

# Reading Plan Sheets

Standard drafting symbology is used in signal design to represent common equipment, providing valuable information to the user without using any text. As such, the user should become familiar with the standard symbols and line styles.

Bubble notes are used in conjunction with the standard drafting symbology to provide the specific information about the installation. The bubble notes have been designed to be “intelligent”, such that an experienced user will be able to read the signal plan sheets without much assistance from the bubble note legend text. For example:

Bubble notes use abbreviations for equipment that can be defined entirely by the bubble note legend text:

 *Install model 2070 controller in  
model 332 cabinet*

“C” abbreviation for “Controller”  
and 2070 indicates the model

Bubble notes use abbreviations **AND** variables (shown in pink) for equipment that must be further defined by where/how it is used:

 *Install (T=type) standard traffic signal mast arm pole  
(See, “Pole Entrance Chart”)*

“SM” abbreviation for “Signal Mast  
arm pole” and “T” is the variable

“Variable always  
defined in text

Regardless of experience level, it is always advised to read the bubble note legend text at least once because changes in text may occur. For example:

 *Install phase (Ph=phase) 6' round or 4' diamond  
vehicle detector loop*

VS.

 *Install phase (Ph=phase) 6' round  
vehicle detector loop*

If there is conflict between symbology and the bubble note, contact the Engineer of Record for clarification.

## BASIC DRAFTING SYMBOLOGY

### C A B I N E T S

-  336 controller cabinet (door shows orientation)
-  332 controller cabinet (door shows orientation)
-  Base Mounted Service Cabinet (BMC, BMCL, or BMCF)

### P O L E S

-  Mast Arm Pole (15' to 55')
-  Steel Signal pole shaft (no foundation)
-  Steel Signal pole w/foundation
-  Wood pole
-  Pedestrian or vehicle pedestal w/foundation
-  Existing or proposed power supply pole

 Pole Anchor

### L U M I N A I R E S

 Luminaire head

### S I G N A L S

-  Vehicle signal head (new)
-  Vehicle signal head (existing)
-  Pedestrian signal head (new)
-  Pedestrian signal head (existing)

### F I R E P R E E M P T I O N

-  Fire preemption head (single channel, one or two barrels)
-  Fire preemption head (two channels, two barrels)

### S I G N S

-  Aluminum sign (mast arm or signal pole mounted)
-  Interior illuminated sign (mast arm or signal pole mounted)

# BASIC DRAFTING SYMBOLOGY

## JUNCTION BOXES

 Junction Box, Type JB/1, JB/2 and JB/3

 Junction Box, Type JB1/A, JB2/A and JB3/A

## DETECTION

 6' round vehicle detector loop

 6' diamond vehicle detector loop

 2 1/2' diamond bicycle detector loop

 6' diamond pre-formed vehicle detector loop

 Entrance for loop wires into junction box (Loop pocket)

 Radar Detector

 Video Detection Camera (new)

 Video Detection Camera (existing)

## MISCELLANEOUS

 Crosswalk closure barricade

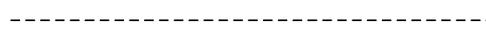
## CONDUITS

 Conduit (new)

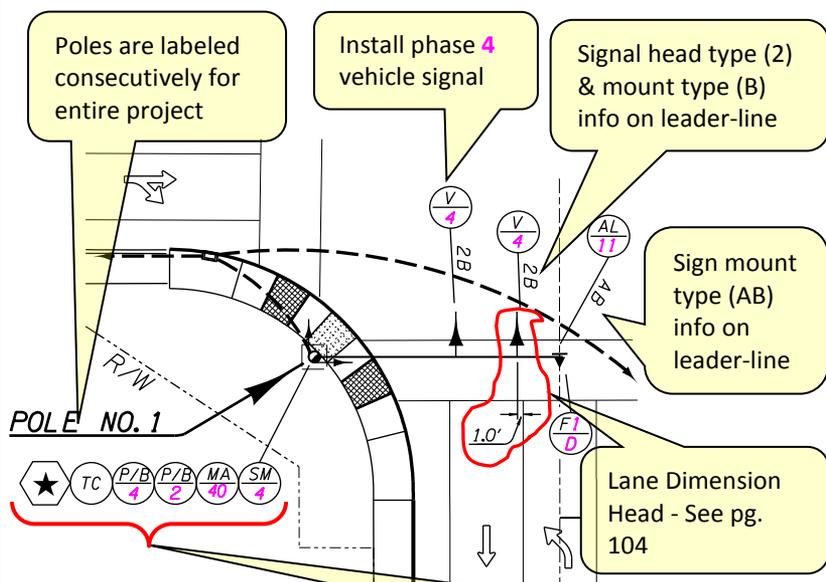
 Conduit (existing)

## WIRES & CABLES

 Loop Wire

 Span Wire

# READING PLAN SHEETS (Pole & Signal Indications)



## LEGEND

-  Install (*T=type*) standard traffic signal mast arm pole (See, "Pole Entrance Chart")
-  Install (*L=length*) foot traffic signal mast arm
-  Install terminal cabinet
-  Install phase (*Ph=phase*) vehicle signal
-  Install phase (*Ph=phase*) pedestrian signal with clamshell mount and pushbutton with 'H' mount
-  Install channel (*Ch=channel*), (*N=number*) barrel fire preemption detector unit
-  Install aluminum (30"x36", type "W7 mod") "LEFT TURN YIELD ON GREEN BALL" sign (R10-12)
-  See signing plans for details on sign and attachment

### SIGNAL MOUNTING OPTIONS

B = Adjustable signal bracket assembly w/rain cap(s)  
(Install 1" galvanized chase nipple)

### SIGN MOUNTING OPTIONS

AB = Adjustable sign bracket assembly w/rain cap(s)



Replace variables in text when reading: "Install channel (**D**), (**1**) barrel fire preemption"

Detailed on other plan sheet:  
not paid under traffic signal bid

### SIGNAL HEAD TYPES

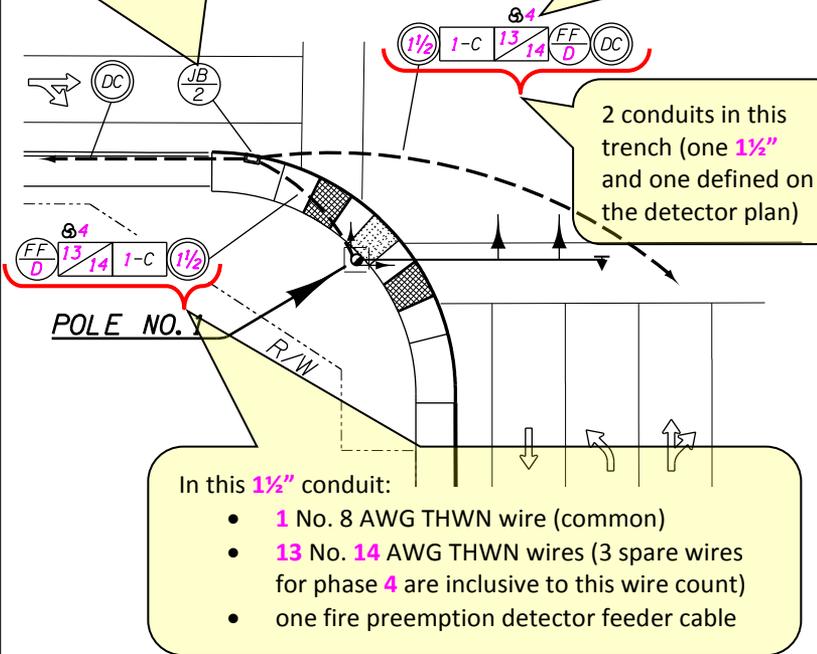
2 = 12" R, 12" Y, 12" G

# READING PLAN SHEETS (Conduit & Wiring)

4 conduits enter this junction box:

- Two conduits defined on detector plan, and
- Two 1 1/2" conduit

3 spare wires for phase 4 are inclusive to the number of wires listed below (13 No. 14 AWG)



## L E G E N D



Install 22"x12"x12" (min. dimension) precast concrete junction box



Install (S=size) inch conduit



Detector conduit (See Detector Plan)



Install (N=number) No. 8 AWG THWN (Signal system common)



Install (N=number) No. (G=AWG wire size) THWN wires



Install channel (Ch=channel) fire preemption detector feeder cable



Includes 3 spare wires for phase (Ph=phase) as per table

# READING PLAN SHEETS (Cabinets & Controllers)

In this 1½" conduit: 2 No. 6 AWG XHHW wires.  
Typical wiring between the BMCL & controller cabinet.  
(Bonding wire also required by specifications – not shown on plans)

In this 1½" conduit:

- 4 No. 10 AWG XHHW wires (for illumination fixtures)
  - 3 No. 12 AWG THHN wires (for photo electric cell)
- Illumination wiring ALWAYS bypasses the controller cabinet

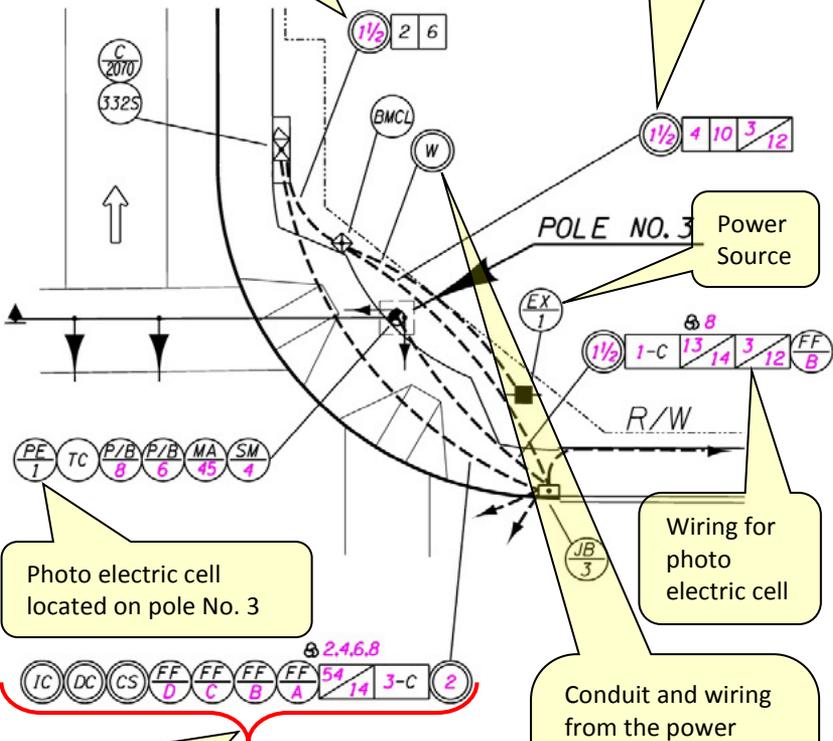


Photo electric cell located on pole No. 3

Wiring for photo electric cell

There are 4 conduits in this trench. three conduits carry all the wiring going directly into the controller cabinet. One conduit is for future use (CS).

Conduit and wiring from the power source to the BMCL is always according to the requirements of the power company (permit)

# READING PLAN SHEETS (Cabinets & Controllers)

Door orientation is shown on the plan sheet by the controller cabinet symbology

## L E G E N D

-  Install a model 332S cabinet & control equipment with riser frame, orient lowered door as shown
-  Install model 2070 controller in model 332S cabinet
-  Install base mounted service cabinet, 120/240 volt metered, for signal and signal pole mounted illumination systems
-  Retain and protect existing power pole (Power source)
-  Install (T=type) standard traffic signal mast arm pole (See, "Pole Entrance Chart")
-  Install (L=length) foot traffic signal mast arm
-  Install phase (Ph=phase) pedestrian signal with clamshell mount and pushbutton with 'H' mount
-  Install terminal cabinet
-  Install photo electronic control relay on pole, as per Std. Dwg. No. TM465
-  Install 30"x17"x12" (min. dimension) precast concrete junction box
-  Install (S=size) inch conduit
-  Install 2" conduit stub (For future use, cap ends)
-  Install conduit and wire as required by power company
-  Detector conduit (See Detector Plan)
-  Interconnect conduit (See Interconnect Plan)
-  Install (N=number) No. 8 AWG THWN (Signal system common)
-  Install (N=number) No. (G=AWG wire size) THWN wires
-  Install (N=number) No. (G=AWG wire size) XHHW wires
-  Install channel (Ch=channel) fire preemption detector feeder cable
-  Ph Includes 3 spare wires for phase (Ph=phase) as per table

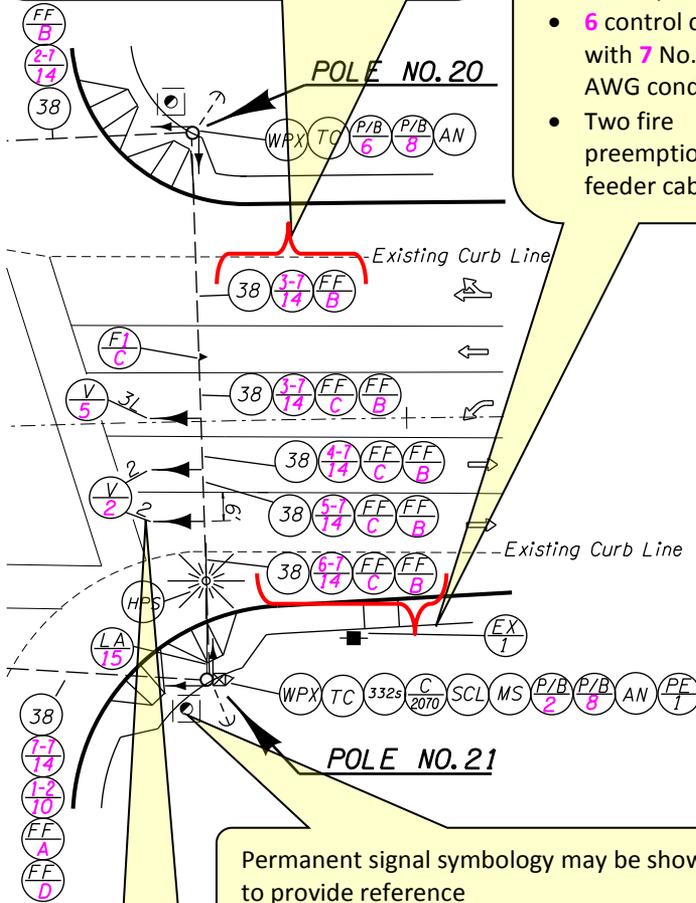
# READING PLAN SHEETS (Temporary Signal & Span Wire)

This portion of span wire (between the pole and the Fire Preemption unit) has:

- 3 control cables with 7 No. 14 AWG conductors
- one fire preemption feeder cable

This portion of span wire (between the pole and the signal indication) has:

- 6 control cables with 7 No. 14 AWG conductors
- Two fire preemption feeder cables



Permanent signal symbology may be shown to provide reference

The signal head type (2) is located on the leader-line.

**Any changes to temporary lane use may require modification to the signal indications or phasing. ALWAYS contact EOR for options.**

# READING PLAN SHEETS (Temporary Signal & Span Wire)

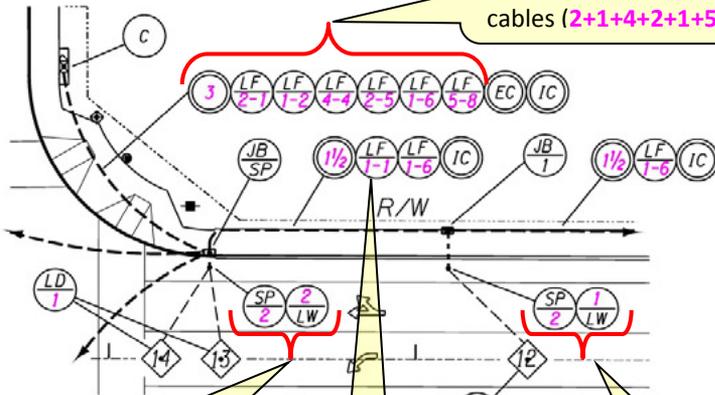
## L E G E N D

- 336s
Install a model 336s pole mounted cabinet & control equipment
- C  
2070
Install model 2070 controller in model 336s cabinet
- EX  
1
Retain and protect existing power pole (Power source)
- WPX
Install special (X=non-standard) treated wood pole (See, "Pole Entrance Chart")
- AN
Install back guy and anchor(s)
- LA  
L
Install (L=length) foot luminaire arm
- TC
Install terminal cabinet
- SCL
Install service cabinet, 120/240 volt, for both signal and illumination circuits
- MS
Install 120/240 volt meter base
- V  
Ph
Install phase (Ph=phase) vehicle signal
- P/B  
Ph
Install phase (Ph=phase) pedestrian signal with clamshell mount and pushbutton with 'H' mount
- PE  
1
Install photo electronic control relay on pole, as per Std. Dwg. No. TM465
- HPS
Install 250 watt high pressure sodium luminaire, type M-S-III, 120/240 dual voltage mag-regulator ballast. Bond luminaire to pole grounding terminal with No. 10 AWG THWN wire
- 38
Install galv. steel 3/8" messenger and 1/4" tether cables
- X-N  
G
Install (X=number of cables) control cable(s) with (N=number) (G= AWG wire size) AWG conductors
- FF  
Ch
Install channel (Ch=channel) fire preemption detector feeder cable
- FN  
Ch
Install channel (Ch=channel), (N=number) barrel fire preemption detector unit

Wood poles are non-standard. They are designed by the contractor and submitted to ODOT for review and approval.

# READING PLAN SHEETS (Loop Detection)

In the 3" conduit there is a total of 15 loop feeder cables (2+1+4+2+1+5)



2 pairs of loop wires (one from loop no. 13 & one from loop No. 14) are entering the 2" sand pocket block out.

Loop No. 12 for phase 1

1 pair of loop wires (from loop no. 12) is entering the 2" sand pocket

1 loop feeder cable for phase 1 (for loop no. 12)

## LEGEND

- Install Controller cabinet (See Signal Plan)
- Junction box (See Signal Plan)
- Install 6" max. sand pocket block-out with (S=size) inch conduit to junction box
- Install (S=size) inch conduit
- Electrical conduit (See Signal Plan)
- Interconnect conduit (See Interconnect Plan)
- Install (X=number of cables) phase (Ph=phase) loop feeder cables
- Install (N=number) pair of loop wires
- Install phase (Ph=phase) 6' round vehicle detector loop

Replace variables in text when reading: "Install (2) phase (1) loop feeder cables"

# READING PLAN SHEETS (Loop Detection)

Lines represent  
loop feeder cable

Total of 15 Loop feeder cables  
entering the controller cabinet  
(Count the number of lines  
crossing into the controller  
cabinet). For example there are  
2 loop feeder cables for phase 5.

Loop Number	Distance Feet	Phase	Slot	Voyage
1	180	2	I2U	9
2	75	5	J1U	5
3	15	5	J9U	6
4	5	4	I6U	14
5	75	4	I6L	15
6	75	4	I7U	16
7	15	4	I7L	17
8	5	6	J2U	19
9	15	1	I1U	1
10	5	1	I9U	2
11	180	8	J6U	24
12	75	8	J6L	25
13	15	8	J7U	26
14	5	8	J7L	27
15	75			
16	75			
17	15			
18	5			
19	15			
20	5			

Controller Cabinet

**LOOP DETECTOR WIRING DIAGRAM**  
"Distance" is from Stop Line to center of loop in feet

Loops are wired  
in series.  
(Splice inside the  
junction box)

Loops are wired in  
series.  
(Splice inside the  
controller cabinet)