

## **CHAPTER 18**

### **ROUTE AND PROJECT PLANNING**

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## GENERAL DESCRIPTION OF ROUTE AND PROJECT PLANNING

### 18-01 GENERAL

This chapter describes some steps of the organization to be utilized and the responsibilities assigned in regional studies (system planning), corridor studies, and route location.

### 18-02 REGIONAL STUDIES (System Planning)

System planning studies are carried out to develop long-range, area wide plans for overall transportation systems, all modes inclusive.

The System Planning Studies are: 1) the Urban Transportation Studies, 2) the Highway Classification and Needs Studies, 3) Small Urban Areas Studies.

These three documents constitute the factual highway master plan. All highway facilities must be analyzed and studied following the concepts and priority criteria under the applicable study. For example, if the project is located within a metropolitan boundary the respective urban transportation study is the principal planning guide and tool followed by the Highway Classification and Needs Study and possibly by any pertinent special project.

#### 1. Urban Transportation Studies

The Metropolitan Planning Organization (MPO) is the organization designated by the Governor as being responsible for carrying out the provisions of section 134 of title 23 of US Code related to highway planning in urban areas of more than 50,000 population and capable of meeting the requirements of Section 1602, 1603 and 1604 of title 49 of US Code related to Urban Mass Transportation Planning.

The MPO is responsible for, but not limited to the following activities:

- a. In cooperation with publicly owned operators of mass transportation services carry out the urban transportation planning process specified in paragraph 12 of Volume 4, Chapter 4, Section 2 of the Federal-Aid Highway Program Manual (FHPM).
- b. Develop the prospectus and the UPWP.
- c. Development of a transportation plan consisting of a Transportation System Management Element and a long-range element.
- d. Review the Transportation Plan annually to confirm its validity and its consistency with current Transportation and Land Use conditions.
- e. Development of a transportation improvement program including an annual element, as described in Volume 4, Chapter 4, Section 6 of the FHPM. This program must be consistent with the Transportation Plan developed under paragraph 10 of Volume 4, Chapter 4, Section 6 of the FHPM.
- f. Coordinate the Urban Transportation Planning Process with all other related state and Federal Agencies.
- g. Is the recipient of FHWA, UMTA and FAA planning funds.
- h. Negotiate all contracts and agreements deemed necessary and convenient in order to achieve the plans and programs.
- i. Enter into contracts with the A-95 clearinghouse agency, other state agencies and municipal authorities to carry out selected elements of the Planning Process.

The Transportation Planning Studies start with the setting of goals and objectives which include the economic, environmental and social aspects and transportation needs of communities or regions.

Travel, social, economic and environmental information is collected through personal interviews in the community under study and by using census or any other reliable source of information in collaboration with the Puerto Rico Planning Board, DTPW and other government agencies, civic organizations, institutions and public interest groups.

The analysis of this data serves as the basis for forecasts and plans for land use development from which the travel estimates are then made. To fit this future travel, alternative networks are developed, including all possible modes of transportation. Extensive social and economic analysis consultation is required leading to a selection of the recommended transportation plan. The recommended plan, then is presented to the citizens in informal meetings and citizens points of view and opinions are evaluated. The resulting plan then is endorsed by the MPO and adopted by the Planning Board that undertake public hearings before it is submitted to the Governor for approval. Projects for different modes will be entrusted by the Secretary of Transportation and Public Works to the pertinent government agency attached to the Department for implementation.

## **2. Highway Classification and Needs Study (H.C.N.S.)**

This document constitutes the long-range Master Plan for all highways in Puerto Rico.

In general terms, highway needs studies are undertaken to determine the funds necessary to construct new roads and streets, to maintain and improve existing facilities, and to administer highway programs for several time periods into the future. It is an integral part of the planning-programming process.

To develop highway travel forecasts, close coordination is maintained with the Planning Board, Municipal Governments and the Urban Transportation Studies to obtain socio-economic, traffic and land use data which enables to estimate travel patterns that are in line with local and island-wide development policies.

The results of the study provide information about the deficiencies and needed improvements and costs of the functional highway system devised for the future. This provides, in conjunction with the needs indicators that aid in establishing priorities, for an orderly and sound planning program.

## **3. Small Urban Area Studies**

In urban area communities with a population ranging from 5,000 to 50,000, system planning is accomplished in a detail commensurate to the level of importance and general development of the area.

These studies, resulting in the preparation of Urban Master Plans, are made by the Puerto Rico Planning Board following the current methodology and procedures for urban planning. An inventory is done of the existing physical, social, economic and environmental elements and a 20-year projection is made of the relevant elements — population, employment, land use, growth rate and transportation needs.

These documents are subject to review by the DTPW and other Commonwealth and Federal related agencies prior to and after public hearings before they are approved by the Governor after which they become the guide for the development of the infrastructure which are the legally binding regulations.

## **18-03 THE FIVE-YEAR PRIORITY CONSTRUCTION PROGRAM**

Annually the Programming and Control Office of the Planning Area of the DTPW prepares an updated 5-year priority construction program.

Almost all of the individual projects selected to be included in the 5-year program are from the projected road network in the Master Plan as described before. The priority criteria for the

inclusion of projects in the 5-Year Program are: a) traffic needs, b) highway users costs, c) completion of circuits, d) service to important centers of activity, e) economic evaluation and, f) overall public interest which includes social and environmental considerations.

The 5-Year Program in brief, identifies each project, describes its length and location, indicates the estimated costs and origin of funding, indicates the estimated dates for the start and completion of the project and estimates the year by year investment.

After the 5-Year Program is approved by the Planning Board, the Secretary of the DTPW will authorize to proceed with the processing of the Program. At this stage the specific projects within the 5-Year Program are identified and scheduled for processing in the next step, the Corridor Location Stage.

## 18-04 CORRIDOR LOCATION

### 18.04-01 NATURE OF STUDIES

The Corridor Location Studies are generally undertaken during the Regional Studies (System Planning). When a corridor resulting from these studies becomes part of the Master Plan for Highway and/or an Urban Master Plan the corridor location phase is considered completed and projected processing continues to the next phase: route location. The recommended corridor does not represent a specific location, but only a variable width band through which the highway may be placed. For a project not evaluated under systems planning, the corridor location study will be the initial planning phase.

### 18.04-02 WORK DESCRIPTION

In executing the identification of the corridor, the Traffic Analysis Office has the responsibility to prepare the preliminary engineering of all the alternatives involved. To carry out this activity, a general reconnaissance of the terrain is made by means of topographic maps, geological maps, flood control maps, existing and proposed road networks, aerial photographs and previous road location studies in the area.

The limits of the strip of terrain to be studied is defined using the information obtained during the reconnaissance and evident environmental issues that are identified. A field data collection program is referred for execution to the Data Collection Office. This program may include mechanical traffic volume counts, turning movement counts at intersections, vehicle classification counts, and origin and destination surveys.

Simultaneously with the field traffic data collection, the social, economic and environmental appraisal studies are undertaken. To prepare these studies it is necessary to make direct contact with pertinent State and Federal Agencies to gather the necessary information. This is done by personal interviews, letters and telephone calls.

Throughout the duration of the location studies stage there is continuous feedback information between the studies team and interested persons and parties and the public in general. This is done through the personal interviews during the studies and more formally through the Citizens Committee which will be organized to permit interaction with the study team and the Technical and Policy Committees.

### 18.04-03 WORK ASSIGNMENT

The principal work load and compliance with FHPM-7-7-1 requirements in E.S.E. corridor location studies are assigned in the following manner:

The preliminary engineering, socio-economic and environmental studies are assigned to the Traffic Analysis Office and the Multidisciplinary Team. Once the preliminary engineering

studies are undertaken and corridor alternatives selected, the Multidisciplinary Team in a series of meetings will evaluate their socio-economic and environmental effects.

Once the corridor has been identified, selected, and included in the 5-Year Program, the FHWA processing starts.

## 18.05 ROUTE LOCATION STUDIES

### 18.05-01 ALTERNATE ROUTES SELECTION

After the corridor has been finally selected by the Puerto Rico Highway Authority, and approved by FHWA, the Design Area starts route location and selection studies.

The following information is made available by the Planning Area to the Design Area for the selection of the alternate routes to be studied, including a no-build alternative.

1. Limitations derived from socio-economic and environmental studies.
2. Recommendations of local, state and federal agencies.
3. Recommendations of the citizenship.
4. Limitations imposed by the topography and the geology of the area.

Limitations imposed by the ROW compelling considerations will also be submitted by the ROW Area to the Design Area.

The selection of the alternate routes is made jointly by the Design Area and the Interdisciplinary Team, composed of a group of specialized technicians of different disciplines such as: engineering, planning, geology, biology, sociology, economics and environmental sciences.

### 18.05-02 ADVANCE PRELIMINARY ENGINEERING ON ALTERNATE ROUTES

A traffic analysis is made from the information submitted by the Data Collection Office. Computerized techniques are used in some stages of this analysis. Programs as "Origin-Destination Survey" and "Speed and Delay" are commonly used. Based on this analysis, estimates are made of the existing current and future traffic.

1. The highway typical cross section is selected based on the traffic capacity analysis.
2. A horizontal alignment is established, considering intersection with existing and projected highways.

The necessary data for selected cross section is obtained using U.S. Geological Survey Maps.

3. At this stage, with the cross sections data, a profile of the terrain is produced and the vertical alignment is established. A rough design of the alternates is made using the computer facilities. The Roadway Analysis and Design System (ROADS) and Coordinate Geometry (COGO) subsystems of the Integrated Civil Engineering System (ICES) program are used to obtain the earthwork, slope, stake, etc., for the typical road cross section and alignment.
4. Vertical and horizontal alignment of the different alternates are used for the performance of related studies, such as: soil studies, hydrological studies, and the preliminary design of required structures.
5. Vertical and horizontal alignment of the different alternates are sent to the Property Acquisition and Administration Area for the determination of the right of way costs.
6. Cost and time estimates of the design and construction phases of each one of the alternates are determined.

Where applicable, the rough design of each alternate is submitted to the U. S. Coast Guard, and the U. S. Corps of Engineers.

A rough draft of each alternate including the estimated time and cost of design and construction is submitted to the Economic and Statistical Research Office and to the O. E. S. for more detailed socio-economic and environmental evaluations.

#### 18.05-03 SOCIO-ECONOMIC AND ENVIRONMENTAL STUDIES

##### 1. Socio-Economic Studies

A through review and updating is done of the socio-economic elements considered and studied during the corridor location studies, as presumably impacted by each of the alternatives including the no-build.

##### 2. Environmental Studies

A detailed analysis is made of the impact of each alternative on the following factors: noise impact, air pollution, water pollution, wildlife and vegetation, solid waste disposition, historic or archeological sites and visual and aesthetic impact.

#### 18.05-04 ALTERNATE ROUTES EVALUATION

After having considered the engineering, socio-economic, environmental factors and the recommendations of the Coast Guard and Corps of Engineers (where required), the Design Area jointly with the Multidisciplinary Team evaluates the different alternatives (including the no-build) to insure that the E.S.E. factors are thoroughly considered and weighted.

The comparison base of this evaluation is the no-build alternative against which all other alternatives will be compared to determine the environmental and socio-economic impact of each alternate route.

#### 18.05-05 ALTERNATE ROUTES STUDY REPORT

After the evaluation of each alternative, including the no-build, and considering the engineering, social, economic and environmental studies, the alternate Routes Report is prepared.

This report will address the following items:

1. General description of the area—includes land use pattern, location, tax bases, etc.
2. Geology and hidrology—includes general information about the characteristic composition and hidrological features of the area affected by the alternatives.
3. Soils—includes an evaluation of the soils affected by the alternatives, its use and its adequacy for foundations throughout the length of the proposed lines.
4. Existing roads in the area—includes general information about the roads to be substituted by the alternatives, and on the roads affected by it.
5. Traffic capability studies of the proposed routes—the determination of the traffic carrying ability of a roadway, which is influenced by its width, lateral obstructions, grades, percentage of trucks and buses, sight distance, service volume and capacity rates and required level of service.
6. Design—includes the criteria for the design of this primary facility and its appurtenances base on the latest standards, findings, recommendations and specifications.
7. Aesthetics—discusses the aspect of integrating the highway to be constructed with the environment.

8. Description of preliminary routes—it discusses the preliminary investigations, the adaptation and combinations of portions of plans and profiles of different alternates from which the final alternates are selected. All must satisfy the basic requirements of the geometric design criteria established for the project.
9. Unit prices—presents the unit prices which are to be basis for the development of the cost estimates.
10. Construction cost estimates of recommended route—comparative cost estimates of the recommended lines.
11. Road user benefit analysis—it includes the quantifiable benefits to the road users, such as: reduced vehicle operating costs, savings in time, increased comfort and convenience and most important reduction of overall accident rates.

To arrive at the computed benefit ratios, use is made of the existing facility as the "comparison base". A second benefit ratio analysis is made, where the different alternatives are compared to the recommended line.

12. Impact of improvement on the economy of the area—includes an analysis of the effects of the new facility to individuals and to the economic development of the area.
13. Impact of improvement on the environment—includes an analysis of the effects of the new facility to the community, to vegetation, water bodies, littoral view, fish, wildlife refuges, etc.
14. Availability of construction materials—includes information about the necessary materials for the construction of the facility, its abundance and its nearness to the construction site.
15. Bibliography

To allow for public participation and to keep the affected citizenry posted on the development of the project, a copy of the Alternate Routes Study Report will be sent to the president of the Citizens Committee, and to all interested members, who should provoke a special meeting to discuss the contents of the report and submit their comments and recommendations heretofore. Representatives of the O.E.S. Multidisciplinary Team and Design Area should attend this meeting.

#### 18.05--06    **ROUTE SELECTION**

It is conducted after the following:

- a) Draft Environmental Impact Statement
- b) Public Hearing

After the Multidisciplinary Team selects a route, a final EIS or a Negative Declaration is prepared for the recommended alternative. Final approval to the EIS by the FHWA constitutes the location approval of the project.