



II. THE TRAFFIC DESIGN PROCESS

This chapter of the DelDOT Traffic Design Manual describes the recommended process for performing traffic design, from the initial request through installation of the device in the field.

A. Request

The traffic design process begins with a request to install or modify a traffic signal or other traffic device at an existing or proposed location. The request should include information regarding how the proposed traffic device would be expected to improve safety and/or operations at an intersection or along a corridor. The requests may come from a variety of sources, and in general, the source of the request determines which project type will be performed.

<u>Requester</u>	<u>Typical Project Type</u>
DelDOT Planning, Traffic, Project Development, Bridge Design	Project Type 1 – Capital Projects
DelDOT Pavement Management	Project Type 2 – Pave & Rehab Projects
Elected Officials, Citizen, Traffic Representative, Fire Companies	Project Type 3 – Traffic Section Projects
Developer	Project Type 4 – Developer / Subdivision Projects

B. Establish Need for Traffic System Design Elements

Once the request is received, the DelDOT Traffic Section must establish the need for the traffic device before the design process can begin. Need is typically established by conducting a study of current conditions and assessing the potential benefits of the traffic device. For example, to establish need for a new, modified, or removed traffic control signal, a signal study is required (see Chapter IV-A).

Approval from the Chief Traffic Engineer is required before a project involving a new traffic control signal or the removal of an existing traffic control signal can advance to the design stage. If it is determined that the traffic device is not needed, the findings should be documented and filed in the case history for future reference.



New Signal or Modification to an Existing Signal for Type 1 (Capital Projects), Type 2 (Pave & Rehab Projects) and Type 4 (Developer / Subdivision Projects):

DelDOT's Traffic Systems Design Group (Design) will coordinate a meeting with the DelDOT Project Process Group, including the Project Consultant (if not in-house design) and others with a specific interest in the project, at the time survey plans are submitted. The purpose of the meeting is to discuss the communications, facilities, and signal design. Data about the proposed or modified signals should be obtained and provided at the meeting. Agreement will be reached on recommendations for the changes, lane assignments and other elements such as the phasing, system detection, integration, etc. Upon concurrence by the Project Process Group that a new signal is justified, a signal resolution will be drafted for signature by the Chief Traffic Engineer. A signal agreement may also be required in which the Developer and DelDOT will agree on private funding requirements and/or right-of-way access (For additional information on signal agreements, see **Appendix B**). The project will subsequently be "handed off" to the Design Group or to a Consultant to begin the development of base plans.

New Signal or Modification to an Existing Signal for Type 3 (Traffic Section Projects):

DelDOT Traffic Engineering Studies Group (Studies) or Traffic Safety will conduct a traffic signal warrant or other traffic engineering study of the location, as outlined in Part III of this manual. If a new signal is justified or if modifications to an existing signal are being recommended, Studies will meet with the Chief Traffic Engineer to review the study. If approved by the Chief Traffic Engineer, a resolution will be drafted and signed, authorizing the new signal. Studies will then meet with the DelDOT Project Process Group. The Studies Group will provide copies of the study and other pertinent data for discussion. Agreements will be reached on the recommended change(s) and other required design elements. The project will be subsequently "handed off" to the Design Group so that they can begin the base plan preparation. Additionally, modifications to existing signals may be initiated by DelDOT's Design Group and/or Maintenance Group. These requests are typically associated with asset management projects.

C. Notify DelDOT Public Relations

Once the need for the new or modified traffic signal or other traffic systems device has been established, the group initiating the signal project should notify DelDOT Public Relations of the intent to commence design. Information that should be provided to Public Relations includes project location, scope, schedule, and the potential for MOT impacts. Continued coordination between the DelDOT Traffic Section and DelDOT Public Relations is important throughout the



design process, particularly if there are any changes to the project scope or schedule. Prior to design completion, the Traffic Design Section should inform PR of the pending signal handoff and anticipated signal construction. During the construction phase, DelDOT's Signal Construction Group should keep PR informed of all lane closures, operational changes, and new activations.

D. Design Process Checklist

At this point in the traffic design process, the designer should begin preparing the design process checklist. The checklist is a working document that records the completed project tasks and follows the project from the beginning of design through handoff to Construction or Maintenance. A sample handoff form is provided with this Manual in **Appendix C**.

E. Plan Preparation

The next step in the traffic design process is plan preparation. Prior to beginning plan preparation, the Designer should obtain from the Department all existing data on record pertaining to the proposed location. A thorough on-site inventory / assessment should be conducted, at which time construction and operational constraints should be identified. If the project is located near an airport, port facility or an at-grade rail crossing, additional coordination with the appropriate agencies (Federal Aviation Administration (FAA), CSX, etc.) will likely be required. If an existing traffic signal is present, the designer should verify existing equipment and operation of the signal. If any field issues/irregularities are discovered, the designer should report them to the appropriate group or section in the Department. If utility, right of way, geometric, or other required information is indeterminable, a survey of the intersection may be required.

Base plans should be developed at 30-scale and include/identify existing and proposed roadway geometrics, utilities, right-of-way, and clear zone, as well as any physical features that could affect the design of the signal. All existing and proposed signal equipment should be shown, and the proposed phasing, lane use, intersection/system detection and system communication requirements should be shown and identified. Further details of base plan preparation are presented in Chapter III of this manual.



F. Design Review

Upon completion of the preliminary design, the Designer should again meet with DeIDOT's Project Process Group to review the design plans. Following this review, the Designer will typically receive additional recommendations to modify the design. One or two more meetings (semi-final and final plan review) may be required with the Designer and DeIDOT's Project Process Group to review design issues and address additional comments and recommendations.

Once all parties have reached a final agreement on the traffic design plan, the Designer will finalize the plan and sign the plan as recommended. For signal design projects, the Designer will then obtain the signature of the Signal System Manager and submit the signed plan(s) to the TMC Operation Manager for development of the final timing sheet. Once the signed timing sheet is obtained, the Designer should provide the Chief Traffic Engineer the final (signed) signal plan(s) and final timing sheet concurrently for signature. While some projects may not have a timing sheet ready for signature at this time, the process described previously is preferred. Next, DeIDOT's Traffic Systems Design Group will provide a handoff form to Construction along with the signed signal plan(s), final timing sheet(s), traffic statement and any other project-specific information. For Type 3 projects (Traffic Section Projects), Traffic Construction controls the schedule. Therefore, priority should be designated as "ASAP," "High," or "Normal" on the handoff form, as appropriate. For other project types, priority should be designated as "Support" on the handoff form, and the Traffic schedule will follow the main project's schedule. The anticipated start date should also be noted on handoff form. A sample handoff form is provided in **Appendix C**.

G. Cost Estimate

During the design process the Designer should generate a cost estimate (i.e., a traffic statement) for the required work for the traffic device installation and/or modification. The cost estimate should include all items to be furnished and installed by the contractor and/or DeIDOT to make the traffic device fully operational. The cost estimate should also include a contingency factor. The cost estimate should show the breakdown of cost contribution by any developers, local government and DeIDOT, as determined by the project type.



H. Construction

Once the handoff form is provided by DelDOT's Traffic Systems Design Group and funding is verified, DelDOT Signal Construction will issue a Notice to Proceed to the selected Contractor to begin work on the project. The Contractor is responsible for coordinating all assigned construction activities with other projects administered by DelDOT Signal Construction. The Contractor is responsible for notifying MISS UTILITY prior to beginning construction. DelDOT Signal Construction will notify the Power Company at least 30 days in advance of a "turn-on" date.

Generally, a traffic signal project requires 30 - 40 calendar days to complete construction. For other types of projects such as signal enhancements and capital projects, the construction of signals is treated as an integral part of the total project and, therefore, may require a longer time to complete. The timetable to complete construction of other traffic systems devices varies by device type and scope of the project.

I. Activation

An important time of the traffic design process is the day the device is activated and put into service. For major projects, one representative of each DelDOT Section should attend the field activation. Typically, a new traffic control signal is operated on "flash" for a minimum of 72 hours prior to converting to stop and go operation. Similarly, portable changeable message signs (PCMS) are used to provide information to motorists about the pending signal activation approximately 1 week prior to signal activation. Prior to activation, the construction manager should notify DelDOT Public Relations regarding the "turn-on" date. Public Relations will then inform the public of any changes to traffic patterns in the area. Following activation, the project documents are handed off to Traffic Maintenance.

J. As-Built Plans

Once the project is constructed, completed, inspected and accepted by DelDOT Construction and Maintenance, the construction inspector will prepare an "as-built" plan. The "as-built" plan is a record of the final location and operations of the traffic signal equipment. The construction manager will submit the red lined "as-built" plan to the designated Traffic Systems design representative. The Designer will be responsible for updating the record drawings. If needed, new signatures will be obtained. Additional information on the preparation of "as-built" plans is included in Chapter III of this Manual.