



# INDIANA DEPARTMENT OF TRANSPORTATION

*Driving Indiana's Economic Growth*

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Indianapolis, Indiana 46204

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

## APPROVED MINUTES

### September 16, 2010 Standards Committee Meeting

#### MEMORANDUM

October 28, 2010

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes for the September 16, 2010 Standards Committee Meeting

The Standards Committee meeting was called to order by Mr. Miller at 9.03 a.m. on September 16, 2010 in the 9<sup>th</sup> Floor Conference Center. The meeting was adjourned at 12.13 p.m.

The following committee members were in attendance:

Mark Miller, Chairman  
Greg Pankow, Constr. Mgmt.  
Yadu Shah\*, Roadway Services  
Michelle Allen\*\*, Environ. Services  
Ron Walker, Materials Mgmt.  
Tom Caplinger, Crawfordsville Dist.

Dave Andrews, Pvmt. Engineering  
Bob Cales, Contract Admin.  
Dave Boruff, Traffic Admin.  
Tony Uremovich\*\*\*, Str. Services  
Jim Keefer, Fort Wayne Dist.

\*Proxy for John Wright

\*\*Proxy for John Wright (for Item No. 03)

\*\*\*Proxy for Anne Rearick

Also in attendance were the following:

Ken Leuderalbert, FHWA  
Scott Trammell, Secretary  
Joe Bruno, INDOT  
Greg Richards, INDOT  
Michael Prather, INDOT  
Dudley Bonte, Rieth-Riley Constr.  
Leslie Elmore, Site-Safe Products of Kentucky

Jan Schutt, Indiana Sign and Barricade  
Steve Fisher, INDOT Sitemanager  
Dan McQueen, INDOT  
Paul Berebitsky, ICA  
Charlie Holland, Aspht. Pavement Assoc.  
Lana Podorvanova, INDOT

The following agenda items were considered:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items considered)

NEW BUSINESS

1. Approval of the June 17, 2010 Minutes

Motion: Mr. Andrews

Second: Mr. Keefer

Ayes: 9

Nays: 0

ACTION:

Approved as Revised

DISCUSSIONS: Several RSP's discussed in the June meeting that are to be included in the book and brought up so any concerns can be addressed at this time.

- Item 1 had to do with the bridge deck overlay, RSP 722-B-581, and will be going into the 2012 Standard Specifications.
- Item 2, 4 and 5 are HMA provisions and are all revisions from RSP 400-R-553, and because of multiple revisions to this particular RSP in multiple contracts, we want to pull all of it together into the 2012 book. It is not intended to have this RSP in Sept 2011. There should be no more revisions unless a dramatic cost savings is found. This way we won't have multiple revisions in different contracts.
- Item 3 was the structure backfill. RSP 211-R-570. Intended to be pulled into the 2012 book. There have been a lot of changes to the gradations. If anyone has any concerns with that, we need to know before deciding to put it into the book. Also included are the MSE and modular concrete walls, but it had been decided to not put those in the book and leave those as recurring, since changes to them are still forthcoming. Mr. Uremovich confirmed that changes to those two are indeed forthcoming, they're working on them and should be able to present them to the Standards Committee before the end of this year, and will be in time for the 2012 book.
- Item 6 was the SMA course aggregates requirements. 904-R-560. We're going to pull that revision into the 2012 book.
- The last item, RSP 103-C-584, which has to do with DBE certifications, cannot be put in the book because it will not apply to all contracts.
- On Page 32 of the Final Draft Minutes is a editorial change.

2. 2012 Standard Specifications:

a. Schedule for submitting and approval revisions

DISCUSSIONS: Mr. Miller informed all attendees that any items to be submitted for approval for incorporation into the 2012 SS book should be in by January 24, 2011, and that we will have a meeting in February to address any items that need to get into the book. The goal is to wrap up some of the RSPs that we've had for some time.

b. Metric system in 2012 book

DISCUSSIONS: Mr. Walker asked if there will any attempt in cleaning up titles for Materials and Test Division, Materials and Test Engineer. Mr. Miller agreed that is a good point. Mr. Walker also stated that they are reviewing all of the test methods, and that AASHTO is in the process of eliminating a lot of the ASTM test methods in their book so there might be some changes that need to be made for that too. Mr. Miller asked Mr. Walker to provide the information for those changes.

Mr. Miller explained that the plan is to not issue standard metric drawings, but to issue Standard English drawings. If anyone has a metric contract, they can make the necessary conversions.

Mr. Miller also stated that there is no harm in leaving the 2012 SS book in English units with metric units shown in parenthesis, and that there would be no gain in taking the metric references out. If anyone has a concern with that, they can let us know. Mr. Uremovich asked if we're retaining metric in the spec book for 2012, but that the 2012 standard drawings will be English only. Mr. Miller confirmed that yes that is correct. Mr. Uremovich commented that therefore the 2011 standard drawings will be metric and English. This was confirmed by Mr. Miller.

Mr. Andrews said he sees several metric projects coming through, especially on the LPA front lately. He then asked if that is going to be a problem with the standard drawings with not having a reference there. Mr. Miller stated that if someone thinks it is then we can consider that, and that Smetzer's memo from 2005 (?) said to go ahead and convert to English, and can't understand why we're still getting metric jobs. Mr. Andrews suggested that we can probably get a list of those jobs by calling up the DES numbers tied to that memo and see how many are still out there. Mr. Miller stated that we'll work on that. Mr. Andrews and Mr. Uremovich stated that there are still some metric jobs from the 90's still to be let. Mr. Andrews commented that we can force the issue on those and that if they're still not ready then they can convert them back to English units.

Mr. Berebitsky asked when the 2012 book will be going to the printer. Mr. Miller told him that it will be in April of 2011, and reminded everyone that the information has to be in by February so the editing and proofreading can be accomplished.

c. Recurring Special Provisions for 2012

DISCUSSIONS: Mr. Miller briefly went over the list of RSPs and asked that the key people get together and identify as many as possible, since many are rather old, update them and pull them into the spec book. Ms. Podorvanova will send out the list of RSPs for review and comments to all members of the Committee.

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items considered)

NEW BUSINESS

(No items considered)

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS ITEMS

OLD BUSINESS

Item No. 09 06/17/10 (2010 SS) Mr. Boruff page 6

Recurring Special Provision:

805-T-XXX

WIRELESS VEHICLE DETECTION SYSTEMS

Recurring Plan Details:

805-T-XXXd

WIRELESS VEHICLE DETECTORS STOP BAR  
DETECTION ZONE

Design Manual:

77-4.02(03)

Other Detector Types

77-4.02(04)

Decision making criteria for when to  
use another type of detection

FIGURE 77-4H

Typical Wireless Vehicle Detection  
System Design

E      *FIGURE 77-4I**Typical Hybrid Wireless Vehicle  
Detection System Design*

ACTION:

PASSED AS REVISED

NEW BUSINESS

<u>Item No. 01    09/16/10 (2010 SS)</u>	<u>Mr. Wright</u>	<u>page 26</u>
601-R-497	SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS	

ACTION:

PASSED AS REVISED

<u>Item No. 02    09/16/10 (2010 SS)</u>	<u>Mr. Boruff</u>	<u>page 31</u>
Standard Drawings:		
801-TCSN-06	Traffic Control Signs	
801-TCSN-12 (Sheet 1 of 2)	Sign Design Details	
801-TCSN-12 (Sheet 2 of 2)	Sign Design Details	
801-TCSN-13	Sign Design Details	

ACTION:

PASSED AS REVISED

<u>Item No. 03    09/16/10 (2010 SS)</u>	<u>Mr. Wright</u>	<u>page 40</u>
104.07	Rights in and Use of Materials Found in the Project Site	
107.10	<del>Blank</del> Archaeological Artifacts	
203.08	Borrow and Disposal	

ACTION:

PASSED AS REVISED

<u>Item No. 04    09/16/10 (2010 SS)</u>	<u>Mr. Boruff</u>	<u>page 46</u>
801.02	Materials	
801.15(b)	Changeable Message Signs	
801.17	Method of Measurement	
801.18	Basis of Payment	
Design Manual:		
83-2.06	Portable Changeable Message Signs	

ACTION:

WITHDRAWN

<u>Item No. 05    09/16/10 (2010 SS)</u>	<u>Mr. Wright</u>	<u>page 78</u>
STANDARD DRAWINGS:		
601-CWGS-02	CURVED W-BEAM GUARDRAIL SYSTEM	
601-CWGS-04	CURVED W-BEAM GUARDRAIL SYSTEM	
601-MTGR-01	THRIE BEAM GUARDRAIL DETAILS	
601-TBGC-01	THRIE-BEAM GUARDRAIL COMPONENTS	
601-TMTT-01	THRIE BEAM GUARDRAIL TO THRIE BEAM GUARDRAIL TRANSITION, TTT	
601-TTGB-01	GUARDRAIL TRANSITION TYPE TGB	
601-TTGB-03	GUARDRAIL TRANSITION TYPE TGB	
601-TTGB-04	GUARDRAIL TRANSITION TYPE TGB	
601-TTGB-05	GUARDRAIL TRANSITION TYPE TGB	
601-TTGP-01	GUARDRAIL TRANSITION TYPE GP	
601-TTGP-02	GUARDRAIL TRANSITION TYPE GP	
601-TTGT-01	GUARDRAIL TRANSITION, TGT	
601-TTMS-01	DOUBLE FACED THRIE BEAM GUARDRAIL TRANSITION TO GRET TYPE MS	
601-TTVH-01	GUARDRAIL TRANSITION TYPE VH	
601-TTVH-02	GUARDRAIL TRANSITION TYPE VH	
601-TWGB-03	GUARDRAIL TRANSITION TYPE WGB	



601-TWGT-01	W-BEAM GUARDRAIL TO THRIE BEAM GUARDRAIL TRANSITION, WGT
601-WBGA-01	W-BEAM GUARDRAIL ASSEMBLIES
601-WBGA-02	W-BEAM GUARDRAIL ASSEMBLIES
601-WBGA-06	WR-BEAM GUARDRAIL
706-TBRC-01	RETROFIT THRIE BEAM BRIDGE RAILING TR
706-TBRC-02	RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS
706-TBRF-01	RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS
706-TTBC-01	CONCRETE BRIDGE RAILING TRANSITION TBC
706-TTBP-01	CONCRETE BRIDGE RAILING TRANSITION, TPF-1
706-TTBO-03	CONCRETE BRIDGE RAILING TRANSITION, TPF-2
706-TTBP-05	CONCRETE BRIDGE RAILING TRANSITION, TPS-1
706-TTBP-07	CONCRETE BRIDGE RAILING TRANSITION, TPS-2
706-TTBT-01	CONCRETE BRIDGE RAILING TRANSITION TYPE TBT
706-TTTX-01	CONCRETE BRIDGE RAILING TRANSITION, TTX
706-TWBC-01	CONCRETE BRIDGE RAILING TRANSITION TYPE WBC
706-TTCA-01	1 1/4" DIAMETER HOLES PLACEMENT FOR TERMINAL CONNECTOR ATTACHMENT
RECURRING PLAN DETAILS:	
706-B-140d (3 SHEETS)	BRIDGE RAILING TYPE TS-1 & GUARDRAIL TRANSITION TYPE TGS-1
ACTION:	WITHDRAWN
<u>Item No. 06 09/16/10 (2010 SS)</u>	<u>Mr. Walker page 119</u>
906.02(a)4	<del>Asphalt Rubber Sealant</del>
906.02(a)54	Polychloroprene Joint Membrane and Adhesive
RECURRING SPECIAL PROVISION:	
408-R-564	SEALING CRACKS AND JOINTS
ACTION:	PASSED AS SUBMITTED
<u>Item No. 07 09/16/10 (2010 SS)</u>	<u>Mr. Walker page 125</u>
RECURRING SPECIAL PROVISION:	
401-R-581	JOINT ADHESIVE AND INFORMATIONAL CORES
ACTION:	PASSED AS REVISED

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

SPECIFICATION REVISIONS

(OLD BUSINESS ITEM)

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REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Sometimes it is difficult to install inductive loop detectors on an approach to a signalized intersection due to poor pavement condition, lack of underground conduit, right-of-way constraints, or other circumstances. The construction of underground cable and conduit and inductive loop detectors, particularly for dilemma zone loops at high-speed intersections, is expensive.

PROPOSED SOLUTION:

Wireless magnetometer detection systems make it possible to install vehicle detection on an approach without cutting loops or running conduit and detector housings. The magnetometers are installed in cored holes in the pavement. They transmit wirelessly to either receiver processors or through repeaters to receiver processors. Detection of a vehicle and/or vehicular counts are transmitted via ethernet cable to contact closure cards in a standard detector rack in the controller cabinet where they're processed as detected vehicles from inductive loops typically are. The development of a recurring special provision and plan details, a revision of the Indiana Design Manual, and a new Indiana Test Method (ITM) will ensure that the system is designed and constructed properly.

APPLICABLE STANDARD SPECIFICATIONS: 805.10, 805.15, 805.16, 922.11

APPLICABLE STANDARD DRAWINGS: 805-SGLI-01

APPLICABLE DESIGN MANUAL SECTION: Section 77-4.02(03) and Section 77-4.02(04)

APPLICABLE SECTION OF GIFE: NONE

APPLICABLE RECURRING SPECIAL PROVISIONS: 805-T-169, 922-T-168

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 7/26/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by district traffic and construction and contractors.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL  
PROPOSED RECURRING SPECIAL PROVISION 805-T-XXX WIRELESS VEHICLE DETECTION  
SYSTEM

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805-T-173 WIRELESS VEHICLE DETECTION SYSTEM

(Adopted XX-XX-XX)

**Description**

This work shall consist of furnishing and installing wireless vehicle detection systems for vehicle detection at traffic signals.

**Materials**

The wireless vehicle detection system, WVDS, is comprised of wireless in-pavement magnetometers, contact closure cards, receiver processors, and wireless repeaters installed for a signalized intersection. The system shall be capable of monitoring vehicles on a roadway via detection of changes in inductance caused by the presence or passage of a vehicle and shall provide detector outputs to a traffic signal controller.

The WVDS shall include in-pavement magnetometers, a minimum of ~~two~~2 receiver processors, the required mounting equipment, cables, rack mounted cards, set-up and operating software, all connectors, and miscellaneous equipment necessary for the installation and operation of the system. If required, the WVDS shall also include wireless repeaters.

Only models from the Department's approved materials list *for traffic signal control equipment* shall be used.

Ethernet cable for wireless vehicle detectors shall be outdoor rated and UV shielded.

**Construction Requirements**

Prior to the installation, the Contractor shall test all in-pavement sensors and demonstrate proper operation and communication between the in-pavement sensors and the receiver processor and wireless repeater, if required.

Prior to the installation, the Contractor shall demonstrate that each in-pavement sensor ~~will~~shall be installed within range of its corresponding receiver processor, using wireless repeaters as necessary. All in-pavement sensors assigned to either a receiver processor or wireless repeater shall be located within a 120° arc measured from the receiver processor or wireless repeater.

The Contractor shall install each in-pavement sensor in the roadway according to the manufacturer's recommendations and as shown on the plans. Holes cored in the pavement shall be cleaned and dried before installing in-pavement sensors. The cored pavement shall be backfilled according to the manufacturer's recommendations.

Receiver processors and wireless repeaters ~~will~~shall be mounted on traffic signal steel strain, or cantilever poles, or signal pedestals on type A foundations. The mounting height of receiver processors above the pavement surface shall be between 20 ft (6.0 m) and 35 ft (10.7 m). The mounting height of wireless repeaters above the pavement surface shall be between 13 ft (3.9 m) and 35 ft (10.7 m).

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL  
PROPOSED RECURRING SPECIAL PROVISION 805-T-XXX WIRELESS VEHICLE DETECTION  
SYSTEM (CONTINUED)

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The minimum distance between a receiver processor and wireless repeater mounted on the same structure shall be 2 ft (0.6 m). This distance may be increased to enable better communication between the devices.

After installation, the Contractor shall demonstrate successful communication between each in-pavement sensor, receiver processor, and wireless repeater to the ~~Project~~ Engineer.

**Method of Measurement**

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be measured by the number of units installed.

**Basis of Payment**

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be paid for at the contract unit price per each.

Pay Item	Pay Unit Symbol
Contact Closure Card.....	EACH
Receiver Processor.....	EACH
Wireless Magnetometer Detector Type_____	EACH
Wireless Repeater.....	EACH

The cost of coring the pavement, sealant, and all work necessary for proper installation and operation of the in-pavement sensors shall be included in the cost of the wireless magnetometer detector.

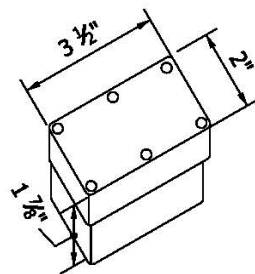
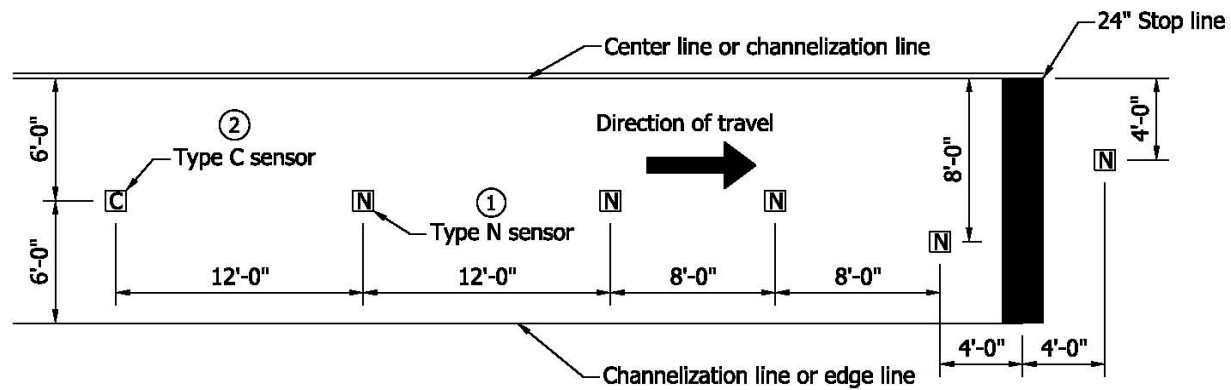
The cost of cables, connectors, set-up and operating software, access boxes, rack mounted expansion cards, and all hardware necessary to complete the installation shall be included in the cost of the contact closure cards.

The cost of required mounting equipment, cables, connectors, and miscellaneous equipment necessary for proper installation and operation of the receiver processors shall be included in the cost of the receiver processors.

The cost of required mounting equipment, connectors, and miscellaneous equipment necessary for proper installation and operation of the wireless repeaters shall be included in the cost of the wireless repeaters.

**GENERAL NOTES**

- ① Type N sensors detect only vehicle presence.
- ② Type C sensors detect vehicle presence and provide vehicle counts.
3. There should be at least  $\frac{1}{4}$ " and no more than  $\frac{1}{2}$ " of clearance between the top of the sensor and the top of the pavement

**DETAIL A**

Wireless in-pavement sensor  
(both types)

INDIANA DEPARTMENT OF TRANSPORTATION

WIRELESS VEHICLE DETECTORS  
STOP BAR DETECTION ZONE  
DRAFT

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

(OLD BUSINESS ITEM)

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PROPOSED RECURRING PLAN DETAILS *805-T-XXXd WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE* (DRAFT)

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REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES

ADDITION IDM 77-4.02(04) *DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

## **77-4.02(03) Other Detector Types**

There are numerous types of vehicular detectors available. However, INDOT typically uses the inductive-loop detector. The following discusses several other detector types that are available.

### **1. Magnetic Detector**

Magnetic detectors consist of a small coil of wires located inside a protective housing embedded into the roadway surface. As vehicles pass over the device, the detector registers the change in the magnetic field surrounding the device. This signal is recorded by an amplifier and relayed back to the controller as a vehicular detection. A major problem with this detector is that it can only detect the passage of a vehicle traveling at speeds of 3 mph (5 km/h) or greater. It cannot be used to determine a stopped vehicle's presence. The advantages are that they are simple to install and are resistant to pavement-surfacing problems.

### **2. Magnetometer Detector**

A magnetometer detector consists of a magnetic metal core with wrapped windings, similar to a transformer. This core is sealed in a cylinder about 1 in. (25 mm) in diameter and 4 in. (100 mm) long. The detector is placed in a drilled vertical hole about 1 ft (0.3 m) deep in the pavement surface. Magnetometer detectors sense the variation between the magnetic fields caused by the passage or presence of a vehicle. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. Magnetometer detectors are sufficiently sensitive to use to detect bicyclists or as a counting device. A problem with the magnetometer detector is that it does not provide a sharp cutoff at the perimeter of the detection vehicle (i.e., it may detect vehicles in adjacent lanes).

### **3. Wireless Vehicle Detector**

*A wireless vehicle detector is similar to a magnetometer detector except that it uses a low-power radio to transmit the signal to a wireless repeater or receiver processor. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. The detector is placed in a drilled vertical hole about 0.2 ft (60 mm) deep in the pavement surface. Magnetometer detectors are sufficiently sensitive to use to detect bicyclists or as a counting device. An additional problem with the wireless magnetometer detector beyond those of a wired magnetometer detector is that the wireless magnetometers have to be replaced, at a maximum, every 10 years, and the wireless repeaters' batteries have to be replaced every 2 years. See Figure 77-4H and Figure 77-4I for typical installation designs.*

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

(CONTINUED)

REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES

ADDITION IDM 77-4.02(04) *DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

#### 4. Microloop Detector

A microloop detector is similar to the magnetometer detector, but it can work with the standard inductive loop detector amplifiers. The microloop is typically installed by drilling a 3-in. (75 mm) diameter hole 1'-6" (500 mm) deep into the pavement structure, by securing it to the underside of a bridge deck, or inserting a 3" diameter conduit under the pavement to accommodate a series of microloops (non-invasive microloop system). A major disadvantage of the microloop detector is that it requires some motion to activate the triggering circuitry of the detector and does not detect stopped vehicles. This type of detector would typically require two detectors placed side-by-side per lane due to its limited field of detection.

#### 5. Video Image Detection

The video image detector consists of one to six video cameras, an automatic control unit and a supervisor computer. The computer detects a vehicle by comparing the images from the camera(s) to those stored in memory. The detector can work in both the presence and passage modes. This detector also allows the images to be used for counting and vehicular classification. Special housings are required to protect the camera from environmental elements. Early models experienced problems with the video detection during adverse weather conditions (e.g., fog, rain, snow). INDOT currently allows video detection only for temporary signals.

#### 6. Pedestrian Detectors

The most common pedestrian detector is the pedestrian push or call button. These pedestrian call buttons should be placed so that they are convenient to use, reachable by the handicapped and not placed in the direct path for the blind. Inconvenient placement of pedestrian detectors is one of the reasons pedestrians may choose to cross the intersection illegally and unsafely.

#### 7. Bicycle Detectors

The two most common methods for bicycle detection are:

##### a. Pedestrian Push-Button Detector

With the push-button detector, the bicyclist must stop and push the detector button for the controller to record the detection. This may require the bicyclist to leave the roadway and proceed on the sidewalk to reach the detector.

##### b. Inductive-Loop Detector

The inductive-loop detector can detect the bicycle without the bicyclist's interaction. For the greatest sensitivity of the detector, the bicyclist should be guided directly over the wire. A problem with bicycle inductive-loop detectors is that they require a significant amount of metal to be activated. Today's bicycle designs tend to use a substantial amount of non-



REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

(CONTINUED)

REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES

ADDITION IDM 77-4.02(04) *DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

magnetic, man-made materials to increase their strength and reduce their weight. This has substantially reduced the metal content that can be detected.

***77-4.02(04) Decision making criteria for when to use another type of detection***

*Detection systems other than inductive loops require a specialized design. In order to use a type of detection other than inductive loops, INDOT designers and consultants and local agency consultants must provide and submit documentation that 2 of the following 3 conditions have been met:*

- 1. An inductive loop design will not work because of a physical limitation (R/W, geometrics, pavement conditions, obstructed conduit paths, etc).*
- 2. A full inductive loop design has been considered and there is a post-design lifecycle cost advantage to using a detection system other than loops. No design time cost or labor savings will be considered in lifecycle cost calculations.*
- 3. A hybrid design using loops at the stop bar and wireless magnetometers for advance vehicle detection has been considered and evaluated where wireless magnetometers have been evaluated for advance vehicle detection only, and the hybrid design is the most cost effective (post design lifecycle cost).*

*In addition, written concurrence from both the INDOT Office of Traffic Control Systems and the District Traffic Engineer, or the local agency for local projects, before wireless vehicle detection may be used at a specific location.*

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

(CONTINUED)

REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES

ADDITION IDM 77-4.02(04) *DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

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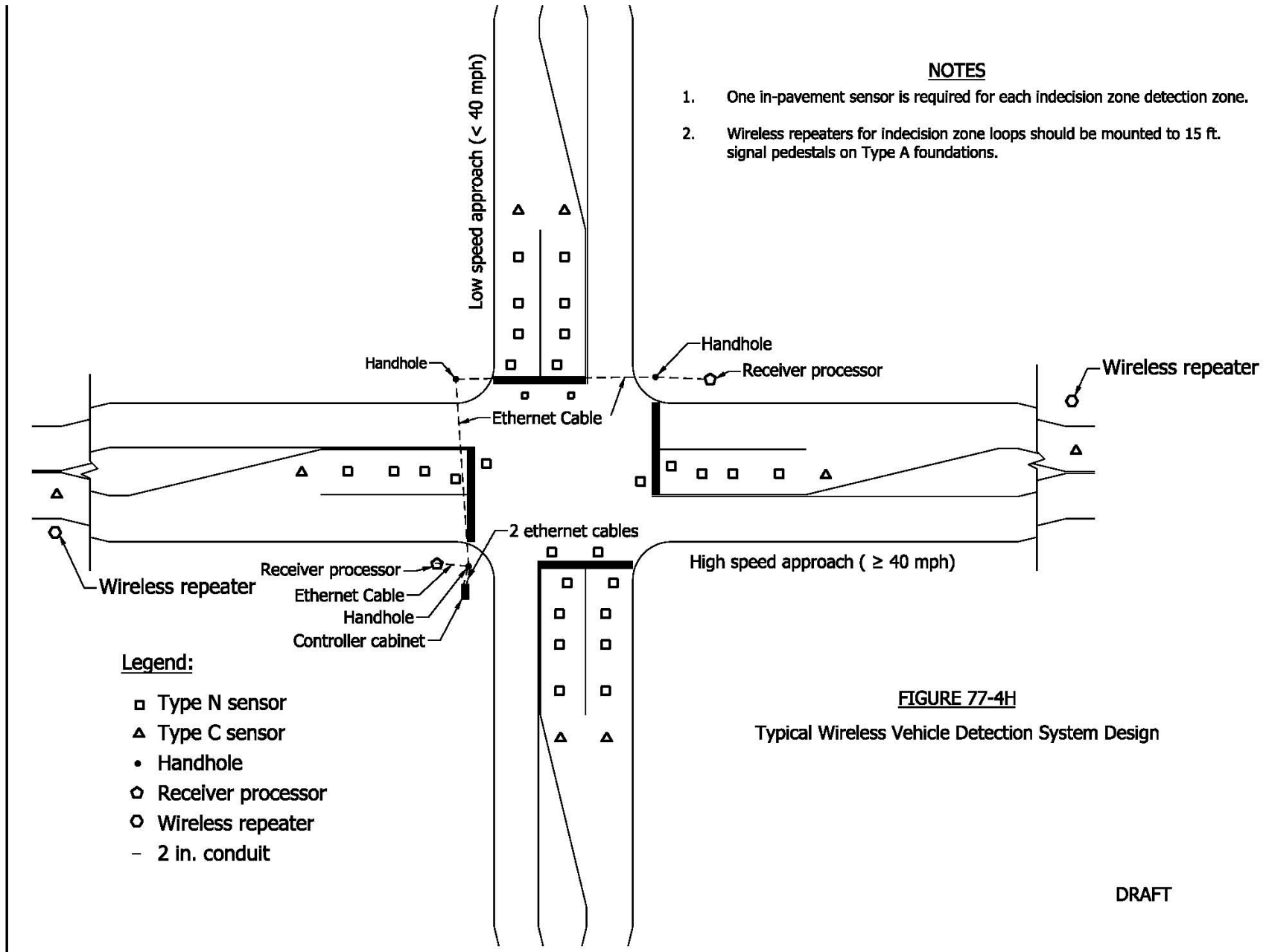
APPROVED MINUTES

## REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

(OLD BUSINESS ITEM)

## IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

ADDITION: FIGURE 77-4H TYPICAL WIRELESS VEHICLE DETECTION SYSTEM DESIGN (REVISED DRAFT)

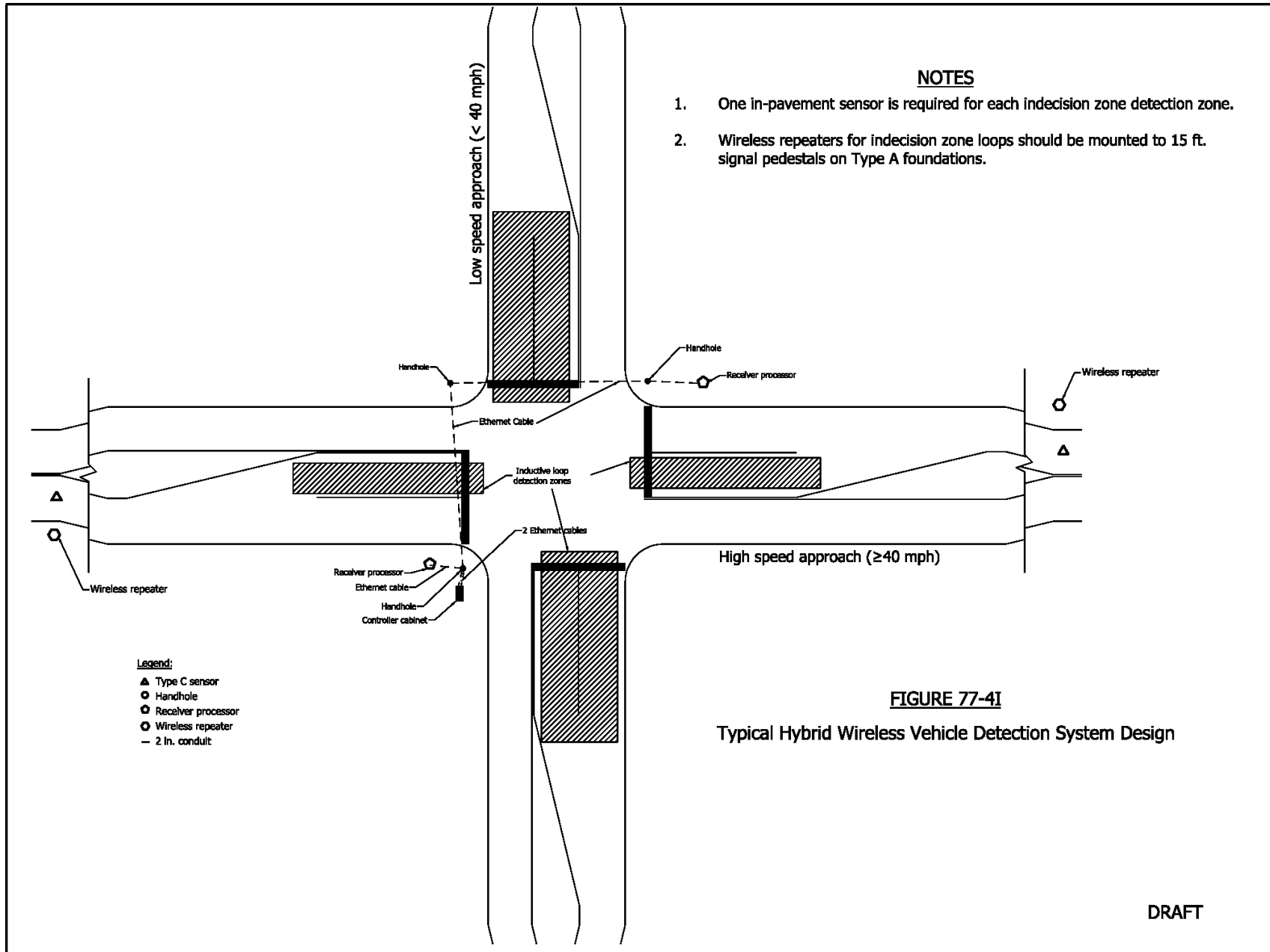


## REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

(OLD BUSINESS ITEM)

## IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

## ADDITION: FIGURE 77-4I TYPICAL HYBRID VEHICLE DETECTION SYSTEM DESIGN (REVISED DRAFT)



REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL  
BACKUP No. 1 (ITM) PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL  
LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

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New ?-?-10

Effective ?-?-10

**INDIANA DEPARTMENT OF TRANSPORTATION  
OFFICE OF MATERIALS MANAGEMENT**

**PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST  
REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)  
ITM No.**

**1.0 SCOPE.**

- 1.1** This test procedure covers the methods that a wireless vehicle detection system (WVDS) is bench tested, evaluated in the field, and is placed on, maintained on, or removed from an approval list.
- 1.2** The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this Indiana Testing Method (ITM) is used. Within the text, SI metric units are shown in parentheses. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.
- 1.3** This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITM's use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

**2.0 REFERENCES.**

**2.1 Indiana Test Methods or Procedures**

Indiana Test Method No. 934-08P, Procedure for Evaluating Vehicle Detection Performance

**2.2 NEMA Standards.**

2003 NEMA Standards Publication TS-2 Traffic Signal Controller Assemblies.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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BACKUP No. 1 (ITM) PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL  
LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)  
(CONTINUED)

**3.0 TERMINOLOGY.** Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101 and NEMA TS-2 Section 1.

**3.1 Abbreviations** Wherever the following abbreviations are used in this ITM, they are to be construed the same as the respective expressions represented.

WVDS                      Wireless Vehicle Detection System

**4.0 SIGNIFICANCE AND USE.**

**4.1** This Indiana Testing Method (ITM) is used to evaluate, approve, maintain approval, and remove from the approval listing of wireless vehicle detection systems which is placed on the Department's List of Approved Traffic Controller Equipment. Each model of WVDS will be bench tested and field tested separately.

**5.0 APPARATUS.**

**5.1** A fully functional instrumented intersection, with detector data output logging and live video overlay capabilities.

**6.0 SAMPLING.** The manufacturer shall furnish, at no cost to the Department, one randomly selected production-run wireless vehicle detection system of each model for bench testing and field testing. The model shall include all components and purpose-built cables and connectors necessary for operation.

The wireless vehicle detection system shall consist of all electronic equipment, in-pavement sensors, receiver/processors, repeaters, mounting hardware, cables, and power supplies.

**7.0 PROCEDURE.** The Department will evaluate the performance of individual vehicle detectors upon successful completion of all other requirements specific to the vehicle detector being tested.

**8.0 SUBMITTAL REVIEW.** The documentation will be reviewed for usability of the WVDS with Department approved NEMA TS-2 traffic controller assemblies. The documentation will be reviewed for product compliance with the MUTCD and the draft INDOT specifications. The manufacturer's recommended schedule and extent of maintenance will be reviewed for acceptability.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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BACKUP No. 1 (ITM) PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL  
LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)  
(CONTINUED)

**9.0 BENCH TESTING.** The WVDS will be bench tested for compatibility with all NEMA TS-2 signal controller assemblies used by the Department. The WVDS will be verified for full NEMA TS-2 functionality & full manufacturer's claimed optional functionality.

**10.0 FIELD TESTING.** Field testing of the WVDS shall be in accordance with ITM 934-08P.

**11.0 REPORT.** A final report will include the notations and findings from the electronic bench test and field testing results and documentation.

**12.0 APPROVAL LIST**

**12.1 Approval of a wireless vehicle detection system.** The WVDS model may be placed on the approval list when the following conditions are met:

**12.1.1** A potential net benefit to the Department is realized by inclusion of the item on the list.

**12.1.2** The bench and field testing are completed with satisfactory results.

**12.1.3** The required documentation is submitted.

**12.1.4** No excessive amount of routine or periodic maintenance is required.

**12.1.5** No failure with any of the different types of NEMA TS-2 traffic controller assemblies or individual traffic control components used by the Department.

**12.1.6** The wireless vehicle detection system shall include:

- All manuals & documents
- All required software to realize full potential of the WVDS.

**12.1.7** Only minimal maintenance operations were necessary during the field testing.

**12.2 Maintaining Approval.** Maintaining approval of the WVDS shall be in accordance with ITM 934-08P.

**12.3 Removal from Approval List.** Removal from the approval list shall be in accordance with ITM 934-08P.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR  
WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

ITM ???-??

New x-xx-xx  
. Effective 9-01-xx

APPENDIX A

INDIANA DEPARTMENT OF TRANSPORTATION  
DIVISION OF OPERATIONS SUPPORT  
PRELIMINARY INFORMATION FOR PRODUCT MATERIAL EVALUATION

Trade Name \_\_\_\_\_ Date \_\_\_\_\_

Manufacturer \_\_\_\_\_ Patented? Yes \_\_\_\_\_ No \_\_\_\_\_ Applied for \_\_\_\_\_

Address \_\_\_\_\_  
Street No (P. O. Box) \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Representative \_\_\_\_\_ Phone No ( ) \_\_\_\_\_

Address \_\_\_\_\_  
Street No (P. O. Box) \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Product Information \_\_\_\_\_  
\_\_\_\_\_

Materials Composition \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\*\* Is this product considered HAZARDOUS MATERIAL when disposing of non-used or  
surplus materials? Yes \_\_\_\_\_ No \_\_\_\_\_

\*\* What is the shelf life of this material? Years \_\_\_\_ Months \_\_\_\_ N/A \_\_\_\_\_

Recommended Use-Primary \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR  
WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

Recommended Use-Alternate \_\_\_\_\_

Advantages and/or Benefits \_\_\_\_\_

\*\* Materials specifications by manufacturer, installation/operation manual, maintenance manual, literature, test results, guarantee, hazardous material data sheets, plan, picture or sketch must be submitted with this form. In the case of electronic devices the schematic diagram, parts list, and parts layout diagram must be submitted for each printed circuit board within the device.

Meets following specifications:

AASHTO \_\_\_\_\_

ASTM \_\_\_\_\_

OTHER \_\_\_\_\_

Use by highway authorities or similar agencies in other states.

Agency	Years Used	Remarks
_____	_____	_____
_____	_____	_____
_____	_____	_____

\*\* Has product ever been evaluated by and rejected for use by a governmental agency?

Yes \_\_\_\_\_ No \_\_\_\_\_ yes, by what agency and for what reason?

Will demonstration be provided? Yes \_\_\_\_\_ No \_\_\_\_\_

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR  
WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

Availability: Seasonal \_\_\_\_\_ Nonseasonal \_\_\_\_\_ Delivery at site \_\_\_\_\_

After receipt of order, are quantities limited? Yes \_\_\_\_\_ No \_\_\_\_\_

\*\* Will FREE SAMPLES be furnished? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, Quantity Furnished \_\_\_\_\_

\*\* If the sample is salvageable, do you desire to have it returned Yes \_\_\_\_ No \_\_\_\_

(Desired return of salvageable samples will be at the supplier's expense.)

(The manufacturer agrees upon the return of salvageable samples, such samples may be damaged or non-operable. Normal care will be taken that the samples, when returned, are in operable condition; INDOT, however, does not guarantee that the returned samples are operable.)

Will laboratory analysis be furnished? Yes \_\_\_\_\_ No \_\_\_\_\_

\*\* Approximate cost \_\_\_\_\_ Royalty Cost \_\_\_\_\_

When was the product introduced to the market? \_\_\_\_\_

This product is an alternate for what product? \_\_\_\_\_

\_\_\_\_\_

Will warranty be provided? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, for how long? \_\_\_\_\_

Background of company, including principal products \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What offices of the Indiana Department of Transportation have been contacted?

Additional Information \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Attach additional sheets as necessary)

Person furnishing information \_\_\_\_\_

Name

Title

Address \_\_\_\_\_

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

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BACKUP No. 1 (ITM) APPENDIX A

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR  
WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

Street No (P. O. Box)	City	State	Zip Code
-----------------------	------	-------	----------

Items marked \*\* MUST BE RESPONDED TO or further consideration may not be given for this product.

Please mail this form to:                      Manager, Office of Traffic Engineering  
100 N. Senate Ave., Room N925  
Indianapolis, IN 46204-2249

If INDOT elects to evaluate your product/material - traffic signal equipment will be shipped to:

Electronic Technician Supervisor  
Indiana Department of Transportation  
6400 E. 30<sup>th</sup> Street  
Indianapolis, IN 46219-8222

While all other materials to be evaluated will be shipped to:

Traffic Evaluations Engineer  
Indiana Department of Transportation  
6400 E. 30<sup>th</sup> Street  
Indianapolis, IN 46219-8222

COMMENTS AND ACTION

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RECURRING SPECIAL PROVISION 805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM  
RECURRING PLAN DETAILS 805-T-XXXD WIRELESS VEHICLE DETECTORS STOP BAR  
DETECTION ZONE  
REVISION TO IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

DISCUSSIONS:

Mr. Boruff began discussion by explaining the need for this provision as stated in the proposal, and as revised per comments from the June meeting.

Mr. Miller asked if there were any plans as to how often this provision would be required. Mr. Boruff stated that these systems will be used quite frequently, especially in long approaches. Mr. Richards added that the wireless detection system will be used quite a bit, and are anticipated to be a cost effective alternative, and that the cost savings when used in work zone protection could be quite substantial. Mr. Miller mentioned that they will need revisions to the design manual, recurring provision and an ITM, and asked when they will need the ITM. Mr. Boruff and Mr. Richards said that is unknown at this time. Mr. Walker said that the next ITM meeting is November 9, and asked if that will be soon enough. They agreed that it would be. Mr. Walker requested a Word copy of what they have, from the agenda.

Mr. Miller asked if any committee members had any concerns or questions about the material. Mr. Uremovich suggested making the triangles and squares in the lanes on the drawings (page 12 of the agenda) bigger so it is easier to tell what they are. Mr. Pankow commented on the same page, recommending that dashed lines be clarified in order to easier to determine what they represent.

Mr. Pankow had some spec-ese comments on page 5 of the agenda, suggested changing 'Project Engineer' to 'Engineer' (second paragraph from the top). Also, on page 4, replace the word should with 'shall'. Mr. Uremovich concurred and pointed out other instance of this needed correction.

Mr. Miller asked if there were any other comments about the drawings or plan details. He also mentioned the Design Manual language and that could be handled through the ITM. Mr. Miller asked if there is an approved list and Mr. Richards said there was not.

Mr. Miller said that a RSP will be created and asked when it will be ready. Mr. Cales asked how long the designer will need to incorporate this item. 7 months? Mr. Miller and Mr. Cales agreed that this should be ready by May for the May 2011 letting. Mr. Miller asked if we need a sunset date and Mr. Cales suggested a sunset date of September 2011 and recommended putting this into the 2012 book. Mr. Boruff commented that there will likely be additions or changes to this RSP. Mr. Miller reiterated that this will have a sunset date of September 2011 so it can be in the 2012 book. Mr. Uremovich concurred that the drawings will also be needed, and Mr. Pankow stated that there will be no required changes to the GIFE.

Mr. Leuderalbert (FHWA) gave his approval to the items as discussed.

COMMENTS AND ACTION (CONTINUED)

RECURRING SPECIAL PROVISION 805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM  
 RECURRING PLAN DETAILS 805-T-XXXD WIRELESS VEHICLE DETECTORS STOP BAR  
 DETECTION ZONE  
 REVISION TO IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

Motion: Mr. Boruff Second: Mr. Cales Ayes: 9 Nays: 0	Action: <input type="checkbox"/> Passed as Submitted <input checked="" type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  SECTION 805 TRAFFIC SIGNALS  Recurring Special Provisions:  805-T-169 TRAFFIC SIGNALS  Standard Sheets affected:  805-SGLI-01  Design Manual Sections affected:  SECTION 77-4.02  GIFE Sections cross-references:  NONE	<input checked="" type="checkbox"/> 2012 Standard Specifications Book  <input checked="" type="checkbox"/> Create RSP (No. 805-T-173) Effective May, 2011 Letting RSP Sunset Date: September, 2011  <input type="checkbox"/> Revise RSP (No. ____) Effective ____ Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input checked="" type="checkbox"/> Create RPD (No. 805-T-173d) Effective May, 2011 Letting RPD Sunset Date: September, 2011  <input type="checkbox"/> 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? <input checked="" type="checkbox"/>

SPECIFICATION REVISIONS

REVISION TO THE RECURRING SPECIAL PROVISION

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Recurring Plan Detail 601-R-497d, which illustrates the Spare Parts Packages for INDOT Approved Attenuators, contains spare parts information for both Stage 1 and Stage 2 spare parts packages. The Pay Item shown in Standard Specifications section 601.14, for Impact Attenuator Spare Parts Package, currently contains spaces to determine the type-width, and the test level. This current pay item does not contain any space for the determination of desired Stage.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.  
A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

PROPOSED SOLUTION: The proposed editorial update of the aforementioned pay item will allow the designer to specify the type-width, the test level, and the stage for the desired spare parts package.

APPLICABLE STANDARD SPECIFICATIONS: 601.08

APPLICABLE STANDARD DRAWINGS: 601-IAED-01

APPLICABLE DESIGN MANUAL SECTION: 49-8.04

APPLICABLE SECTION OF GIFE: 21.1

APPLICABLE RECURRING SPECIAL PROVISIONS: 601-R-497

Submitted By: John Wright

Title: Roadway Services Manager

Organization: INDOT

Phone Number: 317-232-5147

Date: August 26, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by members of the Impact Attenuator Committee.

REVISION TO THE RECURRING SPECIAL PROVISION

REVISION TO 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

(Revised xx-xx-xx)

The Standard Specifications are revised as follows:

SECTION 601, BEGIN LINE 202, DELETE AND INSERT AS FOLLOWS:

~~If a spare parts package is required for the unit being installed, such package shall consist of those parts which are shown on the list provided by the manufacturer. The spare parts shall correspond to those shown on the list for the unit to be placed. The package shall be delivered to the location directed and will become the property of the Department.~~ *\_\_\_\_\_ stage 1 spare parts package(s) and \_\_\_\_\_ stage 2 spare parts package(s) shall be supplied for each type of impact attenuator being installed. The spare parts package shall consist of those parts which are shown on the replacement parts list shown in the Contract Information Book. The spare parts package(s) shall be delivered to the following location.*

SECTION 601, LINE 253, DELETE AS FOLLOWS:

~~each. Impact attenuators, and resetting impact attenuators, and impact attenuator spare parts packages~~ will be measured per each for the type and width and test level, complete in place.

SECTION 601, AFTER LINE 261, INSERT AS FOLLOWS:

*Impact attenuator spare parts packages will be measured per each for the type and width, test level, and stage for which it is specified.*

SECTION 601, LINE 276, DELETE AS FOLLOWS:

~~paid for at the contract unit price per each, complete in place. Impact attenuators, and resetting impact attenuators, and impact attenuator spare parts packages~~ will be paid for at the contract unit price per each for the type and width, and test level specified.

SECTION 601, AFTER LINE 282, INSERT AS FOLLOWS:

*Impact attenuator spare parts packages will be paid for at the contract unit price per each for the type and width, test level and stage for which it is specified.*

SECTION 601, BEGIN LINE 318, INSERT AS FOLLOWS:

Impact Attenuator Spare Parts Package, \_\_\_\_\_,  
type-width  
\_\_\_\_\_, \_\_\_\_\_.....EACH  
test level stage

REVISION TO THE RECURRING SPECIAL PROVISION

BACKUP NO. 1: RECURRING PLAN DETAIL 601-R-497d SPARE PARTS PACKAGES FOR INDOT  
APPROVED ATTENUATORS (REVISED, SEE COMMENTS AND ACTION)

601-R-497d Spare Parts Packages for INDOT Approved Attenuators

(Revised 09-16-10)

03-01-11

Unit	Type	Manufacturer	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
			Option	Qty	Item	Option	Qty	Item
QUADGUARD II	Impact Attenuator	Energy Absorption Systems, Inc.	QUADGUARD II TL 3 (ED, R1, R2, SD, W1)	1	Nose Assembly	QUADGUARD II TL 3 (ED, R1, R2, SD, W1)	1	Nose Assembly
				3	Energy Absorption Cartridge Type 1	QUADGUARD II TL 3 (ED, R1, R2, SD, W1)	3	Energy Absorption Cartridge Type 1
						QUADGUARD II TL 3 (ED, R1, R2, SD, W1)	3	Energy Absorption Cartridge Type 2
QUADGUARD II	Impact Attenuator	Energy Absorption Systems, Inc.	QUADGUARD II TL 2 (ED, R1, R2, SD, W1)	1	Nose Assembly	QUADGUARD II TL 2 (ED, R1, R2, SD, W1)	1	Nose Assembly
				2	Energy Absorption Cartridge Type 1	QUADGUARD II TL 2 (ED, R1, R2, SD, W1)	2	Energy Absorption Cartridge Type 1
						QUADGUARD II TL 2 (ED, R1, R2, SD, W1)	1	Energy Absorption Cartridge Type 2
QUADGUARD II	Impact Attenuator	Energy Absorption Systems, Inc.	QUADGUARD II (LS, W1)	1	Nose Assembly	QUADGUARD II (LS, W1)	1	Nose Assembly
				1	Energy Absorption Cartridge Type 1	QUADGUARD II (LS, W1)	1	Energy Absorption Cartridge Type 1
						QUADGUARD II (LS, W1)	1	Energy Absorption Cartridge Type 2

Notes:

Packages **shall** include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

Unit	Type	Manufacturer	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
			Option	Qty	Item	Option	Qty	Item
TAU II	Impact Attenuator	Barrier Systems, Inc.	TAU II TL 3 (ED, R1, R2, SD, W1)	3	Energy Absorption Cartridge Type A	TAU II TL 3 (ED, R1, R2, SD, W1)	3	Energy Absorption Cartridge Type A
				1	Energy Absorption Cartridge Type B	TAU II TL 3 (ED, R1, R2, SD, W1)	5	Energy Absorption Cartridge Type B
			TAU II TL 2 (ED, R1, R2, SD, W1)	1	Energy Absorption Cartridge Type A	TAU II TL 2 (ED, R1, R2, SD, W1)	1	Energy Absorption Cartridge Type A
TAU II	Impact Attenuator	Barrier Systems, Inc.		1	Energy Absorption Cartridge Type B	TAU II TL 2 (ED, R1, R2, SD, W1)	3	Energy Absorption Cartridge Type B

Notes:

Packages **shall** include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

\* For W2 and W3 units:

1. Include all Type A Cartridges for Stage 1
2. Include all Type A and B Cartridges for Stage 2

Unit	Type	Manufacturer	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
			Option	Qty	Item	Option	Qty	Item
TRACC	Impact Attenuator	Trinity Highway Products, LLC	TRACC TL-3 (ED, R1, R2, SD)	1	Nosepiece and reflective assembly	TRACC TL-3 (ED, R1, R2, SD)	1	Nose piece and reflective assembly
				1	Stage 2 Rip Plate Repair Kit	TRACC TL-3 (ED, R1, R2, SD)	1	Stage 3 Rip Plate Repair Kit
			TRACC TL-2 (ED, R1, R2, SD)	1	Nosepiece and reflective assembly	TRACC TL-2 (ED, R1, R2, SD)	1	Nose piece and reflective assembly
TRACC	Impact Attenuator	Trinity Highway Products, LLC		1	Stage 2 Rip Plate Repair Kit	TRACC TL-2 (ED, R1, R2, SD)	1	Stage 3 Rip Plate Repair Kit

Notes:

Packages **shall** include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

**\*\* There are NO spare parts packages for Impact Attenuator, Type CR**



COMMENTS AND ACTION

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REVISION TO 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

DISCUSSIONS:

Mr. Shah referred everyone to the Recurring Plan Detail 601-R497d for the Attenuator Spare Parts Package which illustrates parts for stage 1 and stage 2 spare parts packages. The editorial changes are so that the RPD matches what can actually be supplied by the manufacturer, in order to provide the proper parts needed for all systems.

Mr. Caplinger asked how we will know how many are needed and where they are to go. Mr. Pankow said that that determination is to be made by the District. Mr. Cales agreed in that District Construction is to check on what and where spare parts packages are needed. Mr. Pankow stated that sometimes there is no room to store what they already have. Mr. Pankow and Mr. Keefer discussed details concerning quantities, types and stages of the packages.

Mr. Pankow suggested changing the wording on page 24 of the agenda (the RPD) to 'shall' instead of 'are to'.

Mr. Miller asks Mr. Caplinger if that answered his question and Mr. Caplinger said that it did. All agreed that the revised motion will pass as revised.

Note: Mr. Pankow's suggestions referred to the Recurring Plan Details, 601-R-497d that have been shown on the Agenda as a backup material to the item. Proposed RSP have been approved as submitted. Proposed changes to the RPD are shown in these minutes.

Mr. Miller asked if we should keep it as a Recurring Special Provision. Mr. Uremovich suggested that it go into the book since it revises a pay item. Mr. Miller said that we'll reduce the Recurring to the top part shown, and asked if we can make it available in May. Mr. Cales said that they will target March, but might make it by February. After general discussion, Mr. Pankow mentioned that we need to identify the different stages in the book. Mr. Cales suggested to make it a part of the recurring and that the original recurring should be okay and mention concern over printing of the detail in the book.

Mr. Miller asked if we'll be leaving it as a RSP/RPD for now, and all agreed. Mr. Caplinger stated that everything below the "location" field line on page 23 can go into the book. Mr. Miller asked who will take care of it and Mr. Caplinger stated that Yadu Shah will take care of it.

Mr. Leuderalbert (FHWA) gave his approval to the items as discussed.

COMMENTS AND ACTION (CONTINUED)

REVISION TO 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

Motion: Mr. Shah Second: Mr. Cales Ayes: 9 Nays: 0	Action: <input type="checkbox"/> Passed as Submitted <input checked="" type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  601.08 pg 353; 601.13 pg 354; 601.14 pg 356.  Recurring Special Provisions:  601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS  Standard Sheets affected:  NONE  Design Manual Sections affected:  NONE  GIFE Sections cross-references:  NONE	<input checked="" type="checkbox"/> 2012 Standard Specifications Book (see comments) <input type="checkbox"/> Create RSP (No. ____) Effective ____ Letting RSP Sunset Date: ____  <input checked="" type="checkbox"/> Revise RSP (No. 601-R-497 and RPD 601-R-497d) Effective March, 2011 Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input type="checkbox"/> Create RPD (No. ____) Effective ____ Letting <input type="checkbox"/> 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? <input checked="" type="checkbox"/>

SPECIFICATION REVISIONS

REVISION TO THE STANDARD DRAWINGS

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The regulatory version of the Reduced Speed Ahead sign is still being used even though it was eliminated from the current Manual on Uniform Traffic Control Devices and replaced by a warning sign version. All regulatory Reduced Speed Ahead signs must be replaced by the FHWA compliance date of 12/22/18.

PROPOSED SOLUTION: The Reduce Speed Sign should be included in standard drawings for Traffic Control Signs and Sign Design Details with a Design Memo sent as notification of the correct sign to be used.

APPLICABLE STANDARD SPECIFICATIONS: n/a

APPLICABLE STANDARD DRAWINGS: 801-TCSN-06; 801-TCSN-12; 801-TCSN-13

APPLICABLE DESIGN MANUAL SECTION: n/a

APPLICABLE SECTION OF GIFE: n/a

APPLICABLE RECURRING SPECIAL PROVISIONS: n/a

Submitted By: Dave Boruff

Title: Supervisor, Traffic Administration Section

Organization: INDOT

Phone Number: 317-899-8626

Date: 8.12.10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad hoc review by Tony Uremovich, Pat McCarty.

SPECIFICATION REVISIONS  
REVISION TO THE STANDARD DRAWINGS

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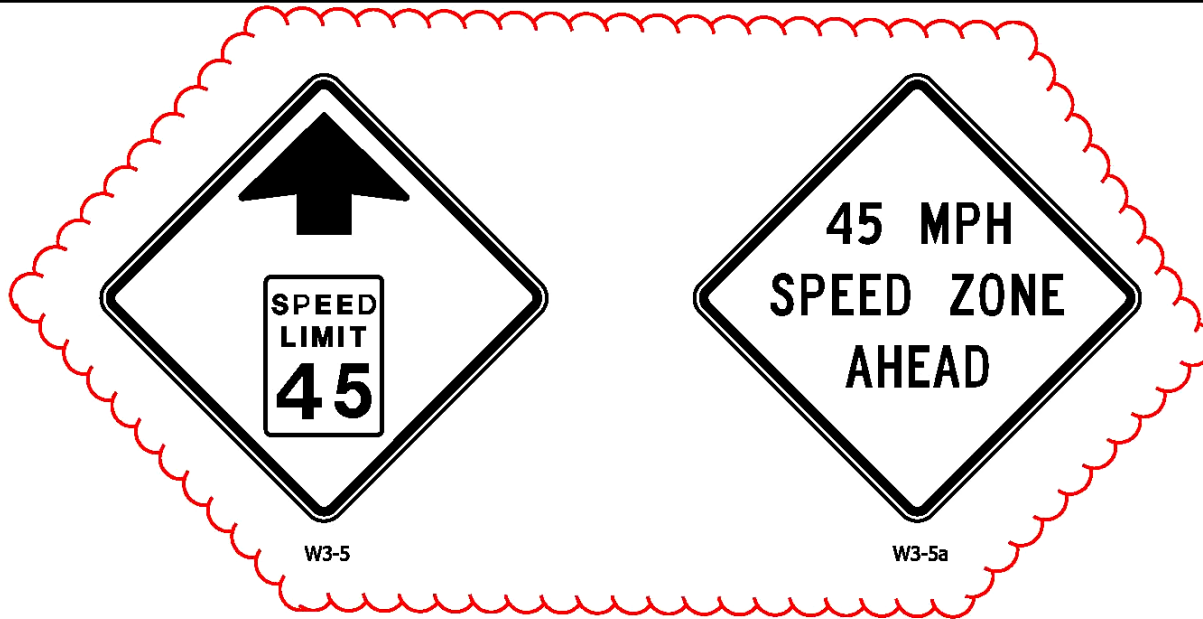
APPROVED MINUTES

## REVISION TO THE STANDARD DRAWINGS

## REVISION TO 801-TCSN-06 TRAFFIC CONTROL SIGNS (DRAFT)

**NOTE:**

- ① See Standard Drawing E 801-TCSN-11 for additional general notes.

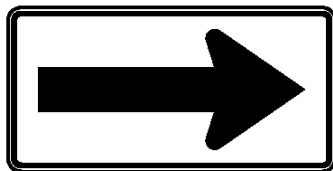


W3-5

W3-5a



XW13-1-A  
To be used below a  
warning sign only.



XW1-6  
XW1-6-A ①



XW6-2a-A  
XW6-2a-B ①



XW8-3-A

INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL  
SIGNS

SEPTEMBER 2010

STANDARD DRAWING NO. E 801-TCSN-06

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

## REVISION TO THE STANDARD DRAWINGS

## REVISION TO 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 1 OF 2) (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE ①	PCT. ①	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY								HEAD	SHAFT		ONE	TWO
XG20-1	"Road Construction Next ____ Miles"	*	B	60 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C					2 1/4		X
XG20-2	"End Construction"	*	B	60 x 24	Orange	Black	1/2	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-2a	"End Road Work"	*	B	48 x 18	Orange	Black	1/2	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-4	"Pilot Car Follow Me"	--	--	36 x 18	Orange	Black	1/2	3/8	5 - Series C	5 - Series C						1 1/2		
XG20-5	(Route number or) "Lane Closed" __ (date)	*	B	48 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C					2 1/4		X
XG20-5-B	"Worksite" plate	--	--	48 x 16	Orange	Black	1/2	3/8	8 - Series C							1 1/2	----	----
XW20-6	"Lane Restrictions On Or After *** ** 2007	*	B	60 x 30	Orange	Black	3/4	1/2	5 - Series C	5 - Series C	4 - Series C					1 7/8		X
XW20-6a	"Lane Restrictions On Or After *** ** 2007	*	B	72 x 36	Orange	Black	7/8	5/8	6 - Series C	6 - Series C	5 - Series C					2 1/4		X
XM4-9 (R or L)	"Detour" (above black arrow)	*	A	30 x 24	Orange	Black	1/2	3/8	5 - Series D			"Detour"		7 x 8	11 x 3 1/2	1 1/2		X
XM4-9-B (R or L)	"Detour" (above black arrow)	*	B	60 x 48	Orange	Black	1 1/4	3/8	10 - Series D			"Detour"		14 3/4 x 16	21 3/4 x 7	3		X
XM4-10 (R or L)	"Detour" (inside orange arrow)	*	B	48 x 18	Black & Orange	Black	----	3/8	6 - Series D					12 x 13 3/8	29 3/4 x 8	1 1/2		X
XW1-1-A (R or L)	(Turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-1-B (R or L)	(Turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-2-A (R or L)	(Curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-2-B (R or L)	(Curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-3-A (R or L)	(Reverse turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-3-B (R or L)	(Reverse turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-4-A (R or L)	(Reverse curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-4-B (R or L)	(Reverse curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-6	(Single headed arrow)	*	B	48 x 24	Orange	Black	3/4	3/4						13 1/8 x 15	26 x 6 1/2	1 1/2		X
XW1-6-A	(Single headed arrow)	*	B	60 x 30	Orange	Black	3/4	1/2						16 3/8 x 18	32 1/2 x 8	2 1/4		X
XW4-2 (R or L)	(Lane ends merge ____ symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	See Standard Sheet 3A Detours							2 1/4		X
XW4-2-A (R or L)	(Lane ends merge ____ symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4	See Standard Sheet 3A Detours							1 1/2		X
XW6-2a-A	(Divided highway ends symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	5 - Series D	5 - Series D	5 - Series D					2 1/4		X
XW6-2a-B	(Divided highway ends symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW3-5-A	Arrow - "Speed Limit ____"	*	A	36 x 36	Orange	Black	7/8	5/8	3 - Series E	3 - Series E	12 - C					2 1/4		X
XW3-5-B	Arrow - "Speed Limit ____"	*	B	48 x 48	Orange	Black	1 1/4	3/4	4 - Series E	4 - Series E	15 C					3		X
XW3-5a-A	" ____ - MPH - Speed Zone Ahead"	*	A	36 x 36	Orange	Black	7/8	5/8	5 - Series C	5 - Series C	5 - Series C					2 1/2		X
XW3-5a-B	" ____ - MPH - Speed Zone Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C					3		X

\*Wood post permitted.

## NOTES:

- ① Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.
2. See Standard Drawing E 801-TCSN-11 for additional general notes.
3. All dimensions are in inches.

## INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS  
(Sheet 1 of 2)

SEPTEMBER 2010

STANDARD DRAWING NO. E-801-TCSN-12

DESIGN STANDARDS ENGINEER

/s/ XXXXXXXXXX 01/01/09  
DESIGN STANDARDS ENGINEER DATE/s/ XXXXXXXXXX 01/01/09  
CHIEF HIGHWAY ENGINEER DATE

## REVISION TO THE STANDARD DRAWINGS

## REVISION TO 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 2 OF 2) (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE ①	PCT. ①	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY								HEAD	SHAFT		ONE	TWO
XW6-3-B	(Two way traffic symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						11 5/8 x 13 3/4	23 1/2 x 6	3		X
XW8-1-A	"Bump"	*	A	36 x 36	Orange	Black	3/4	1/2	10 - Series D							2 1/4		X
XW8-1-B	"Bump"	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series D							3		X
XW8-2-A	"Dip"	*	A	36 x 36	Orange	Black	3/4	1/2	10 - Series E							2 1/4		X
XW8-2-B	"Dip"	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series E							3		X
XW8-3-A	"Pavement Ends"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-4-A	"Soft Shoulder"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-4-B	"Soft Shoulder"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C						3		X
XW8-6-A	"Truck Crossing"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-6-B	"Truck Crossing"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C						3		X
XW9-1-A (R or L)	" ____ Lane Ends"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series D	6 - Series D	6 - Series D					2 1/4		X
XW9-1-B (R or L)	" ____ Lane Ends"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series D	8 - Series D	8 - Series D					3		X
XW9-2-A (R or L)	"Lane Ends Merge ____"	*	B	48 x 48	Orange	Black	1 1/4	3/4	5 - Series C	8 - Series D	8 - Series D					2 1/4		X
XW12-1-C	(Double headed arrow)	*	B	48 x 48	Orange	Black	1 1/4	3/4						12 1/2 x 15	12 x 5 1/4	3		X
XW13-1-A	" ____ MPH" (Advisory speed plate)	*	A	24 x 24	Orange	Black	1/2	3/8	10 - Series E	4 - Series E						1 1/2	----	----
XW20-1	"Road Construction Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	"Construction"	25			3		X
XW20-1-A	"Road Construction Ahead"	*	B	60 x 60	Orange	Black	1 1/2	1	8 - Series C	8 - Series C	8 - Series C	"Construction"	25			95		X
XW20-1a	"Road Repairs Next ____ Miles"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	6 - Series C					3	6	X
XW20-2	"Detour Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series D	8 - Series D		"Detour"	25			3		X
XW20-3	"Road Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW20-4	"One Lane Road Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C					3		X
XW20-5 (R, C, or L)	" ____ Lane Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	6 - Series C	6 - Series C	6 - Series C		2			3		X
XW20-7a-A	(Flagger symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								1 1/2		X
XW21-1a	(Workers symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series D							2 1/4		X
XW21-2	"Fresh Oil"	*	A	30 x 30	Orange	Black	3/4	3/8	6 - Series D	6 - Series D		"Fresh"	2/4			1 7/8	X	
XW21-2-A	"Fresh Oil"	*	A	36 x 36	Orange	Black	3/4	1/2	7 - Series D	7 - Series D		"Fresh"	3/4			2 1/4		X
XW21-3-A	"Road Machinery Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D	"Machinery"	25			3		X
XW21-4-A	"Road Work Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW21-5-A	"Shoulder Work"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C		"Shoulder"	1			2 1/4		X
XW21-6-A	"Survey Crew"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X

\*Wood post permitted.

## NOTES:

- ① Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.
2. See Standard Drawing E 801-TCSN-11 for additional general notes.
3. All dimensions are in inches.

## INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS  
(sheet 2 of 2)

SEPTEMBER 2010

STANDARD DRAWING NO. 801-TCSN-12

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

## REVISION TO THE STANDARD DRAWINGS

## REVISION TO 801-TCSN-13 SIGN DESIGN DETAILS (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	LETTER HEIGHT SERIES-LINE 4	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY							HEAD	SHAFT		ONE	TWO
XW101-1	"Mowing Crews Ahead"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C				2 1/4		X
XW101-1-A	"Mowing Crews Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	8 - Series C				3		X
XW102-1	"Mowing Crews Next _____ Miles"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	4 - Series C	4 - Series C			2 1/4		X
XW102-1-A	"Mowing Crews Next _____ Miles"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	6 - Series C	6 - Series C			3		X
XW103-1	"Watch For Stopped Traffic"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C				3		X
XW104-1	"Overhead Sign Installation"	*	B	60 x 24	Orange	Black	1/2	3/8	6 - Series C	6 - Series C					1 1/2		X
XW105-1-A	"Right Lane Exit Open"	*	B	48 x 48	Orange	Black	1 1/4	3/4	6 - Series C	6 - Series C					3		X
XW106-1-A	"Exit Closed"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C					3		X
XW106-2-A	"Exit Open"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C					3		X
XW108-1	"Utility Work Ahead"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series D	6 - Series D	6 - Series D				2 1/4		X
XW108-1-A	"Utility Work Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	6 - Series C	6 - Series C	6 - Series C				3		X
XW109-1	"Exit" (above black arrow)	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series D						3		X
R2-1	"Speed limit _____"	*	A	24 x 30	White	Black	1/2	3/8	4 - Series E	4 - Series E	10 - Series E				1/2	X	
R2-1-B	"Speed limit _____"	*	B	48 x 60	White	Black	1 1/4	3/4	8 - Series E	8 - Series E	16 - Series E				3		X
<del>R2-15b-B</del>	<del>"Reduced Speed _____ Ahead"</del>	<del>*</del>	<del>A</del>	<del>48 x 60</del>	<del>White</del>	<del>Black</del>	<del>1 1/4</del>	<del>3/4</del>	<del>8 - Series E</del>	<del>8 - Series E</del>	<del>14 - Series E</del>	<del>8 - Series E</del>			<del>6</del>		
R3-2-A (R or L)	(No _____ turn symbol)	*	A	30 x 30	White	Black	3/4	3/8							2		X
R3-2-C (R or L)	(No _____ turn symbol)	*	B	48 x 48	White	Black	1 1/4	3/4							3		X
R4-1	"Do Not Pass"	*	A	24 x 30	White	Black	1/2	3/8	6 - Series D	6 - Series D	5 - Series D				1 7/8	X	
R4-1-B	"Do Not Pass"	*	B	48 x 60	White	Black	1 1/4	3/4	10 - Series D	10 - Series D	10 - Series D				3		X
R5-1-A	"Do Not Enter" (inside symbol)	*	A	36 x 36	Red	White	Radius 17	1/2	5 - Series D	6 x 30 Bar	5 - Series D				2 1/4		X
R5-1-B	"Do Not Enter" (inside symbol)	*	B	48 x 48	Red	White	Radius 23	1/2	6 - Series D	8 x 40 Bar	6 - Series D				3		X
R6-1 (R or L)	"One Way" (inside white arrow)	*	A	36 x 36	Black & White	Black		3/8	4 - Series D				7 1/2 x 8 1/2	22 1/4 x 5 1/4	1 1/2		X
R6-2-A (R or L)	"One Way" (above black arrow)	*	A	24 x 30	White	Black	1/2	3/8	6 - Series D	6 - Series D			5 1/4 x 6	8 x 2 1/4	1 1/2	X	
R11-2	"Road Closed"	*	B	48 x 30	White	Black	3/4	3/8	8 - Series D	8 - Series D					1 7/8		X
R11-3	"Road Closed _____ Miles Ahead "Local Traffic Only"	*	B	60 x 30	White	Black	3/4	3/8	8 - Series C	5 - Series C	4 - Series C				1 7/8		X
R11-4	"Road Closed To Thru Traffic"	*	B	60 x 30	White	Black	3/4	3/8	6 - Series C	5 - Series C	6 - Series C				1 7/8		X
R12-1	"Weight Limit _____ Tons"	*	A	24 x 30	White	Black	1/2	3/8	4 - Series D	4 - Series D	5 - Series E	5 - Series D			1 1/2	X	
R12-1-A	"Weight Limit _____ Tons"	*	B	36 x 48	White	Black	3/4	1/2	6 - Series D	6 - Series D	8 - Series E	10 - Series D			2 1/4		X
S 4-4	"When Flashing" plate	---	---	48 x 20	White	Black	1/2	3/8	5 - Series D	5 - Series D					1 1/2	---	---

\* Wood post permitted.

## GENERAL NOTES

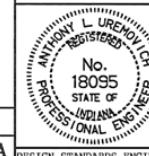
1. See Standard Drawing 801-TCSN-11 for additional general notes.
2. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

## SIGN DESIGN DETAILS

SEPTEMBER 1999

STANDARD DRAWING NO. E 801-TCSN-13

/s/ Anthony L. Uremovich 9-01-99  
DESIGN STANDARDS ENGINEER DATE/s/ Donald W. Lucas 9-01-99  
CHIEF HIGHWAY ENGINEER DATESource Sheet: Det3A,  
Source Sheet: Det5, 5A



REVISION TO THE STANDARD DRAWINGS

BACKUP NO. 1 DESIGN MEMORANDUM NO.10-\_\_ (DRAFT)



# INDIANA DEPARTMENT OF TRANSPORTATION

*Driving Indiana's Economic Growth*

## Design Memorandum No. 10-\_\_ Technical Advisory

July 2, 2010 DRAFT

**TO:** All Design, Operations, and District Personnel, and Consultants

**FROM:** \_\_\_\_\_

**Richard L. VanCleave**  
**Roadway Engineering Standards Engineer**  
**Highway Design and Technical Support Division**

**SUBJECT** Reduced-Speed-Limit Ahead Sign

**REVISES:** *Indiana Design Manual Section 83-2.03(01) item 7*

**EFFECTIVE:** ???????????

With the adoption of the 2008 Indiana Manual on Uniform Traffic Control Devices the regulatory sign, R2-15b, "Reduced Speed XX Ahead" is no longer to be specified. Instead, reduced-speed-limit warning sign W3-5 or W3-5a will be utilized. This applies to permanent signing and temporary traffic control. The details are shown on Recurring Plan Detail 801-R-\_\_\_\_d, attached herewith. Only one of the designations should be specified for the entire project.

The recurring plan detail should be called for through the August 2011 letting. It will be superseded by standard drawings beginning with the September 2011 letting.

\_\_\_\_:alu

COMMENTS AND ACTION

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REVISION TO THE STANDARD DRAWINGS:

801-TCSN-06 TRAFFIC CONTROL SIGNS  
801-TCSN-12 SIGN DESIGN DETAILS (SHEET 1 OF 2)  
801-TCSN-12 SIGN DESIGN DETAILS (SHEET 2 OF 2)  
801-TCSN-13 SIGN DESIGN DETAILS

DISCUSSIONS:

Mr. Boruff suggested adding the corrected sign, and that there will be two sizes for each version. He also said there will be updated sheets where shown, and that he'd like to get the word out to let people know for use in both temporary and permanent traffic control.

Mr. Uremovich asked if the speed limit is always going to be 45? Mr. Boruff said that it would not, so Mr. Uremovich suggested that the number 45 on the drawing be shown as a broken line like the 35 MPH sign below it. Mr. Caplinger asked if they'll have to go out and change all the signs. Mr. Miller commented that we have until 2018, and asked if we have until then? Mr. Pankow added that most people aren't using them anyway.

The motion then passed as revised and it was agreed to get this out in March 2011, with a sunset date of September 2011. Mr. Cales mentioned that recurring detail sheets are needed.

Mr. Leuderalbert (FHWA) gave his approval to the items as discussed.

APPROVED MINUTES

COMMENTS AND ACTION (CONTINUED)

REVISION TO THE STANDARD DRAWINGS:

801-TCSN-06 TRAFFIC CONTROL SIGNS  
 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 1 OF 2)  
 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 2 OF 2)  
 801-TCSN-13 SIGN DESIGN DETAILS

Motion: Mr. Boruff Second: Mr. Cales Ayes: 9 Nays: 0	Action: <input type="checkbox"/> Passed as Submitted <input checked="" type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  SECTION 805 TRAFFIC SIGNALS  Recurring Special Provisions:  Standard Sheets affected: 801-TCSN-06, -12, -13.  Design Manual Sections affected: NONE  GIFE Sections cross-references: NONE	<input type="checkbox"/> 20 Standard Specifications Book  <input type="checkbox"/> Create RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>  <input type="checkbox"/> Revise RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>  Standard Drawing Effective <input type="checkbox"/> <input checked="" type="checkbox"/> Create RPD (No. 801-T-174d) Effective <u>March, 2011</u> Letting RPD Sunset Date: <u>September, 2011</u>  <input type="checkbox"/> Technical Advisory  GIFE Update Req'd.? Y <input type="checkbox"/> N <input type="checkbox"/> By <input type="text"/> Addition or <input type="text"/> Revision  Frequency Manual Update Req'd? Y <input type="checkbox"/> N <input type="checkbox"/> By <input type="text"/> Addition or <input type="text"/> Revision  Received FHWA Approval? <input checked="" type="checkbox"/>

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

---

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Current specs regarding archaeological discoveries do not reflect current laws and procedures.

PROPOSED SOLUTION: Update specification with proposed revisions.

APPLICABLE STANDARD SPECIFICATIONS: Sections 104, 107 and 203

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

B

Submitted By: John Wright

Title: Director or Roadway Services

Organization: INDOT

Phone Number: 317.232.5147

Date: 8.27.10

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

REVISION TO THE STANDARD SPECIFICATIONS

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SECTION 104 - SCOPE OF WORK

104.07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE PROJECT SITE

The Standard Specifications are revised as follows:

SECTION 104, BEGIN LINE 544, DELETE AND INSERT AS FOLLOWS:

~~If *Discovery of* archaeological artifacts are encountered during excavation operations, these operations shall be ceased in the immediate vicinity and the Engineer shall be notified construction shall be addressed in accordance with 107.10. An archaeologist will be provided by the Department and a determination will be made as to the significance and the disposition of such findings. In no event shall an employee of the Contractor or the State of Indiana share in such ownership, or profit from salvaged archaeological findings. Unless otherwise agreed to in writing, compliance with this requirement will not be paid for directly. The cost thereof shall be included in the cost of the pay items.~~

REVISION TO THE STANDARD SPECIFICATIONS

---

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC  
107.10 ~~BLANK~~ ARCHAEOLOGICAL ARTIFACTS

The Standard Specifications are revised as follows:

SECTION 107, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

**107.10 Blank Archaeological Artifacts**

*If archaeological artifacts, including cultural features, or ~~human~~ skeletal remains are discovered, all work within a minimum 100 foot (30 m) radius of the discovery shall cease immediately, the area shall not be further disturbed and the Contractor shall notify the Engineer immediately.*

*In accordance with IC 14-21-1-27, if ~~human~~ skeletal remains are ~~discovered~~ encountered, the Contractor shall notify the local law enforcement agency immediately and the Engineer immediately thereafter. The Department will notify IDNR, ~~Division of Historic Preservation and Archaeology~~ within ~~two~~ 2 days. Work within the area of the discovery shall not resume without written authorization.*

*For discoveries other than ~~human~~ skeletal remains, the Department will coordinate with IDNR, ~~Division of Historic Preservation and Archaeology~~ to mitigate impacts to the discovery. Work within the area of the discovery shall not resume without written authorization.*

*In no event shall an employee of the Contractor or the State of Indiana share in ownership or profit from salvaged archaeological findings.*

*Unless otherwise agreed to in writing, compliance with this requirement will not be paid for directly. The cost thereof shall be included in the cost of the pay items.*

REVISION TO THE STANDARD SPECIFICATIONS  
SECTION 203 - EXCAVATION AND EMBANKMENT  
203.08 BORROW OR DISPOSAL

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The Standard Specifications are revised as follows:

SECTION 203, BEGIN LINE 117, DELETE AND INSERT AS FOLLOWS:

Except when a commercial source is utilized, a qualified archaeologist shall perform a record check and field survey of borrow or disposal limits to determine if any significant archaeological sites are within the limits. Results of the record check and survey shall be furnished in writing prior to the excavation of any material. If any archaeological sites are identified, the archaeologist shall establish the limits of the site along with a reasonable border. The site shall not be disturbed unless the archaeological site is cleared by established procedures and written authorization to enter the site has been issued. ~~Under no circumstances shall an employee of the Contractor or the State of Indiana share in the ownership or profit from the sale of any archaeological artifacts that may be salvaged.~~ No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site.

~~Discovery of a~~ *Archaeological artifacts encountered during operations shall be addressed in accordance with 107.10.*

COMMENTS AND ACTION

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104.07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE PROJECT SITE  
107.10 ~~BLANK~~ ARCHAEOLOGICAL ARTIFACTS  
203.08 BORROW OR DISPOSAL

DISCUSSIONS:

Ms. Allen stated that this revision is needed to get the correct wording in the specifications in order to reflect current laws and procedures. Also agreed to the striking of the last two sentences of the last paragraph shown on page 36 of the agenda.

When asked by Mr. Pankow about changing the names in the revision, Ms. Allen stated that she wants to make sure everyone knows who to contact and would like to leave IDNR in there.

Mr. Andrewski suggested changing 'Department' to 'Engineer'. Mr. Pankow stated that 'Department' sounds good there, and that 'Engineer' could be anybody. Mr. Keefer expressed his concern about that also. Mr. Cales offered that as long as it is addressed in the GIFE, then we should leave it as 'Department'. All agreed to leave IDNR and 'Department' in there.

Mr. Keefer inquired as to why the word 'discovery' was used instead of 'encountered'. There was much discussion about the use and difference of the words 'discover' and encounter'. All agreed on 'skeletal remains', and Mr. Keefer asked about arrow heads. After much discussion on how to revise the RSP, Ms. Allen to amend the language if needed and to remove 'cultural features', and defined an 'archaeological site'. Mr. Miller noted that we can expand on that in the GIFE, and Mr. Keefer said that would be a good way to do that.

Mr. Leuderalbert (FHWA) asked if the term 'Contractor' would be broad enough. Mr. Cales, Mr. Pankow and Mr. Keefer all agreed that although we have no control over utilities that 'Contractor' includes the Contractor and all of his sub-contractors.

There was discussion between Ms. Allen and Mr. Leuderalbert (FHWA) about the law, and Ms. Allen stated that they are required to follow the law. Mr. Miller inserted that we cannot overwrite the law. Ms. Allen said she can play with the language and Mr. Miller said that if we just say 'the law' then it is what it is.

It was then agreed by all to remove the word 'Discovery' from the RSP and replace it with 'Encounter', to remove DHPA from both paragraphs on page 35, and to strike the last paragraph.

Ms. Allen then made the motion to approve these revisions. Mr. Cales said he can get it into the January lettings, and Mr. Miller confirmed that this RSP will take effect in the January letting.

Mr. Leuderalbert (FHWA) gave his approval to the items as discussed.



COMMENTS AND ACTION (CONTINUED)

104.07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE PROJECT SITE  
 107.10 ~~BLANK~~ ARCHAEOLOGICAL ARTIFACTS  
 203.08 BORROW OR DISPOSAL

Motion: Ms. Allen Second: Mr. Cales Ayes: 9 Nays: 0	Action: <input type="checkbox"/> Passed as Submitted <input checked="" type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  104.07 pg 37; 107.10 pg 69; 203.08 pg 141.  Recurring Special Provisions:  NONE  Standard Sheets affected:  NONE  Design Manual Sections affected:  NONE  GIFE Sections cross-references:  NONE	<input checked="" type="checkbox"/> 2012 Standard Specifications Book  <input checked="" type="checkbox"/> Create RSP (No. 107-C-225 ) Effective January, 2011 Letting RSP Sunset Date: ____  <input type="checkbox"/> Revise RSP (No. ____) Effective ____ Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input type="checkbox"/> Create RPD (No. ____) Effective ____ Letting <input type="checkbox"/> Technical Advisory  GIFE Update Req'd.? Y <input checked="" type="checkbox"/> N ____ By ____ Addition or ____ Revision  Frequency Manual Update Req'd? Y ____ N ____ By ____ Addition or ____ Revision  Received FHWA Approval? <input checked="" type="checkbox"/>

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Maintenance of traffic plans often do not include any details about portable changeable message sign (PCMS) location and purpose leaving uncertainty for bidders about the amount of effort that will be involved in changing messages and locations. Too often for contracted and in-house work PCMS do not display appropriate messages or are improperly located.

PROPOSED SOLUTION: Develop an INDOT wide guideline for PCMS use. With it certain revisions to the Design Manual and Standard Specifications are necessary.

APPLICABLE STANDARD SPECIFICATIONS: 801.02, 801.15, 801.17, and 801.18

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: Section 83-2.06

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

B

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 8/4/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Developed by a Task Group that included Paul Berebitsky, Myron Short, Steve Apple (Industry), Ron Heustis, Steve Wuertz, Todd Shields, Pat McCarty, Abby Lalko (INDOT).

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

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SECTION 801 – TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE  
OPERATIONS

801.02 MATERIALS  
801.15(b) CHANGEABLE MESSAGE SIGNS  
801.17 METHOD OF MEASUREMENT  
801.18 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 66, INSERT AS FOLLOWS:

*Only Portable Changeable Message Signs from the Department's list of approved Solar Powered Traffic Control Devices shall be used.*

SECTION 801, BEGIN LINE 714, DELETE AND INSERT AS FOLLOWS:

**(b) Changeable Message Signs**

This shall consist of furnishing, installing, and maintaining a trailer-mounted, portable sign upon which varying electronically generated messages will be displayed to traffic. The message being relayed to traffic shall be legible and easily understood for a minimum distance of 650 ft (200 m).

~~A malfunctioning sign shall be repaired or replaced within 24 h.~~

*The Contractor shall display the messages shown in the plans or as approved or directed by the Engineer. Messages shall be formatted per the "INDOT Guidelines for Portable Changeable Message Signs". Only upper case letters shall be used. Each message phase shall be displayed for at least 2 seconds. Display time for an entire message shall not exceed 8 seconds.*

*Placement of the PCMS's shall be as shown on the plans or as directed by the Engineer. A 7 ft (2.1 m) minimum clearance from pavement to the bottom of the PCMS shall be provided. Units shall be level and trailers shall be leveled. PCMS's shall be turned from the view of traffic, placed in "stand-by" mode, or left blank until there is a valid message to be displayed. When in use PCMS's shall be turned approximately 3° from perpendicular towards oncoming traffic to minimize glare.*

*When specified, the PCMS shall be equipped with an Aries Field Processor and shall include IP cellular phone service to allow the Department to connect to and control the PCMS remotely.*

SECTION 801, BEGIN LINE 845, DELETE AS FOLLOWS:

**801.17 Method of Measurement**

Construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, ~~temporary~~ portable changeable message signs, and temporary raised pavement markers will be measured by the number of units installed, maintained, and removed.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS

(CONTINUED)

801.02 MATERIALS  
801.15(b) CHANGEABLE MESSAGE SIGNS  
801.17 METHOD OF MEASUREMENT  
801.18 BASIS OF PAYMENT

SECTION 801, BEGIN LINE 915, DELETE AND INSERT AS FOLLOWS:

**801.18 Basis of Payment**

The accepted quantities of construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, permanent road closure sign assemblies and temporary raised pavement markers will be paid for at the contract unit price per each. Payment for temporary worksite speed limit assemblies, ~~and temporary portable~~ changeable message signs, *PCMS, and Aries Field Processors* will be made for the maximum number of such assemblies in place at any one time during the life of the contract. *No additional payment will be made for changes in PCMS message or location that are shown in the plans or suggested by the Contractor. Additional materials necessary to place the PCMS in a secure and level manner for site conditions such as wet ground or slopes shall be included in the cost of the pay item.* Type III-A, type III-B, and permanent type III barricades will be paid for at the contract unit price per linear foot (meter).

SECTION 801, BEGIN LINE 1004, DELETE AND INSERT AS FOLLOWS:

Payment will be made under:

Pay Item	Pay Unit Symbol
<i>Aries Field Processor for PCMS</i> .....	<i>EACH</i>
Barricade, _____ type	LFT (m)
Barricade, III, Permanent .....	LFT (m)
Barrier, Direction Indicator .....	EACH
Construction Sign, _____ type	EACH
Detour Route Marker Assembly .....	EACH
Detour Route Marker Assembly, Multiple Routes .....	EACH
Drum, Permanent .....	EACH
Energy Absorbing Terminal, CZ, TL - _____ test level	EACH
Flashing Arrow Sign .....	DAY
Maintaining Traffic .....	LS
Patroller .....	DAY
Road Closure Sign Assembly.....	EACH
Road Closure Sign Assembly, Permanent .....	EACH
Temporary Buzz Strips .....	LFT (m)
Temporary Traffic Barrier, _____ type	LFT (m)

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS

(CONTINUED)

801.02 MATERIALS

801.15(b) CHANGEABLE MESSAGE SIGNS

801.17 METHOD OF MEASUREMENT

801.18 BASIS OF PAYMENT

Temporary Traffic Barrier, Anchored, _____	LFT (m)
type	
Temporary Crossover, _____	EACH
type	
Temporary Crossover, _____, Refurbish _____	EACH
type	
Temporary Crossover Drainage Pipe _____	LFT (m)
<del>Temporary</del> Portable Changeable Message Sign _____	EACH
Temporary Illumination _____	LS
Temporary Panel Signs _____	SFT (m2)
Temporary Panel Sign Supports _____	LFT (m)
Temporary Pavement Marking, _____ in. (mm) _____	LFT (m)
width	
Temporary Pavement Marking, Removable, _____ in. (mm) ...	LFT (m)
width	
Temporary Pavement Message Marking, _____	EACH
description	
Temporary Pavement Message Marking, Removable, _____	EACH
description	
Temporary Raised Pavement Marker, _____	EACH
grade	
Temporary Traffic Signal _____	LS
Temporary Traffic Signal with Detectors _____	LS
Temporary Transverse Pavement Marking, _____ in. (mm) .....	LFT (m)
width	
Temporary Transverse Pavement Marking,	
Removable, _____ in. (mm) _____	LFT (m)
width	
Temporary Worksite Speed Limit Sign Assembly _____	EACH
Tubular Marker, Permanent _____	EACH

SECTION 801, BEGIN LINE 1118, DELETE AND INSERT AS FOLLOWS:

Each construction sign, barricade, temporary worksite speed limit sign assembly, ~~temporary changeable message sign~~, or flashing arrow sign will be paid for only once regardless of how many times each is moved, replaced, or how many times each is altered to change the sign message. Payment will not be made for signs or barricades used for the convenience of the Contractor.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

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SECTION 801 - TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS

(CONTINUED)

801.02 MATERIALS

801.15(b) CHANGEABLE MESSAGE SIGNS

801.17 METHOD OF MEASUREMENT

801.18 BASIS OF PAYMENT

*All costs required to furnish, install, program, and maintain PCMS shall be included in the cost of the pay item. The cost of IP cellular phone service shall be included in the cost of the pay item.*

APPROVED MINUTES

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL  
IDM 83-2.0 HIGHWAY SIGNS  
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS

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### **83-2.06 Portable Changeable Message Signs**

~~A portable~~ *Portable* changeable message sign signs (PCMS) ~~is~~ *are* very effective in communicating the construction zone information to the general public. ~~NDOT's practice is to use PCMS on each applicable freeway construction project. The use of a PCMS on another type of facility should be determined on a project by project basis based on road alignment, traffic routing, or other situation requiring advance warning and information. Their use in construction projects shall be as outlined in "INDOT Guidelines for Portable Changeable Message Signs". For each facility, the applications where the PCMS device may be effectively used in construction zones are as follows:~~

- ~~1. where speed is expected to drop substantially;~~
- ~~2. where significant traffic queuing and delays are expected;~~
- ~~3. where a change in road alignment or surface conditions are present;~~
- ~~4. to provide advance notice of a ramp, lane, or road closure;~~
- ~~5. to notify or direct motorists to alternate routing; or~~
- ~~6. to show a work site speed limit as supplemental to other regulatory signs.~~

*It is INDOT's practice to consider the need for PCMS on all construction projects involving:*

- 1. intermittent or short term, road, lane or ramp closures*
- 2. frequent changes in traffic patterns*
- 3. roads with traffic volumes that will be at or over capacity during construction*
- 4. other projects as deemed necessary by*
  - a. the District Office*
  - b. the Construction Management Division or*
  - c. the Traffic Management Business Unit.*

*PCMS should not be used to convey messages that can be made effectively with static signing.*

*When PCMS are specified the following information will be provided on the plans or in the contract documents:*

- 1. The approximate location of each PCMS. Unless there are specific reasons otherwise PCMS's should be located per tables I and II of the Guidelines.*
- 2. The message content for each PCMS. Messages should be per the Guidelines either selected from the standard messages given in table VII or developed as non-standard.*

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL  
IDM 83-2.0 HIGHWAY SIGNS  
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

3. *A programming sheet for each non-standard message given. Programming sheets should be included in the contract documents. Consult the MUTCD for guidance on phase and cycle lengths.*

*The Schedule of Pay Items should include the pay item "Portable Changeable Message Sign" and the appropriate quantity.*

The *MUTCD* provides the design and application criteria relative to a PCMS. The designer should also consider the following ~~in~~ *when* specifying a PCMS.

- 1 Display. The display should provide no more than the maximum amount of information that can be read and comprehended by the motorist at a quick glance (i.e., no rolling messages). ~~A PCMS~~*The typical changeable message sign* is capable of displaying three lines of eight characters each. There should be ~~not no more than three~~ *two* messages phased in order to provide readability and comprehension. Each message *phase* should be able to stand alone. For ~~a~~ multiple messages, use two signs.
- 2 Location. The sign should be visible from 2500 ft under ideal day and night conditions, ~~and~~ *The first message should be legible at a minimum distance of 650 ft from each all lanes. A PCMS should typically be placed in advance of any other advance-warning signs. For further instruction on PCMS plan location see the Placement section of the Guidelines. If two signs are needed to communicate a multiple message, they should be placed on the same side of the roadway and separated by at least 1000 ft. A PCMS is placed on the shoulder, but if practical may be farther from the traveled way. Overhead placement may also be considered.*
- 3 Traffic-Control Devices. A PCMS may be used as a supplement, but it should not be used as a substitute to the proper use of conventional traffic- control devices.
- 4 Flashing-Arrow Signs. A PCMS should not be used as an alternative to a flashing-arrow signs. However, a PCMS may be used to simulate an arrow display in ~~a the~~ message.

*As part of the Traffic Management Plan for projects in Advanced Traffic Management System (ATMS) areas, the designer should consult with district construction and the appropriate Traffic Management Center to determine whether TMC control of the PCMS is desired.. The ATMS areas are:*



REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL  
IDM 83-2.0 HIGHWAY SIGNS  
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

Indianapolis (Indy TMC)

I-65, from SR 44 (mile 90) to US 52 (mile 141)  
I-69, from I-465 (mile 0) to SR 9/109 (mile 26)  
I-70, from SR 39 (mile 59) to SR 9 (mile 104)  
I-74, from SR 267 (mile 66) to I-465 (mile 73)  
I-74, from I-465 (E. Jct- mile 94) to Pleasant View Rd (mile 101)  
I-465, (mile 0 to mile 53)  
I-865, from I-65 (mile 0) to I-465 (mile 5)

Northwest Indiana (Gary TMC)

I-65 from US 231 (mile 247) to I-90 (mile 262)  
I-80/94 from the Illinois State Line (mile 0) to I-90 (mile 16)  
I-94 from I-90 (mile 16) to SR 49 (mile 26)

*If the PCMS will be TMC controlled the designer will place the ATIS Compatibility Clause and Aries Field Processor Special Provisions in the Contract. These provisions may be obtained through the ITS Technology Deployment Division of the Traffic Management Business Unit.*

**PROGRAMMING SHEET FOR  
PORTABLE CHANGEABLE MESSAGE SIGNS**

**LOCATION OF PCMS:** \_\_\_\_\_

**MESSAGE DISPLAYED DURING (MOT phase, event, etc.):** \_\_\_\_\_

\_\_\_\_\_

**CREATED BY** \_\_\_\_\_

\_\_\_\_\_

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL  
IDM 83-2.0 HIGHWAY SIGNS  
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

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**MESSAGE PHASE 1**


**MESSAGE PHASE 2**


**TIMING:**

MESSAGE PHASE 1 WILL BE RUN \_\_\_\_\_.\_\_\_\_ SECONDS.

MESSAGE PHASE 2 WILL BE RUN \_\_\_\_\_.\_\_\_\_ SECONDS.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS

## **INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS**

### **POLICY STATEMENT**

This policy provides specific requirements and guidelines for the use of portable changeable message signs (PCMS) on the Indiana highway system. PCMS's provide an excellent means to communicate with motorists since they are easily noticed and command attention. It is for these reasons that PCMS's must be used appropriately. Therefore it is INDOT's policy that these principles be followed when considering a PCMS message:

#### **PRINCIPLE #1- RELEVANCE**

PCMS's shall convey only accurate, pertinent and up to date roadway or emergency information. The display of a message like "CAUTION/CAUTION/CAUTION" is not relaying specific information and as such is not an acceptable use of a PCMS. (*Recommendation 2009 MUTCD 2M.02*)

#### **PRINCIPLE #2- CLARITY**

PCMS messages shall be conveyed in a standard, non-confusing manner. Drivers must be able to both read and react to the information given in a timely fashion. (*Recommendation 2009 MUTCD 2M.02*) Messages shall be one or two phases (display screens) in length; three phase messages are not acceptable.

#### **PRINCIPLE #3- SINGULARITY**

PCMS's should not display messages for an extended period of time that can be effectively conveyed with static signing (panel or sheet signs). The display of standard highway sign messages on a PCMS over an extended time diminishes the ability of PCMS to command attention. (*Variation on the recommendation 2009 MUTCD 6F.57*)

#### **PRINCIPLE #4- IMPARTIALITY**

PCMS's *shall not* display messages that in any way advertise commercial events or entities (*Requirement 2009 MUTCD 2M.01*). Messages shall be for the benefit the general motoring public.

### **AUTHORITY AND RESPONSIBILITIES**

#### **CONTRACTED ACTIVITIES**

For contracted activities the Contractor or designated-sub will:

- Supply the PCMS

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

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BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

- Maintain the PCMS
- Relocate the PCMS
- Enter messages (except when the TMC controls)
- Verify message correctness (except when the TMC controls)
- Change messages (except when the TMC controls)

The contractor is not responsible for selecting messages, but rather the designer or District Construction, Traffic or Maintenance and Operations office will determine the appropriate message(s) for each phase of construction or change of conditions. The designer will:

- Determine all messages associated with the bid MOT plan
- Include all planned messages in the bid plans
- Develop programming sheets for all non-standard, planned messages
- Include the programming sheets in the contract proposal

If the maintenance of traffic plan is changed after letting the engineer will determine the applicability of the original messages. The engineer may also direct the contractor to display applicable standard messages when the plans do not address a need (see Table VII, page 19). These messages will not supersede applicable higher priority messages detailed in the plans.

For contracted activities in Advanced Traffic Management System areas the District Construction office and the Traffic Management Center (TMC) may agree to control the PCMS through the TMC. This decision will be made during the design process as part of the Traffic Management Plan. In these cases the TMC will generate and change the messages and ensure that the correct message is displayed.

#### **NON-CONTRACTED ACTIVITIES**

For non-contracted activities the District Highway Maintenance and Operations or Traffic office will determine the message(s) to be displayed. The PCMS deployer will enter/change messages and ensure that the correct message is displayed.

The TMC may also provide messages for contracted work outside of the ATMS areas or non-contracted activities. However, in these cases it is the Engineer's or PCMS deployer's responsibility to ensure that the message is correct and the highest priority message is displayed.

#### **PLACEMENT**

Typical placement of PCMS's are given in tables I and II for various work zone conditions. Engineering judgment should be applied to specific temporary traffic control plan to best locate the PCMS's.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS  
( CONTINUED )

**TABLE I: PCMS PLACEMENT FOR FREEWAYS**

Event	Duration	Min. # required per approach	Location of 1 <sup>st</sup> PCMS	Location of 2 <sup>nd</sup> PCMS
Road Closure	any length	2	<b>1 mile</b> in advance of the detour exit (if detour is provided) or the closure	1000' in advance of the detour exit (if detour is provided) or the closure
Ramp Closure	less than 1 week (or less than 1 month for unplanned closure)	2	<b>1 mile</b> in advance of detour exit (if detour is provided) or the closed ramp	1000' in advance of the detour exit (if detour is provided) or the closed ramp
Lane Closure w/ Anticipated Queuing	any length	2	<b>1 mile</b> in advance of the previous exit upstream of the anticipated queue length	1000' in advance of anticipated queue length
Lane Closure	mobile or stationary at any one location less than 2 weeks	2	2500' in advance of previous exit upstream of the closure	1000' in advance of the first construction sign
Frequent or Intermittent changes in Alignment	any length	1	1000' in advance of the first construction sign	n/a
Frequent or Intermittent Changes in Pavement Condition	any length	1	1000' in advance of the first construction sign	n/a
Speed Limits reduced by 20 mph or more for Work Zone	any length	1	1000' in advance of the first construction sign	n/a
Location with a Significant Crash History	any length	1	1000' in advance of the first construction sign	n/a

**TABLE II: PCMS PLACEMENT FOR NON-FREEWAY STATE HIGHWAYS**

Event	Duration	Min. # required per approach	Location of 1 <sup>st</sup> PCMS
Road Closure	less than 2 weeks	1	500' in advance of the first construction sign
Side Road Closure	less than 1 week (or less than 1 month for unplanned closure)	1	500' in advance of the closed side road
Lane Closure w/Peak Hour Delay > 5 minutes	any length	1	1500' in advance of the first construction sign
Lane Closure	mobile or stationary at any one location less than 2 weeks	1	500' in advance of the closed side road
Frequent or Intermittent Changes in Alignment	any length	1	500' in advance of the first construction sign
Frequent or Intermittent changes in Pavement Condition	any length	1	500' in advance of the first construction sign
Speed Limits reduced by 20 mph or more for Work Zone	any length	1	500' in advance of the first construction sign
Location with a Significant Crash History	any length	1	500' in advance of the first construction sign

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

Further guidance on the spacing and placement of PCMS's:

- Where possible, PCMS's should be placed behind barrier wall, guardrail or outside the construction clear zone provided that the area can be accessed and the PCMS can be leveled without undue effort. Where it is not practical to positively protect or place outside the construction clear zone the minimum lateral offset should be 6 feet or 12 feet where shoulders are 6 feet or less in width.
- Where possible, PCMS's should be on the right side of the road with the following exceptions:
  - On divided highways the preferred placement for PCMS's is in the median behind protection as might be found at a bridge pier or overpass.
  - In the case of a left lane closure on freeway where the median is at least 30' in width PCMS's should be placed off the left shoulder.
- On curve alignments the angle of placement should be determined by the direction of approaching traffic rather than the roadway edge at the PCMS location.
- Placement in sag curves and just beyond crests should be avoided.
- For work zones in place for at least 1 week the locations of PCMS's used to display queuing/delay information should be adjusted from the planned location according to field observations of actual maximum queue.
- If more than two phases are required for a message then the PCMS's shall be used in series—that is two consecutive PCMS's displaying the first and last part of the message. For freeways PCMS's used in series shall be placed on the same side of the roadway and spaced at approximately 1000'- for non-divided roads the spacing should be approximately 500'.
- PCMS's oriented for the same direction of travel should not be placed opposite one another on both the left and right sides of the road.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS  
(CONTINUED)

**MESSAGE TYPE AND PRIORITY**

Portable PCMS's may be used to display messages as indicated in Table III. Priority level 1 messages take precedence over level 2, level 2 over level 3, and so on. In the event that more than one message of the same priority level is needed judgment must be used as to which is most beneficial. The District Traffic office, the Work Zone Safety Section or the Traffic Management Centers may be consulted to make this determination.

**TABLE III: MESSAGE PRIORITY**

<b><u>PRIORITY LEVEL</u></b>	<b><u>MESSAGE TYPE</u></b>
1 (highest)	Road Closure
2	Ramp Closure/Access Restriction
3	Hazardous Conditions
4	Real-time traffic information
5	Advance notice for scheduled events.
6 (lowest)	Public information pertinent to highway safety

**MESSAGE TYPES:**

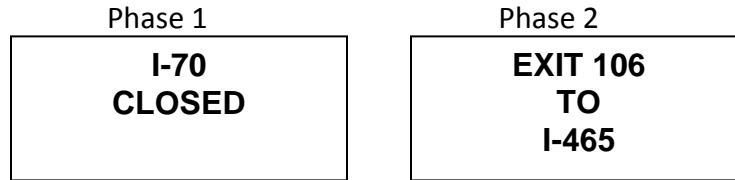
1. **Road Closure**— These are events where complete traffic diversion is required and the closures or effect of the closures will be of sufficient duration for the PCMS to be deployed and programmed.

Examples:

- The Department of Homeland Security conducting nuclear or hazardous material evacuation
- The military requiring road closure for major troop/equipment transport
- Closure of the facility due to a crash, damaged structure, pavement failure or toxic spill
- Roadway closures resulting from hazardous conditions such as landslides, flooding, blizzards, whiteouts, or other severe weather that greatly affects visibility or driver ability
- Road closure due to setting of overhead structures or signals.

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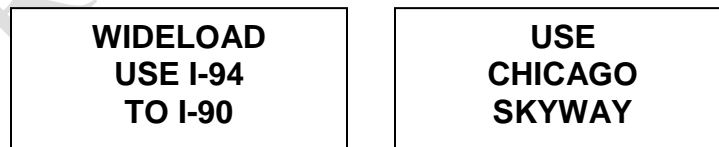


In an emergency where another agency is in command of the situation that agency may direct specific use of PCMS's. In all likelihood, the command agency will rely on INDOT for locating and programming signs and developing the exact messages.

2. **Ramp Closure/Access Restriction**– If planned detours are to be in place for more than a week, conventional detour signing should be used. If the detour was not planned, the PCMS can be used as an alternate to conventional signing; however, if the detour is expected to remain in place for more than a month, conventional signs should be installed as soon as possible. These messages can be especially useful for a partial audience for which no other signing is in place. Care must be taken to keep these messages updated with correct information.

Examples:

- Detour for specific audience such as over-width vehicles that cannot traverse a construction zone with barriers
- Overnight ramp closure for which no detour is given because it is assumed that motorists know alternate routes
- Closing of an intersecting roadway adjacent to mainline



3. **Hazardous Conditions** – These messages warn of hazardous conditions that do not result in road closure and that cannot be effectively signed for statically by panel or sheet signs. The majority of information relevant to the motorists would fall into this category, therefore it is extremely important for all parties to cooperate and ensure that motorists are receiving the most important information at any particular time.

Examples:



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- Crash and/or emergency vehicles in a lane or on the shoulder within or adjacent to the work zone
- Unplanned or short term lane/shoulder closures or blockages
- Extreme weather that impairs driving ability and/or visibility such as ice, snow, fog, flooding
- Unusual roadway conditions for the roadway type such as lane shifts, rough pavement or narrow lanes on a freeway due to construction or maintenance
- Workers or construction equipment in close proximity to an open travel way
- Speed reduction (e.g. caused by congestion)

**CRASH  
I-65 N  
AT SR 47**

**PASS ON  
RIGHT  
SHOULDER**

**RIGHT  
LANE  
CLOSED**

**1/2 MILE**

**RIGHT  
LANE  
CLOSED**

**VEHICLE  
ON  
SHOULDER**

**LEFT  
LANE  
CLOSED**

**WORKERS  
NEXT  
2 MILES**

**LEFT  
LANE  
CLOSED**

**TRUCKS  
ENTERING**

4. **Real-Time Traffic Information**— Information about real-time traffic conditions will help motorists to avoid congestion and delays. In order for motorists to react to this

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type of information they must trust that it is accurate or they will not change their route of travel. Unless facilities for real-time data collection are provided in the contract or delays are visually confirmed by the Engineer or District Traffic office, the Traffic Management Center will provide this type of information and may recommend the corresponding messages. Identification of alternate routes must be coordinated with District Traffic/Maintenance and Operations. Local routes will not be used as alternates without the prior approval by the agency of jurisdiction.

Examples:

- Real-time travel delay; allowing motorists to consider an alternate route
- Suggested alternate route(s)
- Combination of the above
- Suggested routes to a large traffic generator
- Amber Alerts (these alerts are provided only through the TMC).

**SLOW  
TRAFFIC**

**NEXT  
3 MILES**

**20 MIN  
DELAY  
ON I-69**

**ALT  
I-469**

**GAME  
TRAFFIC**

**LEFT  
LANES**

**ABDUCTED  
CHILD**

**BLUE  
FORD  
49A 1234**

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5. **Advance Notice of Special Events** – If a planned event such as a road/ramp/lane closing is expected to occur, motorists should be warned ahead of time to avoid that area during the event.

Examples:

- Large, traffic-generating sports event
- Scheduled lane closure with a heavy traffic impact

**HEAVY  
TRAFFIC  
SUN 1-4**

**PLAN  
AHEAD**

**LANE  
CLOSURES  
7PM-6AM**

**BEGINS  
APRIL 20**

6. **Public Information Pertinent to Highway Safety** – This type of message requires an action by drivers and shall only be displayed with the District Traffic/Maintenance & Operations Engineer's or their designee's approval. The intended use for this message type is to improve safety and mobility, and to reduce congestion.

Example:

- License, DUI, seat-belt or weight check by law enforcement.

**LICENSE  
CHECK  
AHEAD**

**MESSAGE SELECTION & NON STANDARD MESSAGE DEVELOPMENT**

To promote consistency in INDOT work zones, pre-approved, standard messages are provided on pages 19 - 22.

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The Designer or District Traffic/Maintenance and Operation Office will create non-standard messages. The Traffic Management Centers and the Work Zone Safety Section may be consulted for advice on non-standard messages. For contracted work a "Programming Sheet for Changeable Message Sign Use" will be included in the special provisions for each non-standard message identified in the maintenance of traffic plans.

### COMPONENTS OF A MESSAGE

When designing a message, enough information needs to be given to the motorists to enable them to react and possibly make a decision. If this is not done, the message may be ignored. The message can be broken down into the 5 W's (what, where, when, who and why). All of these components are not necessarily needed for each and every message. They may often be implied. Generally the message can address any of the following:

1. **What** action should be taken
2. **Where/When** is the event
3. **Who** is affected
4. **Why** the action is needed

If a message or element of a message is not addressing one or more of these points then it should not be used.

**What?** – What action is required by the motorist?

- This is the instruction you want motorists to follow. It could be to reduce speed, divert to a specific route, begin to merge, etc. The motorists will tend to ignore a simple WHAT statement unless they are also given a WHY. Motorists need to have as much information as possible so they can make an informed decision.
- The WHAT component of a message may be implied. The following future event message is an example:

This message gives the motorists a WHY and WHEN, but it implies that they need to plan to be elsewhere at that time. If the driver population is very familiar with an area, a WHY and WHERE may be given as:

**HEAVY  
TRAFFIC  
SUN 1-4**

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**KEYSTONE  
AVE  
CLOSED**

This implies that motorists must find an alternate route for Keystone Avenue.

The WHAT component is the most important piece of information given that will affect drivers' decisions. They must be clear, comprehensible and recognizable. or example:

**WHAT:**

**DETOUR  
EXIT 247**

**WHY:**

**ROAD  
CLOSED**

WHATs include MERGE RIGHT, MERGE LEFT, KEEP RIGHT, KEEP LEFT, PREPARE TO STOP, REDUCE SPEED, DO NOT PASS, STAY IN LANE, SLOW TO xx MPH, STAY IN VEHICLE, TUNE RADIO 530 AM, EXIT 1 MILE, FOLLOW DETOUR, FOLLOW ALT ROUTE, etc..

**Where?** – Where is the decision point at which motorists must take an action. The following guidelines should be observed on WHERE messages:

- When giving a location, only use major points of reference such as exit numbers. Interchange names may be use in combination with an exit number. Overpass or underpass names should not be used.
- When the majority of motorists are interstate travelers who are not familiar with the names of local cross-streets, locations should be described in distances to the nearest ½ mile.
- If the majority of motorists are local, use the local street names. Most urban drivers are more familiar with street names than route numbers, SR numbers, mile markers, or reference markers.
- AHEAD is not a WHERE; it's a filler word. For notices of an incident, lane closure or heavy congestion, an actual distance should be given instead of just the word AHEAD. This will give the driver a point of reference and the opportunity to divert based on the driver's knowledge of the area.

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WHERE includes xx MILES AHEAD, AT MOREHEAD ST., NEAR (LANDMARK), EXITS xx TO xx.

**When?** – When will an event occur for which drivers should change their actions?

For future events, give specific data for its traffic disruption only if it is certain to occur. The PCMS's will lose their credibility if they advertise traffic conditions that never occur. An example is a major, traffic-generating sports event. Do not make the message specific if real time information cannot be kept current. This type of message is usually required to be combined with a WHERE.

An example of a **message not to display** is:

**ROAD  
OPENS  
21 DAYS**

The road may not open as planned. WHEN can be a date, time, holiday, or weekend.

**Who?** – If only a partial audience is required to take an action, who are they?

A partial audience could potentially include:

- Over-width vehicles.
- Motorists with a particular destination; such as in a secondary road or ramp closure detour situation.
- Traffic en-route to a specific event such as:

**GAME  
TRAFFIC**

**USE  
LEFT  
LANES**

WHO includes ALL TRAFFIC, THRU TRAFFIC, CARS, TRUCKS, BUSES, WIDELOAD, EMER VEH/ONLY, highway/road name with a direction, LOCAL/TRAFFIC, etc.. Downstream cities and destinations (e.g. CHICAGO TRAFFIC) identify an audience also.

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**Why?** – Additional information to assist and/or spur motorists' decision making.

This is intended to encourage motorists to make a change to their driving and follow the message instruction. The following are examples:

<b>AVOID 20 MIN DELAY</b>	<b>USE US 20 TO BEACH</b>
<b>REDUCE SPEED</b>	<b>WATER ON ROAD</b>

Without the WHY statements the motorists will most likely ignore the instruction, but with the additional information they will make an informed decision. WHY includes LEFT LANE CLOSED, RIGHT LANE CLOSED, RAMP CLOSED, xx MILE BACKUP, xx MIN DELAY, SLOW TRAFFIC, RIGHT SHOULDER CLOSED, EXPECT DELAYS.

**WORD USAGE**

Avoid filler words such as AHEAD or CAUTION. Both of these words can be implied in most instances. Drivers will realize that if you are giving a warning you are also advising caution. They will also assume that they would only be advised of situations ahead of them. However, there are times where AHEAD is beneficial as it can differentiate between the distance to a lane restriction versus the length of a lane restriction. For example, RIGHT/LANE /CLOSED|5 MILES/AHEAD makes it clear that the right lane is closed 5 miles ahead, not that the right lane is closed for 5 miles. The word, TRAFFIC, when addressing a specific audience, may be deleted when space considerations do not allow.

When using more than one phase, repeat key words. Do not use potentially contradictory terms. For instance both LEFT and RIGHT should not be used in the same sequence, such as RIGHT/LANE/CLOSED|MERGE LEFT. Inattentive drivers will scramble the message. A better message is RIGHT/LANE/CLOSED|PREPARE/TO/ MERGE or the basic standard message (no 13) RIGHT/LANE/CLOSED.

Use vocabulary familiar to the driver population. Express Lanes, for instance, are not utilized in Indiana except in Chicago and Indianapolis metro areas, so the message THRU/TRAFFIC|USE/ EXPRESS/LANE could be confusing outside of those locales.

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(CONTINUED)

The use of abbreviations should be kept at a minimum. When space will not allow all key words to be spelled out the standard abbreviations found on pages 16-18 should be used.

### **ADDITIONAL REQUIREMENTS FOR PCMS MESSAGES**

The standards and guidelines found in the Manual on Uniform Traffic Control Devices (MUTCD) regarding portable changeable message signs shall be observed. Only upper case letters shall be used. Alternating a line and leaving the other lines the same between the first and second phase of a two phase message is not permissible.

### **LIMITS TO MESSAGE SIZE**

At normal highway speeds motorists are limited in the amount of information they can read on one sign. This was recognized in the current MUTCD in which greater limits have been placed on message size. As a result it is INDOT's policy to limit the amount of information displayed on a PCMS per the MUTCD and as follows:

- A maximum of 8 characters per line (including spaces) shall be used
- PCMS's shall display no more than 3 lines per phase
- No more than two phases per message. One phase should be used when possible.
- When two phases are used to create a message each phase should be understandable on its own
- Each phase should be limited to three units of information (or data items used for decision making). As an example standard message #1 (see page 19) consists of 1 phase with two units of information- the first unit is "ROAD WORK" the second is "XX MILES"
- Each message should be limited to 4 units of information

If the message exceeds these limitations then the amount of information in the message should be reduced by deleting the least significant or the lowest priority information. In general the priority based on type of information is:

- 1 Why
- 2 Where
- 3 When (if applicable)
- 4 What (may be implied in many instances)
- 5 Who (if applicable)

### **MULTIPLE MESSAGES**

It may be necessary to relay multiple pieces of information to motorists. This can be accomplished by careful message design. For instance, if a segment of I-70 is closed due to an overhead bridge collapse; a priority 1 message will result. If, at the same time, the truck that hit



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the bridge is on fire and billowing smoke on to the alternate route, I-465, a priority 3 message may be necessary. In the following example, three phases are used to inform motorists that there is an emergency requiring action on their part and to warn of a potentially hazardous condition that could be encountered after taking the action.



Three phases should only be used if there is no reasonable way to convey critical information on two. When three phases are needed multiple PCMS's should be used in series to convey the message in order to satisfy the MUTCD and INDOT policy regarding the maximum number of phases per message.

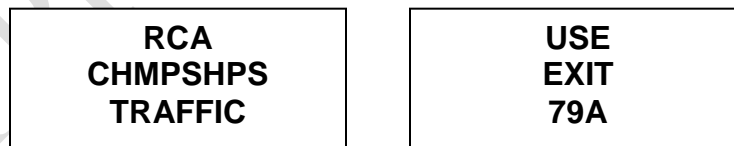
**APPROVAL OF NON-PRIORITY MESSAGES**

PCMS's shall only display messages that pertain to highway safety or congestion. Special use of PCMS may be requested by the Commissioner, Deputy Commissioner, Traffic Management, or the District Deputy Commissioner, but messages must still conform to policy and special messages must be approved by the District Traffic/Maintenance & Operations Engineer.

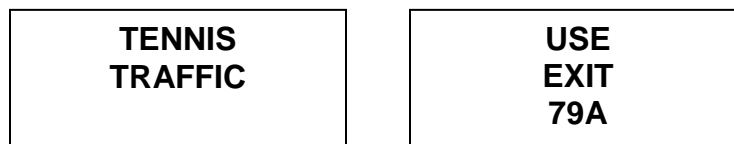
**MESSAGE TYPES TO AVOID**

Message types that are not permitted:

1. PCMS's shall not display messages that in any way advertise commercial events or entities. An example of a **message not to display** is:



An acceptable message is:



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Although the same information is relayed, no names are used. This awareness will prevent businesses from being able to accuse INDOT of advertising their competitors.

The placement of advertisements in advance notification messages should also be avoided. The following is a message warning motorists of expected heavy traffic due to a planned athletic event. INDOT cannot be accused of advertising the event or any of its teams because this message does not include names.

<b>HEAVY TRAFFIC SUN 1-4</b>	<b>USE ALT ROUTE US 40</b>
--------------------------------------	------------------------------------

2. PCMS's should not be used to convey a message for an extended period of time, approximately two weeks or more, that could be conveyed with a conventional warning or guide sign. An example of this is ROAD/WORK/AHEAD being displayed for more than two weeks while the standard construction sign could have been used.
3. PCMS's should not display generic messages that convey non specific information about the work zone or road conditions (e.g. CAUTION/CAUTION/CAUTION).

**STANDARD ABBREVIATIONS**

These easily understood Standard abbreviations may be used:

**TABLE IV: STANDARD ABBREVIATIONS**

<b><u>Word</u></b>	<b><u>Abbr.</u></b>	<b><u>Word</u></b>	<b><u>Abbr.</u></b>
Afternoon/Evening	PM	Lane	LN
Alternate	ALT	Left	LFT
Avenue	AVE/AV	Maintenance	MAINT
Bicycle	BIKE	Morning	AM
Boulevard	BLVD	Normal	NORM
Cannot	CANT	Northbound	N-BND
CB Radio	CB	Parking	PKING
Center	CNTR	Right	RHT
Circle	CIR	Road	RD

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Crossing	XING	Route	RTE
Do Not	DONT	Service	SERV
Eastbound	E-BND	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Entrance, Enter	ENT	Southbound	S-BND
Expressway	EXPWY	Speed	SPD
Feet	FT	Street	ST
Freeway	FRWY, FWY	Temporary	TEMP
Hazardous	HAZ	Traffic	TRAF
Highway	HWY	Travelers	TRVLRS
Hour(s)	HR	Vehicle	VEH
Information	INFO	Warning	WARN
It Is	ITS	Westbound	W-BND
Junction	JCT	Will Not	WONT

Other abbreviations may be used with approval of the District Traffic/Maintenance & Operations Engineer.

Other abbreviations are easily understood whenever they appear in conjunction with a particular word commonly associated with it. These words and abbreviations are as follows:

**TABLE V: ABBREVIATIONS ACCEPTABLE WITH PROMPT WORD**

<u>Word</u>	<u>Abbr.</u>	<u>Prompt</u>
Ahead	AHD	Fog*
Blocked	BLKD	Lane
Bridge	BRDG	[Name]
Chemical	CHEM	Spill
Condition	COND	Traffic*
Congested	CONG	Traffic*
Construction	CONST	Ahead
Downtown	DWNTN	Traffic
Exit	EX, EXT	Next
Frontage	FRNTG	Road
Interstate	I	[Number]
Major	MAJ	Crash
Mile(s)	MI	[Number]*
Minor	MNR	Crash
Oversized	OVRSZ	Load
Minute(s)	MIN	[Number]*

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Prepare	PREP	To Stop
Pavement	PVMT	Wet*
Quality	QLTY	Air*
Roadwork	RDWK	Ahead [Distance]
Route	RTE	Best*
Vehicle	VEH	Stalled*
Cardinal Directions	N, E, S, W	[Number]*

\* These prompt words should precede the abbreviation.

**TABLE VI: UNACCEPTABLE ABBREVIATIONS**

<u>Abbreviation</u>	<u>Intended Word</u>	<u>Common Misinterpretations</u>
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

**STANDARD MESSAGES**

The following table lists messages that are considered standard and as such may be displayed when appropriate without authorization as specified in the "AUTHORITY AND RESPONSIBILITIES" section on page 2:

**TABLE VII: STANDARD MESSAGES**

<u>Number</u>	<u>First Phase</u> <u>Line 1/Line 2/ Line 3</u>	<u>Second Phase</u> <u>Line 1/Line 2/ Line 3</u>
1	ROAD/WORK/xx MILES	n/a
2	WORK/ZONE/xx MILES	n/a
3	NIGHT/WORK/xx MILES	n/a
4	DETOUR/xx MILES	n/a

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(CONTINUED)

5	MEDIAN/WORK/xx MILES	n/a
6	SIGNAL/xx MILES	n/a
7	CRASH/xx MILES	n/a
8	YIELD/xx MILES	n/a
9	STOP/xx MILES	n/a
10	WATER/ON/ROAD	n/a
11	FOG/xx MILES	n/a
12	FLAGGER/xx MILES	n/a
13	RIGHT/LANE/CLOSED	n/a
14	LEFT/LANE/CLOSED	n/a
15	CENTER/LANE/CLOSED	n/a
16	RIGHT 2/LANES/CLOSED	n/a
17	LEFT 2/LANES/CLOSED	n/a
18	MERGE/xx MILES	n/a
19	MERGE/LEFT	n/a
20	MERGE/RIGHT	n/a
21	KEEP/LEFT	n/a
22	RIGHT/LANE/NARROWS	n/a
23	KEEP/RIGHT	n/a
24	PASS/LEFT	n/a
25	PASS/RIGHT	n/a
26	TRUCK/CROSSING	n/a
27	ROAD/CLOSED/xx MILES	n/a
28	ALL/TRAFFIC/EXIT RHT	n/a
29	CRASH/AHEAD/SLOW	n/a
30	USE/LEFT/LANE	n/a
31	USE/RIGHT/LANE	n/a
32	DO/NOT/PASS	n/a
33	ROAD/CLOSED/xx MILES	n/a
34	ROAD/WORK/xx MILES	RIGHT/LANE/CLOSED
35	ROAD/WORK/xx MILES	RIGHT 2/LANES/CLOSED
36	ROAD/WORK/xx MILES	LEFT/LANE/CLOSED
37	ROAD/WORK/xx MILES	LEFT 2/LANES/CLOSED
38	ROAD/WORK/xx MILES	CENTER/LANE/CLOSED
39	WORK/ZONE/xx MILES	RIGHT/LANE/CLOSED
40	WORK/ZONE/xx MILES	RIGHT 2/LANES/CLOSED
41	WORK/ZONE/xx MILES	LEFT/LANE/CLOSED
42	WORK/ZONE/xx MILES	LEFT 2/LANES/CLOSED
43	WORK/ZONE/xx MILES	CENTER/LANE/CLOSED
44	NIGHT/WORK/xx MILES	RIGHT/LANE/CLOSED
45	NIGHT/WORK/xx MILES	RIGHT 2/LANES/CLOSED
46	NIGHT/WORK/xx MILES	LEFT/LANE/CLOSED

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 (CONTINUED)

47	NIGHT/WORK/xx MILES	LEFT 2/LANES/CLOSED
48	NIGHT/WORK/xx MILES	CENTER/LANE/CLOSED
*49	RIGHT/LANE/CLOSED	PREPARE/TO/STOP
*50	LEFT/LANE/CLOSED	PREPARE/TO/STOP
*51	CENTER/LANE/CLOSED	PREPARE/TO/STOP
*52	RIGHT 2/LANES/CLOSED	PREPARE/TO/STOP
*53	LEFT 2/LANES/CLOSED	PREPARE/TO/STOP
54	CRASH/AHEAD	DETOUR/AT/EXIT xxx
55	CRASH/ON/BRIDGE	DETOUR/AT/EXIT xxx
56	CRASH/AT/EXIT xxx	FOLLOW/DETOUR/EXIT xxx
57	CRASH/AT/EXIT xxx	PASS ON/RIGHT/SHOULDER
58	CRASH/AT/EXIT xxx	SLOW/MOVING/TRAFFIC
59	CRASH/AT/EXIT xxx	ALL/LANES/CLOSED
60	CRASH/AT/EXIT xxx	RIGHT/LANE/CLOSED
61	CRASH/AT/EXIT xxx	RIGHT 2/LANES/CLOSED
62	CRASH/AT/EXIT xxx	LEFT/LANE/CLOSED
63	CRASH/AT/EXIT xxx	LEFT 2/LANES/CLOSED
64	CRASH/AT/EXIT xxx	CENTER/LANE/CLOSED
65	CRASH/AT/MILE xxx	FOLLOW/DETOUR/EXIT xxx
66	CRASH/AT/MILE xxx	PASS ON/RIGHT/SHOULDER
67	CRASH/AT/MILE xxx	SLOW/MOVING/TRAFFIC
68	CRASH/AT/MILE xxx	ALL/LANES/CLOSED
69	CRASH/AT/MILE xxx	RIGHT/LANE/CLOSED
70	CRASH/AT/MILE xxx	RIGHT 2/LANES/CLOSED
71	CRASH/AT/MILE xxx	LEFT/LANE/CLOSED
72	CRASH/AT/MILE xxx	LEFT 2/LANES/CLOSED
73	CRASH/AT/MILE xxx	CENTER/LANE/CLOSED
74	ROAD/CLOSED	USE/DETOUR/EXIT xxx
75	ROAD/CLOSED/DATE	USE/EXIT xxx
76	BRIDGE/CLOSED	USE/DETOUR/EXIT xxx
77	BRIDGE/CLOSED/DATE	USE/EXIT xxx
78	EVENT/TRAFFIC	USE/RIGHT 2/LANES
79	GAME/TRAFFIC	USE/RIGHT/LANE
80	CONCERT/TRAFFIC	FOLLOW/SIGNS
**81	EXIT xx/CLOSED	DATE (e.g. DEC 4-7)
**82	EXIT xx/CLOSED	DAY(S) (e.g. MONDAY)
83	ICY/BRIDGE	REDUCE/SPEED
84	SLIPPERY/ROAD	REDUCE/SPEED
85	DENSE/FOG	REDUCE/SPEED
86	HIGH/WINDS	REDUCE/SPEED
87	ROAD/FLOODED	REDUCE/SPEED

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88	BLOWING/SNOW	REDUCE/SPEED
89	ROAD/FLOODED	SLOW/MOVING/TRAFFIC
90	TRUCK/CROSSING	WATCH/FOR/TRUCKS
91	TRAVEL/ LANE/CLOSED-	USE/SHOULDER
92	LOAD/SPILL	FOLLOW/DETOUR/EXIT xx
93	LANE/MARKING	EXPECT/DELAYS
94	LANE/MARKING	SLOW/MOVING/TRAFFIC
95	LANE/MARKING	LEFT/LANE/CLOSED
96	LANE/MARKING	CENTER/LANE/CLOSED
97	LANE/MARKING	RIGHT/LANE/CLOSED
98	LANE/MARKING	<i>Duration (e.g. 10AM-3PM)</i>
***99	TRAFFIC/ADVISORY	TUNE/TO/530 AM (or 1610 AM)
100	FLAGGER/AHEAD	PREPARE/TO/STOP
101	ROAD/WORK	SLOW/MOVING/TRAFFIC
102	DEBRIS/ON/ROAD	RIGHT/LANE/BLOCKED
103	DEBRIS/ON/ROAD	CENTER/LANE/BLOCKED
104	DEBRIS/ON/ROAD	LEFT/LANE/BLOCKED
105	DEBRIS/ON/ROAD	MERGE/RIGHT
106	DEBRIS/ON/ROAD	MERGE/LEFT
107	EMER/VEHICLES/AHEAD	MERGE/RIGHT
108	EMER/VEHICLES/AHEAD	MERGE/LEFT
109	NEW/TRAFFIC/PATTERN	LANES/SHIFT/xxx FT
110	EXIT xx/CLOSED	DETOUR/xxMILES/AHEAD
111	EXIT xx/RAMP/CLOSED	FOLLOW/DETOUR/EXIT xx

Notes:

\* Messages 49 through 53 should be use only during times when queuing is occurring. Queuing can be detected by real time technologies, observed by personnel on site, or by inference as queuing has been previously detected or observed at the same location during the same time of day and day of week.

\*\* Message #81 is preferred when displayed 7 days or more in advance or when the closure will be longer than one week.  
Message #82 is preferable when the closure will occur within 7 days.

\*\*\* The use of message #99 must be coordinated with the Traffic Management Center

COMMENTS AND ACTION

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801.02 MATERIALS  
801.15(b) CHANGEABLE MESSAGE SIGNS  
801.17 METHOD OF MEASUREMENT  
801.18 BASIS OF PAYMENT  
IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS

DISCUSSIONS:

Mr. Boruff explained that this is needed so that TMC can control the signs.

Mr. Leuderalbert (FHWA) stated that this will require a statewide public interest finding and that their office will have to approve it.

Mr. Pankow mentioned that this adds a pay item, and Mr. Boruff said it will also have a compatibility clause. Mr. Miller asked if the Ft Wayne District's changeable message signs are operated by TMC, and Mr. Boruff confirmed that yes they are.

Mr. Cales said he'd like the reference to 'Aries' taken out, and agreed with Mr. Pankow that they would also need to rename the pay item.

Mr. Leuderalbert (FHWA) asked where this item is specified and Mr. Pankow asked how the Contractor will know. Mr. Boruff replied that the Contractor will know by the pay item shown and the guidelines are contained in the standard message lists.

Mr. Cales asked why this was being changed from temporary to portable, to which Mr. Boruff replied that it is to match the MUTCD, since the MUTCD says portable changeable.

Mr. Keefer asked if it could read temporary or temporary portable. Mr. Cales suggested adding the word temporary. Mr. Miller asked the group what we want to do. Mr. Cales asked if we can leave the language the same, and define it in the Basis of Payment. Mr. Cales, Mr. Caplinger and Mr. Boruff discussed if and agreed to call it 'Temporary Portable Changeable Message Signs'.

Mr. Pankow asked what to do with the boards when they are not being used, and when it's out there, should it still be flashing stand by? Mr. Keefer mentioned a previous memo that had come out about putting drums there. Mr. Miller suggested that the sign could say 'Caution Caution Caution'.

Mr. Pankow commented on the reference to turn the sign at 3 degrees from perpendicular, and that it is too much of an angle and that they are not readable. Mr. Boruff suggested that it say that the PCMS's are to be oriented towards traffic per manufacturer's recommendation. Mr. Pankow and Mr. Cales suggested that when not in use, it should be put in standby mode.

Mr. Boruff, Mr. Pankow and Mr. Cales all agreed that the specs should say that the messages displayed shall be as shown on the plans, or as approved or directed by the Engineer (page 39). They agreed to remove the words 'turned approximately 3 degrees from perpendicular'.

Mr. Boruff also suggested changing 2 seconds to 3 seconds. General discussion on duration of message displays. Mr. Miller suggested adding that only 2 messages shall be displayed per phase. Mr. Boruff also suggested removing the reference to minimal clearance on page 39 of the agenda.

Mr. Caplinger asked who will decide when the signs will have processors. Mr. Boruff said that the designers will make that determination. Mr. Boruff agreed with Mr. Caplinger in that the Contractor will not control the signs, that they will be controlled by TMC. Mr. Caplinger asked if the Contractor will know that from reading the specs. Mr. Leuderalbert (FHWA) said that the Contractor will have to coordinate with TMC. Mr. Boruff stated that he'll need to add that to the language. Mr. Miller confirmed that they'll need to add to page 39 that the Contractor shall coordinate with the Department.



COMMENTS AND ACTION

801.02 MATERIALS  
 801.15(b) CHANGEABLE MESSAGE SIGNS  
 801.17 METHOD OF MEASUREMENT  
 801.18 BASIS OF PAYMENT  
 IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS

After much more discussion it was decided that there too many revisions to be made and this item was withdrawn.

Motion: Mr. Boruff Second: Mr. Andrews Ayes: Nays:	Action: <input type="checkbox"/> Passed as Submitted <input type="checkbox"/> Passed as Revised <input checked="" type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  801.02 pg. 653; 801.15(b) pg.668; 801.17 pg. 671; 801.18 pg. 673, 675, 677  Recurring Special Provisions:  NONE  Standard Sheets affected:  NONE  Design Manual Sections affected:  SECTION 83-2.06  GIFE Sections cross-references:  NONE	<input type="checkbox"/> 20__ Standard Specifications Book  <input type="checkbox"/> Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____  <input type="checkbox"/> Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input type="checkbox"/> Create RPD (No. ____) Effective ____Letting <input type="checkbox"/> 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? ____

SPECIFICATION REVISIONS (09/09/10 REVISED PROPOSAL SHEET)  
REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: FHWA Memorandum from David A. Nicol, P.E. dated May 17, 2010 provides guidance to all state DOTs on the height of generic guardrail G4 (1S). Recent research on standard 27 inch guardrail shows that it does not meet NCHRP Report 350 Test Level 3(TL-3) criteria. This requires a revision of current policy with regard to new guardrail installation height. The FHWA guidance requires that transportation agencies should ensure the minimum height of newly-installed generic G4 (1S) W-beam guardrail is at least 27 ¾ inches to the top of the rail.

PROPOSED SOLUTION: Revise applicable INDOT Standard Drawings to show the installation height from 27 inches to 27 ¾ inches to the top of the rail. The proposed change will result into ¾ inch reduced embedment length of the guardrail post which is insignificant and will not impact the strength of the post as the INDOT guardrail posts are 7 feet long compared to 6 feet required for NCHRP 350 TL-3. Also INDOT already has Approved guardrail end treatments that can be used for the 27 ¾ inches height.

APPLICABLE STANDARD SPECIFICATIONS: N/A

APPLICABLE STANDARD DRAWINGS:

LIST OF PROPOSED REVISIONS TO STANDARD DRAWINGS.

601-CWGS-02	601-CWGS-04	601-MTGR-01
601-TBGC-01	601-TMTT-01	601-TTGB-01
601-TTGB-03	601-TTGB-04	601-TTGB-05
601-TTGP-01	601-TTGP-02	601-TTGT-01
601-TTMS-01	601-TTVH-01	601-TTVH-02
601-TWGB-03	601-TWGT-01	601-WBGA-01
601-WBGA-02	601-WBGA-06	706-TBRC-01
706-TBRC-02	706-TBRF-01	706-TTBC-01
706-TTBP-01	706-TTBP-03	706-TTBP-05
706-TTBP-07	706-TTBT-01	706-TTTX-01
706-TWBC-01		

LIST OF PROPOSED NEW STANDARD DRAWINGS:  
706-TTCA-01

SPECIFICATION REVISIONS

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REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS  
(CONTINUED)

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

APPLICABLE RECURRING PLAN DETAILS: 706-B-140d

Submitted By: John Wright

Title: Highway Design and Technical Support Director

Organization: INDOT

Phone Number: 317-232-5147

Date: 07/26/2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Reviewed by Tony Uremovich (Design resources), Changes discussed with and endorsed by Ken Leuderalbert and Rick Drumm (FHWA).

SPECIFICATION REVISIONS

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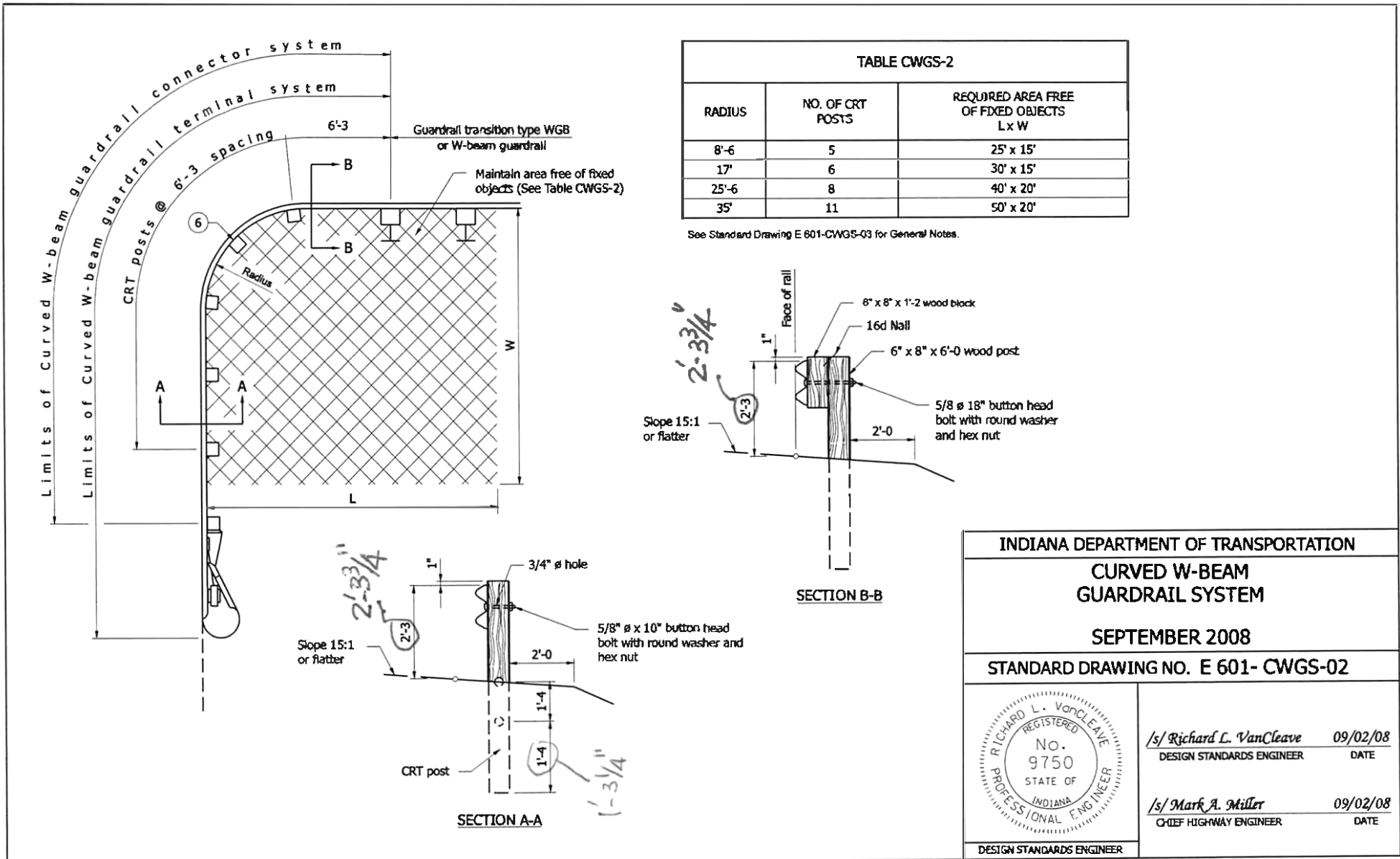
REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS  
(CONTINUED)

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APPROVED MINUTES

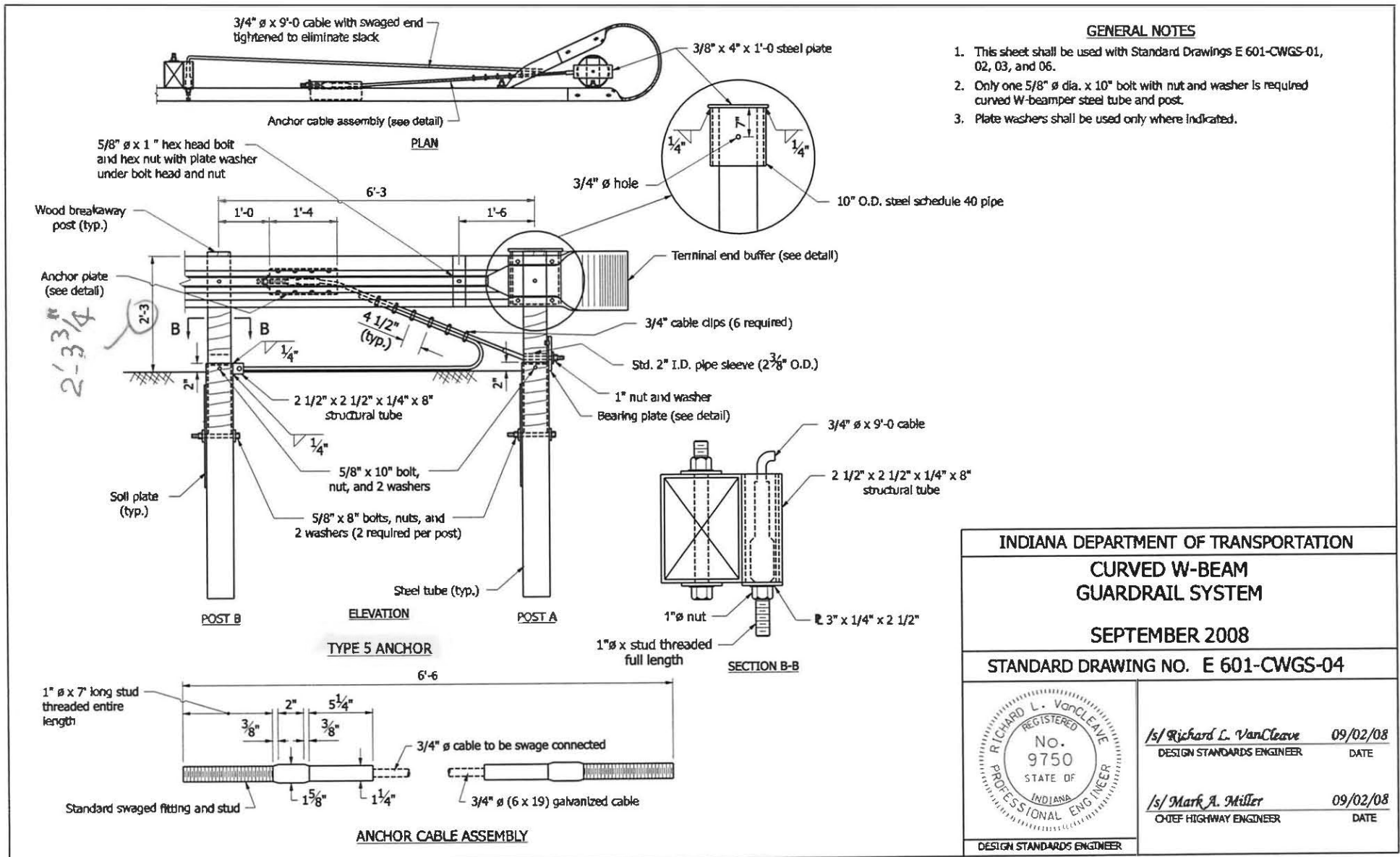
# REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

REVISION TO 601-CWGS-02 CURVED W-BEAM GUARDRAIL SYSTEM



## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-CWGS-04 CURVED W-BEAM GUARDRAIL SYSTEM



Thrie-Beam Backup Plate (At post where Thrie-Beam splices does not occur)

Thrie-Beam

1"

3'-3/4"

36"

W 6 x 9 Post

6"

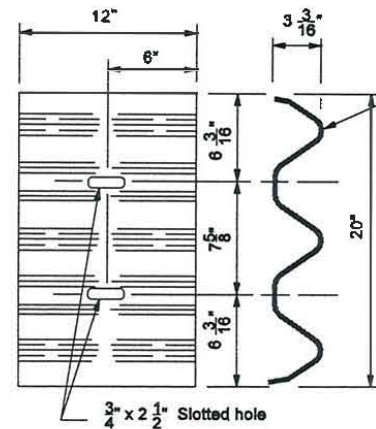
40°

Ground Line

49"

3'-1 1/4"

### THREE BEAM GUARDRAIL



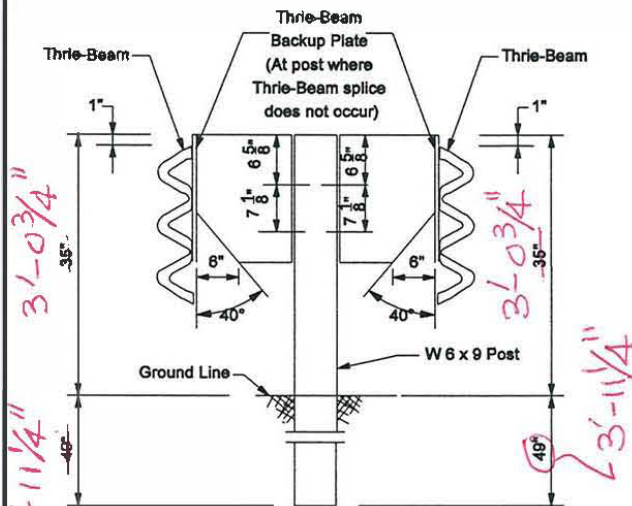
— Cross section dimensions shall conform to those shown on Standard Drawing E 601-TGBC-01.

THREE BEAM GUARDRAIL BACK-UP PLATE

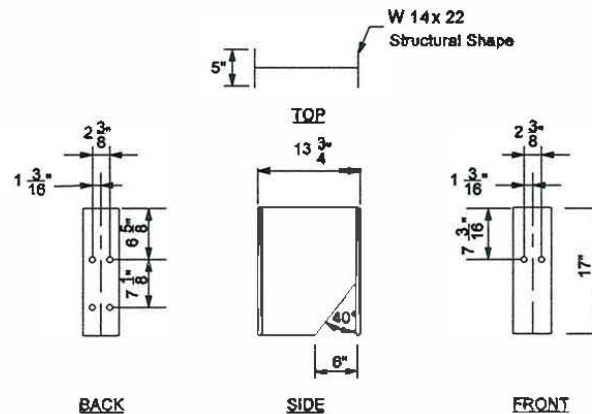
### AT LOCATIONS WITHOUT SPLICE

Notes:

1. For Thrie Beam rail section details, see Standard Drawing E 601-TBGC-01.
2. For W 6x9 post hole pattern details, see Standard Drawings E 601-TTGB-03 and E 601-TTGB-04.
3. Typical post spacing for Thrie Beam Guardrail and Double Faced Thrie Beam Guardrail is 6' - 3".
4. Only the blockout material shown may be used.



DOUBLE FACED THRIE BEAM GUARDRAIL



### THREE BEAM GUARDRAIL BLOCKOUT

(STEEL ONLY)

INDIANA DEPARTMENT OF TRANSPORTATION	
THREE BEAM GUARDRAIL DETAILS	
MARCH 2005	
STANDARD DRAWING NO. E 601-MTGR-01	
	<i>/s/ Richard L. VanCleave</i> 3-0-05 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Richard K. Smutzer</i> 3-0-05 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARD ENGINEER	

REVISION TO 601-TBGC-01 THRIE-BEAM GUARDRAIL COMPONENTS



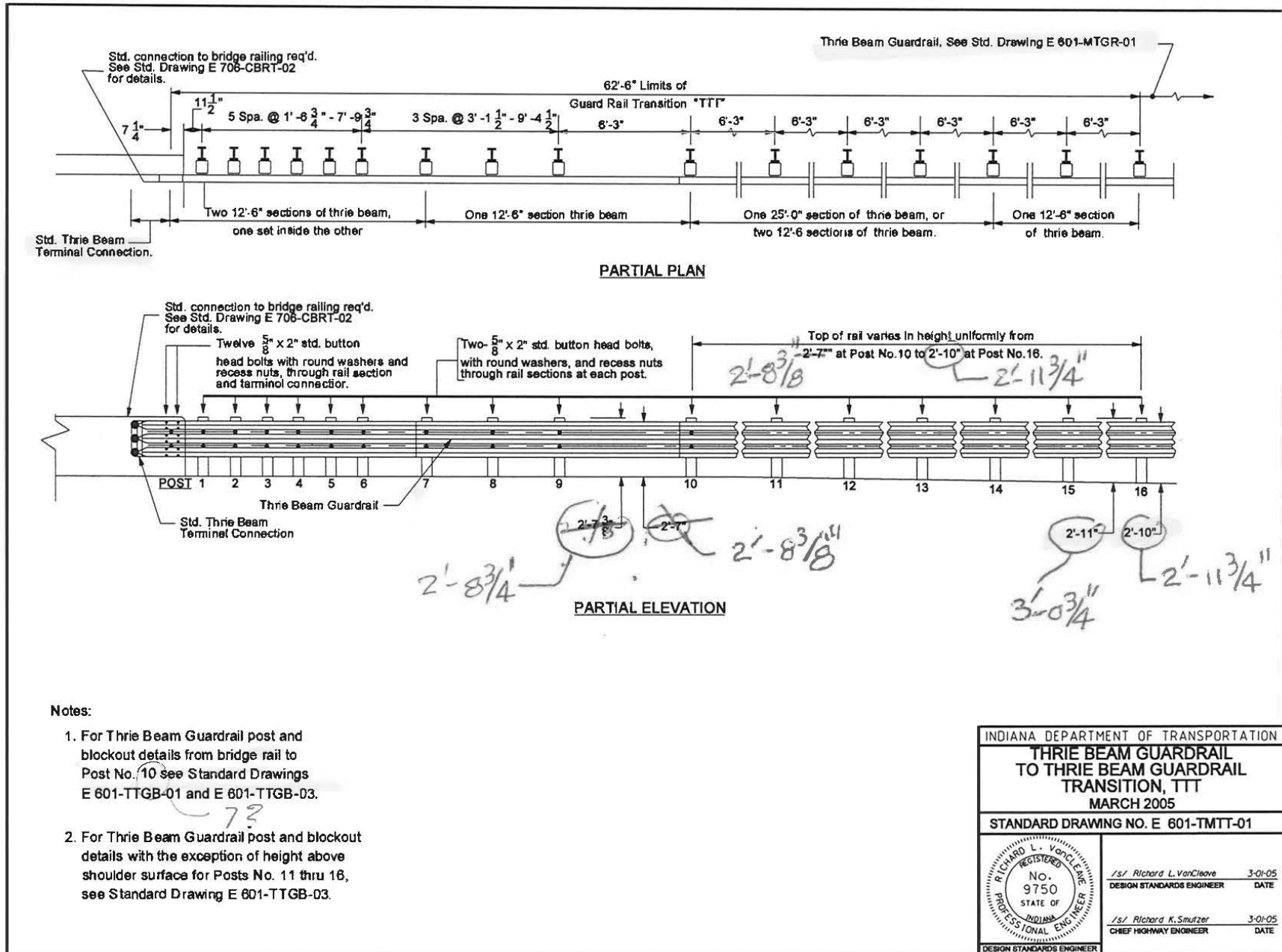
1. This drawing shall be used where three-beam guardrail is specified. This drawing shall also be used if a three-beam guardrail system requires the use of standard W-beam guardrail components.

84



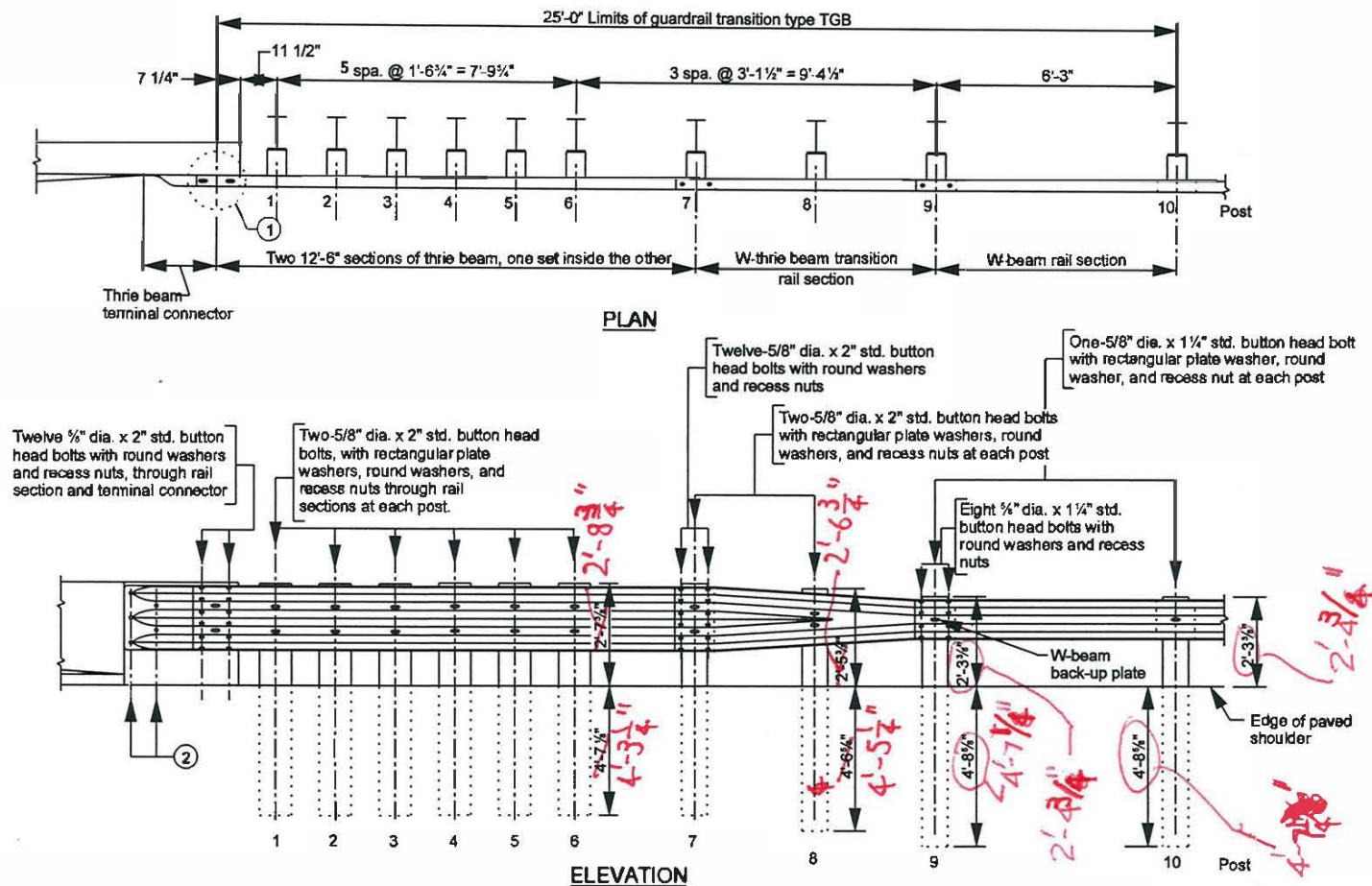
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TMTT-01 THRIE BEAM GUARDRAIL TO THRIE BEAM GUARDRAIL TRANSITION, TTT



## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TTGB-01 GUARDRAIL TRANSITION TYPE TGB

**GENERAL NOTES**

- ① See Standard Drawing E 601-TTGB-02 for Lap Detail.
- ② See Standard Drawing E 601-TBGC-01 for connection details.
3. See Standard Drawings E 601-TTGB-03 through -05 for post and block details.

INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE TGB	
MARCH 2003	
STANDARD DRAWING NO. E 601-TTGB-01	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER
	3-03-03 DATE
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER
	3-03-03 DATE

## REVISION TO 601-TTGB-03 GUARDRAIL TRANSITION TYPE TGB



REVISION TO 601-TTGB-04 GUARDRAIL TRANSITION TYPE TGB



41-5-11  
7/29/74

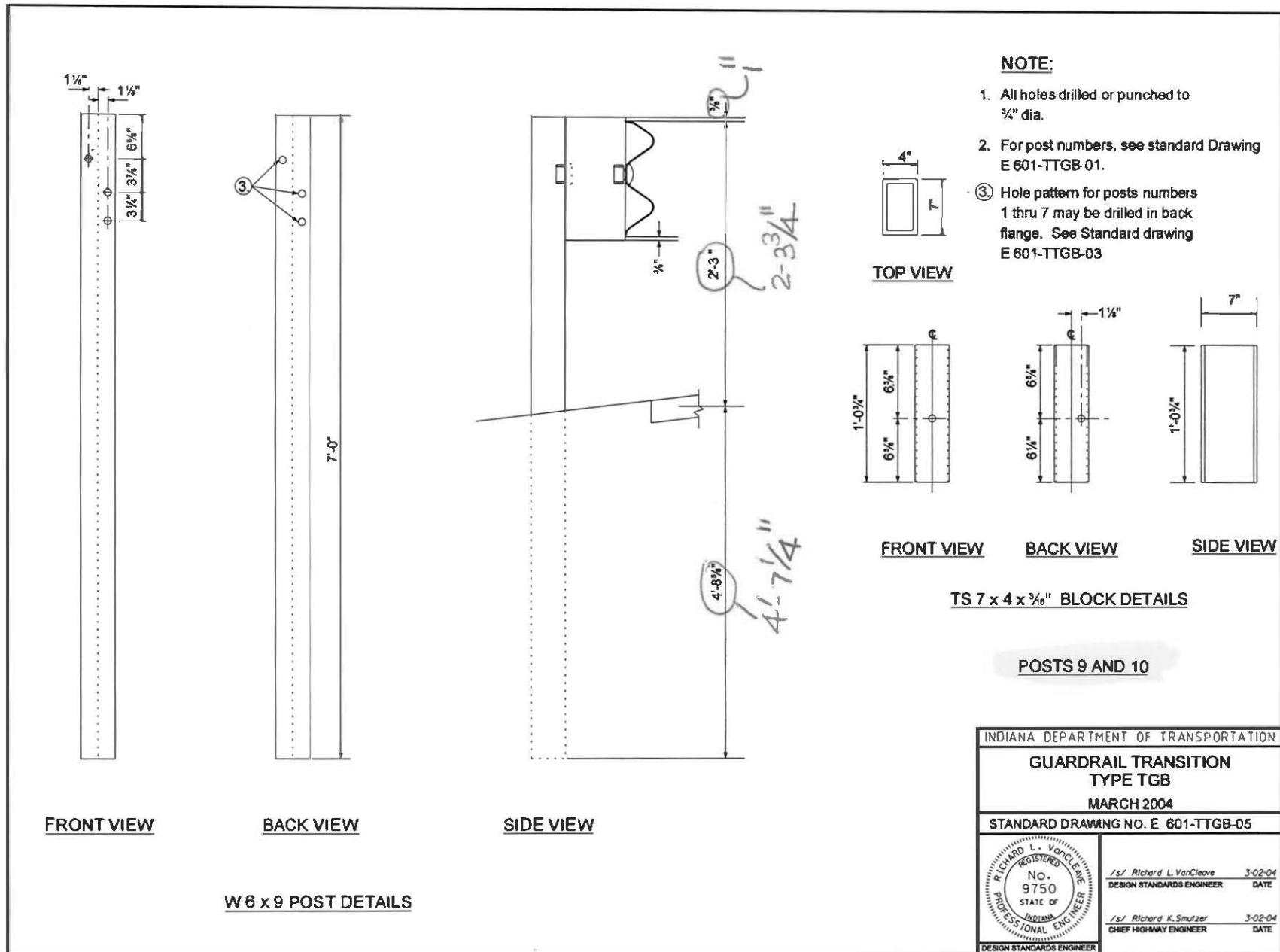
SIDE VIEW

/s/ Richard K. Smutzer 3-01-04  
CHIEF HIGHWAY ENGINEER DATE

③. Hole pattern for posts numbers 1 thru 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03

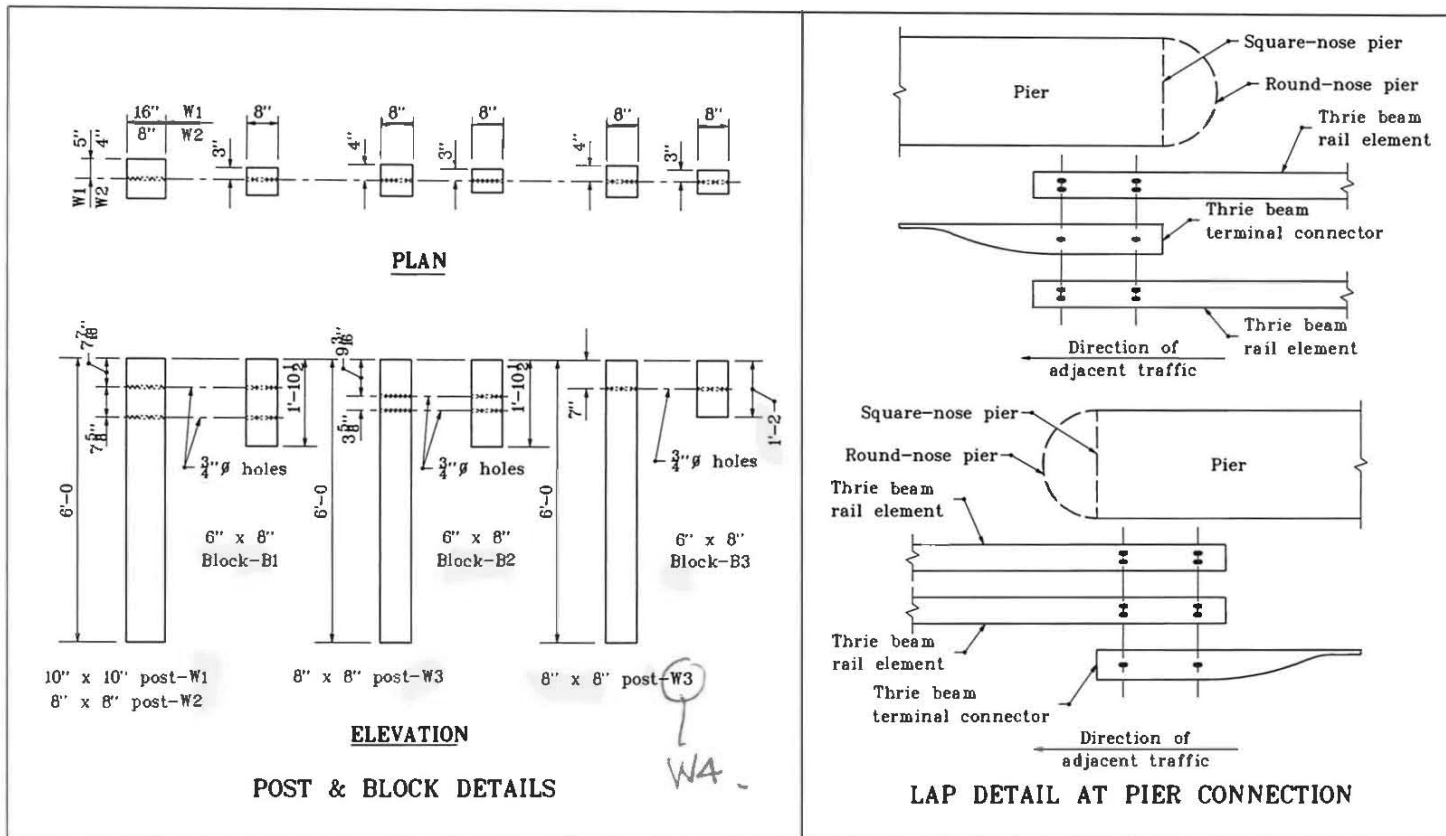
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TTGB-05 GUARDRAIL TRANSITION TYPE TGB



REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

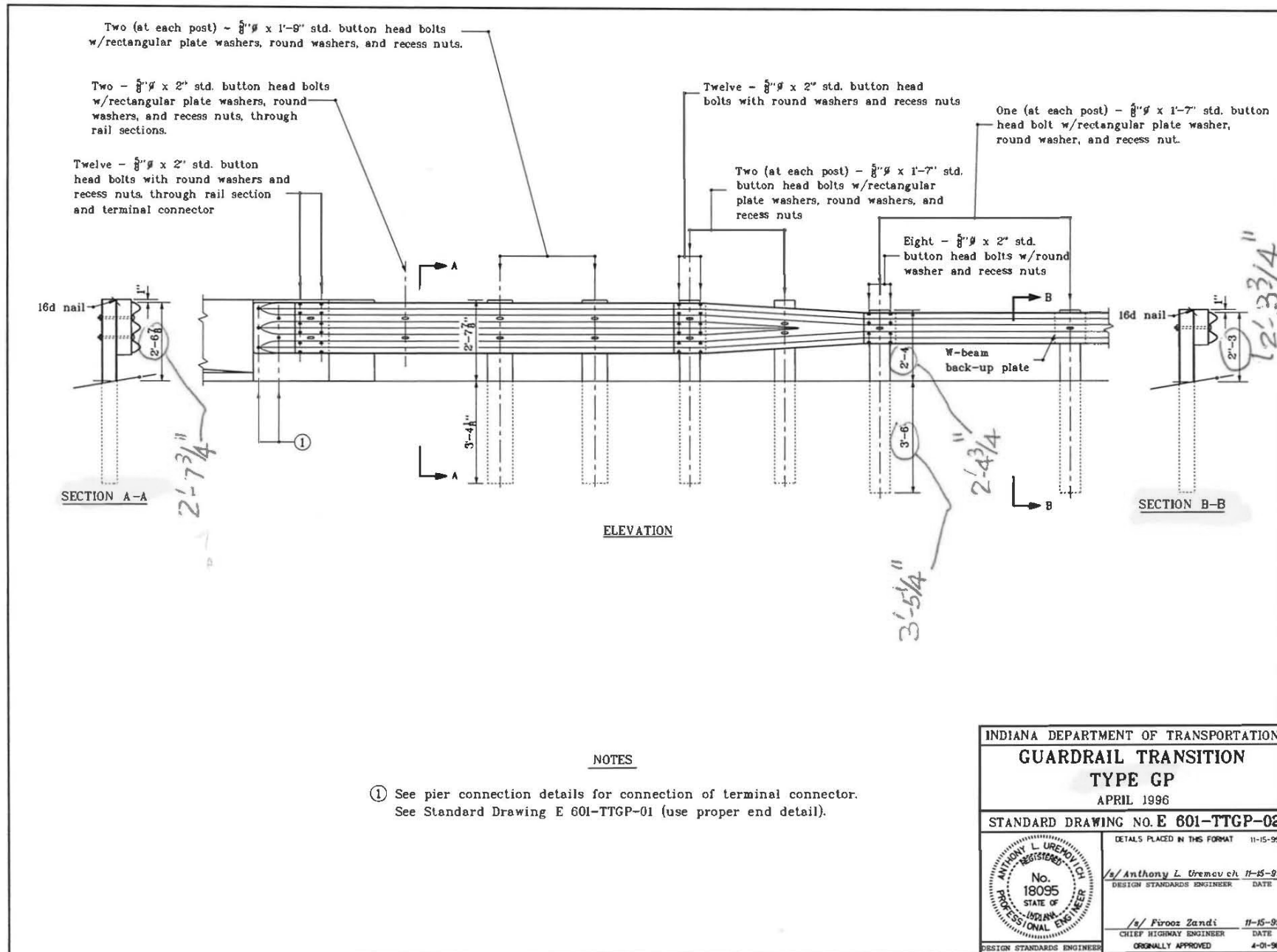
REVISION TO 601-TTGP-01 GUARDRAIL TRANSITION TYPE GP



INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION	
TYPE GP	
APRIL 1995	
STANDARD DRAWING NO. E 601-TTGP-01	
DETAILS PLACED IN THIS FORMAT	11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Farooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 4-03-95

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

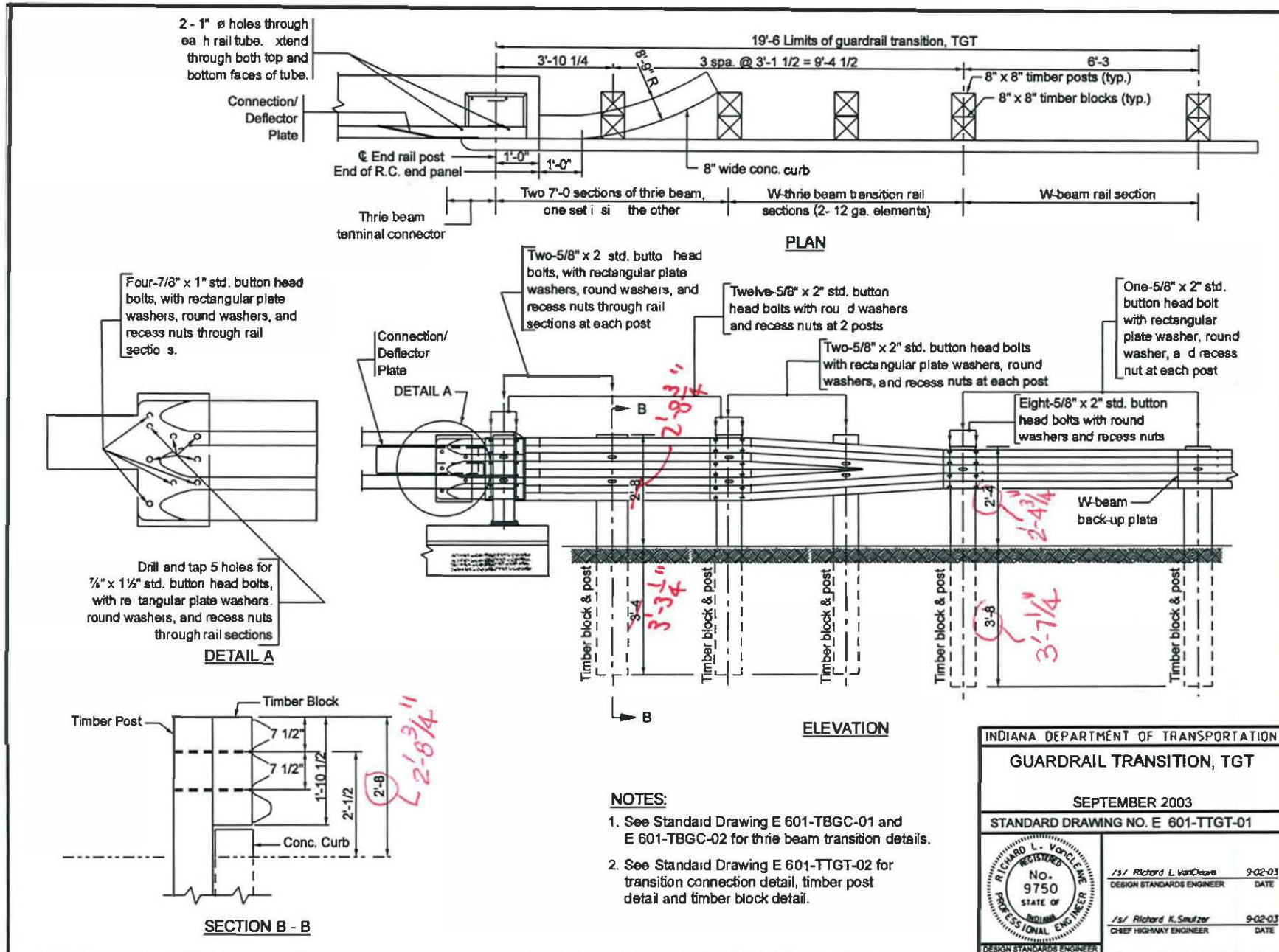
## REVISION TO 601-TTGP-02 GUARDRAIL TRANSITION TYPE GP





## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

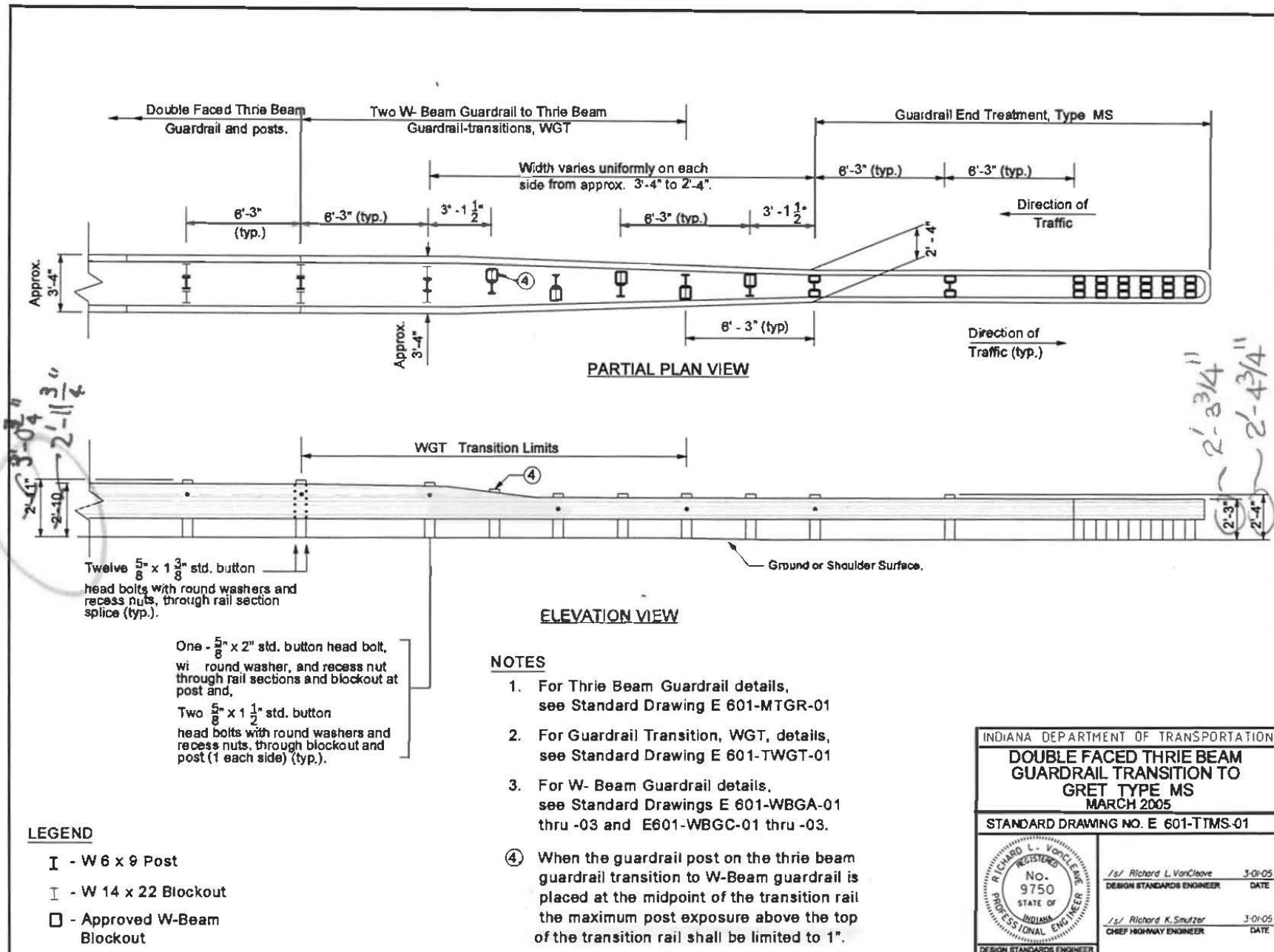
## REVISION TO 601-TTGT-01 GUARDRAIL TRANSITION, TGT





## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TTMS-01 DOUBLE FACED THRIE BEAM GUARDRAIL TRANSITION TO GRET TYPE MS

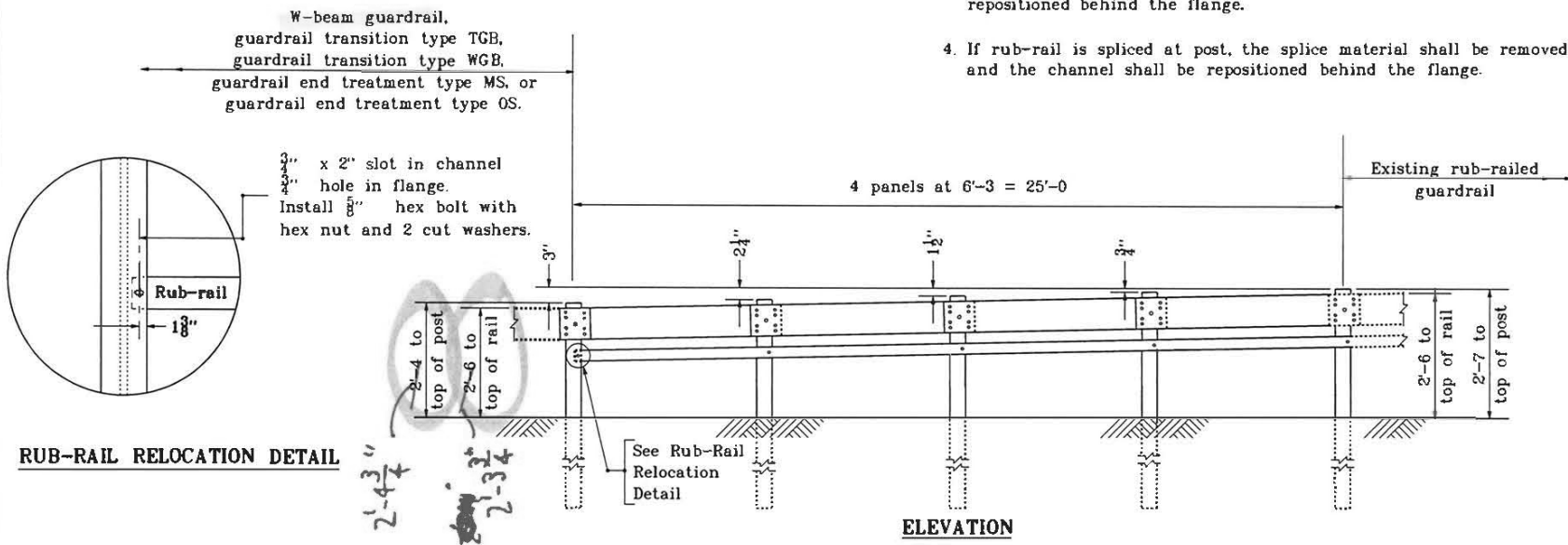


## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TTVH-01 GUARDRAIL TRANSITION TYPE VH

**NOTES**

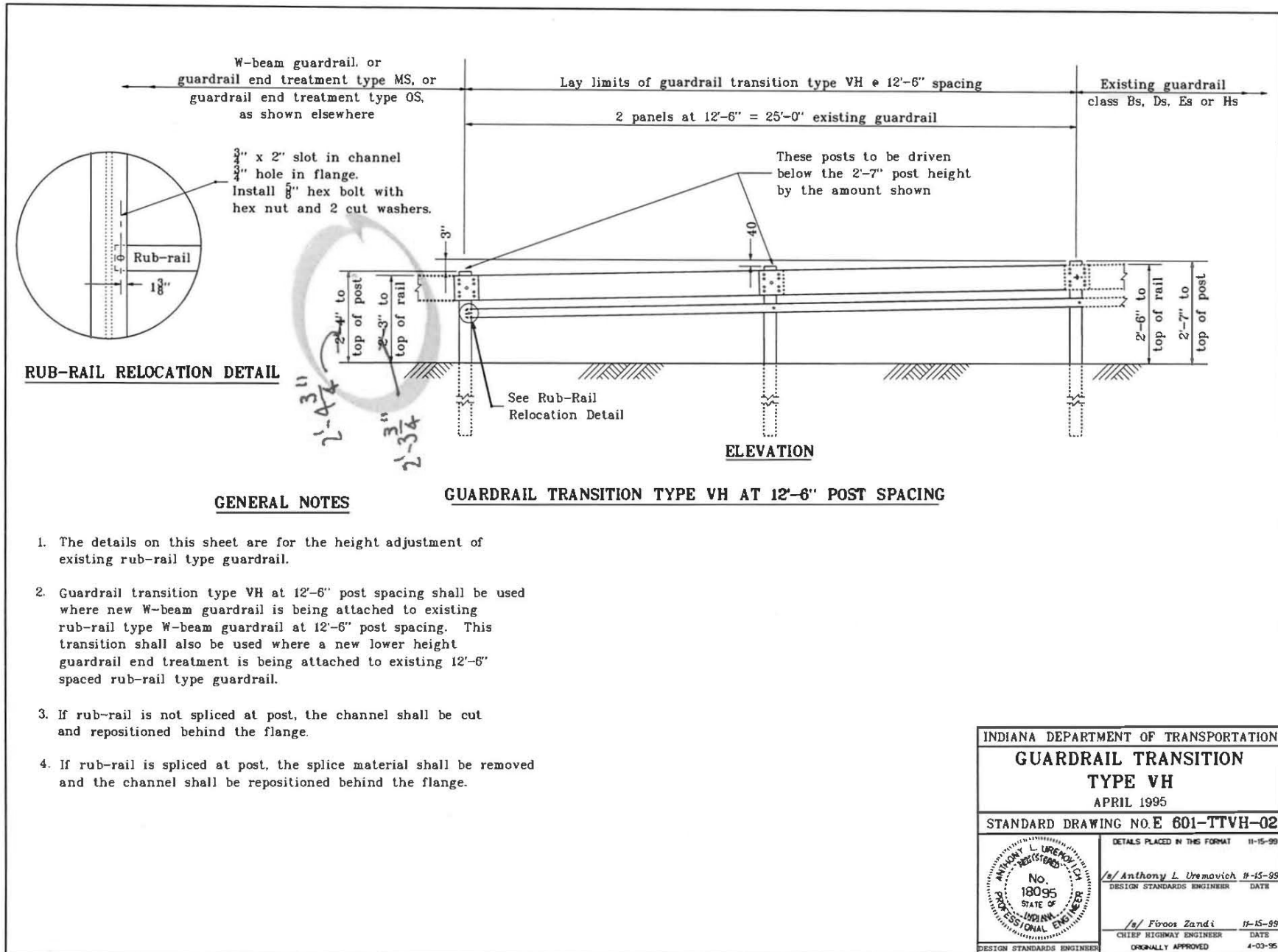
1. This transition shall be used where new W-beam guardrail is being attached to existing rub-railed W-beam guardrail. This transition shall also be used where a new lower height guardrail end treatment is being attached to existing rub-railed type guardrail.
2. These details are for the height adjustment of existing rub-railed type guardrail.
3. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the flange.
4. If rub-rail is spliced at post, the splice material shall be removed and the channel shall be repositioned behind the flange.

**GUARDRAIL TRANSITION TYPE VH AT 6'-3 POST SPACING**

INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE VH	
APRIL 1995	
STANDARD DRAWING NO. E 601-TTVH-01	
DETAILS PLACED IN THIS FORMAT 11-15-99	
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-03-95

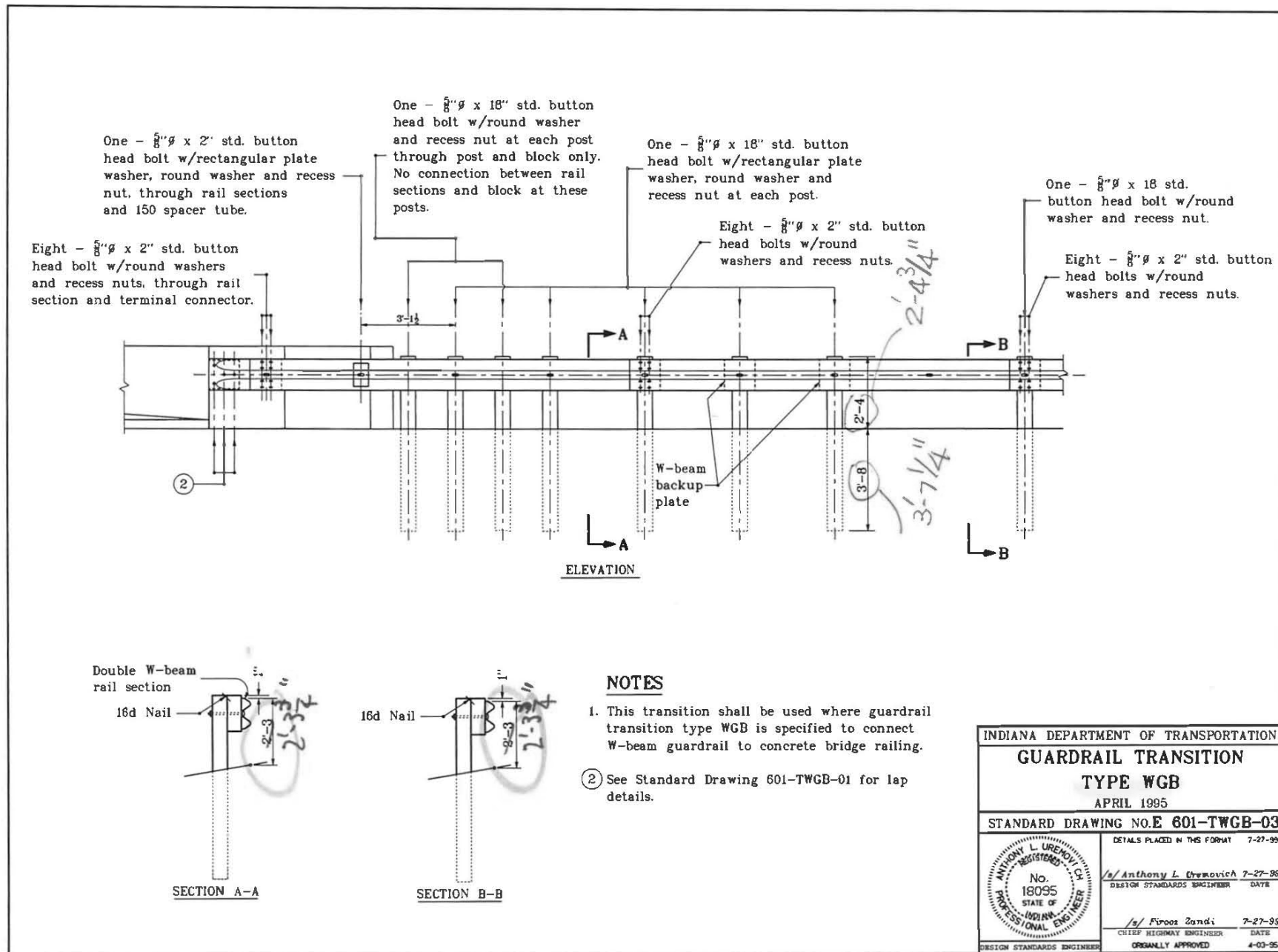
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TTVH-02 GUARDRAIL TRANSITION TYPE VH



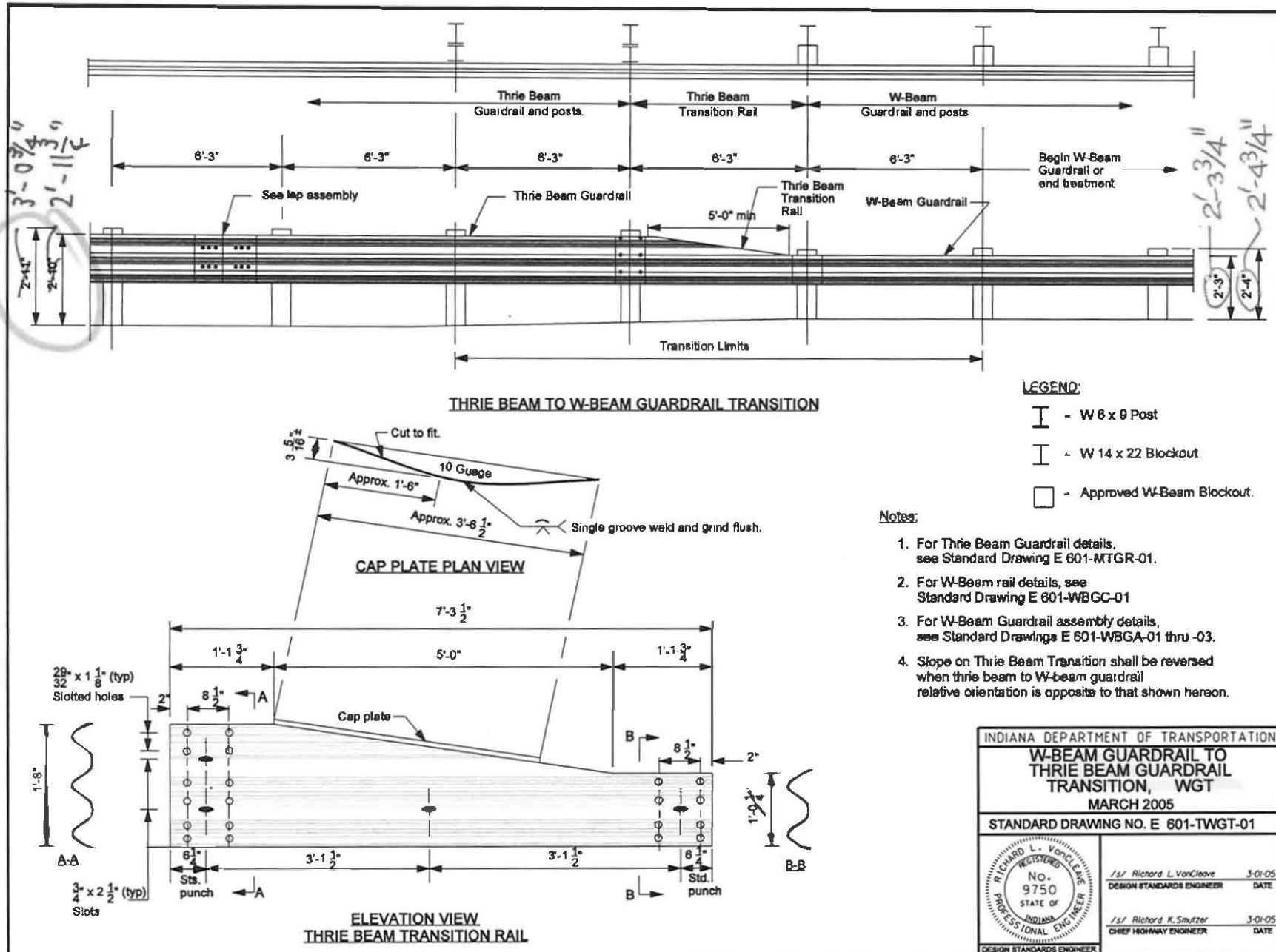
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TWGB-03 GUARDRAIL TRANSITION TYPE WGB



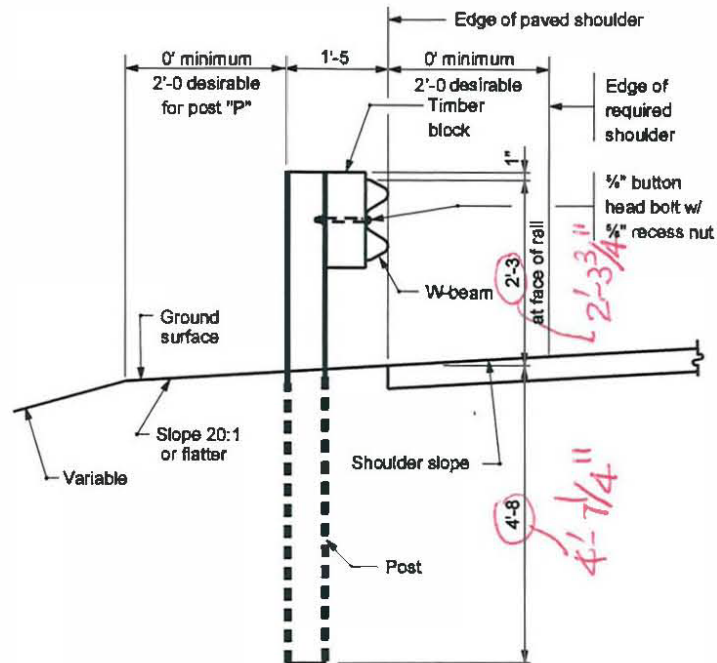
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-TWGT-01 W-BEAM GUARDRAIL TO THRIE BEAM GUARDRAIL TRANSITION, WGT

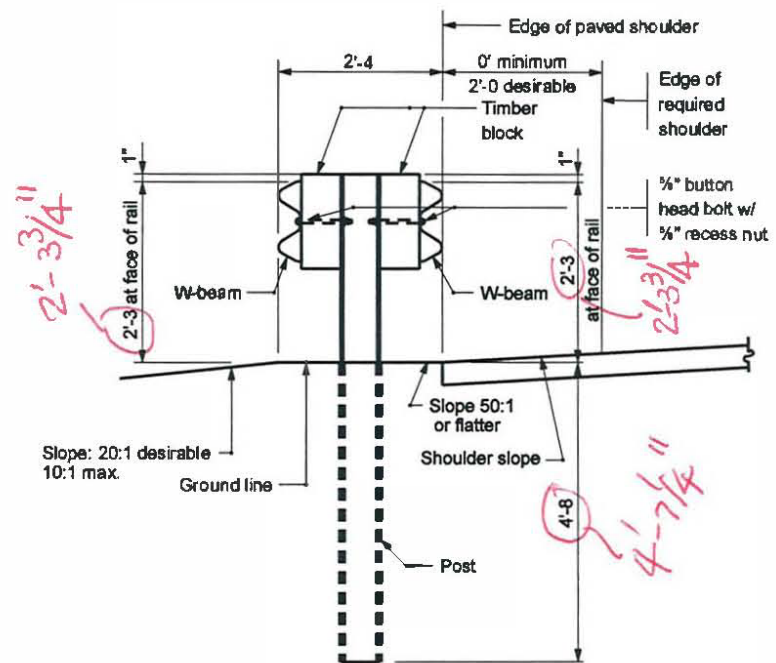


## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-WBGA-01 W-BEAM GUARDRAIL ASSEMBLIES



TYPICAL W-BEAM INSTALLATION

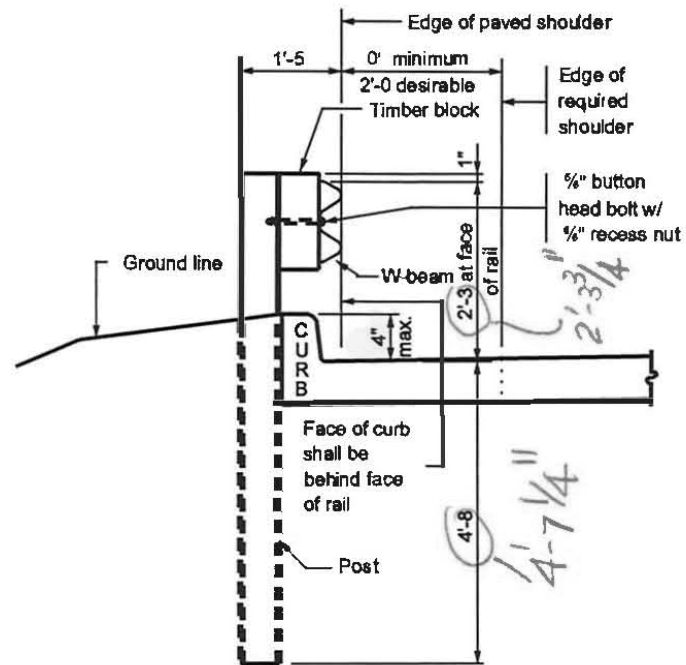


TYPICAL DOUBLE FACED W-BEAM INSTALLATION

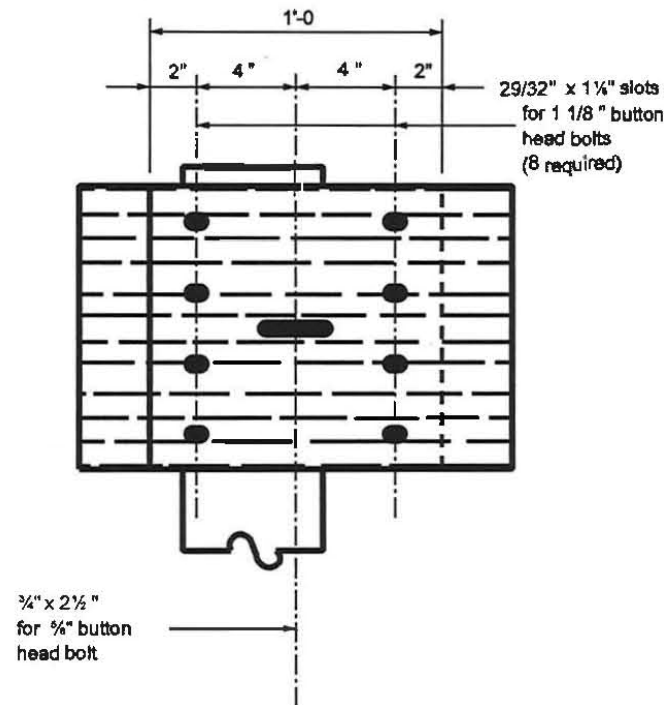
INDIANA DEPARTMENT OF TRANSPORTATION	
W-BEAM GUARDRAIL ASSEMBLIES	
MARCH 2004	
STANDARD DRAWING NO. E 601-WBGA-01	
	/s/ Richard L. VanCleave 3-01-04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 601-WBGA-02 W-BEAM GUARDRAIL ASSEMBLIES



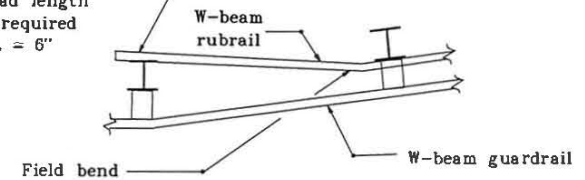
TYPICAL W-BEAM INSTALLATION AT CURB



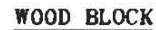
STEEL W-BEAM SPLICE DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION	
W-BEAM GUARDRAIL ASSEMBLIES	
SEPTEMBER 2002	
STANDARD DRAWING NO. E 601-WBGA-02	
	/s/ Richard L. VanCleave 9-03-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-03-02 CHIEF HIGHWAY ENGINEER DATE

REVISION TO 601-WBGA-06 WR-BEAM GUARDRAIL



1. All posts shall be 8'-0 long and spaced at 6'-3.



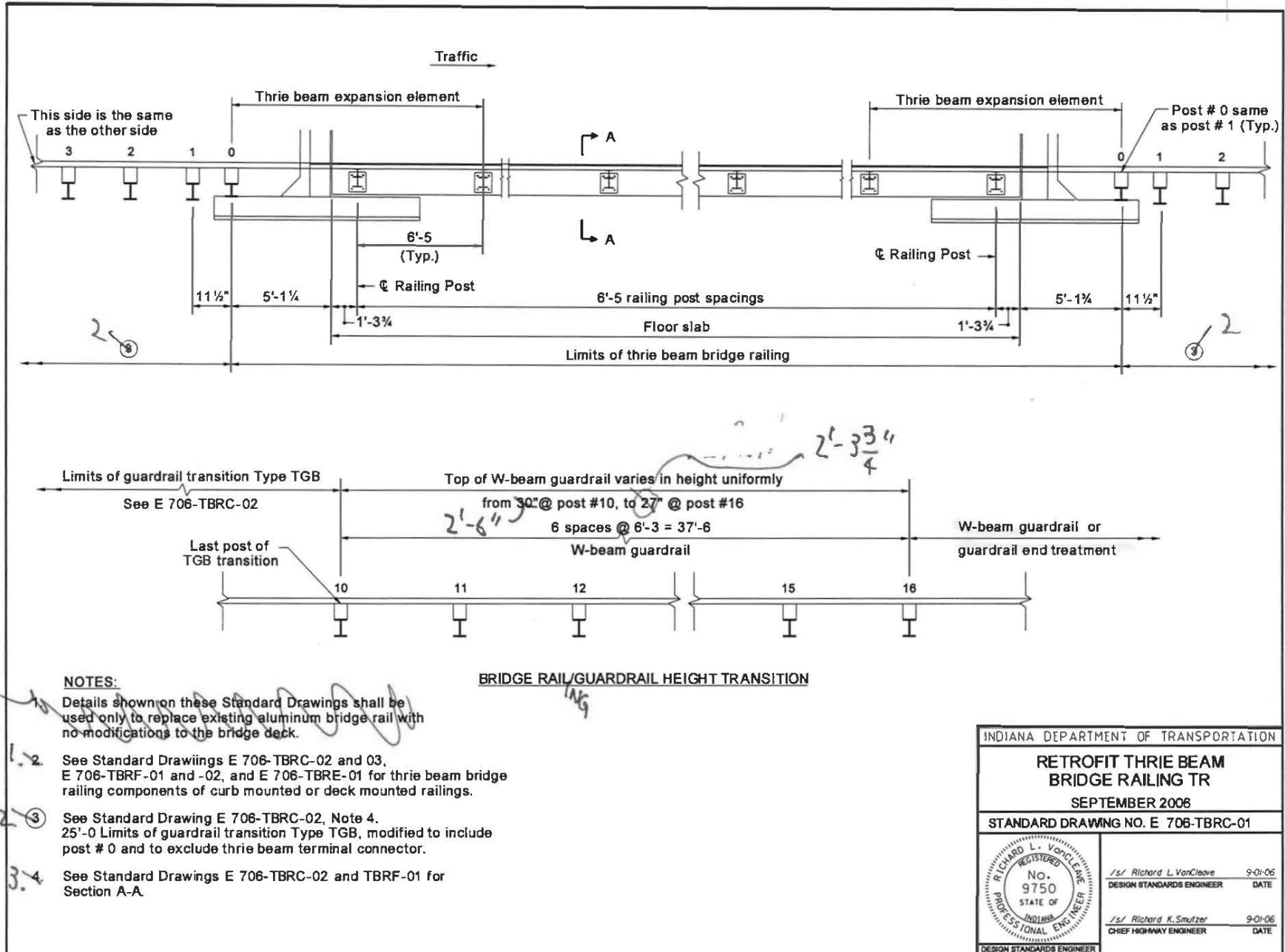
**STEEL POST AND WOOD BLOCK DETAIL**  
**FOR WR-BEAM GUARDRAIL**

100

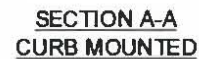


## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TBRC-01 RETROFIT THRIE BEAM BRIDGE RAILING TR



REVISION TO 706-TBRC-02 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS

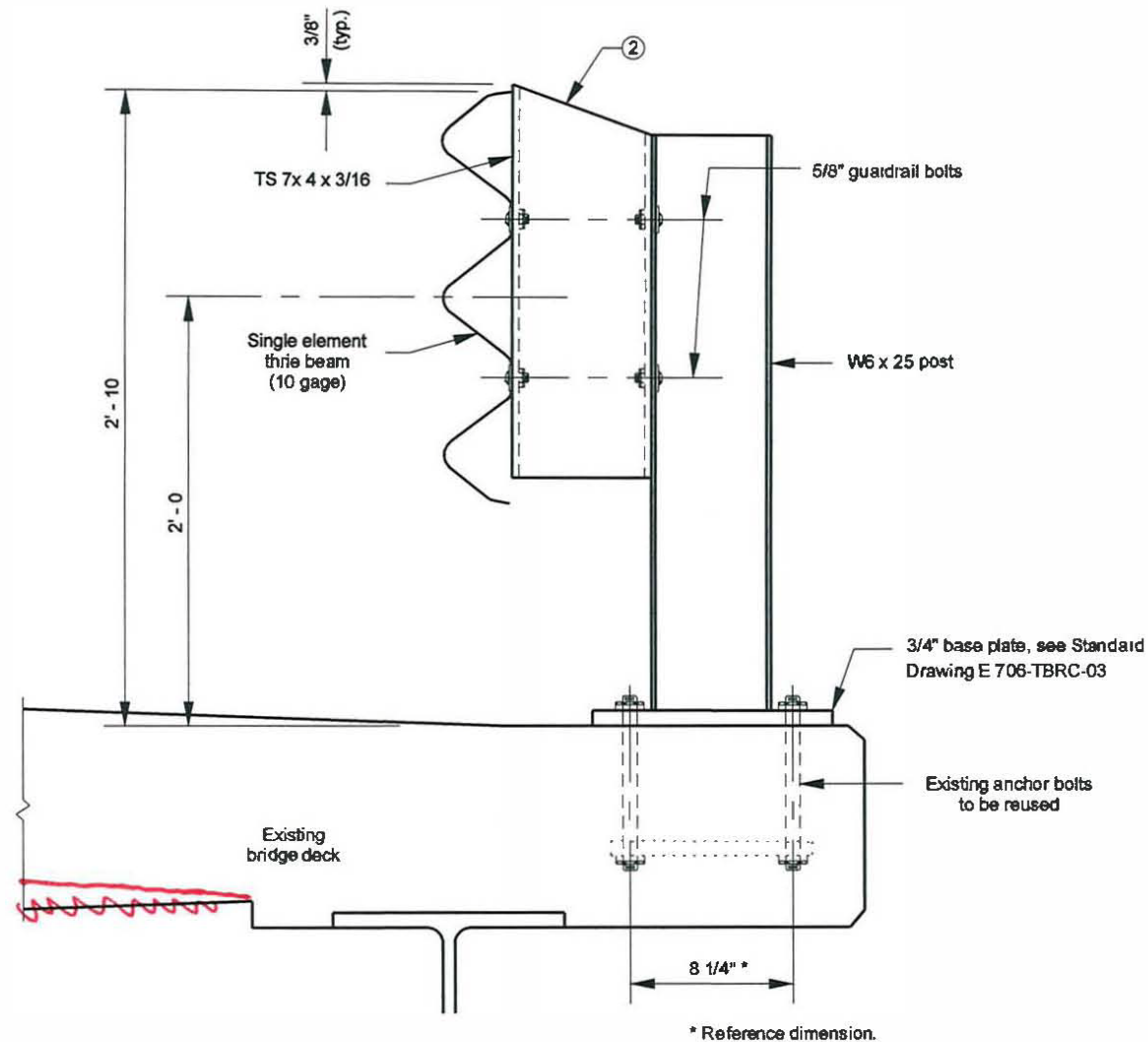


- ⑤ See Standard Drawing E 706-TBRC-03 for post and blockout details.
6. See Standard Drawing E 706-TBRF-01 for deck mounted bridge railing.

INDIANA DEPARTMENT OF TRANSPORTATION	
<b>RETROFIT THREE BEAM BRIDGE RAILING TR COMPONENTS</b>	
<b>MARCH 2005</b>	
<b>STANDARD DRAWING NO. E 706-TBRC-02</b>	
	<u>/s/ Richard L. VanCleave</u> 3-01-05 DESIGN STANDARDS ENGINEER      DATE
	<u>/s/ Richard K. Smutzer</u> 3-01-05 CHIEF HIGHWAY ENGINEER      DATE
DESIGN STANDARDS ENGINEER	

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TBRF-01 RETROFIT THRIE BEAM BRIDGE RAILING TR COMPONENTS



**SECTION A-A**  
**BRIDGE DECK MOUNTED**

**NOTE:**

1. See Standard Drawing E-706-TBRC-01 for plan view.
- ② See Standard Drawing E 706-TBRF-02 for post and blockout details for deck mounted bridge railing.

INDIANA DEPARTMENT OF TRANSPORTATION

**RETROFIT THRIE BEAM BRIDGE  
RAILING TR COMPONENTS**

MARCH 2005

STANDARD DRAWING NO. E 706-TBRF-01

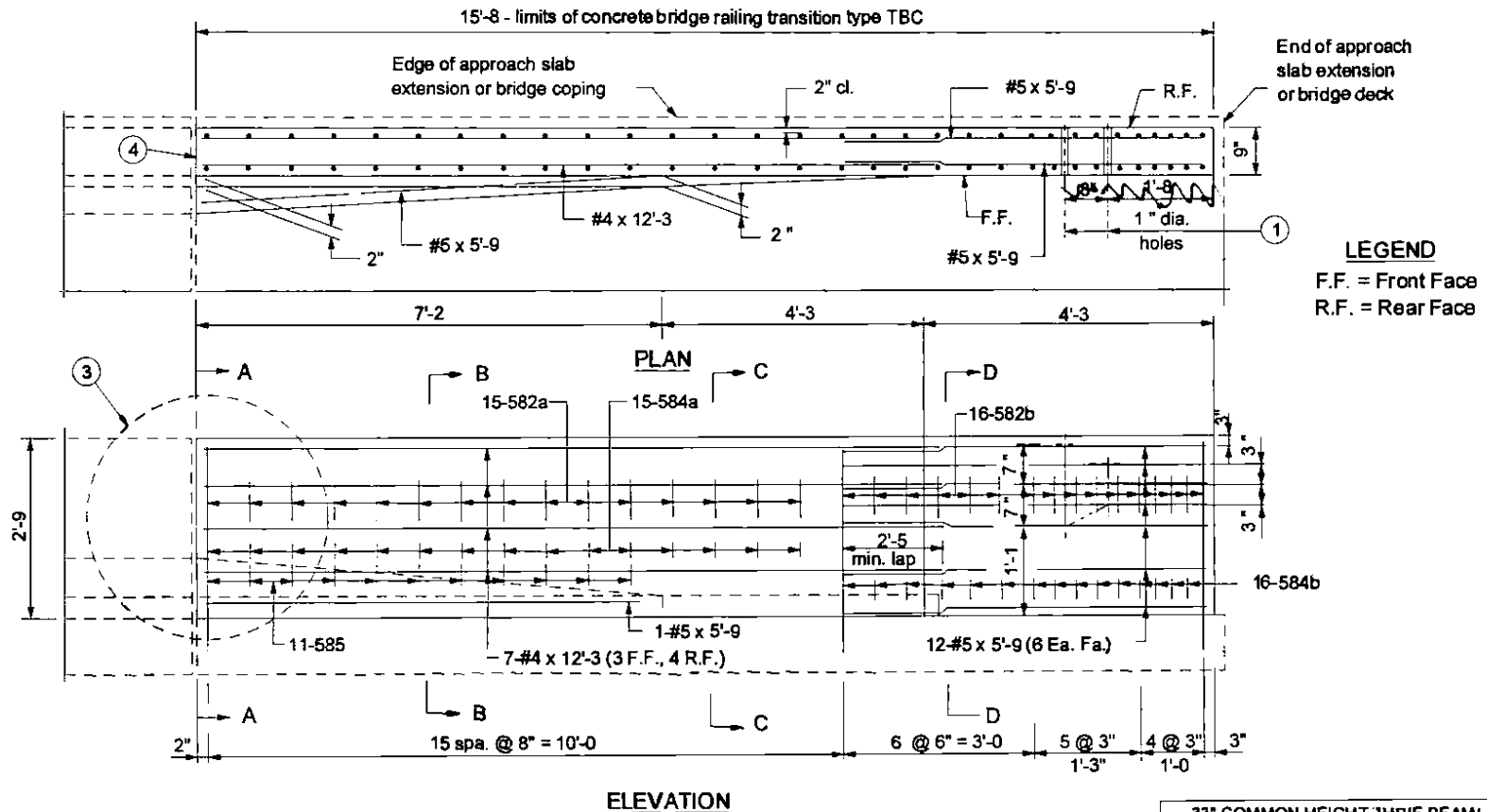


/s/ Richard L. VanCleave 3-01-05  
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05  
CHIEF HIGHWAY ENGINEER DATE

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TTBC-01 CONCRETE BRIDGE RAILING TRANSITION TBC

**NOTES:**

- ① See Standard Drawing E 706-CBRT-02 for details of guardrail transition type TGB attachment.
2. See Standard Drawing E 706-TTBC-02 for Sections A-A, B-B, C-C and D-D and Drawing E 706-TTBC-03 for reinforcement and bill of materials.
3. See Standard Drawing E 706-TASE-05 for General Notes.

4. *(See E 706-TTBC-01 for the note)*

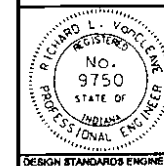
33" COMMON HEIGHT THRIE BEAM/  
CONCRETE BRIDGE RAILING TRANSITION

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BRIDGE RAILING  
TRANSITION TBC

MARCH 2004

STANDARD DRAWING NO. E 706-TTBC-01



/s/ Richard L. VanCleave 3-0-04  
DESIGN STANDARDS ENGINEER DATE

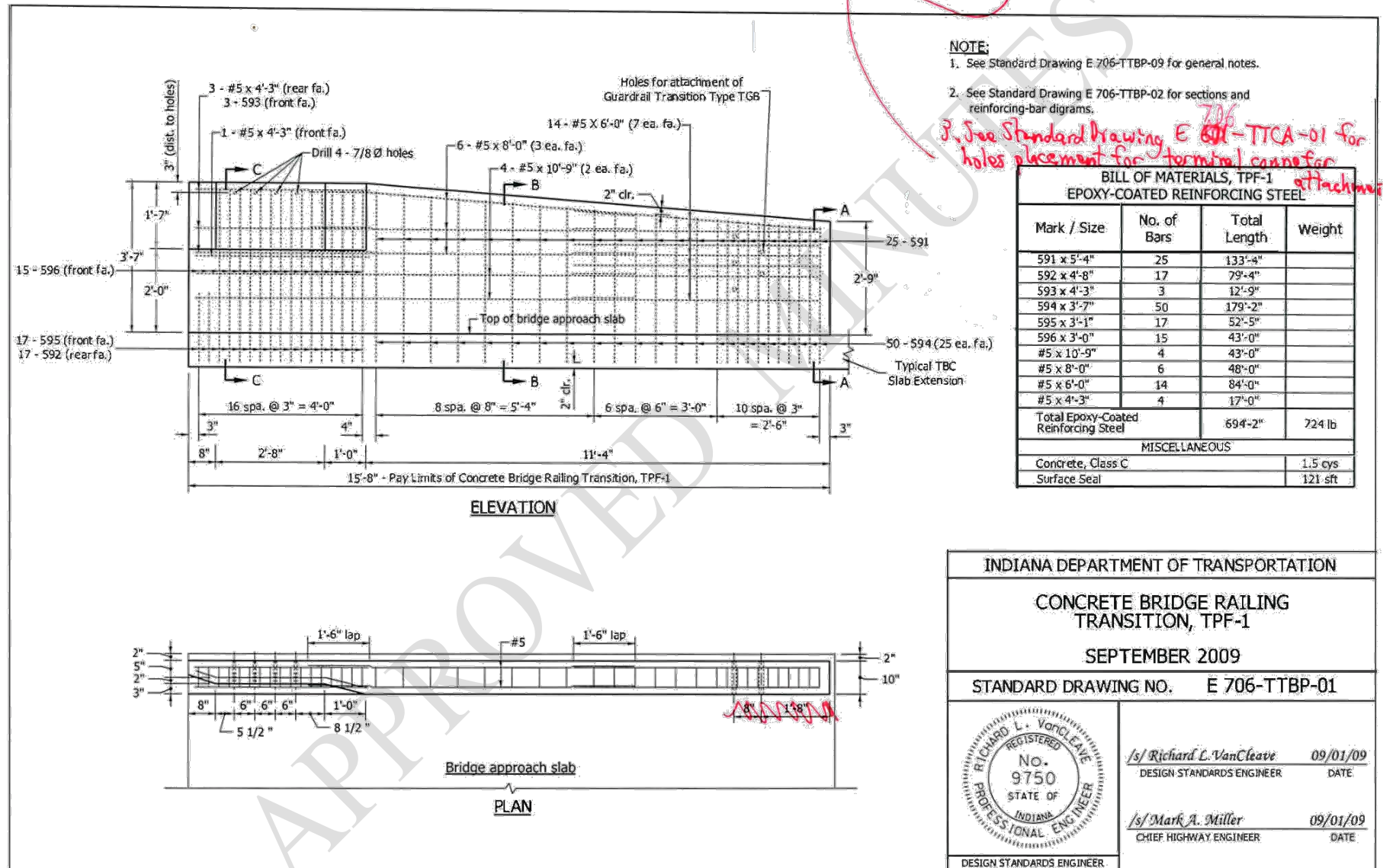
/s/ Richard K. Smutzer 3-0-04  
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TTBP-01 CONCRETE BRIDGE RAILING TRANSITION, TPF-1

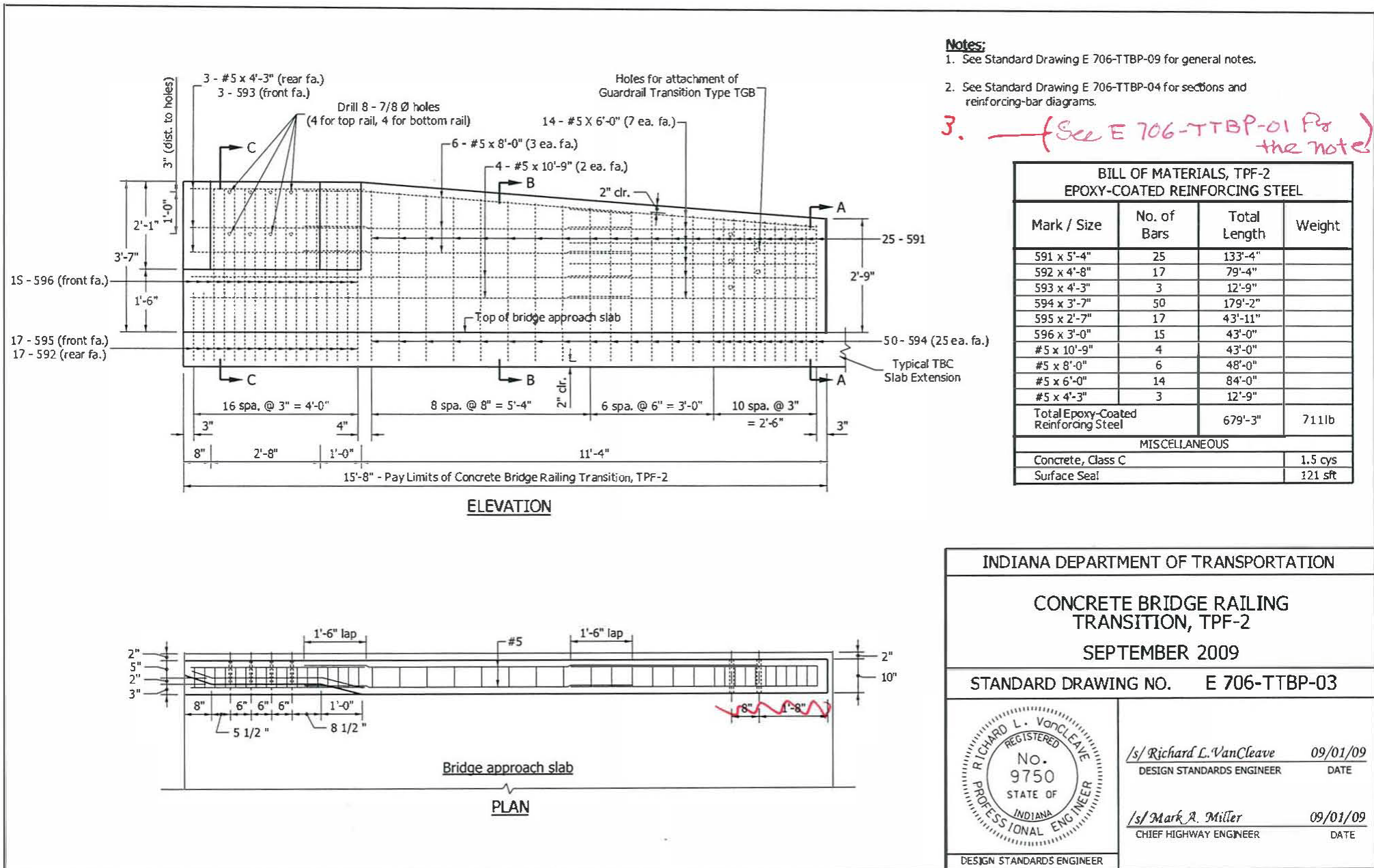
POSS GEN NOTE?





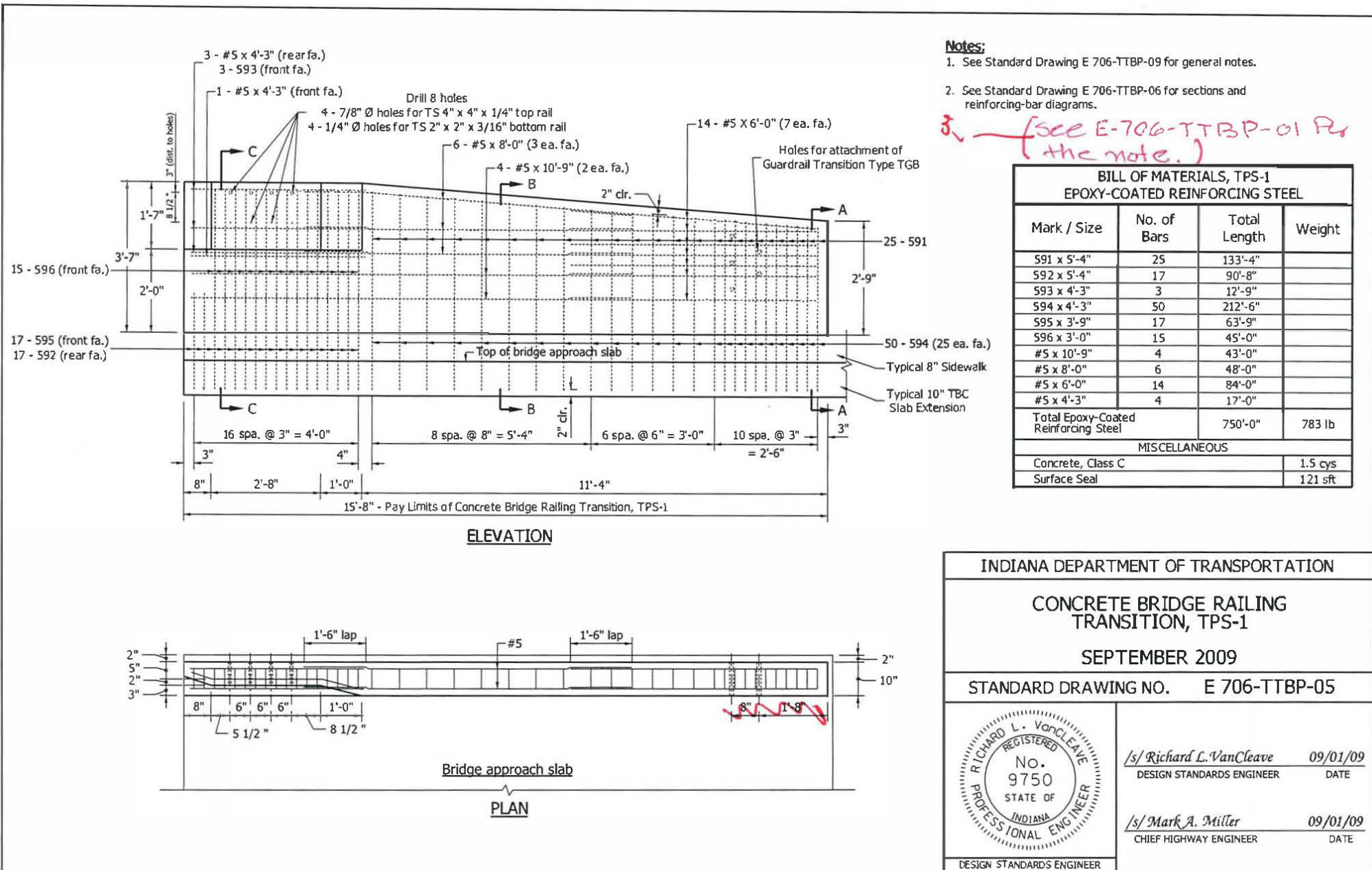
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TTBO-03 CONCRETE BRIDGE RAILING TRANSITION, TPF-2



## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TTBP-05 CONCRETE BRIDGE RAILING TRANSITION, TPS-1





REVISION TO 706-TTBP-07 CONCRETE BRIDGE RAILING TRANSITION, TPS-2



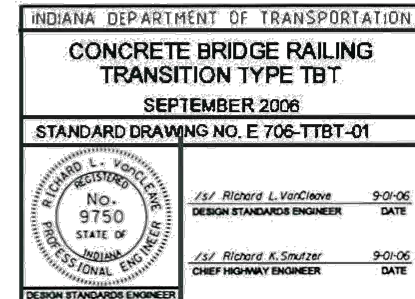
DESIGN STANDARDS ENGINEER



1. See Standard Drawing E 706-TTBT-02 for sections.
2. See Standard Drawing E 706-TASE-05 for General Notes.

**LEGEND:**  
F.F. = Front Face  
R.F. = Rear Face

**LEGEND:** (See E-706-TT13P-01 for the note)

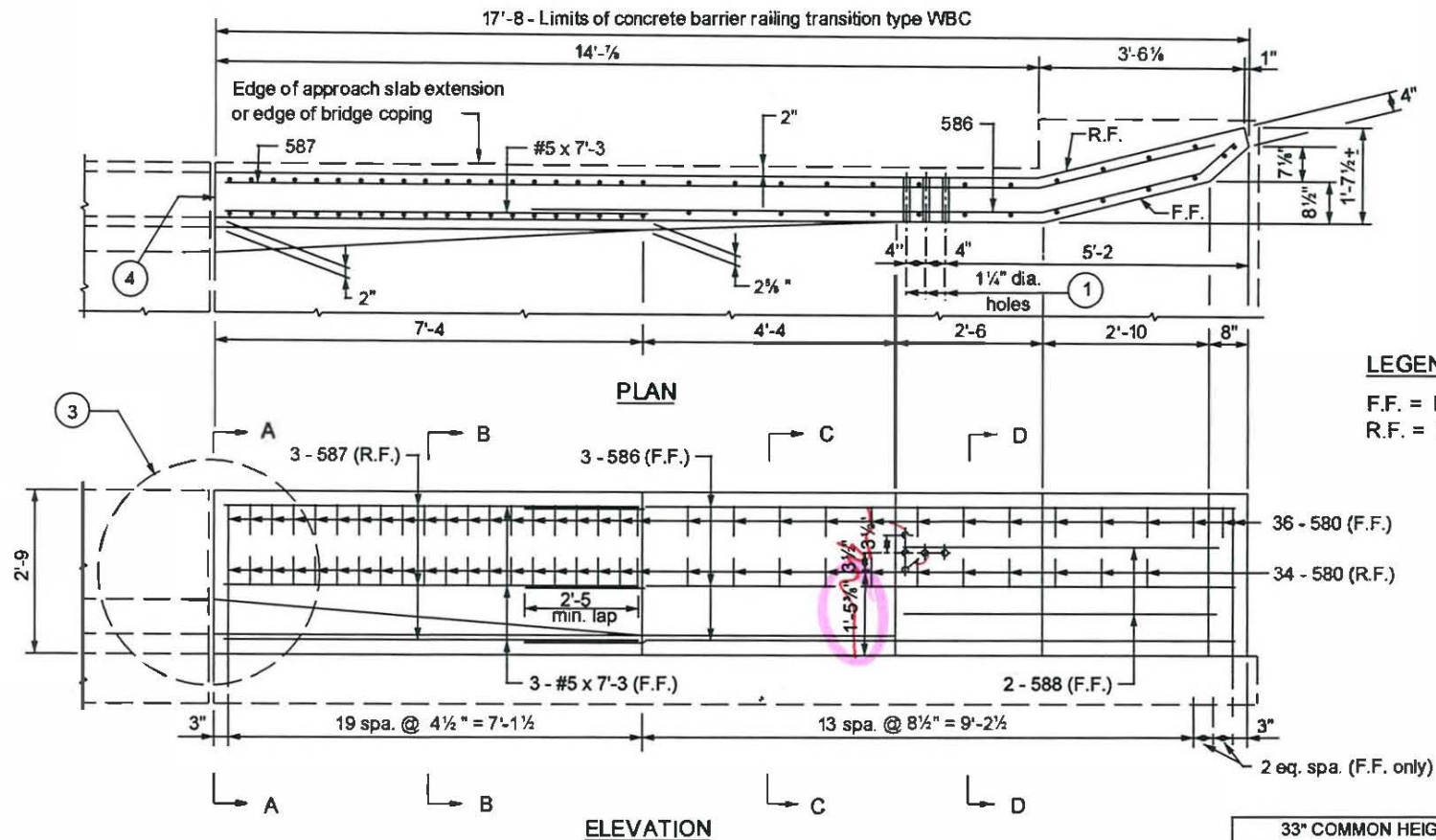


REVISION TO 706-TTXX-01 CONCRETE BRIDGE RAILING TRANSITION, TTX



## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO 706-TWBC-01 CONCRETE BRIDGE RAILING TRANSITION TYPE WBC

**NOTES :**

- ① See Standard Drawing E 706-CBRT-03 for details of guardrail transition type WGB attachment.
2. See Standard Drawing E 706-TWBC-02 for Section A-A, B-B, C-C and D-D and Drawing E 706-TWBC-03 for reinforcement and bill of materials.
3. See Standard Drawing E 706-TASE-05 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION

**CONCRETE BRIDGE RAILING  
TRANSITION TYPE WBC**

MARCH 2003

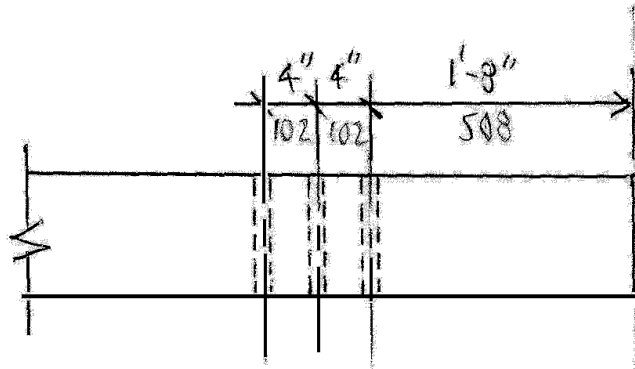
STANDARD DRAWING NO. E 706-TWBC-01

/s/ Richard L. VanCleave 3-03-03  
DESIGN STANDARDS ENGINEER DATE/s/ Richard K. Smutzer 3-03-03  
CHIEF HIGHWAY ENGINEER DATE

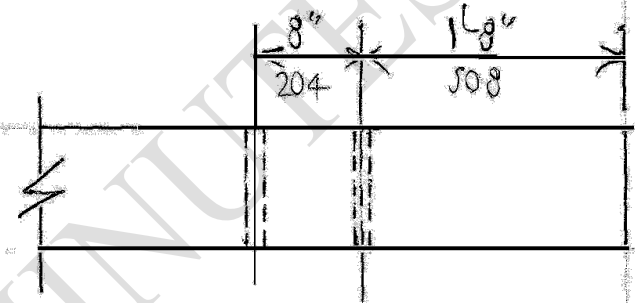
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

PROPOSED NEW DRAWING 706-TTCA-01 1 1/4" DIAMETER HOLES PLACEMENT FOR TERMINAL CONNECTOR ATTACHMENT (DRAFT)

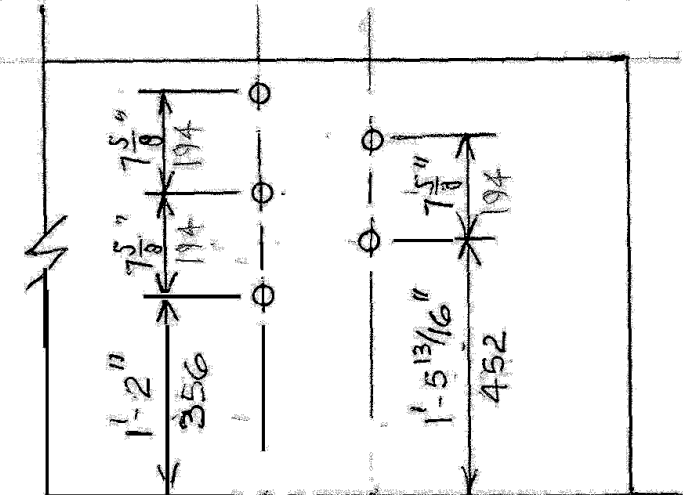
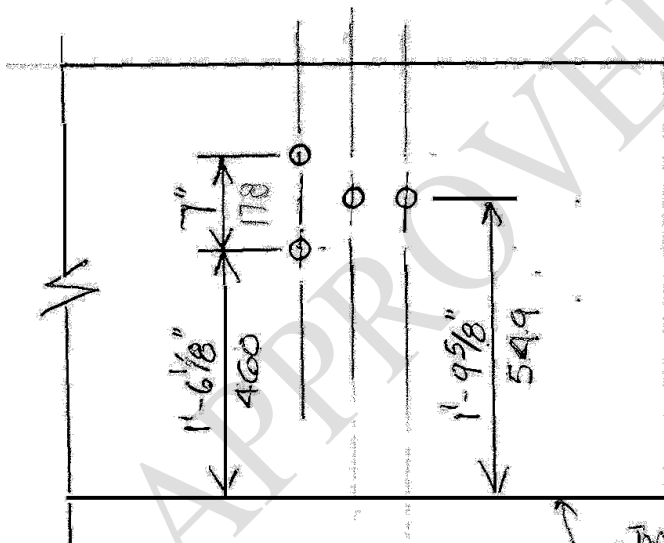
W-BEAM TRANSITION



TRIPLE-BEAM TRANSITION



DWG. TITLE: (32)

1 1/4" DIA. HOLES PLACEMENT FOR  
TERMINAL CONNECTOR ATTACHMENTDWG. NO. ~~706~~-TTCA-01  
E/706

TOP OF BRIDGE DECK OR RCBA

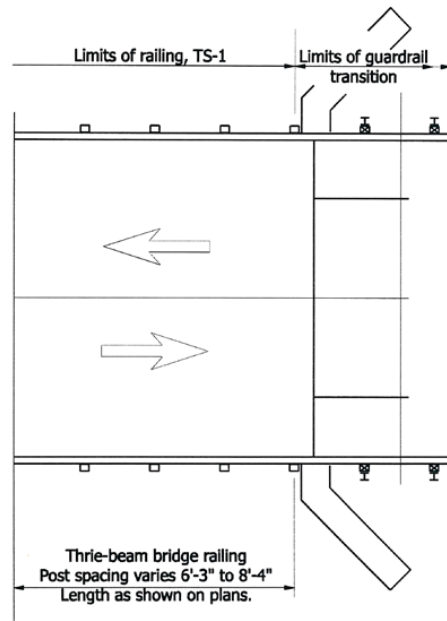
E/ ~~706~~-TTCA-01  
706



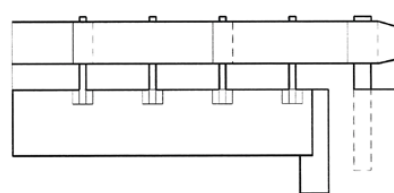
## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 &amp; GUARDRAIL TRANSITION TYPE TGS-1 (PAGE 1 OF 3)

E 706-B-140d 1 of 3



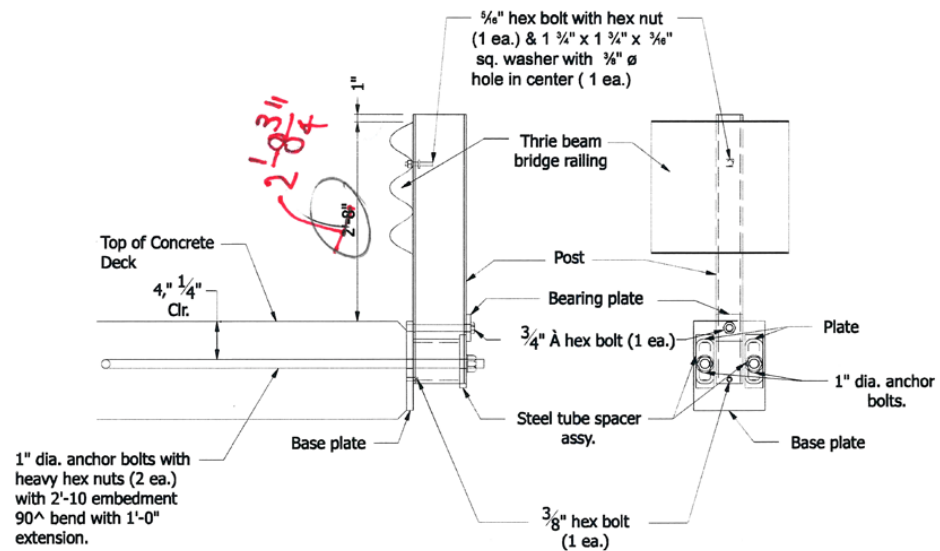
PLAN VIEW



ELEVATION VIEW

NOTES:

- 1 See Standard Drawings E 601-TBGC-01 and -02 for thrie beam rail section.

THRIE-BEAM BRIDGE RAILING  
ASSEMBLY DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION

RAILING, TS-1

7-25-05

REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 & GUARDRAIL TRANSITION TYPE TGS-1 (PAGE 2 OF 3)

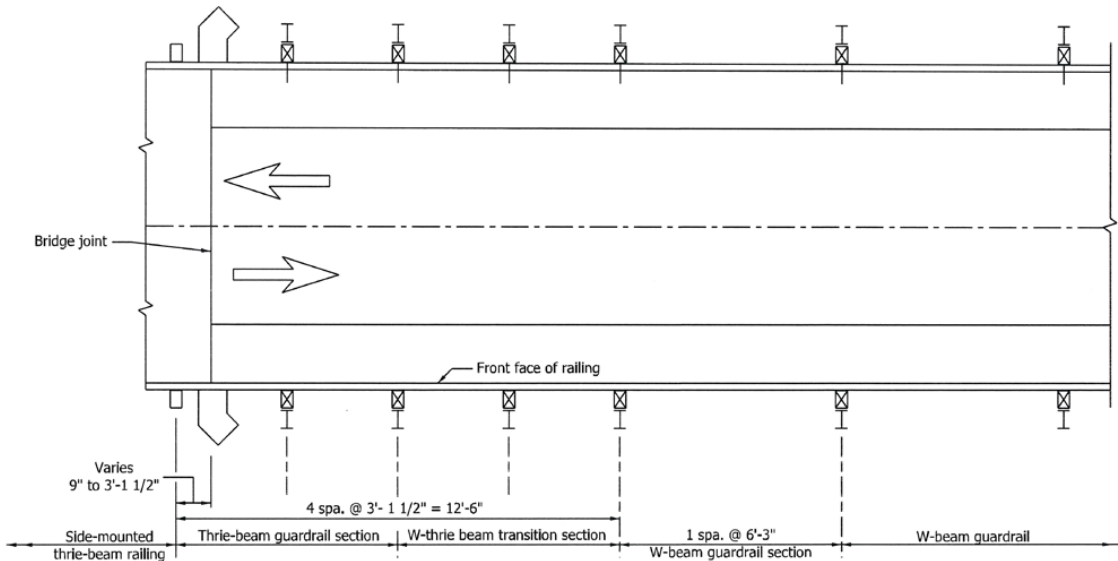
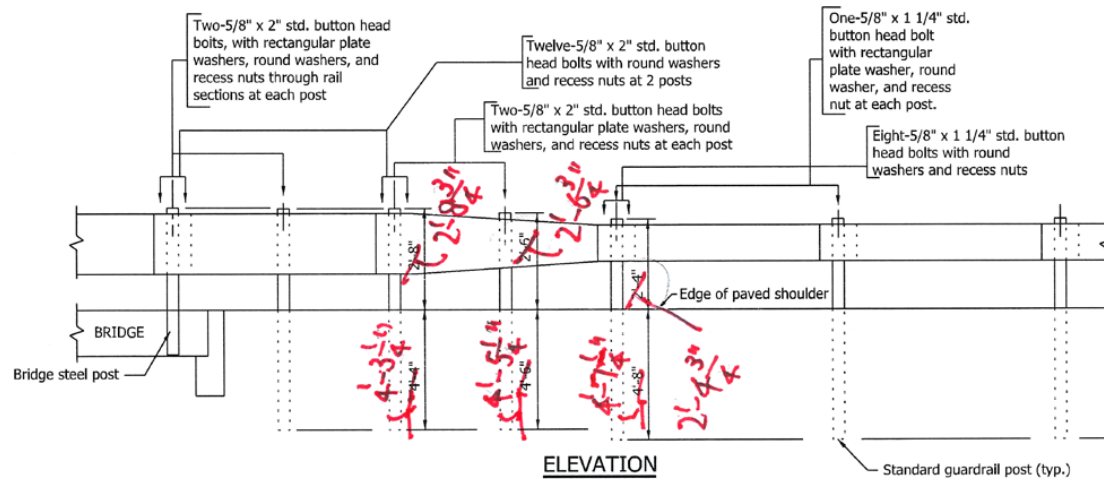
① Post length may vary. If the 1"  $\varnothing$  anchor bolts in the deck must be lowered to accommodate the deck reinforcing steel, the steel base plate shall be lowered and the post length increased.



7-25-05

## REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

## REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 &amp; GUARDRAIL TRANSITION TYPE TGS-1 (PAGE 3 OF 3)

PLAN VIEWELEVATIONNOTES:

1. See Recurring Plan Detail E 706-B-140d 1 of 3, for bridge Steel Post Detail.
2. See Standard Drawings E 601-TBGC-01 and E 601-TBGC-02 for thrie-beam guardrail components.
3. See Standard Drawings E 601-WBGC-01, E 601-WBGC-02 and E 601-WBGC-03 for W-beam guardrail components.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION, TGS-1

9-1-10

REVISION TO THE STANDARD DRAWINGS AND RECURRING PLAN DETAILS

REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 & GUARDRAIL TRANSITION TYPE TGS-1 (PAGE 3 OF 3)

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APPROVED MINUTES



COMMENTS AND ACTION

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REVISION TO THE STANDARD DRAWINGS AS LISTED ON A PROPOSAL SHEET  
REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 &  
GUARDRAIL TRANSITION TYPE TGS-1

DISCUSSIONS:

Mr. Shah explained the safety reasons behind changing the height 27  $\frac{3}{4}$  inches, and went through the drawings changes showing the revised dimensions.

Mr. Caplinger pointed out that not all of the dimensions shown add up in reference to the total post height, and that this revision also changes the dimensions on the hole locations.

Mr. Miller stated that we cannot implement this one too quickly since there are changes to be made. Mr. Miller also recommended that this item be withdrawn until the changes are made.

Mr. Pankow discussed the importance of clarity in reference to the dimensions that are shown on the drawings.

Mr. Caplinger asked about construction tolerances on the guardrails and the post. Mr. Keefer said that the certified installer is to know all of that. Mr. Caplinger said he wants to know what Construction looks at when inspecting the installation.

Mr. Leuderalbert (FHWA) said that FHWA is requesting that states actually go to 31 inches, and that this change to 27  $\frac{3}{4}$  inches will allow the use of current materials, and that rubber is not needed. Mr. Shah stated that not all DOT's have the 27  $\frac{3}{4}$  inches.

Mr. Miller stated that we are not under any time pressure and recommended withdrawal and wait for corrected drawings.

Mr. Leuderalbert (FHWA) mentioned that they'd used metric standards, stressing states to use 27  $\frac{3}{4}$  inch. Mr. Miller asked for confirmation that we can use 27  $\frac{3}{4}$  inches as a minimum and asked if there is a maximum. Mr. Leuderalbert (FHWA) stated that 31 inches is the maximum.

Mr. Cales said that our posts are 7 feet long, so we have plenty of post to work with. He also suggested that Yadu Shah look at all of our standards.

The item was withdrawn and Yadu Shah said he will look at the posts.

COMMENTS AND ACTION (CONTINUED)

REVISION TO THE STANDARD DRAWINGS AS LISTED ON A PROPOSAL SHEET  
 REVISION TO RECURRING PLAN DETAILS 706-B-140d BRIDGE RAILING TYPE TS-1 &  
 GUARDRAIL TRANSITION TYPE TGS-1

Motion: Second: Ayes: Nays:	Action: <input type="checkbox"/> Passed as Submitted <input type="checkbox"/> Passed as Revised <input checked="" type="checkbox"/> Withdrawn
Standard Specifications Sections affected:	<input type="checkbox"/> 20 Standard Specifications Book
NONE	<input type="checkbox"/> Create RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>
Recurring Plan Details affected:	<input type="checkbox"/> Revise RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>
706-B-140d	<input type="checkbox"/> Standard Drawing Effective <input type="text"/> <input type="checkbox"/> Create RPD (No. <input type="text"/> ) Effective <input type="text"/> Letting <input type="checkbox"/> Technical Advisory
Standard Sheets affected:	GIFE Update Req'd.? Y <input type="checkbox"/> N <input type="checkbox"/> By <input type="text"/> Addition or <input type="text"/> Revision
AS LISTED ON PROPOSAL SHEET	Frequency Manual Update Req'd? Y <input type="checkbox"/> N <input type="checkbox"/> By <input type="text"/> Addition or <input type="text"/> Revision
Design Manual Sections affected:	Received FHWA Approval? <input type="text"/>
None	
GIFE Sections cross-references:	
NONE	

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

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PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Section 906.02(a)1 requires that Hot Poured Joint Sealants (Type II) be tested by Materials Management and pre-approved if passing tests are obtained. Section 906.02(a)4 requires that Asphalt Rubber Sealants (Type I) be accepted by a Type A Certification. PG binders are selected for low temperature performance in our climate at -22C. Type II sealants are tested at -29C and Type I sealants are tested at -18C. There is no specification or design guidance on which materials are to be used and Materials Management would prefer to pre-test these materials and not allow Type I sealants that do not span our low temperature requirements.

PROPOSED SOLUTION: A revision to 906.02 is required to delete the section allowing Asphalt Rubber Sealants (Type I).

APPLICABLE STANDARD SPECIFICATIONS: 906.02

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251x204

Date: September 1, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

Revisions recommended by the Office of Materials Management and the Pavement Preservation Committee.

REVISION TO THE STANDARD SPECIFICATIONS

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SECTION 906 - JOINT MATERIALS

REVISION TO 906.02(a)4 ASPHALT RUBBER SEALANT

REVISION TO 906.02(a)5 POLYCHLOROPRENE JOINT MEMBRANE AND ADHESIVE

The Standards Specifications are revised as follows:

SECTION 906, BEGIN LINE 78, DELETE AND INSERT AS FOLLOWS:

**4. Asphalt Rubber Sealant**

**a. Requirements**

~~The asphalt rubber sealant shall be a single component asphalt sealant that contains a minimum of 18% recycled rubber by weight of asphaltic components. Seventy percent of the rubber shall be ground reclaimed rubber. The asphalt rubber sealant shall be in accordance with ASTM D 6690, type I.~~

**b. Packaging**

~~The asphalt rubber sealant shall be delivered in the manufacturer's original sealed packaging. Each container shall be marked legibly with the manufacturer's name, name of material, the batch or lot number, the expiration date, the recommended pouring temperature, and the safe heating temperature.~~

**c. Installation**

~~The rubber asphalt sealant shall be installed in accordance with manufacturer's recommendations. The backer rod shall be in accordance with manufacturer's specifications and 906.02(b) if a backer rod is required.~~

**d. Certification**

~~The Contractor shall supply a type A certification in accordance with 916 for each batch or lot of material furnished.~~

**54. Polychloroprene Joint Membrane and Adhesive**

Polychloroprene joint membrane shall be general purpose, heavy duty polychloroprene sheeting with nylon fabric reinforcement. The sheeting shall be in accordance with the following:

REVISION TO THE SPECIAL PROVISION

RECURRING SPECIAL PROVISION 408-R-564 SEALING CRACKS AND JOINTS (ADDED, SEE COMMENTS AND ACTION)

408-R-564 SEALING CRACKS AND JOINTS

(Revised 09-16-10)

The Standard Specifications are revised as follows:

SECTION 408, BEGIN LINE 9, INSERT AS FOLLOWS:

**408.02 Materials**

Materials shall be in accordance with the following:

Asphalt Emulsion for	
Crack Sealing, AE-90, AE-90S, AE-150.....	902.01(b)
Asphalt Binder for Crack Sealing, PG 64-22.....	902.01(a)
Fine Aggregates, No. 23 or 24 .....	904
Joint Sealing Materials.....	906.02

SECTION 408, BEGIN LINE 30, DELETE AND INSERT AS FOLLOWS:

**408.05 Routing and Filling Cracks and Joints**

Cracks and joints shall be routed when specified, with a ~~vertical spindle router with carbide tipped or diamond router bits~~ *routing machine capable of cutting a uniform shape* to form a reservoir not exceeding ~~0.5~~ 0.75 in. (~~13~~ 19 mm) wide with a minimum depth of 0.75 in. (19 mm). The operation shall be coordinated such that routed materials do not encroach on pavement lanes carrying traffic and all routed materials are disposed of in accordance with 104.07. Cracks and joints shall be filled with ~~asphalt rubber~~ *hot poured joint sealant* to within 0.25 in. (7 mm) of the surface in accordance with the manufacturer's recommendations.

SECTION 507, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:

**507.02 Materials**

Materials shall be in accordance with the following:

Asphalt Emulsion AE-90, AE-90S, AE-150.....	902.01(b)
Asphalt Binder for Crack Sealing, PG 64-22.....	902.01(a)
Dowel Bars.....	910.01(b)10
Fine Aggregates, Size No. 23 or 24 .....	904
Joint Sealing Materials.....	906.02
Rapid Set Patching Materials.....	901.07

SECTION 507, BEGIN LINE 28, DELETE AND INSERT AS FOLLOWS:

**(a) Routing, Cleaning and Sealing**

Cracks in PCCP shall be routed and cleaned when specified. Cracks shall be routed with a ~~vertical spindle router with carbide tipped or diamond router bits~~ *routing machine capable of cutting a uniform shape* to form a reservoir not exceeding ~~0.5~~ 0.75 in. (~~13~~ 19 mm) wide with a minimum depth of 0.75 in. (19 mm). The operation shall be coordinated such that routed materials do not encroach on pavement lanes carrying traffic and all routed materials are

REVISION TO THE SPECIAL PROVISION (CONTINUED)

RECURRING SPECIAL PROVISION 408-R-564 SEALING CRACKS AND JOINTS (ADDED, SEE COMMENTS AND ACTION)

disposed of in accordance with 104.07. The cracks shall be cleaned with compressed air or by other suitable means. Air compressors shall be capable of producing a minimum air pressure of 100 psi (690 kPa). Water blasting shall not be utilized.

Cracks shall be sealed with ~~asphalt-rubber~~ *hot poured joint sealant* in accordance with the manufacturer recommendations within 0.25 in. (7 mm) of the surface. A distributor in accordance with 409.03 shall be used with an indirect-heat double boiler kettle and mechanical agitator. The ~~asphalt-rubber~~ *hot poured joint sealant* shall be placed utilizing a “V” shaped wand tip, to allow the penetration of the materials into the cracks.

Application of ~~asphalt-rubber~~ *hot poured joint sealant* shall be completed without covering existing pavement markings. When traffic is to be maintained within the limits of the section, temporary traffic control measures in accordance with 801 shall be used. Treated areas shall not be opened to traffic until the ~~asphalt-rubber~~ *hot poured joint sealant* has set.

SECTION 507, BEGIN LINE 49, DELETE AND INSERT AS FOLLOWS:

**(b) Cleaning and Filling**

The cracks shall be cleaned by blowing with compressed air or by other suitable means when specified. Air compressors shall be capable of producing a minimum air pressure of 100 psi (690 kPa). Water blasting shall not be utilized.

Cracks shall be filled with asphalt ~~emulsion~~ *material*. The cracks shall be completely filled or overbanded not to exceed 5 in. (125 mm), or as required. Asphalt ~~emulsion~~ *material* shall be placed utilizing a “V” shaped wand tip, to allow the penetration of the materials into the cracks. The filled cracks shall be covered with sufficient fine aggregate to prevent tracking of the asphalt ~~emulsion~~ *material*. All excess cover material shall be removed from the pavement.

Application of asphalt ~~emulsion~~ *material* shall be completed without covering existing pavement markings. When traffic is to be maintained within the limits of the section, temporary traffic control measures in accordance with 801 shall be used. Treated areas shall not be opened to traffic until the asphalt ~~emulsion~~ *material* has set.

SECTION 507, BEGIN LINE 80, DELETE AND INSERT AS FOLLOWS:

Joints shall be sealed with joint sealing materials in accordance with the sealant manufacturer's recommendations. Transverse joints shall be sealed with silicone sealant or preformed elastomeric joint sealant. Longitudinal joints shall be sealed with ~~an asphalt-rubber~~ *hot poured joint* or silicone sealants.

SECTION 507, BEGIN LINE 95, DELETE AND INSERT AS FOLLOWS:

Joints shall be filled with ~~asphalt-rubber~~ *hot poured joint sealant* in accordance with the manufacturer's recommendations within 0.25 in. (7 mm) of the surface. A distributor in accordance with 409.03 shall be used with an indirect-heat double boiler kettle and mechanical agitator. The ~~asphalt-rubber~~ *hot poured joint sealant* shall be placed utilizing a “V” shaped wand tip, to allow the penetration of the materials into the joints.

COMMENTS AND ACTION

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REVISION TO 906.02(a)4 ASPHALT RUBBER SEALANT

REVISION TO 906.02(a)5 POLYCHLOROPRENE JOINT MEMBRANE AND ADHESIVE

RECURRING SPECIAL PROVISION 408-R-564 SEALING CRACKS AND JOINTS (ADDED)

DISCUSSION:

Mr. Walker explained the reasons behind this item as stated in the proposal to the committee, to remove Asphalt Rubber Sealant from section 906, stating that it will not work to simply revise the language.

Mr. Miller asked if Todd Shields and the Pavement Preservation folks are aware of this. Mr. Walker confirmed that Mr. Shields is aware.

Mr. Andrewski exclaimed that Asphalt Rubber Sealant performs better than hot pour.

Mr. Prather explained the difference between Type I and Type II rubber sealants and that they are only asking that we eliminate the Type I rubber. He also stated that there is no design manual guidance as to when to use Type I or Type II, and that he is only making sure that we use only approved tested material.

General discussion revealed they are only wanting to eliminate Type I material, but that Type II, being the higher quality material, will still be used.

Mr. Prather and Mr. Walker agreed that they will work with us to identify editorial changes to other effected sections. Note: Proposed changes have been included in these minutes.

They're targeting the January letting and this item should roll into the 2012 book.

Note: Revised changes to the section 906.02(a)4 were included in the revised Recurring Special Provision 408-R-564.

COMMENTS AND ACTION (CONTINUED)

REVISION TO 906.02(a)4 ASPHALT RUBBER SEALANT  
 REVISION TO 906.02(a)5 POLYCHLOROPRENE JOINT MEMBRANE AND ADHESIVE  
 RECURRING SPECIAL PROVISION 408-R-564 SEALING CRACKS AND JOINTS (ADDED)

Motion: Mr. Walker Second: Mr. Cales Ayes: 9 Nays: 0	Action: <input checked="" type="checkbox"/> Passed as Submitted <input type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  408.05 pg 270; 507.03 pg 337; 507.04 pg 338; 906 pg 785, 786.  Recurring Special Provision affected:  408-R-564 SEALING CRACKS AND JOINTS  Standard Sheets affected:  NONE  Design Manual Sections affected:  None  GIFE Sections cross-references:  SECTION 13	<input checked="" type="checkbox"/> 2012 Standard Specifications Book  <input checked="" type="checkbox"/> Create RSP (No.____) Effective ____ Letting RSP Sunset Date: ____  <input checked="" type="checkbox"/> Revise RSP (No.408-R-564) Effective January, 2011 Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input type="checkbox"/> Create RPD (No. ____) Effective ____ Letting <input type="checkbox"/> 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? <input checked="" type="checkbox"/>



SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

---

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Longitudinal joint performance has been a problem with HMA pavements by allowing water to penetrate the joint and eventually cause stripping of the underlying HMA layers, and deterioration of the joint. Also, low density of the HMA adjacent to the joint may allow water to penetrate this area resulting in the same problems. Sealing the joint to prevent this water intrusion and requiring a minimum density within a designated distance from the joint would improve the joint performance.

PROPOSED SOLUTION: A Special Provision to require a joint adhesive and obtain informational cores for determination of the joint density is required as follows:

1. A joint adhesive material would be required for longitudinal joints constructed in the top course of dense graded intermediate mixtures and all surface mixture courses. This would include joints within the traveled way as well as between the traveled way and an auxiliary lane, traveled way and a paved shoulder, and an auxiliary lane and a paved shoulder.

2. Two additional informational cores would be obtained at the same station as the density acceptance cores. The center of 1 core shall be located 6 in. from the left edge of the course being laced and the center of the other core shall be located 6 in. from the right edge of the course being placed. These cores will not be used to determine the density pay factor.

APPLICABLE STANDARD SPECIFICATIONS: 401

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: Section 13

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Walker

Title: Manager, Office of Materials Management

Organization: INDOT

Phone Number: 317-610-7251x204

Date: September 1, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

Revisions recommended by the INDOT/APAI Longitudinal Joint Density Committee.

REVISION TO THE SPECIAL PROVISION

PROPOSED RECURRING SPECIAL PROVISION 401-R-XXX JOINT ADHESIVE AND  
INFORMATIONAL CORES

401-R-581 JOINT ADHESIVE AND INFORMATIONAL CORES

(Adopted XX-XX-XX)

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, 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, INSERT AS FOLLOWS:

*Joint adhesive 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 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.*

REVISION TO THE SPECIAL PROVISION

PROPOSED RECURRING SPECIAL PROVISION 401-R-XXX JOINT ADHESIVE AND  
INFORMATIONAL CORES

(CONTINUED)

SECTION 401, BEGIN LINE 362, DELETE AND INSERT AS FOLLOWS:

Density acceptance by cores will be based on samples obtained from ~~two~~ 2 random locations selected by the Engineer within each subplot 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 ~~3~~ 12 in. (75 300 mm) from a ~~confined edge or 6 in. (150 mm) from a non-confined~~ 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, INSERT AS FOLLOWS:

*Joint adhesive will be measured by the linear foot in accordance with 109.01(a).*

SECTION 401, AFTER LINE 681, INSERT AS FOLLOWS:

*Joint adhesive will be paid for by the linear foot, complete in place.*

SECTION 401, AFTER LINE 685, INSERT AS FOLLOWS:

*Joint Adhesive, ..... LFT (m)  
course type*

COMMENTS AND ACTION

RECURRING SPECIAL PROVISION 401-R-XXX JOINT ADHESIVE AND INFORMATIONAL CORES

DISCUSSIONS:

Mr. Walker explained that he believed this would be a most effective joint adhesive material to be used along the longitudinal joint between the lanes of new HMA pavement. The use of this material may also slightly change the locations of the cores taken during testing.

Mr. Miller wanted to know why we are accepting this by type A certification. Mr. Walker explained that this material will cost approximately 60 cents per linear foot for each joint and should be cost effective in the long term. Maintenance costs would be reduced and he would like to try it on a few different jobs. He'd also like to see what different materials are presented.

Mr. Prather pointed out that the importance of well constructed joints and how it will affect performance.

Mr. Pankow stated that he wants to make sure it is used on the right jobs.

Mr. Andrews recommended limiting this to just the surface course due to the shortage of funds, especially since we do not yet have cost to benefit ratio.

Mr. Prather explained the long term effects and benefits, providing that the surface is properly compacted. He stated that they're looking for the biggest cost to benefit ratio.

Mr. Miller suggested that this become a research project. Mr. Walker said they'd like to do some test sections on existing jobs.

Whether to make this a USP or RSP, Mr. Andrews recommends a RSP, and Mr. Cales suggested controlling this by Basis of Use. Mr. Miller concurred with controlling by Basis of Use so that not just anyone can put it in a contract.

Mr. Walker also stated that they are not associating the joint problems with any particular type of aggregate.

Mr. Uremovich confirmed the use of the word 'will' on page 47 and suggested that they add 'Method of Measurement' and 'Basis of Payment'. Mr. Miller stated that we still don't know what portion will be labor or material on the bid price.

The suggestion is to create two items, one for Intermediate, and one for Surface. The pay item would be revised to include the course type, with the choices being either intermediate or surface.

Mr. Leuderalbert (FHWA) asked if more than just one supplier can provide this material.

Mr. Prather responded that no, only Crafcro is currently able to supply this. The others could not yet supply this material. Mr. Prather said he feels that other suppliers will come online as the demand grows, but that so far no one else makes it. He also stated that the table shown in the spec is essentially a Crafcro spec.

Mr. Cales asked if the formula is patented and Mr. Prather that it is not, that he is aware.

Mr. Leuderalbert (FHWA) said that it sounds like this is a proprietary item and that they may have to do a public interest finding.

COMMENTS AND ACTION (CONTINUED)

RECURRING SPECIAL PROVISION 401-R-XXX JOINT ADHESIVE AND INFORMATIONAL CORES

Mr. Miller said that he likes the idea of doing this as a research project. Mr. Prather added that this has been studied, but in order to get it launched, then he is okay with leaving out the intermediate layer.

Mr. Andrews cast the only nay vote due to the high cost.

It was then determined that there is no set sunset date and will not be effective to any certain letting. The projects will be as chosen for special use, and is pending review of the Public Interest Finding requirement.

Motion: Mr. Walker Second: Mr. Keefer Ayes: 8 Nays: 1	Action: <input type="checkbox"/> Passed as Submitted <input checked="" type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:  SECTION 401  Recurring Special Provision affected:  NONE  Standard Sheets affected:  NONE  Design Manual Sections affected:  None  GIFE Sections cross-references:  SECTION 13	<input type="checkbox"/> 20__ Standard Specifications Book  <input checked="" type="checkbox"/> Create RSP (No. <u>401-R-581</u> ) Effective <u>TBD</u> Letting RSP Sunset Date: ____  <input type="checkbox"/> Revise RSP (No. ____) Effective ____ Letting RSP Sunset Date: ____  Standard Drawing Effective ____ <input type="checkbox"/> Create RPD (No. ____) Effective ____ Letting <input type="checkbox"/> 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? <u>Pending (see</u> <u>comments)</u>