Northern Virginia District Traffic Engineering
Traffic Signal Design Plan Development
Top Ten Design Issues Checklist

The following list contains common design issues that frequently result in iterative submissions and longer design periods. NoVA Traffic Engineering encourages all designers to review this checklist prior to submitting a plan for review.

1) **Final Quality Control.** Responsibility for quality control lies with the design team. Confirm your plan has been reviewed top-to-bottom by an experienced signal designer. If this is a second plan submittal, that review should be performed cross-checking revisions based on previous VDOT comments. Missed plan revisions associated with previous VDOT review comments are frequently the cause for resubmittals.

2) **Alignment with road design plan, pavement marking plan, and/or streetscape plan.** If your traffic signal design plan is part of a larger project with multiple disciplines engaged, confirm your design plan and design decisions correspond to those on the other plan sets. Frequent errors include inconsistency with lane configuration, markings, and roadside elements. Before submitting the signal design at each stage, re-verify the plans by others.

3) **Proposed equipment and construction within R/W.** Confirm all proposed construction activities and equipment to be maintained by VDOT are located within existing R/W. Or if outside R/W, confirm that temporary and/or permanent signal easements are shown.

4) **Signal pole/arm layout and head alignment.** For optimal signal visibility and alignment with travel lanes, one mast arm per intersection approach is preferred. If diagonal arms are proposed as shared by heads for multiple approaches, communicate with the submittal the specific design constraints that required this arrangement. Refer to the MUTCD Part 4 Chapter 4D for the proper signal head type, number of signal heads and head alignment for the given phasing and lane configuration.

5) **Current standards and design practices.** VDOT design review comments commonly are related to updated or new guidelines and standards. At key milestones during the design process and as part of the final quality control review, check the most current Road and Bridge Standards related to signal design, Traffic Engineering (TE) Memos, and other relevant design publications, as well as the VDOT Northern Region Operations Public Files for region-specific guidelines. Additionally, the signal design plan appearance should be consistent with the style, symbols, conventions, standards, and guidelines as presented in the Traffic Engineering Design Manual Chapter 1. One design plan sheet is preferred to display traffic signal information. A second sheet is acceptable on a case by case basis where there this insufficient space for all traffic signal information.

Northern Virginia District Traffic Engineering
Traffic Signal Design Plan Development
Top Ten Design Issues Checklist

6) **Lane use signs.** Most minor roadway approaches (particularly those with shared-use lanes) should include overhead lane control signs (i.e., R3 series lane use signs) for all lanes. When heads are centered over the lanes, locate each sign to the right of each head. When heads are not aligned over the center of each lane (e.g., when the number of heads is not the same as the number of lanes), locate each sign over the center of each lane projection. Refer to MUTCD Sections 2B.19-2B.22 for additional information.

7) **Proper controller cabinet location.** When determining the most suitable location for the controller cabinet, in addition to considering electrical and communication sources, also consider the needs of the VDOT maintenance personnel who will be accessing the cabinets. The cabinet should be in an easily-accessible and relatively level location on the roadside. Maintenance personnel should have a clear view to the intersection and signal heads from the proposed location.

8) **Proposed stop bar and geometry for new signal control.** Evaluate vehicular turn paths (and provide AutoTurn drawings with the draft plan) to determine if any conflicts exist between opposing left-turn movements or turning paths with new stop bar locations. Adjust stop bar and median noses if necessary. Refer to the AASHTO Greenbook (A Policy on Geometric Design of Highways and Streets) Chapter 2. Identification of a proper design vehicle should be part of the assessment.

9) **Mast arm loadings.** The current Road and Bridge Standard MP-3 and the maximum loadings shown in that standard should be applied.
   a. Verify the proposed loading shown on the design plan is less than the maximum standard MP-3 loading.
   b. If the loading is higher than the MP-3 loading for the given arm length, indicate on the plan that a special pole and arm design is required for the proposed loading shown plus one five-section head located 1-ft from the tip of the arm and one 30"x36" sign. The same additional loading should be applied for arms longer than 75-ft.
   c. For existing signal poles with changes in loading proposed, the designer should evaluate the change in loading. If there are any design constraints/limitations then bring them to VDOT's attention. Also include a note that the contractor shall recertify the pole.

10) **Consistent signal operation charts.** Verify the proposed indications in the color sequence chart, proposed operation in the phasing diagram, and proposed signal heads chart are consistent.