

Advance Planning Operations in the North Carolina State Highway Commission

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• TODAY most engineers and administrators are aware of the importance of the planning function within the framework of the highway department. It is the intent of this paper to set forth in some detail how the North Carolina State Highway Department handles its advance planning functions. To understand North Carolina's particular operation, it is important to note that in that state the Highway Department has responsibility for some 71,000 miles of highways, including all primary highways, all secondary roads (there are no secondary roads under county government), and approximately 30 percent of all the streets within the incorporated limits of the municipalities. Thus, the Highway Department has responsibility for all streets and highways in the State with the exception of approximately 7,000 miles of city streets, which are primarily residential or collector-type streets.

HIGHWAY DEPARTMENT ORGANIZATION

The North Carolina Highway Department has a seven-member policy board known as the Highway Commission, appointed by the Governor with four-year, overlapping terms. The Commission is responsible to the people for the over-all activities of the Department and makes all policy and financial decisions. The Highway Commission does not enter into the administrative activities of the

Department. By statute, all administrative functions are the responsibility of the Director of Highways, who reports to the Commission, recommending policy to them. It is the responsibility of the Director to execute and administer all policy decisions adopted by the Commission. The Highway Commission allocates funds in terms of a total budget adopted by the Legislature and is responsible for the final selection of long-range and short-range highway project programing, including the selection of individual projects.

There are approximately 8,000 permanent employees in the Highway Department handling maintenance and construction activities. In addition, there are approximately 1,000 temporary summer employees on maintenance and force account construction. The Highway Department also works approximately 6,000 prisoners on the roads each day in routine maintenance. Thus, the Highway Department is a fairly large organization, which might be considered to have something of the order of 15,000 employees. This large organization requires two distinct levels of highway management within the framework of the over-all operation, as follows:

1. *Staff Administration:* The staff administration reporting to the Director consists of the Finance Department, headed by a Controller who is delegated by statute certain

responsibilities for developing appropriate management operations for controlling the finances within the budget, and for setting up various types of audits and systems to insure good sound operation. The Legal Department, actually reporting to the Attorney General, is a service department on the staff level. Other staff level departments include Personnel, Public Relations, Purchase and Central Services, and three other basic departments comprising the Department of Secondary Roads, the Traffic Engineering Department, and the Planning Department.

- (a) *Traffic Engineering*: This department is organized on the staff level rather than the operational level because it works as a service department developing basic policy for speed zoning, signing, marking, channelization, and design of the highways.
- (b) *Secondary Roads*: Development of North Carolina's vast 58,000-mile secondary road system is a major Highway Department responsibility. Funds for maintenance and improvement of secondary roads in North Carolina are allocated for use by the State in a given county based upon the need of that county as related to total needs of all the counties. These needs have been determined by exhaustive cost studies of need determined from basic policies concerning the minimum levels of service that should be provided on secondary roads as adopted by the Highway Commission. According to the statutes, Highway Department field personnel work up with the

County Commissioners in each county each year a "Secondary Road Plan," which sets forth the work to be performed on the secondary roads, such as which new bridge might be built, which roads will be stabilized, and which roads will be paved. Thus, a major department at the staff level is needed to implement the basic policies on secondary roads and to work with field personnel in the development of secondary road plans with County Commissioners.

- (c) *Planning Department*: In North Carolina there is a firm conviction that planning activities should be carried on at the staff level and be somewhat disassociated in the initial stages from engineering activities. The operation in North Carolina is somewhat unique in that the Planning Department is broken into two distinct units and has actually two department heads, one the State Planning Engineer who supervises all of the highway planning survey activities and is in charge of all basic studies and traffic surveys. The other segment of this department is the Advance Planning Department, headed by the Advance Planning Engineer. This department has to do with the basic planning for highways and other activities, which will be discussed in some detail in this paper. The reason for the dual operation is one of simplification from a management standpoint in the rather elaborate record-keeping

that is needed for the use of highway planning survey funds, inasmuch as both functions are supported from the highway planning survey.

2. *Engineering Operations:* The engineering operations are handled by the Chief Engineer, who is also the Deputy Director of the Highway Department. The Chief Engineer and Deputy Director serves as a member of the over-all staff, although he is primarily in charge of the engineering operation. To aid him in his activities he has four Assistant Chief Engineers—one reporting to him on administrative matters; another in charge of design, construction and maintenance of bridges; another in charge of field location, roadway design and right-of-way; and a fourth in charge of the over-all construction and maintenance activities. Each Assistant Chief Engineer has approximately four department heads reporting to him. The Chief Engineer and his assistants control the over-all engineering operations in the design, construction, and maintenance of the highway system. Maintenance and construction activities are supervised by the Division Engineers in the 14 field divisions in line with policies developed by the Chief Engineer and his assistants.

COORDINATION BETWEEN STAFF FUNCTIONS AND ENGINEERING OPERATIONS

As previously indicated, the Highway Department is broken down into two management levels with the planning functions at the staff level and the design, engineering, and construction functions reporting to the Chief Engineer. When one analyzes highway planning functions, it is obvious that there is an overlap between the planning function and the actual location and design function. Planning must be based on design conditions as well as economic and land use con-

siderations. Thus, one of the most critical needs in North Carolina is for good liaison between the planning and engineering activity. This is accomplished through the medium of a Planning Board.

The Planning Board consists of the Director, who serves as Chairman, and from the staff level, the Controller, the Public Relations Officer, the Secondary Roads Officer, the State Planning Engineer and the Advance Planning Engineer, who serves as secretary to the Board. From the engineering or operational phase of the Highway Department, the members of the Planning Board include the Chief Engineer and the four Assistant Chief Engineers, having at their call such department heads as are necessary. To provide proper coordination at the top level with the Bureau of Public Roads, the Division Engineer, the District Engineers, and the Planning Engineer of the Bureau of Public Roads serve also as members of the Planning Board.

The Planning Board meets weekly for approximately two to three hours and has responsibility for making final decisions on all planning matters as recommended by the Advance Planning Department. It has responsibility for acting on policy matters from Traffic Engineering and from Secondary Roads. This top administrative board serves to make administrative policy much in the same manner as the Highway Commission determines over-all policy in the best interests of the State. The actual functions and operation of the Planning Board will become more evident as the operation of the Advance Planning Department is explained, inasmuch as all activities in Advance Planning are recommended to the Planning Board in the form of reports.

Perhaps the most important function of the Planning Board is not only in acting on all planning matters, but also in providing a proper liaison be-

tween staff planning functions and engineering operations. In addition it provides good liaison and coordination between the State and the Federal Bureau of Public Roads, with most of the basic fundamentals of projects being worked out at the Planning Board level. Experience in North Carolina has shown that with this combined staff-engineering and bureau type Planning Board a great many controversies and misunderstandings have been eliminated.

ADVANCE PLANNING DEPARTMENT

As previously described, the Advance Planning Department is headed by an Advance Planning Engineer who reports to the Planning Board and serves as its secretary. The basic functions delegated to this department by the Highway Commission and by the Director might be outlined as follows:

1. The determination of the overall needs of the primary and urban highway system and the needs of the secondary system in cooperation with the Secondary Roads Department.

2. The recommending of the classification of the primary and urban system into basic categories depending on the type of traffic service to be provided. North Carolina has three primary system classifications, the Trunk System, the Trunk Feeder System, and the Rural Collector System. The recommending of the level of service to be provided on these systems. (In this context, level of service is the defining of the average operating speeds which each system should provide and includes capacity recommendations and the degree of control of access to be used on the various systems.)

3. The development of a 15-year highway improvement plan for North Carolina, indicating by general priority the location, magnitude, and type of improvement that is

needed throughout the primary system and on the urban extensions of this system, and the general delineation of the amount of funds needed to improve the secondary roads in each county. The Advance Planning Department is also charged with the continual re-analysis and up-dating of the priorities and projects in the 15-year plan.

4. The recommendation to the Planning Board, and thence to the Highway Commission, of a specific series of highway projects that might be considered for actual construction approval by the Highway Commission. (In North Carolina an accrual or encumbrance procedure is used and each year the Highway Commission approves a series of projects approximately equal to the amount of funds estimated to be available perhaps three years in the future. This preliminary approval is the go-ahead sign for the beginning of the planning of these projects, which ultimately will go to contract three or four years later. Actually, as the projects move from the planning to the design stage, they will be referred back to the Highway Commission several times for further discussion if the projects are controversial or if the projects appear to be excessively costly in terms of the service to be provided.)

5. The development of cooperative thoroughfare plans with all of the municipalities in the State. (By statute in North Carolina, it has been indicated that highway improvements within the urban area should be based on a comprehensive land development plan from which a master thoroughfare or arterial plan is developed, with such plan being mutually adopted by both the governing board of the city and the State Highway Commission. These plans are first developed without regard to whether the proposed arterial routes should be a Highway Department responsibility or a city responsibility. The

plans are developed and adopted based on the needs for the area; then, as a second part of the statute, the city and the State determine which of these proposed or future improvements will be a part of the State Highway System and which will be a part of the City or Urban System. This determination is based on the language of the general statutes, which indicates that the Highway Commission is responsible for providing efficient traffic service to move traffic from beyond the city limits through the city and to major business, commercial, and industrial destinations. In essence the State's responsibility might be considered as the major arterials or expressway system, with the city's responsibility being for the minor thoroughfares, collector streets, residential streets, and purely business or industrial streets.)

6. The Advance Planning Department is responsible for analyzing all requests from citizens and civic groups for various types of improvements. In addition it makes recommendations pertaining to requests for median openings, special types of channelization, and other treatments. It also recommends the basic policies pertaining to service roads and things of that order.

7. One of the most important functions of the Advance Planning Department is development of the initial concept of a project approved for construction by the Highway Department. Once the Commission has indicated approval of a project and encumbered funds for it, based on preliminary estimates of cost, the project is referred back to the Advance Planning Department, which calls for such surveys as are necessary. These might include traffic studies, origin and destination studies, land use studies, and may call for aerial photography and photogrammetry at large scale so that a corridor location can be

selected. Based on these studies, the Advance Planning Department prepares a report for analysis by the Planning Board. These reports are normally referred to as Phase "A" or Phase "B" reports. The Phase "A" is a preliminary report which may merely recommend a general corridor location and then request the Planning Board to obtain detailed photogrammetry and topographic mapping. A Phase "A" report might also request the Planning Board to have right-of-way appraisals made on several possible locations because there is an apparent basic economic consideration that must be resolved before preliminary planning can do a reasonable job. The Phase "B" report is a more detailed report and in general makes a specific recommendation concerning the project to the Planning Board. This recommendation normally includes a corridor location, the type of facility to be provided (such as fully-controlled access), the number of lanes that will be needed now and in 1980, and recommendations as to the amount of right-of-way to be acquired. In addition the report would set forth the general types and locations of interchanges, where grade separations are to be provided with or without ramps, and maybe certain recommendations about closure or service roads. Approval by the Planning Board of a Phase "B" report takes the matter from the planning function to the engineering or design function.

As the preliminary plans are developed for the project, it then goes out to public hearing, after which a report is made back to the Planning Board, which may either adopt the preliminary recommendations of the Advance Planning Department or refer the entire matter back to the Advance Planning Department for further study. In cases of highly controversial locations, the Planning Board will recommend that the full

Highway Commission make a complete study of this matter.

In summary, the previous outline indicates the functions of the Advance Planning Department, all coordinated by the Planning Board. It should be noted that the Advance

Planning Department has over-all responsibility for all types of planning, both rural and urban, thoroughfare planning, and basic planning policies. It is felt of great importance that all planning be controlled within a single agency, such that all activities may be properly coordinated.

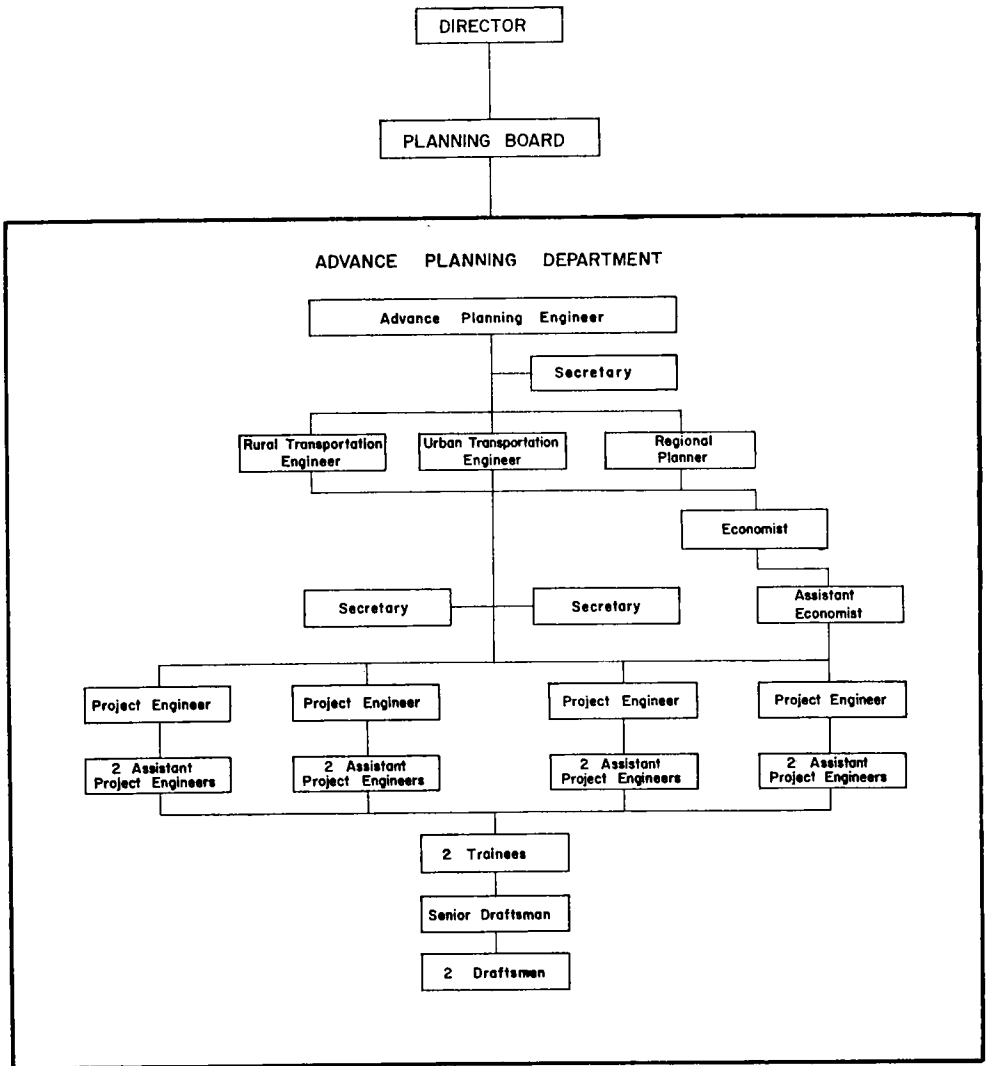


Figure 1. Organization chart of Advance Planning Department, North Carolina State Highway Commission.

It is further believed that these policies and activities of the Advance Planning Department, although operated at the highest possible staff level, should not be the final determination for approval, but rather that all top-level staff represented by the Planning Board should make such administrative decisions. Although time-consuming, the Planning Board in the long run saves the taxpayers a great deal of money and provides the best possible project.

The Advance Planning Department is organized similar to the administrative organization of the North Carolina Highway Department in that it is composed of two levels of management which might be considered as staff personnel and operating personnel (Fig. 1).

Staff Personnel

The Advance Planning Engineer, who is head of this Department and serves as Secretary to the Planning Board, has three key staff personnel who might be considered as specialists in a given area of planning. These positions are outlined as follows:

The Rural Transportation Engineer is in charge of over-all planning for rural sections of the primary highway system and is primarily responsible for development and continual updating of the 15-year plan. This position is filled by a specialist who has a sound engineering background in location and highway design and is competent to handle development of the preliminary planning for any rural highway project.

The Urban Transportation Engineer is a specialist in urban design problems and in the general field of thoroughfare planning. He is responsible for development of thoroughfare plans in cooperation with cities and works with extensions of major primary facilities through the urban area.

The Regional Planner is a qualified city and regional planner and works with the Urban Transportation Engineer in preparation of land development plans for the various cities. He also cooperates with the Rural Transportation Engineer on matters of land use, land economics, and the impact of any given highway upon the land development in an area.

The three staff personnel have also as a subordinate staff member an economist who is familiar with economic problems and statistical methods. He provides special technical help in land economics and statistics.

Operating Personnel

The operating personnel consist of four Project Engineers, who each have two Assistant Project Engineers. Needed drafting help is available to this group. The Project Engineers generally have undergraduate or graduate degrees in civil and transportation engineering and have had extensive in-service training in urban and regional planning. Development of reports pertaining to an individual project to be presented to the Planning Board, or details of development of an expressway or thoroughfare system, are handled by the Project Engineers and their assistants, who seek necessary technical advice from staff personnel. Generally these individuals are qualified to work on any phase of either primary or urban planning under the guidance of the three staff engineers.

When reports on any particular project or a thoroughfare plan are developed in the preliminary stages, the staff personnel working with the Advance Planning Engineer serve as a preliminary board of review to go over the projects. When this group has approved the projects or modified the proposals, the projects are put into final report form and are presented to the Planning Board.

The general concept used in the

development of this department was to bring to bear as many disciplines as possible on any specific type of project or thoroughfare plan. It was hoped with this type of organization that all project engineers, as well as staff personnel, would through their close association develop a great thread of thinking so that they would be able to analyze any specific proposal in terms of its economic, social, and other implications, as well as the engineering facets of the problem. With three years experience it is believed that this type of organization has developed considerable maturity and breadth and that the entire department serves as a melting pot of ideas and in the long run brings forward to the Planning Board a report that has analyzed any specific proposal from all possible angles.

SUMMARY

Development of the Advance Planning Department over the past three years has taken a great deal of time and effort by the Advance Planning Engineer and his staff. Many extra night and weekend hours have been spent in in-service training programs for the project engineers and their assistants. These in-service programs have included such subjects as

the fundamentals of capacity, highway design, basic concepts of land development planning, basic concepts and geometry of thoroughfare planning, economics of highway costs and access control, and many other related subjects. It is believed that these in-service training programs have given great breadth to the project engineers, who have a good understanding of all facets of highway and thoroughfare planning and are now able to put all of the basic elements together with proper weight being given to engineering and non-engineering considerations for a given project.

Finally, the Planning Board has not only served to coordinate all of the activities of the Highway Department, but it has also achieved a second result in that the members of the Planning Board, all specialists in given areas such as finance, public relations, construction, and maintenance, now also have a much better grasp of the over-all concepts of urban and rural highway planning. They are all more keenly aware of planning problems, of the necessity for adequate planning, and through the medium of the Planning Board have a better understanding of all that is taking place in the planning and design activities of the North Carolina State Highway Department.