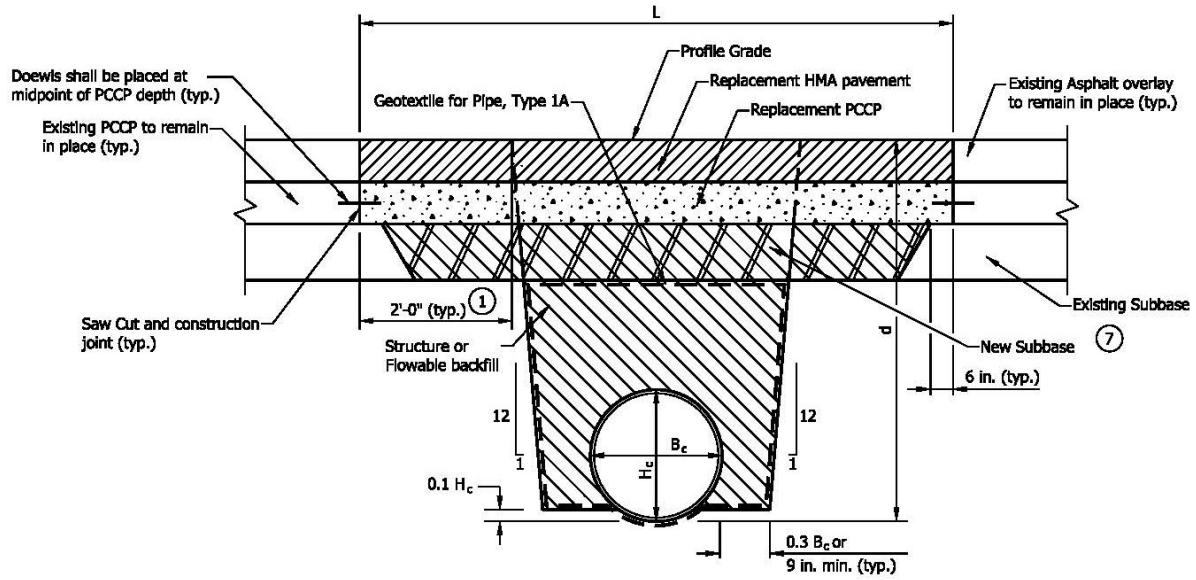
NOTES :

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.
7. Where flowable fill is used in lieu of structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL METHOD 1 NEW ROADWAY, EMBANKMENT SEPTEMBER 2008	
STANDARD DRAWING NO. E 715-BKFL-04	
	DETAILS PLACED IN THIS FORMAT mm/dd/yy *09/02/08* DESIGN STANDARDS ENGINEER DATE *09/02/08* CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-05 PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH (proposed DRAFT)



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

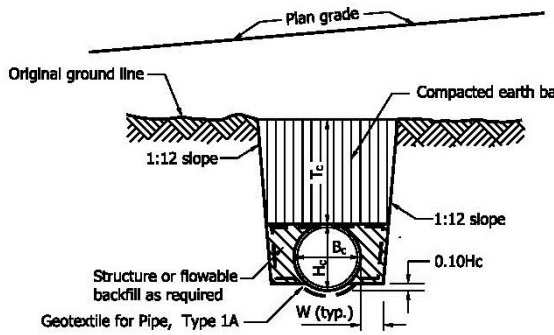
NOTES :

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.
8. Where flowable fill is used in lieu of structure backfill geotextile is not required.

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL METHOD 1 EXISTING ROADWAY, TRENCH SEPTEMBER 2008	
STANDARD DRAWING NO. E 715-BKFL-05	
	09/02/08 DESIGN STANDARDS ENGINEER DATE *09/02/08* CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

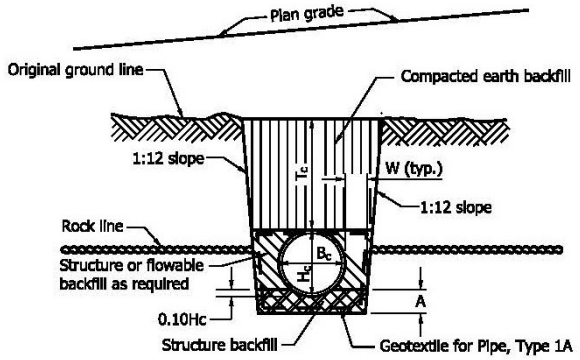
E 715-BKFL-06 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (proposed DRAFT)



SECTION C-C

LEGEND

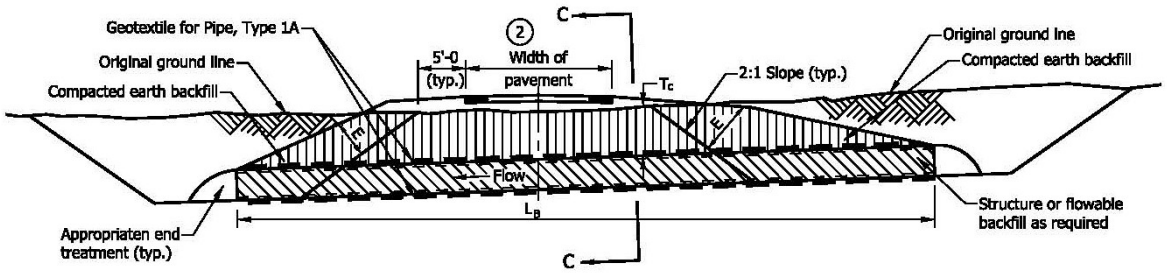
H_c = Overall diameter or rise (typ.)
B_c = Overall diameter or span
A = 8" min. for fill height less than 16'
= 12" min. for fill height of 16' or more
T_c = Trench cover depth over pipe
W = 0.3 B_c or 9", whichever is greater
E = Encasement
L_B = Backfill length measured from toe to toe of the 2:1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



SECTION C-C
ROCK FOUNDATION

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.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required.

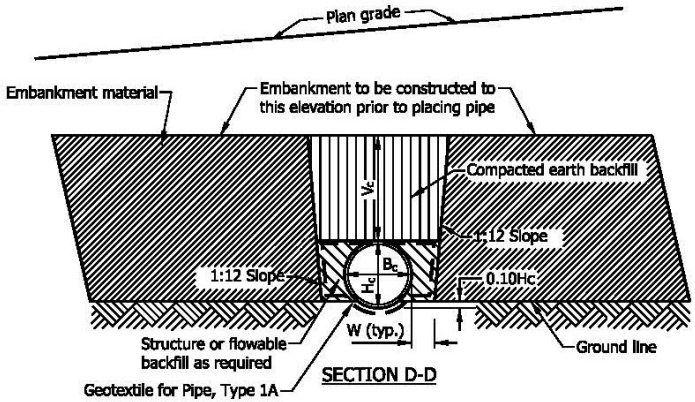


ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION	
PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE SEPTEMBER 2008	
STANDARD DRAWING NO. E 715-BKFL-06	
	DETAILS PLACED IN THIS FORMAT mm/dd/yy *09/02/08* DESIGN STANDARDS ENGINEER DATE *09/02/08* CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-07 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (proposed DRAFT)

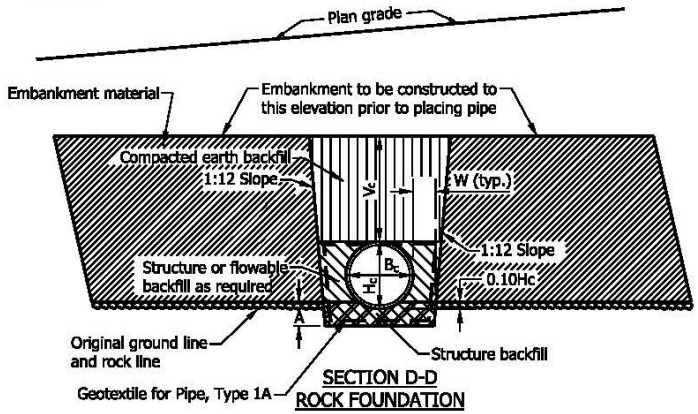


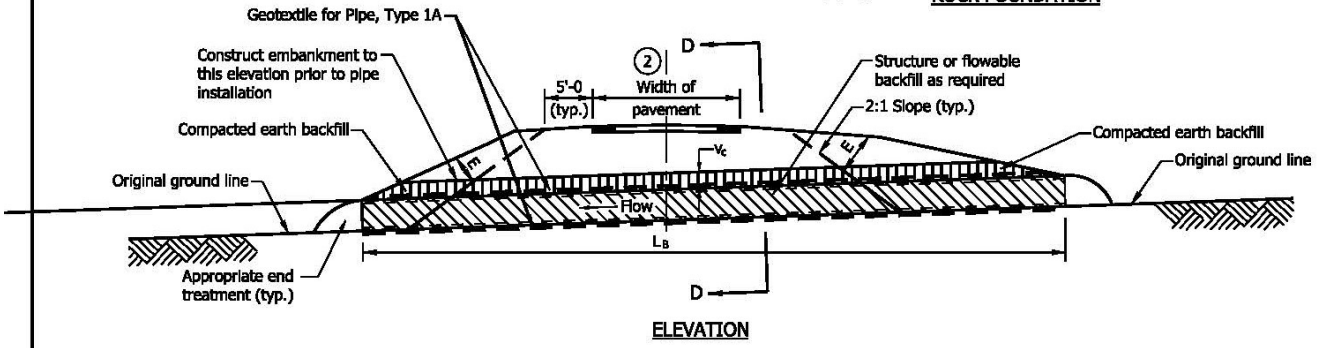
NOTES :

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.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required.

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.





INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE

SEPTEMBER 2008

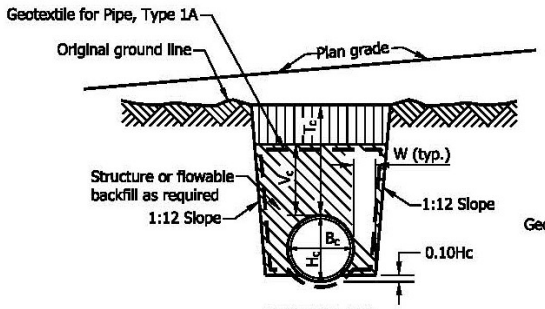
STANDARD DRAWING NO. E 715-BKFL-07

09/02/08
DESIGN STANDARDS ENGINEER DATE

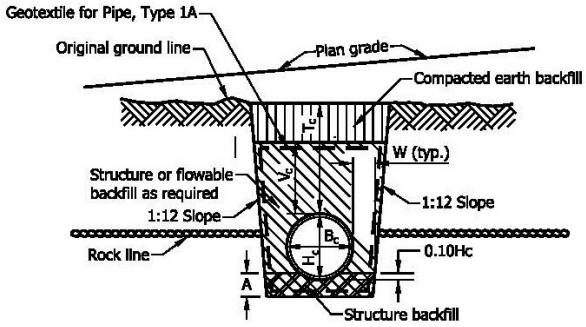
09/02/08
CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-08 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (proposed DRAFT)



SECTION E-E



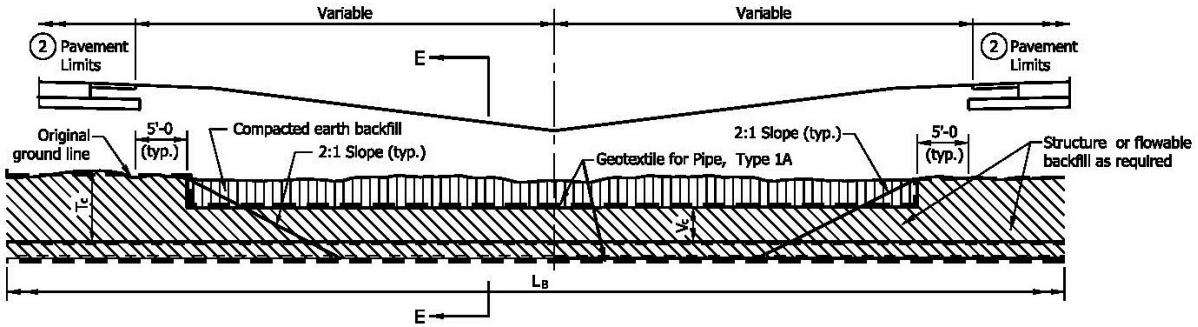
SECTION E-E
ROCK FOUNDATION

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
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.
3. Flowable or structure backfil shall be encased by compaced earth backfill. The minimum encasement shall be 2 ft. If necessary, the 2:1 slopbetwee the flowable or structure backfill and the encasement shall be modified to maintain the minimum 2 ft encasement.
4. Where flowable fill is used in lieu of structure backfill geotextile is not required.



ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 2
NEW OR EXISTING DRIVE

SEPTEMBER 2008

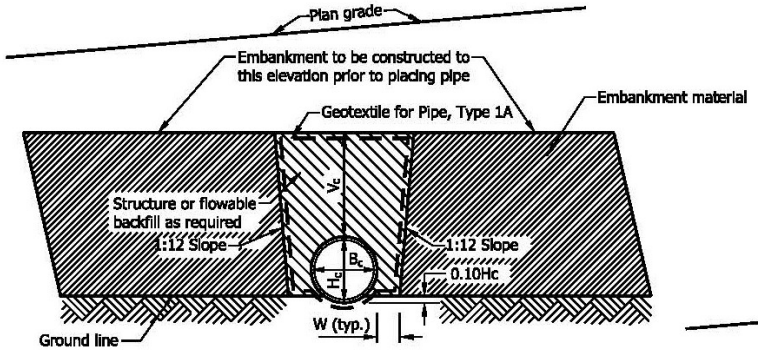
STANDARD DRAWING NO. E 715-BKFL-08

09/02/08
DESIGN STANDARDS ENGINEER DATE

09/02/08
CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-09 PIPE BACKFILL METHOD 2 NEW OR EXISTING DRIVE (proposed DRAFT)



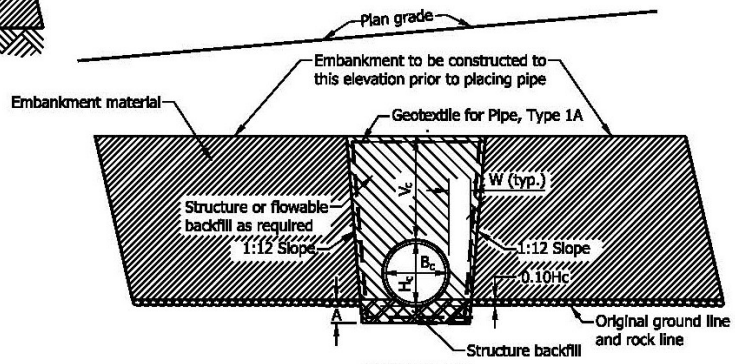
SECTION F-F

NOTES :

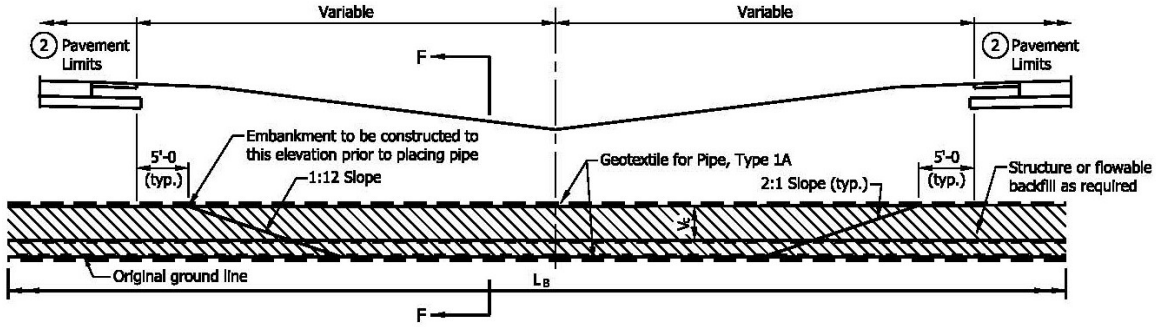
1. Protective cover shall be constructed prior to running heavy equipment over installed pipes. The minimum covers are listed below:
   a.) 1.5' for $B_c \leq 18"$
   b.) 3' for $18" < B_c \leq 54"$
   c.) 4' for $B_c > 54"$
2. For backfill purposes, paved shoulders, curbs, and sidewalks are considered pavement. See Standard Drawing E 715-BKFL-10 for pavement limits when curbs, paved shoulders, or sidewalks are present.
3. Where flowable fill is used in lieu of structure backfill geotextile is not required.

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 F-F
ROCK FOUNDATION



ELEVATION THRU MEDIAN STRIP

INDIANA DEPARTMENT OF TRANSPORTATION

PIPE BACKFILL METHOD 1
MEDIAN INSTALLATION, EMBANKMENT

SEPTEMBER 2008

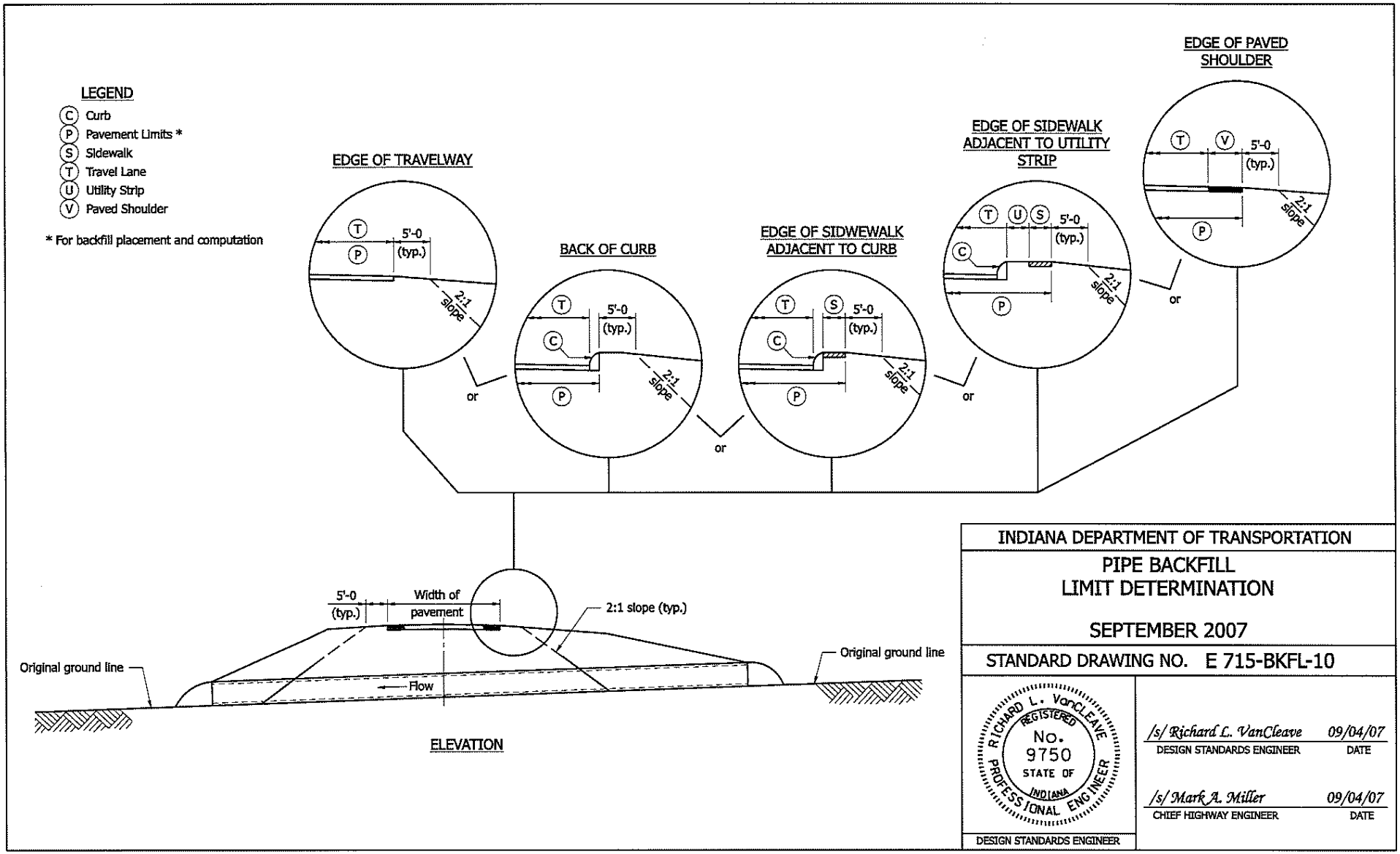
STANDARD DRAWING NO. E 715-BKFL-09

09/02/08
DESIGN STANDARDS ENGINEER DATE

09/02/08
CHIEF ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND STANDARD DRAWINGS

E 715-BKFL-10 PIPE BACKFILL LIMIT DETERMINATION (NO proposed CHANGES)



COMMENTS AND ACTION

714.11 Method of Measurement
714.12 Basis of Payment
715-R-732 PIPE CULVERTS, AND STORM AND SANITARY SEWERS
918-M-060 GEOSYNTHETIC MATERIALS
E 715-BKFL series

DISCUSSION:

This item was introduced and presented by Mr. Beeson, sitting in for Mr. Reilman, who explained that, currently, the Standard Drawing Series 715-BKFL only shows the geotextile capping structure backfill of pipes to prevent infiltration. Infiltration can occur anywhere around the structure backfill, therefore for, in most locations, structure backfill should be lined and capped.

Mr. Beeson proposed to have structure backfill types 1, 2, 3, and 4 for pipes lined and capped with geotextile. Where flowable fill is used in lieu of structure backfill, geotextile will not be required. In addition, all geotextile materials to be used to line and cap a pipe will be paid for as Geotextile for Pipes. Mr. Beeson moved to withdraw this item pending further discussions and review.

Prior to the meeting:
Mr. Novak asked if we had actual problems that we can associate to infiltration of structure backfill? Has industry been involved in the constructability of wrapping with geotextile?
Mr. Siddiki replied that when a pipe is replaced without a box, perched and trapped water has softened the side of the excavated cut. These soils fall into structure backfill material. This may affect the performance of structural backfill. Most of the soils are low plastic soils which have strength loss with the presence of moisture. Geotextile should be used to separate the soils and structural backfill. When the cut soils are sand or granular, geotextiles are not required. When coarse aggregate is used as structure backfill and the subgrade consists of No. 53, finer aggregates may penetrate into the coarser aggregates and create a void in the subgrade. Geotextile should be used to separate the fine aggregate from the coarse aggregate.
Mr. Koch concurred that if infiltration is a concern, we should consider dense graded structure backfill.

COMMENTS AND ACTION

714.11 Method of Measurement
714.12 Basis of Payment
715-R-732 PIPE CULVERTS, AND STORM AND SANITARY SEWERS
918-M-060 GEOSYNTHETIC MATERIALS
E 715-BKFL series

[continued]

Motion: Mr. Second: Mr. Ayes: Nays: FHWA Approval:	Action: ___ Passed as Submitted ___ Passed as Revised _X_ Withdrawn
2022 Standard Specifications Sections affected: 714 pg 729 and 730. 715 begin pg 731; 918.02 pg 1129. Recurring Special Provision affected: 715-R-732 PIPE CULVERTS, AND STORM AND SANITARY SEWERS 918-M-060 GEOSYNTHETIC MATERIALS Standard Drawing affected: E 715-BKFL series Design Manual Sections affected: 17-3.0 GIFE Sections cross-references: Section 4	___ 2024 Standard Specifications ___ Revise Pay Items List ___ Create RSP (No.__) Effective: September 2022 RSP Sunset Date: ___ Revise RSP (No.__) Effective: RSP Sunset Date: ___ Standard Drawing Effective: ___ Create RPD (No. __) Effective: ___ GIFE Update ___ Frequency Manual Update ___ SiteManager Update

Mr. White
Date: 2/17/22

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The E 707-BPBF series Standard Drawings were last published in 2012 and are not in the current format for Standard Drawings. The current sheet 03 shows tolerances for the placement of lifting loops, which are determined by the manufacturer and are not detailed on the design plans. This has caused confusion and delays in the shop drawing review process.

PROPOSED SOLUTION: Several minor changes to the fabrication tolerances are being proposed in order to provide more consistency with the Precast/Prestressed Concrete Institute Tolerance Manual for Precast and Prestressed Concrete Construction, First Edition, Fourth Printing. Since the tolerances for AASHTO I-Beam and Bulb-Tee Beams are the same, current sheets 02 and 03 are being combined into one sheet. The lifting loops that are currently shown on sheet 03 are being removed in order to avoid confusion related to the responsibility of detailing those items.

APPLICABLE STANDARD SPECIFICATIONS: Section 707 (no changes required as a result of the proposed changes to the Standard Drawings)

APPLICABLE STANDARD DRAWINGS: E 707-BPBF series

APPLICABLE DESIGN MANUAL SECTION: Chapter 406 (no changes required, but updates to provide more clear guidance on lifting checks are forthcoming)

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad hoc committee including Jim Reilman, Mahmoud Hailat, Mike Wenning, and Katlyn Shergalis.

IF APPROVED AS RECURRING SPECIAL PROVISION OR PLAN DETAILS, PROPOSED BASIS FOR USE: Projects that include 707-xxxxx pay items

IMPACT ANALYSIS (attach report): see attached

Submitted By: Pete White, PE
Title: Design Manager
Organization: INDOT Bridge Engineering
Phone Number: 317-232-5371
Date: January 27, 2022

Mr. White
Date: 2/17/22

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD DRAWINGS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? No
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

- Construction costs? No
- Construction time? No
- Customer satisfaction? No
- Congestion/travel time? No
- Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? Yes

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? Yes

Is this proposal needed for compliance with:

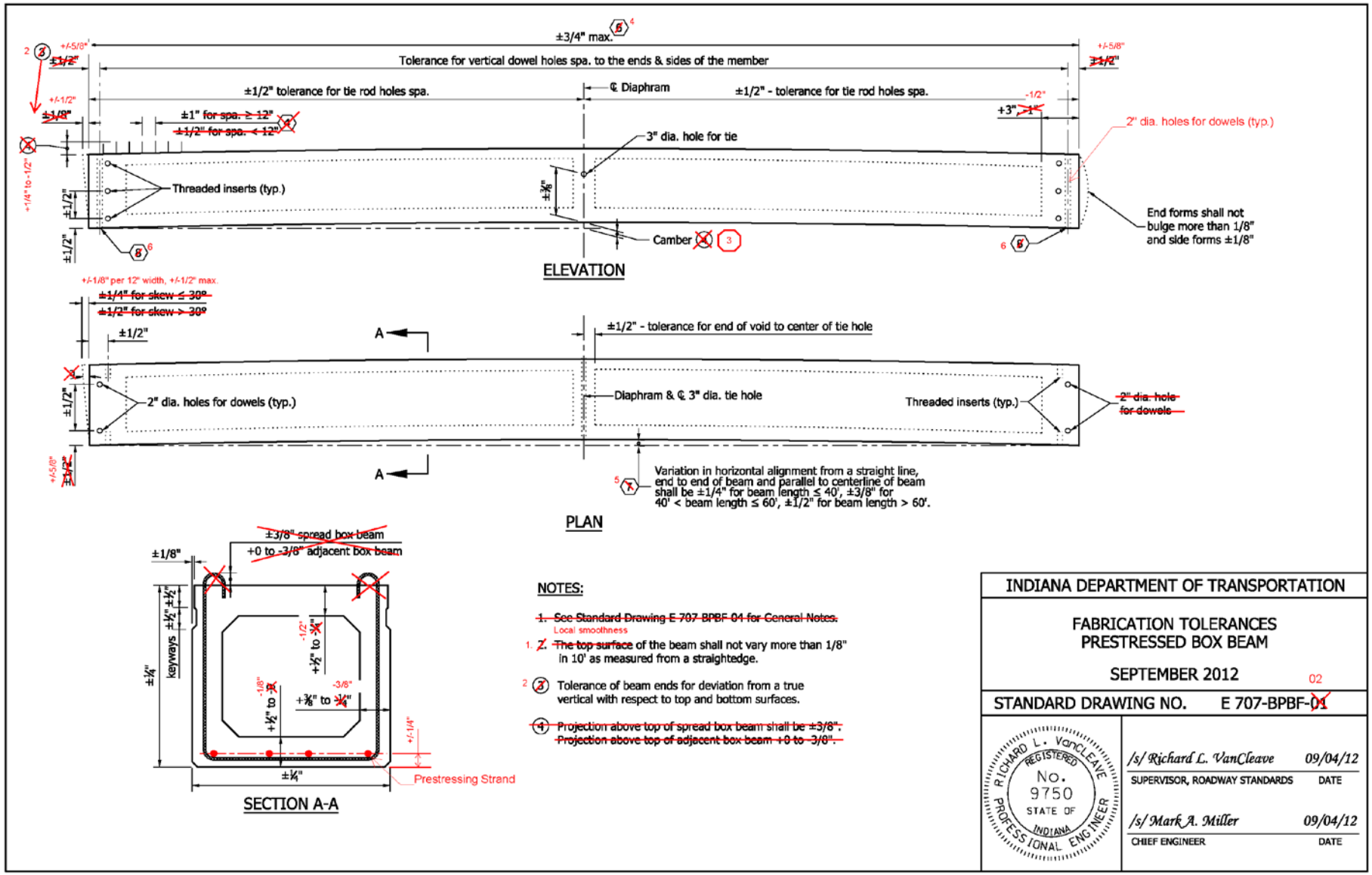
- Federal or State regulations? No
- AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: The proposed updates to the E 707-BFBP series Standard Drawings will provide more consistency with industry standards and will eliminate discrepancies related to prestressed beam lifting details.

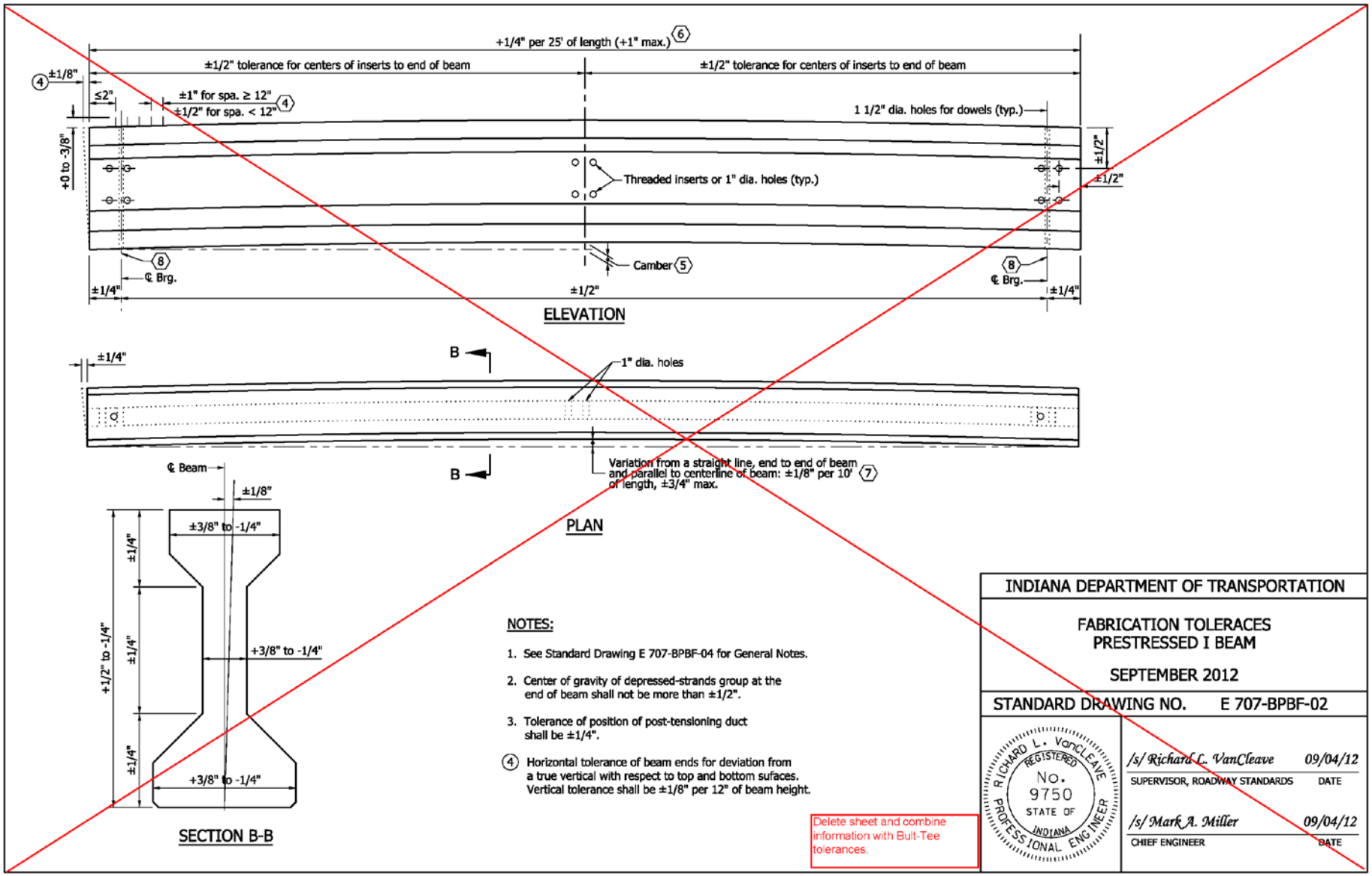
REVISION TO STANDARD DRAWINGS

E 707-BPBF-01 FABRICATION TOLERANCES PRESTRESSED BOX BEAM (shown markups)



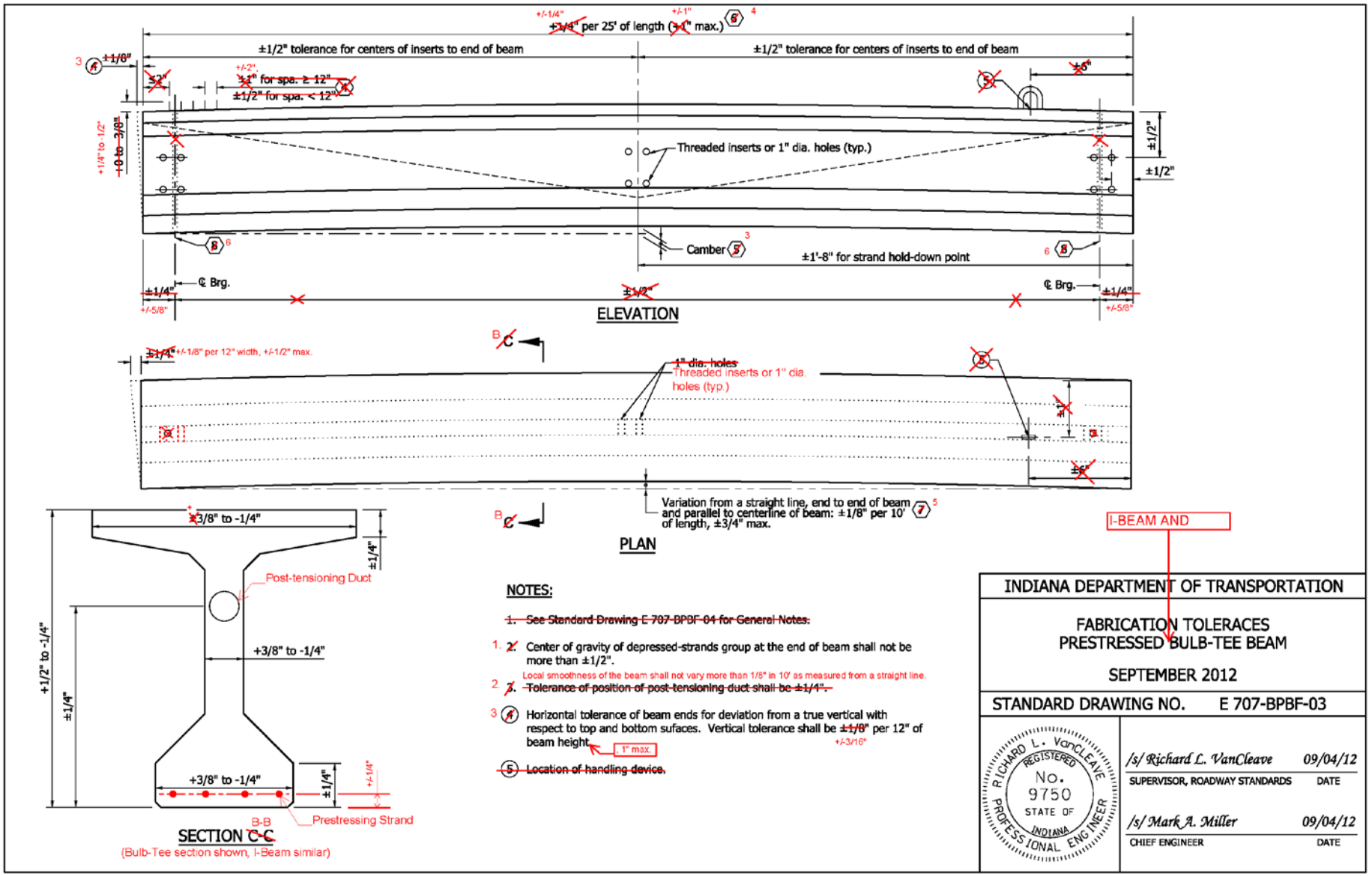
REVISION TO STANDARD DRAWINGS

E 707-BPBF-02 FABRICATION TOLERANCES PRESTRESSED I BEAM (proposed to delete)



REVISION TO STANDARD DRAWINGS

E 707-BPBF-03 FABRICATION TOLERANCES PRESTRESSED BULB-TEE BEAM (shown markups)



REVISION TO STANDARD DRAWINGS

E 707-BPBF-04 FABRICATION TOLERANCES GENERAL NOTES (shown markups)

INDEX	
SHEET NO.	SUBJECT
1	Fabrication Tolerances, Index and General Notes
2	Fabrication Tolerances, Prestressed Box Beam
3	Fabrication Tolerances, Prestressed I-Beam and Bulb-Tee Beam

GENERAL NOTES :

1. Tolerances shown are maximum permissible varations from the dimensions shown on the plans or shop drawings. Tolerances shall not be considered cumulative. Longitudinal tolerances are based on design length. Casting length shall be adjusted to compensate for shrinkage and plastic flow.

~~2. End stirrup bars shall not be more than 2" from the end of the beam.~~

2 ~~3.~~ Mild reinforcing steel concrete cover tolerance shall be ~~1/8" to +3/8".~~ +3/8" to -1/8"

~~4 Tolerances for reinforcing bars for composite beam.~~

3 ~~5~~ Vertical ~~Variation of~~ camber shall ~~not~~ be ~~more than 1" on one span nor more than 1/2" between adjacent members to be measured at time of erection.~~ checked within 72 hours of transfer of prestressing force. Camber shall also be measured within three days prior to shipping and any exceedances shall be reported to the Engineer prior to shipping.

Permitted camber variation from design camber is as follows:

I-beam or bulb-tee beam:	±1/8" per 10'-0" length with ±1/2" maximum for member length of 80'-0" or less ±1" maximum for member length of greater than 80'-0"
Box beam:	±1/8" per 10'-0" length with ±1/2" ~~mm~~ maximum

4 ~~6~~ Tolerance in length of beam shall be checked after the final curing phase and within three days prior to shipping.

5 ~~7~~ Horizontal-alignment tolerance shall be checked immediately after removal of forms and strand release, and prior to removal from bed.

6 ~~8~~ At concrete bearing area, deviation from plane surface when tested in all directions of the plane surface with a steel straightedge shall not be more than ~~±1/16".~~ +/-1/8"

INDIANA DEPARTMENT OF TRANSPORTATION

FABRICATION TOLERANCES
INDEX AND GENERAL NOTES

SEPTEMBER 2011

STANDARD DRAWING NO. E 707-BPBF-~~04~~ 01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L.VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD DRAWINGS

E 707-BPBF-01 FABRICATION TOLERANCES INDEX AND GENERAL NOTES (proposed draft)

INDEX	
SHEET NO.	SUBJECT
1	Fabrication Tolerances, Index, and General Notes
2	Fabrication Tolerances, Prestressed Box Beam
3	Fabrication Tolerances, Prestressed I-Beam and Bulb-Tee Beam

GENERAL NOTES :

1. Tolerances shown are maximum permissible varations from the dimensions shown on the plans or shop drawings. Tolerances shall not be considered cumulative. Longitudinal tolerances are based on design length. Casting length shall be adjusted to compensate for shrinkage and plastic flow.

2. Mild reinforcing steel concrete cover tolerance shall be +3/8" to -1/8".

〈3〉 Vertical camber shall be checked within 72 hours of transfer of prestressing force. Camber shall also be measured within three days prior to shipping and any exceedances shall be reported to the Engineer prior to shipping.

Permitted camber variation from design camber is as follows:
I-beam or bulb-tee beam: ±1/8" per 10'-0" length with ±1/2" maximum for member length of 80'-0" or less
±1" maximum for member length of greater than 80'-0"
Box beam: ±1/8" per 10'-0" length with ±1/2" maximum

〈4〉 Tolerance in length of beam shall be checked after the final curing phase and within three days prior to shipping.

〈5〉 Horizontal-alignment tolerance shall be checked immediately after removal of forms and strand release, and prior to removal from bed.

〈6〉 At concrete bearing area, deviation from plane surface when tested in all directions of the plane surface with a steel straightedge shall not be more than ±1/8".

INDIANA DEPARTMENT OF TRANSPORTATION

FABRICATION TOLERANCES
INDEX AND GENERAL NOTES

JANUARY 2022

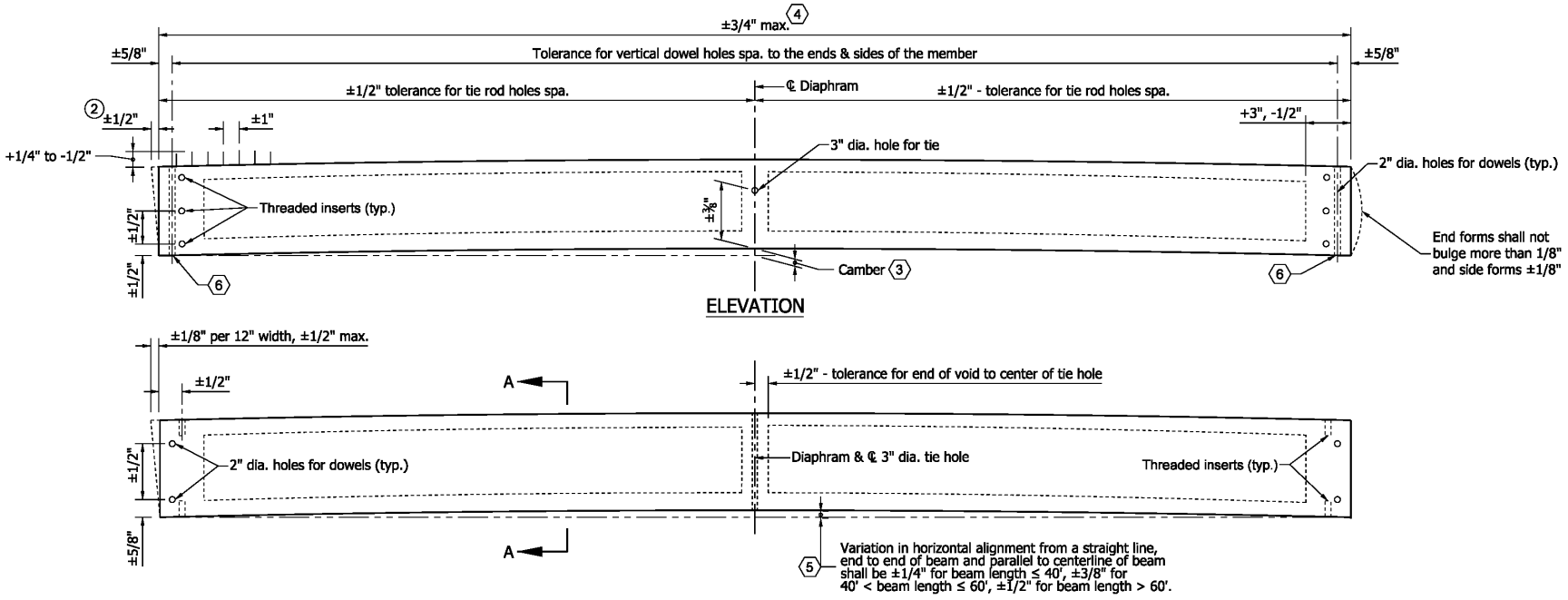
STANDARD DRAWING NO. E 707-BPBF-01

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD DRAWINGS

E 707-BPBF-02 FABRICATION TOLERANCES PRESTRESSED BOX BEAM (proposed draft)



NOTES:

1. Local smoothness of the beam shall not vary more than 1/8" in 10' as measured from a straightedge.

2 Tolerance of beam ends for deviation from a true vertical with respect to top and bottom surfaces.

INDIANA DEPARTMENT OF TRANSPORTATION

FABRICATION TOLERANCES
PRESTRESSED BOX BEAM

JANUARY 2022

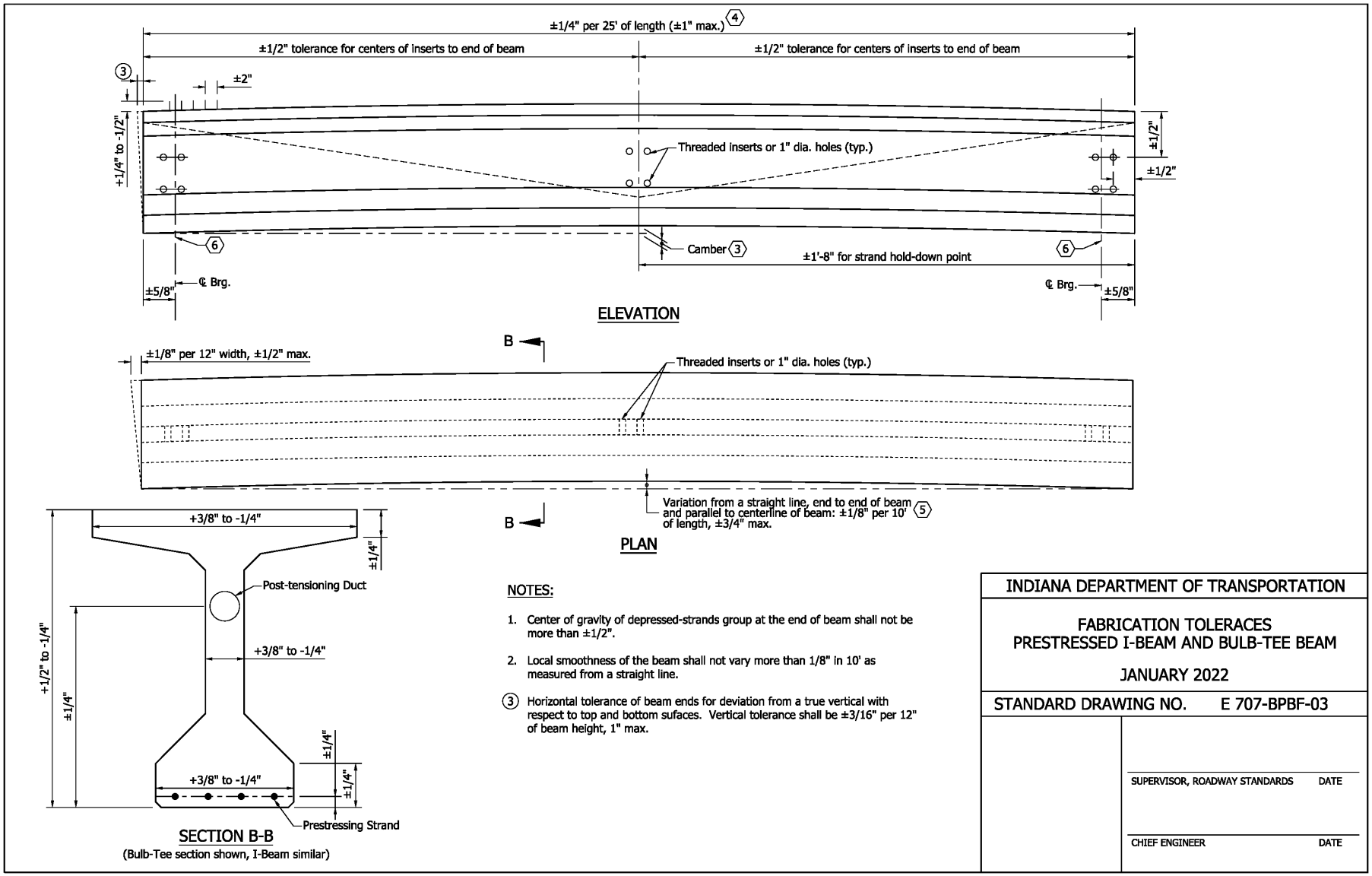
STANDARD DRAWING NO. E 707-BPBF-02

SUPERVISOR, ROADWAY STANDARDS DATE

CHIEF ENGINEER DATE

REVISION TO STANDARD DRAWINGS

E 707-BPBF-03 FABRICATION TOLERANCES PRESTRESSED I-BEAM AND BULB-TEE BEAM (proposed draft)



NOTES:

1. Center of gravity of depressed-strands group at the end of beam shall not be more than ±1/2".
2. Local smoothness of the beam shall not vary more than 1/8" in 10' as measured from a straight line.

(3) Horizontal tolerance of beam ends for deviation from a true vertical with respect to top and bottom sufaces. Vertical tolerance shall be ±3/16" per 12" of beam height, 1" max.

INDIANA DEPARTMENT OF TRANSPORTATION

FABRICATION TOLERACES
PRESTRESSED I-BEAM AND BULB-TEE BEAM

JANUARY 2022

STANDARD DRAWING NO. E 707-BPBF-03

SUPERVISOR, ROADWAY STANDARDS DATE

CHIEF ENGINEER DATE

COMMENTS AND ACTION

E 707-BPBF series

DISCUSSION:

This item was introduced and presented by Mr. White who explained that the E 707-BPBF series Standard Drawings were last published in 2012 and are not in the current format for Standard Drawings. The current sheet 03 shows tolerances for the placement of lifting loops, which are determined by the manufacturer and are not detailed on the design plans. This has caused confusion and delays in the shop drawing review process.

Mr. White stated that several minor changes to the fabrication tolerances are being proposed in order to provide more consistency with the Precast/Prestressed Concrete Institute Tolerance Manual for Precast and Prestressed Concrete Construction, First Edition, Fourth Printing. Since the tolerances for AASHTO I-Beam and Bulb-Tee Beams are the same, current sheets 02 and 03 are being combined into one sheet. The lifting loops that are currently shown on sheet 03 are being removed in order to avoid confusion related to the responsibility of detailing those items.

There was no further discussion and this item passed as submitted.

COMMENTS AND ACTION

E 707-BPBF series

[continued]

Motion: Mr. White Second: Mr. Novak Ayes: 9 Nays: 0 FHWA Approval: YES	Action:	
	X	Passed as Submitted
	___	Passed as Revised
	___	Withdrawn
Standard Specifications Sections referenced and/or affected: 707 begin pg 663 (no changes required).	___	2024 Standard Specifications
	___	Revise Pay Items List
Recurring Special Provision references in: NONE	___	Create RSP (No.___) Effective: RSP Sunset Date:
Standard Drawing affected: E 707-BPBF series	___	Revise RSP (No.___) Effective: RSP Sunset Date:
Design Manual Sections affected: Chapter 406	X	Standard Drawing Effective: September 1, 2022
GIFE Sections cross-references: NONE	___	Create RPD (No. ___) Effective:
	___	GIFE Update
	___	Frequency Manual Update
	___	SiteManager Update

Mr. White
Date: 2/17/22

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The requirements given in Section 707 related to working drawings, lifting, and placing precast, prestressed structural members could benefit from additional clarification. The current requirements don't provide standard lifting parameters and instead defer to the plans, which don't typically specify lifting points. Welded wire reinforcing, WWR, has been used on several recent projects and the use is expected to increase, but is not explicitly referenced in 707.

PROPOSED SOLUTION: Section 707 has been updated to clarify requirements for working drawings, lifting, and placing precast, prestressed structural members. WWR has also been referenced in the material section of the specification.

APPLICABLE STANDARD SPECIFICATIONS: Sections 707.02, 707.03, 707.08, 707.09, and 707.12

APPLICABLE STANDARD DRAWINGS: E 707-BFBP series

APPLICABLE DESIGN MANUAL SECTION: Chapter 406 (no changes required, but updates to provide more clear guidance on lifting checks are forthcoming)

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: N/A

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad hoc committee including Jim Reilman, Mahmoud Hailat, Mike Wenning, and Katlyn Shergalis.

IF APPROVED AS RECURRING SPECIAL PROVISION OR PLAN DETAILS, PROPOSED BASIS FOR USE: Projects that include 707-xxxxx pay items

IMPACT ANALYSIS (attach report): see attached

Submitted By: Pete White, PE
Title: Design Manager
Organization: INDOT Bridge Engineering
Phone Number: 317-232-5371

Date: January 27, 2022

Mr. White
Date: 2/17/22

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO STANDARD SPECIFICATIONS

IMPACT ANALYSIS REPORT CHECKLIST

Explain the business case as to why this item should be presented to the Standards Committee for approval. Answer the following questions with Yes, No or N/A.

Does this item appear in any other specification sections? Yes
Will approval of this item affect the Approved Materials List? No
Will this proposal improve:

- Construction costs? No
- Construction time? No
- Customer satisfaction? No
- Congestion/travel time? No
- Ride quality? No

Will this proposal reduce operational costs or maintenance effort? No

Will this item improve safety:

- For motorists? No
- For construction workers? No

Will this proposal improve quality for:

- Construction procedures/processes? Yes
- Asset preservation? No
- Design process? Yes

Will this change provide the contractor more flexibility? No

Will this proposal provide clarification for the Contractor and field personnel? Yes

Can this item improve/reduce the number of potential change orders? Yes

Is this proposal needed for compliance with:

- Federal or State regulations? No
- AASHTO or other design code? No

Is this item editorial? No

Provide any further information as to why this proposal should be placed on the Standards Committee meeting Agenda: The proposed updates will clarify expectations for beam fabrication, lifting, shipping, and the associated working drawings.

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 – PRECAST AND PRECAST, PRESTRESSED CONCRETE STRUCTURAL MEMBERS
707.02 Materials
707.03 General Requirements
707.08 Handling and Shipping
707.09 Placing Structural Members
707.12 Basis of Payment

The Standard Specifications are revised as follows:

SECTION 707, BEGIN LINE 13, INSERT AS FOLLOWS:

707.02 Materials

Materials shall be in accordance with the following:

Admixtures for Concrete	912.03
Backer Rod	906.02(b)
Coarse Aggregates, Class A or Higher, Size No. 91	904.03
Concrete Curing Materials	912
Elastomeric Bearings	915.04
Fine Aggregates, Size No. 23	904
Fly Ash	901.02
~~Ground Granulated Blast Furnace Slag~~	~~901.03~~
Non-Epoxy PCC Sealers	909.10
PCC Sealer/Healer	901.06
Portland Cement	901.01(b)
Reinforcing Bars *and WWR*	910.01
Slag Cement	*901.03*
Silica Fume	901.04
Uncoated Seven-Wire Strand	910.01(b)7

SECTION 707, BEGIN LINE 47, INSERT AS FOLLOWS:

707.03 General Requirements

Dimensions and design requirements for structural members shall be as shown on the plans. Lengths and dimension tolerances shall be as shown on the plans or as otherwise specified. A beam which is to include a field attached curb shall have curb reinforcement located longitudinally within 3/4 in. of the locations shown on the plans. ~~If detailed drawings are not included in the plans, w~~*W*orking drawings shall be submitted for approval in accordance with 105.02. Certified mill test reports shall be furnished for all uncoated seven-wire strands.

SECTION 707, BEGIN LINE 395, DELETE AND INSERT AS FOLLOWS:

707.08 Handling and Shipping

Precast and precast, prestressed structural members shall not be subjected to excessive abuse which produces crushing or undue marring of the concrete. All structural members damaged during handling, storing, transporting, or erecting shall be replaced. Unless otherwise approved, precast and precast, prestressed structural members shall be

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 – PRECAST AND PRECAST, PRESTRESSED CONCRETE STRUCTURAL MEMBERS
707.02 Materials
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handled with a suitable hoisting device provided with a spreader sling. The spreader shall be of sufficient length to prevent horizontal forces being produced in the structural member due to lifting and shall be equipped with leads and hooks at each end. *Unless otherwise shown on the contract plans, the location of the lifting points along the tops of the beams shall be in accordance with the transportation support point requirements given herein. If any other method of handling is used, it shall be shown on the working drawings. If the method produces horizontal forces in the precast, or precast~~,~~ prestressed structural member, design calculations shall be submitted showing resulting stresses~~,~~. ~~and that t~~The design of the structural members ~~is~~ shall be satisfactory to handle these stresses in accordance with AASHTO LRFD Bridge Design Specifications.* The structural members shall be lifted by the devices *and procedures* shown on the ~~plans~~*working drawings*. ~~Proposed alternate lifting devices and procedures shall be approved prior to use and shown on the working drawings. If any other method of handling is used, it shall be shown on the working drawings and approved prior to use. If the method produces horizontal forces in the precast or precast, prestressed structural member, sufficient reinforcement shall be added to compensate for them.~~

The structural members shall remain in an upright position at all times and shall be supported as indicated herein when in storage and during transportation to the construction site.

In storage, all structural members shall be fully supported across their width on battens not less than 4 in. wide with one being placed at each end at the centerline of the bearing. The supports of the structural members while in storage shall be maintained in a level position so no twisting occurs.

Precast structural members shall not be *lifted,* shipped, or used until the concrete compressive strength reaches a minimum of 4,500 psi for members which are not prestressed and 5,000 psi for members which are prestressed.

During transportation, the structural members shall be supported with truck bolsters or battens no less than 4 in. wide which are padded with no less than 1/2 in. of rubber. The ends of I-beams, U-beams, and bulb-T beams shall extend no more than the depth of the beam and not more than 3 ft 6 in. beyond the supports. The ends of box-beams shall extend no more than 1 1/2 times their depth and not more than 3 ft beyond the supports. The ends of slabs shall extend no more than the depth of the beam beyond the supports. Supports of cantilever beams shall be as shown on the plans. Trucks with double bolsters will be allowed, provided the beams are fully seated on the outer bolsters and the inner bolsters are no more than 8 ft from the ends of the beams. Wood blocks or other suitable material

REVISION TO STANDARD SPECIFICATIONS

SECTION 707 – PRECAST AND PRECAST, PRESTRESSED CONCRETE STRUCTURAL MEMBERS
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707.12 Basis of Payment

shall be placed under the tie chains to prevent chipping the concrete.

707.09 Placing Structural Members

If the method of lifting the structural members in the field differs from the method shown on the beam fabrication working drawings, the Contractor shall submit working drawings and calculations in accordance with 707.08. Erection of precast, prestressed structural members shall commence at the centerline and proceed out to the curb, one member at a time. As each structural member is placed, the transverse tie bars, if shown on the plans, shall be inserted and secured. Any shifting of the structural members shall be done while they are held free of the supports by the hoisting device. The use of a steel pinch bar will not be allowed. Structural members shall be set to proper line and grade with uniform bearing on bridge seats, mortar joints, or bearing pads as required on the plans. When required, structural members shall be secured to the pier or bent with dowel rods. Holes for dowels shall be filled with mortar at fixed ends and with crack or joint filler at expansion ends. Longitudinal keyway joints shall be cleaned. A coat of cement mortar shall be scrubbed on the surface. The joint shall be filled with a non-shrinking grout composed of 1 part portland cement, 2 parts No. 23 fine aggregate, and an approved non-shrinking additive or a non-shrink, non-metallic cementation grout in accordance with ASTM C1107. All bolts or drains shown on the plans as necessary or desirable to be placed in the concrete shall be placed by the methods and at the locations shown on the plans. Necessary tie rods, tie bolts, and hardware for tying structural members together shall be furnished.

SECTION 707, BEGIN LINE 495, INSERT AS FOLLOWS:

Reinforcing bars, *WWR*, prestressing strands, elastomeric bearing pads, modifications to bearing pads, bearing beams required for box beams, bearing assemblies required for I-beams, bulb-T beams, U-beams, and box beams, bearing plates, threaded reinforcing bars, threaded inserts in fascia beams, hex bolts, sealer on the outside face and bottom flange of fascia beams and on the tops of all beams, *working drawings and design calculations,* and necessary incidentals shall be included in the cost of the pay items of this section. The cost of tensioning rods and steel plates shall be included in the cost of the pay items of this section. The cost for providing all molds, cylinder identification tags, facilities, labor, and materials necessary to prepare and cure the test specimens required for work in this section shall be included in the cost of the pay items in this section.

COMMENTS AND ACTION

707.02 Materials
707.03 General Requirements
707.08 Handling and Shipping
707.09 Placing Structural Members
707.12 Basis of Payment

DISCUSSION:
Mr. White introduced and presented this item stating that the requirements given in Standard Specification section 707 related to working drawings, lifting, and placing precast prestressed structural members could benefit from additional clarification. The current requirements don't provide standard lifting parameters and instead defer to the plans, which don't typically specify lifting points. Welded wire reinforcing, WWR, has been used on several recent projects and the use is expected to increase, but is not explicitly referenced in 707.

Mr. White proposed to update 707 in order to clarify the requirements for working drawings, lifting, and placing precast, prestressed structural members. WWR has also been referenced in the material section of the specification.

Prior to the meeting:
Mr. Koch asked about the wording in 707.08 regarding “transportation support point requirements”, and if the language is used elsewhere, such as an ITM? Mr. Koch suggested changing the sentence for clarification. Mr. White agreed that we need to clean things up a bit, but is attempting to define the lifting point locations as being the same as the transportation support points as specified in the last paragraph of 707.08. Mr. White offered to change the sentence in question to “Unless otherwise shown on the plans, the locations of the lifting points shall be in accordance with the transportation support point requirements specified herein.” The issue is that the lifting locations and lifting devices aren’t shown on the contract plans, nor do we want to dictate those means and methods of the Contractor. However, we do want to provide some parameters on acceptable locations of those lifting points.
Mr. Koch asked if the lift points and lifting method could be in accordance with the working drawings?
Mr. White responded that yes, the lifting loop responsibility is on the Contractor. The lifting loops should not be shown on the standard drawings. In practice, Designers don’t show lifting loop locations on the design plans, so having a Standard Drawing with a tolerance for their location doesn’t make any sense.
Our intent is to continue to allow the Fabricators and Contractors to lift the beams using lifting loops at the tops of the beams. The main issue that we’re trying to address is the Specifications aren’t accurately describing the current process, which has been working well for a long time. The Specifications currently indicate that the beams “shall be lifted by the devices shown on the plans.” However, Designers don’t show the lifting devices on the plans, so that statement doesn’t really apply. I’d rather provide general parameters for allowable lifting point locations (same as support point locations), and allow the Fabricator to continue to design their lifting means and methods.

Mr. Koch stated that the sentence referring to the lifting points is confusing, and it seems that the lifting point sentence is unnecessary and could be struck. Ideally ‘The structural members shall be lifted’ sentence could be moved up to provide proper flow. That said; if the process is working, I have no objections.

Following a brief discussion, and suggestions by Ms. Mouser, the revisions, for clarification, are as shown above.

COMMENTS AND ACTION

707.02 Materials
707.03 General Requirements
707.08 Handling and Shipping
707.09 Placing Structural Members
707.12 Basis of Payment

Mr. White revised his motion, which was seconded by Mr. Novak. There was no further discussion and this item passed as revised.

Motion: Mr. White Second: Mr. Novak Ayes: 10 (Mr. Wooden joined for this item) Nays: 0 FHWA Approval: YES	Action: ___ Passed as Submitted _X_ Passed as Revised ___ Withdrawn
Standard Specifications Sections referenced and/or affected: 707 begin pg 663	_X_ 2024 Standard Specifications ___ Revise Pay Items List
Recurring Special Provision: TBD	___ Create RSP (No.__) Effective: RSP Sunset Date:
Standard Drawings: E 707-BFBP series	_X_ Revise RSP (No. 707-B-318) Effective: September 1, 2022 RSP Sunset Date:
Design Manual Sections: Chapter 406	___ Standard Drawing Effective:
GIFE Sections cross-references: Section 5	___ Create RPD (No. __) Effective: _X_ GIFE Update ___ Frequency Manual Update ___ SiteManager Update