

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

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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 special provisions, standard drawings, a revision of the Indiana Design Manual, and an 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-SGDW-01 (attached)

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

B

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 6/9/10

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

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

SECTION 805 - TRAFFIC SIGNAL (RSP 805-T-169)

REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS

REVISION TO 805.15 METHOD OF MEASUREMENTS

REVISION TO 805.16 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 805, BEGIN LINE 376, DELETE AND INSERT AS FOLLOWS:

**805.10 Magnetometer, and Microloop, and Wireless Detectors**

***(a) Magnetometer and Microloop Detectors***

Before installation of Magnetometer or Microloop probes the Contractor shall confirm the adequacy of the magnetic field intensity, to be sure that the range is suitable for their operation. Arrangement of probes shall be located at maximum distance from steel support under bridges. Probes shall be installed with their long dimension vertical, and with the cable end at the top. Probes shall be firmly supported, so the lateral and vertical motion is restricted. Probes shall be connected in series. The splice shall be soldered by means of hot iron, or pouring or dripping without flames, with rosin core solder and shall be insulated and waterproofed in accordance with the manufacturer's specifications.

***(b) Wireless Vehicle Detection System***

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

*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 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 degree arc measured from the receiver processor or wireless repeater.*

*The Contractor shall install each in-pavement sensor in the roadway in accordance with 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 in accordance with the manufacturer's recommendations.*

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

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
 SECTION 805 - TRAFFIC SIGNAL (RSP 805-T-169) (CONTINUED)  
 REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS  
 REVISION TO 805.15 METHOD OF MEASUREMENTS  
 REVISION TO 805.16 BASIS OF PAYMENT

*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 Engineer.*

SECTION 805, AFTER LINE 459, INSERT AS FOLLOWS:

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

SECTION 805, AFTER LINE 497, INSERT AS FOLLOWS:

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

SECTION 805, BEGIN LINE 509, INSERT AS FOLLOWS:

Payment will be made under:

Pay Item	Pay Unit Symbol
Contact Closure Card .....	EACH
Controller and Cabinet, _____, _____ Phase.....	EACH
type no.	
Controller and Cabinet, Flasher, _____ .....	EACH
type	
Controller Cabinet Foundation, _____.....	EACH
type	
Controller Cabinet Foundation, M, Modify to P-1 .....	EACH
Disconnect Hanger .....	EACH
Flasher Installation, Location No. _____ .....	LS
Flasher Modernization, Location No. _____ .....	LS
Handhole, Signal .....	EACH
Loop Detector Delay Amplifier, _____ Channel .....	EACH
no.	
Magnetometer Detector.....	EACH
Microloop Detector .....	EACH
Miscellaneous Equipment for Traffic Signals.....	LS
Pedestrian Push Button .....	EACH
Pedestrian Signal Head, _____, _____ .....	EACH
type lens size	
Receiver Processor.....	EACH



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REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

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SECTION 805 - TRAFFIC SIGNAL (RSP 805-T-169) (CONTINUED)

REVISION TO 805.10 MAGNETOMETER AND MICROLOOP DETECTORS

REVISION TO 805.15 METHOD OF MEASUREMENTS

REVISION TO 805.16 BASIS OF PAYMENT

*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.*

REVISED ITEM NO. 09

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
SECTION 922 - TRAFFIC SIGNALS MATERIALS (RSP 922-T-168)  
REVISION TO 922.11 SIGNAL CABLE  
REVISION TO 922.13 DETECTION WIRE AND SEALANT

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SECTION 922, AFTER LINE 3394, INSERT AS FOLLOWS:

**(d) Ethernet Cable**

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

SECTION 922, LINE 3430, DELETE AND INSERT AS FOLLOWS:

**922.13 Detection Wire and Sealant Wireless Detectors**

SECTION 922, AFTER LINE 3460, INSERT AS FOLLOWS:

**(d) Wireless detectors**

*The wireless vehicle detection system, WVDS, shall consist of wireless in-pavement magnetometers, contact closure cards, receiver processors, and wireless repeaters 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 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 list of approved traffic signal control equipment shall be used.*

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT  
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES  
ADDED IDM 77-4.02(04) *DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

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### **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. The wireless repeaters and receiver processors at*

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)  
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES  
ADDED IDM 77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER  
TYPE OF DETECTION

*intersections should be mounted to signal structures. The ethernet cable for the receiver processors may be run across span wire on span and strain pole installations. Wireless vehicle detectors are sufficiently sensitive to detect bicyclists or for use as a counting device. One of the disadvantages of wireless vehicle detector is that they have to be replaced, at least 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.*

#### 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.



REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)  
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES  
ADDED IDM 77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER  
TYPE OF DETECTION

## 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-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 plan detailing. See Figures 77-4H and 77-4I for typical plan details. 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).*

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REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL  
IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT (CONTINUED)  
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES  
ADDED IDM 77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER  
TYPE OF DETECTION

*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.*

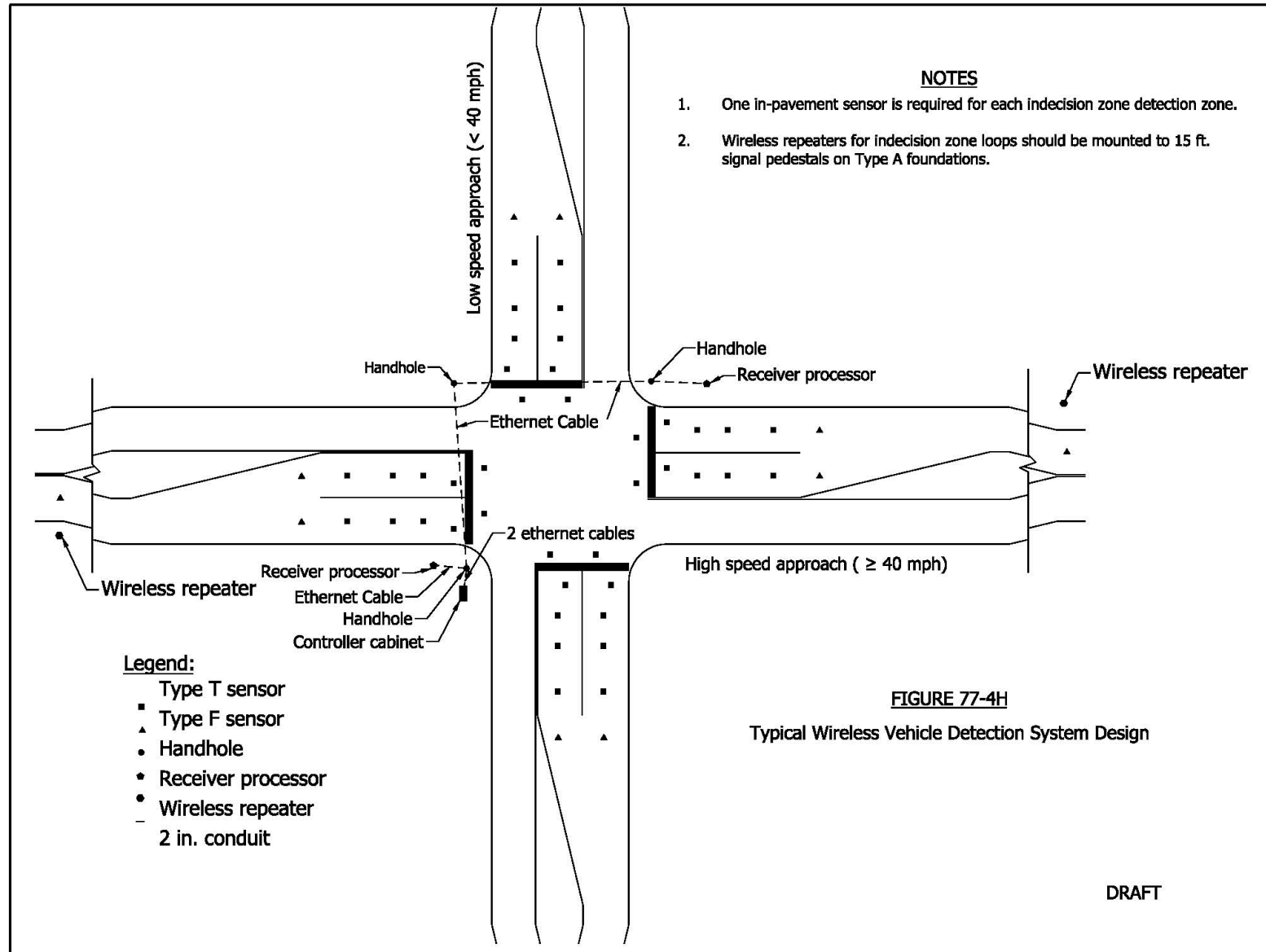
REVISED ITEM NO. 09

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

(CONTINUED)

ADDED FIGURE 77-4H TYPICAL WIRELESS VEHICLE DETECTION SYSTEM DESIGN (DRAFT)

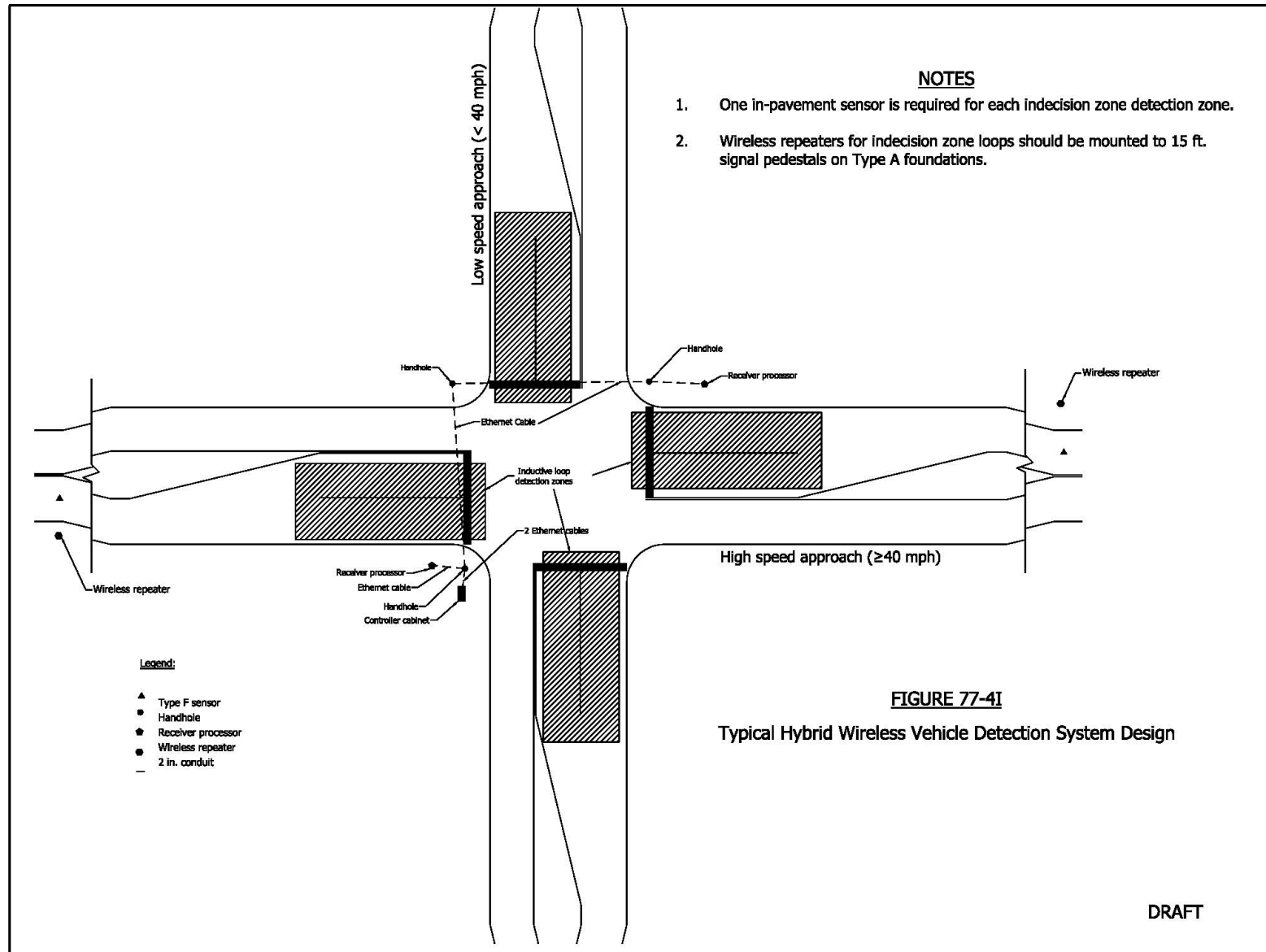


REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

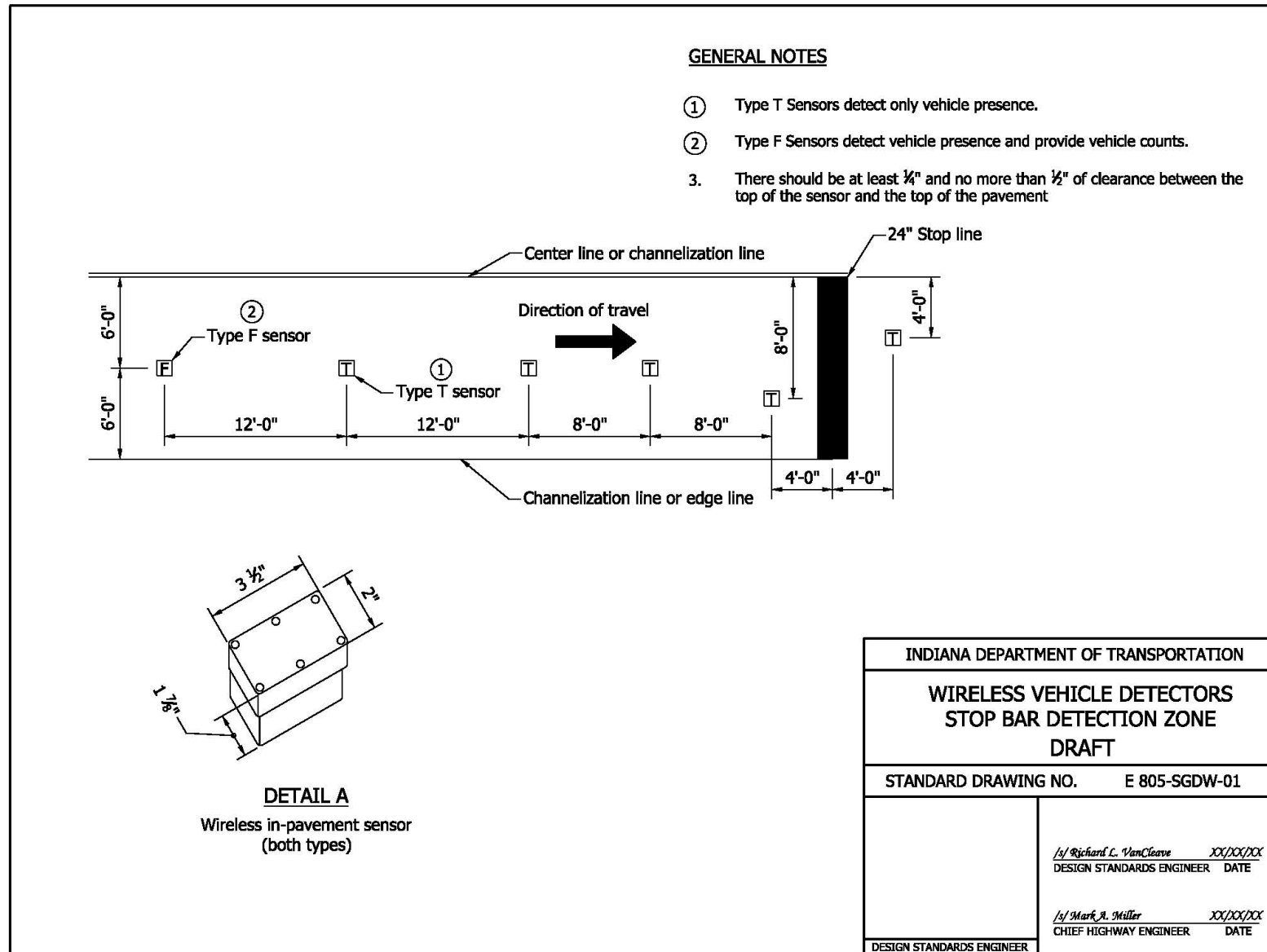
(CONTINUED)

ADDED FIGURE 77-4I *TYPICAL HYBRID WIRELESS VEHICLE DETECTION SYSTEM DESIGN (DRAFT)*



REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

PROPOSED NEW STANDARD DRAWING 805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE (DRAFT)



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REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

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PROPOSED NEW STANDARD DRAWING 805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE (DRAFT)

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REVISED ITEM NO. 09

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS 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)

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 STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

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BACKUP No. 1 (ITM)

(CONTINUED)

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

**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 STANDARD SPECIFICATIONS, DRAWINGS AND DESIGN MANUAL

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BACKUP No. 1 (ITM)

(CONTINUED)

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

**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 STANDARD SPECIFICATIONS, DRAWINGS 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 2-09-05  
Effective 9-01-05

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 STANDARD SPECIFICATIONS, DRAWINGS 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)

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 \_\_\_\_\_

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

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS 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)

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 \_\_\_\_\_

Street No (P. O. Box)

City

State

Zip Code

REVISION TO THE STANDARD SPECIFICATIONS, DRAWINGS 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)

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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

Item No. 09 06/17/10 (2010 SS) (contd.)  
 Mr. Boruff  
 Date: 06/17/10

COMMENTS AND ACTION

REVISION TO THE 805.10 MAGNETOMETER AND MICROLOOP DETECTORS  
 REVISION TO THE 805.15 METHOD OF MEASUREMENTS  
 REVISION TO THE 805.16 BASIS OF PAYMENT  
 REVISION TO 922.11 SIGNAL CABLE  
 REVISION TO 922.13 DETECTION WIRE AND SEALANT  
 REVISION TO IDM 77-4 TRAFFIC SIGNAL EQUIPMENT  
 STANDARD DRAWING 805-SGDW-01 WIRELESS VEHICLE DETECTORS STOP BAR  
 DETECTION ZONE

Motion: Second: Ayes: Nays:	Action: <input type="checkbox"/> Passed as Submitted <input type="checkbox"/> Passed as Revised <input type="checkbox"/> Withdrawn
Standard Specifications Sections affected:	<input type="checkbox"/> 20 Standard Specifications Book
SECTION 805 TRAFFIC SIGNALS SECTION 922 TRAFFIC SIGNAL MATERIALS	<input type="checkbox"/> Create RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>
Recurring Special Provisions	
805-T-169 TRAFFIC SIGNALS 922-T-168 TRAFFIC SIGNAL MATERIALS AND EQUIPMENT	<input type="checkbox"/> Revise RSP (No. <input type="text"/> ) Effective <input type="text"/> Letting RSP Sunset Date: <input type="text"/>
Standard Sheets affected:	Standard Drawing Effective <input type="text"/>
NONE	<input type="checkbox"/> Create RPD (No. <input type="text"/> ) Effective <input type="text"/> Letting
Design Manual Sections affected:	<input type="checkbox"/> Technical Advisory
SECTION 77-4	
GIFE Sections cross-references:	GIFE Update Req'd.? Y <input type="checkbox"/> N <input type="checkbox"/> By <input type="text"/> Addition or <input type="text"/> Revision
NONE	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 type="text"/>