

PERMANENT
TRAFFIC CONTROL DEVICES
LIGHTING - SIGNS - SIGNALS

AN OVERVIEW
OF POTENTIAL PROBLEMS
ON CONTRACT INSTALLATIONS

February 27, 2009

4/1/2009



Agenda

- DISTRICT CONTACTS
- SPECIFICATIONS, STANDARDS, DETAILS
- FIELD CHECKS
- PRE-CONSTRUCTION CONFERENCES
- RECURRING PROBLEMS
 - LIGHTING
 - SIGNS
 - SIGNALS
- AS-BUILT PLANS

DISTRICT CONTACTS

4/1/2009

DISTRICT CONTACTS

CRAWFORDSVILLE

WILLIAM R. SMITH

Traffic & Roadway Engineering Manager

(765) 361-5631

DISTRICT CONTACTS

FORT WAYNE

Dana Plattner

Traffic Engineer
(260) 969-8233

DISTRICT CONTACTS

GREENFIELD

RANDY GLESING
Traffic-Construction Liaison
Engineer

(317) 467-3421



4/1/2009

DISTRICT CONTACTS

LAPORTE

MIKE ESSLING

Maintenance & Operations Engineer

(219) 325-7542

DISTRICT CONTACTS

SEYMOUR

ED COX

Maintenance & Operations Engineer
(812) 524-3762

DISTRICT CONTACTS

VINCENNES

TERRY BOUGH
Traffic Operations Engineer
(812) 895-7450

4/1/2009



SPECIFICATIONS, STANDARDS, & DETAILS

4/1/2009

The INDIANA Manual On

UNIFORM TRAFFIC CONTROL DEVICES

2008 Edition

Indiana Manual on Uniform Traffic Control Devices

for Streets and Highways

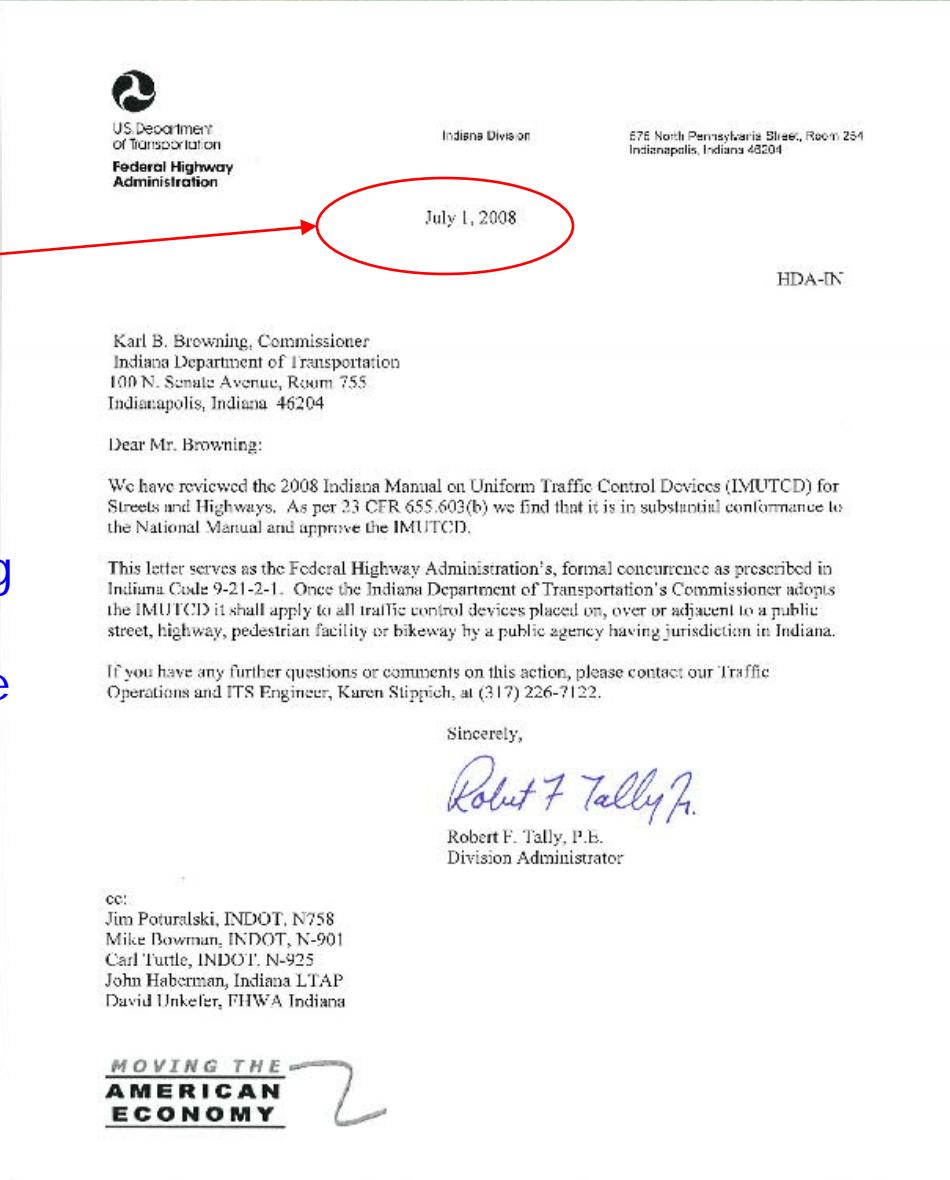
The INDIANA Manual On **UNIFORM TRAFFIC CONTROL DEVICES**

July 1, 2008

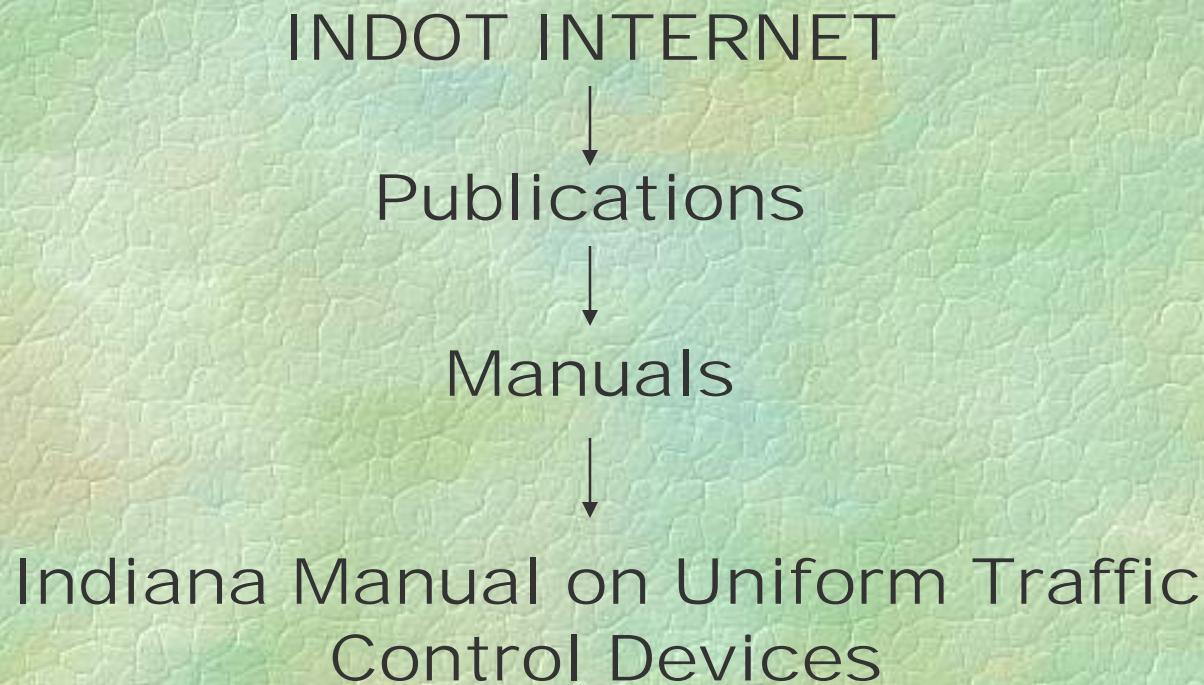
FHWA approval for the INDIANA MUTCD

Commissioner Browning
“adopted” the IMUTCD
on the same date as the
FHWA approval.

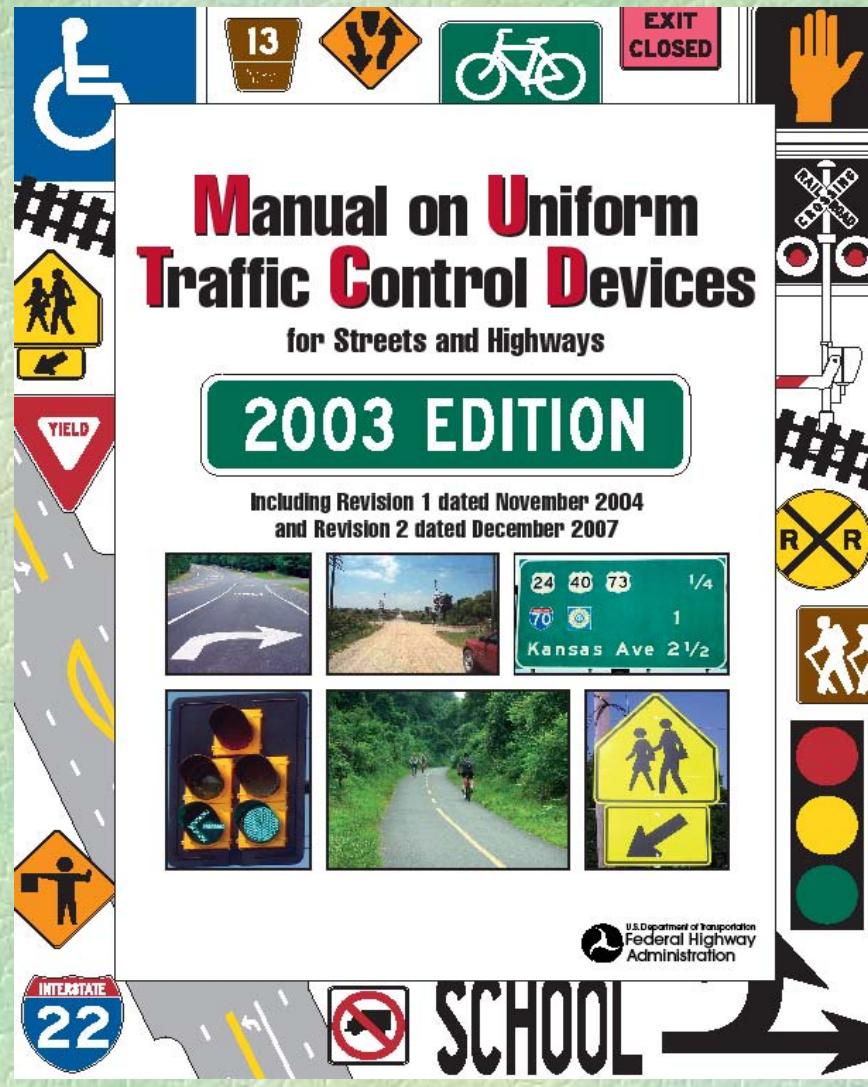
4/1/2009



The INDIANA Manual On UNIFORM TRAFFIC CONTROL DEVICES



The FHWA Manual On Uniform Traffic Control Devices



4/1/2009

The FHWA Manual On
UNIFORM TRAFFIC CONTROL DEVICES
2003 EDITION

is available at:

<http://mutcd.fhwa.dot.gov>

DESIGN FIELD CHECKS

4/1/2009

DESIGN FIELD CHECKS

District Traffic Personnel should always be invited

- Review details of the design
- Answer questions
- Confirm with Consultant or Design Engineer the specific needs and desires of District

PRE-CONSTRUCTION CONFERENCES

4/1/2009

PRE-CONSTRUCTION CONFERENCES

The District Traffic Personnel should be invited to all Pre-Construction Conferences

- Answer Traffic Control questions
- Discuss plan problems or changes
- Review traffic signal maintenance during the contract
- Review the **SIGNAL TURN-ON** procedure
- Review the Chain-of-Command

“Chain-of-Command”

The Contractor should **NOT**
“By-Pass” the PE / PS
by directly contacting the
District Traffic Personnel

All Traffic Control questions should go through
YOU !

RECURRING PROBLEMS

4/1/2009

RECURRING PROBLEMS

LIGHTING

RECURRING PROBLEMS : LIGHTING

- Locating existing underground lighting equipment for Contractors:
→ INDOT is developing a policy for this activity



4/1/2009



RECURRING PROBLEMS : LIGHTING

Communication with the District Traffic Personnel
about the **functional condition** of
Lighting Systems in your contract area:

- Some Districts have TM (Traffic Maintenance) contracts for their Lighting Systems
- District Traffic Personnel conduct scheduled inspections of lighting for maintenance

RECURRING PROBLEMS : LIGHTING

CONSTRUCTION DETAIL PROBLEMS

Waterproofing of splices in Handholes

- Done poorly with improper materials, or, not per INDOT standards and spec's
- NOT DONE AT ALL !



RECURRING PROBLEMS

SIGNS

RECURRING PROBLEMS : SIGNS

Maintaining continuously :

ALL **REGULATORY** SIGNS

(Spec. Book 104.04)



RECURRING PROBLEMS : SIGNS

Relocation of existing signs

- Proper disassembly
- Proper re-assembly



4/1/2009

RECURRING PROBLEMS : SIGNS

Relocation of existing signs

- Proper storage : Vertical & Separated
- If possible : Out of the Weather



4/1/2009

Wrong

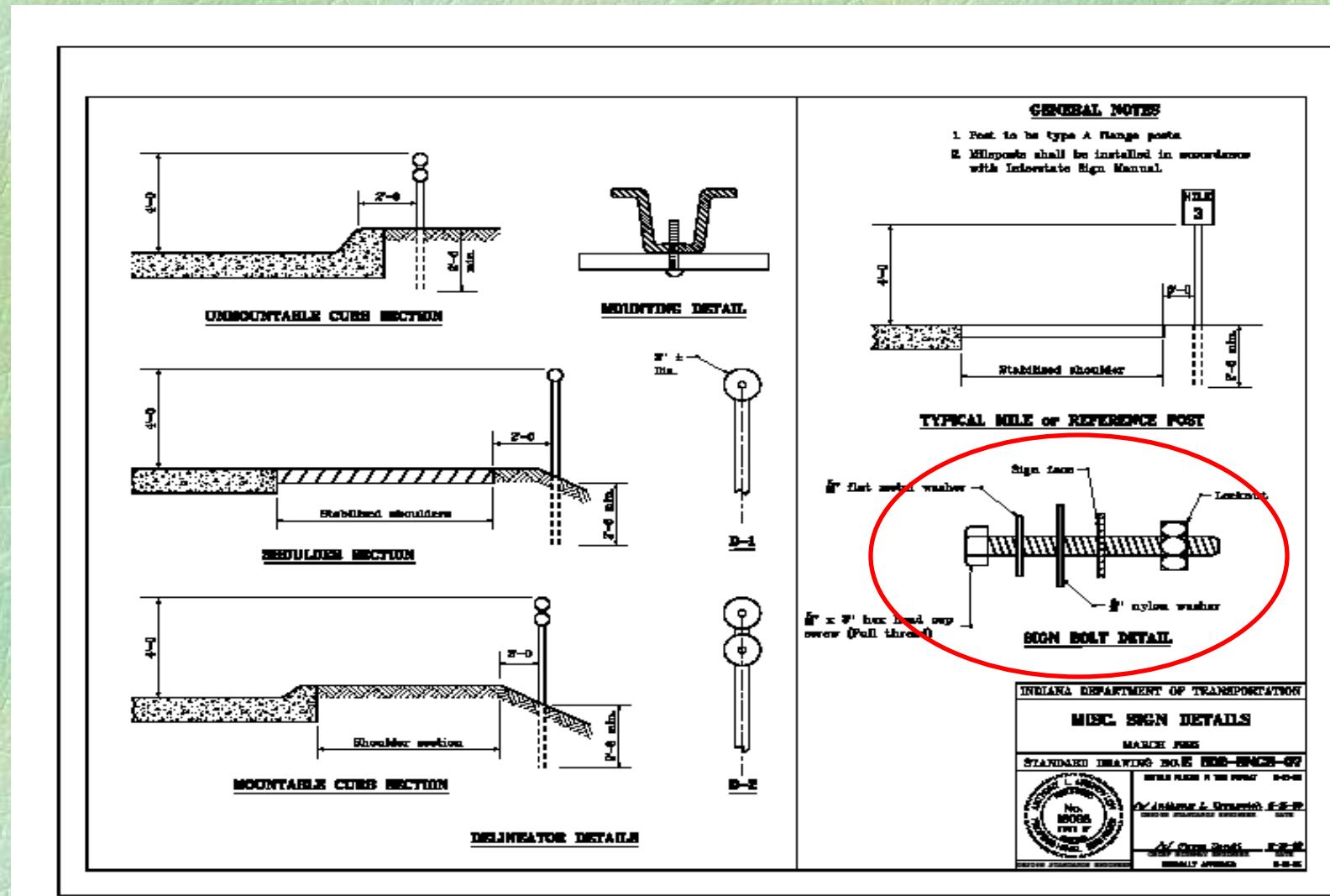


Right

RECURRING PROBLEMS : SIGNS

Proper bolt & washer installation:

- Taking care not to damage the sheeting material



RECURRING PROBLEMS : SIGNS

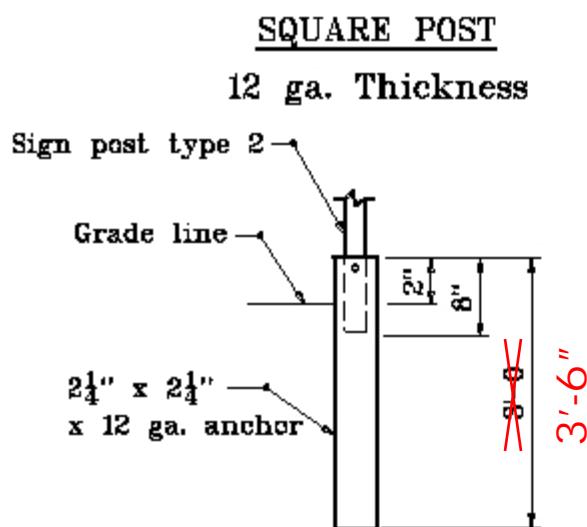
Proper driven-post depth



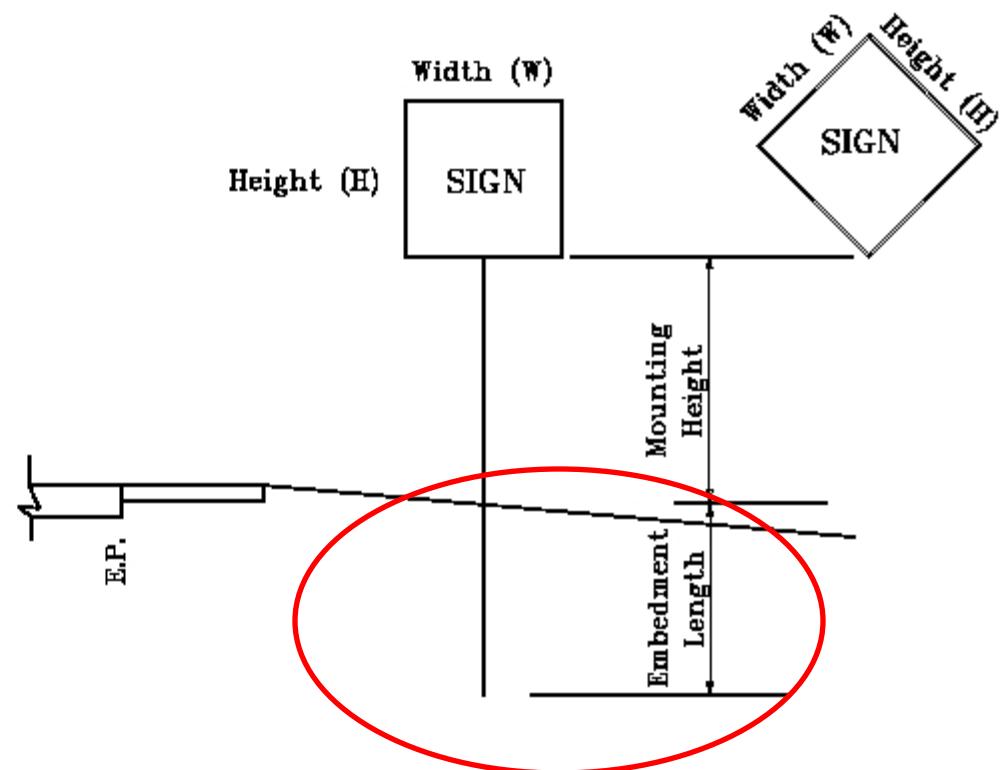
4/1/2009

RECURRING PROBLEMS : SIGNS

Proper driven post depth

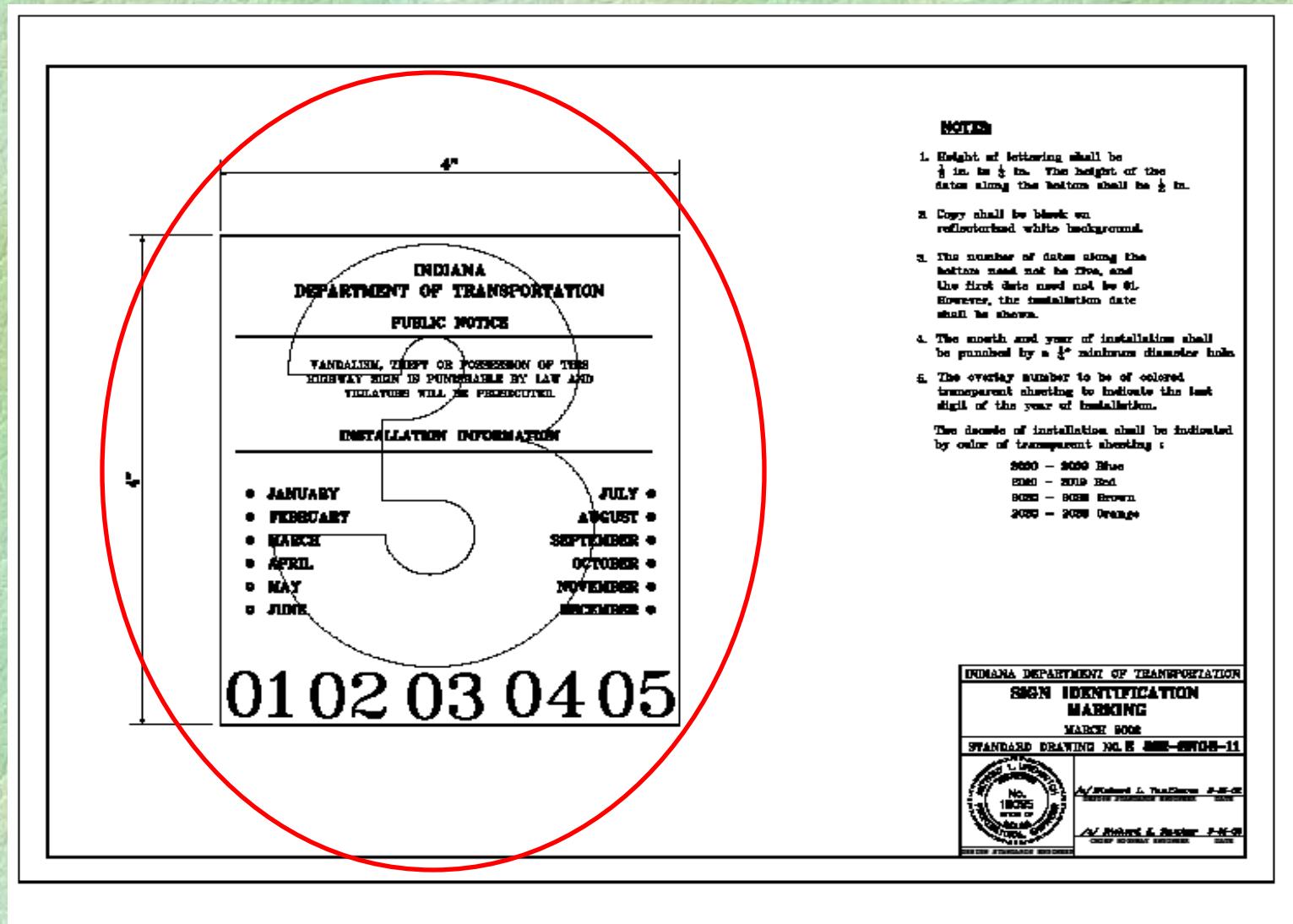


UNREINFORCED ANCHOR BASE



RECURRING PROBLEMS : SIGNS

Identification Sticker on the back of the sign



RECURRING PROBLEMS

TRAFFIC SIGNALS

RECURRING PROBLEMS : TRAFFIC SIGNALS

Skilled, Knowledgeable, and Experienced Signal Technicians
are sometimes hard to find on the job.

Spec. 805.03 requires that

- Electrical wiring terminations and splices
- Controller and cabinet set-up
- Testing, review and turn-on of all operational apparatus

Be done by, or under the charge of, a

LEVEL II TRAFFIC SIGNAL ELECTRICIAN

CHECK CREDENTIALS !

RECURRING PROBLEMS : TRAFFIC SIGNALS

Documentation of work done by the contractor's technician:

Signing the CABINET CARD

RECURRING PROBLEMS : TRAFFIC SIGNALS

Documentation of work done by the contractor's technician:

Submitting the **LOOP TEST REPORT**

<u>LOOP TESTING TABLE</u>											
INTERSECTION _____						PAGE _____ CONTRACT NO. _____					
COMMISSION NO. _____											
TEST PERFORMER-CONTRACTOR (C) _____						DATE _____					
TEST PERFORMER-CONTRACTOR (S) _____						DATE _____					
LOOP DESIGNATION											
Number of Turns											
Inductance 80 to 800	μH	READINGS AT DETECTOR HOUSING BEFORE SPLICED									
Resistance	≤8Ω										
Voltage	≤3Ω										
Megohm (Loop)	>MΩ										
Megohm (Lead-in)	>MΩ										
<u>READINGS AT CABINET AFTER SPLICED</u>											
Inductance 80 to 800	μH	C									
		S									
Resistance	≤8Ω	C									
		S									

RECURRING PROBLEMS : TRAFFIC SIGNALS

Contractor may request a **PUNCHLIST** inspection
or, a signal **TURN-ON**
before the work is completed.

Before District Traffic is called

YOU NEED TO DETERMINE:

- **IS THE POWER INSTALLED ?**
- **IS THE DETECTION INSTALLED & FUNCTIONING ?**
- **IS INTERCONNECT INSTALLED & FUNCTIONING ?**

RECURRING PROBLEMS : TRAFFIC SIGNALS

YOU

SHOULD

CONDUCT A FIELD INSPECTION

TO CONFIRM THAT ALL THE WORK IS
FINISHED AND THE PROJECT IS INDEED
READY FOR A

SIGNAL PUNCHLIST

or

SIGNAL TURN-ON

RECURRING PROBLEMS : TRAFFIC SIGNALS

Salvaged Material Delivery :

Sometimes, a Contractor delivers salvaged signal materials without prior notification to the District Traffic Section

Sometimes,
Contractors deliver
salvaged signal
materials without a
SALVAGED MATERIAL
REPORT

These practices are NOT acceptable!

4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

The procedure for
SIGNAL TURN-ON

Should always be discussed in detail
at the
PRE-CONSTRUCTION CONFERENCE

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL DETECTION LOOP INSTALLATIONS

4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP LAYOUT

It is usually a good practice to have a representative of the DISTRICT TRAFFIC SECTION present when loop locations are laid out, i.e., prior to cutting the loops.



RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP SPLICING

- Poor Workmanship by some contractors
- Don't follow INDOT standards

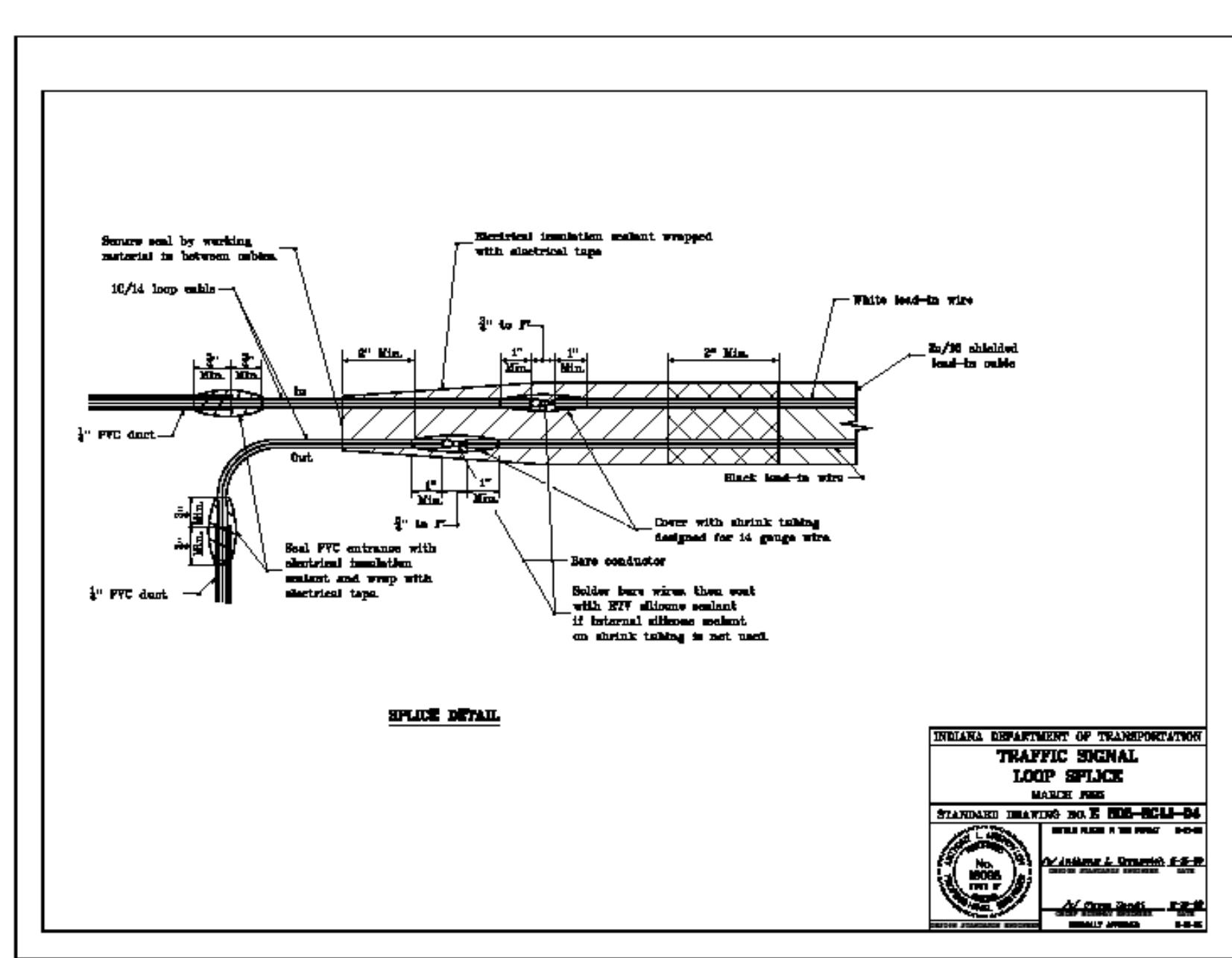
RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP SPLICING

Some Districts may have their own desired variations on the INDOT standard.

Check with Traffic Personnel to confirm their preferences for loop splice installation details.

RECURRING PROBLEMS : TRAFFIC SIGNALS





4/1/2009

Proper Installation Procedures

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING

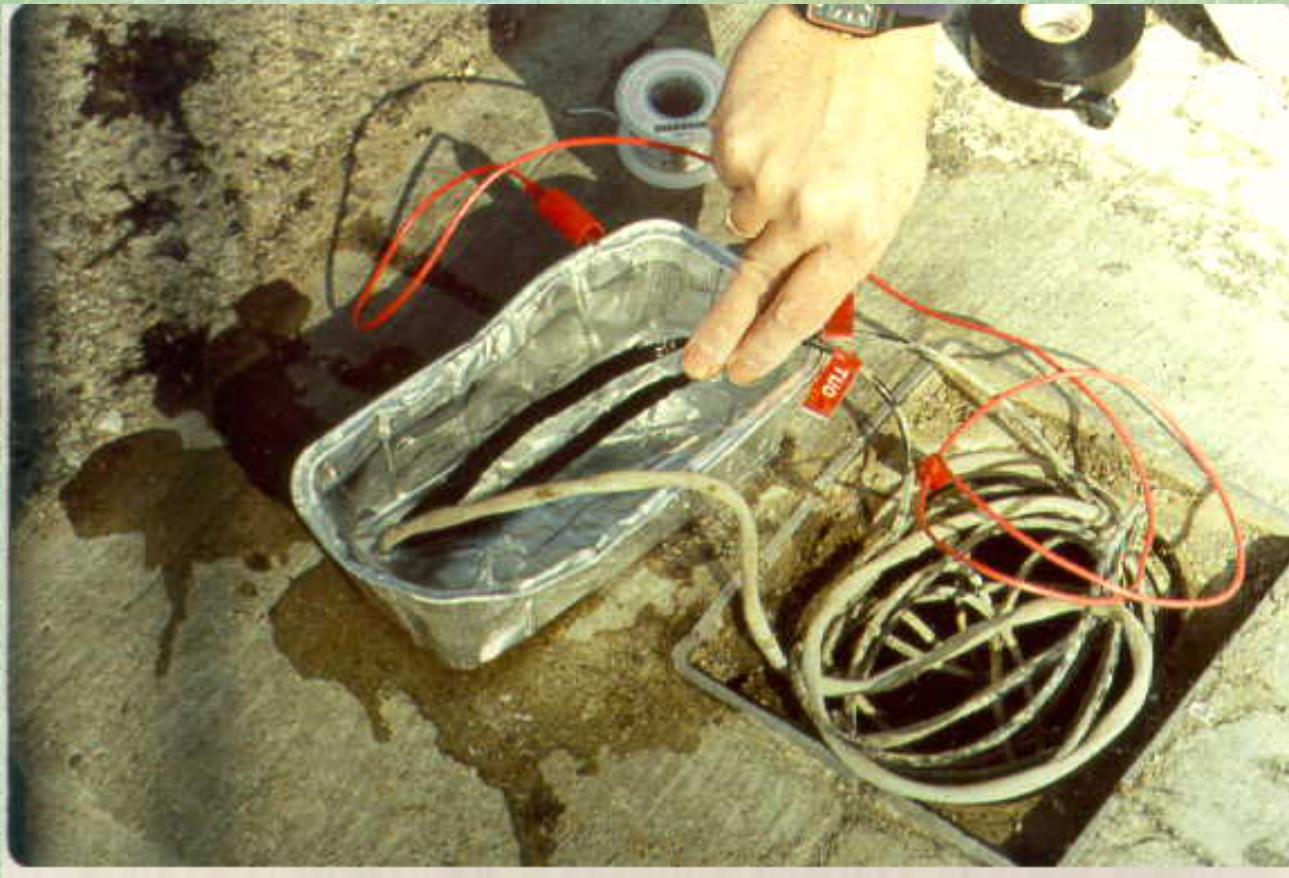
Spec 805.09 REQUIRES the contractor to perform FOUR tests on newly installed detection loops:

- Megohm Test before the Splice is made at the Detector Housing (for the loop)
- Megohm Test before the Splice is made at the Detector Housing (for the lead-in cable)
- Megohm Test after the Splice at the Detector Housing is completed (WET TEST)
- Vehicle Simulator Test

**These tests are important
to insure the long-term serviceability
of new loops !**

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

LOOP TESTING

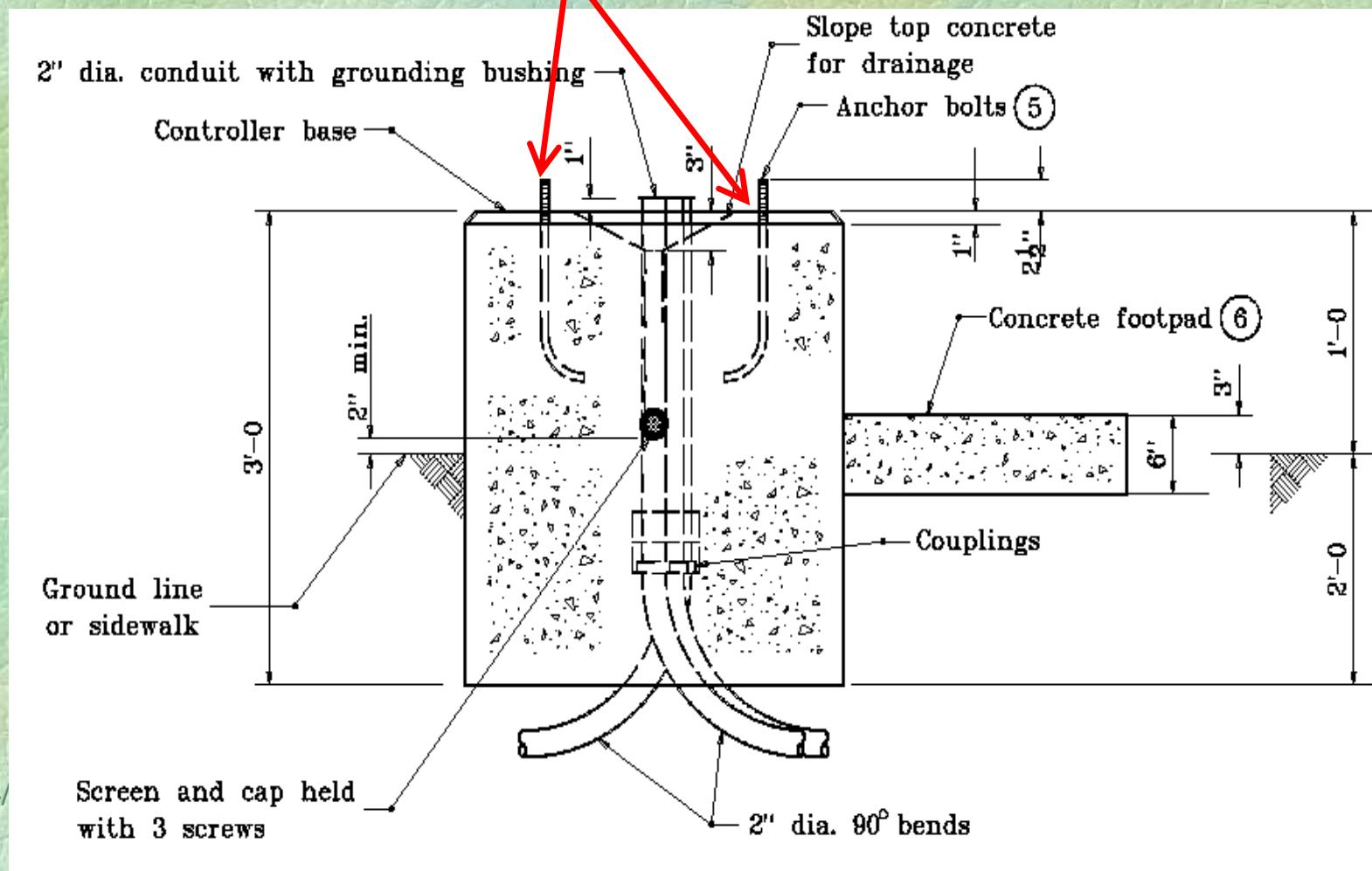
- Some Contractors don't perform the **WET SPLICE** test
- Some Contractors don't perform the **VEHICLE SIMULATOR** test

These tests are important to insure the long-term serviceability of new loops !

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

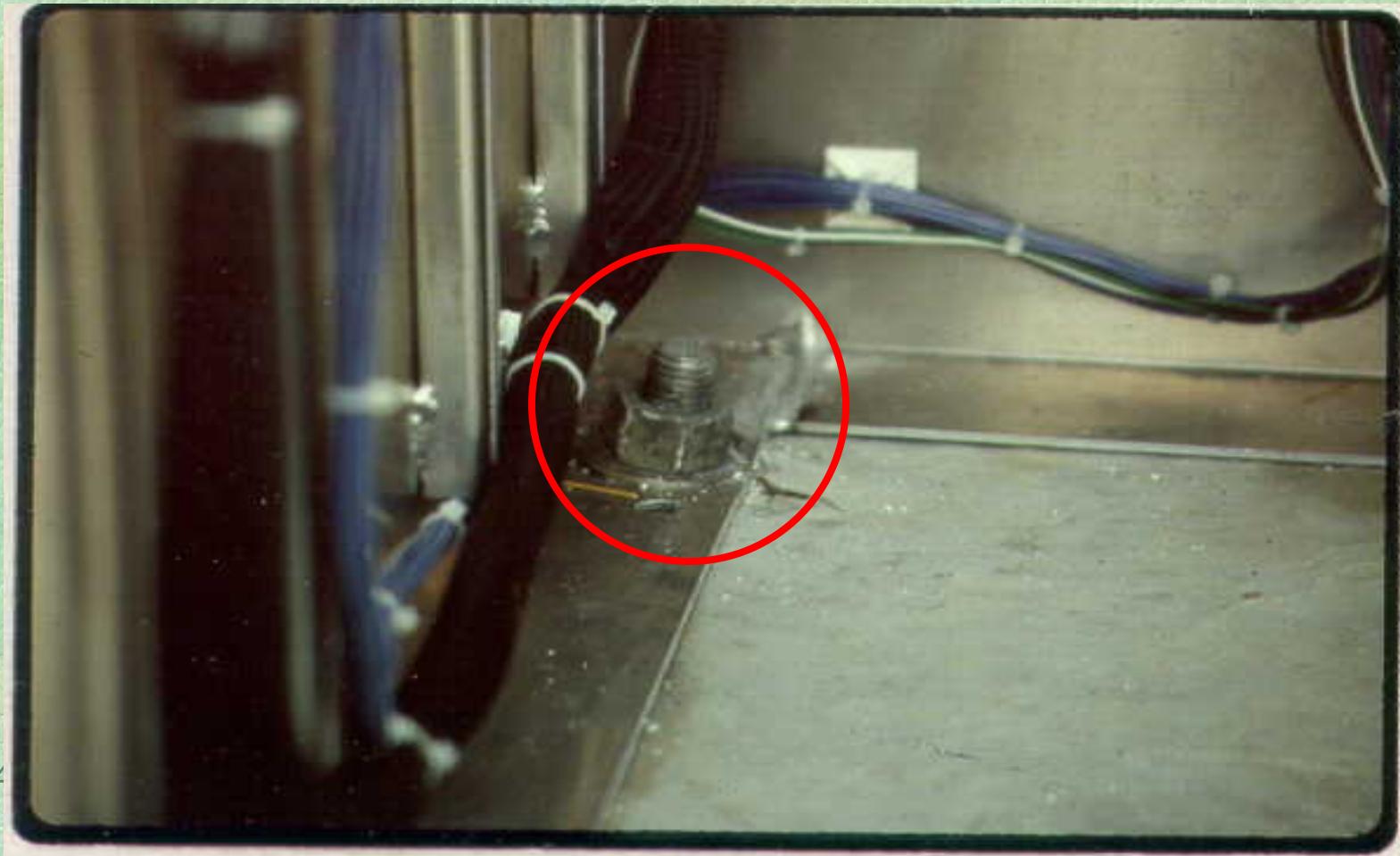
- CONTROLLER CABINETS
- Anchor Bolts



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**
 - Anchor Bolts

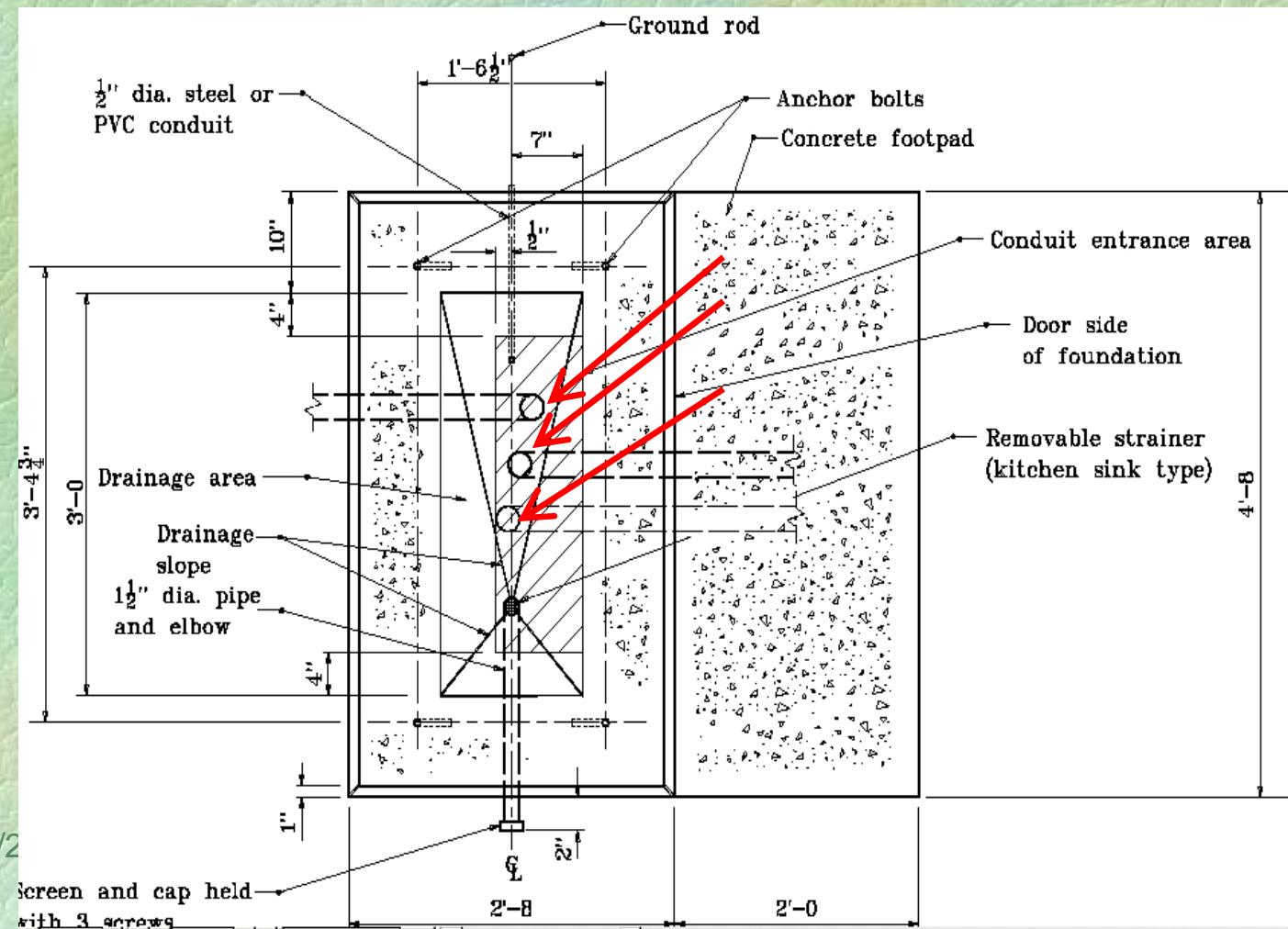


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

•CONTROLLER CABINETS

•Conduit Placements

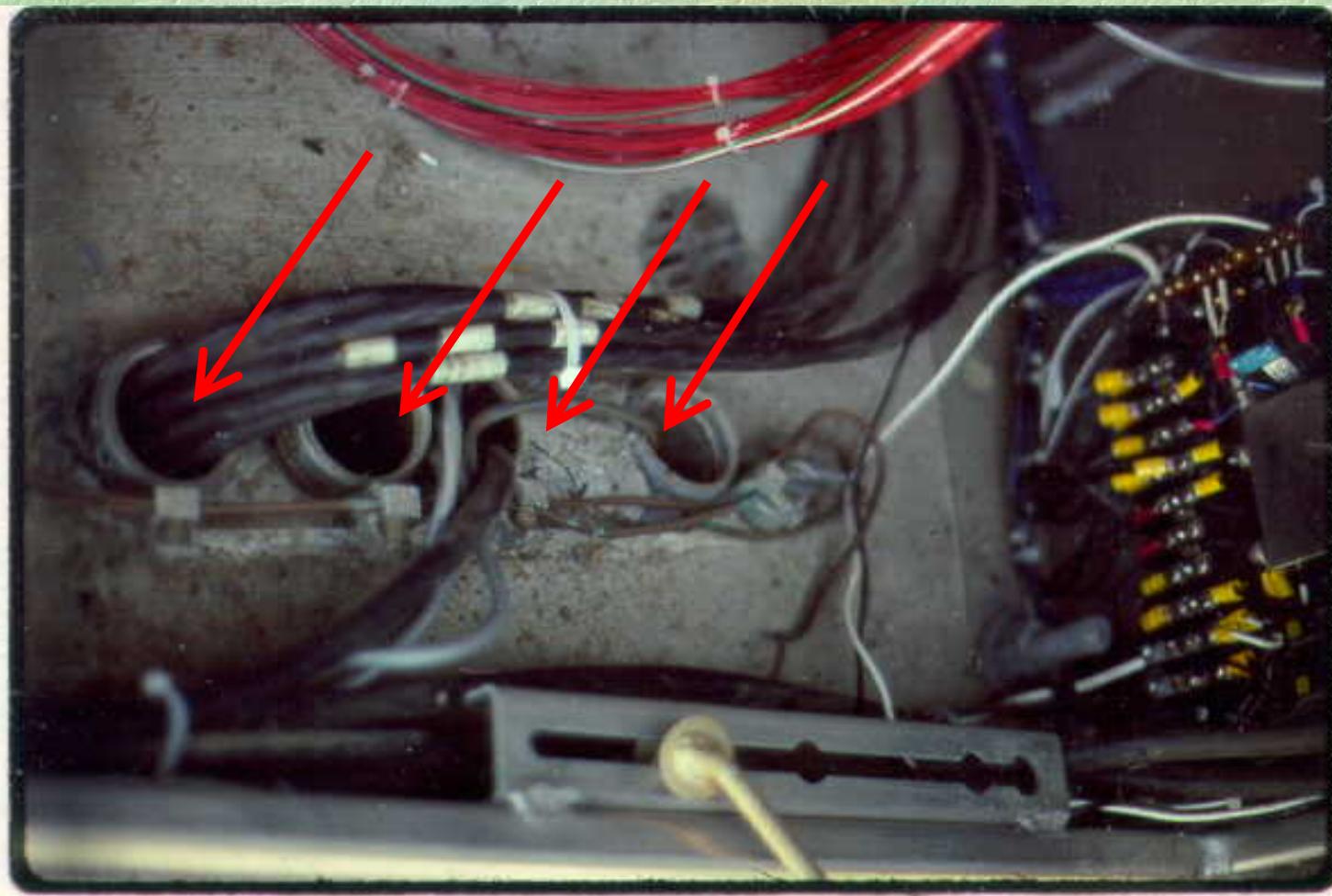


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- **Conduit Placements**

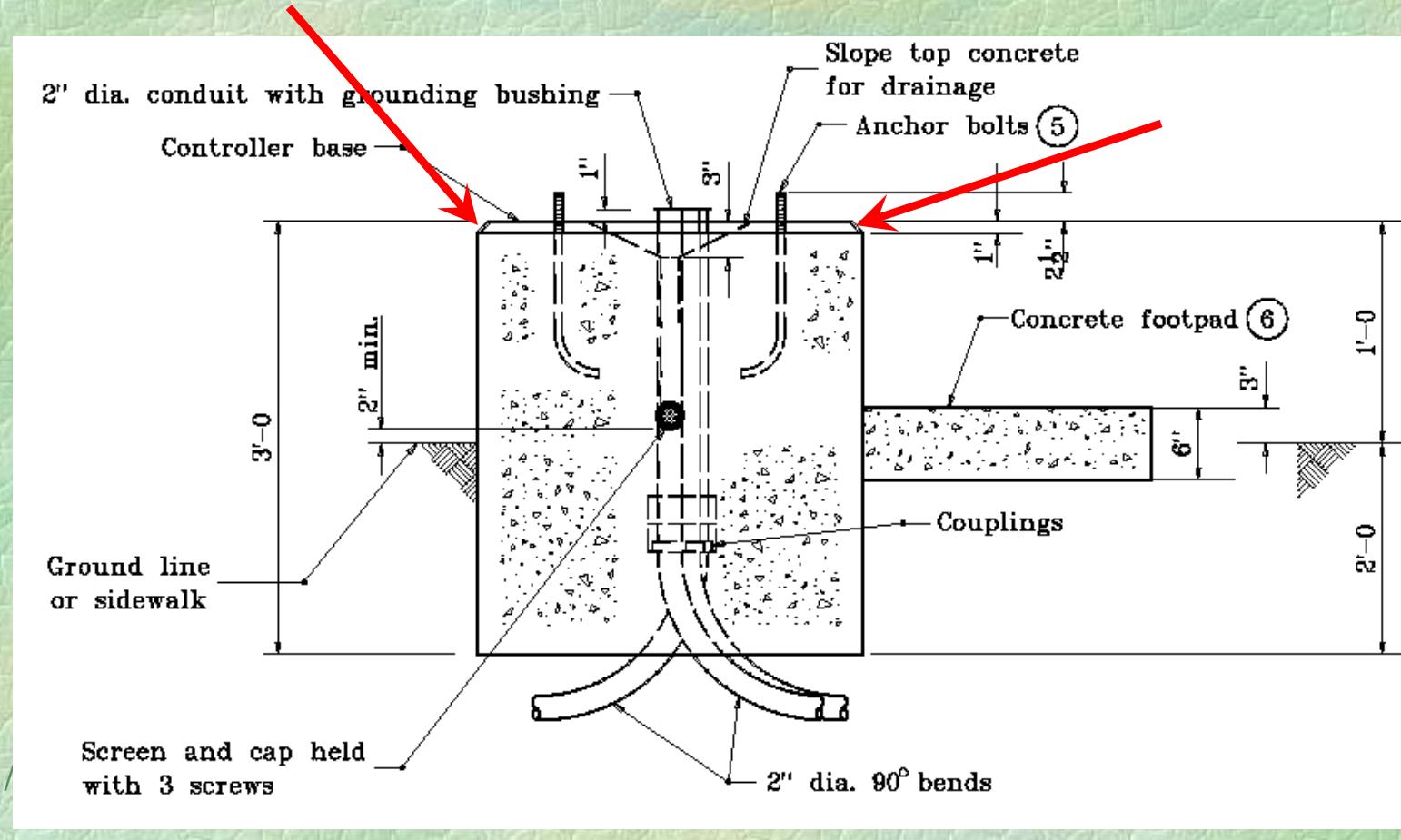


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

•CONTROLLER CABINETS

- Chamfered Edges



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- Chamfered Edges

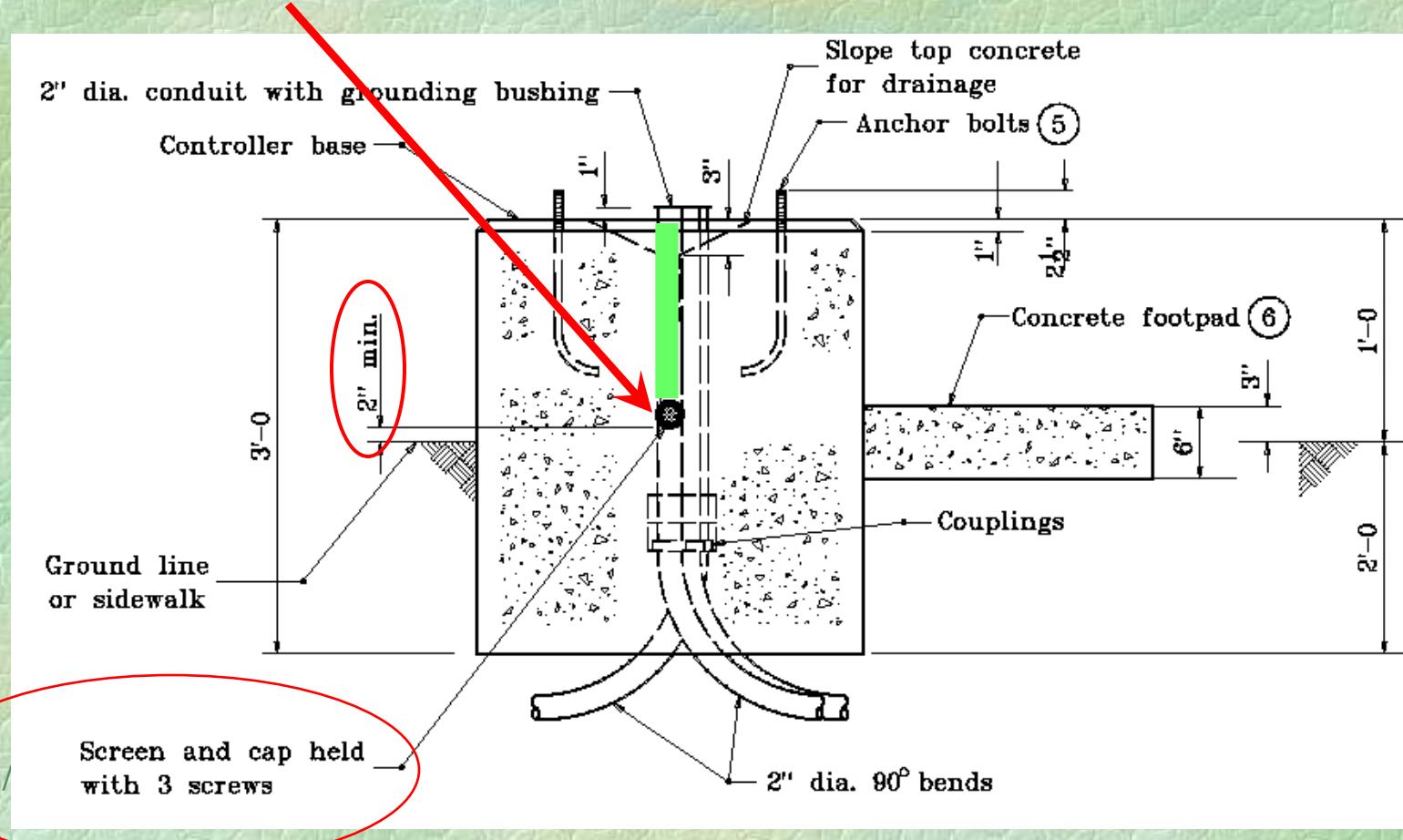


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

•CONTROLLER CABINETS

•Functioning Drain



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURE FOUNDATIONS

- **CONTROLLER CABINETS**

- Drainage
- Top Surface Slope
- Drain Access/Location
- Drain Plugged



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

- **SIGNAL SUPPORT POLES**
- Raked, before spans are installed
- Plumb, after spans are installed

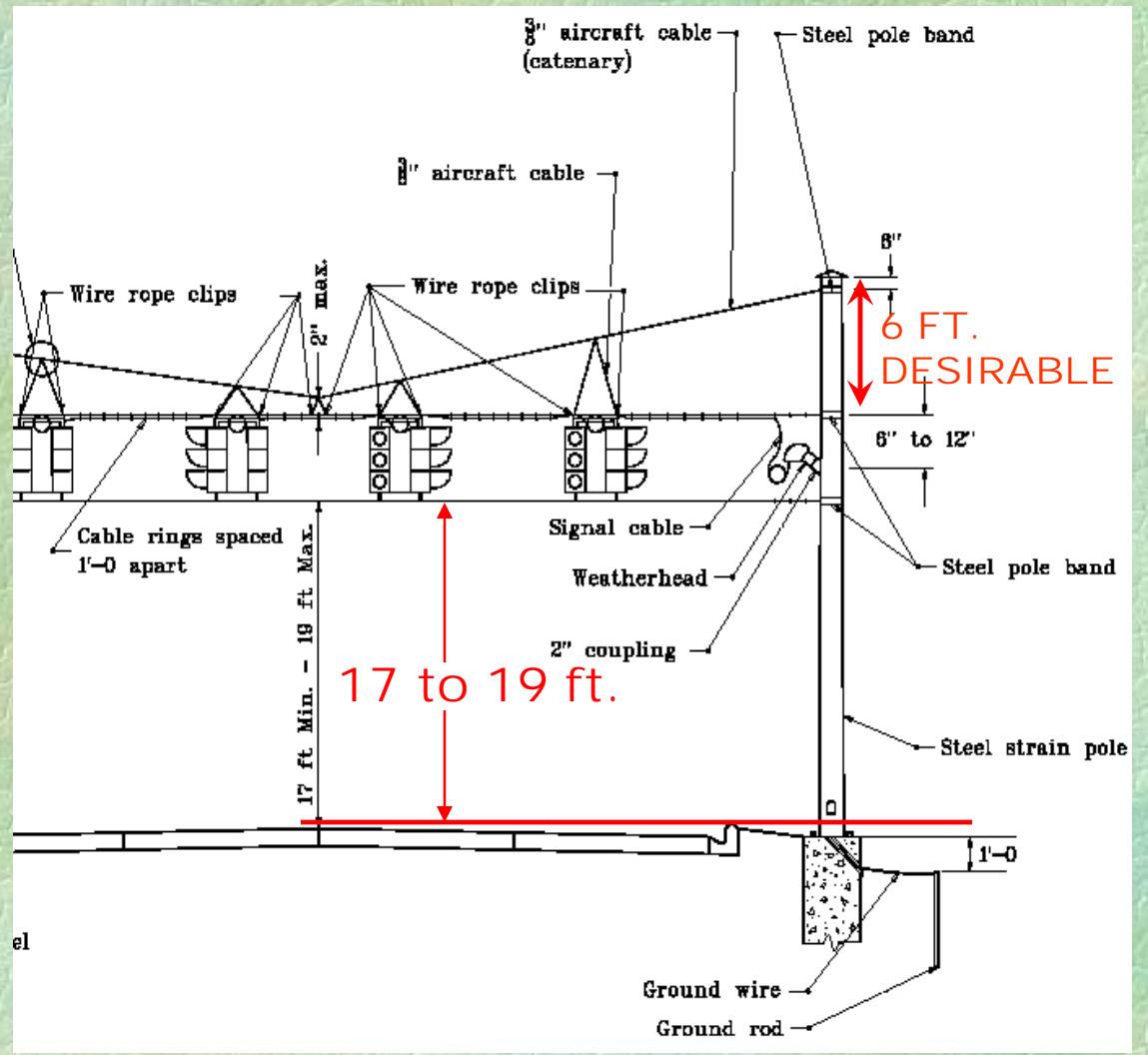


RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

• SIGNAL SUPPORT POLES

- Proper Foundation elevation
- Span / Catenary separation
- Proper Tether Mounting Height



RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

- SIGNAL SUPPORT POLES
- Span / Catenary separation



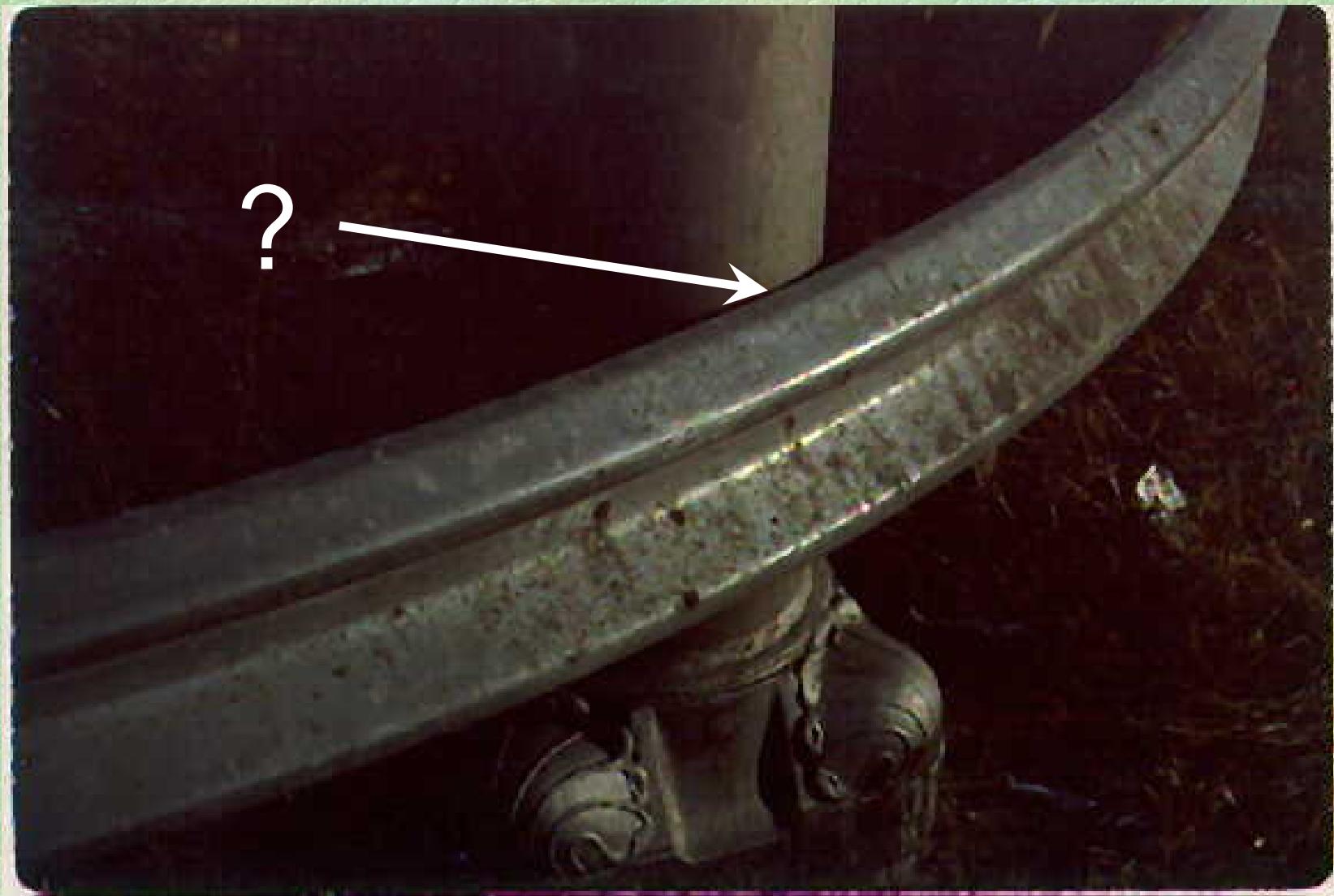
4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

- **LOCATED AS PER PLANS**
(or as directed by **YOU**)
- Any significant location changes should be discussed with the District Traffic Personnel
- Some Contractors may want to relocate structures or conduit runs, but

BEWARE : The Contractor's primary concern may be for his own convenience or savings



4/1/2009

RECURRING PROBLEMS : TRAFFIC SIGNALS

SIGNAL STRUCTURES

Avoid installation of controller cabinets and handholes in ditches



4/1/2009

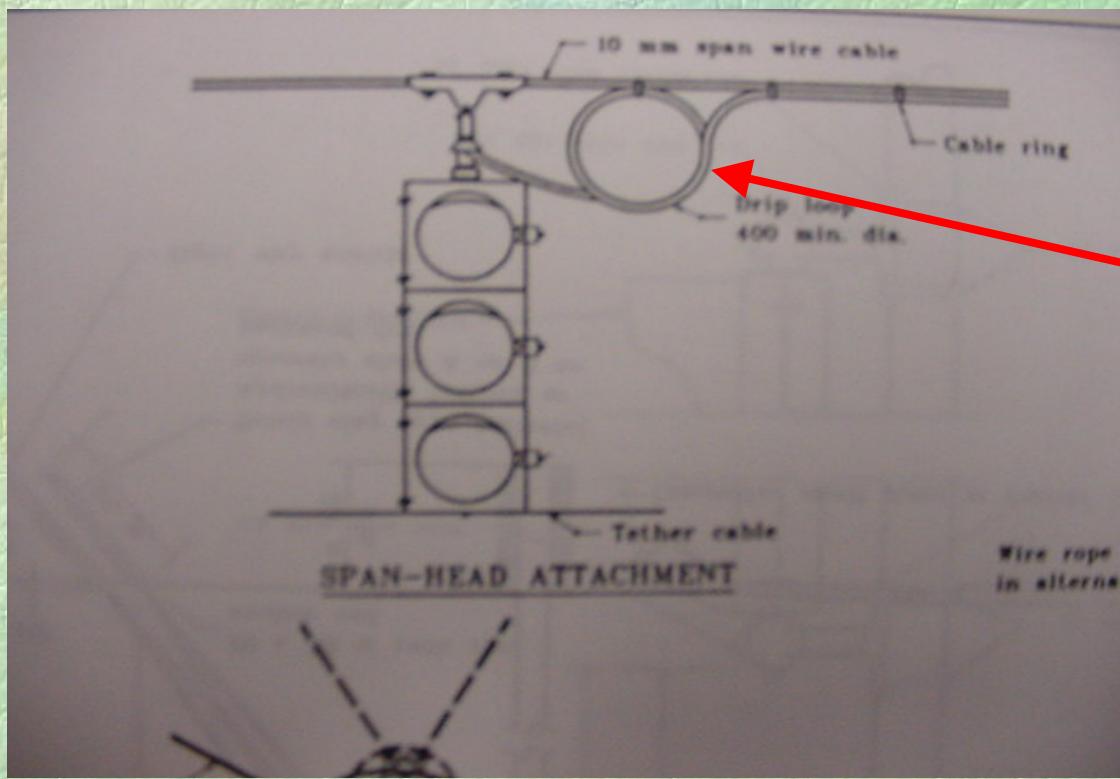
WRONG !

RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

•PROPER DIAMETER

- Standards say 16"
- Some Districts prefer smaller - 8" in Greenfield

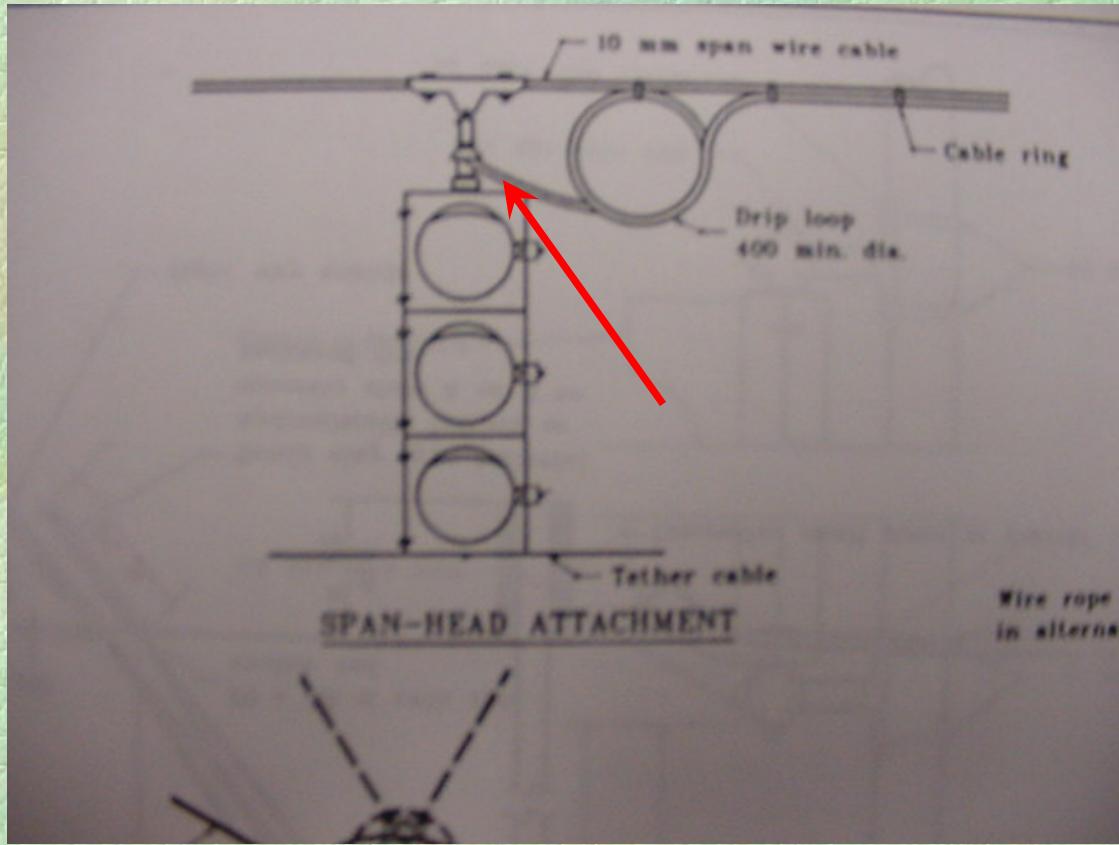


RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

• ORIENTATION

- Wire should enter the head from below



RECURRING PROBLEMS : TRAFFIC SIGNALS

DRIP LOOPS

- ORIENTATION

NOT FROM ABOVE



RECURRING PROBLEMS : TRAFFIC SIGNALS

ELECTRICAL GROUNDING

- LOOSE CONNECTIONS IN A FOUNDATION OR THE BASE OF A POLE
- GROUNDING ROD MISSING

YOU

may encounter these, or many other,
problems during the installation of
TRAFFIC CONTROL DEVICES

DO NOT HESITATE TO SEEK
THE ADVICE OF
DISTRICT TRAFFIC PERSONNEL

AS-BUILT PLANS

4/1/2009

AS-BUILT PLANS

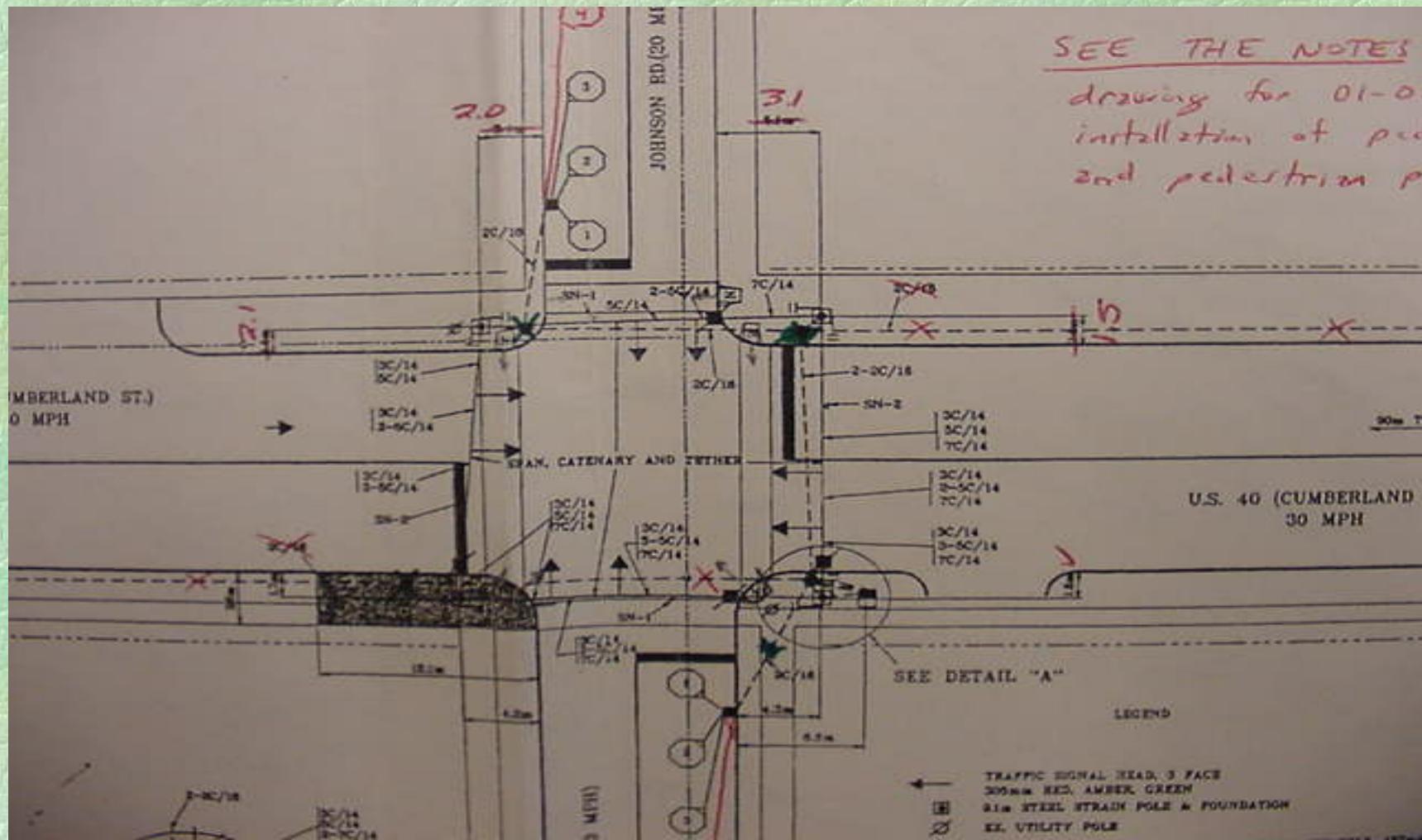
Are needed by the

DISTRICT TRAFFIC SECTION

in order to insure that the
LONG-TERM MAINTENANCE
of INDOT's Traffic Control Devices
can be accomplished
with a minimum of difficulty

AS-BUILT PLANS

- Clearly marked with installation details



AS-BUILT PLANS

- The District Traffic Section may want to receive the **As-Built Plans** **BEFORE** the contract is accepted
- Some Contracts **REQUIRE** (per a Special Provision) that the **As-Built Plans** be submitted before the Contract is accepted

ANY
QUESTIONS?



4/1/2009