

## CHAPTER 2A - LOCATION STUDY

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## CHAPTER 2A - LOCATION STUDY

### SECTION 2A - 1 - PROJECT INITIATION

#### PRELIMINARY ENGINEERING AUTHORIZATION

Projects are initiated and funding requests are submitted according to the system classification. See IIM LD- 183 for the authorization procedure.

#### URBAN PROJECTS

Projects within [towns and cities](#) with populations of 3,500 or more (and other selected urban areas under 3,500) are initiated by municipal resolution to the Local Assistance Division stating their desire for VDOT to consider the implementation of a project. Upon receipt of a request, and approval by the Local Assistance Division Director, the Local Assistance Division forwards to the Location and Design Division a request for assignment of a project number. Upon determining the project number, FHWA-534 Highway Capital Outlay Code, and Functional Classification, this information is provided to the Director, Local Assistance Division on Form LD-219. Form U-9 will then be prepared by the Local Assistance Division and copies sent to the Fiscal Division, giving authorization to set up the appropriate charges, and to the Location and Design Division.

#### INTERSTATE AND PRIMARY PROJECTS

Requests for initiation of projects on the Interstate and Primary Systems originate within VDOT in accordance with established construction schedules, for future planning purposes and in some instances at the request of local governments. Project numbers are assigned using LD-219 according to the Functional Classification and financing. Programming Division authorizes funding using Form PS-14.

#### CERTIFICATION ACCEPTANCE

Certification Acceptance (C.A.) is a form of documentation by VDOT for FHWA (on all Federal - Aid projects except Interstate) showing that all Federal Requirements have been met. [The Program/Project Management System](#) (P/PMS) should be used to monitor the various stages of project development as well as documenting completion of various stages.

In carrying out operations under certification acceptance (CA), it is imperative that all steps in the project implementation stage be strictly followed. This is particularly the case in transmitting a project at the P.S. & E. stage to the Federal Highway Administration, which cannot be submitted until the environmental document has been cleared. The approval is obtained by the Environmental Division. Environmental documents must receive approval by the FHWA before the work can be authorized. Projects in this category are to be held in this Division until notification from the Environmental Division has been received that the document has been approved by the FHWA.

## **EARLY PROJECT NOTIFICATION**

Project Early Notification is required as soon as a project has been initiated (PE authorized) in order to provide state environmental resource agencies an opportunity to comment on highway improvements at an early stage of project development. Early Notifications are required on all proposed improvements that disturb previously undisturbed ground (for specifics, see Environmental Division's State Environmental Review Process Manual). Information on SERP is available at <http://www.virginiadot.org/projects/environmental-SERP-faq.asp>.

Project Early Notification Form EQ-429 shall be completed and submitted with a location map on a section of a U.S.G.S. quadrangle sheet to the applicable District Environmental Manager as follows: Interstate and Primary projects - by the project manager as designated in PPMS; Urban projects - by the Local Assistance Division; Secondary projects - by the **District Construction Engineer** through the Local Assistance Division when submitting Form LD-430. The forms and maps are then forwarded to the sixteen environmental resource agencies for review.

Environmental data identified in this early review process by the resource agencies is returned to the District Environmental Manager within thirty days. The district environmental personnel will utilize this data in their Preliminary Environmental Inventory to determine the significance / non-significance of the project.

## **PRELIMINARY SCOPING**

All projects are to be scoped in the early stages of development and placed in the Six-Year Improvement Program. (See IIM LD- 210)

## **ASSIGNMENT OF PROJECT NUMBERS**

Form LD-219 is used to assign project numbers to new projects, delete project numbers, or request additions/revisions to existing project numbers and descriptions.

## **REQUESTING STRUCTURE NUMBERS**

When a project includes a structure, a “B” or “D” number ([See Section 2E-6 PREPARATION OF SUPPLEMENTAL SHEETS](#)) and a 5-digit FMSII/HTRIS Number is required. The “B” or “D” number is assigned by Location and Design Division’s Plan Coordination Section (or Local Assistance Division). The Project Manager will then request the FMSII/HTRIS Number by submitting Form LD-219 to Thomas Lester (or John Coleman) of the C.O. Structure and Bridge Division or to the District Structure and Bridge section prior to requesting a project number from the appropriate division. This request must provide the location of the crossing, denoted on a map, conceptual sketch, or plans, if available.

## **REQUESTING A PROJECT NUMBER**

New Projects [prior to inclusion of project in the Six Year Improvement Program (SYIP)] - Programming Division will process Form LD-219.

Existing Projects (projects included in SYIP) - The Project Manager may request that an additional number be assigned to a project (additional PE, R/W, C, B or D number) by submitting Form LD-219 to the Programming Division. The Programming Division will forward Form LD-219 to the Location and Design Plan Coordination Section upon concurrence with the request.

## **REQUESTING A REVISION TO A PROJECT NUMBER**

To request a revision to a project number (i.e. changing a “C” to an “M”, canceling a project number, etc.) the Project Manager will submit Form LD-219 to the Programming Division.

## **REQUESTING A REVISION TO A PROJECT DESCRIPTION**

To request a revision to the project description, the Project Manager will complete and submit Form LD-219 to the Programming Division. The Programming Division will process the request, and upon concurrence, forward Form LD-219 to the Location and Design Plan Coordination Section. The Form LD-219 will document Programming Division's concurrence in the Remarks Section of the form.

When a revision to the project description dramatically changes the scope, length, and/or cost of the project, the Project Manager must submit a revised Scoping Form LD-430 to the Programming Division along with Form LD-219. This request should provide a detailed summary of the revision (including reason for the scope change, new estimated cost, and any changes in the project schedule) and must be signed by the State Location and Design Engineer (or District Administrator). Minor revisions to the project scope may not warrant a revised scoping form. The Project Manager should discuss these situations with the Programming Division.

## **SECONDARY ROADS (ARTERIAL-COLLECTOR-LOCAL ROADS)**

The following procedure is to be adhered to in the preparation of secondary projects for field inspection stage:

1. Secondary projects are initiated by the Resident Engineer in conjunction with a master plan and with approval of appropriate boards of supervisors. He will submit Form LD-430 to the Director, Local Assistance with an assigned project number and the Functional Classification.
2. Upon receipt of the secondary roads Preliminary Field Inspection authorization, the State Location and Design Engineer shall request data in accordance with Section 2A-1-PROJECT INITIATION and request historical and archaeological surveys. It is desirable that the information be available to those present at the time of the review. The State Location and Design Engineer shall assist in supplying any mapping or photography which may be required to complete the above.

3. After completion of step No. 2, the District Administrator will schedule an [Initial Field Review](#) and notify the Director, Local Assistance, Location and Design Engineer and Right of Way Engineer of the date, time and site. Representatives from the District Environmental, Right of Way, Traffic Engineering, or any other appropriate section(s) may be requested to attend. A scoping team reviews the design at this time for documentation. (See IIM - LD - 210.)
4. The results of this Initial Field Review are to be forwarded to the Director, [Local Assistance Division](#) on Form LD-430. The cost estimate of the project is to include construction estimates by the Location and Design Section. The District Right of Way Section will provide right of way and utility estimates as required. Projects with anticipated right of way donations are to have the donations fully resolved at this time.
5. Upon receipt of the Form LD-430, the Director, Local Assistance shall complete his review and should he concur with the proposed scheme of development, he will so notify the State Location and Design Engineer with a copy to the District Administrator. Upon approval by the State Location and Design Engineer, field surveys will be authorized. Field surveys are not to be made prior to this approval.
6. Upon completion of the preliminary design, which will include proposed grades and right of way, prints will be [made available](#) to the District Environmental Manager for preparation of the proper environmental document and for permit determination.
7. Any major deviation from the agreements reached at the Initial Field Review and indicated in step No. 3 must be evaluated considering cost differential. This information is to be transmitted along with the preliminary plans as indicated in step No. 6 so that any change from the original concept can be included in the decision making process. The revised project must satisfy the original objective within a reasonable funding scope. In cooperation with the Resident Engineer, the District Design Engineer will be responsible for determining and updating the project cost so that a project will not be scheduled prior to the Department's ability to finance.
8. For instructions on using the "No Plan" and "Minimum Plan" concept see [Appendix A, Section A-7-"No Plan" and "Minimum Plan" PROJECTS](#).

## PROJECT PROGRESSION

The State Location and Design Engineer or his representative for Location will request that the design unit in either the Central Office or the District to which the project has been assigned prepare a preliminary study, if one is warranted. Should a study not be needed, survey will be authorized as noted in [Section 2B-1-GROUND SURVEYS](#). The Preliminary Engineering Section will participate in any special studies and analyses that may be required by management.

## **SECTION 2A - 2 - ADMINISTRATIVE APPROVAL**

### **AUTHORIZATION FOR LOCATION PUBLIC HEARING**

The State Location and Design Engineer will review the project with the appropriate officials to determine if a Location Public Hearing will be required, taking into account the general complexity of the proposed and anticipated public interest (Location Public Hearings are usually held on all projects involving major environmental changes affecting the community.) Should it be found desirable to hold a Location Public Hearing, authorization will be given and those involved will be advised as to the scheduling of the hearing, corridors to be presented and other pertinent information. (A determination should be made at this time as to whether existing photography is adequate for the preparation of an aerial mosaic. If not, the required coverage should be requested.)

In most cases, a [notice of willingness](#) will not be posted on a project with one or more of the following characteristics. These characteristics are cause for considerable public concern which necessitate both a Location Public Hearing and a Design Public Hearing:

1. A major highway project of four or more lanes on a new location;
2. Project impacting the area with significant social, economic or environmental effects;
3. Project having two or more feasible solutions under serious consideration;
4. A Federal-Aid project identified as a Class I action.

### **BOARD APPROVAL**

The Public Involvement Section will assist the State Location and Design Engineer in preparing a memorandum to the Chief Engineer requesting consideration by the Board. This memorandum is to cover the proceedings of the public hearing and the resolution of questions and recommendations. The project is then forwarded to the Vice-Chairman of the Board who arranges to have it placed on the agenda for Board action. After the project has been considered by the Board, the Public Involvement Section shall advise the District Administrator of the action taken. The District Administrator advises those who spoke at the hearing or who corresponded with the Department as part of the hearing record of the action taken, including any changes in the proposal presented at the hearing and appropriate responses to the individual's comments or questions. The District Administrator will also advise all other local officials of the action taken. The Public Involvement Section will notify the appropriate mayor and/or chairman of the Board of Supervisors of the Board's action. The Commonwealth Transportation Board only approves proposed highways on new corridor locations.



## **SECTION 2A - 3 - REVIEWING WORK LOAD AND ASSEMBLING DATA**

### **SCHEDULING PROJECT WITH WORK LOAD**

When a project is received by either the Preliminary Engineering Section or a Design Section, the Section Head will assign it to one of his/her groups. Care must be taken to review existing and possible future construction schedules to assure that the section being assigned the project has sufficient time and manpower. On Preliminary Engineering projects, consideration must be given to long range commitments to assure that the same section will continue the project through the Preliminary Field Inspection stage.

### **SETTING UP CORRESPONDENCE FILES**

The initiation and constant maintenance of correspondence files cannot be over-emphasized. A properly maintained file will provide a continuing history of the project and will permit documentation of the various stages of activities. When a project is received by the Engineer to whom it is assigned, every effort should be made to assemble all correspondence relative to this particular project. This will involve a search of the main file, a review of the files of other divisions, and possibly a review of the files of District personnel. All original correspondence is to go to the central files after copies are made. When all available correspondence is assembled, consideration is to be given to the number of files needed and their content. On large projects or those expected to continue for several years, this is very important, as a separation of certain items will provide optimum access.

When a project has been authorized by the Programming Division, the project designer (or coordinator is to set up a file folder labeled "PRELIMINARY ENGINEERING COST" and the file is to only contain data such as the authorization(s), PE cost expenditures, request for additional funds, and backup data for additional PE cost and cost overruns (e.g., reason - for design of a section; additional study for Environmental considerations; etc.).

### **SETTING UP ROUTE FILES**

Route files will contain all rolls, mosaics, old plans, photographs, USGS quadrangle sheets and other available data. Consideration must be given to the size and expected time frame of the project and sufficient space provided for the anticipated accumulation. Items in the route file are to be identified by some method for easy access. As the project progresses, care must be taken to keep only essential items, as an accumulation of unneeded material will waste valuable space.

## **SECTION 2A - 4 - REQUESTING AND ASSEMBLING ADDITIONAL DATA**

### **PRELIMINARY PLAN DEVELOPMENT**

Preliminary Plan Development is intended to provide the basis for scoping, and the guiding document for the development of Field Inspection plans. It is essential that various alternatives be assessed in sufficient detail in order to preclude major modifications during the latter stages of project development.

The following outline is a guide in the development process to assure that adequate control is applied in the early stage of projects:

1. As early as possible, at the inception of a project, photographic coverage is essential. The location of the project determines the coverage required. Rural projects with sparse development and without extremes in topography and development can generally be addressed at a ratio of 1" = 200' Imperial (1:2000 Metric). A ratio of 1" = 100' Imperial (1:1000 Metric) is preferable, but may limit the band width when relocations or various new alignments are being considered.

Other projects in congested areas may require photography at a ratio of 1"= 50' Imperial (1:500 Metric). It is the designer's responsibility to obtain photography at an appropriate ratio (scale).

2. If traffic data has not been secured, a request should be submitted at this time on Form LD-104, including the date the information is needed.
3. From the photo coverage in step No. 1, a temporary plan base, either in the form of sheets or mosaics, is to be secured. The request should note that the material is to be used as temporary plan base, and photographic screening and/or dodging will be employed to produce a base on which line work will easily be visible.

Studies have shown that these plan bases provide a clearer drawing when the final version is completed. Other annotations can be made more legible by removing the image to provide a "clean" space for descriptions, etc.

4. Depending upon the complexity of the project, the use of title sheets, typical section sheets and other drawings may be used for quantities and details of traffic, intersections, etc. The base photo coverage can be placed on a sheet outline and a set of plans produced.

## **ASSEMBLING ADDITIONAL AVAILABLE DATA**

Quite often there is available data within the Department and other state agencies which proves valuable in determining the location and design of the project. Land use maps, tax maps, soil studies, etc., are available in many instances and should be included in the route file for future use. Transportation studies are available for cities and towns **over 3,500 population**, as well as for several other urban areas **under 3,500**, and should be used as a guide.

## **REQUEST FOR TRAFFIC DATA**

Traffic data is requested on Form LD-104, except for low volume Local Roads and Rural Collectors with a Current ADT (Current ADT being defined as latest available traffic counts) less than 400 VPD. The designer is to check the appropriate blocks to obtain traffic data required for a particular situation. The design year and speed is to be indicated on the form when submitted by the designer. The design year traffic data being requested is to be based on **the criteria shown on Form LD-104.**

Normal traffic data requests on Form LD-104 will be required on Local Roads and Rural Collectors requiring a detailed traffic analysis, such as roads experiencing a higher than normal growth rate or for other reasons that would require some type of traffic forecast. Careful consideration must be given to environmentally sensitive locations which would require possible air or noise studies. Where schools, churches, historical structures, playgrounds, etc., are in close proximity to the proposed project, the District Environmentalist should be contacted to determine the extent of traffic analysis required.

## **REQUESTING PHOTOGRAPHIC COVERAGE/TOPOGRAPHIC MAPPING**

On most new locations, it is desirable to request topographic mapping. A review of available data in most cases allows the Engineer to determine the approximate area to be mapped. In some instances it may be necessary to review the area to be mapped in the field. This area can then be shown accurately on a quadrangle sheet. After determining the area to be mapped, the ratio (scale) of mapping is to be determined. Most mapping is prepared at a 1" = 200' scale (1:2400 ratios); however, it is also available at other scales (ratios). When the proper scale (ratios) is determined, the Project Manager will advise the Photogrammetric Engineer who will proceed in the preparation of the mapping. Immediate action on requests for mapping may not always be possible as the flying time necessary for good aerial photography is limited.

## **ASSEMBLING PHOTOGRAPHS AND MAPPING**

After the photographs are secured, mapping is completed. Prints can be made and used as individual sheets or combined as rolls at the discretion of the Engineer. A set of individual photographs is also essential for stereo viewing. A mosaic can be ordered through the Photogrammetric Engineers, should this be found desirable.

## **SECTION 2A - 5 - FIELD REVIEW**

### **ARRANGING FIELD REVIEW (ON-SITE)**

After all available data is assembled, field review is to be made. Arrangements are to be made with the District Administrator and Resident Engineer (and the Local Assistance Division representative, if applicable) for an on-site review.

### **HOLDING ON-SITE REVIEW**

On the initial field review there are several situations to be investigated. A determination is to be made, with the assistance of the District Administrator, District Construction Engineer and/or Residency Administrator, as to future development which could influence the selection of a corridor. Relative property values should be noted on the prints. Soils, streams and current land use are to be noted. All applicable environmental areas such as parks, historical sites, hazardous waste sites, wetlands, etc., should also be noted. The probable effect on existing roads and entrances should be reviewed. An on-site review should leave the review party with a better understanding or "feel" of the corridors under consideration.

### **PREPARATION OF REPORT**

A report is to be written, either to the section supervisor or to the file, outlining the conclusions reached at the on-site review. An appropriate part of this report is a recommendation as to the most desirable manner in which to proceed. This report will also serve as a record of matters considered.

## **SECTION 2A - 6 - STUDY OF ALTERNATES**

### **PROJECTING HORIZONTAL ALIGNMENT**

In projecting horizontal alignment at this stage of development, all practical considerations should be tested, subject to information obtained from the initial field reconnaissance. The alignment should be governed by the Geometric Design Standards in [Appendix A, Section A-1](#), based on the design speed for the Functional Classification of the highway system that is being considered. In corridor selection, any deviation from these standards is to be noted for consideration. Additional information may also be obtained from AASHTO's [Policy on Geometric Design of Highways and Streets](#) and other related publications. As corridors are studied, it is suggested that one baseline be projected for each alternate.

### **PROJECTING VERTICAL ALIGNMENT**

When all horizontal alignments have been selected and shown on the prints, a tentative grade is necessary in order to properly evaluate these alternates. Care must be taken to confirm to applicable standards in regard to gradient and to passing and stopping sight distances on both crest and sag vertical curves. Grades should present a smooth appearance and eliminate the "roller coaster" concept whenever possible.

### **EVALUATING ALTERNATIVES**

In evaluating alternates at this stage of the project development, it should be kept in mind that this is the initial attempt to define a corridor location and the alignment and grades projected are subject to refinement as shown in [Section 2B-3-DETERMINATION OF ROADWAY DESIGN](#). The basic objective at this time is to eliminate the corridors or alignments which are inferior to others considered within the project area. Ideally, one alignment and grade should appear superior to others considered within a given corridor. The aforementioned items used in considering horizontal and vertical alignment offer the best means of evaluating alternates in addition to any information which was obtained from other sources.

## **PREPARATION OF REPORT**

After alternates have been reviewed and evaluated, a written report to the section supervisor or file is to be prepared stating the conclusions reached, reasons for retaining or eliminating some corridors or alternates and a recommended procedure to follow as the study progresses. Copies are to be sent to the District Administrator and Resident Engineer and any division, which is affected by the project. In this manner all involved parties will be kept abreast of the progress of the project and the files will contain sufficient documentation.

## **EVALUATING PUBLIC INVOLVEMENT PROGRAM**

Informing the public about studies in their area in the earliest stages can be very helpful in the later stages of project development. Contact the [Public Involvement Section](#) for advice and assistance in setting up a useful public involvement program.

## **CONTACTING LOCAL GOVERNMENT AND/OR AGENCIES**

Cooperation and information are two key words in working with local officials. At this stage of development, contact with the local governing bodies, planning commissions and other elected and/or appointed officials is both proper and desirable. Being in contact daily with their local situation gives these local officials an insight to the area's problems and/or changing conditions. In addition to exchange of ideas and information, contact at this time will give them an opportunity to make a contribution to the overall project development. Contact and arrangements for meeting with local officials in urban areas are to be made by the Local Assistance Division. In other areas, these arrangements are to be made by the District Administrator or his/her designated representative. Meetings of this type also afford the opportunity to bring District personnel up to date on progress of the project.

## **SECTION 2A - 7 - PROJECT SCOPING**

### **POLICY**

All projects are to be scoped in their early stages of development. See [Chapter 1D-1-INTRODUCTION](#) for instructions on appropriate timing.

### **SCOPING GROUP**

The Scoping Group is determined according to the roadway classification. It is an interdisciplinary group.

### **SCOPING PROCESS**

The scoping allows all project participants to define the elements comprising the project, the working budget, schedule for designing and developing the project. The recommended design is presented to the scoping group and after agreement is reached, the appropriate form will document the decisions reached.

Interstate, Primary, Urban and Secondary projects will use Form LD-430.

Copies of these forms are to be sent to all team members.

Prior to the plans being signed for right of way (or construction when no right of way is needed), the coordinator will certify that the project is within the original scope, or provide documentation as to the deviations.

The State Location and Design Engineer will use Form LD-404 for this purpose.

### **DESIGN EXCEPTIONS**

If there are geometric values that are below [AASHTO minimum](#) guidelines, the coordinator shall seek to obtain approval of these design exceptions from the State Location and Design Engineer (all projects) and FHWA (if applicable) no later than Public Hearing Stage. Please refer to [IIM-LD-227](#) for specific guideline on obtaining design exceptions.