INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

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Mitchell E. Daniels, Jr., Governor
Michael B. Cline, Commissioner

AGENDA

February 16, 2012 Standards Committee Meeting

MEMORANDUM

February 03, 2012

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Agenda for the February 16, 2012 Standards Committee Meeting

A Standards Committee meeting is scheduled for 09:00 a.m. on February 16, 2012 in the N955 Bay Window Conference Room. Please enter meeting through the double doors directly in front of the conference room.

The following agenda items are listed for consideration.

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. Approval of the Minutes from January 19, 2012 Meeting

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

(No items on this agenda)

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

OLD BUSINESS

Item No. 03 01/19/12 (2012 SS)	Mr. Pankow	pg 04
Recurring Special Provision		
704-X-XXX	~~*PLACING REINFORCEMENT AND CONCRETE*~~ *DECK POUR SEQUENCE*	

Item No. 08 01/19/12 (2012 SS)	Mr. Walker	pg 08
Recurring Special Provision		
401-R-581	JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~	

Item No. 09 01/19/12 (2012 SS)	Mr. Walker	pg 13
401.04	Design Mix Formula	
401.05	Volumetric Mix Design	
401.08	Job Mix Formula	
401.09	Acceptance of Mixtures	
401.11	Preparation of Surfaces to be Overlaid	
401.16	Density	
401.20(d)	BSG of the Density Core	
401.22	Basis of Payment	
402.04	Design Mix Formula	
402.06	Job Mix Formula	
402.11	Preparation of Surfaces to be Overlaid	
402.16	Low Temperature Compaction Requirements	
402.20	Basis of Payment	
410.04	Design Mix Formula	
410.08	Job Mix Formula	
410.16	Density	
410.20(c)	BSG of the Density Core	
SECTION 415	*BASE SEAL*	

NEW BUSINESS

Item No. 01 02/16/12 (2012 SS)	Mr. Strain	pg 22
706.03	Concrete Railing	
910.20	Steel Bridge Railing Components	

Standard Drawings:

706-BCBR-01	BRIDGE RAILING TYPE FC
706-BCBR-02	BRIDGE RAILING TYPE FT
706-BCBR-03	CONCRETE BRIDGE RAILING PLACEMENT
~~706-BCBR-04~~	~~CONCRETE BRIDGE RAILING~~
706-BRPP-01	RAILING, PF-1
706-BRPP-02	RAILING, PF-2
706-BRPP-03	RAILING, PS-1
706-BRPP-04	RAILING, PS-2
706-BRPP-05	RAILING, PF *&AND* PS *RAIL SPLICE* DETAILS
706-BRPP-06	RAILING, PF & PS DETAILS
706-BRTF-01	~~CONCRETE BRIDGE~~ RAILING, ~~TYPE~~ TF-2

706-BRTF-02	~~CONCRETE BRIDGE~~ RAILING, ~~TYPE~~ TF-2 RAIL SPLICE DETAILS
706-BRTF-03	~~CONCRETE BRIDGE~~ RAILING, ~~TYPE~~ TF-2 ~~MISCELLANEOUS~~ DETAILS
~~706-BRTF-04~~	~~CONCRETE BRIDGE RAILING TYPE TF-2~~
~~706-BRTF-05~~	~~CONCRETE BRIDGE RAILING TYPE TF-2 DETAILS~~
~~706-BRTF-06~~	~~CONCRETE BRIDGE RAILING TYPE TF-2~~
~~706-BRTF-07~~	~~CONCRETE BRIDGE RAILING TYPE TF-2~~
~~706-BRTF-08~~	~~CONCRETE BRIDGE RAILING TYPE TF-2 RAILING SPLICE DETAIL~~
~~706-BRTF-09~~	~~CONCRETE BRIDGE RAILING TYPE TF-2~~
~~706-BRTM-01~~	~~RAILING, CF-1~~
~~706-BRTM-02~~	~~RAILING, CF-1~~
706-BRTX-01	RAILING, TX ~~(~~TYPICAL PANEL~~)~~
706-BRTX-02	RAILING, TX ~~(SPAN PILASTER)~~*WINDOW DETAILS*
706-BRTX-03	RAILING, TX ~~(WINDOW DETAILS)~~*SPAN PILASTER*
706-BRTX-04	RAILING, TX ~~(~~PIER OR END BENT PILASTER~~)~~
706-TBRC-01	RETROFIT THRIE BEAM BRIDGE RAILING TR
706-TBRC-02	RETROFIT THRIE BEAM BRIDGE RAILING *TR*
706-TBRC-03	RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS
706-TBRC-04	*RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS*
706-TBRC-05	*RETROFIT THRIE BEAM GUARDRAIL TRANSITION*
706-TBRC-06	*RETROFIT THRIE BEAM GUARDRAIL HEIGHT TRANSITION*
706-TBRE-01	RETROFIT THRIE BEAM BRIDGE RAILING ~~TR COMPONENTS~~
~~706-TBRF-01~~	~~RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS~~
~~706-TBRF-02~~	~~RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS~~

Indiana Design Manual

Figure ~~61-6B~~*404-4B*	BRIDGE-RAILING TYPES

Note: Supporting and backup materials (Crash Test Details) for this item available at: http://www.in.gov/dot/div/contracts/standards/sc/2012/feb/CrashTestDetails.pdf

Item No. 02 02/16/12 (2012 SS) Mr. Pankow pg 88

711.08	Mill Test Reports

cc: Committee Members (11)
FHWA (2)
ICA (1)

Mr. Pankow
Date: 02/16/12

SPECIFICATIONS, SPECIAL PROVISIONS AND DRAWINGS (OLD BUSINESS)

REVISION TO SPECIAL PROVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: There is confusion regarding finishing machine minimum rate of progress for bridge deck pours.

PROPOSED SOLUTION: Adjust language in the 704 section to better explain the deck pour requirements.

APPLICABLE STANDARD SPECIFICATIONS: 704.04

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: 404-2.06(02)2a

APPLICABLE SECTION OF GIFE: 5.16

APPLICABLE RECURRING SPECIAL PROVISIONS: create new 704 recurring special provision

PAY ITEMS AFFECTED: None

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 2-5502

Date: January 26, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc group consisting of: Greg Pankow, Jim Reilman, and Randy Strain.

REVISIONS TO SPECIAL PROVISIONS (OLD BUSINESS)

PROPOSED NEW 704-X-XXX DECK POUR SEQUENCE

(This RSP was titled "PLACING REINFORCEMENT AND CONCRETE" on Agenda for January 19, 2012 meeting, item 03)

704-X-XXX DECK POUR SEQUENCE

(Adopted XX-XX-12)

The Standard Specifications are revised as follows:

SECTION 704, BEGIN LINE 32, DELETE AND INSERT AS FOLLOWS:

704.04 Placing Reinforcement and Concrete

Applicable provisions of 703 shall apply to placing reinforcing bars. No concrete shall be placed until the reinforcement is entirely and securely in place and has been inspected and approved. Walkways shall be in accordance with 702.20(a). Placing of reinforcement during placing of concrete will not be permitted without prior written approval. Splices, when permitted, shall be at locations of least tension in the steel.

The concrete deck pour sequence and procedure shall be submitted *a minimum of 14 days prior to the planned deck pour* for approval. ~~The minimum pour rate is that which permits the finishing machine to progress at a rate of at least 25 ft/h (7.6 m/h). If this rate is not achieved, placement of transverse construction joints may be directed. The addition of construction joints shall be performed with no additional payment. Placement of concrete, when once started, shall be continuous between joints. Horizontal joints will not be permitted.~~*The submittal shall include the following information:*

(a) the contract number;
(b) the Contractor's name;
(c) the bridge file number;
(d) a statement indicating whether the pour sequence shown on the plans is being followed, or the Contractor's proposed pour sequence, whichever is applicable;
(e) the Contractor's proposed pour rate;
(f) the approved concrete mix design; and
(g) the driving time from the concrete batching location to the jobsite.

If, during the pour, the approved pour rate is not achieved, placement of transverse construction joints may be directed as shown on the plans. Placement of concrete shall be continuous between joints. Horizontal joints will not be permitted.

Floor drains shall be placed in gutters at locations shown on the plans and fastened securely before placing the surrounding concrete. The tops of the floor drains shall be no more than 1/2 in. (13 mm) below the adjacent gutter grade. The drains shall be constructed so drainage water is not discharged against portions of the structure.

Expansion joints shall be constructed as shown on the plans and the material shall be in accordance with 906.01.

REVISIONS TO SPECIAL PROVISIONS (OLD BUSINESS)

PROPOSED NEW 704-X-XXX DECK POUR SEQUENCE

~~Transverse construction joints as shown on the plans for the floor slab of prestressed concrete beam structures may be eliminated by written approval under the condition as follows:~~

~~(a) A retarding or a water-reducing retarding admixture shall be used in the concrete to delay set as required and approved.~~

~~(b) Concrete shall be placed for the full width of the structure, unless otherwise approved.~~

~~(c) It is determined that the concrete on 2 adjacent spans can be placed within a period of time which is less than the time for the initial set of the concrete section over the pier common to the 2 spans.~~

COMMENTS AND ACTION (OLD BUSINESS)

704-X-XXX DECK POUR SEQUENCE

Motion: Second: Ayes: Nays:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 704.04 pg 520 and 521. Recurring Special Provision affected: NONE Standard Sheets affected: NONE Design Manual Sections affected: 404-2.06(02)2a GIFE Sections cross-references: Section 5.7.2 and 5.16	____ 20__ Standard Specifications Book ____ Revise Pay Items List ____ Create RSP (No.____) Effective ____ Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____ Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____ Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y___N___ By ____ Addition or ____ Revision Received FHWA Approval? ____

SPECIFICATIONS, SPECIAL PROVISION AND STANDARD DRAWINGS (OLD BUSINESS)
REVISION TO SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Joint Adhesive Unique Special Provision has successfully been placed on several contracts in 2011 and to obtain information on the cost of this application a Recurring Special Provision should be developed and placed in several contracts in 2012. Additionally a provision to require a fog seal after the application of the joint adhesive should be added to Recurring Special Provision to further seal the joint.

PROPOSED SOLUTION: Make the Unique Special Provision for Joint Adhesive and Informational Cores into a Recurring Special Provision and revise the specifications as follows:

1. Move the joint adhesive description, testing, and acceptance requirements into section 906. There is more than one product available for this application that can meet the acceptance requirements.

2. Add a fog seal requirement to be applied after all density cores have been taken and the milled centerline corrugations, when specified, have been completed.

3. Add additional information on the application of the temporary pavement markings.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS: 401-R-581

Submitted By: Ron Walker
Title: Manager, Office of Materials Management
Organization: INDOT
Phone Number: 317-610-7251 x 204
Date: 1-6-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? These specification revisions are recommended by INDOT/APAI Technical Committee.

REVISION TO SPECIAL PROVISION (OLD BUSINESS)

401-R-581 JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~

(This provision (2010 SS) was approved on 09/16/10 Standards Committee Meeting and used on selected projects as the Unique Special Provision. Proposed changes are shown highlighted in gray.)

401-R-581 JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~

(Revised XX-XX-12)

The Standard Specifications are revised as follows:

~~SECTION 401, AFTER LINE 8, INSERT AS FOLLOWS:~~

~~*Joint adhesive is a hot applied asphalt material that is used to seal the construction joint formed between the adjacent HMA pavement courses.*~~

~~SECTION 401, AFTER LINE 31, DELETE AND INSERT AS FOLLOWS:~~

~~*Joint adhesive shall meet the following material requirements.*~~

~~*Test*~~	~~*Method*~~	~~*Test Results*~~
~~*Softening Point, °F (°C)*~~	~~*AASHTO T 51*~~	~~*170 (77) minimum*~~
~~*Ductility @ 77 °F (25 °C) (5 cm/min)*~~	~~*AASHTO T 51*~~	~~*> 30*~~
~~*Ductility @ 39 °F (4 °C) (5 cm/min)*~~	~~*AASHTO T 51*~~	~~*> 30*~~
~~*Apparent Viscosity, cp, @ 400 °F (230°C)*~~	~~*ASTM D 2669*~~	~~*4,000 – 10,000*~~
~~*Asphalt Compatibility*~~	~~*AASHTO M 301*~~	~~*Pass*~~
~~*Cone Penetration, mm*~~	~~*AASHTO M 301*~~	~~*60.0 – 100.0*~~
~~*Flow, mm*~~	~~*AASHTO M 301*~~	~~*< 5*~~
~~*Resilience @ 77 °F (25 °C), %*~~	~~*AASHTO M 301*~~	~~*> 30*~~
~~*Tensile Adhesion @ 77 °F (25 °C)*~~	~~*AASHTO M 301*~~	~~*> 500*~~
~~*Flexibility @ 0 °F (-18 °C)*~~	~~*ASTM D 3111*~~	~~*Pass*~~
~~*Flash Point, °F (°C)*~~	~~*AASHTO T 48*~~	~~*> 410 (210)*~~

~~*The adhesive will be accepted by type A certification in accordance with 916 for each batch or lot of material furnished.*~~

SECTION 401, AFTER LINE ~~342~~ *335*, INSERT AS FOLLOWS:

Joint adhesive in accordance with 906 shall be applied to longitudinal joints constructed in the top course of dense graded intermediate mixtures and all surface mixture courses. This includes joints within the traveled way as well as between any of the following: traveled way and an auxiliary lane, traveled way and a paved shoulder, and auxiliary lane and a paved shoulder.

The material shall be heated in a jacketed, double boiler melting kettle. The kettle shall have an attached pressure feed wand system with applicator shoe.

The joint adhesive shall be applied to the face of the previously constructed edge at the joint using a wand applicator. Prior to application of the joint adhesive, the joint face shall be dry and free of loose material and foreign objects. The adhesive shall be

REVISION TO SPECIAL PROVISION (OLD BUSINESS)
401-R-581 JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~

applied on the joint face 1/8 in. ~~(3 mm)~~ thick at the temperature recommended by the manufacturer. Excess joint adhesive shall not be allowed to pool on the top of the previously constructed pavement course or the pavement to be overlaid. The application of the adhesive shall be made within the same day, but at least 15 min prior to construction of the longitudinal joint.

All surface mixture longitudinal joints that have the joint adhesive applied shall be fog sealed using AE-F asphalt emulsion in accordance with 902.01(b). The fog sealing operation shall not begin until all density cores in accordance with 401.16 and 401.20 have been obtained and the installation of milled centerline corrugations, when specified, has been completed.

The fog seal shall be applied on the joint line a minimum width of 24 in. and a maximum width of 28 in. and may be extended, when necessary, to provide coverage beyond the edge of the corrugation. The fog seal shall be applied at an application rate of 0.06 ± 0.02 gal/sq yd onto a dry surface, free of any foreign or loose material, using a distributor in accordance with 409.03(a). The ambient air or pavement temperature at the time of application shall be greater than 32°F. Temporary pavement markings in accordance with 801.12 shall be offset a sufficient distance from the longitudinal joint so as to not to obstruct the installation of the milled centerline corrugations or the application of the fog seal. The fog seal shall be cured a minimum of 5 days prior to applying the permanent pavement traffic markings in accordance with 808.

~~SECTION 401, BEGIN LINE 362, DELETE AS FOLLOWS:~~

~~*Density acceptance by cores will be based on samples obtained from 2 random locations selected by the Engineer within each sublot in accordance with ITM 802. One core shall be cut at each random location in accordance with ITM 580. The transverse core location will be located so that the edge of the core will be no closer than 12 in.(300 mm) from the edge of the course being placed. The maximum specific gravity will be determined from the samples obtained in 401.09.*~~

~~*In addition, 2 informational cores shall be obtained at the same station as the density acceptance cores. The center of 1 core shall be located 6 in. (150 mm) from the left edge of the course being placed and the center of the other core shall be located 6 in. (150 mm) from the right edge of the course being placed. These informational cores will not be used in the density pay factor determination.*~~

SECTION 401, AFTER LINE ~~667~~*745*, INSERT AS FOLLOWS:

Joint adhesive will be measured by the linear foot in accordance with 109.01(a).
Fog seal will be measured by the square yard complete in place.

SECTION 401, AFTER LINE ~~681~~*759*, INSERT AS FOLLOWS:

Joint adhesive will be paid for by the linear foot, complete in place.
Fog seal will be paid for at the contract unit price per square yard.

SECTION 401, AFTER LINE ~~685~~*763*, INSERT AS FOLLOWS:

REVISION TO SPECIAL PROVISION (OLD BUSINESS)

401-R-581 JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~

Fog Seal ..... *SYS*
Joint Adhesive, _____ ..... *LFT* ~~*(m)*~~
course type

SECTION *906*, AFTER LINE 77, INSERT AS FOLLOWS:

3. Hot Poured Joint Adhesive

Joint adhesive is a hot applied asphalt material that is used to seal the longitudinal construction joint formed between the adjacent HMA pavement courses.

Joint adhesive shall be in accordance with the following:

Test	*Method*	*Test Results*
Softening Point, °F (°C)	*AASHTO T 53*	*> 170 (77)*
Ductility @ 77 °F (25 °C), mm	*AASHTO T 51*	*> 300*
Ductility @ 39 °F (4 °C), mm	*AASHTO T 51*	*> 300*
Apparent Viscosity @ 400 °F (204°C), cp	*ASTM D 2669*	*4,000 – 11,000*
Asphalt Compatibility	*ASTM D 5329*	*Pass*
Cone Penetration @ 77 °F (25 °C), mm	*ASTM D 5329*	*50.0 – 100.0*
Flow @ 140 °F (60 °C), mm	*ASTM D 5329*	*< 5*
Resilience @ 77 °F (25 °C), %	*ASTM D 5329*	*> 30*
Tensile Adhesion @ 77 °F (25 °C), mm	*ASTM D 5329*	*> 500*
Flexibility @ 0 °F (-18 °C)	*ASTM D 3111*	*Pass*
Flash Point, °F (°C)	*AASHTO T 48*	*> 410 (210)*

The joint adhesive will be accepted by type A certification in accordance with 916 for each batch or lot of material furnished.

COMMENTS AND ACTION (OLD BUSINESS)

401-R-581 JOINT ADHESIVE ~~AND INFORMATIONAL CORES~~

Motion: Second: Ayes: Nays:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 401.14 pg 241; 401.21 pg 252; 401.22 pg 253. Recurring Special Provision affected: 401-R-581 JOINT ADHESIVE AND INFORMATIONAL CORES Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Revise Pay Items List ____ Create RSP (No.____) Effective ____ Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____ Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____ Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y___N___ By ____ Addition or ____ Revision Received FHWA Approval? ____

SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS (OLD BUSINESS)
REVISION TO SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The following HMA items require revisions to sections 401, 402, 410, and 415:

1. Preparation of Surfaces to be Overlaid (401.11) -- Additional requirements for maintaining the pavement course or subgrade during construction is needed to include proofrolling a previously constructed course prior to placing a subsequent course. Pavement or subgrade that yields as a result of the proofroll shall be removed and replaced prior to placement of any subsequent course. The cost of this work shall be included in the cost of the other pay items. This requirement is currently in 402.12.

2. Base Seal (401.11, 402.11) -- HMA mixtures placed below open graded mixtures should be sealed to prevent the penetration of moisture into the subgrade. This requirement would not be needed on the base in a full depth section without open-graded mixture because there is no means for the moisture to be removed from the pavement and an accumulation of moisture within the full depth section could be damaging. Time limitations are required to allow density cores to be taken to assure that the base mixture is not exposed to moisture for any significant amount of time. A separate section (415) is required to designate the materials allowed for this application, the construction requirements, and basis of payment of the base seal.

3. Design Mix Formula (401.04, 402.4, 410.04) and DMF/JMF (401.08,402.04, 410.08) -- A maximum temperature of HMA is needed to prevent pavement cracking which has occurred when mixtures are produced at excessively high temperatures. Depending on the PG asphalt used, a maximum plant discharge temperature is required. Also, restrictions on the use of the water-injection foaming device should be removed because of the success we have had with this process.

4. Bulk Specific Gravity of HMA Specimens (401.05, 401.16, 401.20 (b), 402.16, 410.15, and 410.20 (c)) -- AASHTO T 166, Bulk Specific Gravity of Compacted HMA Using SSD Specimens, has been revised to allow T 275 (Parrafin-Coated method) or T 331 (Vacuum Sealing method) to be used when the sample contains open or interconnecting voids or absorbs more than 2.0 % of water by volume. We have conducted a study that indicates there is a significant difference between test values of these two test procedures on the same samples and designating only T 275 as the test method to be used is required. AASHTO will revise T 166 in 2013 based on our study and studies by other states.

SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS (OLD BUSINESS)
REVISION TO SPECIFICATIONS

5. Volumetric Mix Design (401.05) -- Recycled materials, to include RAP and RAS, should be allowed in open-graded mixtures to promote the greater use of these materials. Additional requirements for the binder type when fibers or reclaimed asphalt shingles are used are required.

6. Job Mix Formula (402.06) -- Requirements for changes in the source and grade of the binder when 0 -15 % RAP is used in the mixture should be deleted because this requirement has been replaced by the binder replacement specification in 402.

PROPOSED SOLUTION: The following revisions are recommended:

1. Add proofrolling requirements for maintaining a pavement course or subgrade during construction

2. Require the base mixture placed below open graded mixtures to be sealed

3. Add a maximum plant discharge temperature requirement for HMA

4. Require AASHTO T 275 when specimens contain open or interconnecting voids or absorb more than 2.0 % of water by volume.

5. Allow RAP and RAS in open graded mixtures

APPLICABLE STANDARD SPECIFICATIONS: 401.04, 401.05, 401.08, 401.11, 401.13, 401.16, 401.20(b), 401.21, 402.04, 402.06, 402.11, 402.16, 410.04, 410.08, 410.15, and 410.20(c)

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION:

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS:

Submitted By: Ron Walker
Title: Manager, Office of Materials Management
Organization: INDOT
Phone Number: 317-610-7251 x 204
Date: 1-30-12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? These specification revisions are recommended by the INDOT/APAI Technical Committee.

REVISION TO SPECIFICATIONS (OLD BUSINESS)

SECTION 401 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT
401.04 DESIGN MIX FORMULA
401.05 VOLUMETRIC MIX DESIGN
401.08 JOB MIX FORMULA
401.09 ACCEPTANCE OF MIXTURES
401.11 PREPARATION OF SURFACES TO BE OVERLAID
401.16 DENSITY
401.20(d) BSG OF THE DENSITY CORE
401.22 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 48, DELETE AND INSERT AS FOLLOWS:

The plant discharge temperature for any mixture shall not be more than 315°F whenever PG 58-28, PG 64-22, PG 64-28 or PG 70-22 binders are used or 325°F whenever PG 70-28 or PG 76-22 binders are used. QC/QA HMA may be produced ~~as warm mix asphalt, WMA, by~~ using a water-injection foaming device. ~~for ESAL category 1, 2 and 3 mixtures.~~ The DMF shall list the minimum *and maximum* plant discharge temperature*s* ~~for HMA and WMA~~ as applicable to the mixture.

SECTION 401, BEGIN LINE 79, INSERT AS FOLLOWS:

determined in water in accordance with AASHTO T 209. The bulk specific gravity of the gyratory specimens shall be determined in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required,* for dense graded mixtures and AASHTO T 331 for open graded mixtures.

The percent draindown of open graded mixtures shall not exceed 0.30% in accordance with AASHTO T 305. Open graded mixtures may incorporate *recycled materials and* fibers. *The recycled materials shall be in accordance with 401.06, and the fiber type and minimum dosage rate shall be in accordance with AASHTO M 325.* The binder for open graded mixtures ~~containing fibers~~ may ~~be reduced by 1 temperature classification, 6°C, for the upper temperature classification. The fiber type and minimum dosage rate shall be in accordance with AASHTO M 325~~*have the upper temperature classification reduced by 6°C from the specified binder grade if fibers are incorporated into the mixture or if a minimum of 3.0% reclaimed asphalt shingles by weight of the total mixture are used.*

SECTION 401, BEGIN LINE 190, DELETE AND INSERT AS FOLLOWS:

A job mix formula, JMF, shall be developed by a certified HMA producer. A JMF used in the current or previous calendar year that was developed to N_{des} will be allowed. The mixture compaction temperature shall be 300 ± 9°F ~~(150 ± 5 °C)~~ for dense graded mixtures and 260 ± 9 °F ~~(125 ± 5 °C)~~ for open graded mixtures. The JMF shall list the minimum *and maximum* plant discharge temperature*s* ~~for HMA and WMA~~ as applicable to the mixture. The JMF for each mixture shall be submitted to the Engineer and shall use the same MAF as the DMF.

SECTION 401, BEGIN LINE 222, INSERT AS FOLLOWS:

REVISION TO SPECIFICATIONS (OLD BUSINESS)

SECTION 401 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT
401.04 DESIGN MIX FORMULA
401.05 VOLUMETRIC MIX DESIGN
401.08 JOB MIX FORMULA
401.09 ACCEPTANCE OF MIXTURES
401.11 PREPARATION OF SURFACES TO BE OVERLAID
401.16 DENSITY
401.20(d) BSG OF THE DENSITY CORE
401.22 BASIS OF PAYMENT

The bulk specific gravity of gyratory specimens for dense graded mixtures will be determined in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required*, except samples are not required to be dried overnight. The bulk specific gravity of gyratory specimens for open graded mixtures, OG19.0, OG25.0 will be determined in accordance with AASHTO T 331.

SECTION 401, AFTER LINE 310, INSERT AS FOLLOWS:

Prior to placing an open graded mixture, the underlying HMA course shall have a full width base seal applied in accordance with 415. The base seal materials shall be applied within 3 calendar days after all density cores in accordance with 401.16 have been obtained.

SECTION 401, AFTER LINE 315, INSERT AS FOLLOWS:

All partially completed sections of roadway that are 8 in. or less in thickness shall be proofrolled prior to the placement of additional materials the following spring. Proofrolling shall be accomplished in accordance with 203.26. The contact pressure shall be 70 to 80 psi. Soft yielding areas shall be removed and replaced.

SECTION 401, BEGIN LINE 423, INSERT AS FOLLOWS:

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required*. The maximum specific gravity will be mass determined in water in accordance with AASHTO T 209.

SECTION 401, BEGIN LINE 728, INSERT AS FOLLOWS:

(d) BSG of the Density Core

Additional cores shall be taken within 7 calendar days unless otherwise directed. Additional core locations will be determined by adding 1 ft ~~(0.3 m)~~ longitudinally of the cores tested using the same transverse offset. The appeal density cores will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required.*

SECTION 401, AFTER LINE 779, INSERT AS FOLLOWS:

The cost of removing and replacing soft and yielding areas discovered by proofrolling shall be included in the cost of other pay items in this section.

REVISION TO SPECIFICATIONS (OLD BUSINESS)

SECTION 402 – HOT MIX ASPHALT, HMA, PAVEMENT
402.04 DESIGN MIX FORMULA
402.06 JOB MIX FORMULA
402.11 PREPARATION OF SURFACES TO BE OVERLAID
402.16 LOW TEMPERATURE COMPACTION REQUIREMENTS
402.20 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 402, BEGIN LINE 39, DELETE AND INSERT AS FOLLOWS:

The plant discharge temperature for any mixture shall not be more than 315°F whenever PG 58-28, PG 64-22, PG 64-28 or PG 70-22 binders are used or 325°F whenever PG 70-28 or PG 76-22 binders are used. HMA may be produced ~~as warm-mix asphalt, WMA, by~~ using a water-injection foaming device. ~~for temporary HMA mixtures and type A, B and C mixtures.~~ The DMF shall list the minimum *and maximum* plant discharge temperature*s* ~~for HMA and WMA~~ as applicable to the mixture.

SECTION 402, BEGIN LINE 74, DELETE AS FOLLOWS:

~~For mixtures containing 0.0% to 15.0% RAP, changes in the source and grade of specified binders will be permitted; however, the high temperature grade shall meet the minimum requirements of 402.04.~~

SECTION 402, BEGIN LINE 204, INSERT AS FOLLOWS:

Prior to placing an open graded mixture, the underlying HMA course shall have a full width base seal applied in accordance with 415. The base seal materials shall be applied within 3 calendar days upon completion of paving the underlying HMA course.

SECTION 402, BEGIN LINE 220, DELETE AS FOLLOWS:

~~All partially completed sections of roadway that are 8 in. (200 mm) or less in thickness shall be proofrolled prior to the placement of additional materials the following spring. Proofrolling shall be accomplished in accordance with 203.26. The contact pressure shall be 70 to 80 psi (480 to 550 kPa). Soft yielding areas shall be removed and replaced.~~

SECTION 402, BEGIN LINE 380, INSERT AS FOLLOWS:

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required*. The maximum specific gravity will be mass determined in water in accordance with AASHTO T 209. Density shall not be less than 92.0%.

SECTION 402, BEGIN LINE 431, DELETE AS FOLLOWS:

~~The cost of removing and replacing soft yielding areas discovered by proofrolling shall be included in the cost of other pay items in this section.~~

REVISION TO SPECIFICATIONS (OLD BUSINESS)

SECTION 410 – QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HMA SURFACE – SMA PAVEMENT
410.04 DESIGN MIX FORMULA
410.08 JOB MIX FORMULA
410.16 DENSITY
410.20(c) BSG OF THE DENSITY CORE

The Standard Specifications are revised as follows:

SECTION 410, AFTER LINE 43, INSERT AS FOLLOWS:

The plant discharge temperature for any mixture shall not be more than 315°F whenever PG 58-28, PG 64-22, PG 64-28, or PG 70-22 binders are used or 325°F whenever PG 70-28 or PG 76-22 binders are used. SMA may be produced using a water-injection foaming device. The DMF shall list the minimum and maximum plant discharge temperatures as applicable to the mixture.

SECTION 410, BEGIN LINE 153, INSERT AS FOLLOWS:

410.08 Job Mix Formula

A job mix formula, JMF, shall be developed by a certified HMA producer in accordance with ITM 583. A JMF used for SMA mixture the current or previous calendar year will be allowed. The mixture compaction temperature shall be 300 ± 9°F ~~(150 ± 5°C)~~. *The JMF shall list the minimum and maximum plant discharge temperatures as applicable to the mixture.* The JMF for each mixture shall be submitted to the Engineer.

SECTION 410, BEGIN LINE 344, DELETE AND INSERT AS FOLLOWS:

The Engineer will determine the ~~BSG~~ *bulk specific gravity* of the cores in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required*. The target value for density of SMA mixtures of each sublot shall be 93.0%.

~~The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166, Method A. The maximum specific gravity will be mass determined in water in accordance with AASHTO T 209. Density shall not be less than 92.0%.~~

SECTION 410, BEGIN LINE 465, INSERT AS FOLLOWS:

(c) BSG of the Density Core

Cores shall be taken within 7 calendar days unless otherwise directed. Additional core locations will be determined by adding 1 ft ~~(0.3m)~~ longitudinally of the cores tested using the same transverse offset. The cores will be dried in accordance with ITM 572 and tested in accordance with AASHTO T 166, Method A *or AASHTO T 275, if required*. The Contractor shall clean, dry, and refill the core holes with SMA or HMA surface materials within 1 work day of the coring operations.

REVISION TO SPECIFICATIONS (OLD BUSINESS)

PROPOSED NEW SECTION 415 – BASE SEAL

The Standard Specifications are revised as follows:

SECTION 415, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 415 – BASE SEAL

415.01 Description

This work shall consist of applying asphalt emulsion to the pavement surface in accordance with 105.03.

MATERIALS

415.02 Materials

Base seal materials shall be in accordance with the following:

Asphalt Emulsion, SS-1h, AE-NT.....902.01(b)

CONSTRUCTION REQUIREMENTS

415.03 Equipment

A distributor in accordance with 409.03(a) shall be used.

415.04 Weather Limitations

Base sealing operations shall not be conducted on a wet pavement or when the ambient air or pavement temperature is below 32°F.

415.05 Preparation of Surface

Surfaces shall be clean and free of any foreign or loose material.

415.06 Application of Asphalt Material

The base seal materials shall be applied to the pavement surface uniformly with a distributor at an application rate of 0.22 ± 0.02 gal/sq yd.

415.07 Protection of Surface

The base seal materials shall cure a minimum of 2 hours after application before resuming paving operations.

415.08 Method of Measurement

The base seal will be measured by the ton complete in place.

415.09 Basis of Payment

The base seal will be paid for at the contract unit price per ton.

Payment will be made under:

REVISION TO SPECIFICATIONS (OLD BUSINESS)

PROPOSED NEW SECTION 415 – BASE SEAL

Pay Item	***Pay Unit Symbol***
Base Seal	*TON*

The costs of all asphalt materials, surface preparation and all other necessary incidentals shall be included in the cost of the pay item.

COMMENTS AND ACTION (OLD BUSINESS)

401.04 DESIGN MIX FORMULA
401.05 VOLUMETRIC MIX DESIGN
401.08 JOB MIX FORMULA
401.09 ACCEPTANCE OF MIXTURES
401.11 PREPARATION OF SURFACES TO BE OVERLAID
401.16 DENSITY
401.20(d) BSG OF THE DENSITY CORE
401.22 BASIS OF PAYMENT
402.04 DESIGN MIX FORMULA
402.06 JOB MIX FORMULA
402.11 PREPARATION OF SURFACES TO BE OVERLAID
402.16 LOW TEMPERATURE COMPACTION REQUIREMENTS
402.20 BASIS OF PAYMENT
410.04 DESIGN MIX FORMULA
410.08 JOB MIX FORMULA
410.16 DENSITY
410.20(c) BSG OF THE DENSITY CORE
SECTION 415 – BASE SEAL

Motion:
Second:
Ayes:
Nays:

Action:
_____ Passed as Submitted
_____ Passed as Revised
_____ Withdrawn

Standard Specifications Sections affected:
401.04 pg 233, 234; 401.08 pg 238;
401.09 pg 238, 239; 401.11 pg 240;
401.16 pg 243; 401.20 pg 252;
402.03 pg 255;402.06 pg 256;
402.11 pg 259; 402.12 pg 259;
402.16 pg 263; 402.20 pg 264;
410.04 pg 281; 410.08 pg 284;
410.16 pg 289.

Recurring Special Provision affected:

NONE

Standard Sheets affected:

NONE

Design Manual Sections affected:

NONE

GIFE Sections cross-references:

SECTION 13

____ 20__ Standard Specifications Book

____ Revise Pay Items List

____ Create RSP (No.____)
Effective ____ Letting
RSP Sunset Date: ____

____ Revise RSP (No.____)
Effective ____ Letting
RSP Sunset Date: ____

Standard Drawing Effective ____

____ Create RPD (No. ____)
Effective ____ Letting

____ Technical Advisory

GIFE Update Req'd.? Y ___ N ___
By _____ Addition or _____ Revision

Frequency Manual Update Req'd? Y___N___
By _____ Addition or _____ Revision

Received FHWA Approval? ____

SPECIFICATIONS, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO STANDARD SPECIFICATIONS, STANDARD DRAWINGS AND DESIGN MANUAL

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: In reviewing the bridge rail design materials covered in the Indiana Design Manual chapter 404, figure 404-4B incorrectly identifies the CF-1 rail as a TL-4, The height of the rail was given as 2'-11" instead of the value of 3'-3/4" as ahown in the Standard. The PF-1 rail height is given as 4'-2". The value shown in the Standard is 3'-6".

The Bridge Standards need to be revised for clarity and to correctly reflect the materials as originally crash tested.

The Standard Specifications do not state that the bridge rail is to be built continuous with out joints. The materials for the posts in the bridge rail TF-2 are not called out as high strength steel.

PROPOSED SOLUTION: The Indiana Design Manual Figure 404-4B has been revised. The Bridge Standards listed here are proposed with revisions as noted.

The Standard Specifications section 706 can be revised to include a statement that the bridge rail is to be built without joints.

Section 910.20 can be revised to include the correct steel strength for the railing posts.

Proposed changes:

706-BCBR-01 - 03.....Revise
706-BCBR-04 .....Delete
706-BRPP-01 - 06.....Revise
706-BRTF-01 - 03.....Revise
706-BRTF-04 - 09.....Delete
706-BRTM-01 - 02 .....Delete
706-BRTX-01 - 04.....Revise
706-TBRC-01 - 03 .....Revise
706-TBRE-01.....Delete
706-TBRC-04 - 06 .....New Standards Sheets
706-TBRF-01 - 02.....Delete

SPECIFICATIONS, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO STANDARD SPECIFICATIONS, STANDARD DRAWINGS AND DESIGN MANUAL

APPLICABLE STANDARD SPECIFICATIONS: 706 and 910.20

APPLICABLE STANDARD DRAWINGS:

706-BCBR-01 - 03
706-BCBR-04
706-BRPP-01 - 06
706-BRTF-01 - 03
706-BRTF-04 - 09
706-BRTM-01 - 02
706-BRTX-01 - 04
706-TBRC-01 - 03
706-TBRE-01
706-TBRF-01 - 02

Note: Supporting and backup materials (Crash Test Details) for this item available at:
http://www.in.gov/dot/div/contracts/standards/sc/2012/feb/CrashTestDetails.pdf

APPLICABLE DESIGN MANUAL SECTION: Figure 404-4B

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS: none

PAY ITEMS AFFECTED: none

Submitted By: Randy Strain

Title: Bridge Standards Engineer

Organization: INDOT

Phone Number: 317-232-3339

Date: 1/23/12

APPLICABLE SUB-COMMITTEE ENDORSEMENT:

REVISION TO STANDARD SPECIFICATIONS

SECTION 706 – BRIDGE RAILINGS
706.03 CONCRETE RAILING

The Standard Specifications are revised as follows:

SECTION 706, AFTER LINE 42, INSERT AS FOLLOWS:

Concrete bridge railing shall be built monolithically and continuous from support to support. A joint shall be provided at the end of the bridge between the bridge railing and the railing transition as shown on the plans.

REVISION TO STANDARD SPECIFICATIONS

SECTION 910 – METAL MATERIALS
910.20 STEEL BRIDGE RAILING COMPONENTS

The Standard Specifications are revised as follows:

SECTION 910, BEGIN LINE 1400, DELETE AND INSERT AS FOLLOWS:

910.20 Steel Bridge Railing Components

Materials for steel bridge railing components shall be in accordance with the following~~.~~*:*

(a) Railing *and posts* tubing shall be in accordance with ASTM A 500, Grade B.

(b) Posts, connection plates, splice bars, base plates, and anchor channel bars shall be in accordance with ASTM A *709, Grade* 36 ~~(A 36M)~~. *High strength steel posts and connection plates shall be in accordance with ASTM A 709, Grade 50.*

SECTION 910, BEGIN LINE 1424, DELETE AND INSERT AS FOLLOWS:

(h) Anchor bolts shall be ~~stainless steel~~ *galvanized and* in accordance with ~~ASTM A 276, type 305 or 430. However, they shall have a minimum ultimate strength of 100 ksi (690 MPa)~~ *910.02(g)1*. Threads may be cut or rolled.

REVISION TO STANDARD SPECIFICATIONS

SECTION 910 – METAL MATERIALS
910.20 STEEL BRIDGE RAILING COMPONENTS

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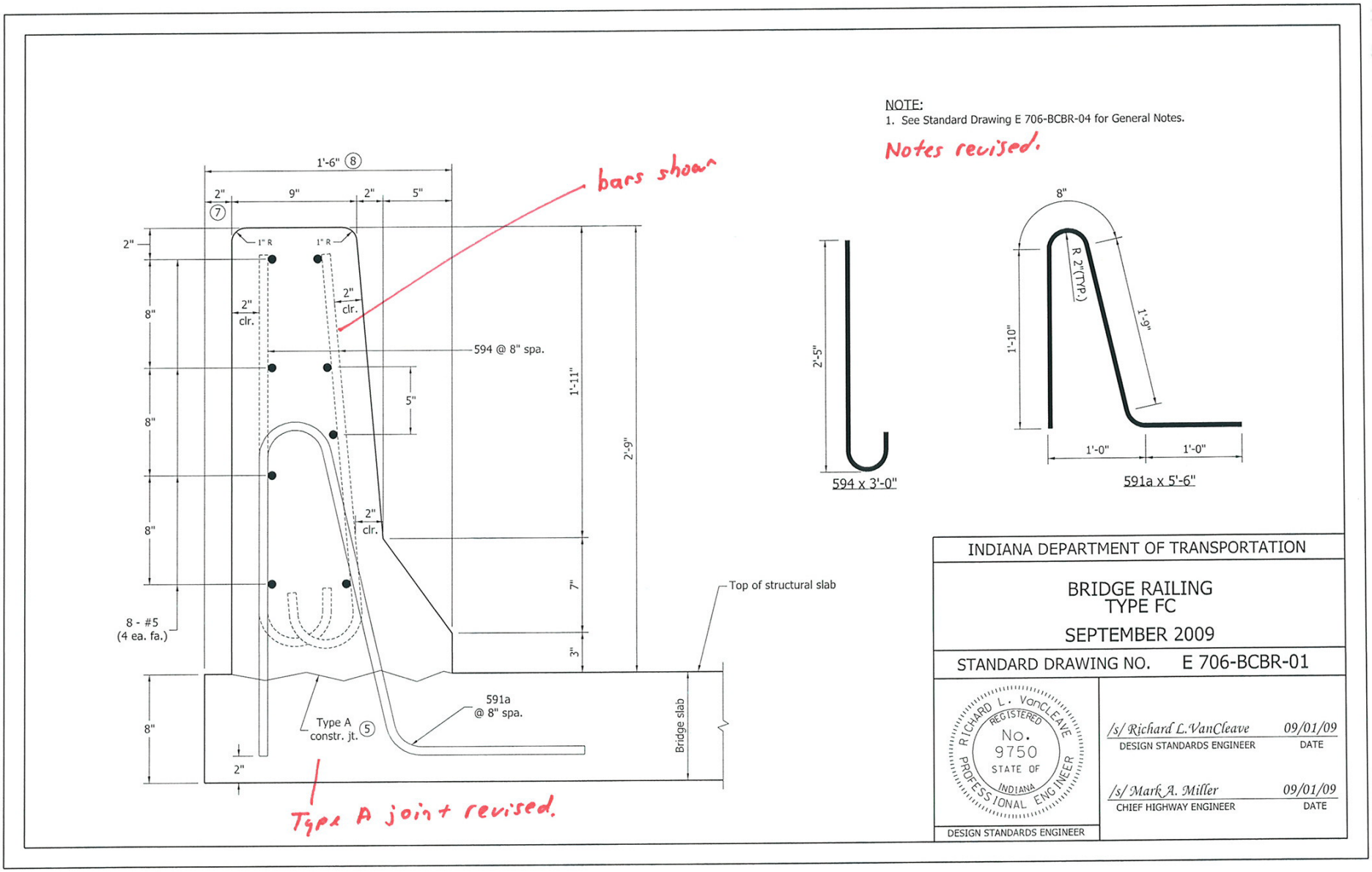
REVISION TO STANDARD DRAWINGS

EXISTING 706-BCBR-01 BRIDGE RAILING TYPE FC (WITH MARKUPS)

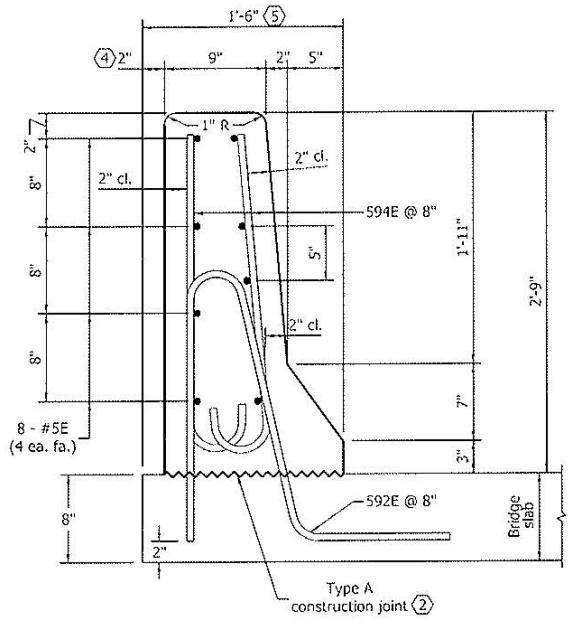


REVISION TO STANDARD DRAWINGS

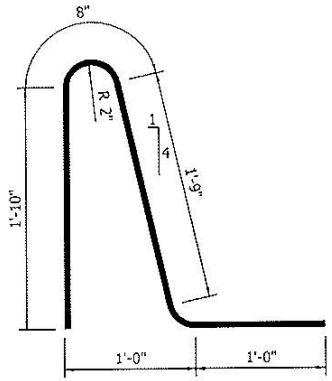
REVISED 706-BCBR-01 BRIDGE RAILING TYPE FC (DRAFT)

NOTES

1. See Standard Drawing E 706-BCBR-03 for General Notes ⬡.
2. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.



594E x 3'-0"



592E x 5'-6"

QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	2.58 CFT
Reinforcing bars	26.3 LBS

INDIANA DEPARTMENT OF TRANSPORTATION

BRIDGE RAILING
TYPE FC

SEPTEMBER 2009

STANDARD DRAWING NO. E 706-BCBR-01

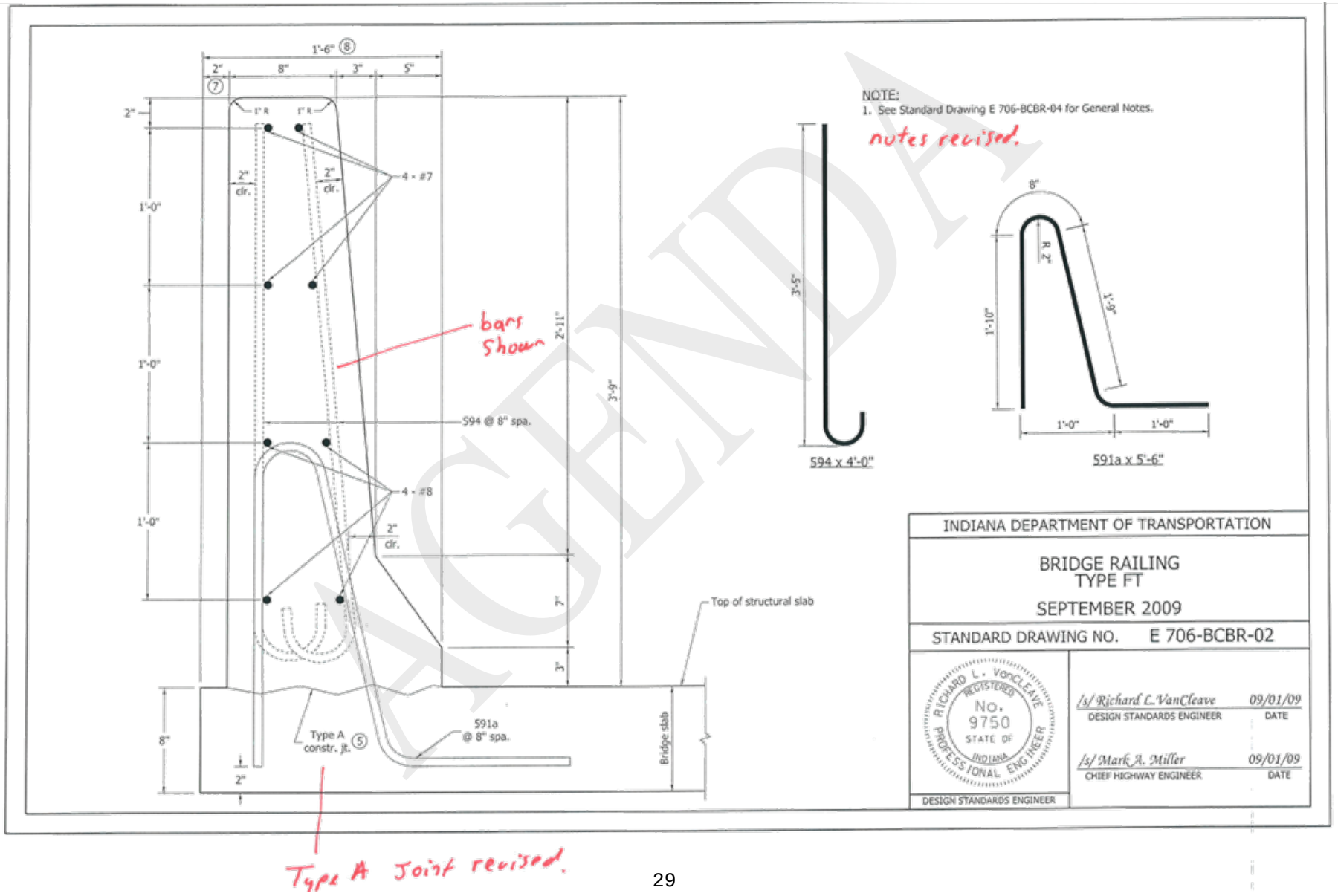
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

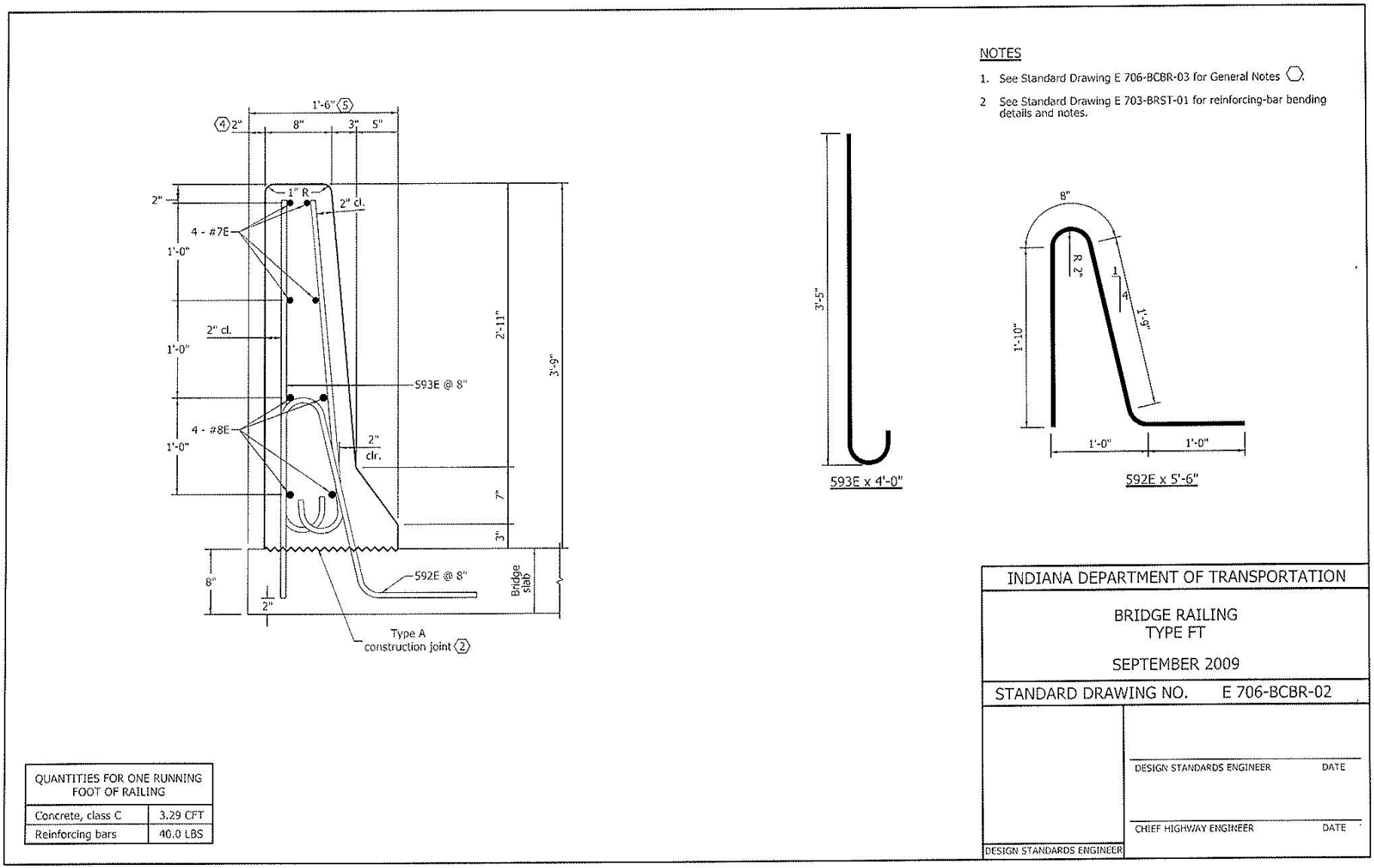
REVISION TO STANDARD DRAWINGS

EXISTING 706-BCBR-02 BRIDGE RAILING TYPE FT (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

REVISED 706-BCBR-02 BRIDGE RAILING TYPE FT (DRAFT)



QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	3.29 CFT
Reinforcing bars	40.0 LBS

INDIANA DEPARTMENT OF TRANSPORTATION

BRIDGE RAILING
TYPE FT

SEPTEMBER 2009

STANDARD DRAWING NO. E 706-BCBR-02

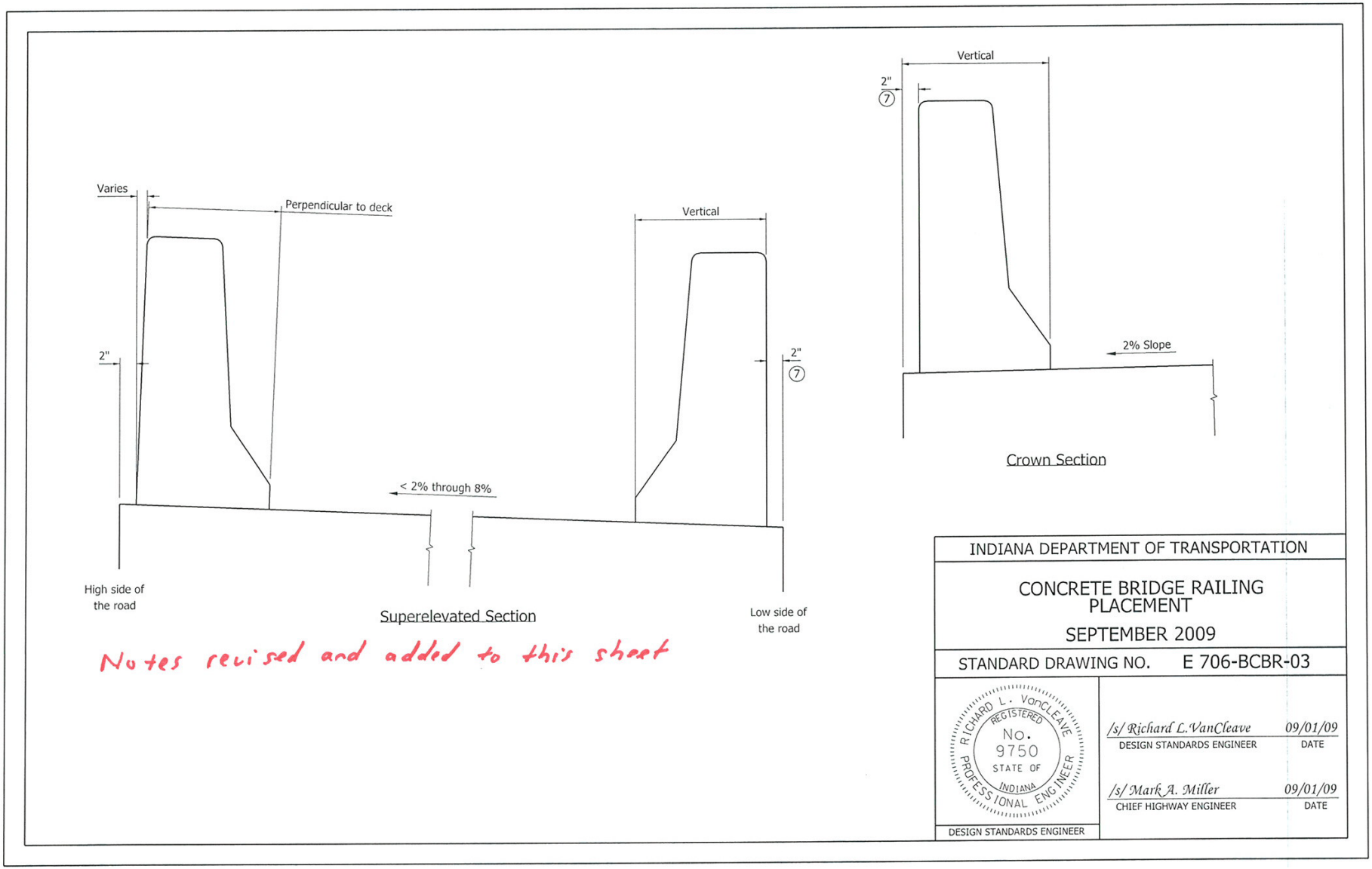
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

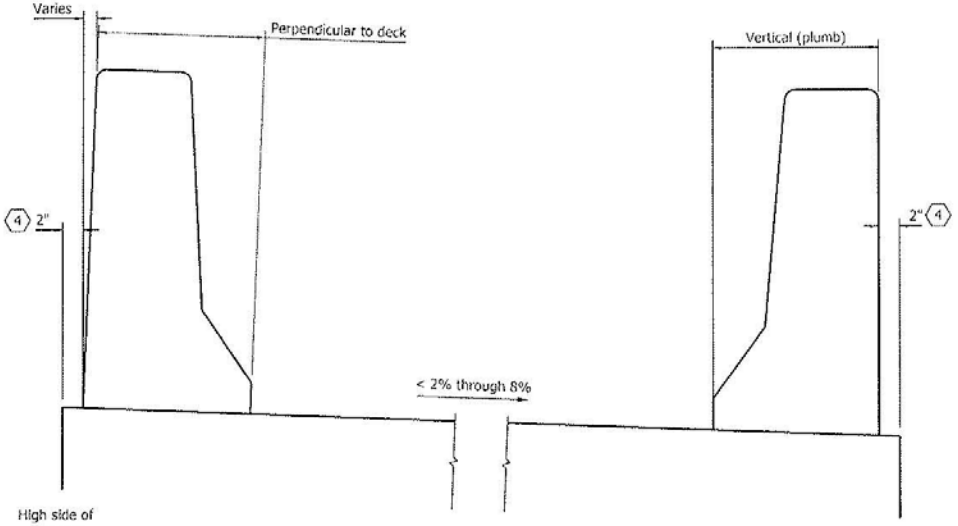
REVISION TO STANDARD DRAWINGS

EXISTING 706-BCBR-03 CONCRETE BRIDGE PLACEMENT (WITH MARKUPS)

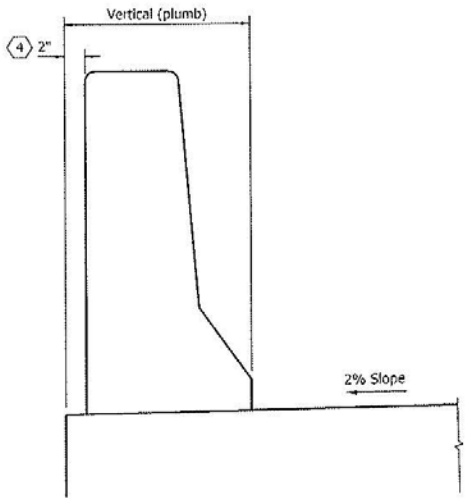


REVISION TO STANDARD DRAWINGS

REVISED 706-BCBR-03 CONCRETE BRIDGE RAILING PLACEMENT (DRAFT)



SUPERELEVATED SECTION



CROWN SECTION

GENERAL NOTES

1. Minimum lap for #5 bars shall be 1'-11".
2. See Standard Drawing E 702-CJTA-01 for construction joint type A.
3. A joint shall be provided between the bridge railing and railing transition at the end of the bridge slab as shown on Standard Drawing E 706-CBRT-01.
4. For twin structures or other structures which are placed side by side, this dimension shall be reduced to 0 on the median side.
5. For twin structures or other structures which are placed side by side, this dimension shall be reduced to 1'-4" on the median side.
6. All reinforcing bars designated E shall be epoxy coated.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BRIDGE RAILING PLACEMENT

SEPTEMBER 2009

STANDARD DRAWING NO. E 706-BCBR-03

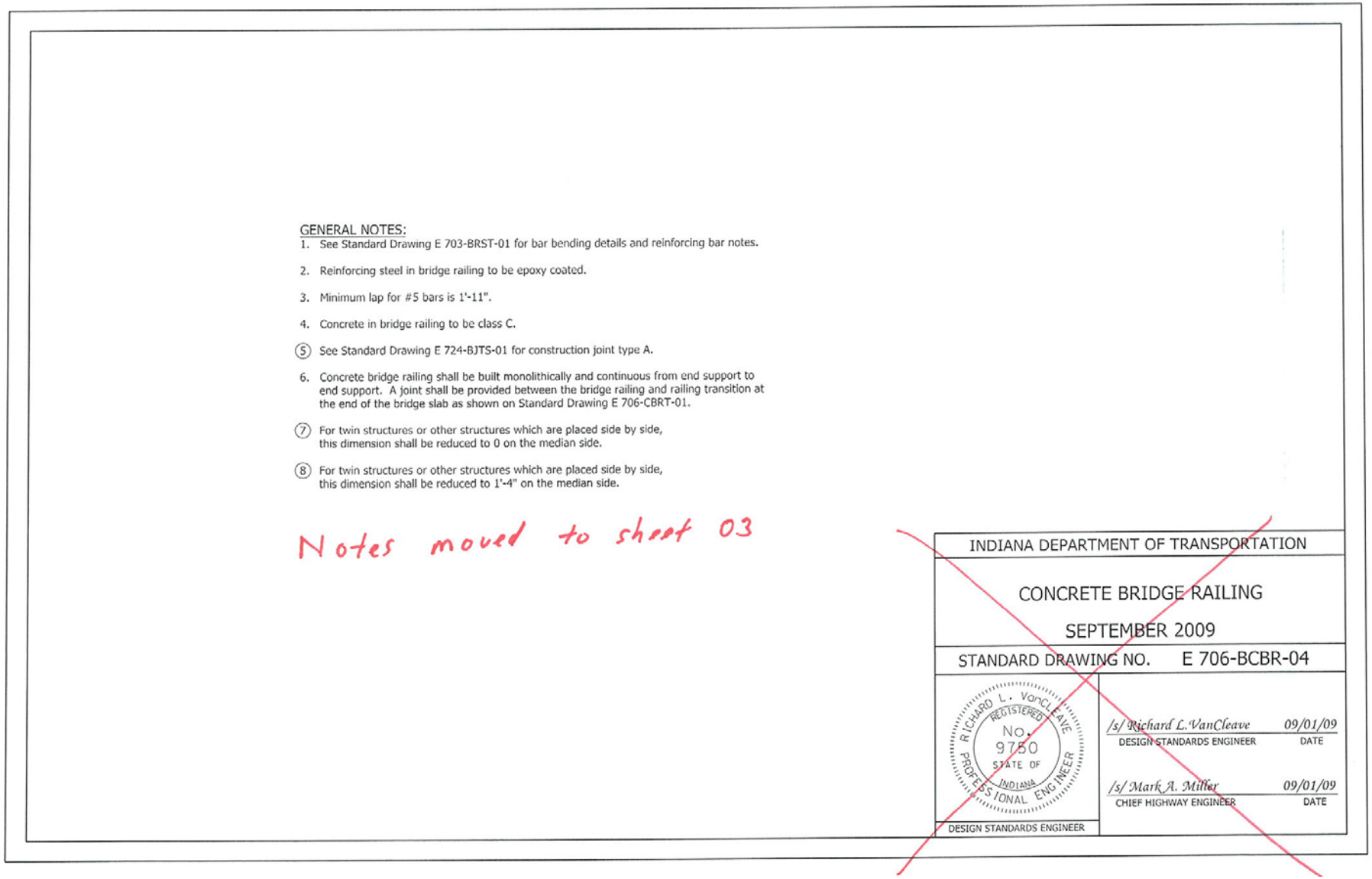
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO STANDARD DRAWINGS

EXISTING 706-BCBR-04 BRIDGE RAILING TYPE FC (PROPOSED TO DELETE)



GENERAL NOTES:

1. See Standard Drawing E 703-BRST-01 for bar bending details and reinforcing bar notes.
2. Reinforcing steel in bridge railing to be epoxy coated.
3. Minimum lap for #5 bars is 1'-11".
4. Concrete in bridge railing to be class C.

(5) See Standard Drawing E 724-BJTS-01 for construction joint type A.

6. Concrete bridge railing shall be built monolithically and continuous from end support to end support. A joint shall be provided between the bridge railing and railing transition at the end of the bridge slab as shown on Standard Drawing E 706-CBRT-01.

(7) For twin structures or other structures which are placed side by side, this dimension shall be reduced to 0 on the median side.

(8) For twin structures or other structures which are placed side by side, this dimension shall be reduced to 1'-4" on the median side.

Notes moved to sheet 03

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BRIDGE RAILING

SEPTEMBER 2009

STANDARD DRAWING NO. E 706-BCBR-04

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

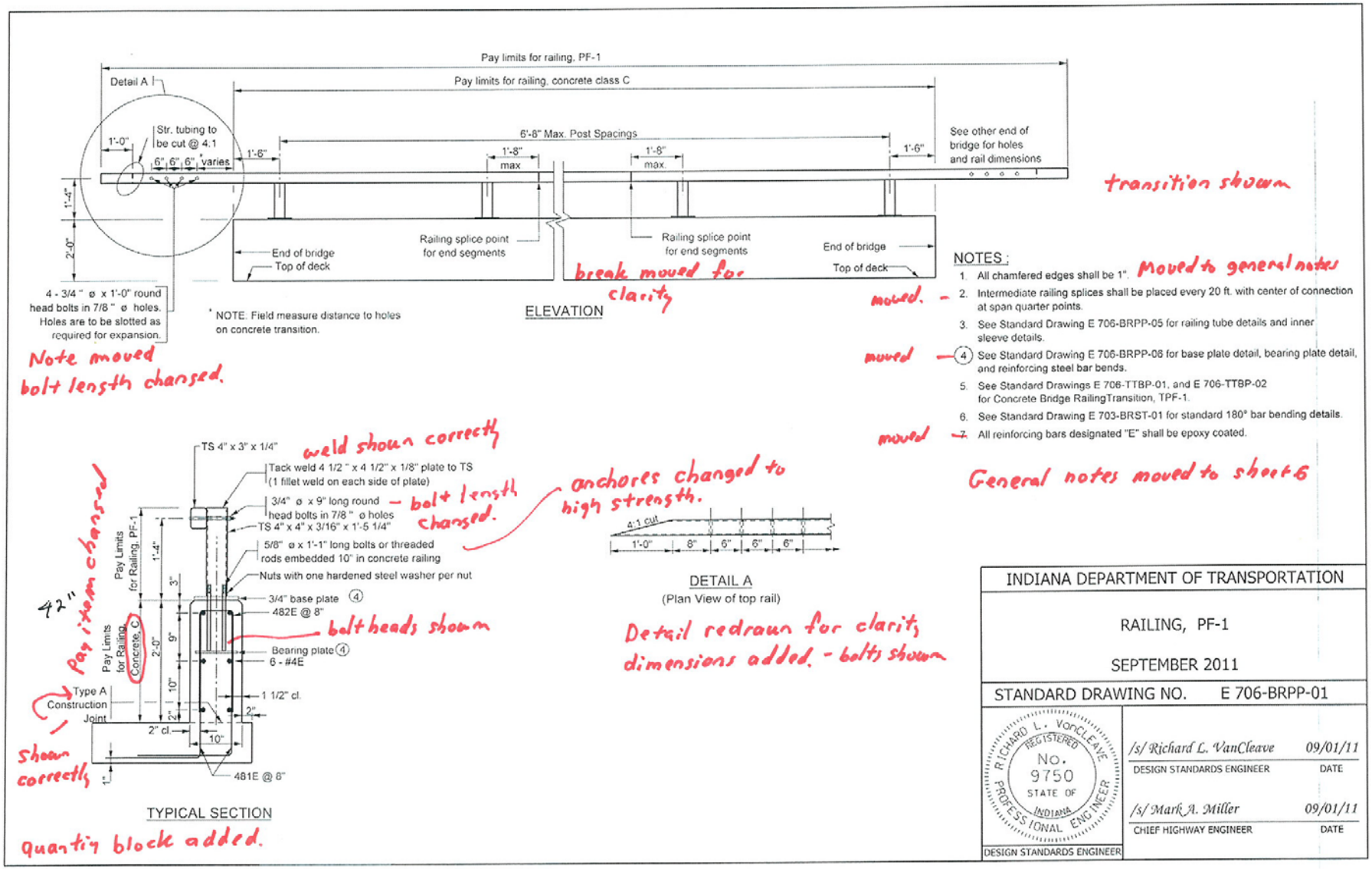
DESIGN STANDARDS ENGINEER

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

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

REVISION TO STANDARD DRAWINGS

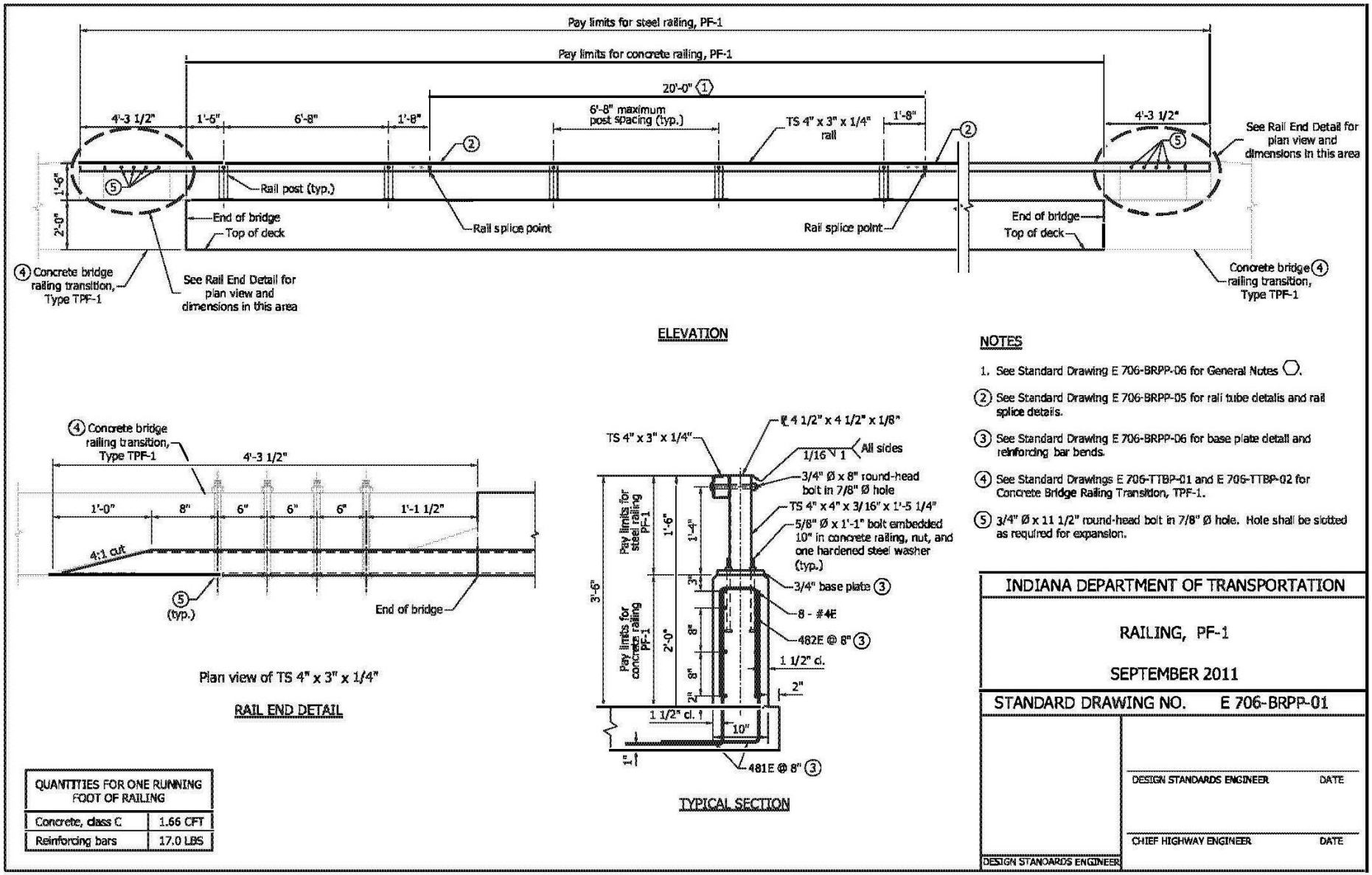
EXISTING 706-BRPP-01 RAILING, PF-1 (WITH MARKUPS)



Design Manual lists this as a 4'-2" rail. This is a TL-4 railing

REVISION TO STANDARD DRAWINGS

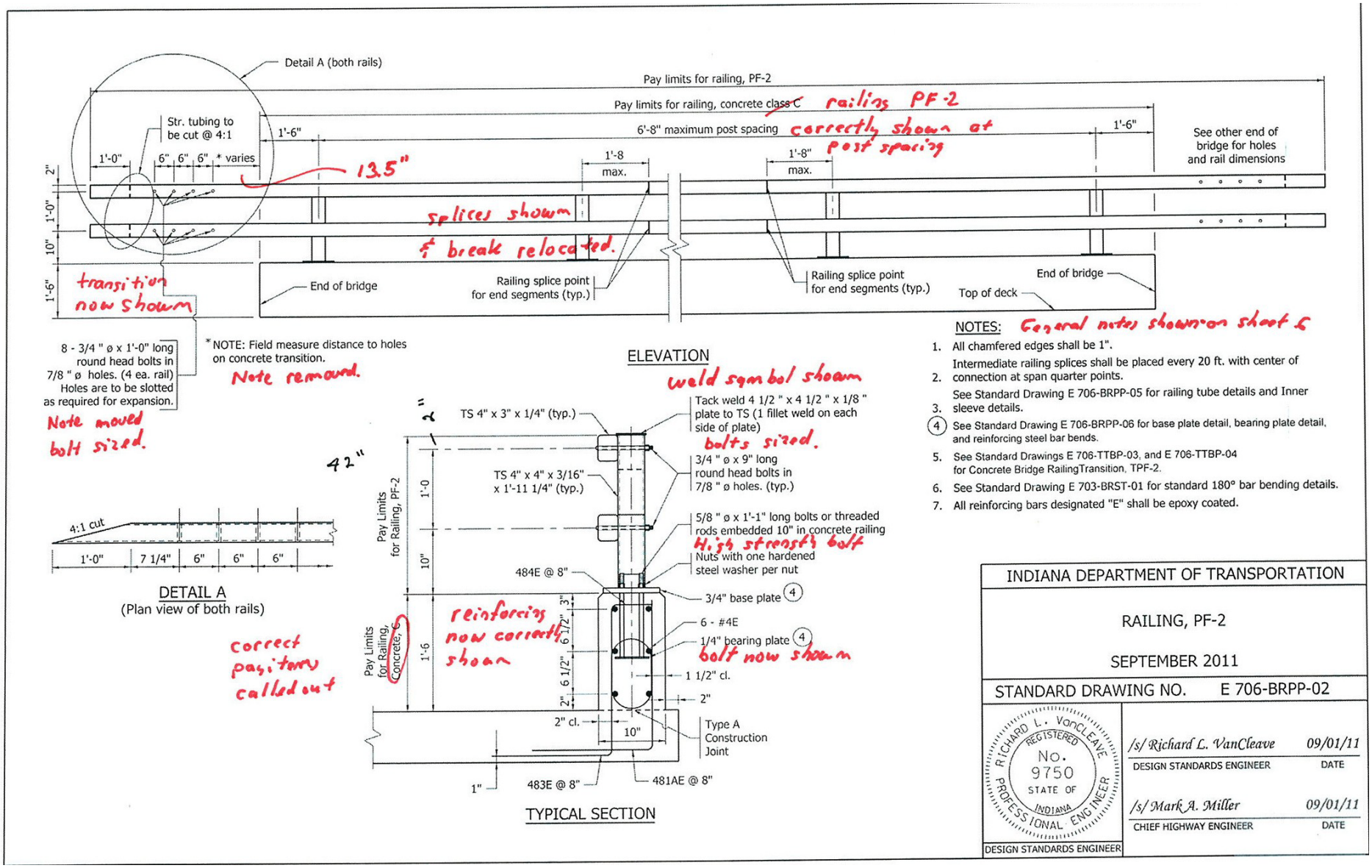
REVISED 706-BRPP-01 RAILING, PF-1 (DRAFT)



QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	1.66 CFT
Reinforcing bars	17.0 LBS

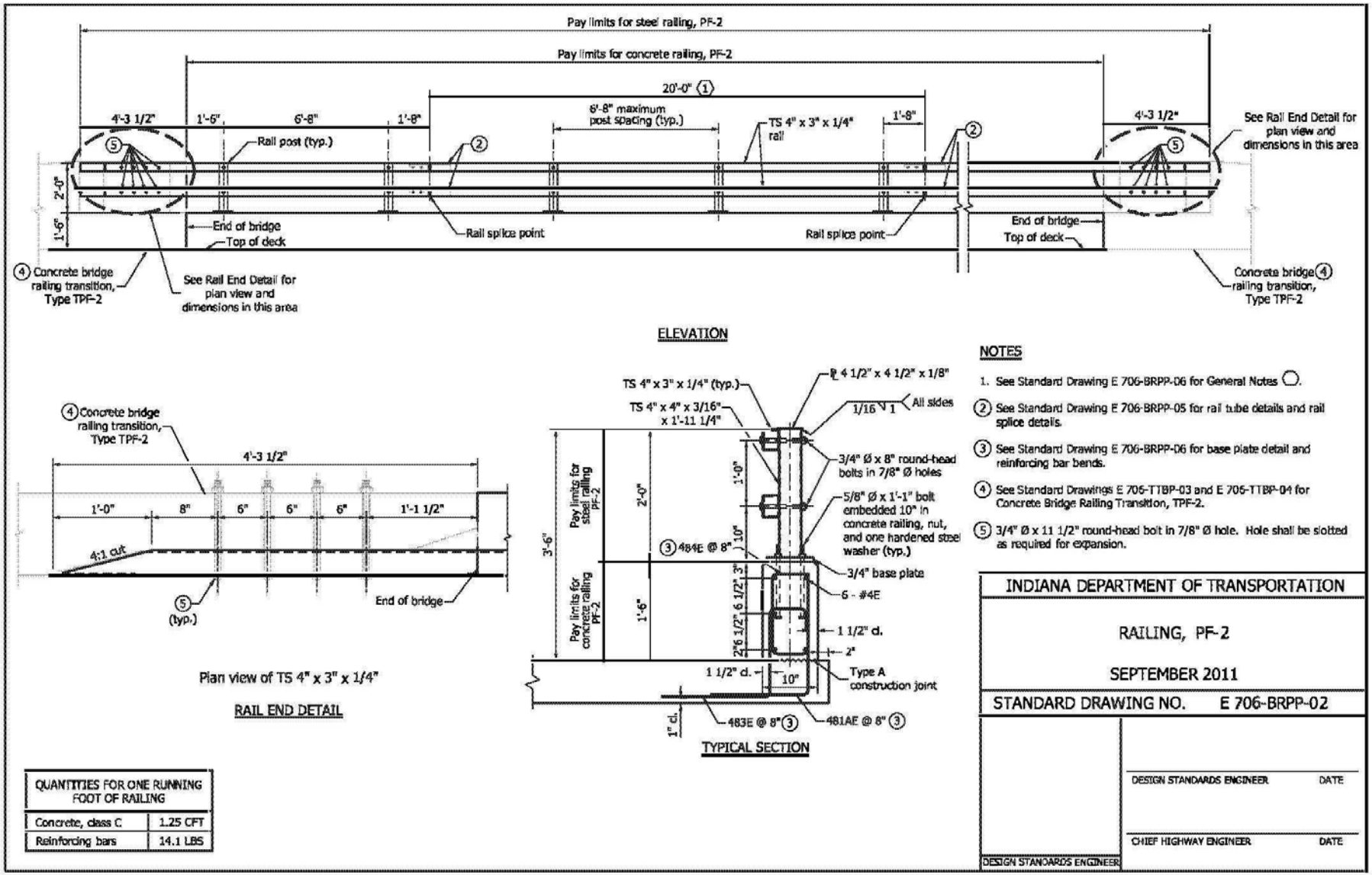
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRPP-02 RAILING, PF-2 (WITH MARKUPS)



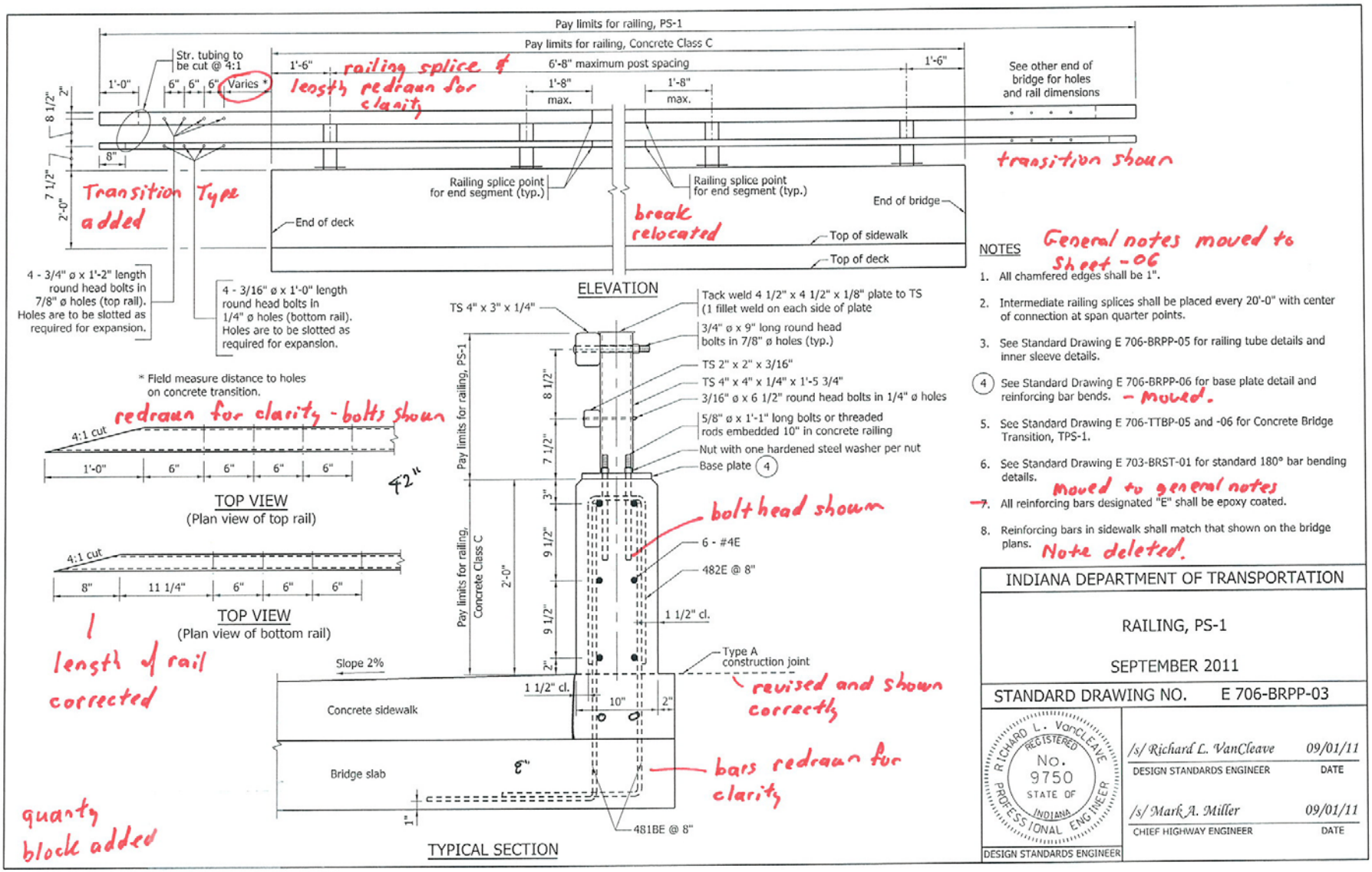
REVISION TO STANDARD DRAWINGS

REVISED 706-BRPP-02 RAILING, PF-2 (DRAFT)



REVISION TO STANDARD DRAWINGS

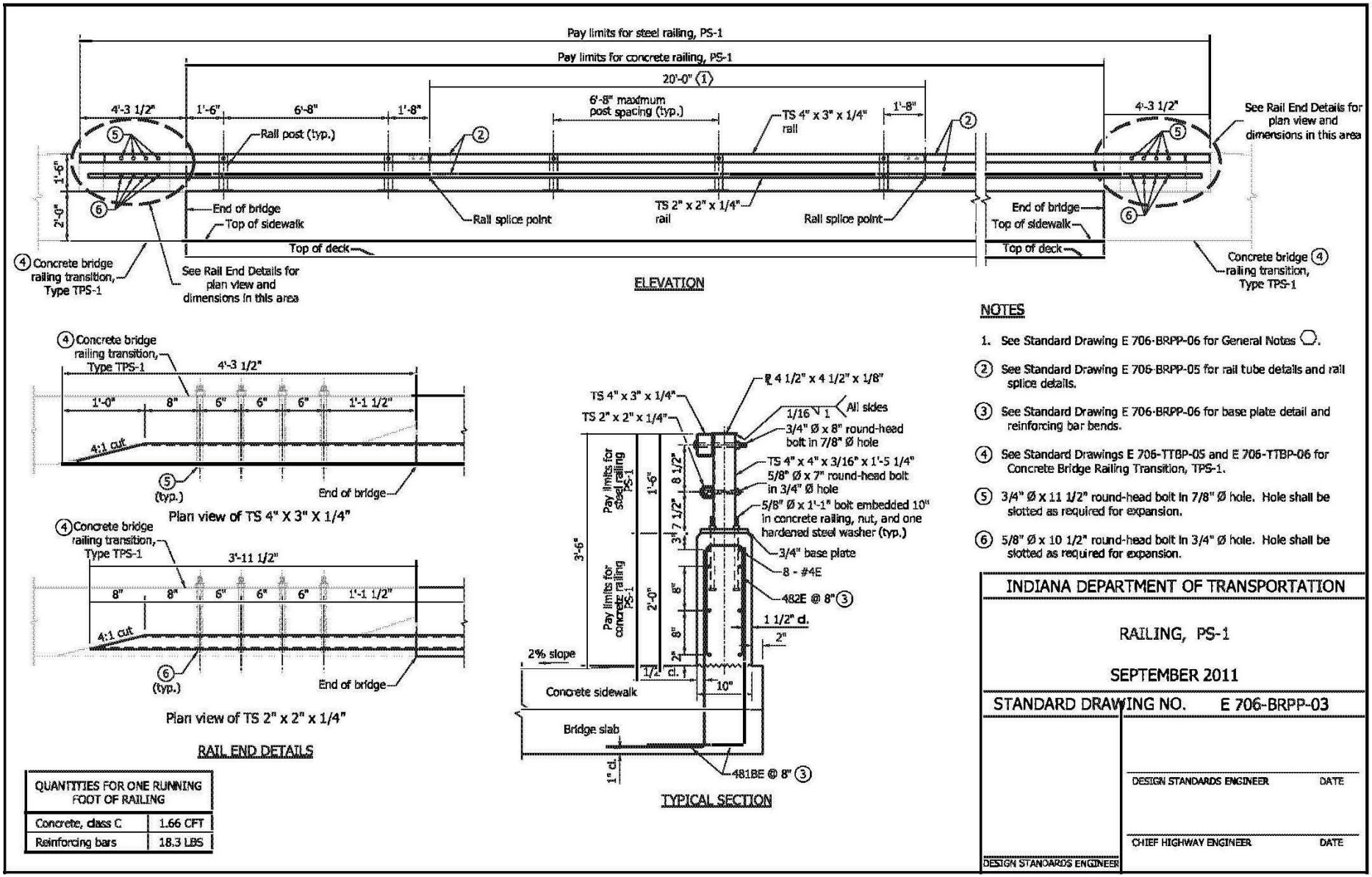
EXISTING 706-BRPP-03 RAILING, PS-1 (WITH MARKUPS)



This is a TL-4 railing

REVISION TO STANDARD DRAWINGS

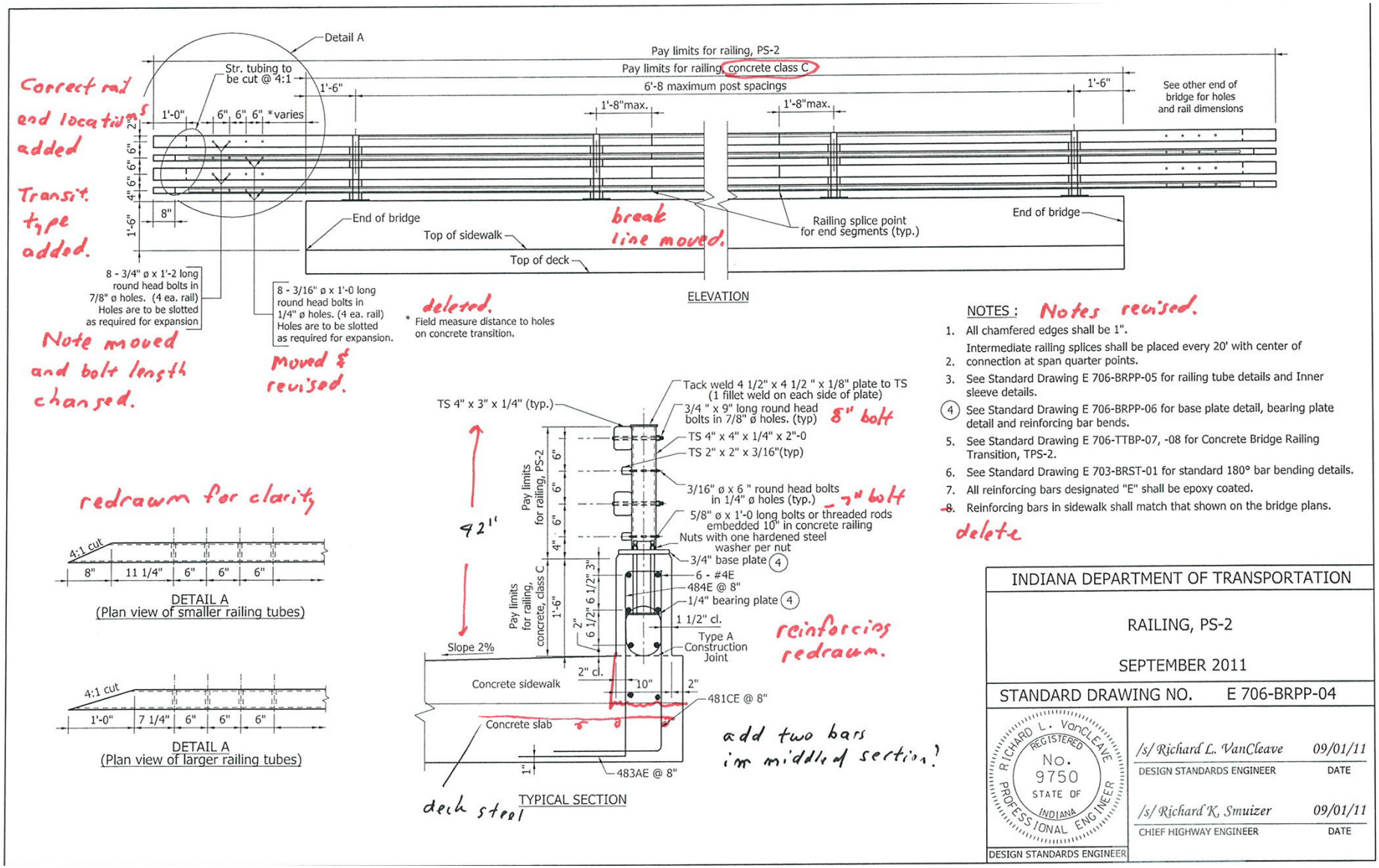
REVISED 706-BRPP-03 RAILING, PS-1 (DRAFT)



QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	1.66 CFT
Reinforcing bars	18.3 LBS

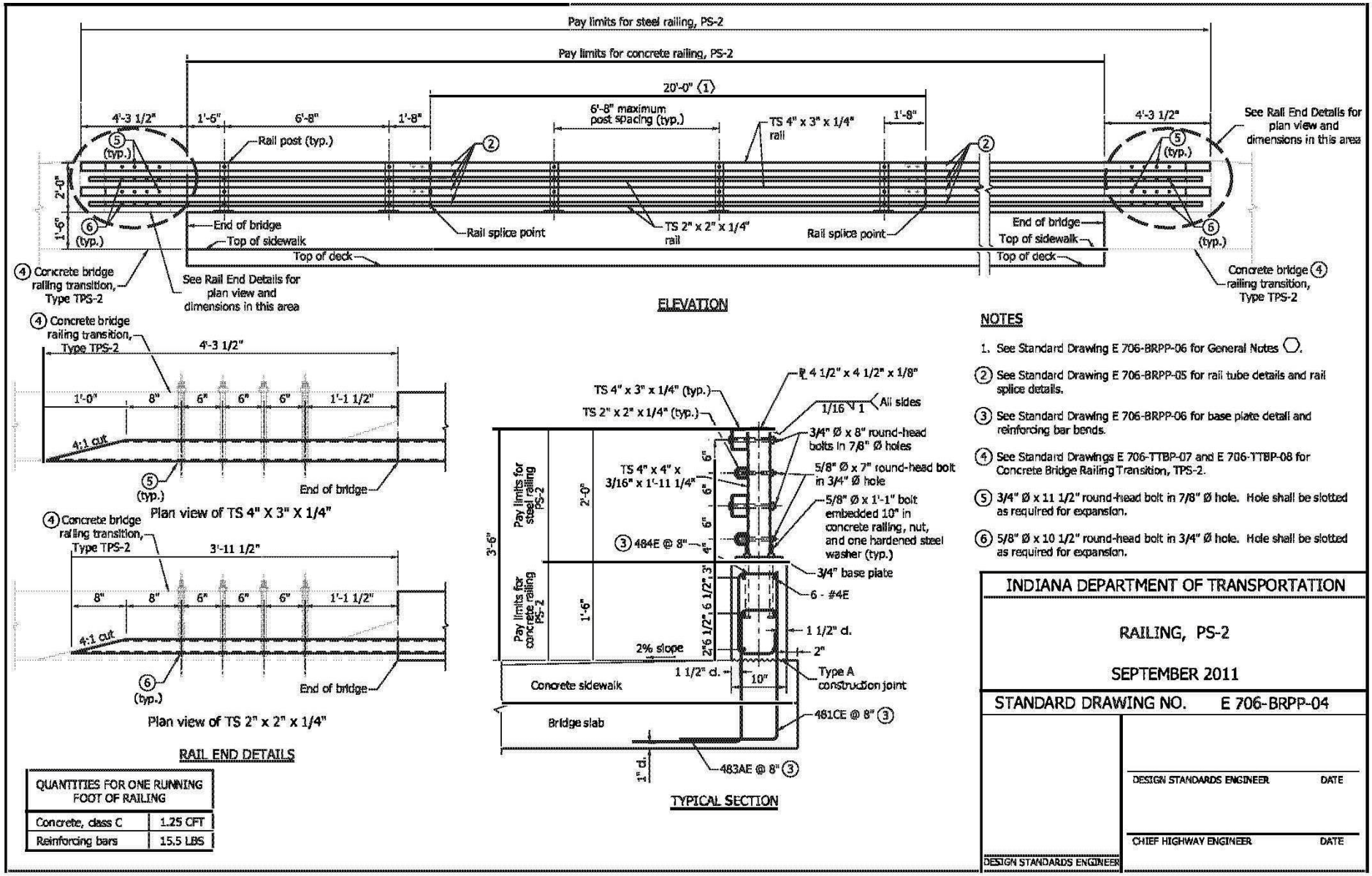
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRPP-04 RAILING, PS-2 (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

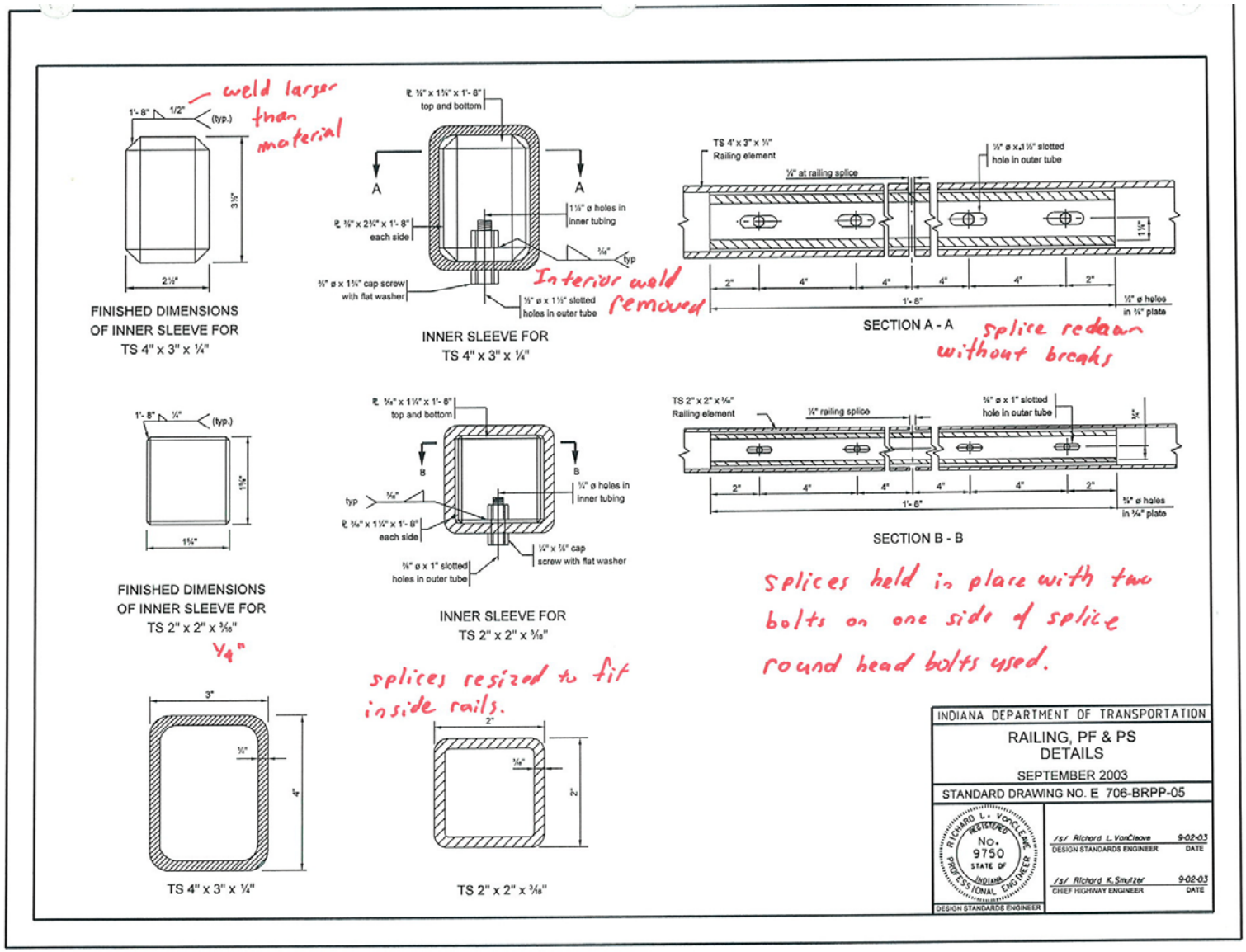
REVISED 706-BRPP-04 RAILING, PS-2 (DRAFT)



QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	1.25 CFT
Reinforcing bars	15.5 LBS

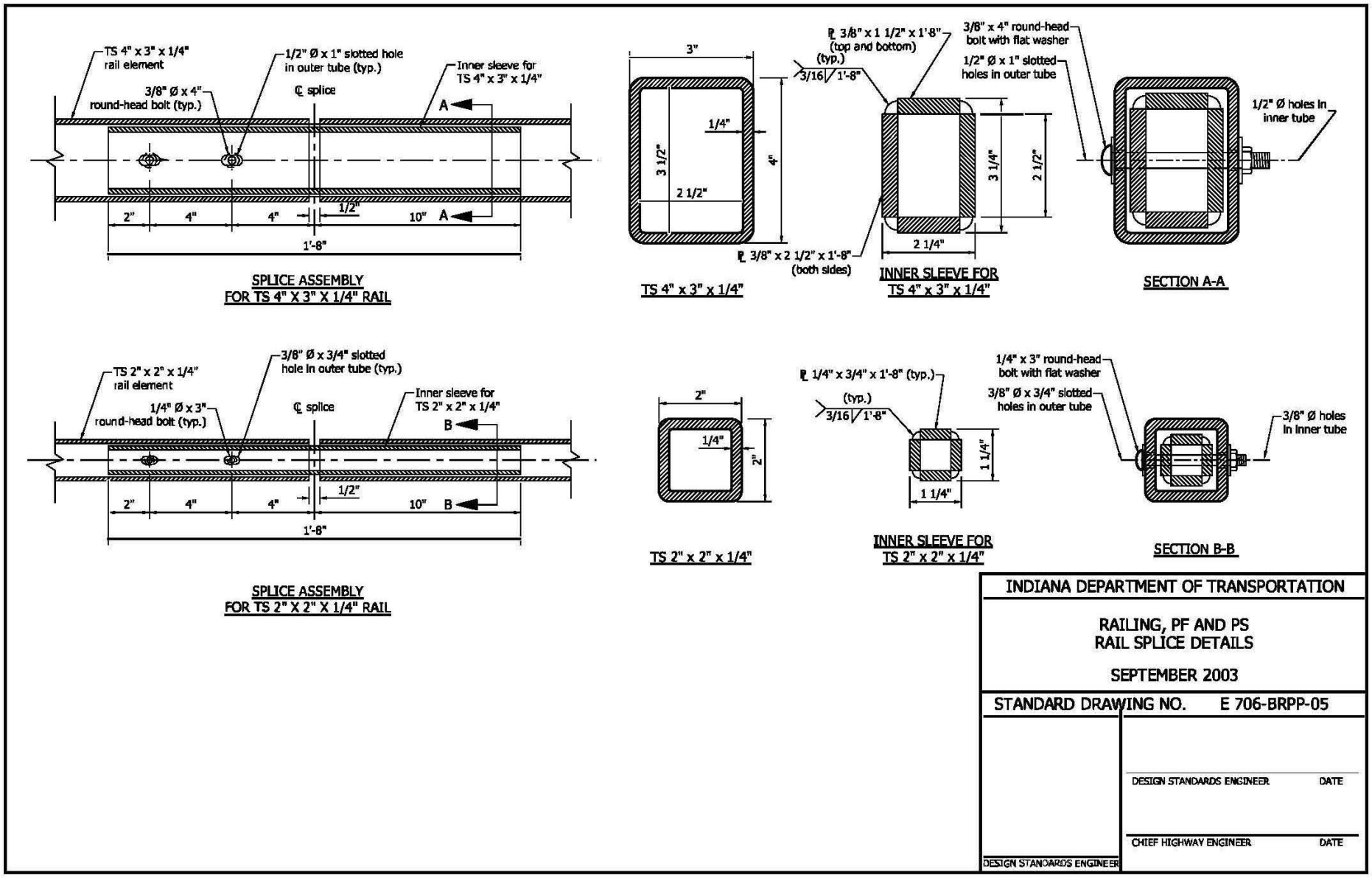
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRPP-05 RAILING, PF & PS DETAILS (WITH MARKUPS)



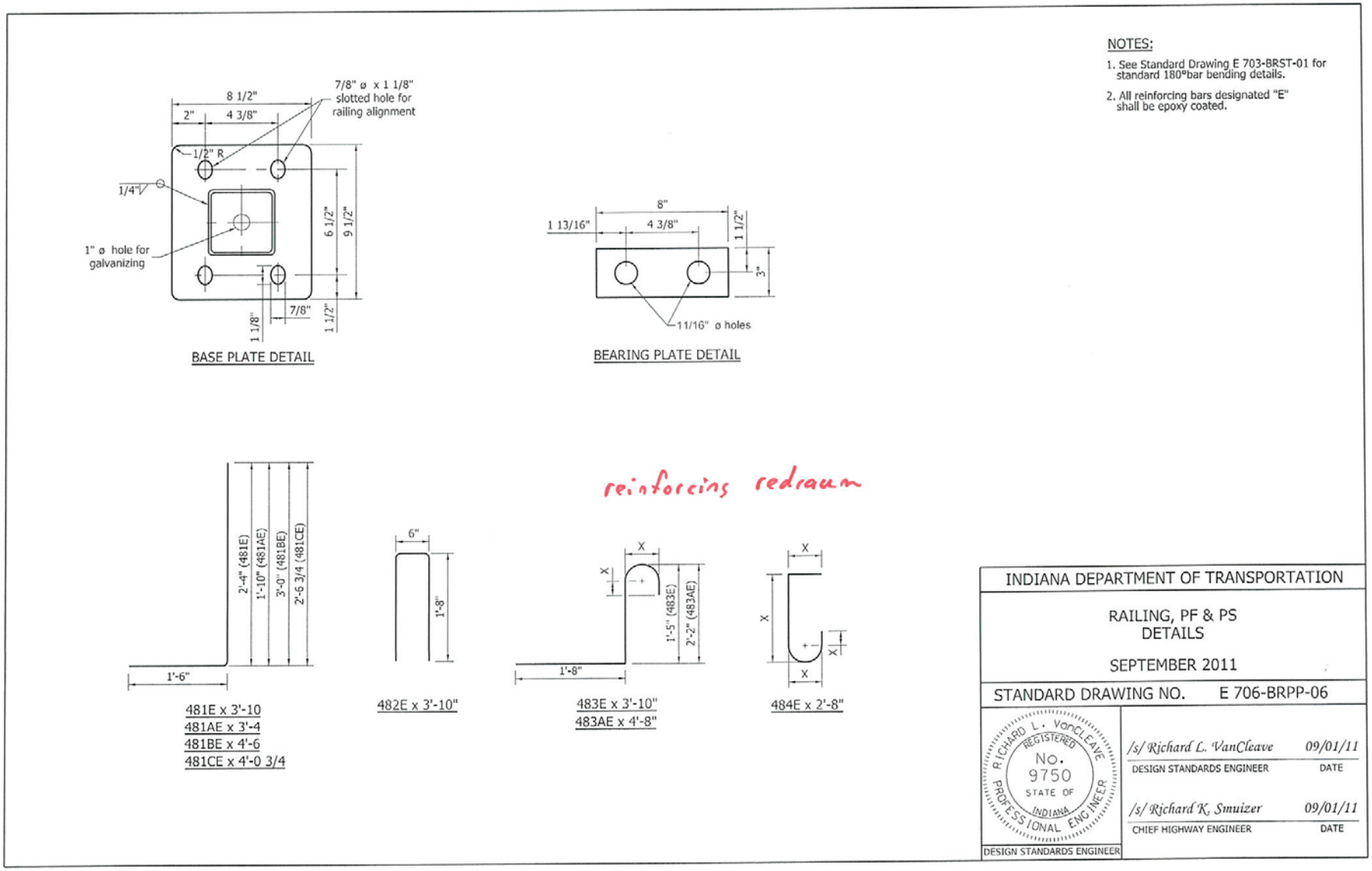
REVISION TO STANDARD DRAWINGS

REVISED 706-BRPP-05 RAILING, PF AND PS RAIL SPLICE DETAILS (DRAFT)



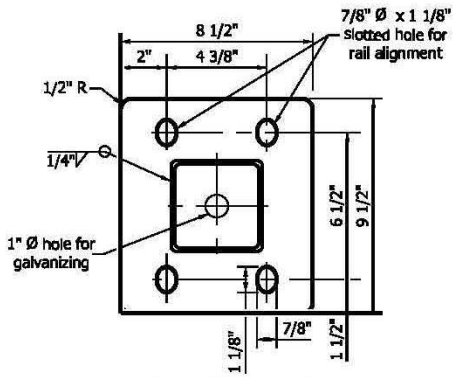
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRPP-06 RAILING, PF & PS DETAILS (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

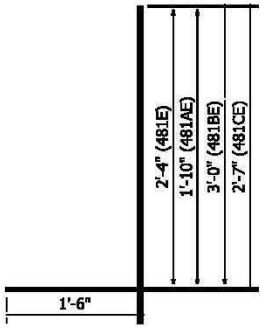
REVISED 706-BRPP-06 RAILING, PF & PS DETAILS (DRAFT)



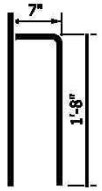
BASE PLATE DETAIL

GENERAL NOTES

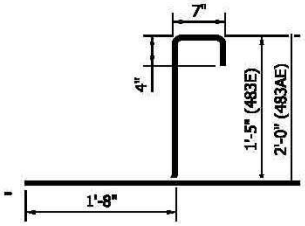
1. Intermediate railing splices shall be placed every 20 ft.
2. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.
3. All chamfered edges shall be 3/4".
4. All reinforcing bars designated E shall be epoxy coated.



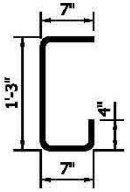
481E x 3'-10"
481AE x 3'-4"
481BE x 4'-6"
481CE x 4'-1"



482E x 3'-11"



483E x 4'-0"
483AE x 4'-7"



484E x 2'-9"

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, PF & PS DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 706-BRPP-06

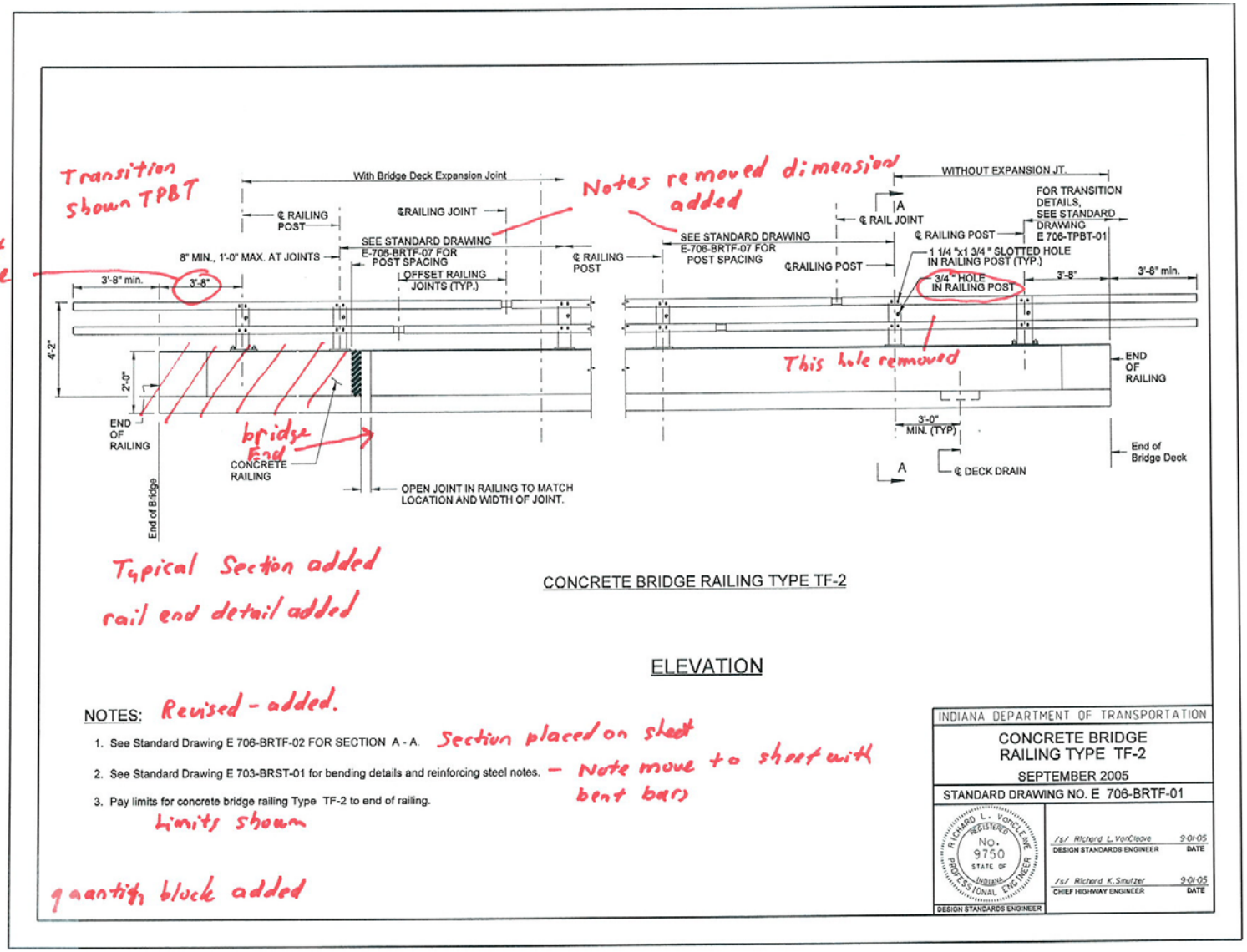
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

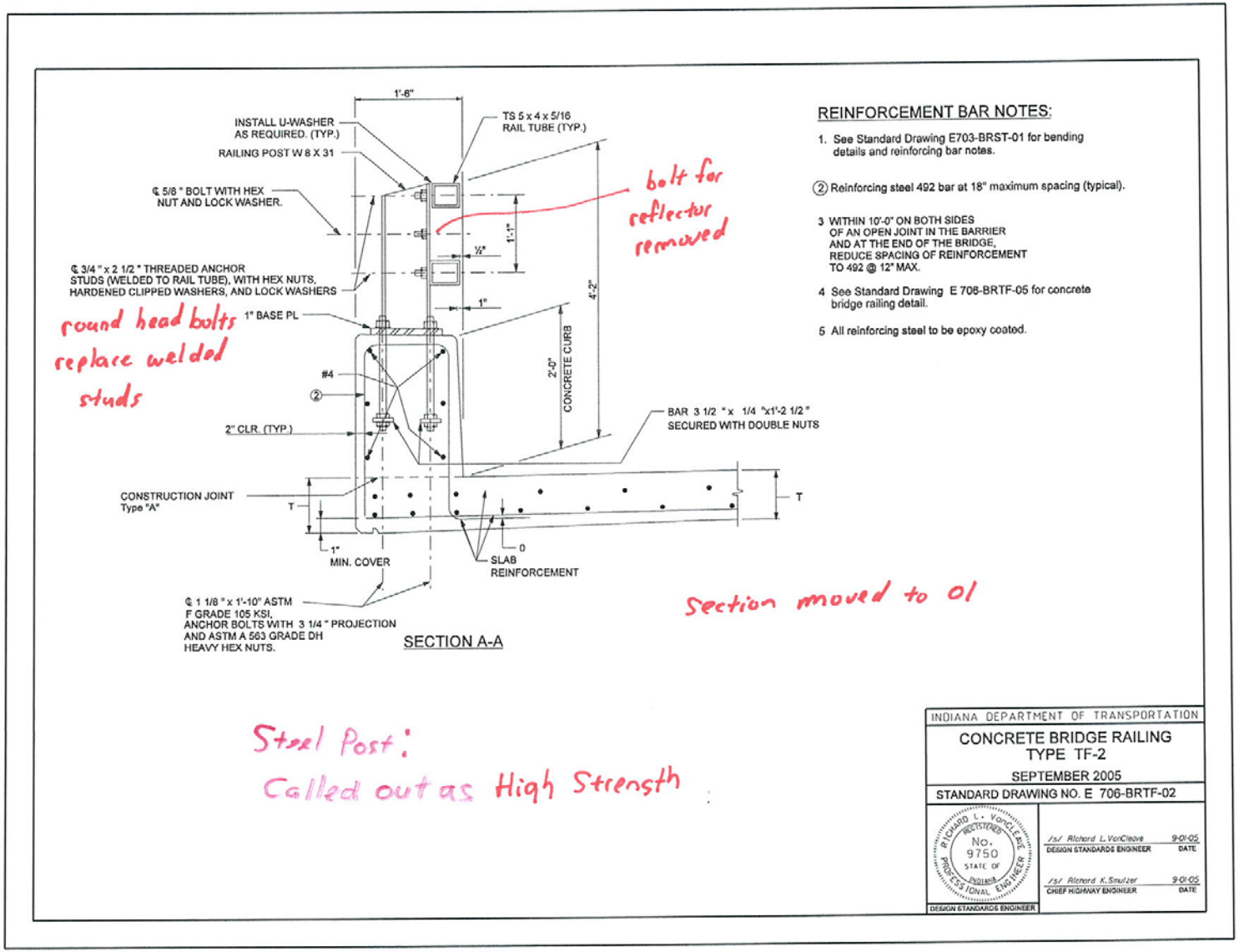
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-01 CONCRETE BRIDGE RAILING TYPE TF-2 (WITH MARKUPS)



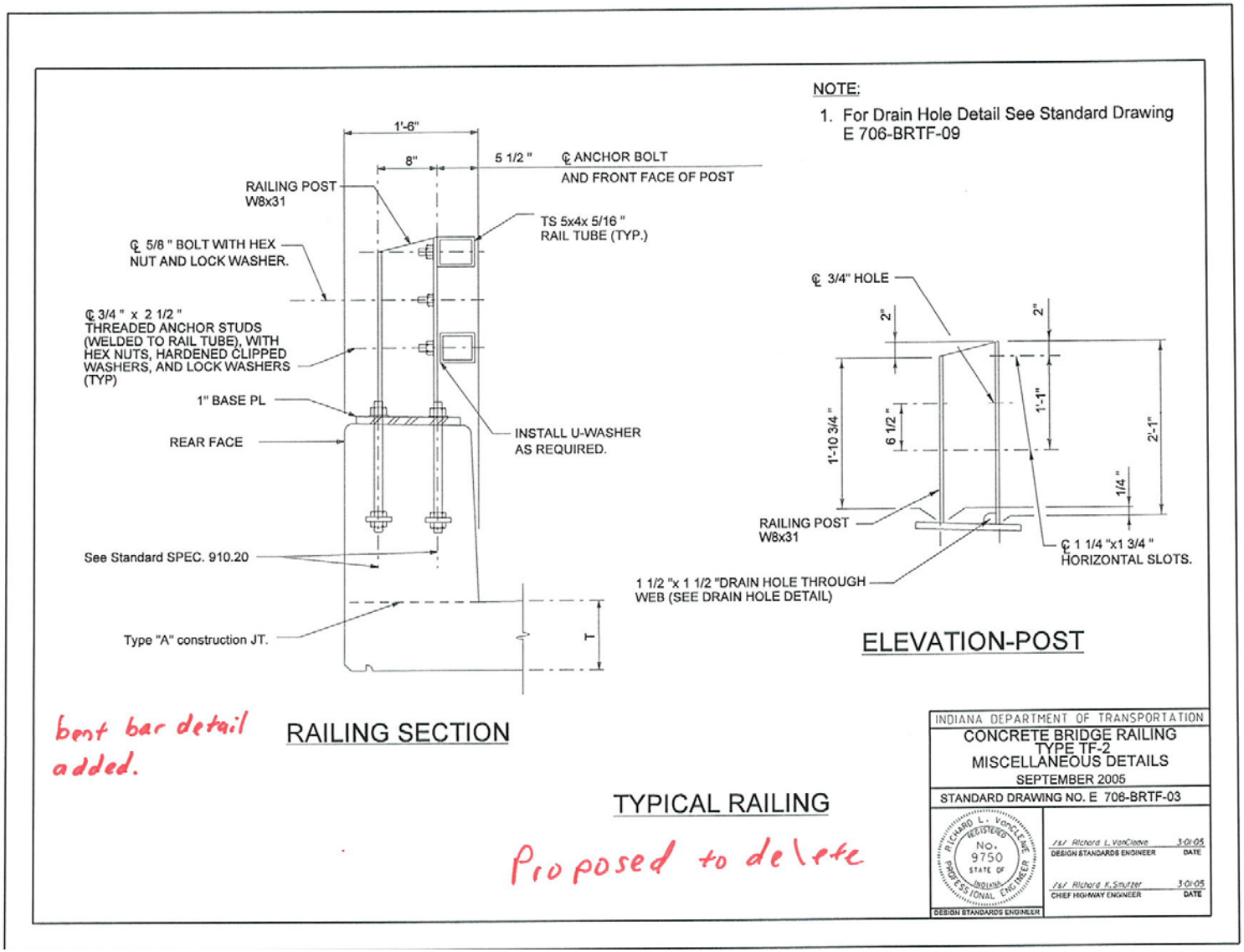
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-02 CONCRETE BRIDGE RAILING TYPE TF-2 (WITH MARKUPS)



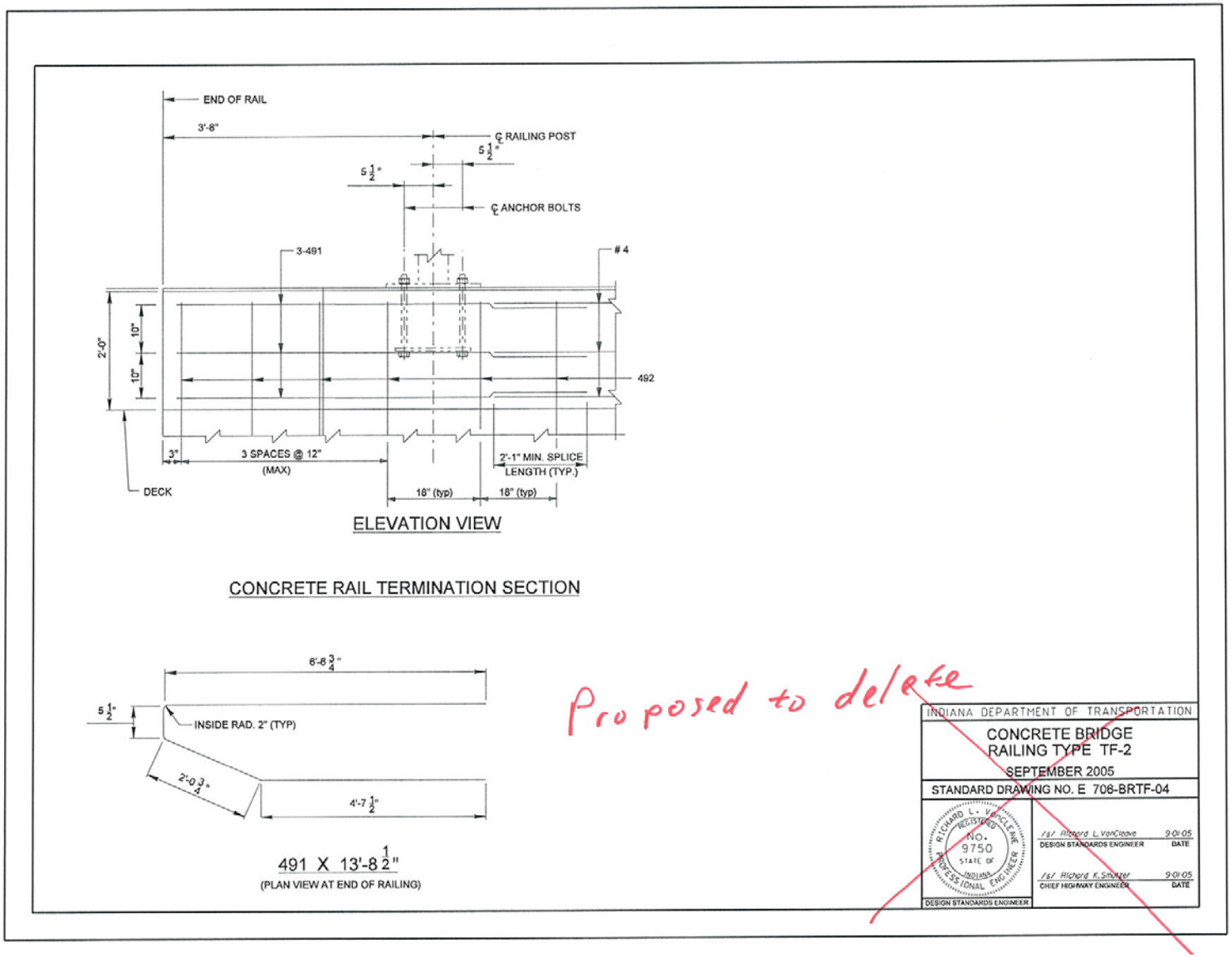
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-03 CONCRETE BRIDGE RAILING TYPE TF-2 MISCELLANEOUS DETAILS (PROPOSED TO DELETE)



REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-04 CONCRETE BRIDGE RAILING TYPE TF-2 (PROPOSED TO DELETE)

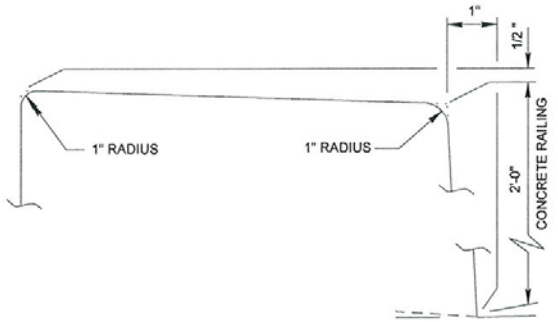


REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-05 CONCRETE BRIDGE RAILING TYPE TF-2 DETAILS (PROPOSED TO DELETE)

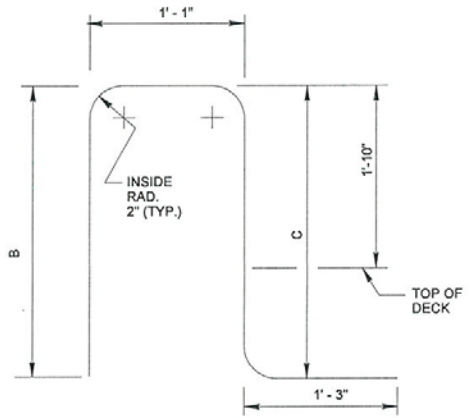
NOTES:

1. T DESIGNATES DECK SLAB THICKNESS (SEE DRAWING E 706-BRTF-02 "TYPICAL SECTION")



CONCRETE RAILING DETAIL
(BASE PLATE AND ANCHOR BOLTS NOT SHOWN FOR CLARITY)

B & C DIMENSIONS FOR TYPE TF-2 BRIDGE RAILING			
T	B	C	LENGTH
8.0"	2'-4"	2'-4"	7'-0"
8.5"	2'-4½"	2'-4½"	7'-1"
9.0"	2'-5"	2'-5"	7'-2"
9.5"	2'-5½"	2'-5½"	7'-3"
10.0"	2'-6"	2'-6"	7'-4"



492 X LENGTH

Placed on sheet 03
Proposed to delete.

INDIANA DEPARTMENT OF TRANSPORTATION
CONCRETE BRIDGE RAILING TYPE TF-2 DETAILS
SEPTEMBER 2005
STANDARD DRAWING NO. E 706-BRTF-05

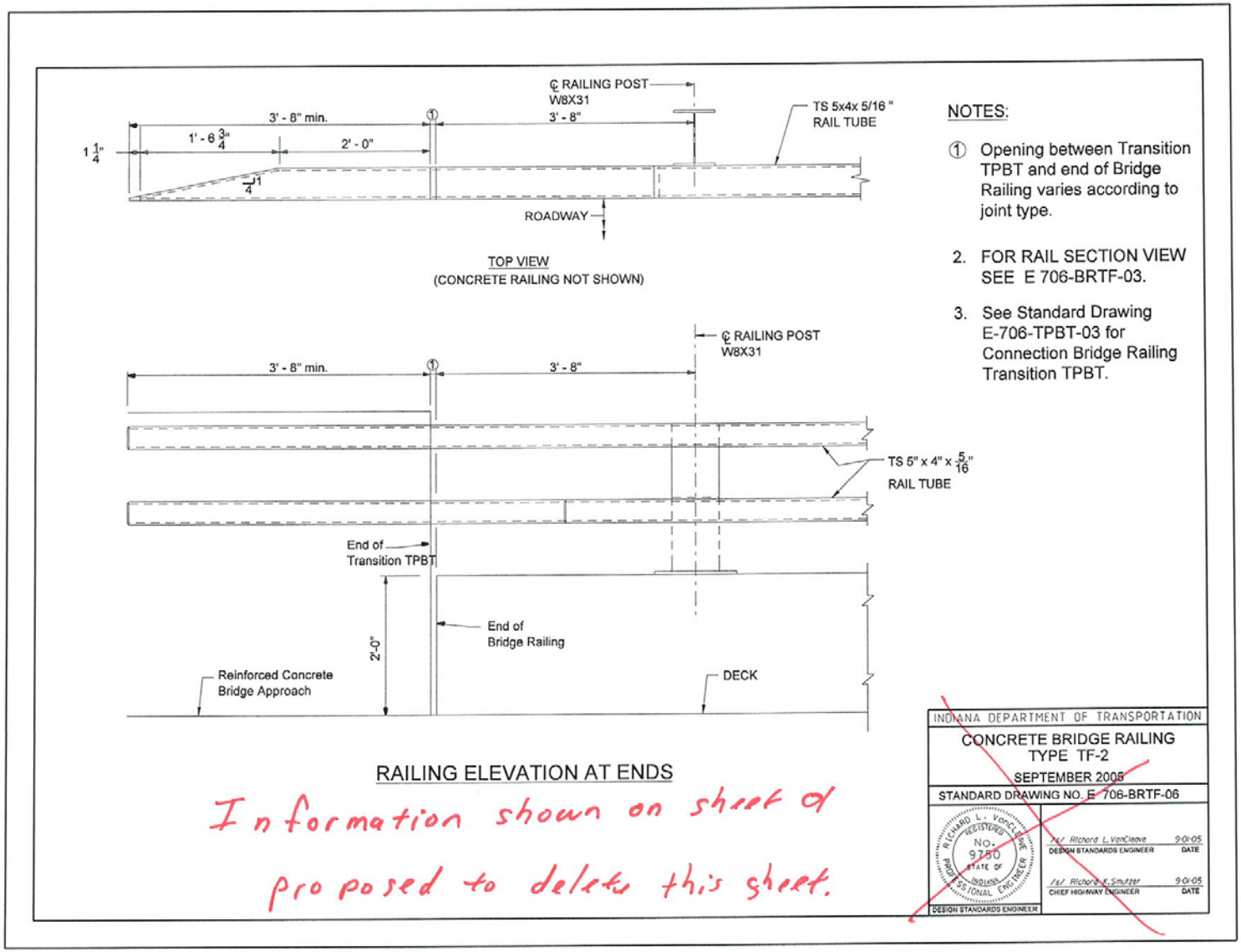
RICHARD L. VANCLEAVE REGISTERED NO. 9750 STATE OF Indiana PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-05
CHIEF HIGHWAY ENGINEER DATE

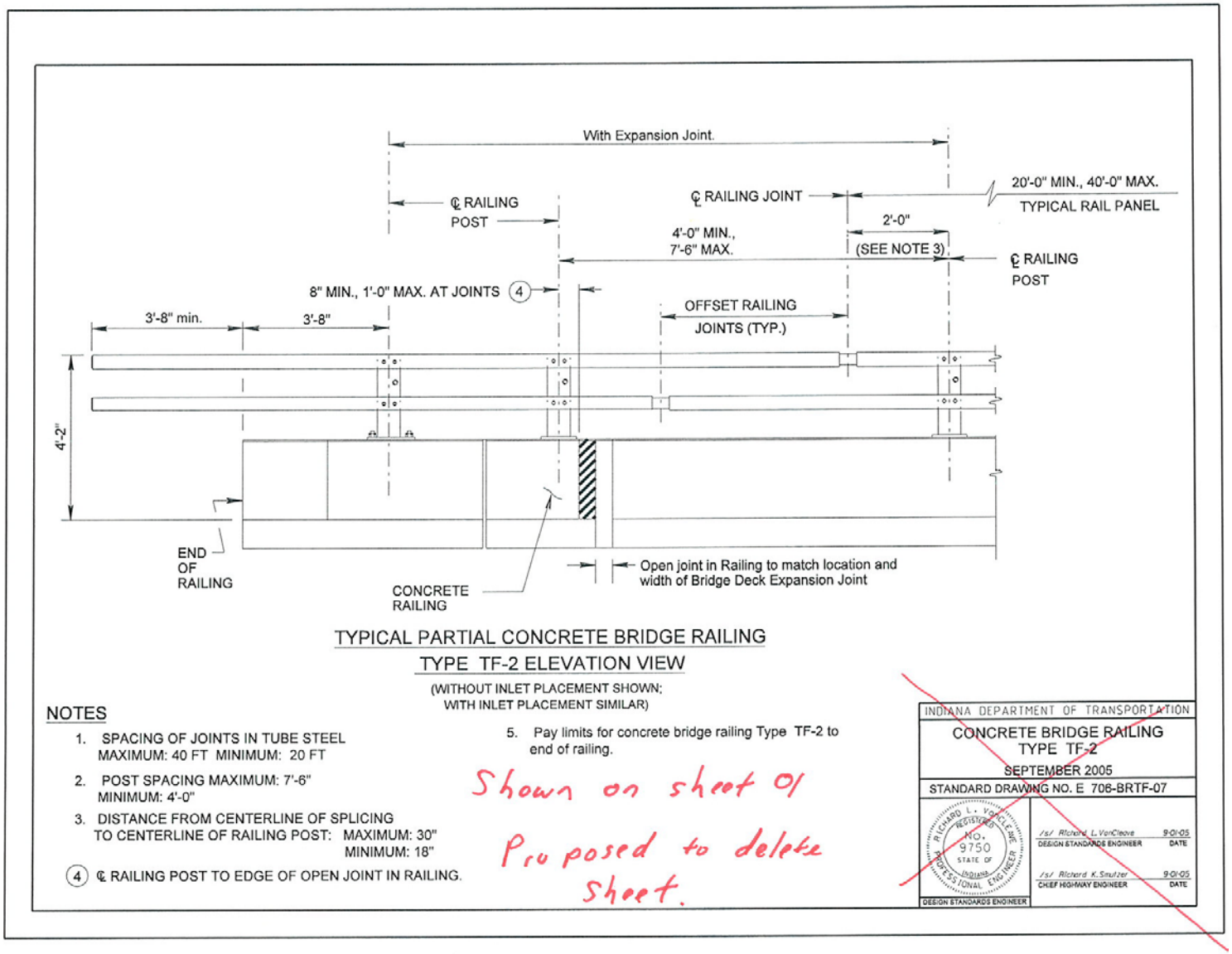
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-06 CONCRETE BRIDGE RAILING TYPE TF-2 (PROPOSED TO DELETE)



REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-07 CONCRETE BRIDGE RAILING TYPE TF-2 (PROPOSED TO DELETE)



TYPICAL PARTIAL CONCRETE BRIDGE RAILING
TYPE TF-2 ELEVATION VIEW

(WITHOUT INLET PLACEMENT SHOWN;
WITH INLET PLACEMENT SIMILAR)

NOTES

1. SPACING OF JOINTS IN TUBE STEEL
   MAXIMUM: 40 FT MINIMUM: 20 FT
2. POST SPACING MAXIMUM: 7'-6"
   MINIMUM: 4'-0"
3. DISTANCE FROM CENTERLINE OF SPLICING
   TO CENTERLINE OF RAILING POST: MAXIMUM: 30"
   MINIMUM: 18"

(4) ℄ RAILING POST TO EDGE OF OPEN JOINT IN RAILING.

5. Pay limits for concrete bridge railing Type TF-2 to end of railing.

Shown on sheet 01

Proposed to delete Sheet.

INDIANA DEPARTMENT OF TRANSPORTATION
CONCRETE BRIDGE RAILING
TYPE TF-2
SEPTEMBER 2005
STANDARD DRAWING NO. E 706-BRTF-07

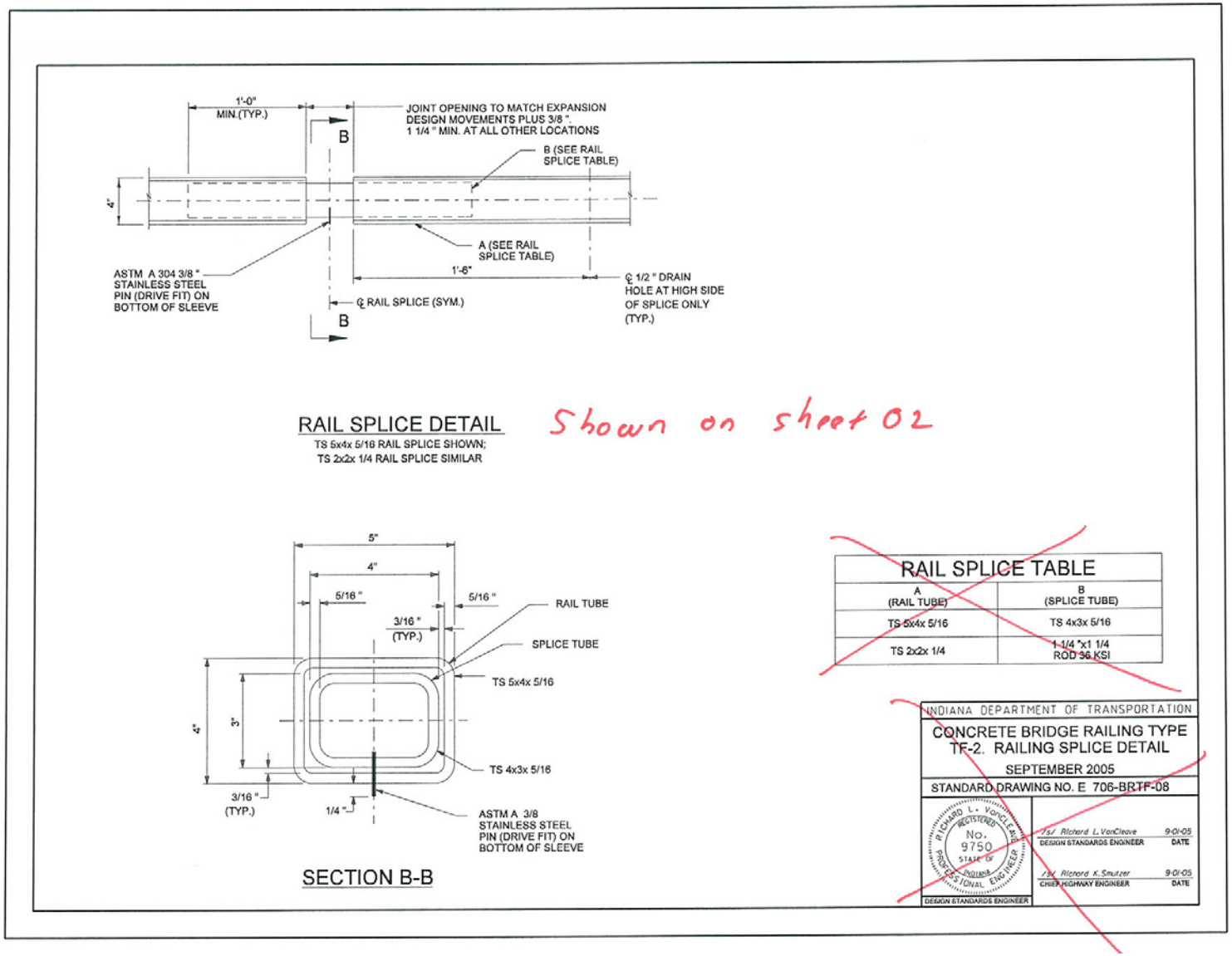
RICHARD L. VANCLEAVE REGISTERED NO. 9750 STATE OF Indiana PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-05
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTF-08 CONCRETE BRIDGE RAILING TYPE TF-2. RAILING SPLICE DETAIL (PROPOSED TO DELETE)

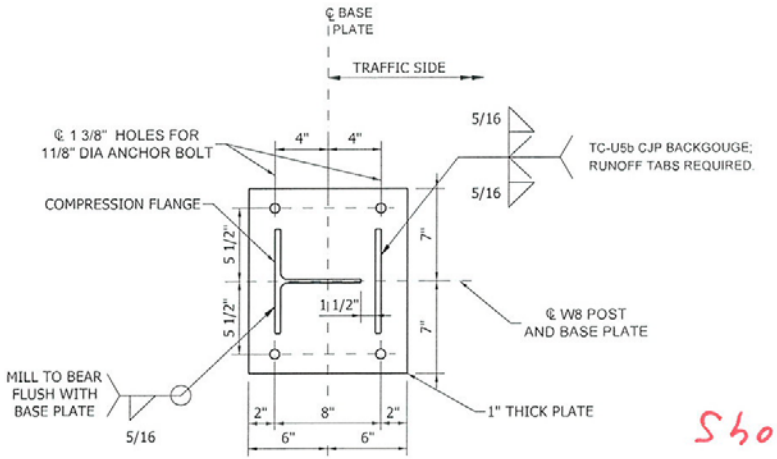


REVISION TO STANDARD DRAWINGS

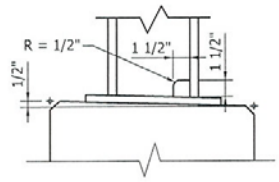
EXISTING 706-BRTF-09 CONCRETE BRIDGE RAILING TYPE TF-2 (PROPOSED TO DELETE)

NOTES:

1. 1 3/8" HOLES FOR 1 1/8" ANCHOR BOLT.



POST TO BASE PLATE DETAIL



WELD-ACCESS HOLE DETAIL

Shown on sheet 03

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BRIDGE RAILING
TYPE TF-2

SEPTEMBER 2011

STANDARD DRAWING NO. E 706-BRTF-09

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

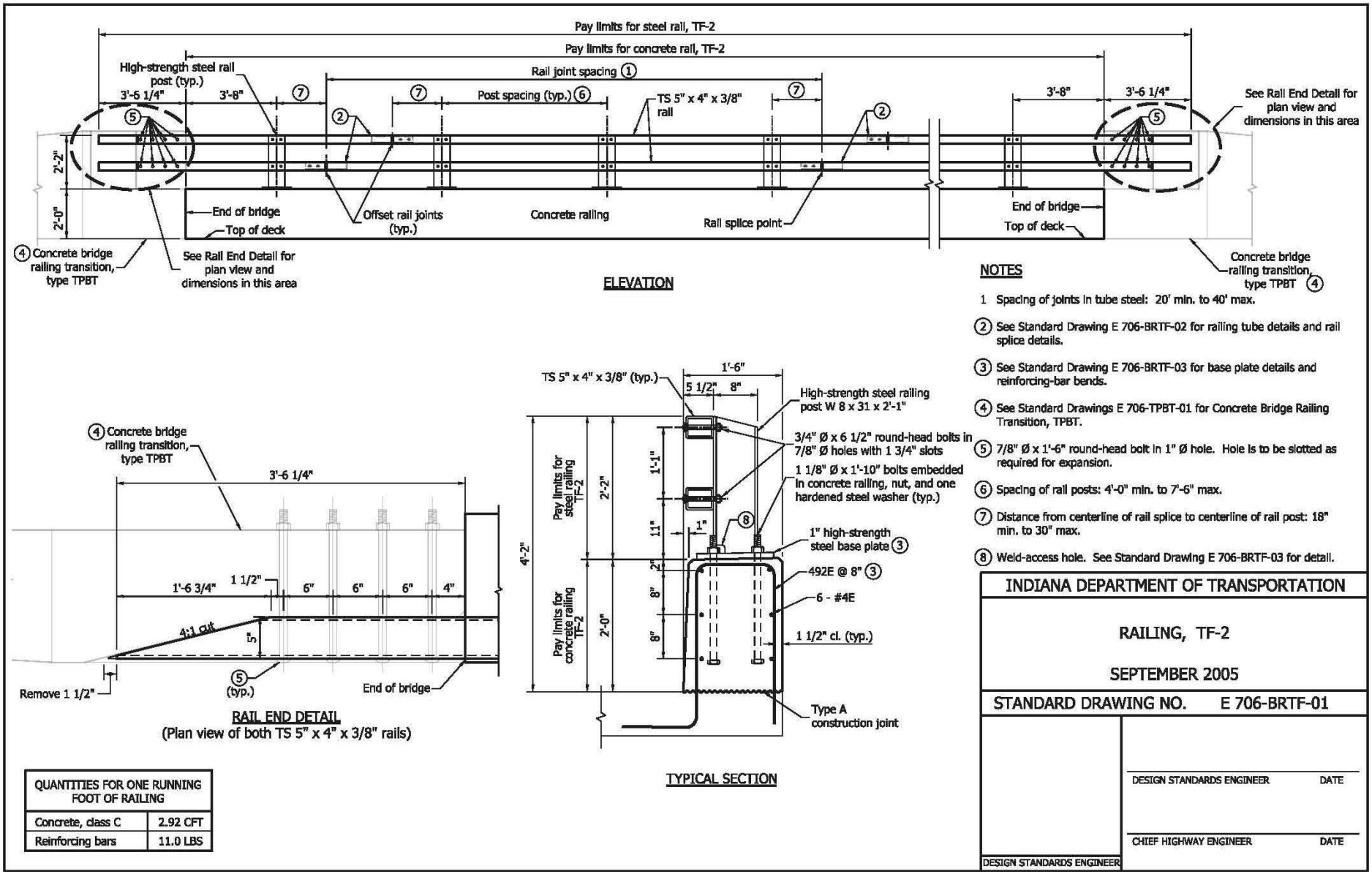
DESIGN STANDARDS ENGINEER

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

/s/ Richard K. Smuizer 09/01/11
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD DRAWINGS

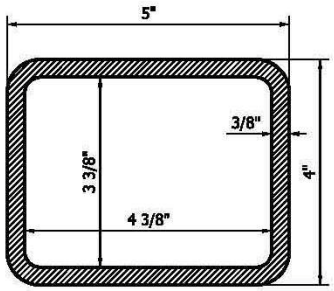
REVISED 706-BRTF-01 RAILING, TF-2 (DRAFT)



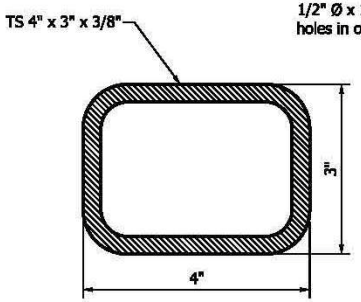
QUANTITIES FOR ONE RUNNING FOOT OF RAILING	
Concrete, class C	2.92 CFT
Reinforcing bars	11.0 LBS

REVISION TO STANDARD DRAWINGS

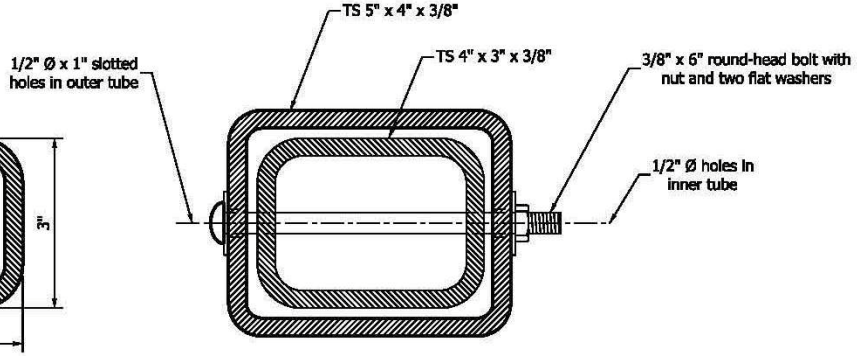
REVISED 706-BRTF-02 RAILING, TF-2 RAIL SPLICE DETAILS (DRAFT)



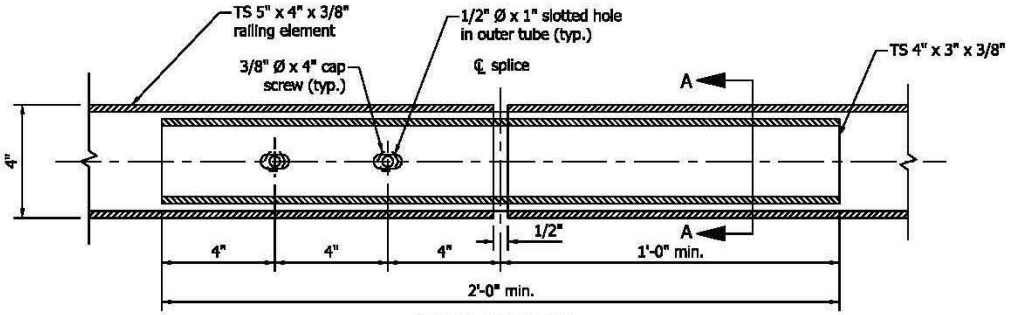
TS 5" x 4" x 3/8"



INNER TUBE FOR
TS 5" x 4" x 3/8"



SECTION A-A



SPLICE ASSEMBLY
FOR TS 5" X 4" X 3/8" RAIL

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, TF-2
RAIL SPLICE DETAILS

SEPTEMBER 2005

STANDARD DRAWING NO. E 706-BRTF-02

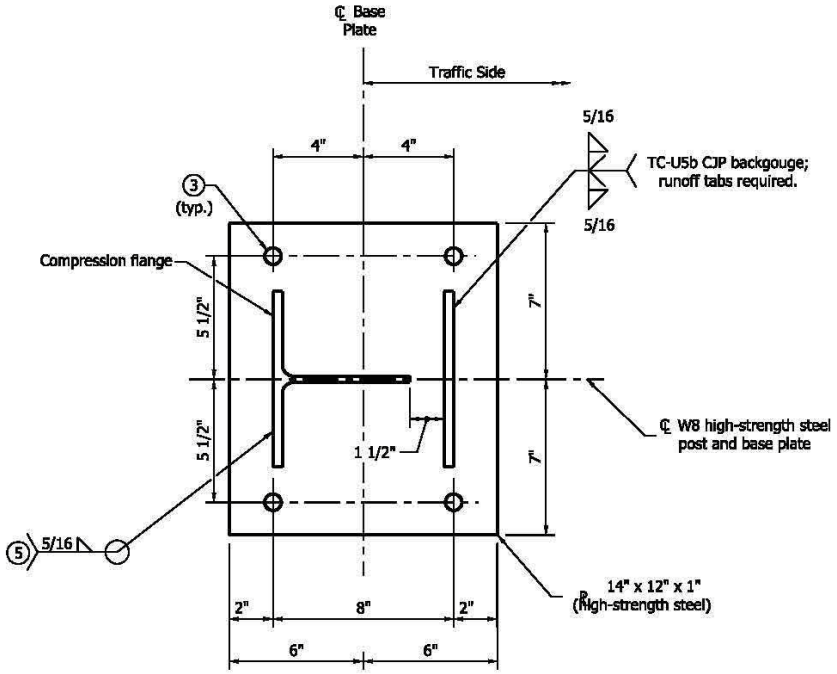
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

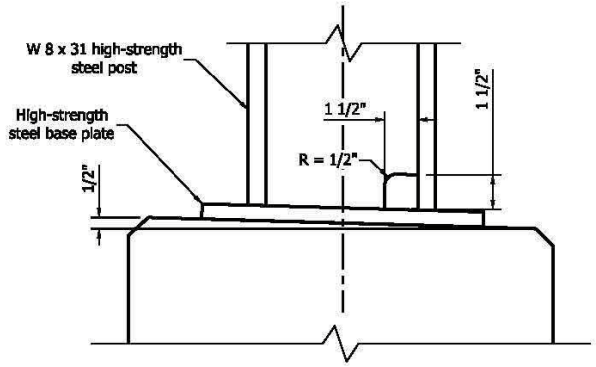
DESIGN STANDARDS ENGINEER

REVISION TO STANDARD DRAWINGS

REVISED 706-BRTF-03 RAILING, TF-2 DETAILS (DRAFT)



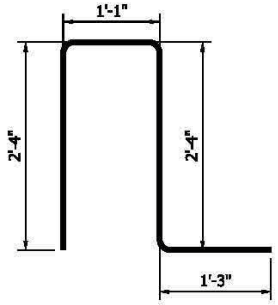
BASE PLATE DETAIL



WELD-ACCESS HOLE DETAIL

NOTES

1. See Standard Drawing E 703-BRST-01 for bar bending details.
2. All chamfered edges shall be 3/4".
3. 1 3/8" Ø holes for 1 1/8" anchor bolts.
4. All reinforcing bars designated E shall be epoxy coated.
5. Mill to bear flush with base plate prior to welding to ensure that the final position of the post is vertical.



492E x 7'-0"

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, TF-2 DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 706-BRTF-03

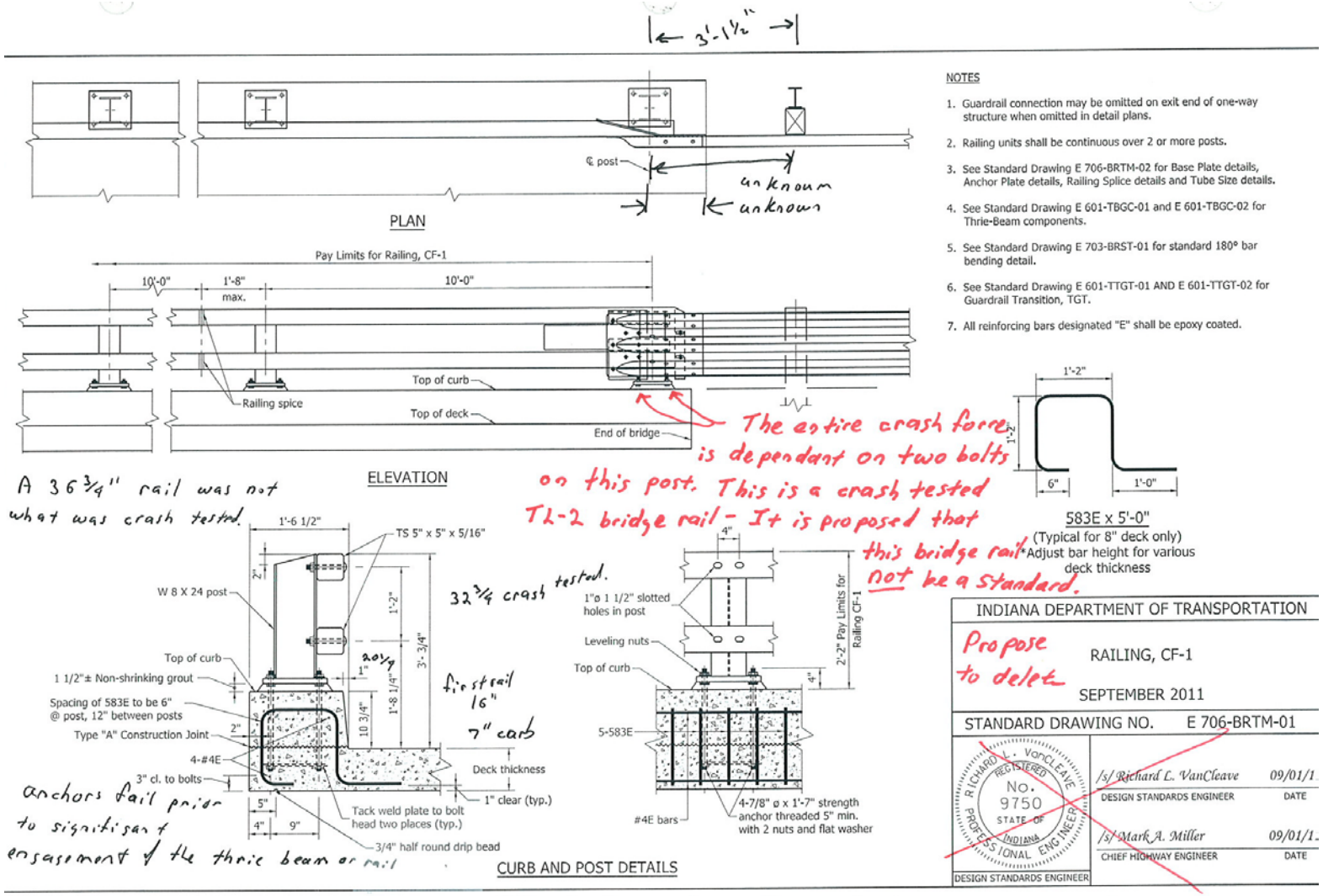
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTM-01 RAILING, CF-1 (PROPOSED TO DELETE)



A 36¾" rail was not what was crash tested.

The entire crash force is dependant on two bolts on this post. This is a crash tested TL-2 bridge rail - It is proposed that this bridge rail not be a standard.

32¾ crash tested.

Anchors fail prior to significant engagement of the thrie beam or rail

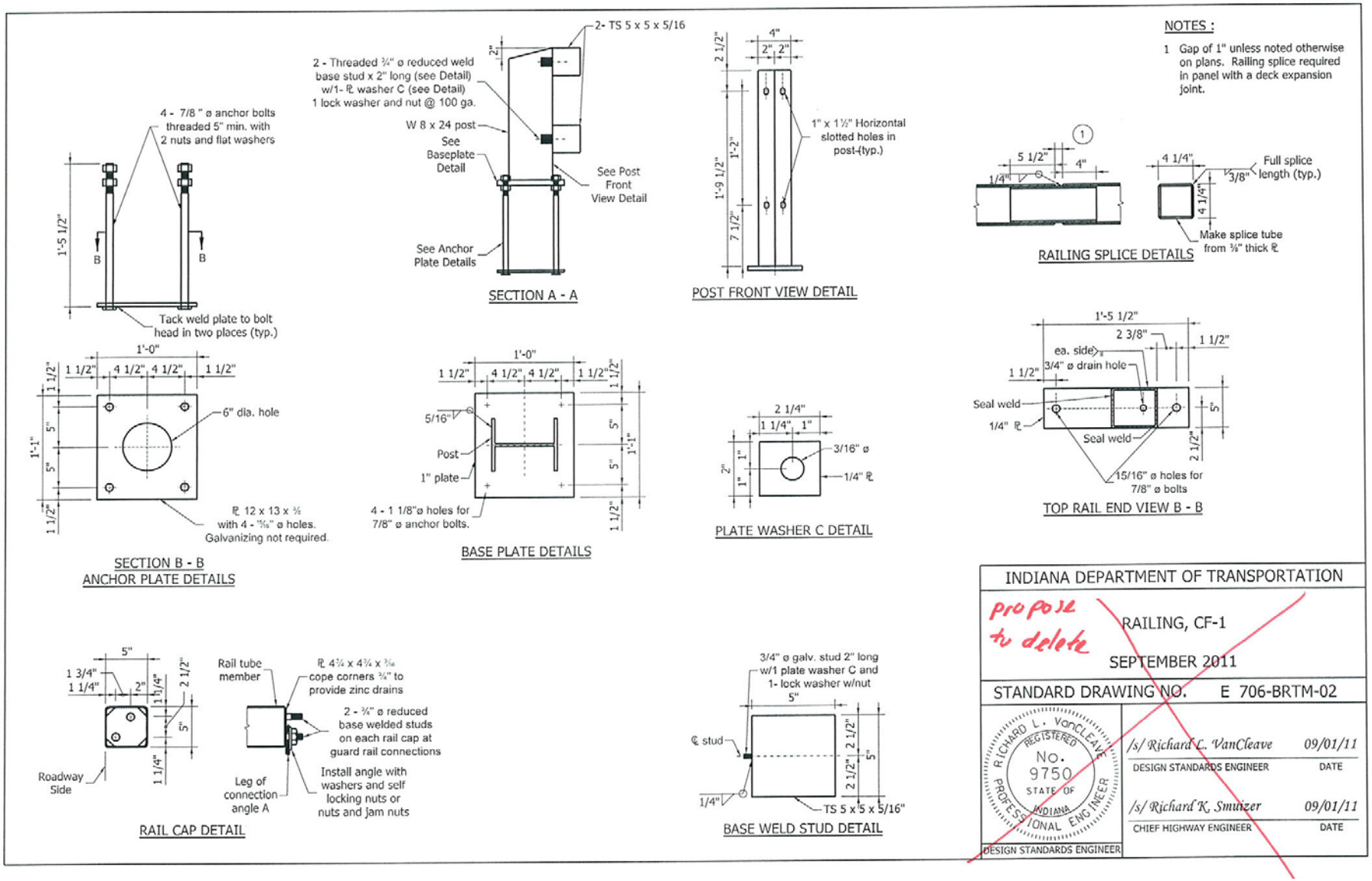
Propose to delete

This bridge rail can be used - It is recomended that this bridge rail Not be a standard. The bridge end seems very vulnerable.

CF-1

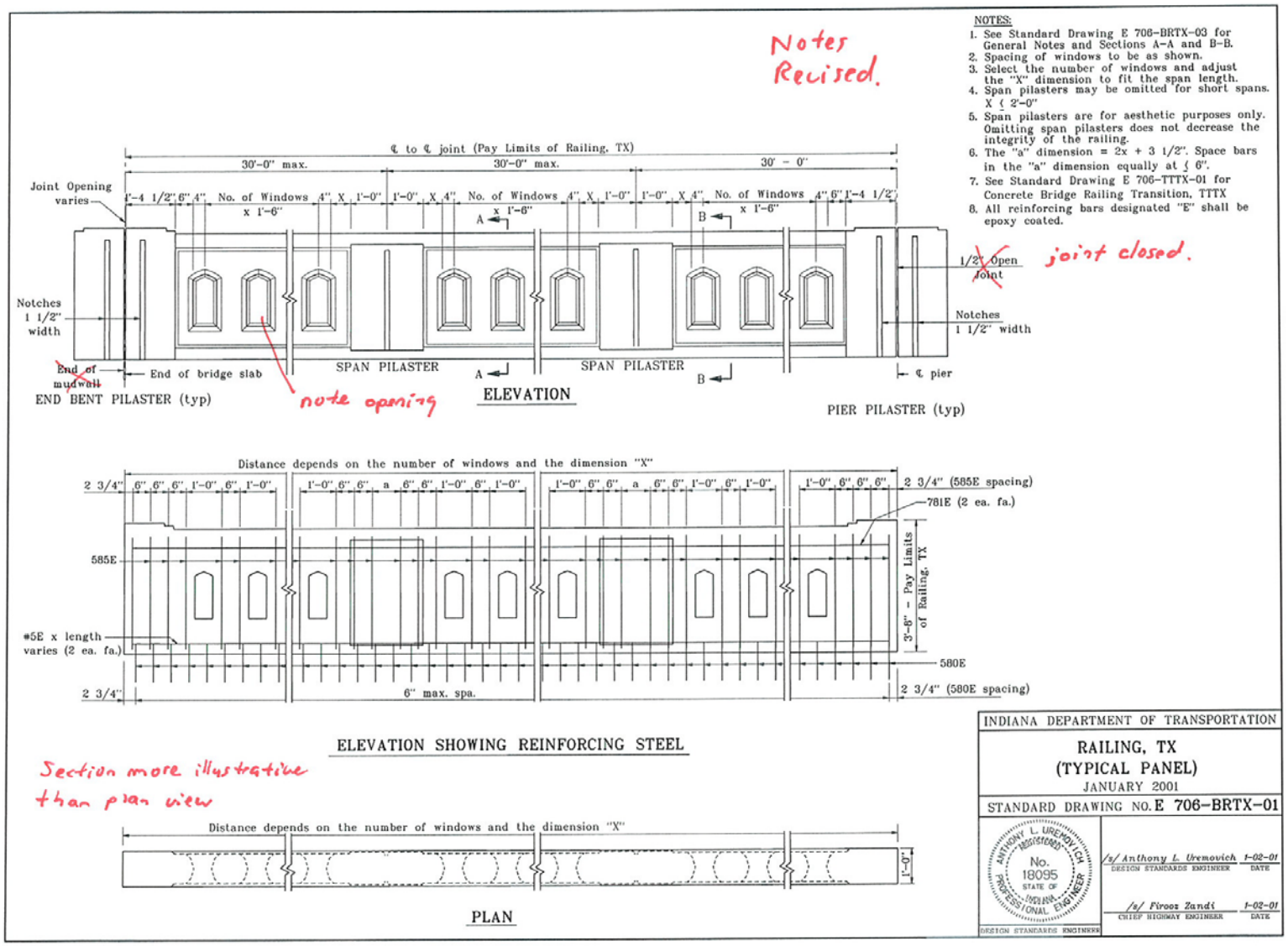
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTM-02 RAILING, CF-1 (PROPOSED TO DELETE)



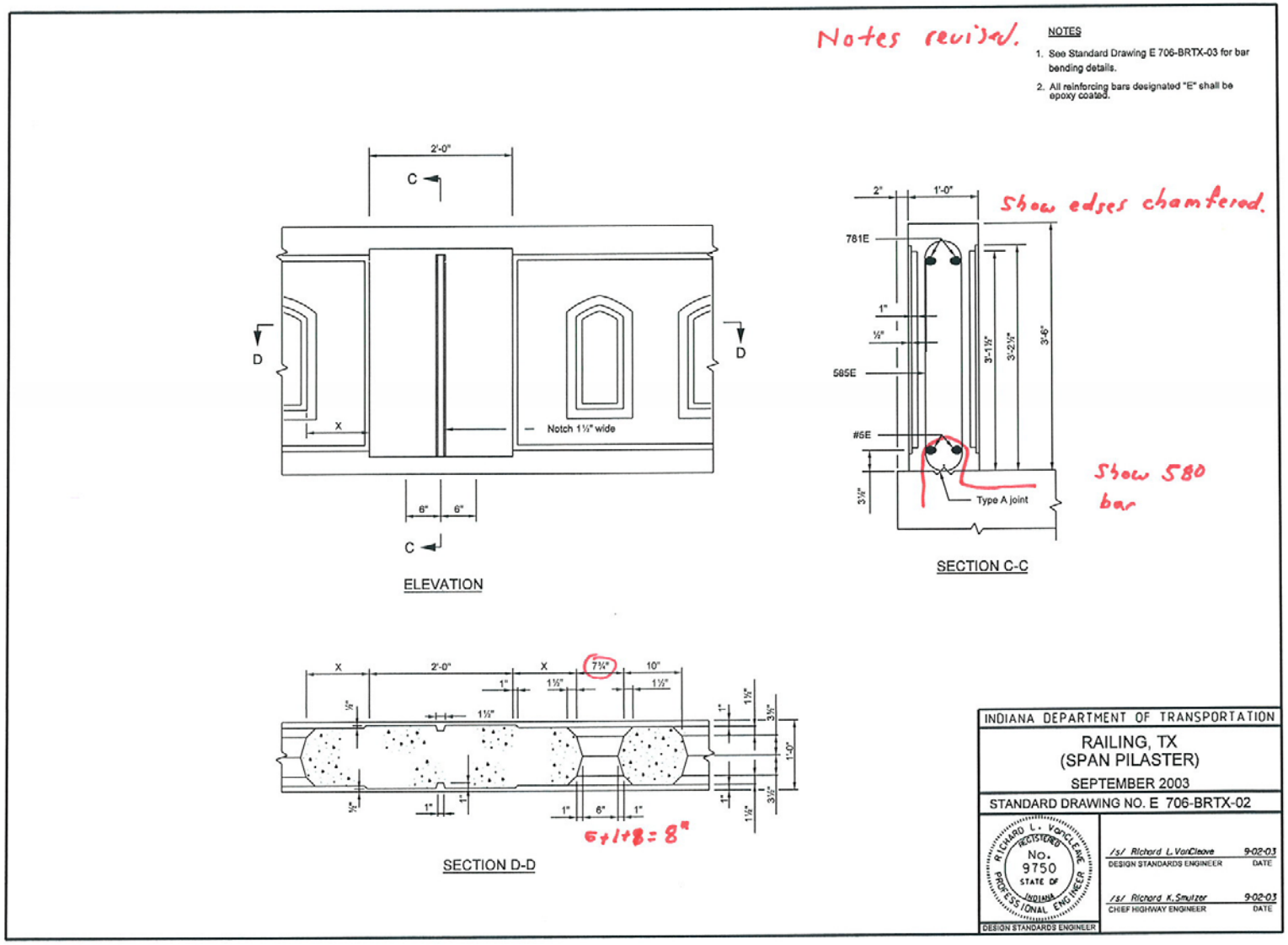
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTX-01 RAILING, TX (TYPICAL PANEL) (WITH MARKUPS)



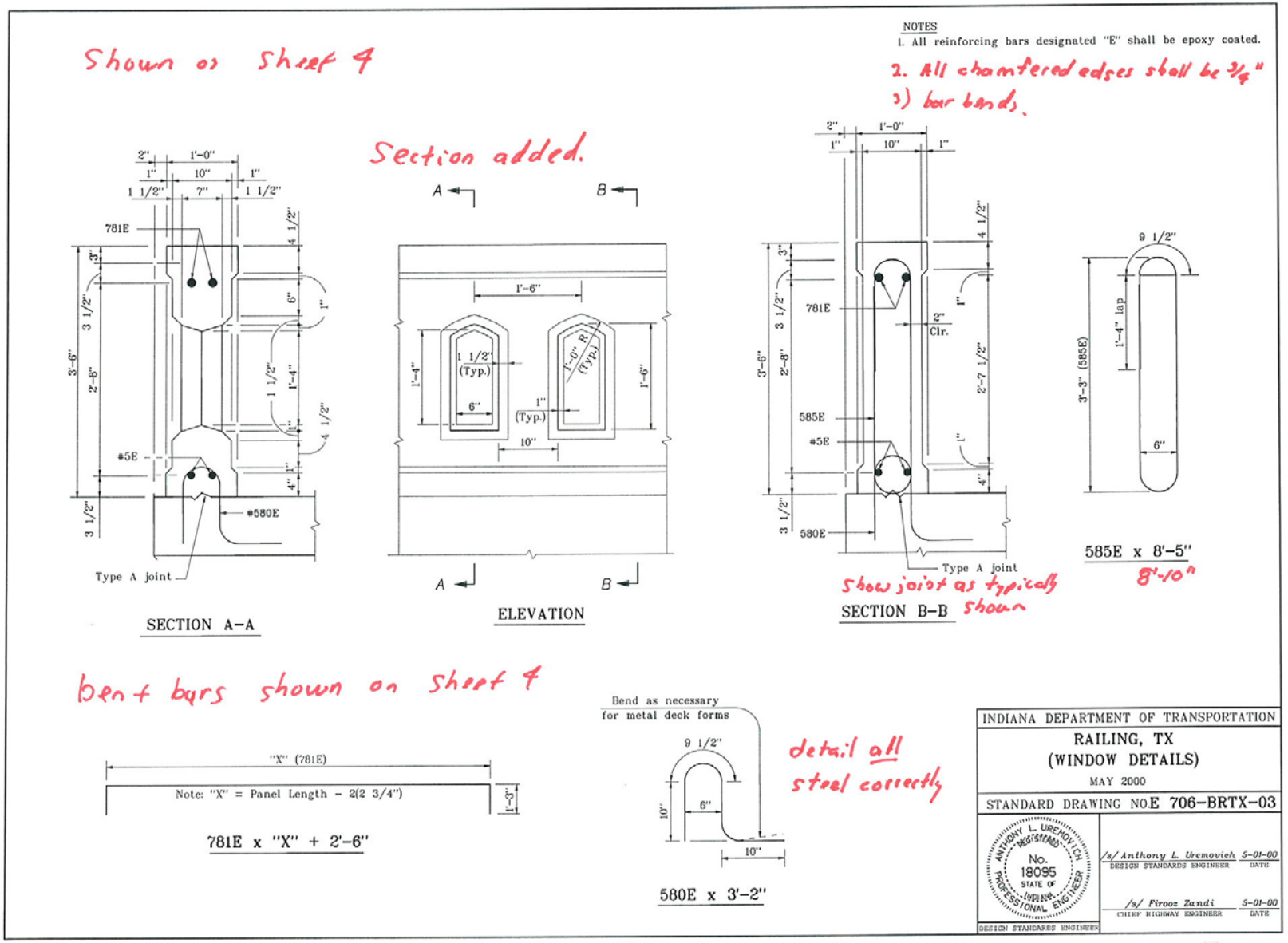
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTX-02 RAILING, TX (SPAN PILASTER) (WITH MARKUPS)



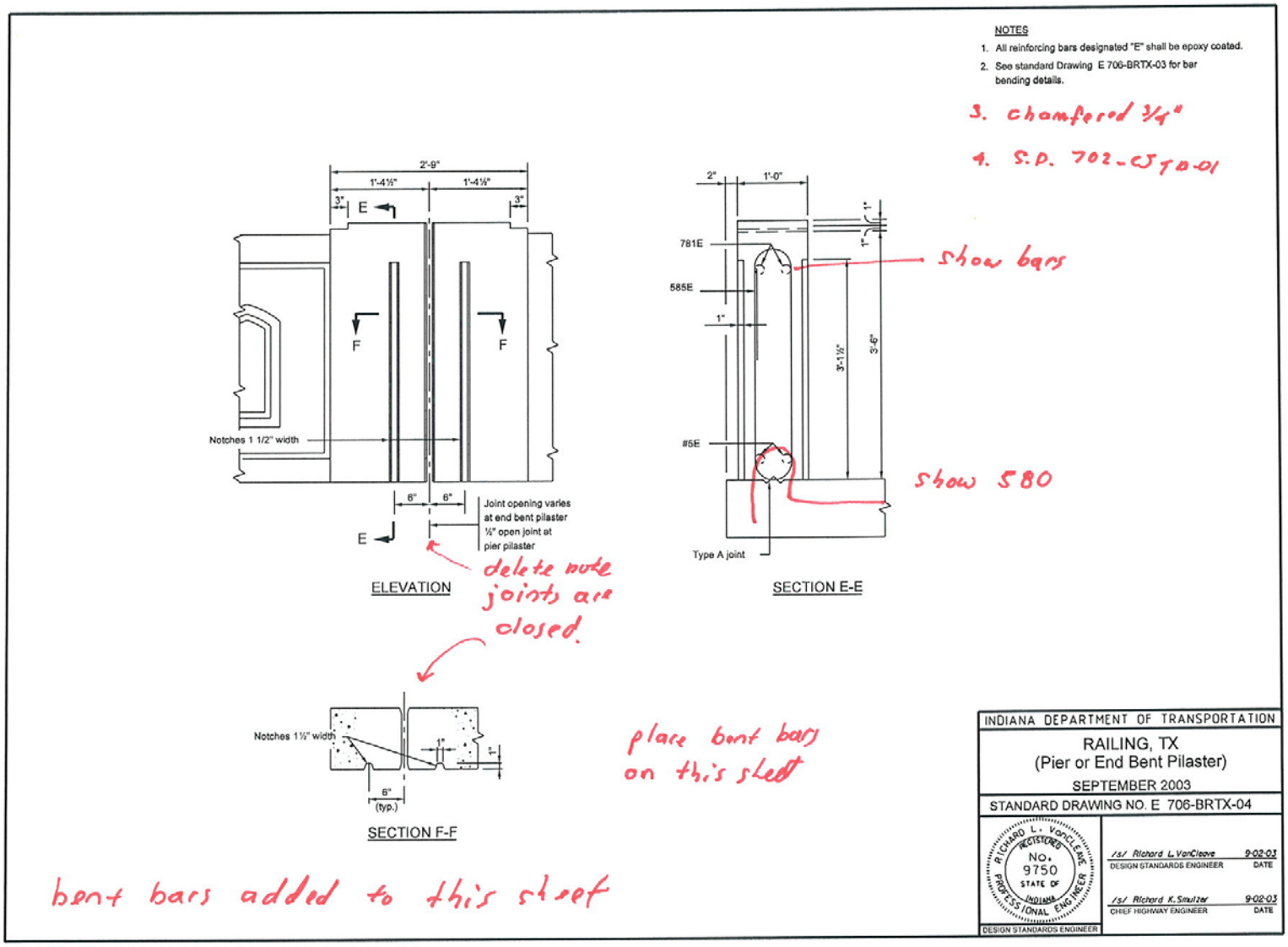
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTX-03 RAILING, TX (WINDOW DETAILS) (WITH MARKUPS)



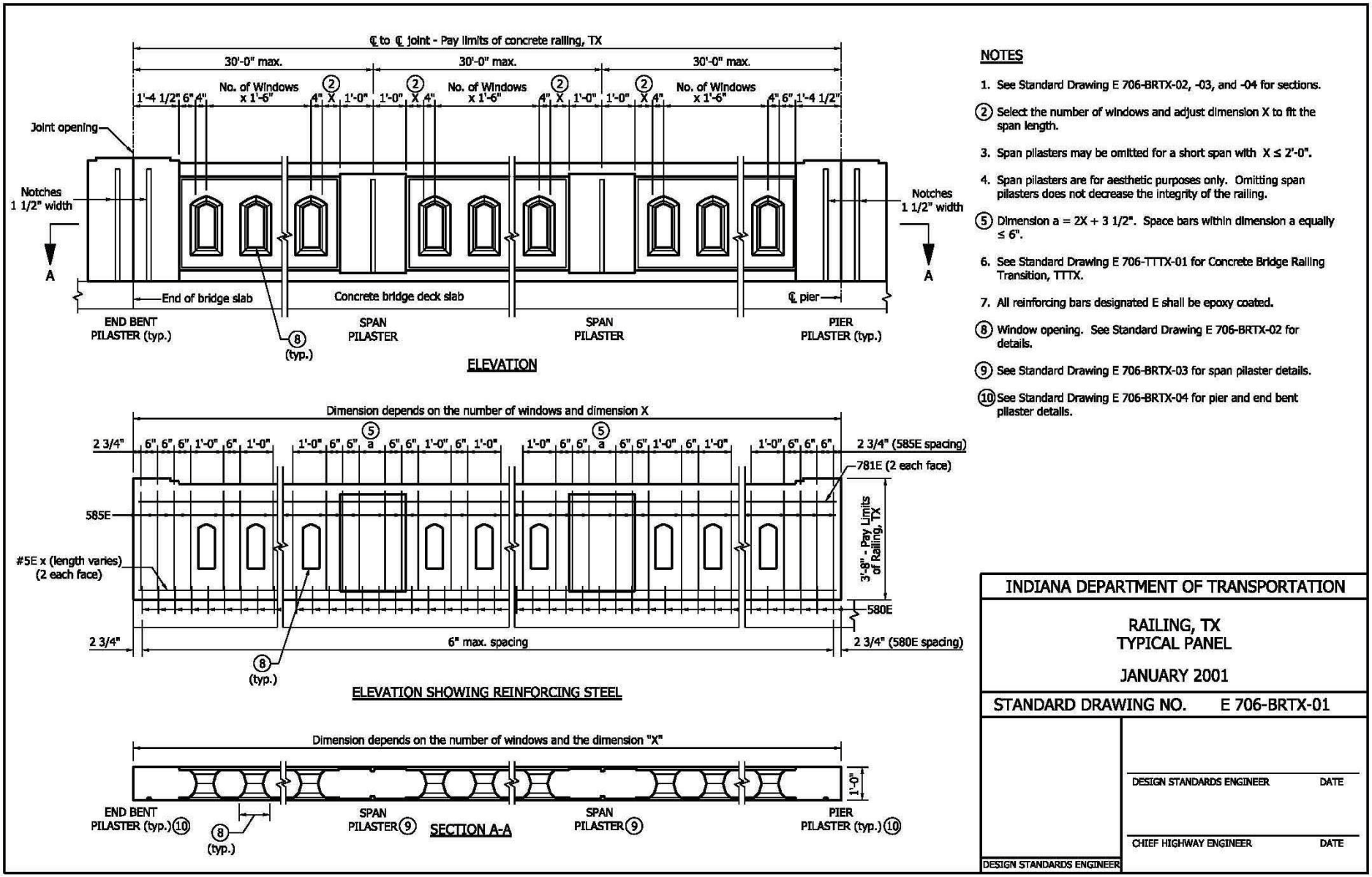
REVISION TO STANDARD DRAWINGS

EXISTING 706-BRTX-04 RAILING, TX (PIER OR END BENT PILASTER) (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

REVISED 706-BRTX-01 RAILING, TX TYPICAL PANEL (DRAFT)



NOTES

1. See Standard Drawing E 706-BRTX-02, -03, and -04 for sections.
2. Select the number of windows and adjust dimension X to fit the span length.
3. Span pilasters may be omitted for a short span with X ≤ 2'-0".
4. Span pilasters are for aesthetic purposes only. Omitting span pilasters does not decrease the integrity of the railing.
5. Dimension a = 2X + 3 1/2". Space bars within dimension a equally ≤ 6".
6. See Standard Drawing E 706-TTTX-01 for Concrete Bridge Railing Transition, TTTX.
7. All reinforcing bars designated E shall be epoxy coated.
8. Window opening. See Standard Drawing E 706-BRTX-02 for details.
9. See Standard Drawing E 706-BRTX-03 for span pilaster details.
10. See Standard Drawing E 706-BRTX-04 for pier and end bent pilaster details.

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, TX
TYPICAL PANEL

JANUARY 2001

STANDARD DRAWING NO. E 706-BRTX-01

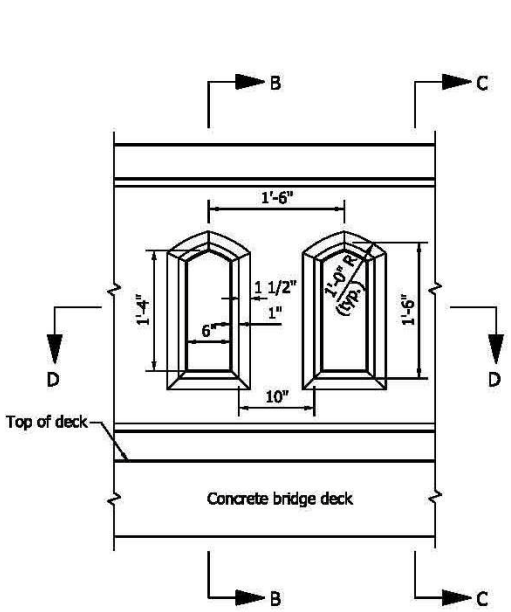
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

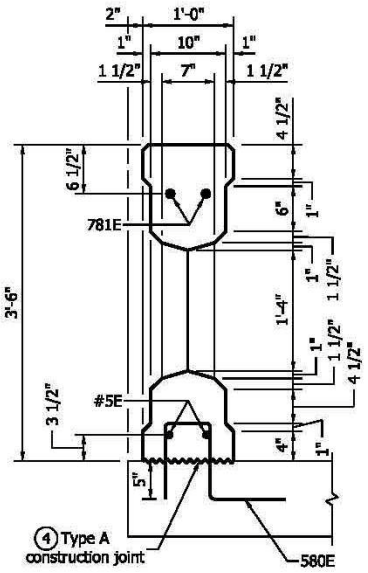
DESIGN STANDARDS ENGINEER

REVISION TO STANDARD DRAWINGS

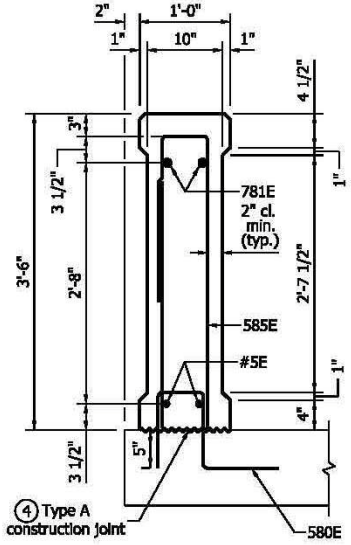
REVISED 706-BRTX-02 RAILING, TX WINDOW DETAILS (DRAFT)



ELEVATION



SECTION B-B

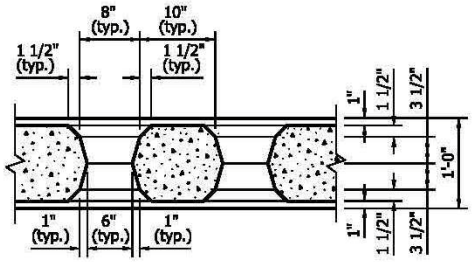


SECTION C-C

NOTES

1. All reinforcing bars designated E shall be epoxy coated.
2. All chamfered edges shall be 3/4".
3. See Standard Drawing E 706-BRTX-04 for reinforcing-bar bends.

(4) See Standard Drawing E 702-CJTA-01 for Type A construction joint details.



SECTION D-D

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, TX
WINDOW DETAILS

MAY 2000

STANDARD DRAWING NO. E 706-BRTX-02

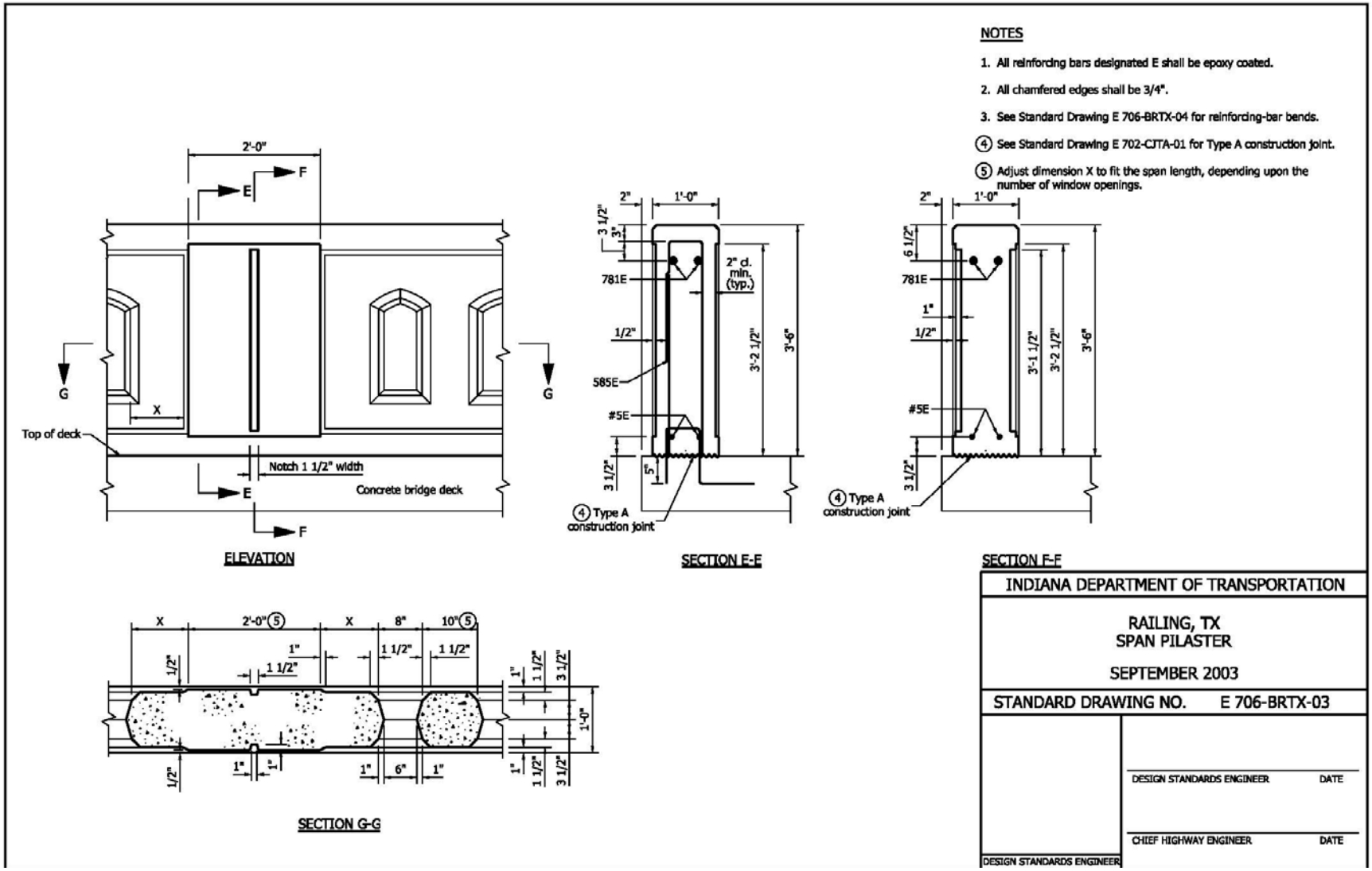
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

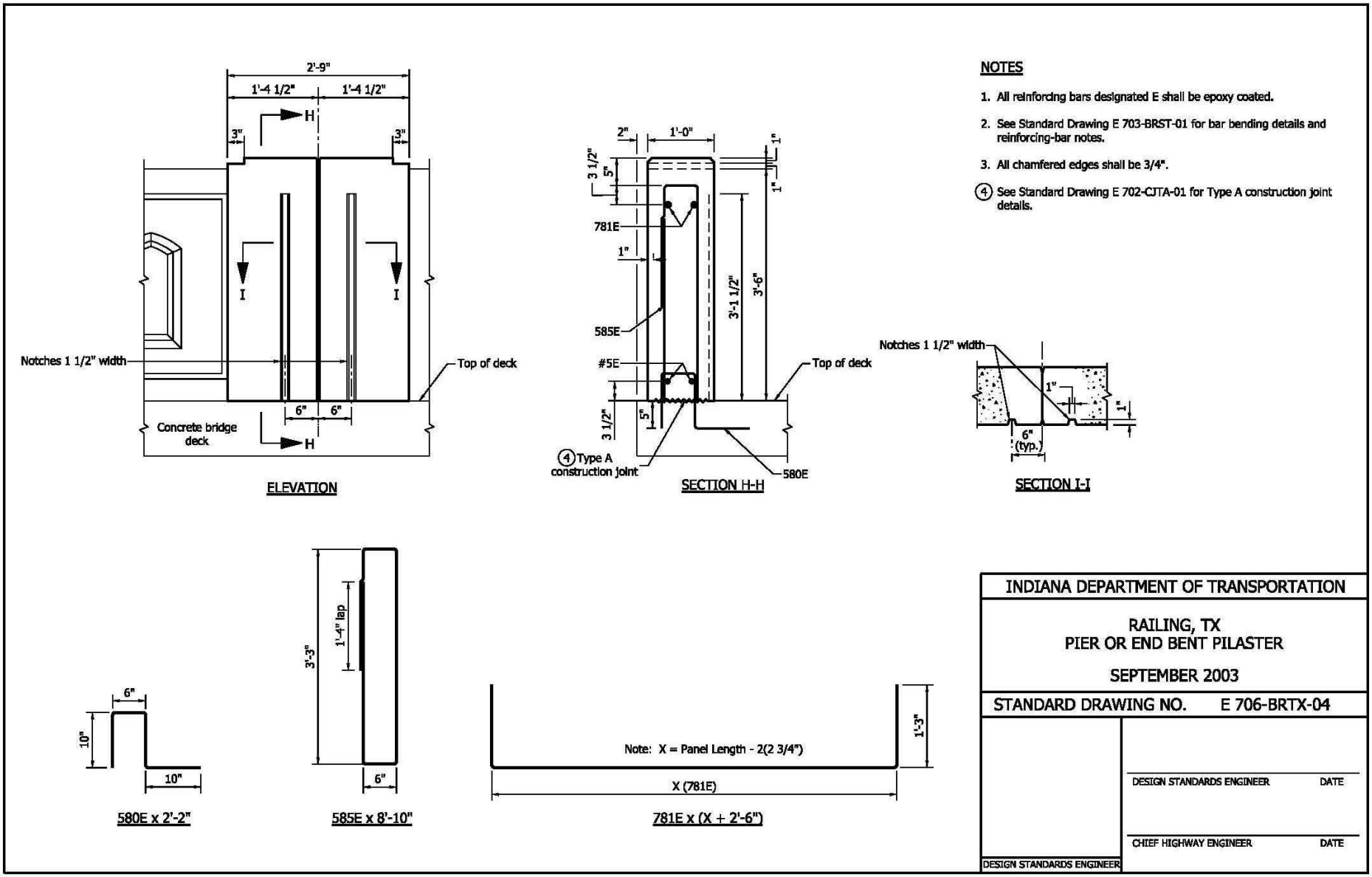
REVISION TO STANDARD DRAWINGS

REVISED 706-BRTX-03 RAILING, TX SPAN PILASTER (DRAFT)



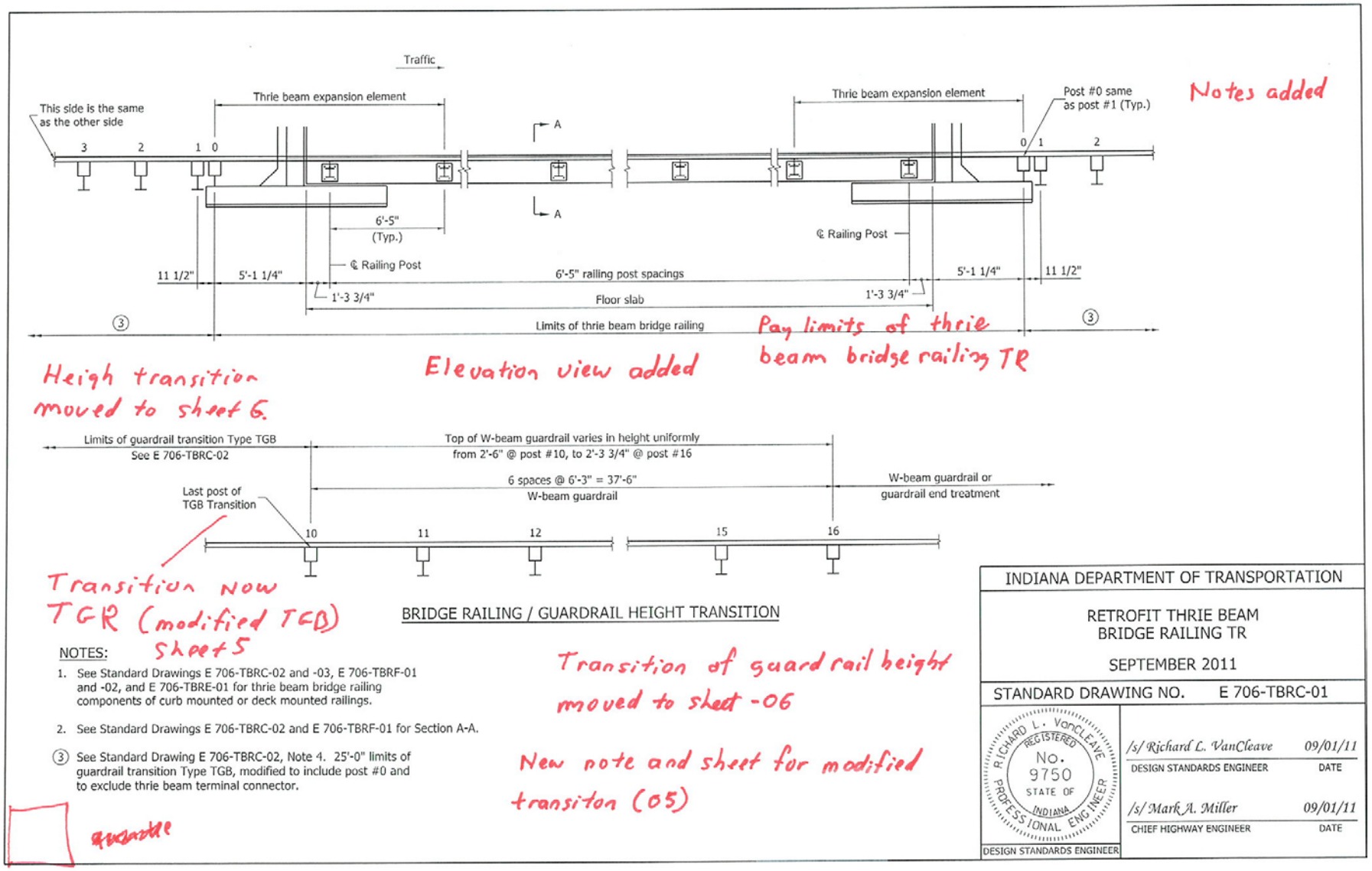
REVISION TO STANDARD DRAWINGS

REVISED 706-BRTX-04 RAILING, TX PIER OR END BENT PILASTER (DRAFT)



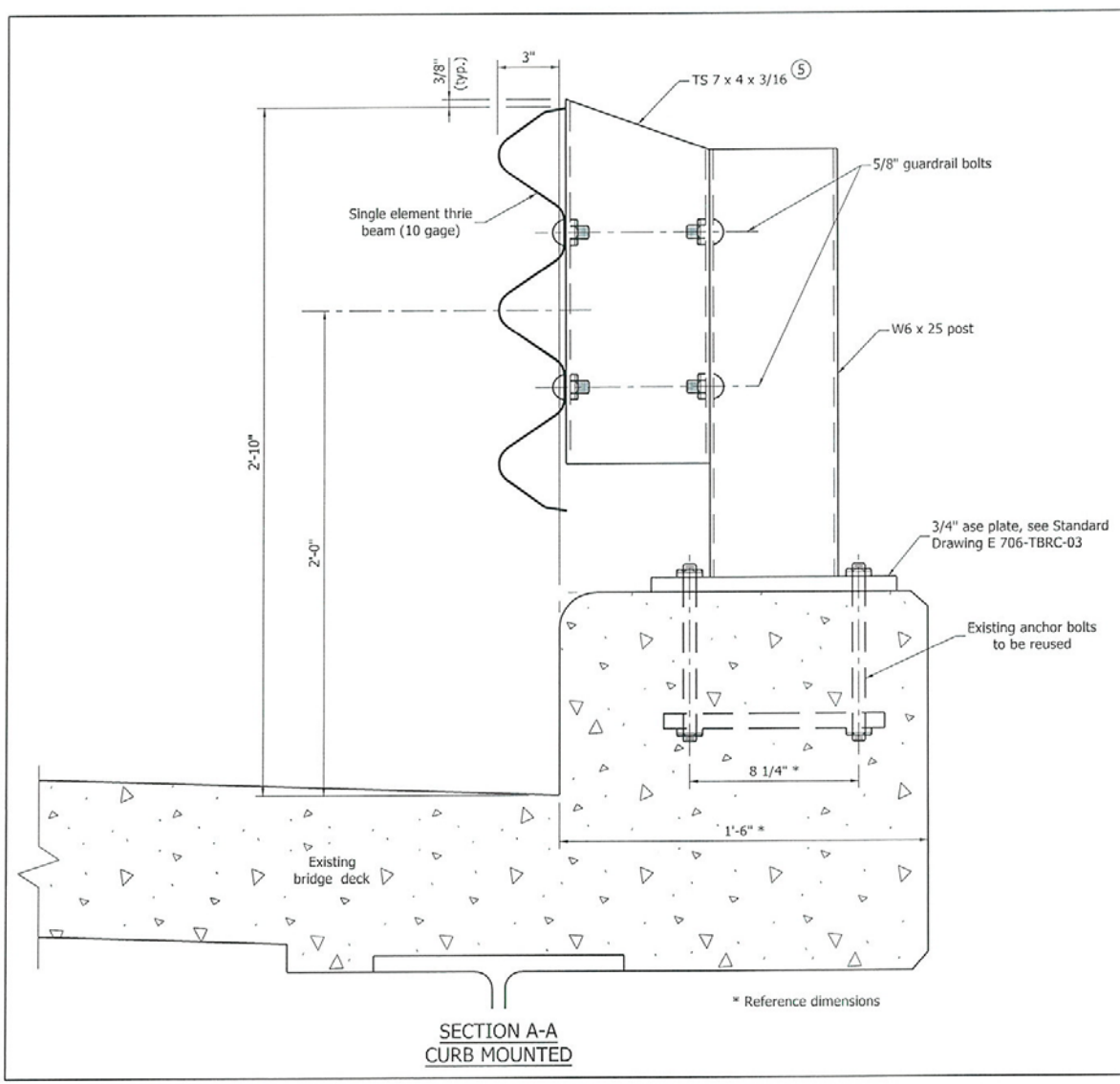
REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRC-01 RETROFIT THRIE BEAM BRIDGE RAILING TR (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRC-02 RETROFIT THRIE BEAM BRIDGE RAILING (WITH MARKUPS)



NOTES:

1. See Standard Drawing E 706-TBRC-01 for plan view.
2. See Standard Drawings E 601-TBGC-01 for thrie beam section.
3. See Standard Drawing E 706-TTGB-01, -03, -04 and -05 for type TGB guardrail transition details.
4. Height of type TGB transition post above ground: 1 through 7: 2'-10 3/8"
   Posts 8: 2'-8 3/8"
   Posts 9 & 10: 2'-6 3/8"
   Posts 11 through 16: height varies uniformly.

These notes are shown in drawings

(5) See Standard Drawing E 706-TBRC-03 for post and blockout details.

6. See Standard Drawing E 706-TBRF-01 for deck mounted bridge railing.

deck moanted option deleted.

INDIANA DEPARTMENT OF TRANSPORTATION

RETROFIT THRIE BEAM BRIDGE RAILING

SEPTEMBER 2011

STANDARD DRAWING NO. E 706-TBRC-02

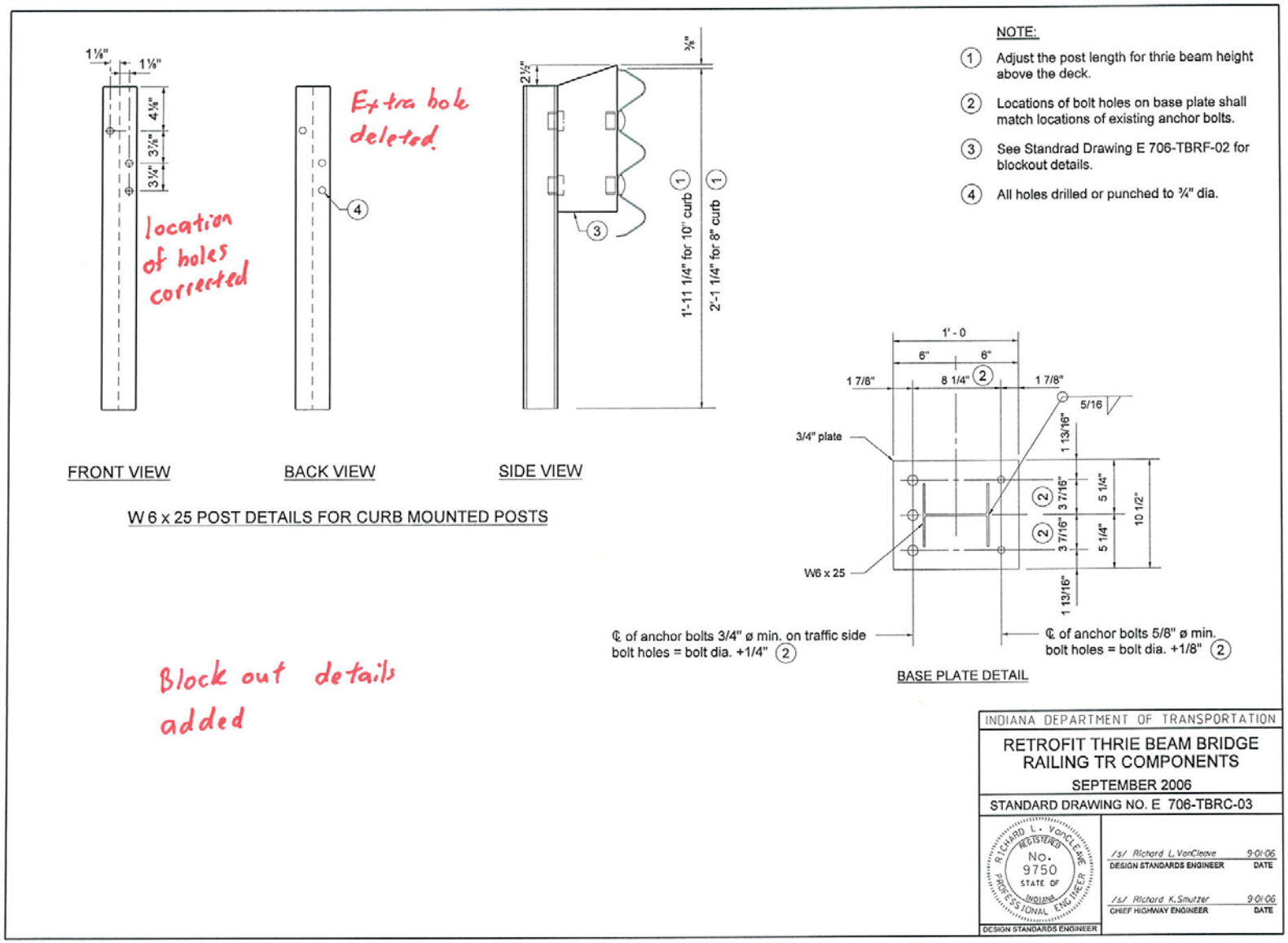
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

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

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

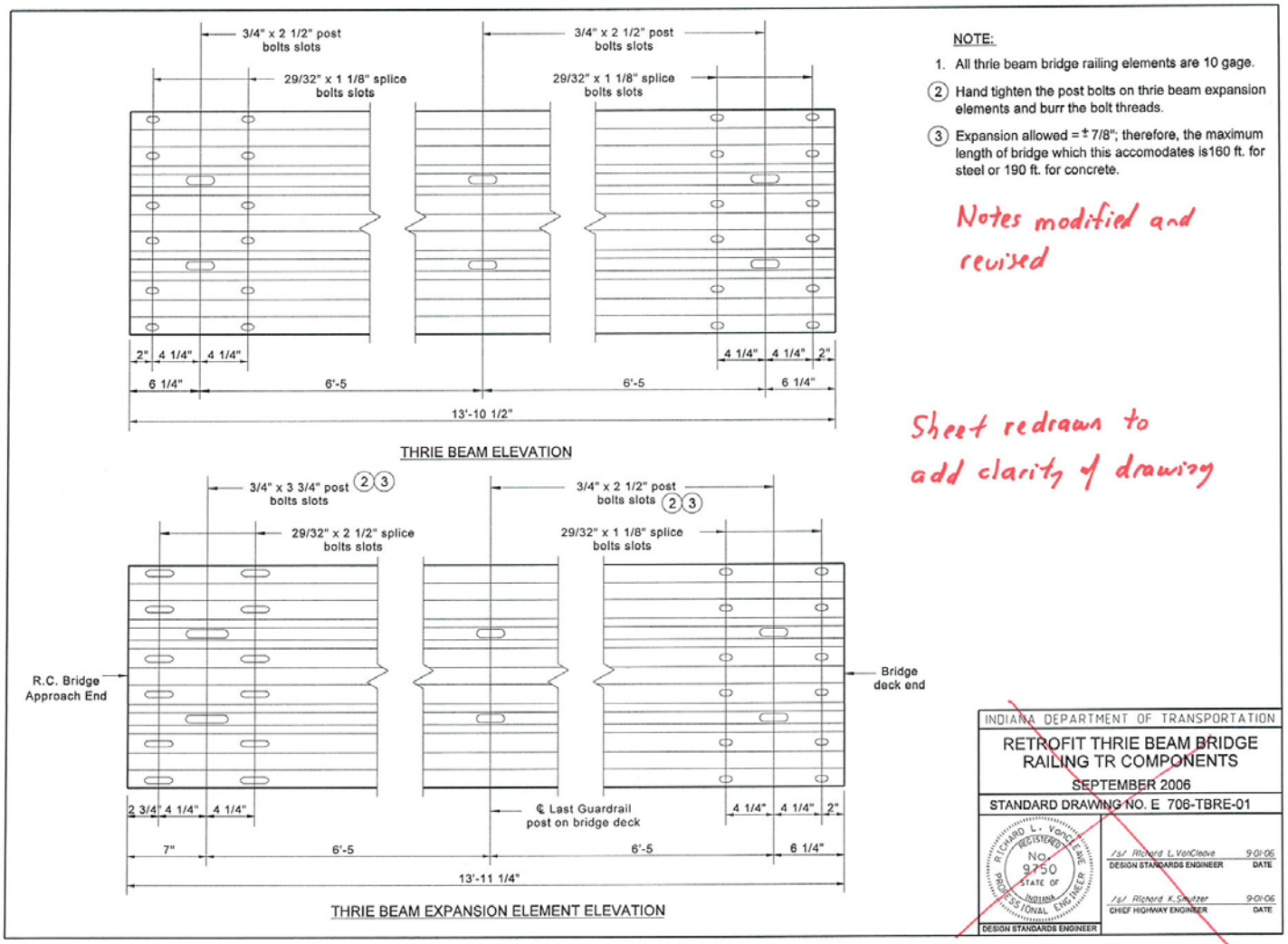
REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRC-03 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (WITH MARKUPS)



REVISION TO STANDARD DRAWINGS

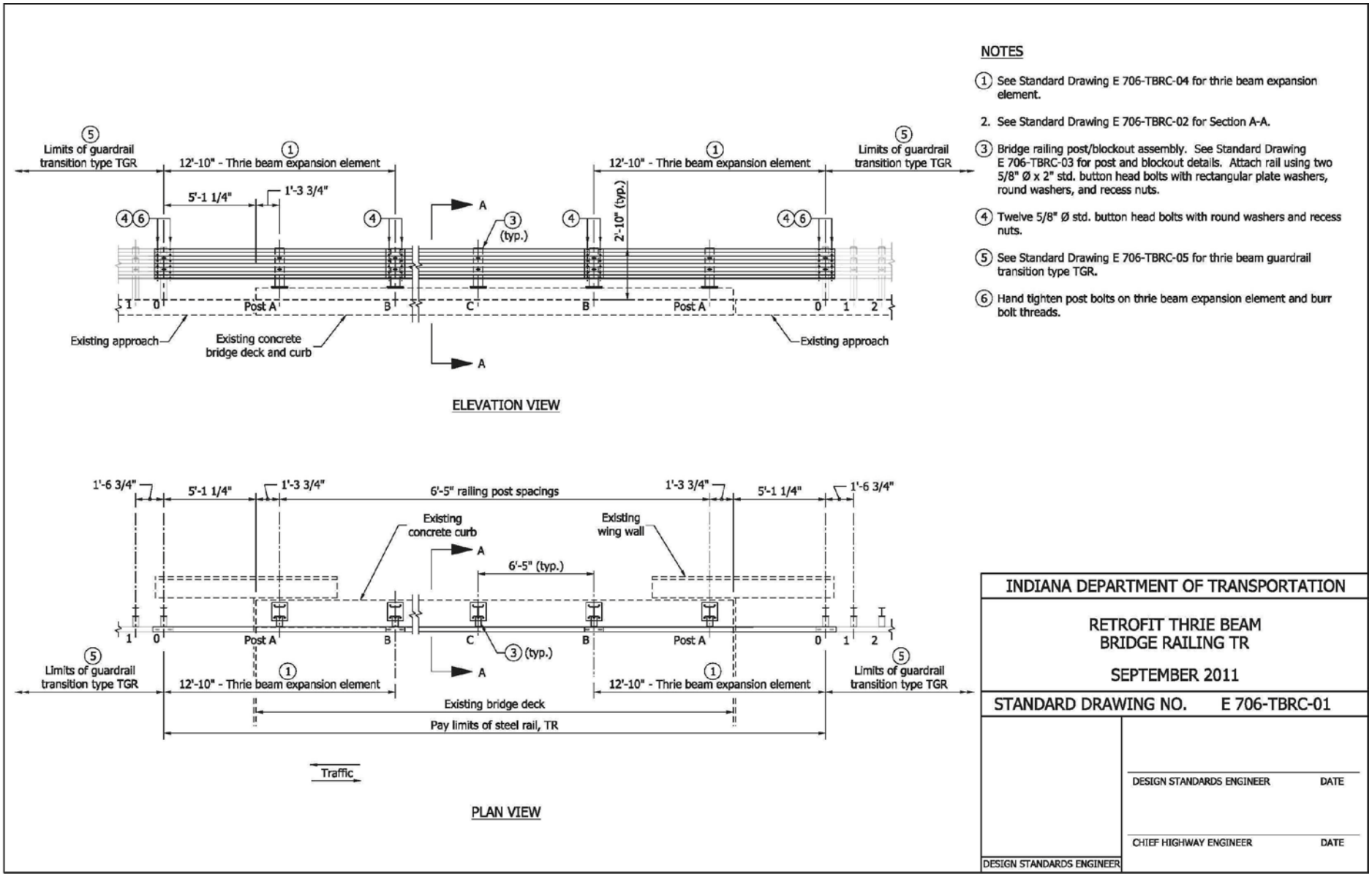
EXISTING 706-TBRE-01 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (WITH MARKUPS)



706-TBRE-01
Now 706-TBRC-04

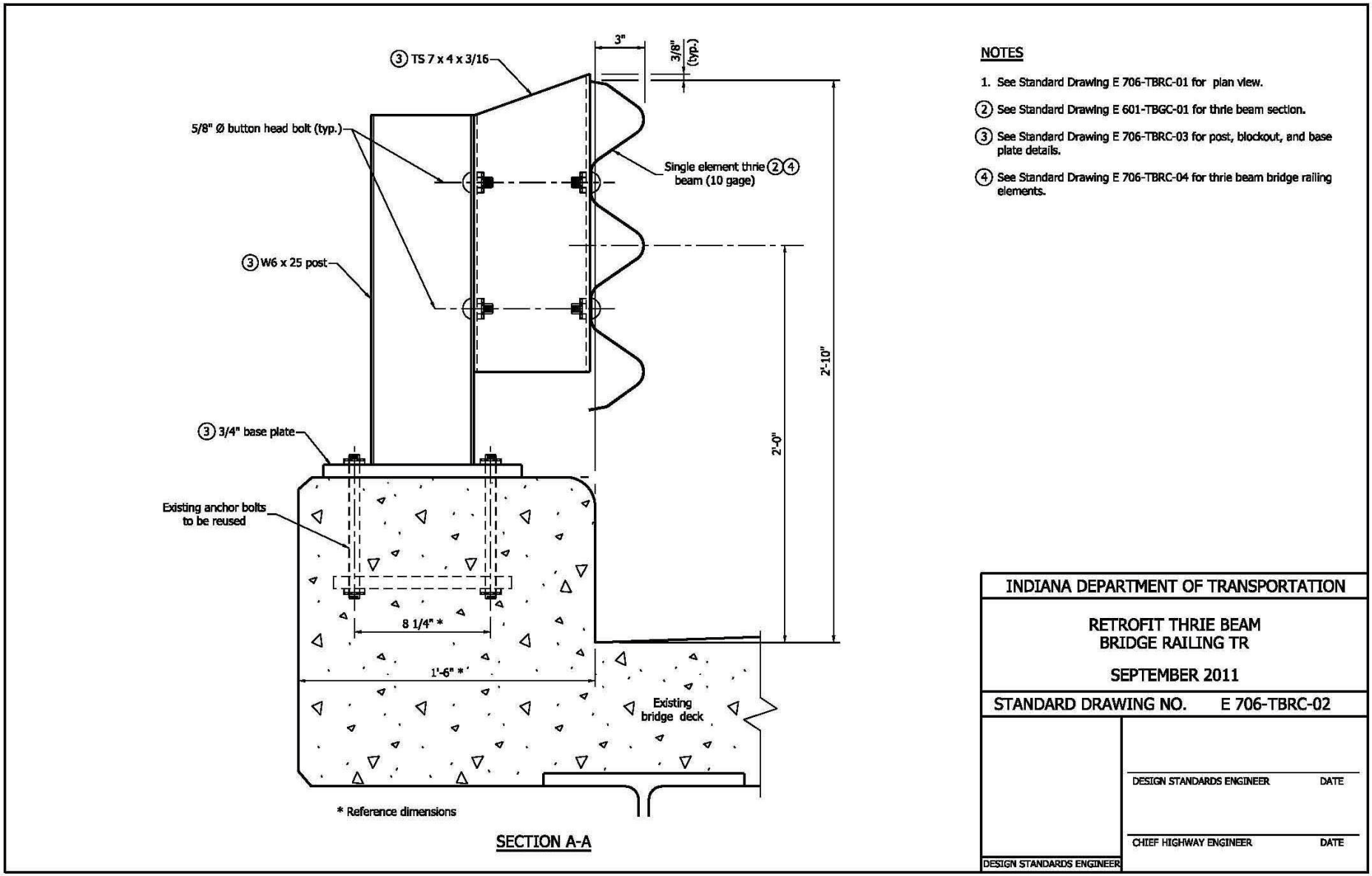
REVISION TO STANDARD DRAWINGS

REVISED 706-TBRC-01 RETROFIT THRIE BEAM BRIDGE RAILING TR (DRAFT)



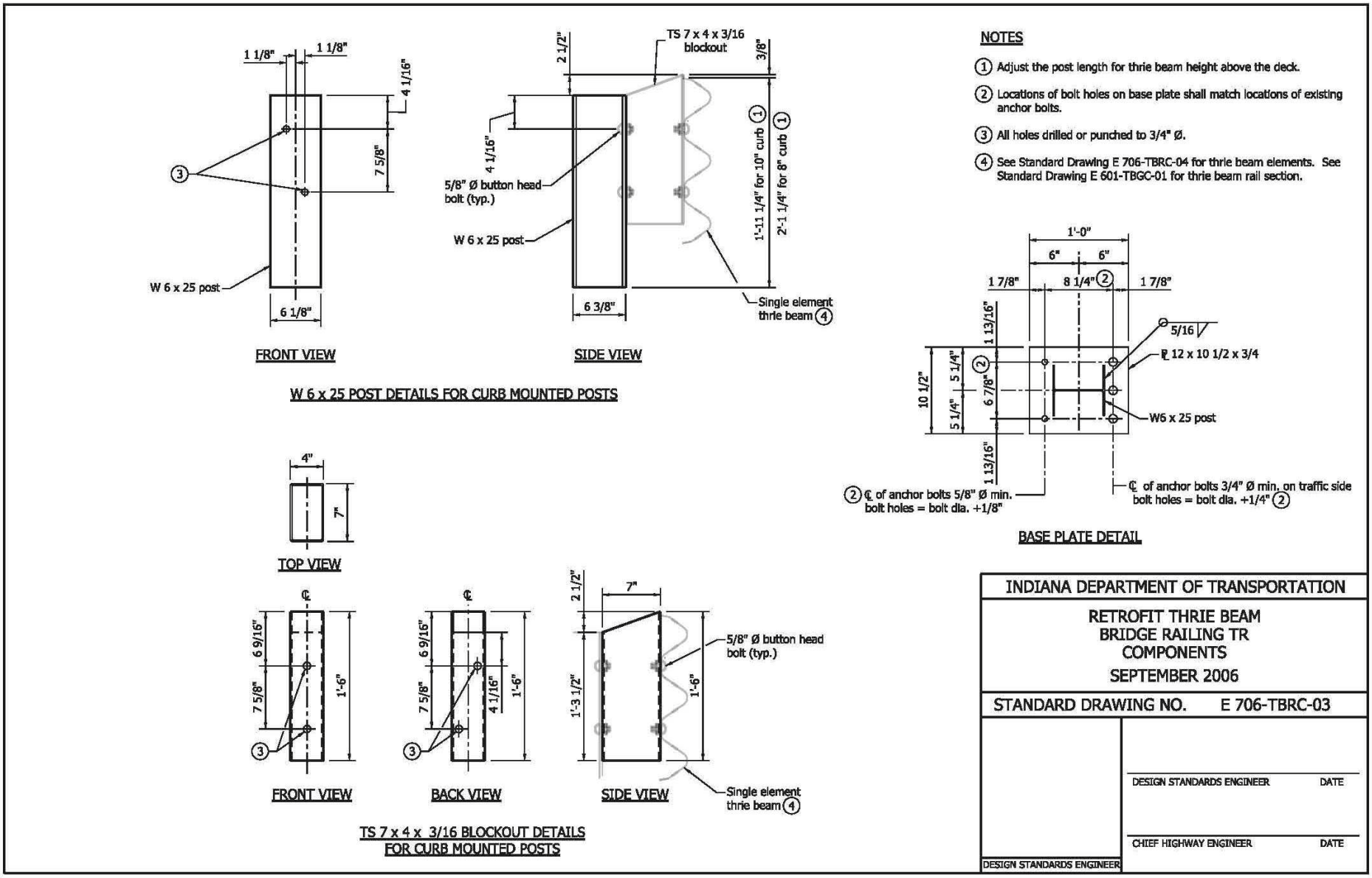
REVISION TO STANDARD DRAWINGS

REVISED 706-TBRC-02 RETROFIT THRIE BEAM BRIDGE RAILING TR (DRAFT)



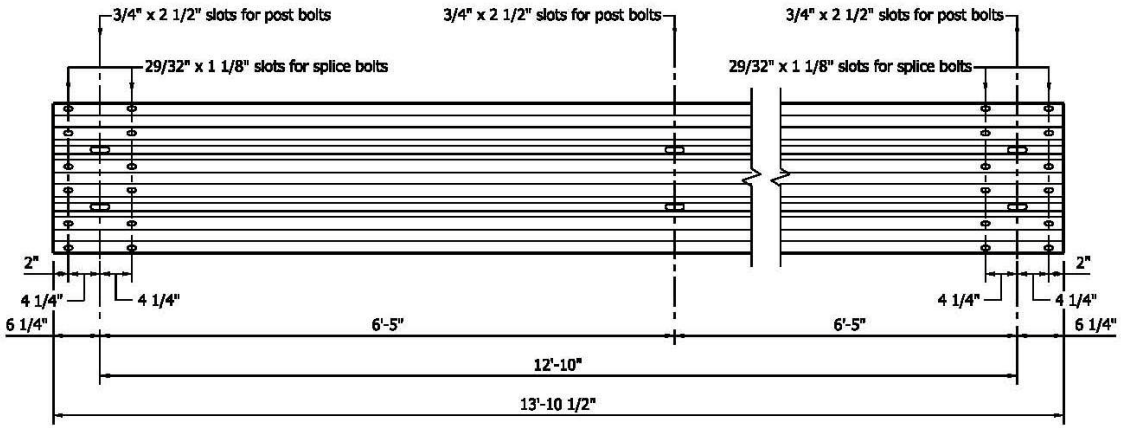
REVISION TO STANDARD DRAWINGS

REVISED 706-TBRC-03 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (DRAFT)

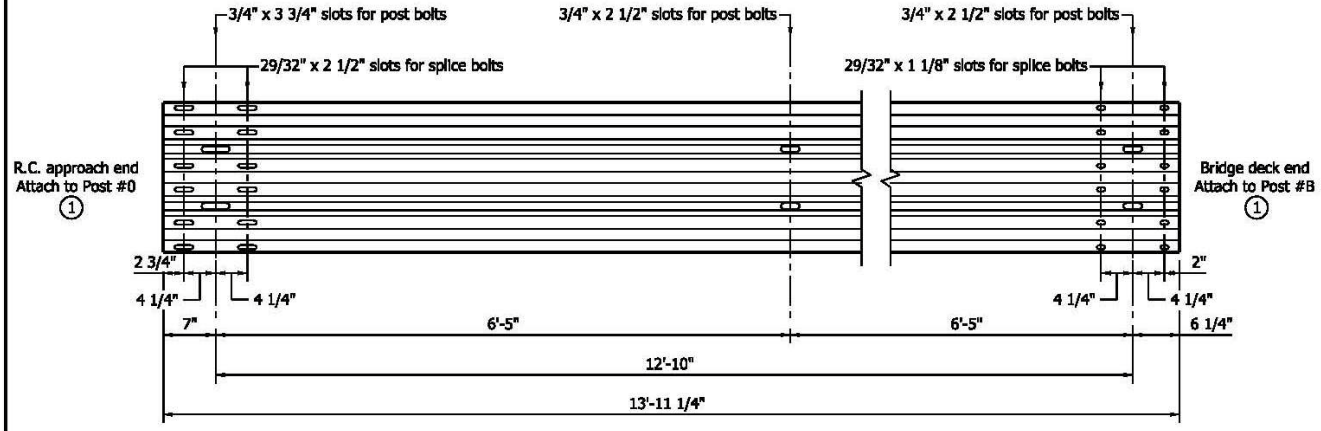


REVISION TO STANDARD DRAWINGS

REVISED NEW 706-TBRC-04 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (DRAFT)



THRIE BEAM ELEVATION



THRIE BEAM EXPANSION ELEMENT ELEVATION

NOTES

1. See Standard Drawing E 706-TBRC-01 for post locations.

INDIANA DEPARTMENT OF TRANSPORTATION

RETROFIT THRIE BEAM
BRIDGE RAILING TR
COMPONENTS
SEPTEMBER 2006

STANDARD DRAWING NO. E 706-TBRC-04

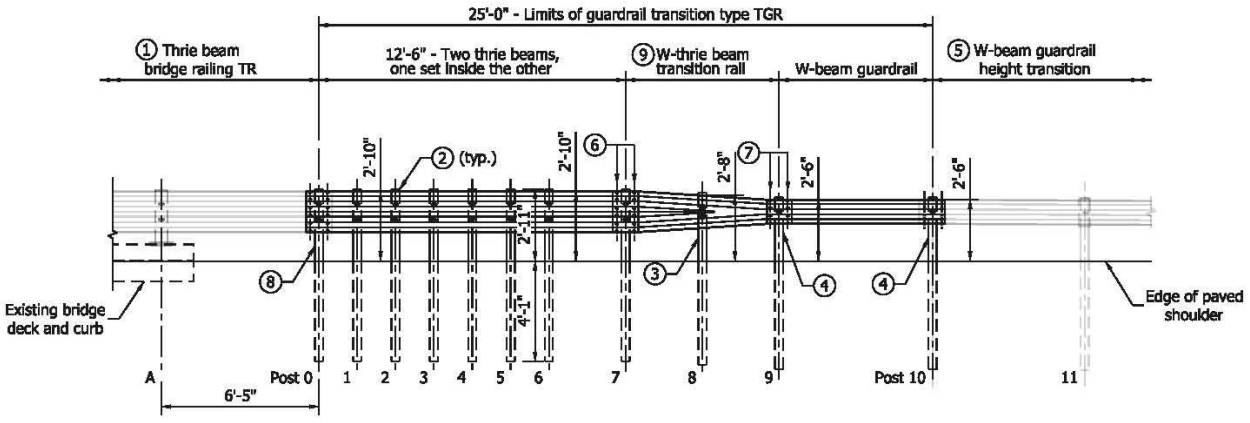
/s/ XXXXXXXXX 01/01/09
DESIGN STANDARDS ENGINEER DATE

/s/ XXXXXXXXX 01/01/09
CHIEF HIGHWAY ENGINEER DATE

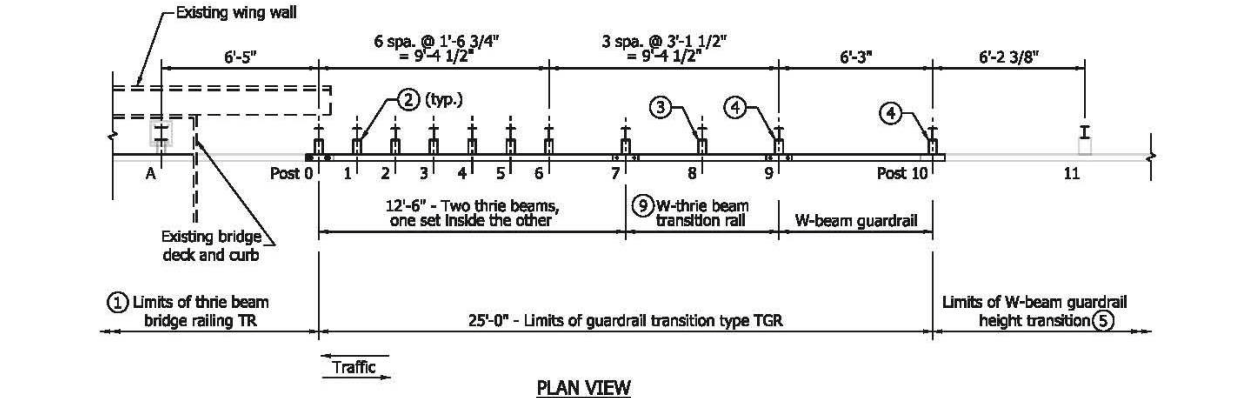
DESIGN STANDARDS ENGINEER

REVISION TO STANDARD DRAWINGS

REVISED NEW 706-TBRC-05 RETROFIT THRIE BEAM GUARDRAIL TRANSITION TYPE TGR (DRAFT)



ELEVATION



PLAN VIEW

NOTES

① See Standard Drawing E 706-TBRC-01 for thrie beam bridge railing TR.

② TGB transition post/blockout assembly. See Standard Drawing E 601-TTGB-03 for post and blockout details. Adjust post height to accommodate guardrail heights indicated on this sheet. Attach rail using two 5/8" Ø x 2" std. button head bolts with rectangular plate washers, round washers, and recess nuts.

③ W-thrie beam transition post/blockout assembly. See Standard Drawing E 601-TTGB-04 for post and blockout details. Adjust post height to accommodate guardrail heights indicated on this sheet. Attach rail using two 5/8" Ø x 2" std. button head bolts with rectangular plate washers, round washers, and recess nuts.

④ W-beam post/blockout assembly. See Standard Drawing E 601-TTGB-05 for post and blockout details. Adjust post height to accommodate guardrail heights indicated on this sheet. Attach rail using one 5/8" Ø x 1 1/4" std. button head bolt with rectangular plate washer, round washer, and recess nut.

⑤ See Standard Drawing E 706-TBRC-06 for W-beam guardrail height transition.

⑥ Twelve 5/8" Ø x 2" std. button head bolts with round washers and recess nuts, through rail sections.

⑦ Eight 5/8" Ø x 1 1/4" std. button head bolts with round washers and recess nuts.

⑧ Hand tighten post bolts on thrie beam expansion element and burr bolt threads.

⑨ See Standard Drawing E 601-TBGC-01 for W-thrie beam transition rail.

INDIANA DEPARTMENT OF TRANSPORTATION

RETROFIT THRIE BEAM GUARDRAIL TRANSITION TYPE TGR

SEPTEMBER 2012

STANDARD DRAWING NO. E 706-TBRC-05

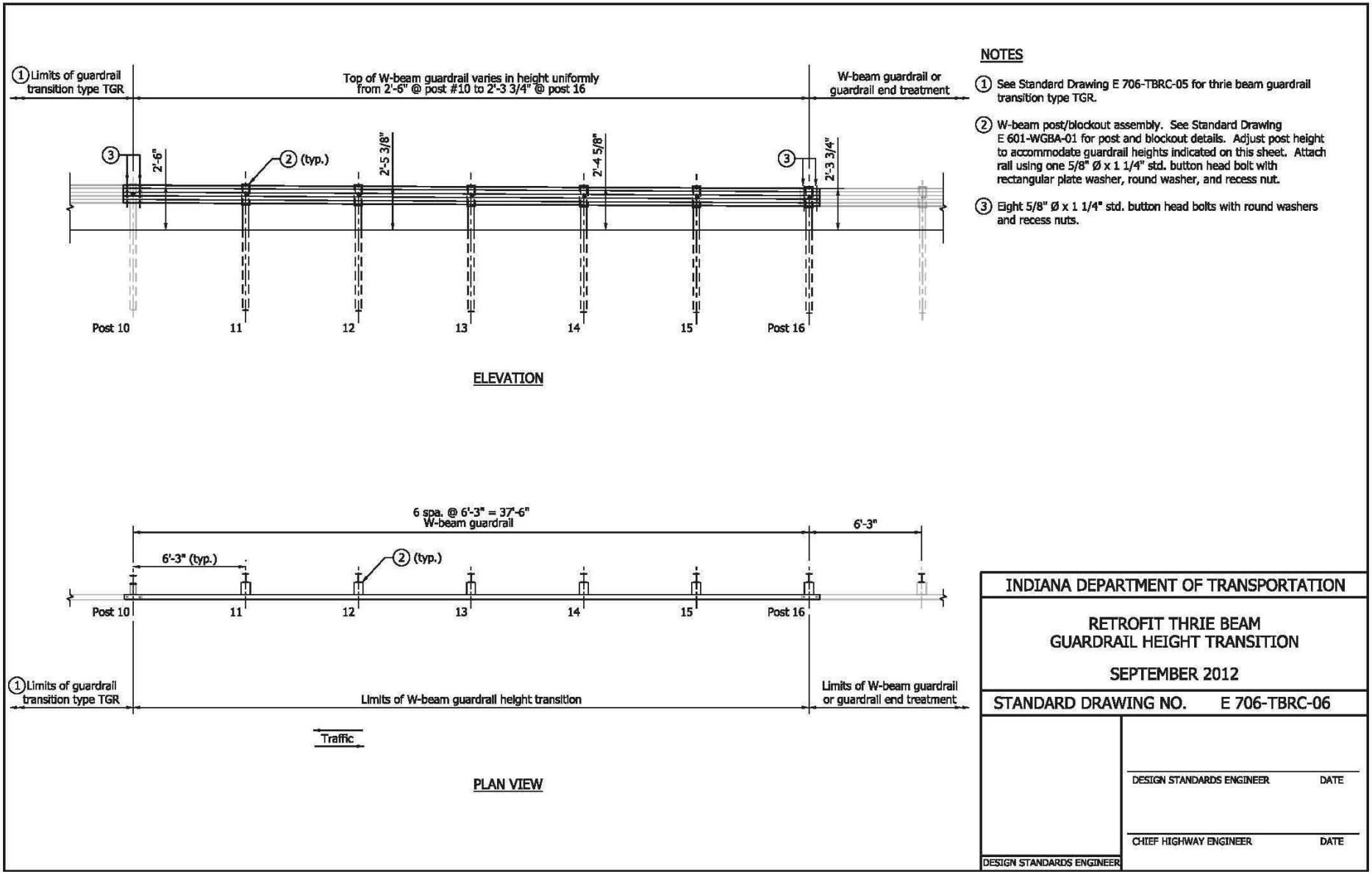
DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

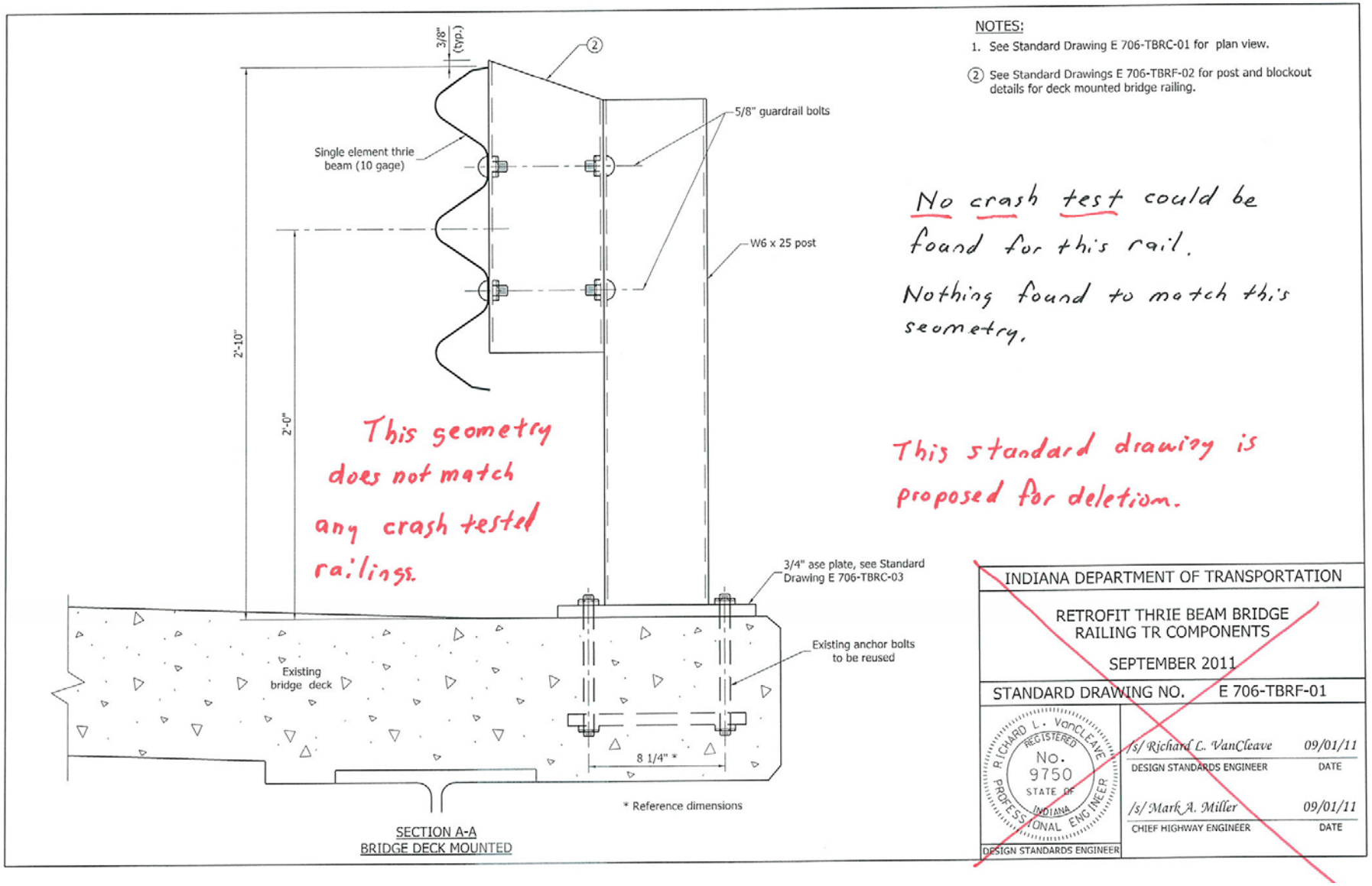
REVISION TO STANDARD DRAWINGS

REVISED NEW 706-TBRC-06 RETROFIT THRIE BEAM GUARDRAIL HEIGHT TRANSITION (DRAFT)



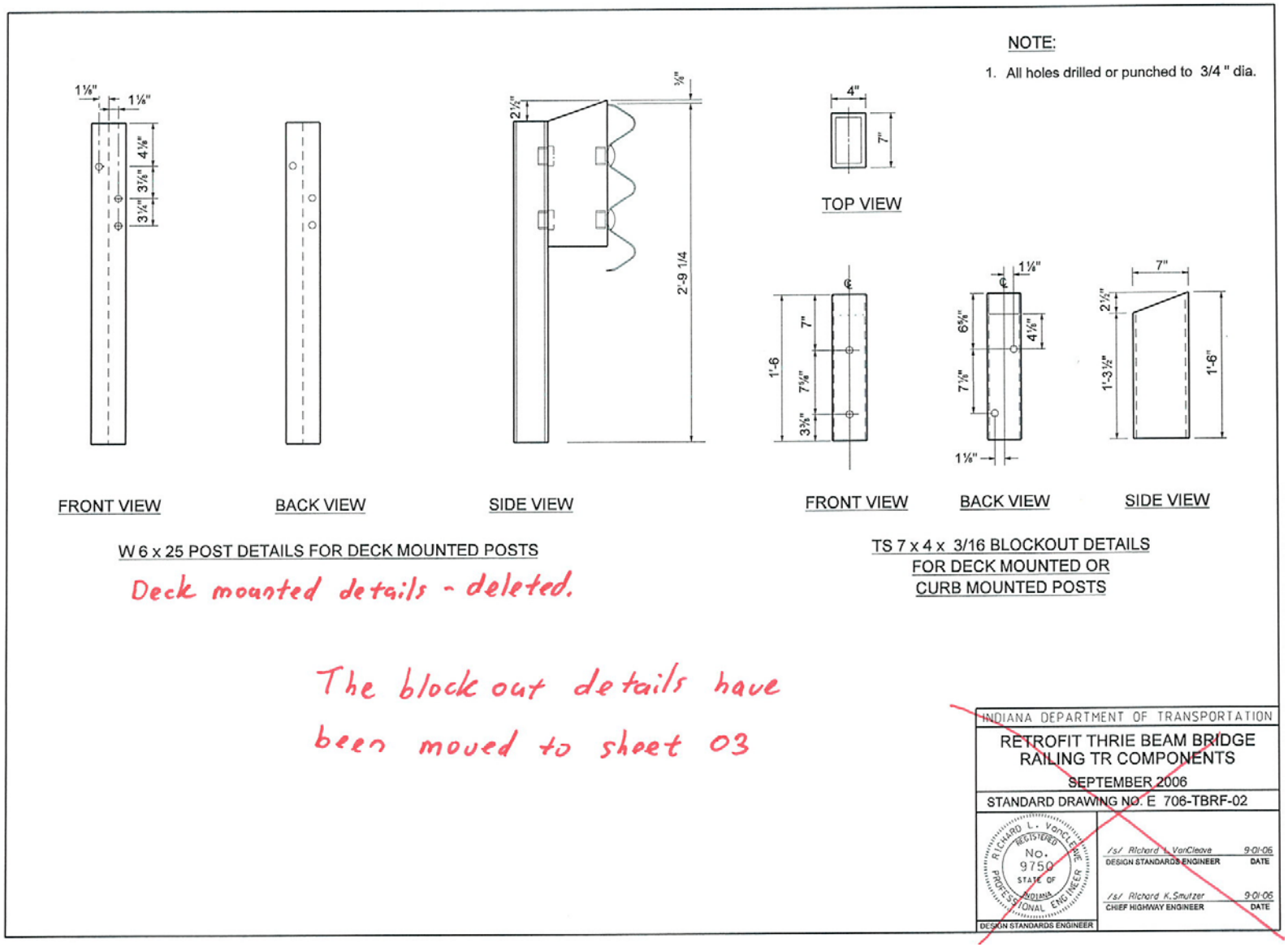
REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRF-01 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (PROPOSED TO DELETE)



REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRF-02 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (PROPOSED TO DELETE)



REVISION TO STANDARD DRAWINGS

EXISTING 706-TBRF-02 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS (PROPOSED TO DELETE)

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REVISION TO DESIGN MANUAL

EXISTING IDM FIGURE 404-4B BRIDGE RAILING TYPES (TEST LEVEL 2) (WITH MARKUPS)

TS post PS post PS post

Railing Designation	TS-1 *	PF-2	PS-2	TX **
Height Designation	Common	Pedestrian	Pedestrian	Pedestrian
Mounting Location	On bridge coping	Flush with bridge deck	Atop sidewalk of minimum 5 ft width	Either atop sdwk. of 5 ft min. width, or flush with bridge deck
Railing Element	Thrie-beam with steel posts	2 steel tubes with steel posts on concrete parapet	2 steel tubes with steel posts on concrete parapet	Concrete
Total Height	2'-9" (3")	3'-6" (4")	3'-6"	3'-6"
Br. Rlg. Standard Drawings	n/a	706-BRPP-02, and -05, -06	706-BRPP-04 through -06	706-BRTX-01 through -04
Bridge Railing Transition	none	TPF-2	TPS-2	TTX
Br. Rlg. Trans. Standard Drawings	n/a	706-TTBP-03, -04, and -09	706-TTBP-07 through -09	706-TTTX-01 and -02
Guardrail Transition	TGS-1	TGB	TGB	TGB
Gdrl. Trans. Standard Drawings	n/a	601-TTGB-01 through -05	601-TTGB-01 through -05	601-TTGB-01 through -05

* Bridge railing type **TS-1** may be used only on a local-public-agency collector or local road. Details for the bridge railing and transition are shown in INDOT Recurring Plan Detail 706-B-140d.

** Bridge railing type TX should be considered for an aesthetically-sensitive area.

BRIDGE-RAILING TYPES
(Test Level 2)

Figure 61-6B

Now 404-4B

REVISION TO DESIGN MANUAL

EXISTING IDM FIGURE 404-4B BRIDGE RAILING TYPES (TEST LEVEL 4) (WITH MARKUPS)

A36 - post
This is 9 TL-2 rail
Not TL-4
Steel post
TS - post
TS - post

Railing Designation	FC	TR ***	CF-1	PS-1	PF-1
Height Designation	Common	Common	Common	Pedestrian	Truck
Mounting Location	Flush with bridge deck	On existing concrete parapet	Flush with bridge deck	Atop sidewalk of minimum 5 ft width	Flush with bridge deck
Railing Element	Concrete, shape F	Thrie beam with steel posts (34")	2 steel tubes with steel posts on concrete curb	1 steel tube with steel posts on concrete parapet	1 steel tube with steel posts on concrete parapet
Total Height	2'-9" (33")	2'-10"	2'-11" (36 3/4") 3'3/4	3'-6"	4'-2"
Br. Rlg. Standard Drawings	706-BCBR-01, -03, and -04	706-TBRC-01, -02, -03; -TBRE-01; -TBRF-01, -02	706-BRTM-01 and -02	706-BRPP-03, and -05, -06	706-BRPP-01, and -05, -06
Bridge Railing Transition	TBC	none	none	TPS-1	TPF-1
Br. Rlg. Trans. Standard Drawings	706-CBRT-01 through -03	n/a	n/a	706-TTBP-05 and -06	706-TTBP-01 and -02
Guardrail Transition	TGB	TGB	TGT	TGB	TGB
Gdrl. Trans. Standard Drawings	601-TTGB-01 through -05	601-TTGB-01 through -05	601-TTGT-01 and -02	601-TTGB-01 through -05	601-TTGB-01 through -05

This rail is 42" rail
Not 4'2" (3'6")

*** Bridge railing type TR should be used only to replace existing aluminum bridge railing where no other modifications to a bridge are to be made, either as a spot improvement or within the limits of a 3R or 4R project.

BRIDGE-RAILING TYPES
(Test Level 4)

Figure 61-6B (Cont'd.)

Now 404-4B

REVISION TO DESIGN MANUAL

EXISTING IDM FIGURE 404-4B BRIDGE RAILING TYPES (TEST LEVEL 5) (WITH MARKUPS)

Steel Post grade 50

Railing Designation	FT	TF-2
Height Designation	Truck	Truck
Mounting Location	Flush with bridge deck	Flush with bridge deck
Railing Element	Concrete, shape F	2 steel tubes with steel posts on concrete parapet
Total Height	3'-9"	4'-2"
Br. Rlg. Standard Drawings	706-BCBR-02, -03, and -04	706-BRTF-01 through -10
Bridge Railing Transition	TBT	PBT
Br. Rlg. Trans. Standard Drawings	706-CBRT-01, through -03	706-TPBT-01 through -09
Guardrail Transition	TGB	TGB
Gdrl. Trans. Standard Drawings	601-TTGB-01 through -05	601-TTGB-01 through -05

To match crash test

Steel posts require 50 ksi steel

BRIDGE-RAILING TYPES
(Test Level 5)

Figure 61-6B (Cont'd.)

REVISION TO DESIGN MANUAL

REVISED IDM FIGURE 404-4B BRIDGE RAILING TYPES TEST LEVEL 2 (DRAFT)

Railing Designation	TS-1 *	CF-1	PF-2	PS-2	TX **
Height Designation	Common	Common	Pedestrian	Pedestrian	Pedestrian
Mounting Location	On bridge coping	Flush with bridge deck	Flush with bridge deck	Atop sidewalk of minimum 5 ft width	Either atop sdwk. of 5 ft min. width, or flush with bridge deck
Railing Element	Thrie-beam with steel posts	2 steel tubes with steel posts on concrete curb	2 steel tubes with steel posts on concrete parapet	2 steel tubes with steel posts on concrete parapet	Concrete
Total Height	2'-9"	3'-0 3/4"	3'-6"	3'-6"	3'-6"
Br. Rlg. Standard Drawings	n/a	706-BRTM-01 and -02	706-BRPP-02, and -05, -06	706-BRPP-04 through -06	706-BRTX-01 through -04
Bridge Railing Transition	none	none	TPF-2	TPS-2	TTX
Br. Rlg. Trans. Standard Drawings	n/a	n/a	706-TTBP-03, -04, and -09	706-TTBP-07 through -09	706-TTTX-01 and -02
Guardrail Transition	TGS-1	TGT	TGB	TGB	TGB
Gdrl. Trans. Standard Drawings	n/a	601-TTGT-01 and -02	601-TTGB-01 through -05	601-TTGB-01 through -05	601-TTGB-01 through -05

* Bridge railing type **TS-1** may be used only on a local-public-agency collector or local road. Details for the bridge railing and transition are shown in INDOT Recurring Plan Detail 706-B-140d.

** Bridge railing type TX should be considered for an aesthetically-sensitive area.

BRIDGE-RAILING TYPES
TEST LEVEL 2

Figure 404-4B
(Page 1 of 3)

REVISION TO DESIGN MANUAL

REVISED IDM FIGURE 404-4B BRIDGE RAILING TYPES TEST LEVEL 4 (DRAFT)

Railing Designation	FC	TR ***	PS-1	PF-1
Height Designation	Common	Common	Pedestrian	Truck
Mounting Location	Flush with bridge deck	On existing concrete parapet	Atop sidewalk of minimum 5 ft width	Flush with bridge deck
Railing Element	Concrete, shape F	Thrie beam with steel posts	1 steel tube with steel posts on concrete parapet	1 steel tube with steel posts on concrete parapet
Total Height	2'-9"	2'-10"	3'-6"	3'-6"
Br. Rlg. Standard Drawings	706-BCBR-01, -03, and -04	706-TBRC-01, -02, -03; -TBRE-01; -TBRF-01, -02	706-BRPP-03, and -05, -06	706-BRPP-01, and -05, -06
Bridge Railing Transition	TBC	none	TPS-1	TPF-1
Br. Rlg. Trans. Standard Drawings	706-CBRT-01 through -03	n/a	706-TTBP-05 and -06	706-TTBP-01 and -02
Guardrail Transition	TGB	TGB	TGB	TGB
Gdrl. Trans. Standard Drawings	601-TTGB-01 through -05	601-TTGB-01 through -05	601-TTGB-01 through -05	601-TTGB-01 through -05

*** Bridge railing type TR should be used only to replace existing aluminum bridge railing where no other modifications to a bridge are to be made, either as a spot improvement or within the limits of a 3R or 4R project.

BRIDGE-RAILING TYPES
TEST LEVEL 4

Figure 404-4B
(Page 2 of 3)

REVISION TO DESIGN MANUAL

REVISED IDM FIGURE 404-4B BRIDGE RAILING TYPES TEST LEVEL 5 (DRAFT)

Railing Designation	FT	TF-2
Height Designation	Truck	Truck
Mounting Location	Flush with bridge deck	Flush with bridge deck
Railing Element	Concrete, shape F	2 steel tubes with steel posts on concrete parapet
Total Height	3'-9"	4'-2"
Br. Rlg. Standard Drawings	706-BCBR-02, -03, and -04	706-BRTF-01 through -10
Bridge Railing Transition	TBT	PBT
Br. Rlg. Trans. Standard Drawings	706-CBRT-01, through -03	706-TPBT-01 through -09
Guardrail Transition	TGB	TGB
Gdrl. Trans. Standard Drawings	601-TTGB-01 through -05	601-TTGB-01 through -05

BRIDGE-RAILING TYPES
TEST LEVEL 5

Figure 404-4B
(Page 3 of 3)

COMMENTS AND ACTION

706.03 CONCRETE RAILING
910.20 STEEL BRIDGE RAILING COMPONENTS
706-BCBR-01-04
706-BRTF-01-09
706-BRTX-01-04
706-TBRE-01
Figure 404-4B
706-BRPP-01-06
706-BRTM-01-02
706-TBRC-01-06
706-TBRF-01-02

Motion:
Second:
Ayes:
Nays:

Action:
____ Passed as Submitted
____ Passed as Revised
____ Withdrawn

Standard Specifications Sections affected:
706.03 pg 525; 910.20 pg 903

Recurring Special Provision affected:

NONE

Standard Sheets affected:

706-BCBR-01 - 03
706-BCBR-04
706-BRPP-01 - 06
706-BRTF-01 - 03
706-BRTF-04 - 09
706-BRTM-01 - 02
706-BRTX-01 - 04
706-TBRC-01 - 03
706-TBRE-01
706-TBRF-01 - 02

Design Manual Sections affected:

NONE

GIFE Sections cross-references:

NONE

____ 20__ Standard Specifications Book
____ Revise Pay Items List

____ Create RSP (No.____)
Effective ____ Letting
RSP Sunset Date: ____

____ Revise RSP (No.____)
Effective ____ Letting
RSP Sunset Date: ____

Standard Drawing Effective ____
____ Create RPD (No. ____)
Effective ____ Letting
____ Technical Advisory

GIFE Update Req'd.? Y ___ N ___
By ____ Addition or ____ Revision

Frequency Manual Update Req'd? Y__N__
By ____ Addition or ____ Revision

Received FHWA Approval? ____

Mr. Pankow
Date: 02/16/12

SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS

REVISION TO SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Minor adjustments are needed to the 711.08 structural steel specification section as it relates to fabricators providing mill test reports.

PROPOSED SOLUTION: Modify the language in the 711.08 section to require a copy of all mill test reports as fabrication begins. With material test reports being sent electronically today there is no reason for any fabricator to not ever have the material test report when the material arrives at the fabrication facility.

APPLICABLE STANDARD SPECIFICATIONS: 711.08

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: create new 711 recurring special provision or, add this language into the soon-to-be issued 711 provision regarding field welding that passed last month since the bases for use will be identical.

PAY ITEMS AFFECTED: None

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 2-5502

Date: January 31, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc group consisting of: Gary Chestnut, Kevin Day, Greg Pankow, Jim Reilman, Mike Rumer, and Brent Schmitt.

REVISION TO SPECIFICATIONS

SECTION 711 – STEEL STRUCTURES
711.08 MILL TEST REPORTS

The Standard Specifications revised as follows:

SECTION 711, BEGIN LINE 116, DELETE AND INSERT AS FOLLOWS:

711.08 Mill Test Reports

~~Prior to, or concurrent with, the fabrication, a~~*A* copy of ~~the~~*all* mill test report*s for all steel on hand that is to be used to fabricate structural steel members* shall be furnished *prior to the start of fabrication. For steel not on hand when fabrication is started that arrives during fabrication, a copy of the mill test reports for that steel shall be provided within 24 h of receipt of the steel. If copies of mill test reports are not provided within the specified timeframe, the Engineer may suspend the fabrication of all structural steel members until such time that copies of the missing mill test reports are provided. Delays due to suspension of fabrication will be considered non-excusable.* If the manufacturer's mill test reports are not available, tests shall be made with no additional payment, and 4 certified copies of such tests shall be furnished. Four copies of an affidavit shall be furnished which shall state that the materials to be used for members not designated for calculated stress and not to be marked in accordance with ASTM A 6 (ASTM A 6M), Article 9, are in accordance with the requirements of the specifications for the materials as shown on the plans. The fabricator shall have on file the mill test reports for the material from which these members were obtained.

COMMENTS AND ACTION

711.08 MILL TEST REPORTS

Motion: Second: Ayes: Nays:	Action: _____ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: 711.08 pg 554; 910.02 pg 876. Recurring Special Provision affected: NONE Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: Section 5.7.2	_____ 20__ Standard Specifications Book _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y__N__ By _____ Addition or _____ Revision Received FHWA Approval? _____