

# Signal Detection

- 8-20.3(14)c
- Induction loop Vehicle Detectors
- Video detection
- Pre-form loops
- Magnetometers
- 9-29.18 Vehicle Detectors

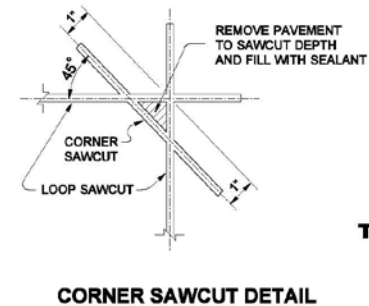
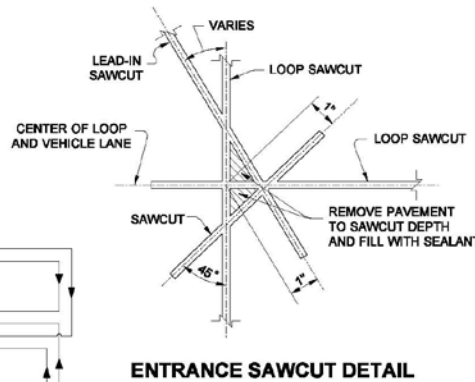
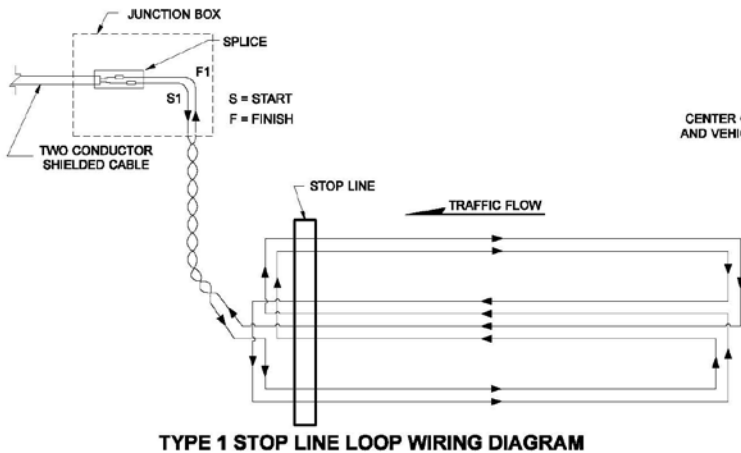
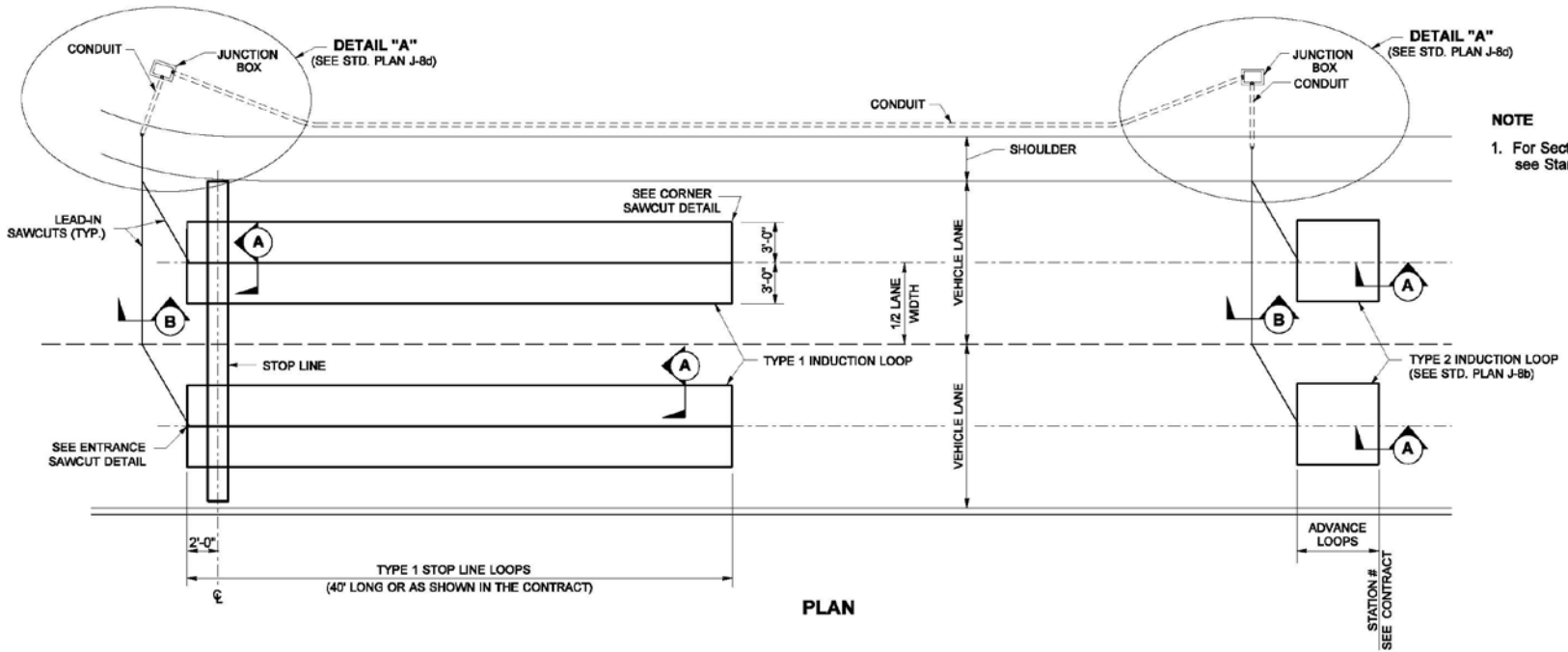
Loop Details  
J-8a through J-8d

Skip J-8 drawings  
Go to Circle Saw



# Standard Plan J-8a

DRAWN BY: MONIQUE GLICK



**TYPE 1 INDUCTION LOOP**  
**STANDARD PLAN J-8a**  
SHEET 1 OF 1 SHEET

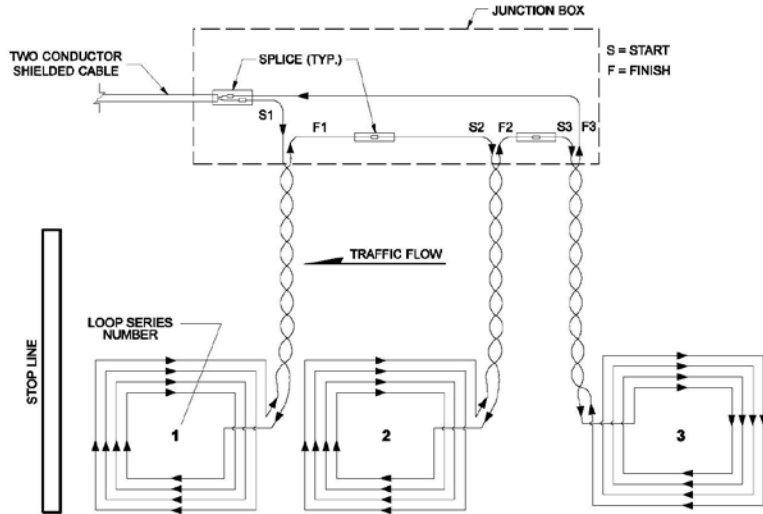
APPROVED FOR PUBLICATION  
**Harold J. Peterfeso** 05-20-04  
STATE DESIGN ENGINEER DATE  
Washington State Department of Transportation

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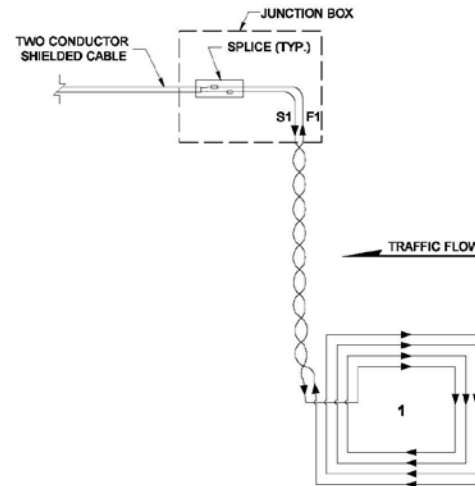


# Standard Plan J-8b 2 of 2

DRAWN BY: MONIQUE GLICK



**TYPE 2 STOP LINE LOOP WIRING DIAGRAM  
(SERIES SPLICE SHOWN)**

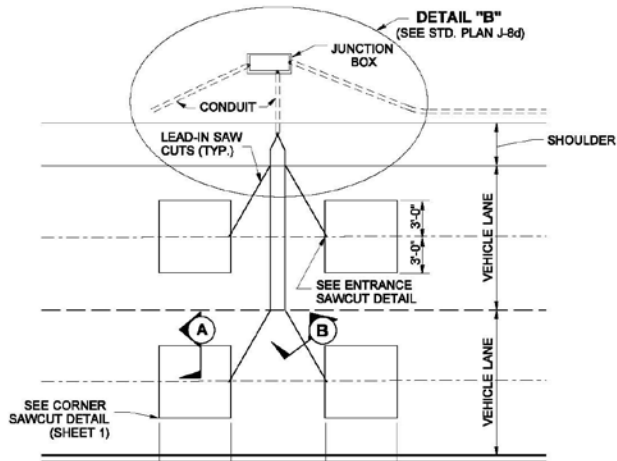


**TYPE 2 ADVANCE LOOP WIRING DIAGRAM**

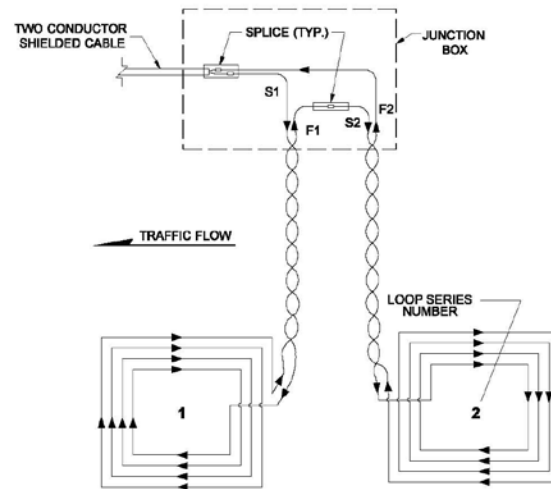
**NOTES**

1. All of the loop lead-in wires shall return to the Junction Box.
2. For Splice Detail, see Standard Plan J-8d.

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**TYPE 2 SAMPLING LOOPS**



**TYPE 2 SAMPLING LOOP WIRING DIAGRAM  
(SERIES SPLICE SHOWN)**



EXPIRES MAY 5, 2005

**TYPE 2 INDUCTION LOOP**

**STANDARD PLAN J-8b**

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

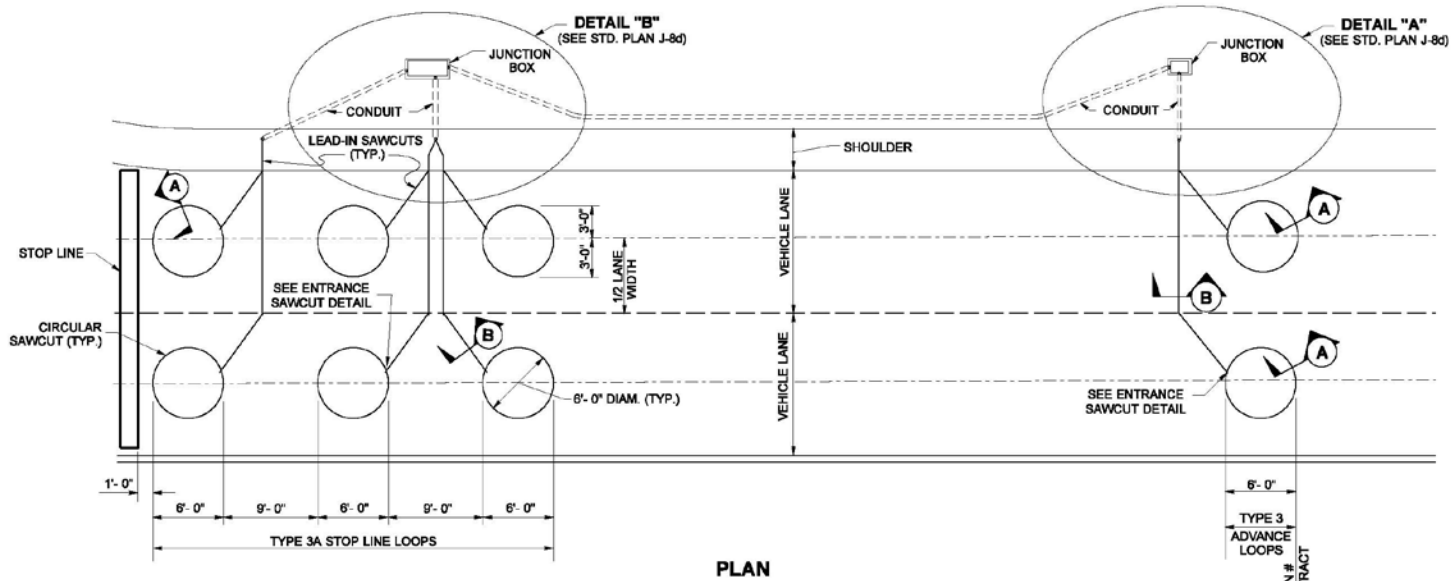
**Harold J. Peterfeso** 05-20-04  
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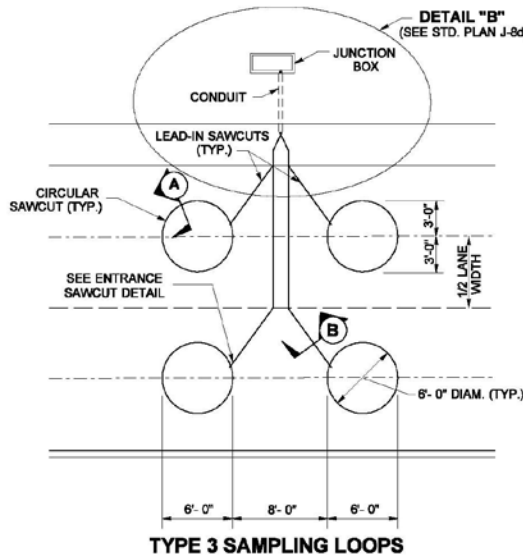
# Standard Plan J-8c 1 of 3

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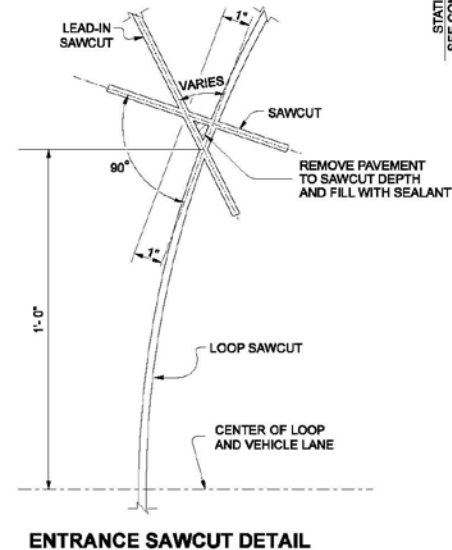


PLAN

**NOTE**  
1. For Sections A and B, see Standard Plan J-8d.



TYPE 3 SAMPLING LOOPS



ENTRANCE SAWCUT DETAIL



EXPIRES MAY 5, 2005

**TYPE 3 INDUCTION LOOP**

**STANDARD PLAN J-8c**

SHEET 1 OF 3 SHEETS

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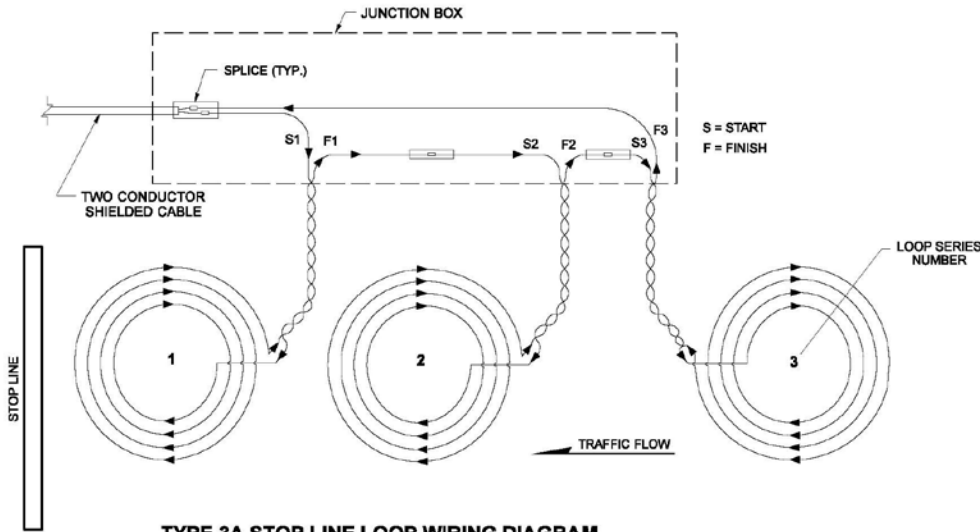


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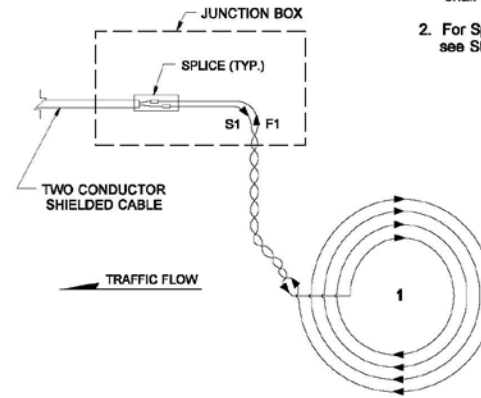
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# Standard Plan J-8c 2 of 3

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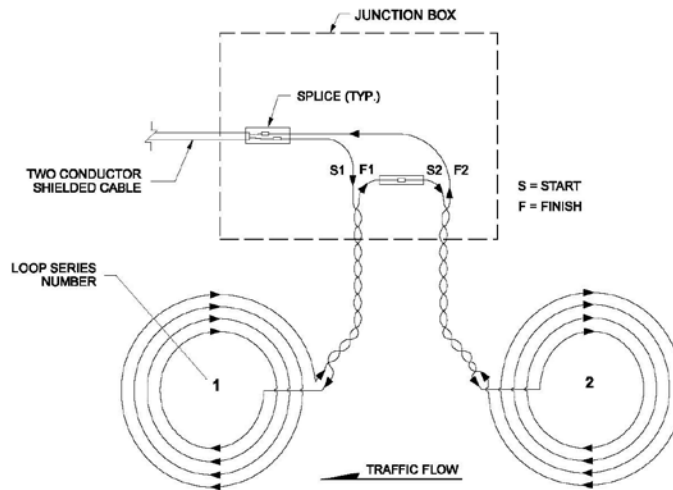
**TYPE 3A STOP LINE LOOP WIRING DIAGRAM**  
(SERIES SPLICE SHOWN)



**TYPE 3 ADVANCE LOOP WIRING DIAGRAM**

**NOTES**

1. All of the loop lead-in wires shall return to the Junction Box.
2. For Splice Detail, see Standard Plan J-8d.



**TYPE 3 SAMPLING LOOP WIRING DIAGRAM**  
(SERIES SPLICE SHOWN)



EXPIRES MAY 5, 2005

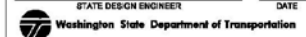
**TYPE 3 INDUCTION LOOP**

**STANDARD PLAN J-8c**

SHEET 2 OF 3 SHEETS

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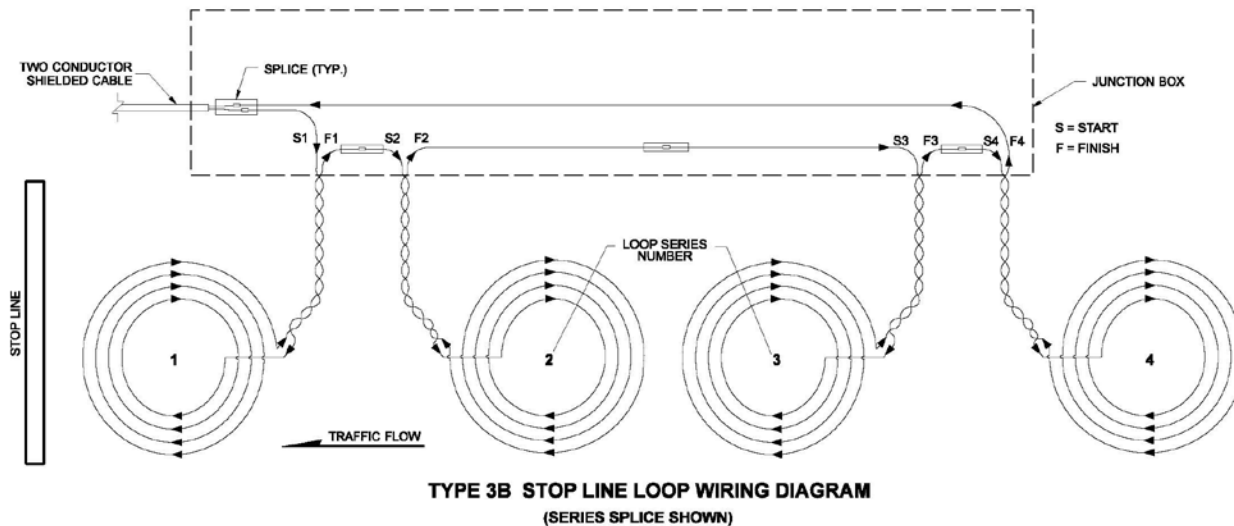
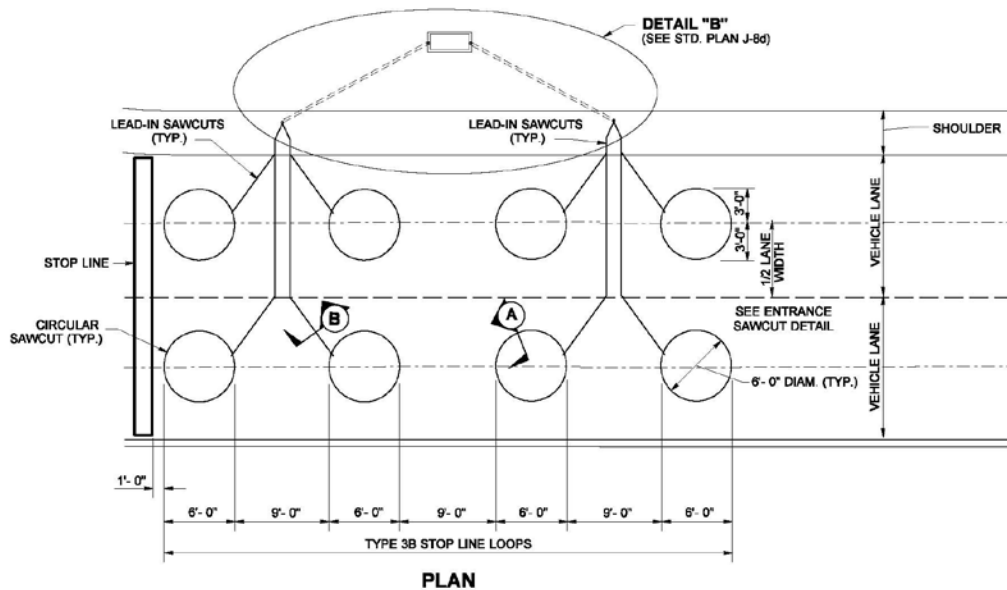
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# Standard Plan J-8c 3 of 3

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**TYPE 3 INDUCTION LOOP**

**STANDARD PLAN J-8c**

SHEET 3 OF 3 SHEETS

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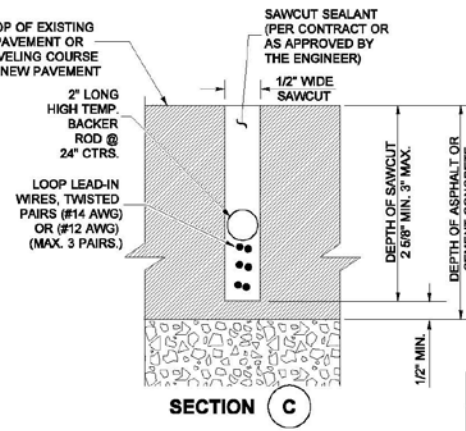
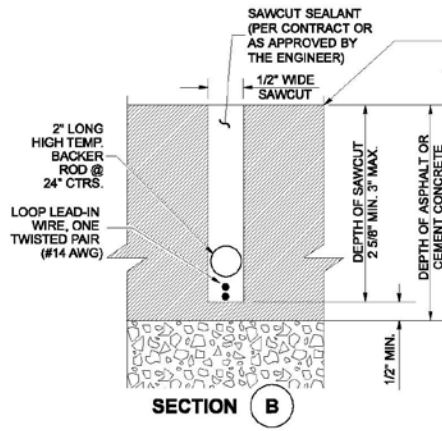
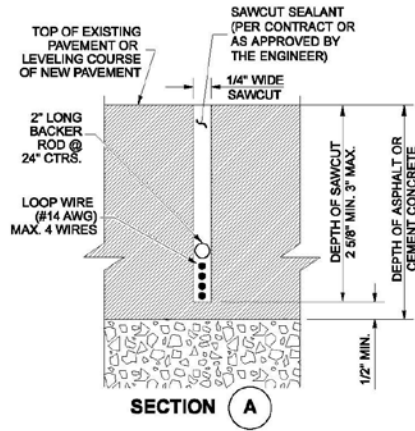
DATE



Washington State Department of Transportation

# Standard Plan J-8d 1 of 2

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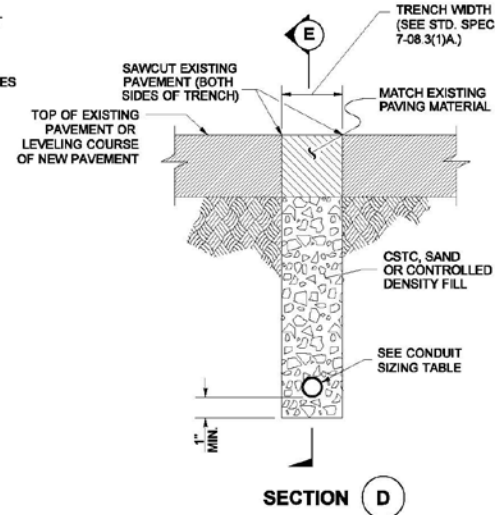
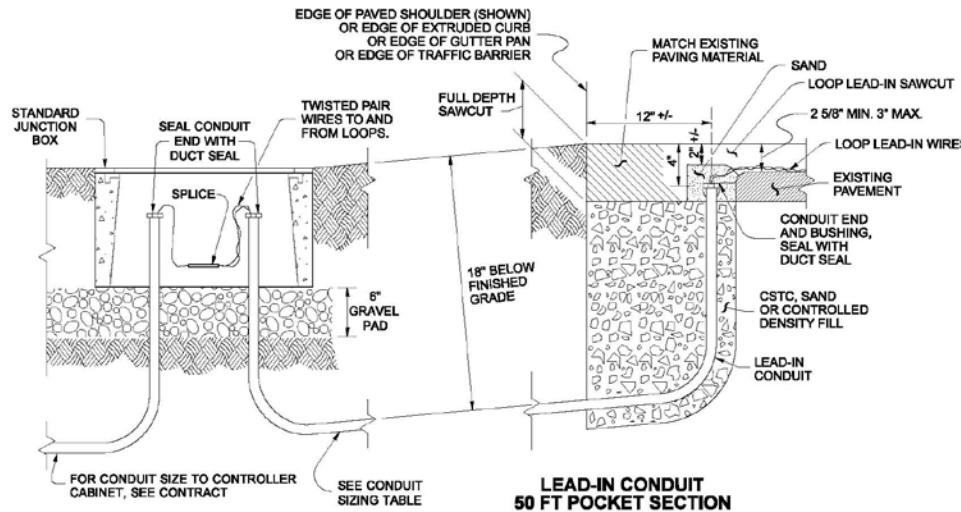


**NOTES**

1. Fill the conduit trench to the top of the existing or new surfacing with CSTC, sand or controlled density fill. See "Standard Specifications" Section 2-09.3(1)E.
2. Minor Regional variation is allowed in the soft pocket closure. Consult with the Engineer or see the Contract for additional requirements.
3. Conductors shall be snug to the bottom of the sawcut. High temperature backer rod shall be snug to the conductors.

**CONDUIT SIZING TABLE**

LOOP LEAD PAIRS	1-2	3	4-5	6-8	9-12
CONDUIT SIZE (MIN)	1"	1 1/4"	1 1/2"	2"	3"



**JUNCTION BOX PLACEMENT**

**SECTION E**



EXPIRES MAY 5, 2005

**INDUCTION LOOP DETAILS  
STANDARD PLAN J-8d**

SHEET 1 OF 2 SHEETS

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DATE

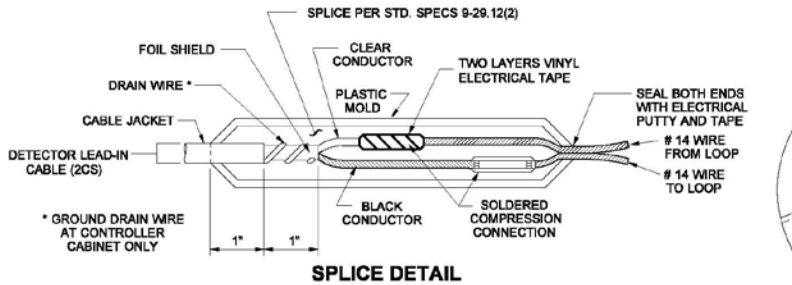


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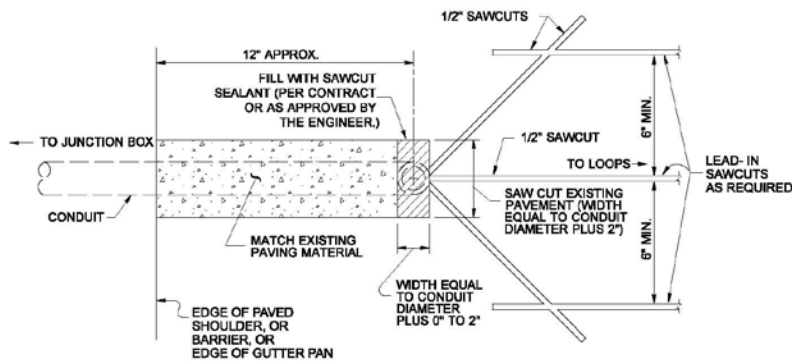
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# Standard Plan J-8d 2 of 2

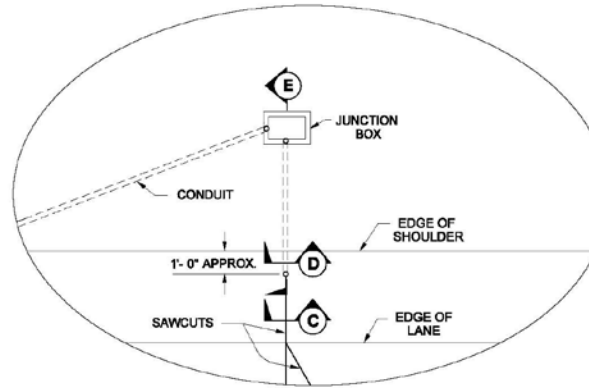
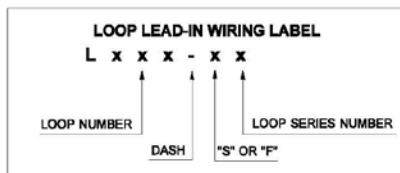
DRAWN BY: MONIQUE GLICK



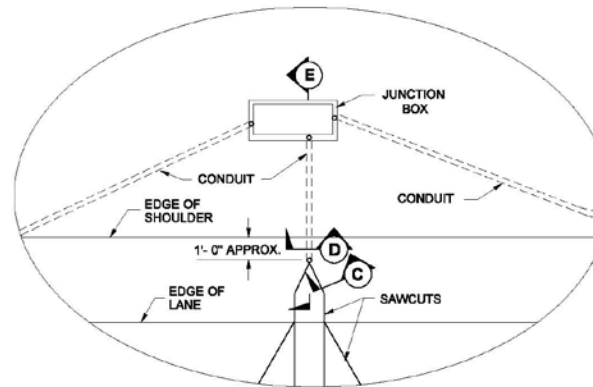
**SPLICE DETAIL**



**SAWCUT AND CONDUIT CONNECTION PLAN**



**DETAIL "A"**



**DETAIL "B"**

**LOOP INSTALLATION NOTES**

1. Install the Junction Box and the lead-in conduit.
2. Sawcut the loop slots and the lead-in slots.
3. Lay out the loop wire starting at the Junction Box, allowing 5' minimum slack.
4. Install the wire in the loop slot as shown.
5. Finish laying out the wire at the Junction Box and identify the leads with the loop number, the "S" for start and the "F" for the finish, and the loop series number.
6. Twist each pair of the lead wires two times per foot from the loop to the Junction Box. Reverse the direction of the twist for each successive pair installed.
7. Construct a supplemental splice containing any series loop connections required in the plans. Supplemental splices are subject to the same requirements shown for the loop lead and the shielded cable splice.
8. Splice the loop leads of supplemental splice leads to the shielded cable as noted in the Contract.
9. Complete installation and test loop circuits or combination loop circuits. See Standard Specifications 8-20.3(14)D.
10. Conduit for the loop stubout shall be as required in the Contract.



EXPIRES MAY 5, 2005

**INDUCTION LOOP DETAILS**

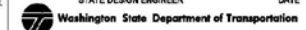
**STANDARD PLAN J-8d**

SHEET 2 OF 2 SHEETS

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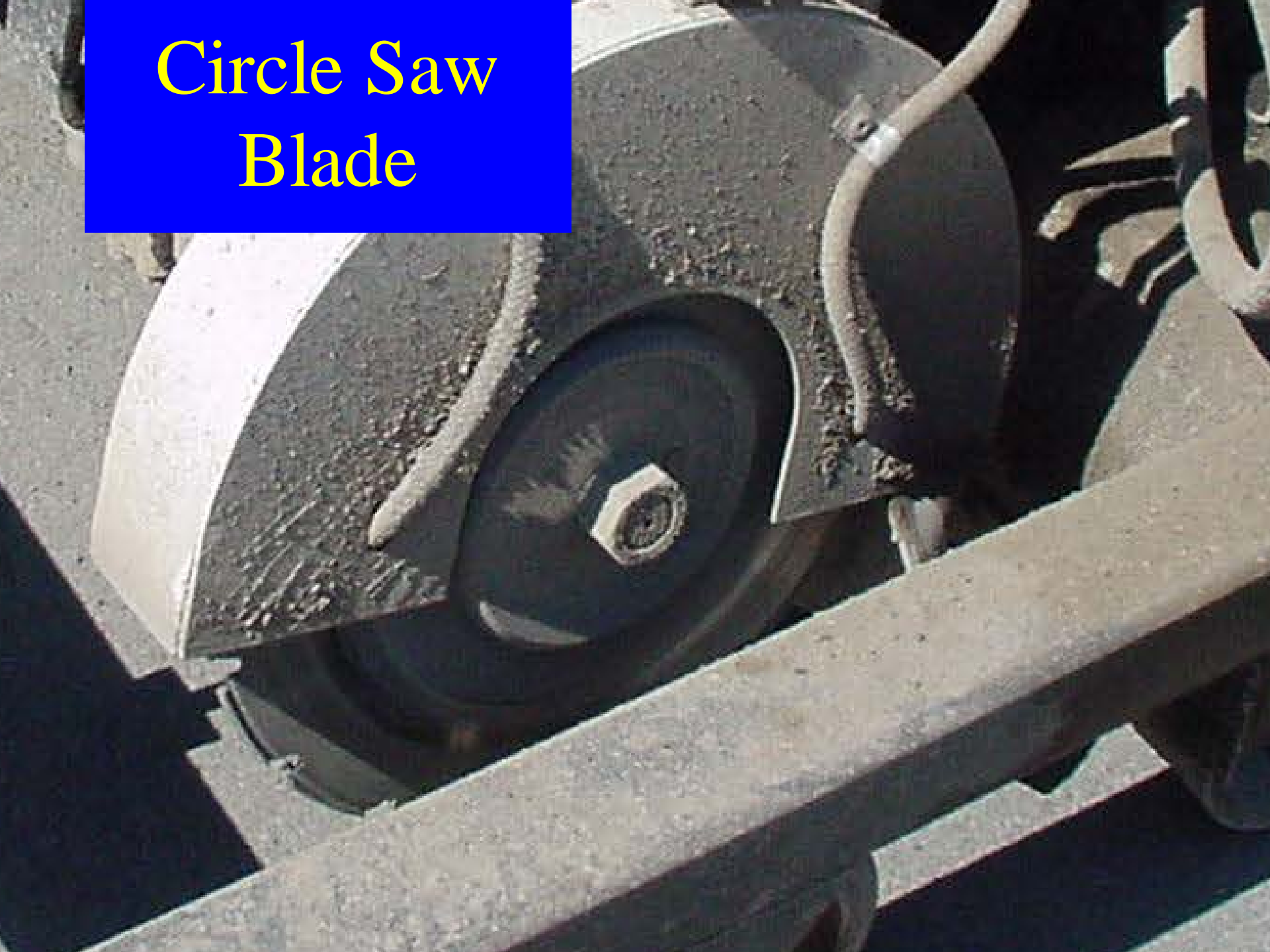


8-20.3(14)C  
Page 660



Circle Saw

# Circle Saw Blade





Cutting Circle Loop



1-07.5(3)  
Page 106

# Vacuum



8 12:14 PM



15 7:50 AM



# Vacuum Slurry





# Sand Bags Help Control Slurry



15 7:55 AM





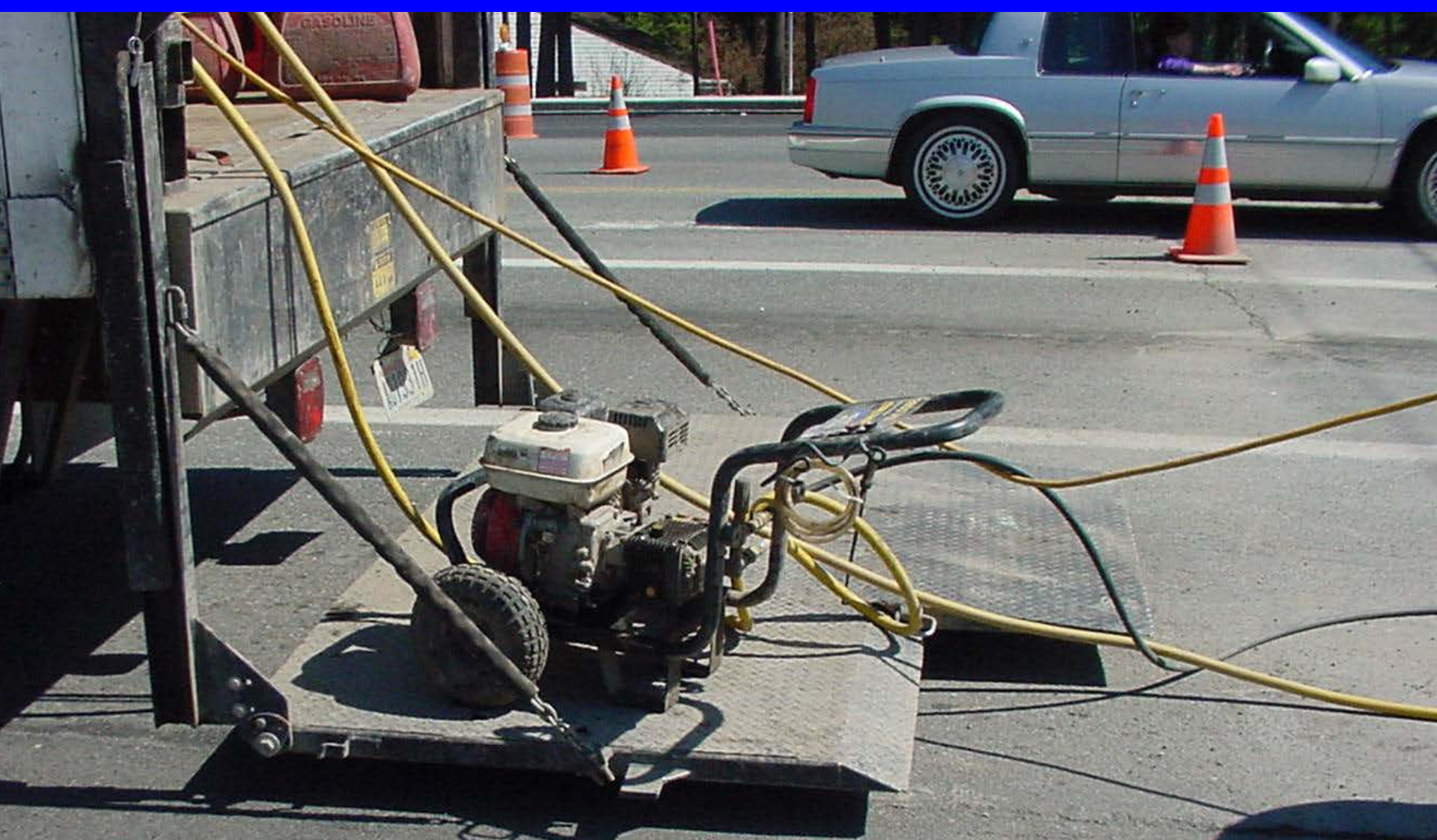
# Home Runs Cut With Flat Saw

8 12:08 PM



Home Run Cuts  
at 45 Degree  
Angles





8-20.3(14)c  
Pages 660, 61

# Pressure Washer

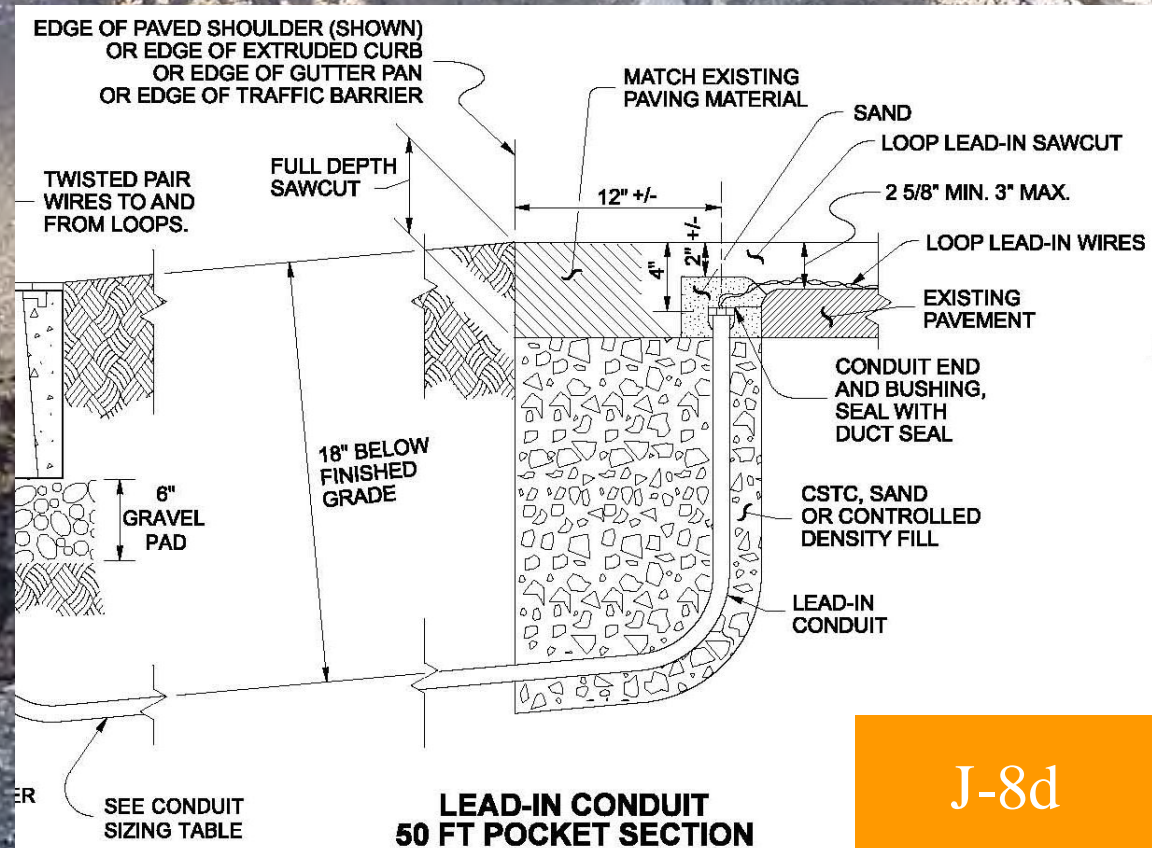
NW region requires 1000 PSI (6.9 Mpa)



Wash Them and Dry Them



# Loop Stub





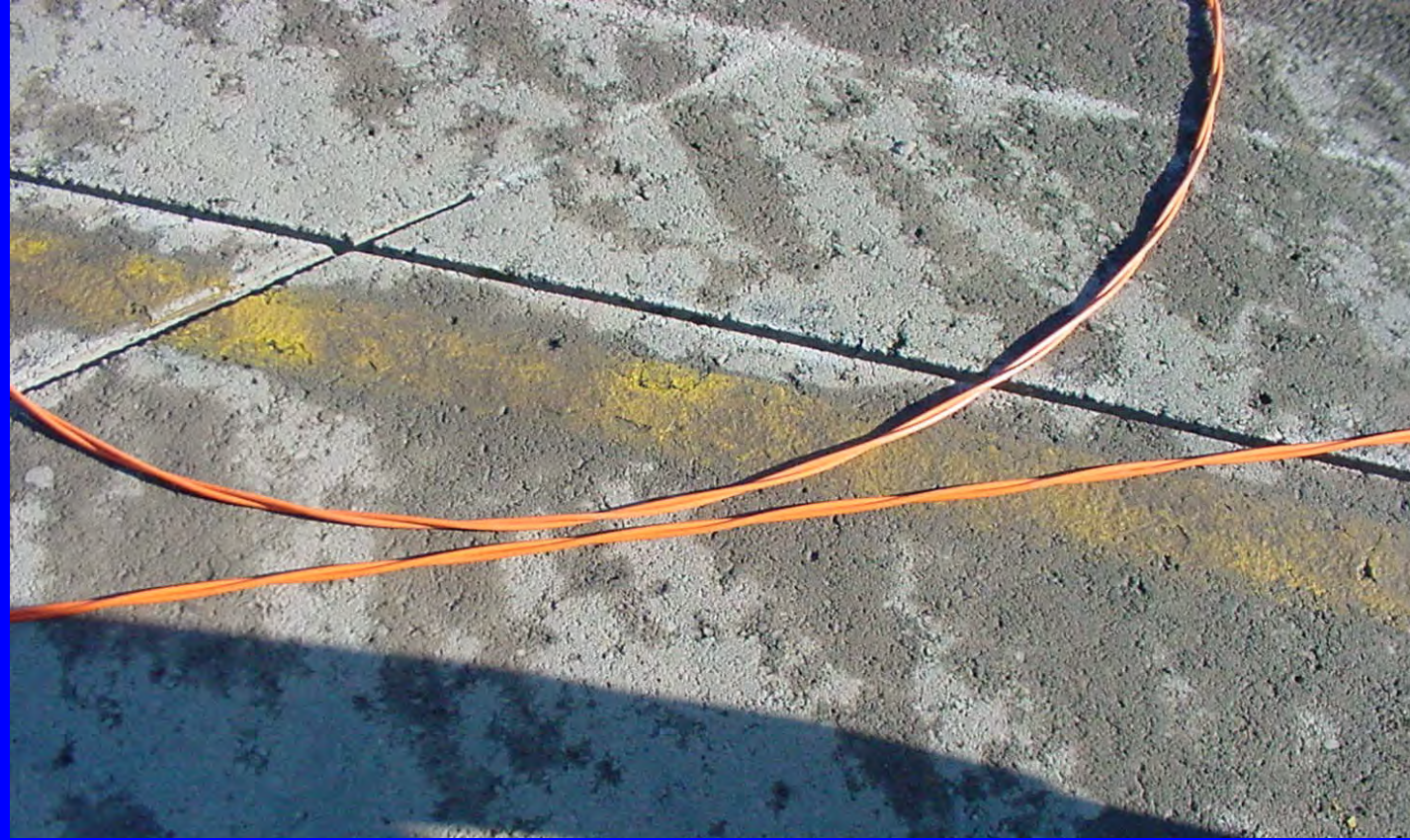
# Install Wire

Use a Wood Tool to Install So Wire Is Not Damaged



8-20.3(14)c  
Pages 660, 61





Twist Each Pair of Loop Lead Wires 2 Times per Foot. Reverse Direction of Twist for each Successive Pair Installed. J-8d sheet 2 Loop Installation Note 6



# 51-7 Wire





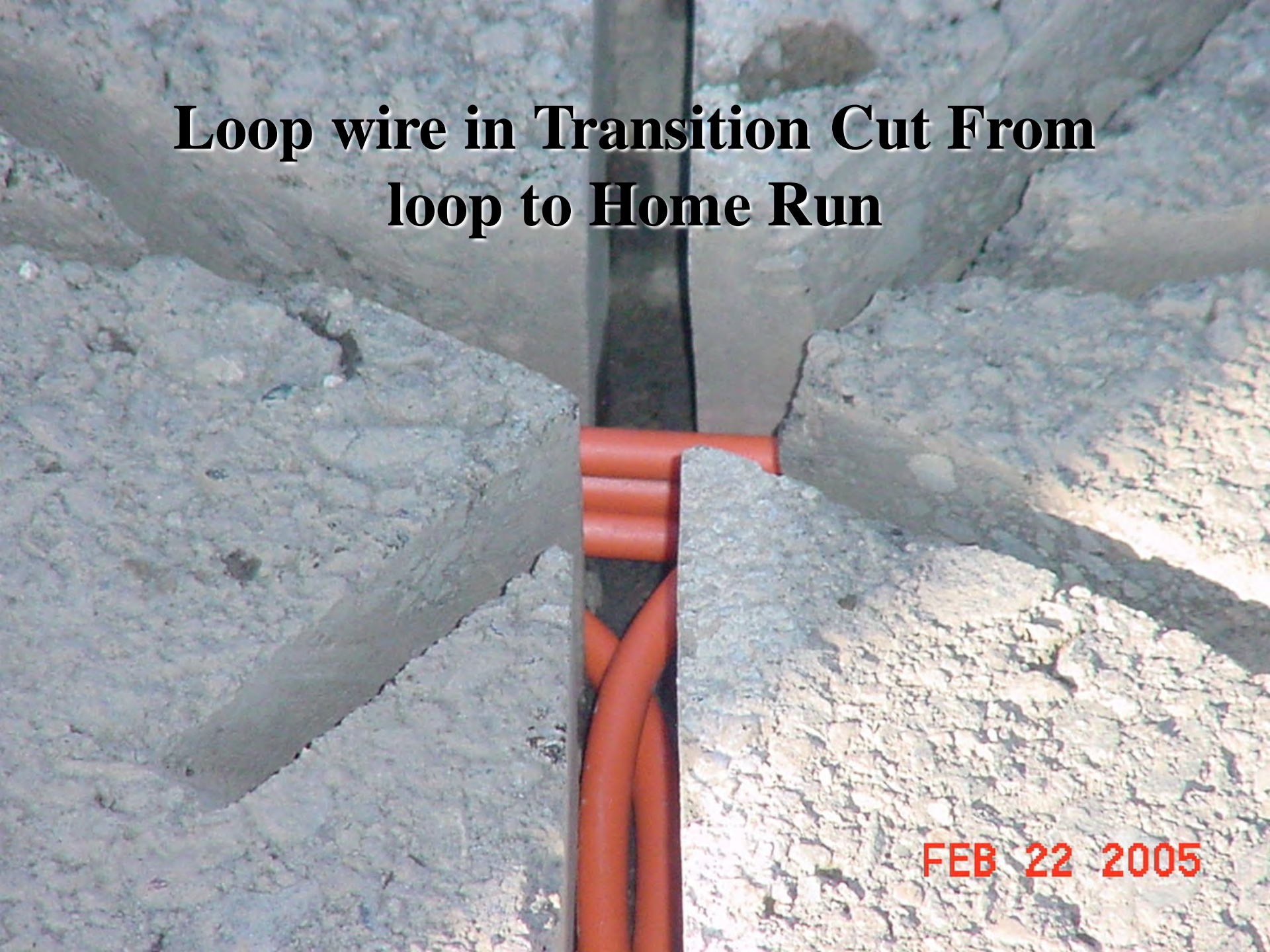
# Orange 51-7 Wire



3SLC-1401-1HW-P  
IMSA 51-7 600  
1 COND 14 AWG TR BC  
FTG. 5000  
DATE: 01/06/2005



# **Loop wire in Transition Cut From loop to Home Run**



**FEB 22 2005**



# Test Loop Before Sealing



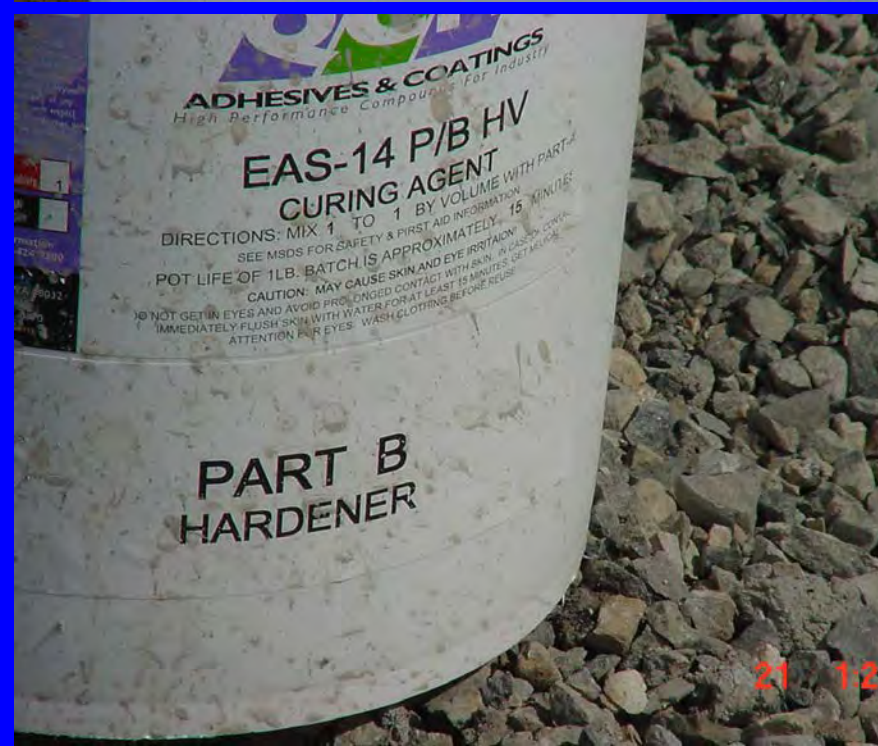
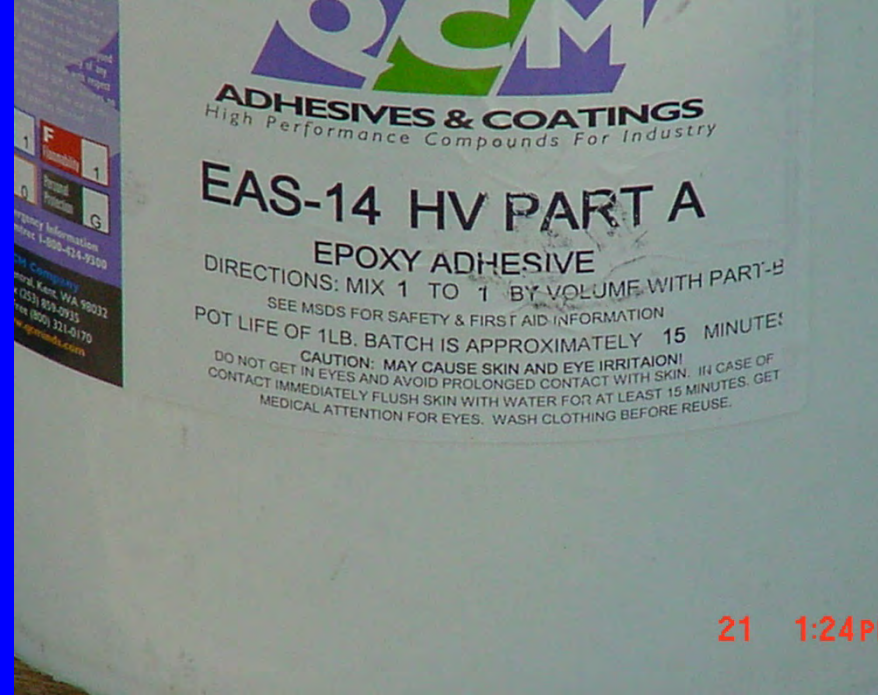
15 8:07 AM





Sealing Loops  
With 3M 5000





# QCM 2 Part Epoxy Loop Sealant



# Mixing QCM Epoxy



21 1:39 PM





Install QCM  
Loop Sealant



# QCM Can Be Messy







# Cold Application Loop Sealants

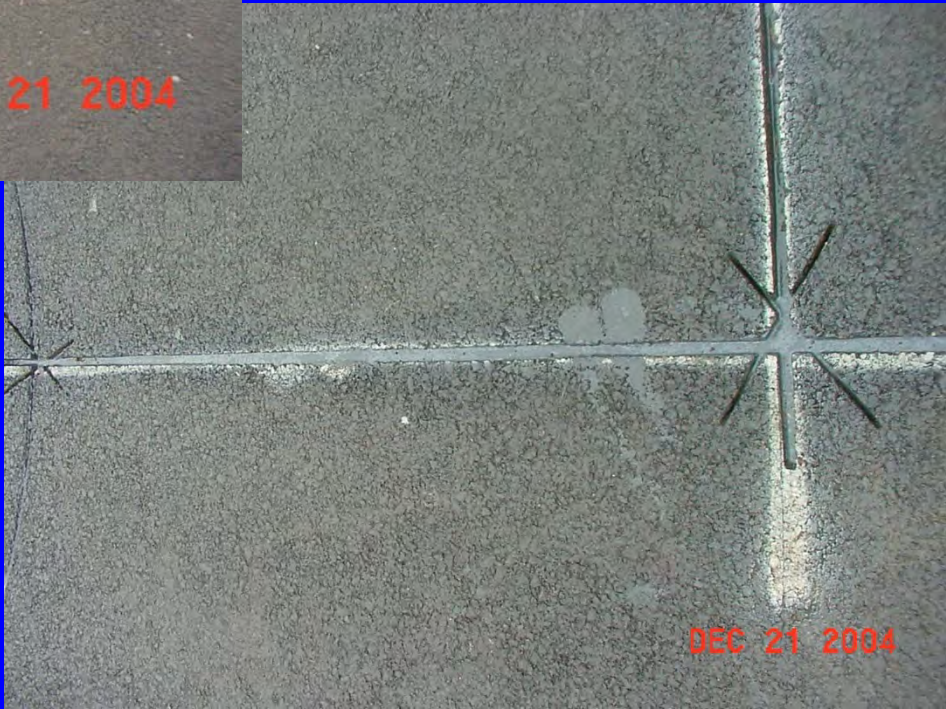
- NW Region Sealants for ACP
  - RAI Pro-Seal 6006EX
  - QCM EAS-14
  - 3m Black 5000
- NW Region Sealants for PCC
  - QCM EAS-14
  - 3m Black 5000
  - Gold Label Flex 1P





Don't Over  
Fill Cuts

These Look Good



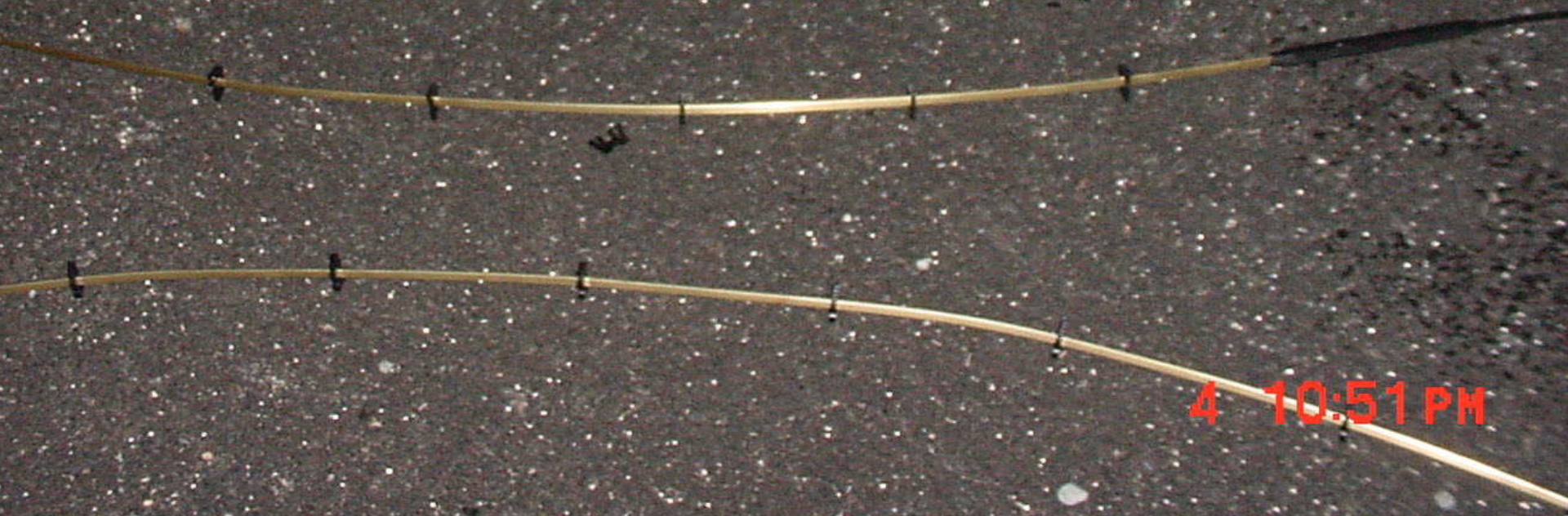




**Finished Product Poor Location**



# Piezo Loop With Clips installed



4 10:51 PM

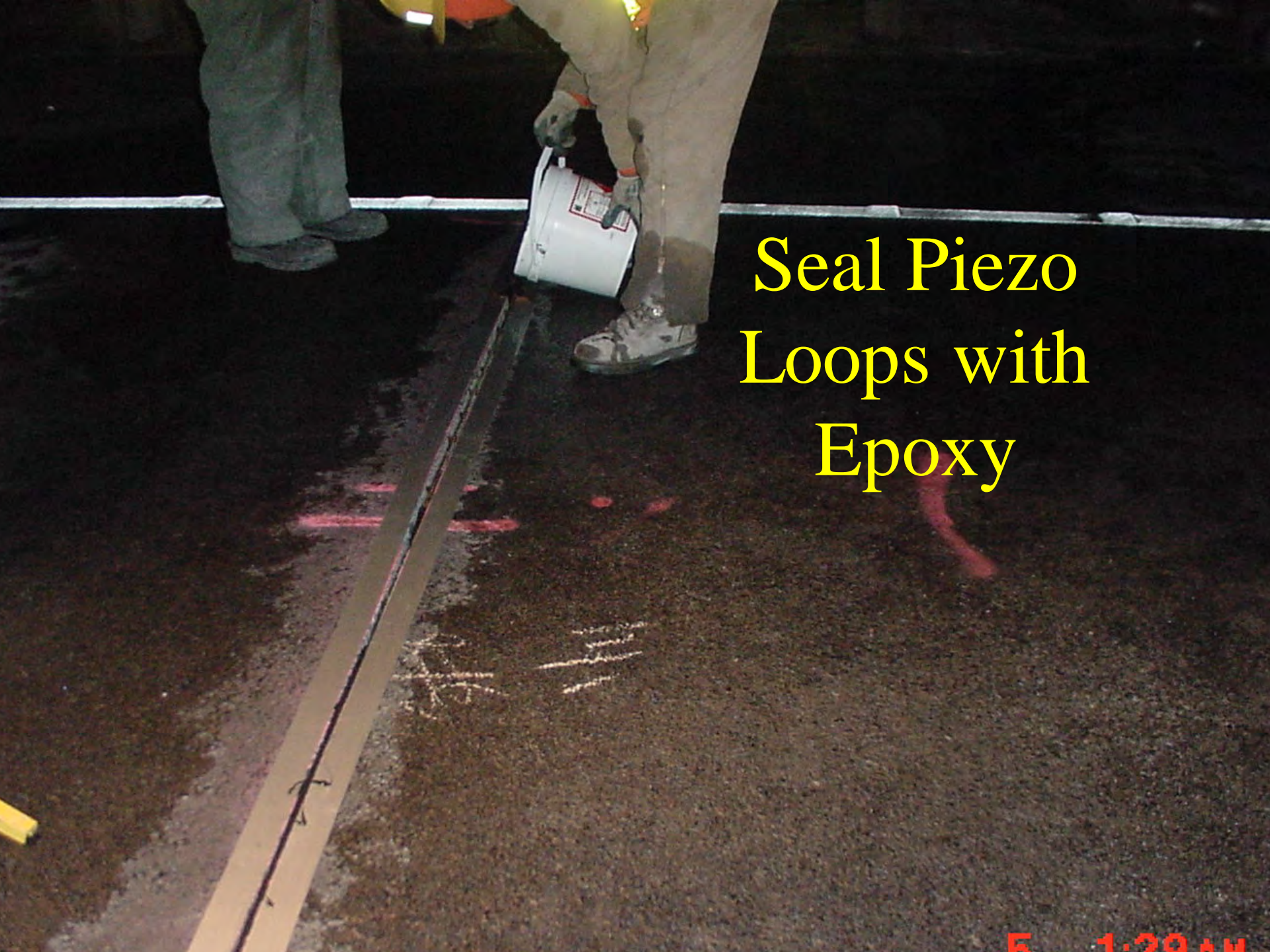


# Piezo Loop /Coil of Coax



4 10:51 PM





Seal Piezo  
Loops with  
Epoxy



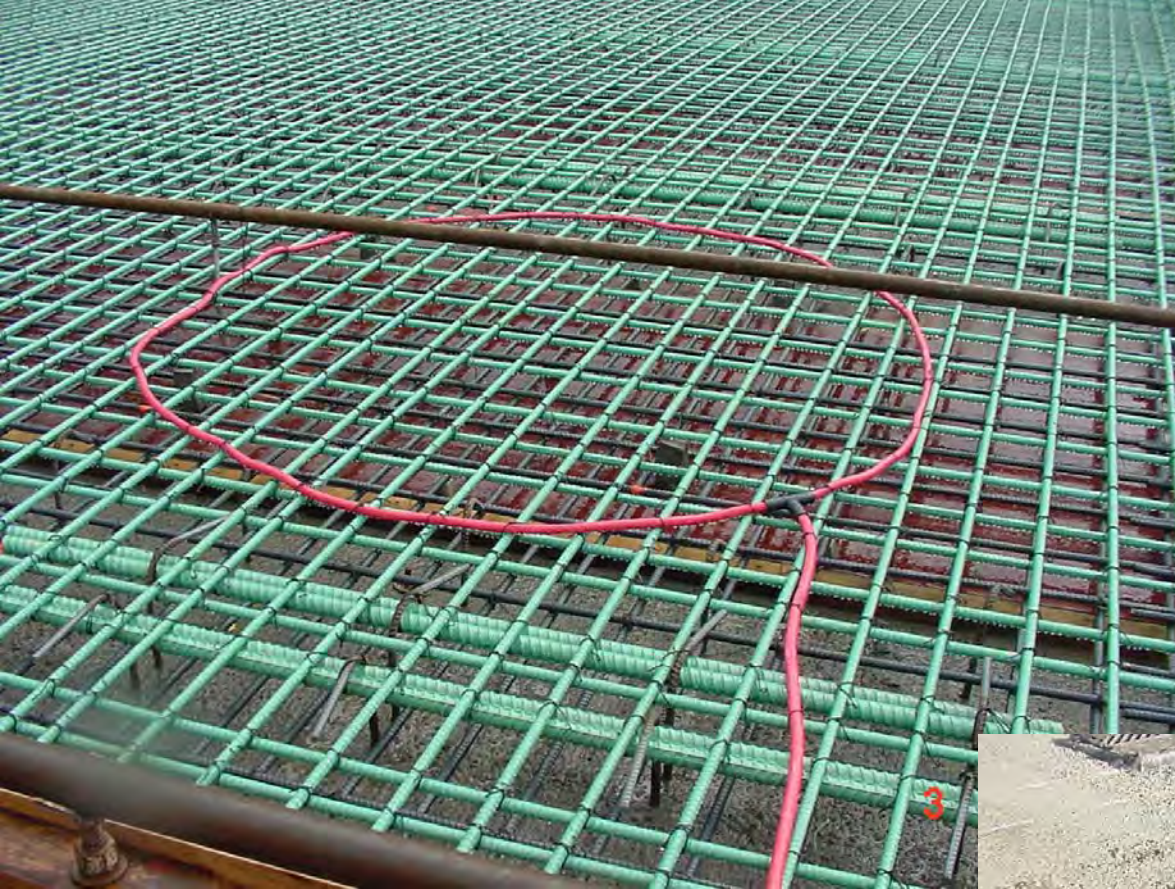
A close-up photograph showing a worker in tan pants and boots using a heat gun to seal a crack in asphalt. A strip of silver 3M 5000 tape is being applied over the crack, which is bordered by pink chalk lines. The heat gun is positioned over the tape, and a small amount of white material is visible where the tape meets the crack.

Seal Coax  
With 3M 5000

5 1:32 AM



# Pre-form Loops







# Pre-form Loop Homerun



Spare Loop Stub for Future with PVC Sleeve



# Pre-form Header Loops

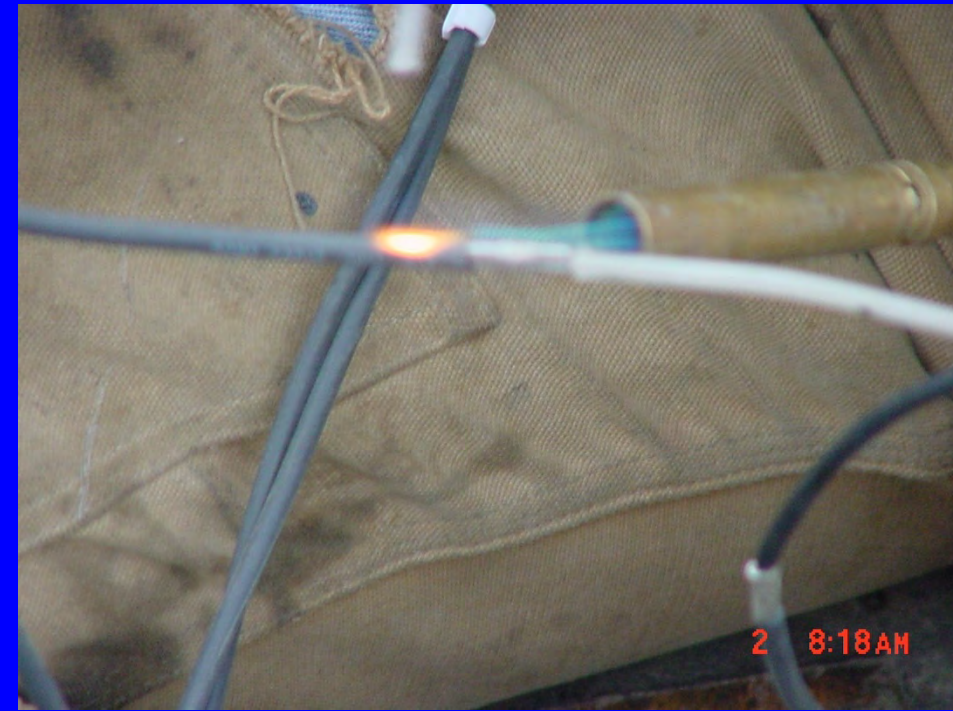




# Loop Splicing

Solder and Tape

J-8d Sheet 2  
Splice Detail



# Video Detection Cameras





# Video Detection Monitor Target





# Test for Induction Loops and Lead-in Cables

- 8-20.3(14)d



# Loop Analyzer



22 7:03 AM





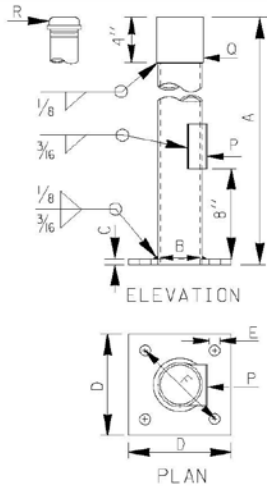


# Signal Standards

- 8-20.3(14)e
- 9-29.6 light and signal standards
- 9-29.6(1) steel light and signal standards
- 9-29.6(3) timber strain poles

# Standard Plan J-7a

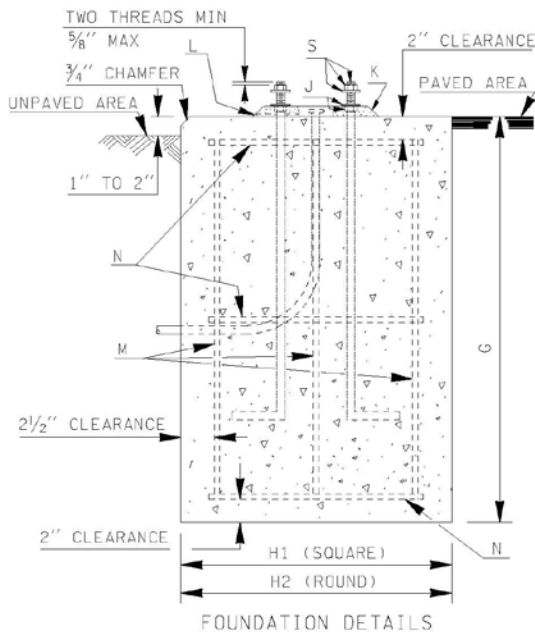
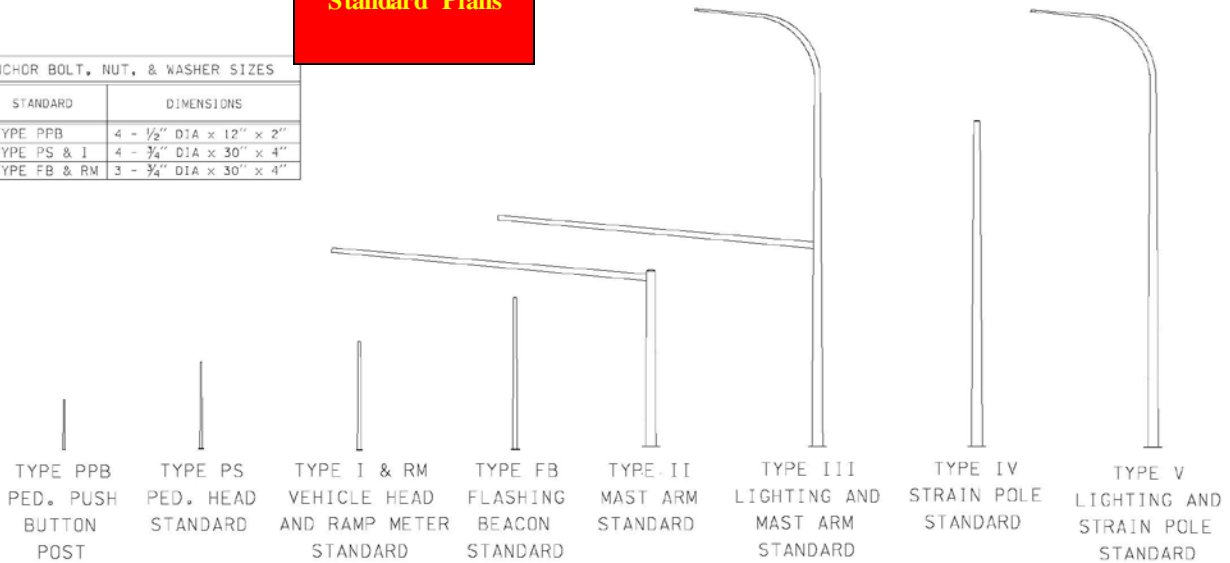
## TYPE PPB, PS, & I STANDARD DETAILS



On Line  
Standard Plans

ANCHOR BOLT, NUT, & WASHER SIZES		
MARK	STANDARD	DIMENSIONS
S	TYPE PPB	4 - 1/2" DIA x 12" x 2"
S	TYPE PS & I	4 - 3/4" DIA x 30" x 4"
S	TYPE FB & RM	3 - 3/4" DIA x 30" x 4"

## STANDARD TYPE DESIGNATIONS



TYPE PPB, PS, I, RM & FB STANDARD DIMENSION CHART						
MARK	ITEM	TYPE PPB	TYPE PS	TYPE I	TYPE RM	TYPE FB
A	HEIGHT	4'-6"	8'-0"	10'-0"	SEE SHEET 2	SEE SHEET 2
B	POLE BASE DIA	2 1/2"	*	*	*	*
C	PLATE THICKNESS	1/2"	1/2"	1/2"	SEE SHEET 2	SEE SHEET 2
D	PLATE WIDTH	5"	9"	9"	SEE SHEET 2	SEE SHEET 2
E	HOLE DIA	3/8"	1"	1"	SEE SHEET 2	SEE SHEET 2
F	BOLT CIRCLE	4 1/2"	8 1/2"	8 1/2"	SEE SHEET 2	SEE SHEET 2
G	FOUNDATION DEPTH	1'-6"	3'-0"	3'-0"	3'-0"	3'-0"
H1	FOUNDATION WIDTH	1'-6"	2'-0"	2'-0"	2'-0"	2'-0"
H2	FOUNDATION DIA	2'-0"	2'-3"	2'-3"	2'-3"	2'-3"
J	NUT & WASHER	Four 1/2"	3/4"	3/4"	3/4"	3/4"
K	GROUT PAD THICKNESS	NONE	**	**	SEE SHEET 2	SEE SHEET 2
L	PLASTIC DRAIN TUBE DIA	NONE	3/8"	3/8"	3/8"	3/8"
M	VERTICAL RE-BAR	NONE	Eight #4	Eight #4	Eight #4	Eight #4
N	HORIZ. RE-BAR HOOP	NONE	Three #4	Three #4	Three #4	Three #4
P	HANDHOLE SIZE	NONE	3 1/2" x 4"	3 1/2" x 4"	3 1/2" x 4"	3 1/2" x 4"
Q	SLIPFITTER DIA (I.D.)	NONE	4"	4"	4"	4"
R	CAP DIA	2 1/2"	NONE	NONE	NONE	NONE

\* TAPERED ROUND OR OCTAGONAL SHAFT, 11 GAGE, 4" OD AT SLIPFITTER WELD. TAPER = 0.14 INCHES/FT.  
 \*\* LEVELING NUT HEIGHT 1" MAXIMUM. LEVELING NUTS NOT REQUIRED FOR TYPE PPB STANDARD



EXPIRES OCTOBER 26, 2002

## SIGNAL STANDARD TYPE DESIGNATIONS AND TYPE PPB, PS, I, RM, & FB DETAILS STANDARD PLAN J-7a SHEET 1 OF 2 SHEETS

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DATE	WELDING SYMBOL SIZES	BY
		MHG

APPROVED FOR PUBLICATION  
**Harold J. Peterfeso** 09-12-01  
 STATE DESIGN ENGINEER DATE  
 Washington State Department of Transportation



J-7a

12

# Mast Arm Pole







# Mast Arm Mount

12 8:35 AM



# Anchor Bolt Nuts Tightening



8-20.3(4) All anchor bolt nuts must be tightened by the turn of the nut method. Minimum  $\frac{1}{4}$  Max  $\frac{1}{3}$  turn past snug tight. Permanent marks shall be set on the base plate and the nuts.

# Grout

- 8-20.3(15)



# Grout Pad Signal Pole Base



17 10:25 AM



# Grout Pad Luminaire Base

## Too Much Grout



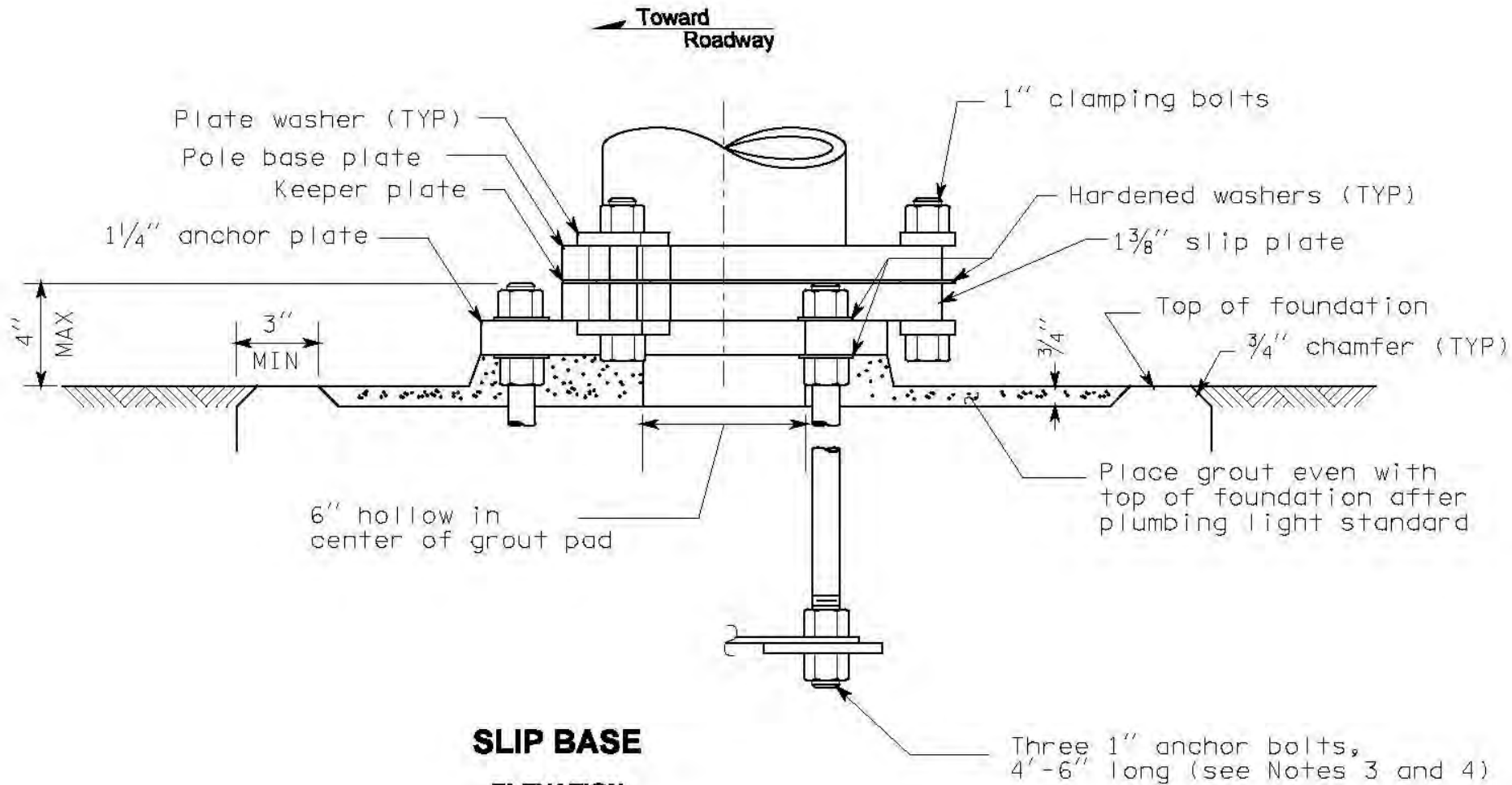


# Good Looking Grout Pad



# From J-1b

J-1b



**SLIP BASE  
ELEVATION**





Rat Screen

20 11:19 AM

# Traffic Signal Turn-on Checklist, Signal Turn-on Process Flow & Loop Installation Checklist

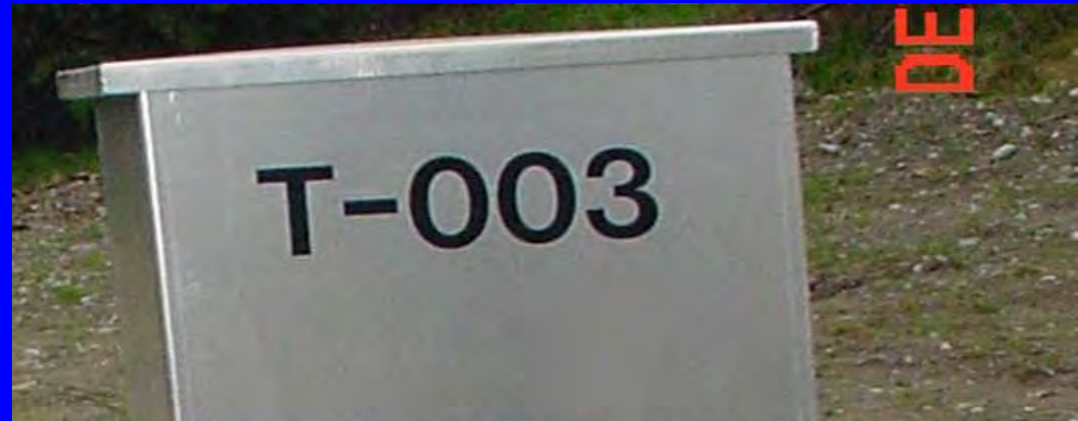
- Provided in Note book



# ITS Controller Cabinet



# Cabinet Labeling As Required by NW Region ITS





# Sign Structures

- 8-21

# Sign Structure On Bridge With Sign Lighter





# Sign Lighter





# Sign Lighter Open



17 1:26 PM





187





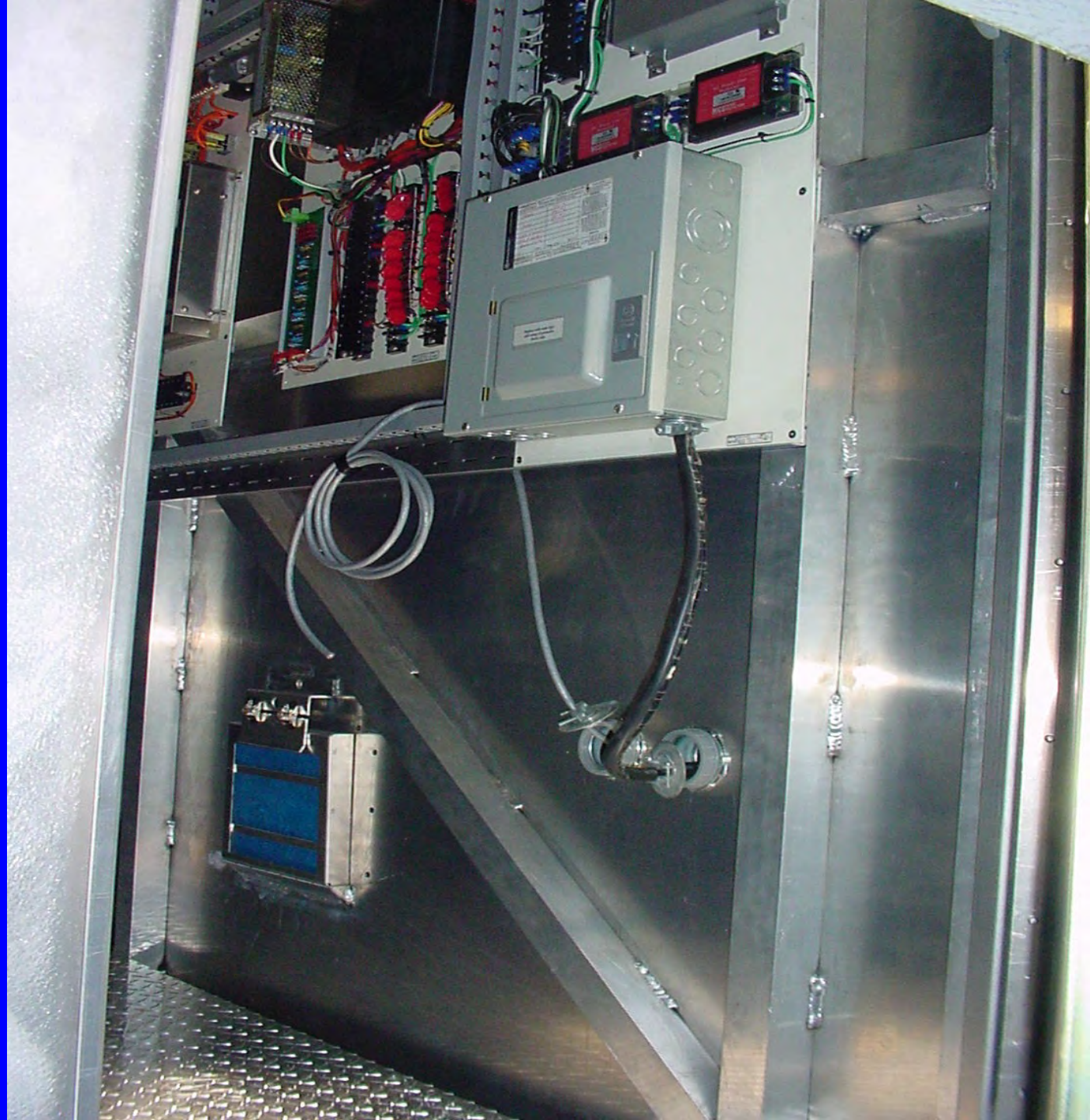
Cantilever Sign Structure  
With Two Sign Lighters



# V.M.S. Sign



- Inside VMS





# Sign Bridge

TRAFFIC ADVISORY  
TUNE 530 AM  
WHEN FLASHING

  
Everett  
Renton  
1 MILE

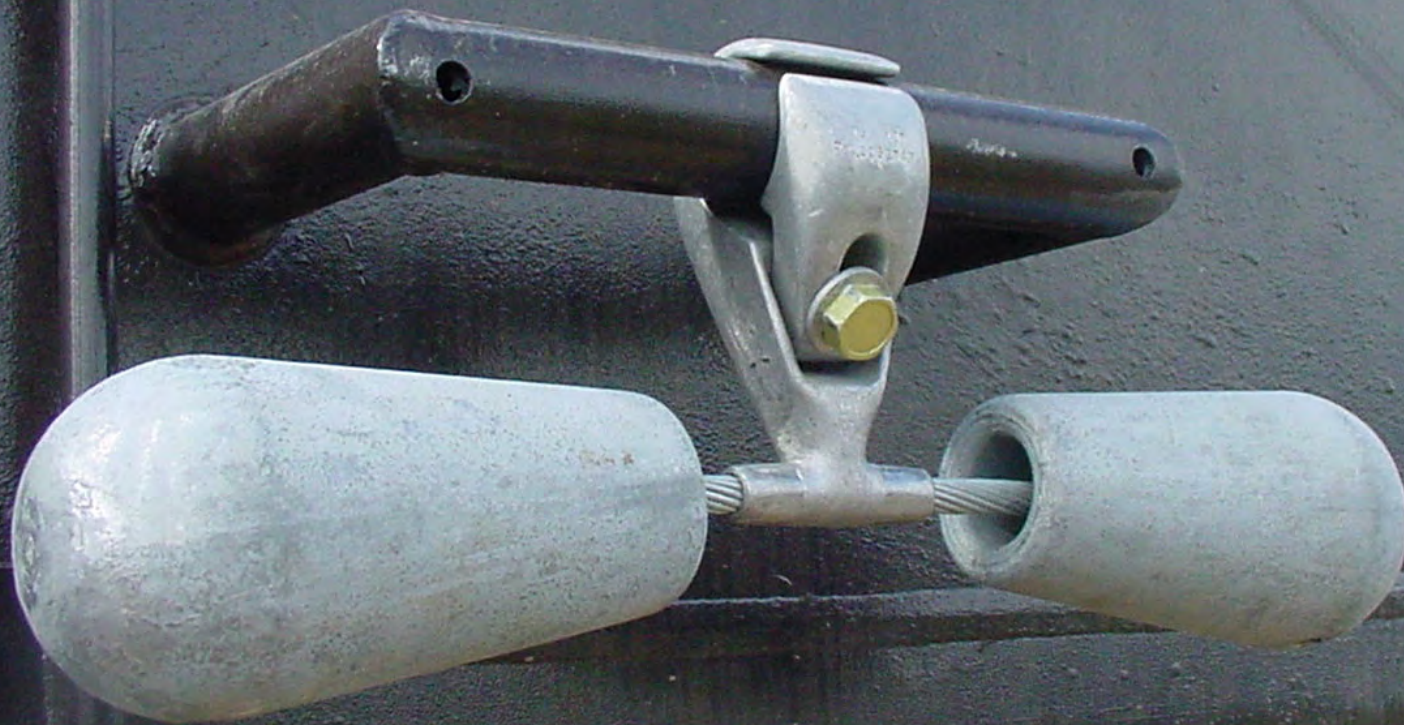


# Putting Sign Bridge Together





# Vibration Damper



16 10:35 AM



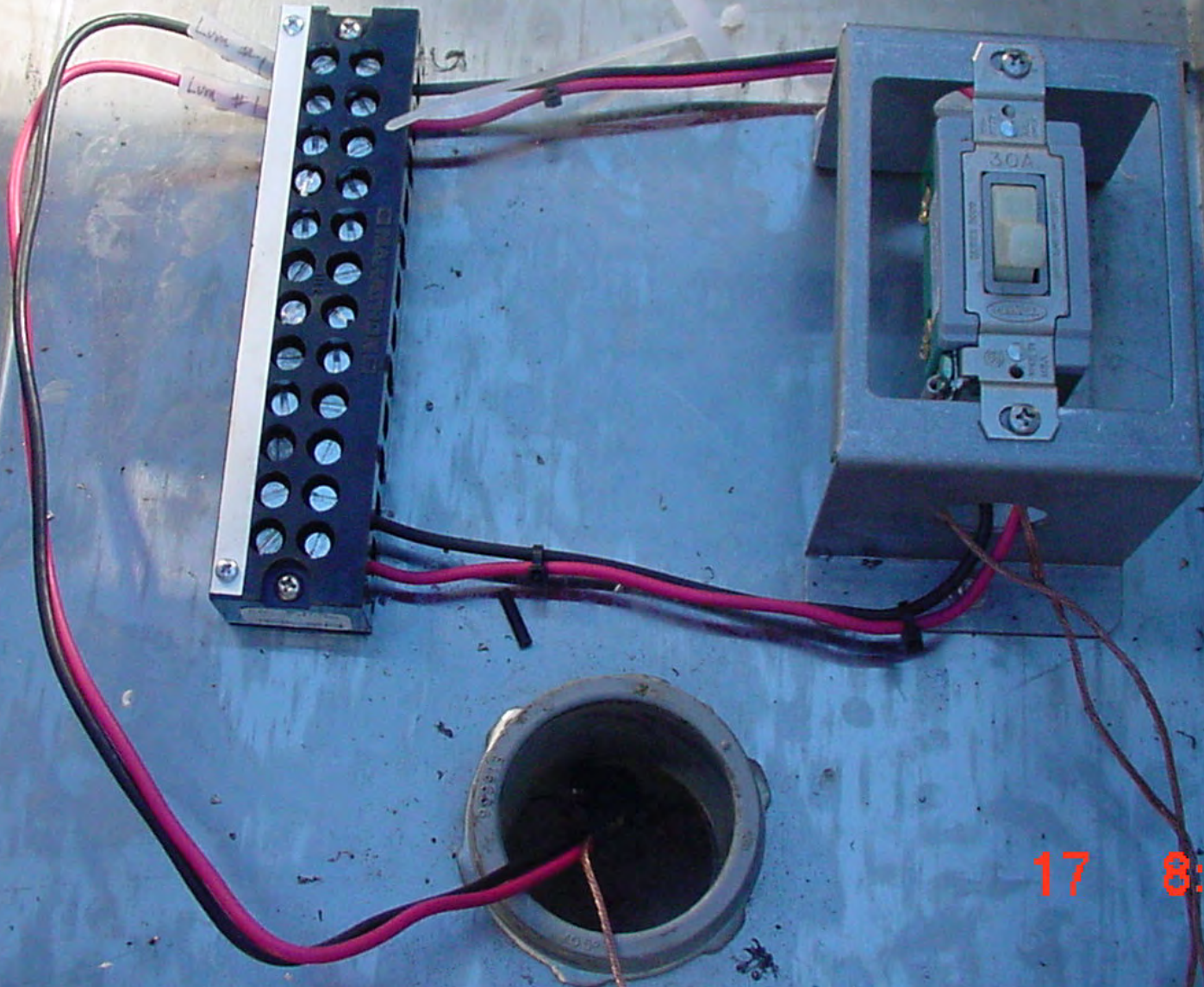
# Isolation Switch



3 2:01 PM



# Inside Isolation Switch



17 8:12AM



# Post Mounted Sign With Light and Flasher



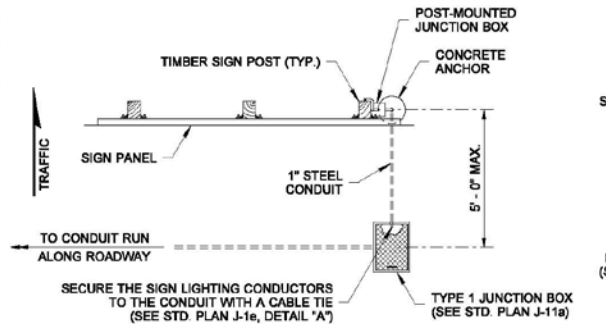


# Flashing Signal Heads on Sign

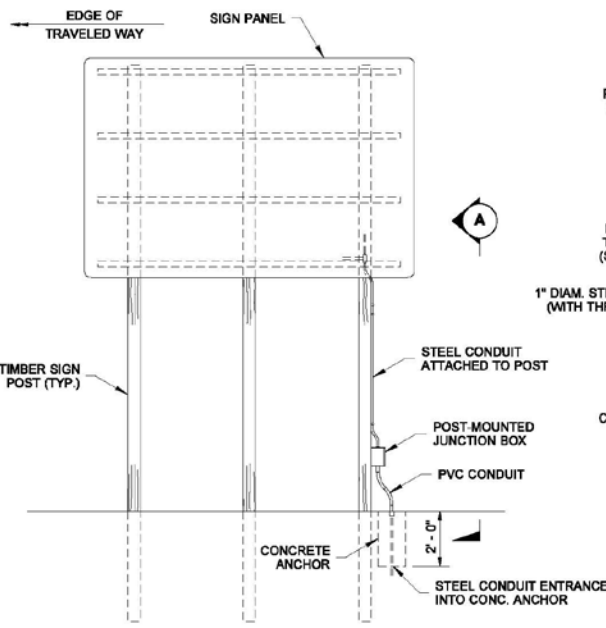


# Post Mounted Conduit Break-away

DRAWN BY: MARK SULIKA

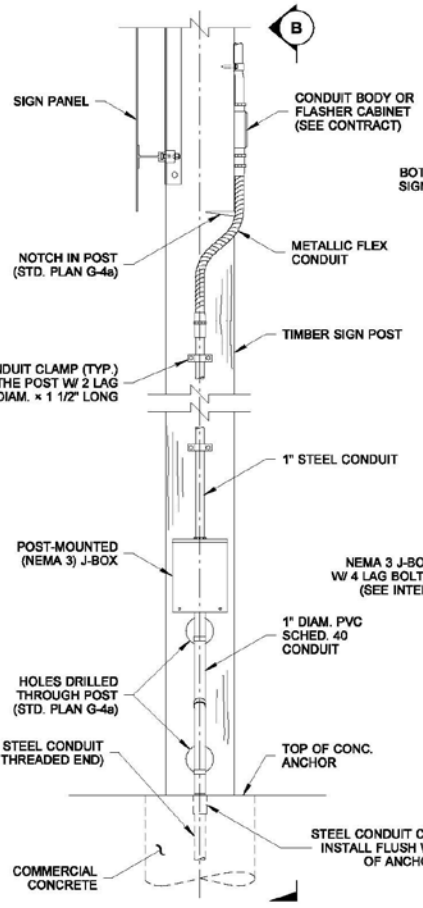


**PLAN**

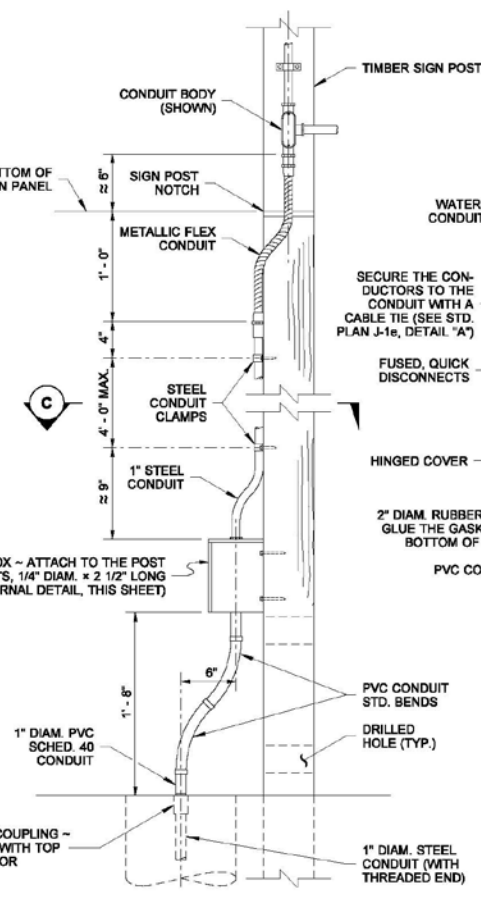


**ELEVATION**

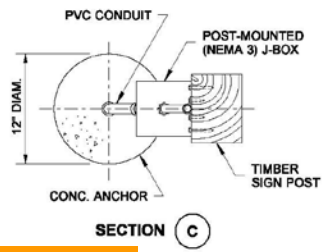
**JUNCTION BOX ATTACHMENT TO TIMBER SIGN SUPPORT**



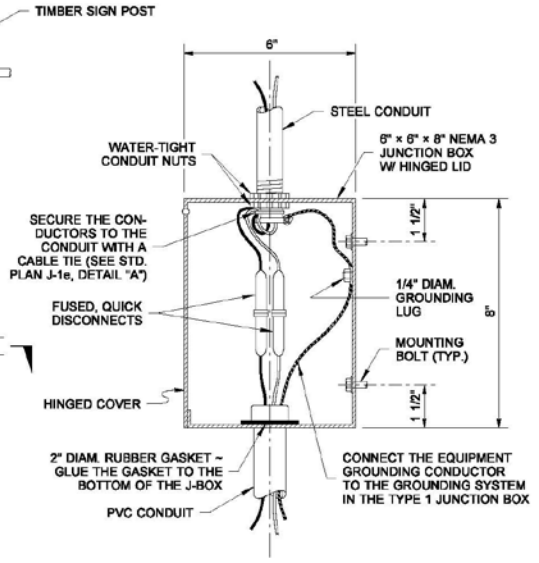
**DETAIL VIEW A**



**DETAIL VIEW B**



**SECTION C**



**JUNCTION BOX INTERNAL DETAIL**



EXPIRES MAY 5, 2005

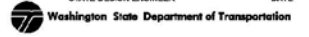
**SIGN POST-MOUNTED JUNCTION BOX  
STANDARD PLAN J-12**

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

**Harold J. Peterfeso** 05-20-04

STATE DESIGN ENGINEER DATE

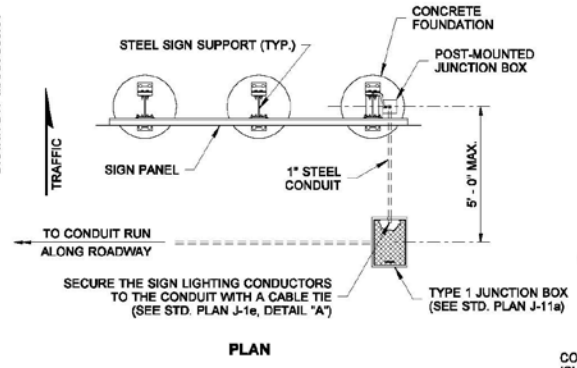


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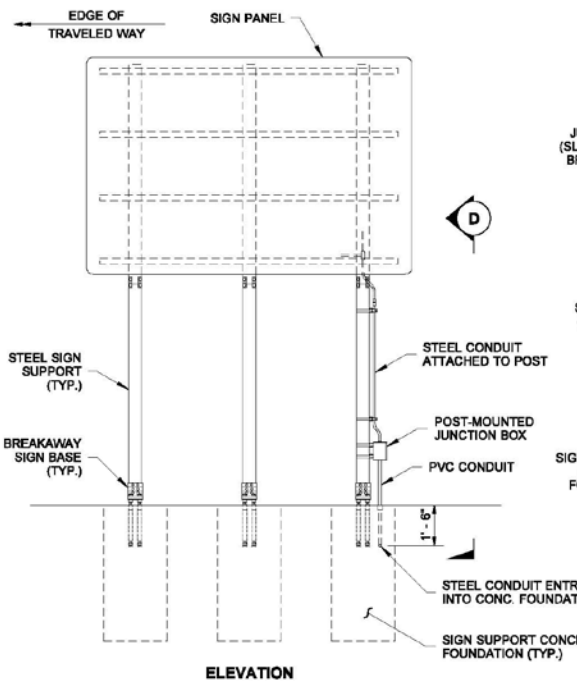


# Post Mounted Conduit Break-away

DRAWN BY: MARK SUJKA

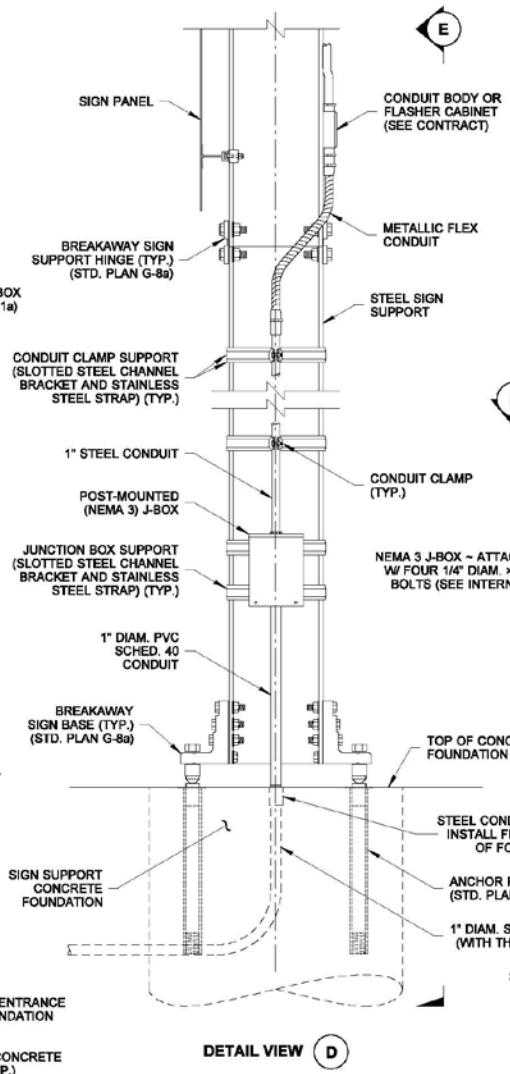


**PLAN**

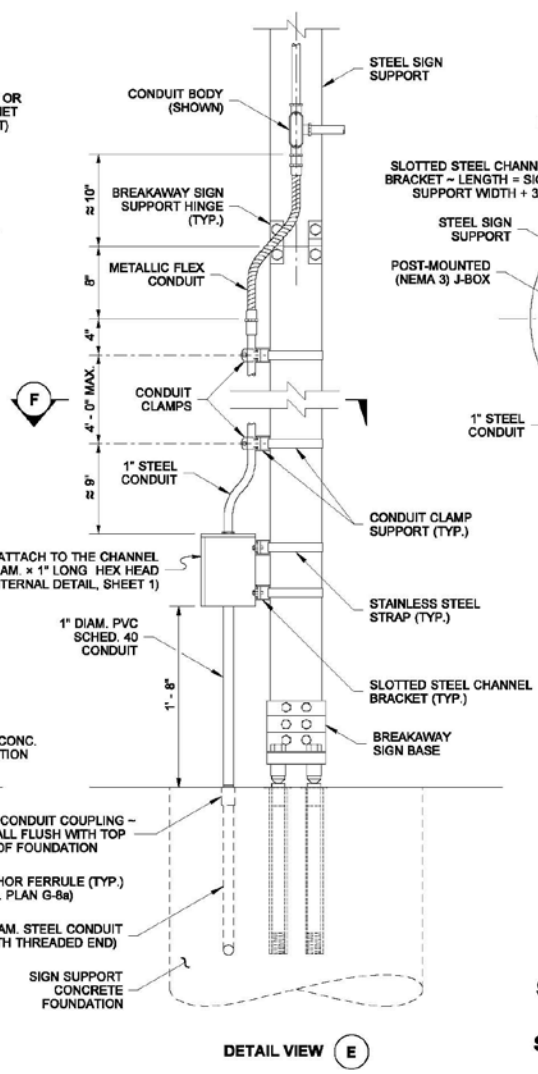


**ELEVATION**

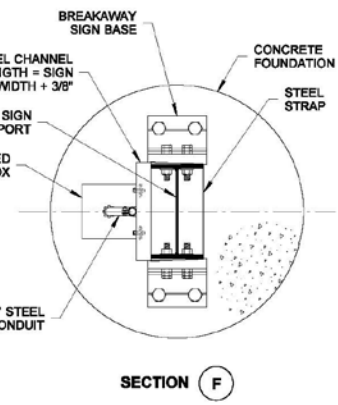
**JUNCTION BOX ATTACHMENT TO STEEL SIGN SUPPORT**



**DETAIL VIEW D**



**DETAIL VIEW E**



**SECTION F**



**SIGN POST-MOUNTED JUNCTION BOX**  
**STANDARD PLAN J-12**  
 SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION  
**Harold J. Peterfeso** 05-20-04  
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