

TRAFFIC SIGNAL DESIGN HANDBOOK



pennsylvania

DEPARTMENT OF TRANSPORTATION

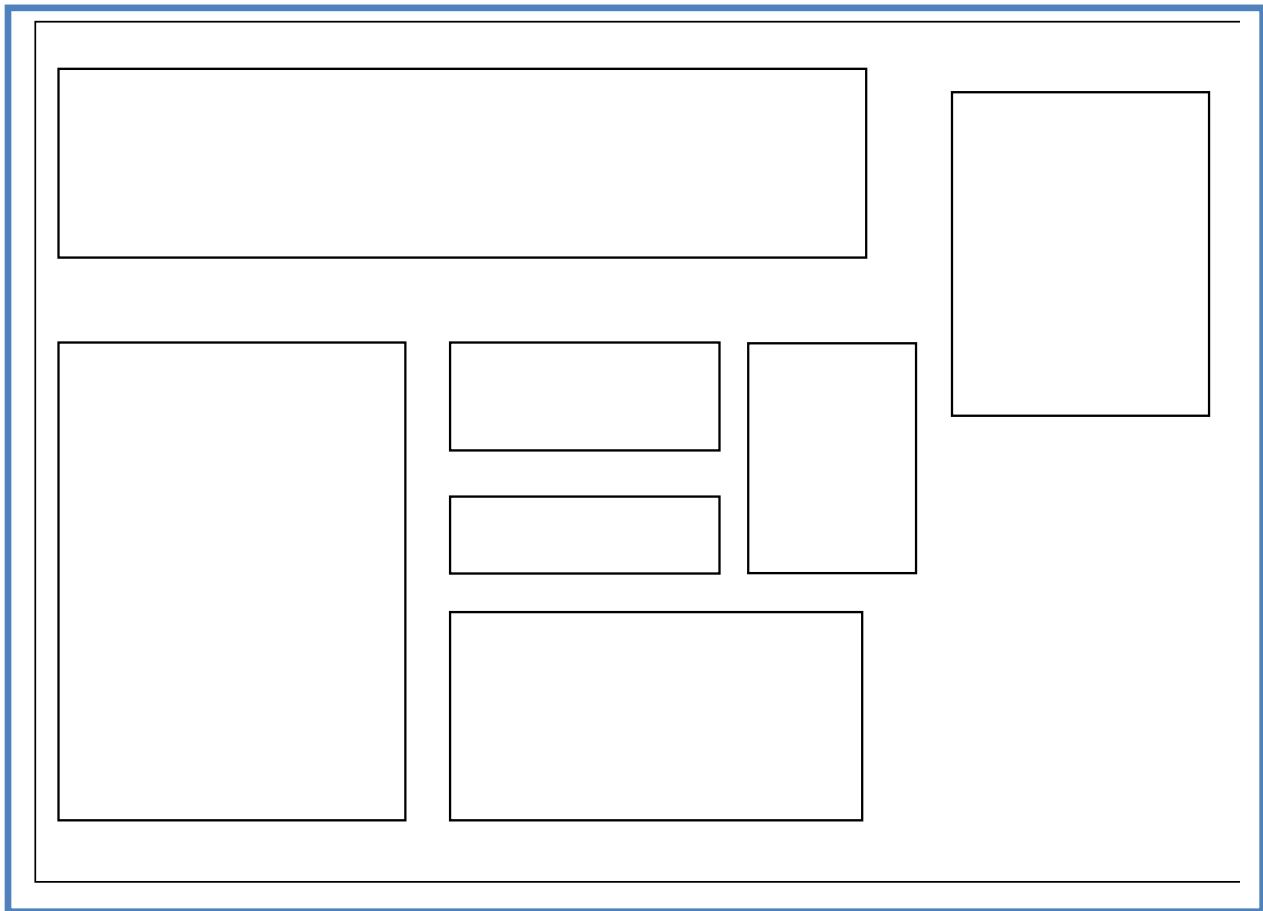
Bureau of Maintenance and Operations

Publication 149

October 14, 2010

(May, 2013 Update)

Exhibit 16-9 STEP 9: Development of a Tabulation Sheet



Complete the various tables on the tabulation sheet in conformance with the guidelines set forth in [Publication 14M \(Design Manual 3\)](#) to provide a complete and accurate listing of all construction items composing the traffic signal design. Complete the tabulation of the electrical distribution items from the wiring diagram. Finally, check both the plan sheet and tabulation sheet to ensure completeness and accuracy.

16.2 Plan Format Checklist

The following checklist is to be used as a guide to prepare a permit plan sheet and/or the construction plans.

In general, the permit plan is used to show operational information and “above ground” traffic signal equipment, signs, and pavement markings related to the operational and safety aspects of the intersection. The roadway geometrics and all traffic control equipment should generally be presented on the permit plan as if they were existing features. The construction plan and tabulation sheet are primarily used as a tool for contractors to know what equipment and items are to be installed new and which items are preexisting that shall remain. The construction plan adds to the information provided on the permit plan by including conduit, junction boxes, controller cabinet, electrical service location, wiring diagram, pavement marking notes, utilities, contractor notes, and any other items specifically needed to relay the full intent of the construction scope of work to a contractor.

Plan Sheet

The information listed below is to be provided on both the permit plan and the construction plan unless indicated otherwise.

Sign Tabulation

- Locate on lower left of sheet.
- Title.
- Column headings.
- Plan symbol.
- Description.
- Size.
- Data Required
- Plan symbol beginning with letter "A".
- Description includes sign nomenclature from [Publication 236](#) and actual legend.
- Size by width and height.

Movement, Phasing, and Sequence Chart

- Locate on upper left of sheet.
- Designate the phases using NEMA phasing. See Chapter 3 of this publication or Appendix A for examples.
- Diagrammatic representation of movements for respective phase, including pedestrian movements with dashed lines.
- Beginning with 1, horizontally list the interval numbers for the cycle.
- Add preemption phases.
- Vertically list the signal head numbers as shown on the plans.
- For each interval, show the signal head display by indicating:

G	for Green
R	for Red
Y	for Yellow
W	for "WALKING PERSON" indication or "WALK" indication
H or DW	for "UPRAISED HAND" indication or "DONT WALK"
FH or FD	for Flashing "HAND" indication or Flashing "DONT WALK" indication
←G-	for Green Arrow indication
←Y-	for Yellow Arrow indication
←R-	for Red Arrow indication

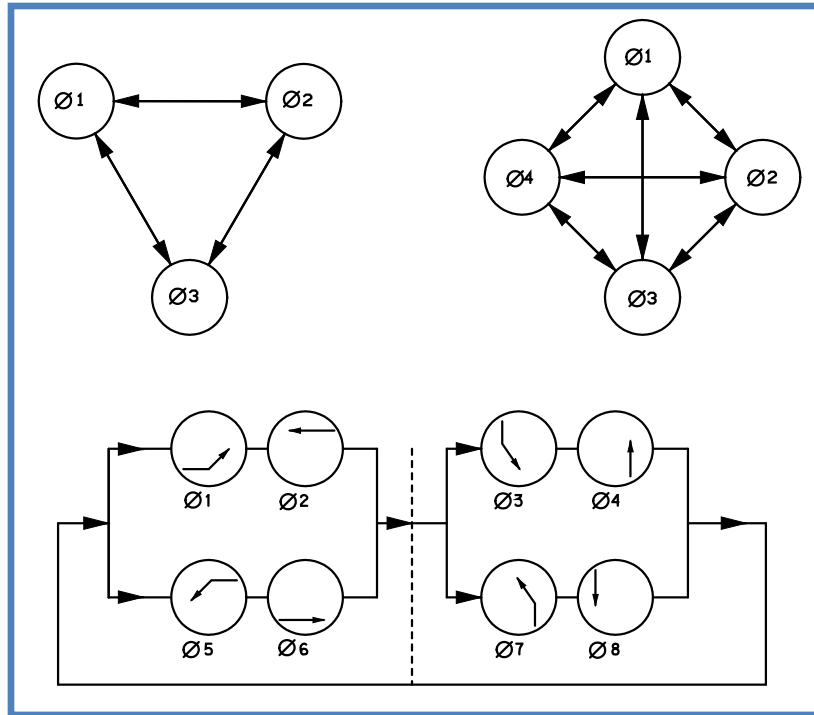
- At bottom of chart indicate the time settings for each interval, using the method indicated in [Figure A-3](#) of this publication.
- On right of chart, color the signals shall indicate when flashing. If not flashing, indicate "OFF".
- Indicate "Flash" (and hours of flashing).
- Show the required operational notes for controller operation.
- If railroad or emergency vehicle preemption is needed, add required phases and appropriate notes.

Phasing Diagram (Required only when sequencing is unusual or needs clarification.)

- Locate next to phasing chart.

- ∅ symbol for phase.
- ← Indicate sequence of controller with arrows.
- Symbol for phase sequence barrier.
- Number of various phases, using numbers 1, 2, 3 etc. (the NEMA standard). Letters (A, B, C) should not be used.

Exhibit 16-10 Example Phasing Diagram (use standard NEMA phasing)



Signal Head Identification

- Located at bottom middle of plan.

Vehicle Signals

- Diagram of signal faces.
- Show signal numbers as they appear on the plans.
- Indicate colors and type.
 - R = red ball
 - Y = yellow ball
 - G = green ball
 - ←G = green arrow indication
 - ←Y = yellow arrow indication
 - ←R = red arrow indication
- Indicate size of signal.
 - 8-inch signal
 - 12-inch signal

- Indicate type of visors.
- Indicate if backplates are to be installed.
- Indicate louvers (if required).

Pedestrian Signals

- Diagram of signal faces.
- Show signal numbers as they appear on the plans.
- Indicate messages and location.
 - Upraised hand indication
 - Walking person indication
 - Countdown digits indication
- Indicate size of message.

Legend

- Located at bottom right of page.
- Indicate all symbols here which appear on the intersection representation that need explanation in addition to those indicated on the sample plan.
- After each symbol, give a definition of what it represents.
- Indicate existing equipment and items as hollow and/or with slanted text.
- Indicate proposed equipment and items as filled in solid and/or with upright text.

Title Block

- Located at bottom right corner.
- Locate in the top quarter of the box the following categories:
 - County: insert respective county
 - Municipality: insert respective municipality
 - Intersection of: insert street name/number of roads.
 - Locate in the second quarter, the following:
 - Approved By: _____

Municipal Official	_____	Date
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 - Locate in the third quarter, the following:
 - Recommended _____

District Traffic Engineer	_____	Date
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- Locate at bottom quarter of box, the following:
 - Scale: (Bar Type) either 1 inch = 20 feet or 1 inch = 25 feet.

For all of the above, the respective information must be filled in for each project.

Notes

- Locate general notes on right hand side of sheet.

Signal Wiring Diagram (Construction Plan ONLY)

- Locate where able on sheet or place on additional sheet.
- Provide diagram of wire routing through the intersection.
- Indicate location of wire splices.
- Indicate wire conductor and size.

Upper Title Block

The following items should be located at the top right corner of the sheet, as required.

- Project data block (PENNDOT CONSTRUCTION PLAN ONLY)
- District - indicate number.
- County - indicate county.
- Route - indicate the routes involved.
- Section - indicate section number.
- Sheet - indicate sheet number of contract plan set.
- Permit block (PERMIT PLAN ONLY)
- Permit No. - indicate number.
- Date Issued - Date original permit was issued.
- Sheet ___ of ___ - this is for this sheet number and for total number of sheets in permit.
- Revision block (PERMIT AND CONSTRUCTION PLAN).

Once plans have been approved, and changes are made, they should be indicated as follows:

- Revision number - indicate number (1, 2, 3, etc.).
- Revision - indicate revision.
- Date - indicate date revision was made.
- By - indicate who made revision.

Intersection

- Located in center of sheet using scale of 1 inch = 20 feet or 1 inch = 25 feet.
- Plan view of intersection.
- North arrow.

(a) Show the following information on both the permit and construction plan:

- Curbs.
- Pavement markings.
- Supports.
- Signals with #'s.
- Pedestrian signals and pushbuttons with #'s or letter designation.
- Detectors with dimensions.
- Signs with letter designation.
- Right-of-way with dimensions and easements.
- SR, segment, and offset.
- Phasing symbols of each approach.
- Lane widths
- Speed limit of each approach
- Average grades of each approach
- Nearest signal in each direction (or "no signal within one mile")
- Municipal border if appropriate

(b) Plot the following proposed data on construction plan.

- Existing data as per [Publication 13M \(Design Manual 2\)](#).
- New curbs.
- Pavement markings (indicate existing versus proposed).
- Supports with pole #'s.
- Controller cabinet.
- Detectors with #'s.

- Signs with letter designation (indicate existing versus proposed).
- Junction boxes with #'s.
- Conduit and its size.
- Electrical service location and type.

Tabulation Sheet

Prepare the following tabulations only for construction plans.

Traffic Signal Supports

- Location.
- Mast arms.
- Strain poles.
- Sign and signal locations.
- Item numbers.

Electrical and Conduit Items

- Location.
- Conduit.
- Trench.
- Signal cable.
- Junction box.
- Electrical service.
- Detector items.
- Item numbers.

Detectors

- Amplifier.
 - Description.
 - Quantity.
 - Location.
 - Operation.
 - Item numbers.
- Sensors.
 - Description.
 - Quantity.
 - Size.
 - Location.
 - Item numbers.

Miscellaneous

- Item numbers.
- Controller assembly.
- Vehicle signal heads .
- Pedestrian signal heads.
- Systems.
- Communications.
- Preemption.

Pavement Markings

- Item numbers.
- Quantity.
- Description.

Signs

- Description.
- Size.
- Square feet.
- Item numbers.
- Sign Type/Mount.
 - Type B.
 - Type F.
 - Structure-Mounted.

16.3 Computer Aided Drafting (CAD)

All signal plans shall be completed using industry standard computer aided drafting software. The electronic drawing file must be in MicroStation (dng) format and shall be provided to the Department prior to final approval of the design for both permit and construction plans. The file shall be organized with appropriate levels or layers to allow convenient isolation of title blocks, text, signal equipment, signs, MST diagram, sign tabulation, legend, proposed versus existing equipment, etc.