

Inventory Procedures and General Organizational Aspects of the Louisville Metropolitan Comprehensive Transportation and Development Program

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INTRODUCTION

The Federal-Aid Highway Act of 1962 states in part that continuing comprehensive transportation planning studies carried on cooperatively by state and local authorities shall be the basis of approval of programs for federally aided highway projects in all metropolitan areas of a population of over 50,000. The act requires that a program be undertaken to insure that long range highway plans be developed with full regard to interdependence of the future highway system, other forms of transportation, and the overall development of the entire urban area.

It is recognized that adequate time must be provided to organize such a program. Necessary studies must be conducted, adequate liaison between participating agencies must be established, and enactment of legislation may be needed to furnish the necessary machinery for the operation of a satisfactory program.

The Louisville Area Program has been organized in a manner to comply with both the letter and spirit of the law. The inventory phase of the study has proceeded to an advanced stage; analysis will soon begin. It is the purpose of this paper to present the organizational structure of the Louisville study and to discuss briefly some of the problems encountered in achieving the present organization. Also, the inventory phase of the study will be discussed in general with some attention being given to the procedures involved in the various phases of the inventory to date.

ORGANIZATION

Committee Structure

The study has been organized under the general direction of a Coordinating Committee. This committee, which establishes general policy and provides overall guidance, is composed of administrative representatives of the two state highway departments and each of the three contributing counties—Clark and Floyd, in Indiana, and Jefferson, in Kentucky. Additional presentation is afforded the Louisville and Jeffersonville County Planning and Zoning Commission, the City of Louisville, the Bureau of Public Roads and the Housing and Home Finance Agency (active participation declined). The Coordinating Committee is composed of public officials having the power to eventually implement the metropolitan plan.

The Technical Advisory Committee has been appointed by the Coordinating Committee to furnish technical advice on the various phases of the study. This committee is a working organization that presently meets every two weeks to furnish continuing direction and coordination for the various consultants and agencies involved in the study. The committee is composed of professional technical representation from each of the two state highway departments, each of the three counties, and the Bureau of Public Roads. The Housing and Home Finance Agency has declined active participation in the activities of this committee also. The membership of the Technical Advisory Committee is composed of representatives of both the planning and engineering professions.

A third committee, the sub-committee for metropolitan development, is actively involved in the Louisville Area Program. This committee includes representation from planning, architecture, both public and private engineering, local government, and a number of interested citizens. The committee furnishes advice and direction on matters particularly pertaining to the land use development aspects of the study.

The prospectus, adopted by the Coordinating Committee, provides for the appointment of various advisory sub-committees if and when they are deemed necessary.

Memorandum of Understanding

A Memorandum of Understanding between the two state highway departments has been drawn up and approved as adequate by the Bureau of Public Roads with the understanding that similar agreements will be executed with affected local authorities within the study area.

The interstate agreement provides that the study will proceed in accordance with the prospectus under the supervision of the Coordinating Committee in a cooperative manner. The ten basic elements for which inventories and analyses are required are:

1. Economic factors affecting development
2. Population
3. Land use
4. Transportation facilities
5. Travel patterns
6. Terminal and transfer facilities
7. Traffic engineering features
8. Zoning ordinances
9. Financial resources
10. Social and community-value factors.

Local Cooperation

The program has suffered a considerable delay due to lack of local cooperation on the part of the Indiana counties. The delay in establishing a working organization in Clark County, Indiana, has been one of the major concerns in the organizational phase of the Louisville area study. The machinery has now been set in motion in Clark County for the establishment of a Regional Planning Board to represent all affected local authorities in the Transportation and Development Study. Floyd County, Indiana, is now operating under unified county-wide planning and is well into a program of full cooperation. Jefferson County, Kentucky, is in the final stages of preparation of all data required by the transportation consultant.

THE STUDY APPROACH

Underlying Assumptions

In the area of metropolitan development it is assumed that observable trends in patterns exist and that the basic development studies will reveal such trends. Based on the development studies, community objectives will be formulated and necessary controls established to guide the area to these objectives.

It is assumed that sufficient information can be gathered in the transportation phase of the study with which to calibrate a mathematical model simulating present and future trip generation and distribution. The study will establish levels of service for transportation facilities. Alternative plans will provide various levels of service and various distribution of travel between the different modes of travel.

It is finally assumed that an optimum plan will be selected providing the greatest benefits to the area consistent with the objectives of the Metropolitan Transportation and Development Program.

Definition of the Study Area and Period

The study area will be defined as the entire three county area of Clark and Floyd Counties, in Indiana, and Jefferson County, in Kentucky.

The project's external cordon circumscribes the urban area—the contiguous portion of the study area that is expected to contain 200 persons per square mile by 1990.

All projections and methodology leading to the determination of future travel demand will be made for the years 1970, 1980, and 1990. Travel forecasting will be made for intermediate years if the land use, economic and population forecasts show any unusual growth patterns which might preclude accurate factoring. Otherwise, the intermediate assignments (1975 and 1985) will be made by factoring the information for the three base years 1970, 1980 and 1990.

The Study Objectives

The general study objective is to produce a plan for metropolitan development that will advance, in the best possible manner, the social and economic welfare of the entire Louisville Metropolitan Area. The specific objectives of the program, as outlined in the prospectus, are:

1. To evaluate the soundness of existing transportation and development policies and practices.
2. To create a truly functional relationship between transportation and balanced metropolitan development.
3. To determine current transportation deficiencies and probable future needs, with respect to both facilities and operations, within the context of urban growth and foreseeable land-use changes.
4. To provide legislative bodies and the public with fully documented reports on needs.
5. To prepare realistic plans to improve all forms of transportation service.
6. To establish priorities for plan implementation.
7. To recommend an organization and a system for continuous planning and programming.

SCHEDULING THE TRANSPORTATION AND DEVELOPMENT PROGRAM

In dealing with the urban problem, the work of affected professional disciplines must be highly coordinated and completely complementary in approach in order that desired objectives may be achieved within limited time and budget requirements. The large scale studies are much too complex to rely on intuitive budgeting and scheduling. Each subphase of the study must be preassigned, with as much accuracy as is possible, the proper amount of time, money and manpower—an amount proportionate to its utility in the overall project. Periodic review and appraisal must be made to insure that the overall project objectives can be fulfilled within the budgeted time and money.

The Critical Path Method of scheduling was established for the Louisville Area Study to determine when each activity or subphase must be started and completed to insure coordinated flow of work. The critical path schedule is based on the individual requirements of and the interrelationships between all activities, or subphases, of the entire project.

Experience with the use of the CPM in the Louisville Area Study as well as other transportation studies has indicated difficulty in separating the studies into individual activities with time, manpower, and money requirements being clearly defined for each activity. A transportation study does not lend itself to exact work analysis, as does a construction project. As historical data on scheduling of transportation and development studies become more abundant, and more readily available, CPM scheduling will become increasingly more valuable to these studies.

BASE MAPPING

Good mapping is essential to current work phases and to later presentation.

Transportation Study

Reproducible planimetric maps have been prepared for the entire study area to the following scales: 1 in.=5,000 ft., 1 in.=2,000 ft.

These maps show streets, railroads, airports, major watercourses and civil division lines. Aerial mosaics at scales of 1 in.=1,000 ft. and 1 in.= 2,000 ft. and contact prints of aerial photography at a scale of 1 in.=1,000 ft. for the urban area and 1 in.=2,000 ft. for the study area have been prepared.

Existing maps (state, city, county, etc.) are made available to the consultant upon request.

Development Purposes

Detailed mapping, with property delineations, at a scale of 1 in.= 500 ft. has been done in conjunction with this portion of the entire study. Full cooperation in the use of available maps is exercised between agencies and consultants involved in all phases of the study.

THE SYNTHESIZED TRAFFIC ANALYSIS

A synthesized traffic assignment has been conducted for the purpose of providing interim answers to immediate planning problems. The synthesized assignment included delineation of analysis zones, establishment of the 1963 base highway system, coding that highway system, determination of 1963 flow characteristics, and the preparation for use of 1963 development data. Based on information obtained through the above work and also based on the assumption of similarity between the Louisville area and other areas of its size and character, trip generation, distribution, and assignment have been made. The 1963 trip production and distribution was synthesized by approximately 354 internal zones. The synthesized data were assigned to the existing 1963 highway network and comparisons made with existing volumes. Adjustments were made in order that reasonable agreement was reached between the synthesized assignment and actual counts. A 1985 base highway system was established and again based on projects (assumed by planners) development data for 1985, trip generation, distribution, and assignment were produced for the 1985 target year. When the origin-destination data are completed, a check on the accuracy of the synthesized analysis will be made.

THE TRANSPORTATION INVENTORY

Origin-Destination Survey

By means of a regional coding dictionary each address, place, or building name and intersection in an urban area may be identified in such a way that a trip to or from that address, place, or building name and intersection may be located as to block, zone, census tract, ring, or sector or any other desired subdivision of the urban area. Street addresses may be tied to tax lot numbers by this system of coding. The Coding Dictionary also provided a systematic listing of dwelling units from which the sample dwelling units to be interviewed in the origin-destination survey may be selected.

The external survey is a principal part of the origin-destination survey and has as its general objectives the determination of total number and character of all vehicles entering, leaving, and passing through the urban area and obtaining the origin-destination of trips from the drivers of a representative sample of vehicles crossing the cordon line. The number and character of vehicles are determined by manual counting and classification at the stations established on the project cordon line. The origin-destination of trips are obtained by stopping and interviewing a selected sample of vehicles at each cordon station. The interview stations were established on a sufficient number of roads to obtain coverage of 95 percent of the total traffic crossing the external cordon line.

The home interview survey is perhaps the largest and most important survey made in the Louisville Area Study and, incidentally, has the largest budget overrun. The greatest number of trips made within the metropolitan area are made by the area's residents. Survey personnel obtained the desired travel information by interviewing 5 percent of the householders in the metropolitan area. Based on the assumption that the travel habits of people living within an urban area are similar, it was possible to obtain accurate statistical data for all residences by measuring the travel habits of a predetermined sampling of the dwelling universe. The internal home interview survey was conducted within the urban area or the area delineated by the cordon line.

The last portion of the origin-destination survey to be discussed is the truck and taxi survey. Owners and operators of trucks and taxis were interviewed inside the cordon line of the study area. Information obtained in this phase of the origin-destination survey will be extremely important in planning street and highway facilities for the region. This information will also be helpful in the analysis of mass transit needs.

The Road and Street Inventory

Prior to the development of plans for future transportation facilities it was deemed necessary to obtain an inventory of the facilities available now and to analyze the effectiveness of existing systems. The field inventory operation of the road and street portion of the study has been directed at the production of an inventory deck composed of eight data processing cards. The eight-card road and street inventory deck will contain information on intersection identification, intersection leg data, link administration data, physical characteristics, approach and control data, railroad crossing data, and highway structures data. In-

formation obtained in the compilation of this deck will produce adequate basis for present system evaluation.

Traffic Volume and Flow Characteristics Studies

The level of transportation service afforded to an urban area is directly related to the characteristics of traffic flow on the area's transportation system. The collection of data on flow characteristics is therefore an important tool for the evaluation of service provided. Since it is not possible or economically feasible to continually measure flow characteristics, this measurement must be made by sampling methods. It is the general purpose of this data collection program to establish the location of sampling stations and the duration and frequency of sampling times so that traffic flow characteristics of the highway transportation network can be evaluated not only initially but also on a continuing basis.

Key station counting is done on each of the eight major classifications of highway in the area and is carried out continuously around the year for the purpose of developing monthly and seasonal trends. Master station counting is used to produce factors for adjusting key station counts or factors to reflect the traffic flow in a particular area. Master station counting is done at each location four times a year—once during each of the seasons. Coverage counting, constituting the greatest number of counting stations, is done for each location only once during the study and factored to an adjusted ADT by means of the key and master station information. The states and the City of Louisville are counting the coverage stations. Screenline counting is done at a natural traffic barrier where all trips crossing the barrier can be intercepted. The screenline information will be used to evaluate the origin-destination survey. In conjunction with the manual classification and counting, machine counting, as a check, was done in conjunction with the external survey. The traffic volume and flow characteristics phase of the transportation inventory will provide information on vehicle speed and delay and intersection turning movements to be used in the traffic assignment.

The Accident Study

The frequency and severity of accidents are an indication of the transportation system's deficiencies. Accident costs furnish a measure of the consequence of non-action. A study of accidents will assist in the establishment of desirable service standards, pinpoint locations of needed improvements, and help set improvement priorities with regard to the safe movement of traffic. Existing information on accidents is

available through the highway departments of Kentucky and Indiana and through the Louisville and Jefferson County Police Departments. This information was made available for the purposes of the transportation study. The Louisville Police Department agreed to establish a system of coding accidents consistent with the system used by the transportation consultant. A uniform method of coding accidents has obvious advantages in the continuing phase of the study.

The Parking Study

Parking studies have been conducted in Louisville and New Albany for the general purposes of determining present parking supply, usage, duration, and parking meter revenue. The analysis phase of the parking study will produce illustrations that will graphically portray the parking picture as it exists today. Tables and illustrations will be included that will augment the statistical facts and interpret these findings in terms of present needs. Less extensive parking studies will be carried out in other cities in the study area.

Routes and Terminals Study

Large volumes of people and commodities are continually being moved within, into, and through the Louisville area in various ways and by various modes of transportation. The routes and terminals study will endeavor to indicate the relative position of each major form of transportation utilized in the movement of people and commodities in the study area, the prevailing practices used by each mode in transferring people and commodities, and the needs of each mode in the future. It is recognized that a successful routes and terminals study will involve the collection and analysis of data that are normally outside the realm of highway transportation and it will be necessary to rely on persons and/or organizations that have a special knowledge of other forms of transportation (ex: airboard, railroad companies, etc.).

Transit Study

The general purpose of the public transit study is to develop the role of public transit within the metropolitan area at the present time. The specific objectives are to identify the routes and load points used by transit, accumulate, analyze, and present operating statistics on the existing transit companies, develop the degree of service offered by existing transit companies, develop the degree of use of this service by the public and obtain sufficient information about existing transit and its characteristics to allow the development of a 1964 transit network for use in transit trip assignment. It has been determined that a great deal of information is readily available from the major transit carrier in

the area, the Louisville Transit Company. All transit companies operating in Kentucky are required to file statistical data with the Kentucky Department of Motor Transportation in Frankfort. The data in the office of Kentucky's Motor Transportation Department have been made available for the Louisville Study. The majority of the transit carriers in the area have information on file with the State of Kentucky.

Planned Transportation Facilities

The purpose of this phase of the Study is the collection of information relative to significant transportation facilities that presently do not exist but will exist sometime during the planning period. All possible sponsoring agencies will be contacted in this phase of the study and their planned facilities will be included in the future planning process. Highway construction, bridge construction, pipe line and terminal construction are among the projects that will be noted in this study. An attempt will be made to determine any anticipated change in air and waterway transportation facilities also.

THE COMMUNITY DEVELOPMENT INVENTORY

Physical Features

Topography, drainage and soil permeability and erodability and subsurface features such as depth of bedrock, mineral resources, and underground water supply shall be mapped. Existing information of the federal government, local government, and other organizations will be used in this phase of the study.

Economic Features

Industrial activity, basic development, employment trends, labor force, and income data are items that will be studied in this phase of the project. Sales and tax information, both public and private capital investment, availability of raw material and a study of the market area will be included in the Economic Features Study by Hammer and Company Associates.

Land Use

The collection and analysis of land use data will yield a distribution by the following general classifications: Residential, commercial, industrial, open space, public service, and other. Characteristics such as density, parcel size, and other pertinent information will be determined. The land use data will be summarized by census tracts for the purpose of use in the transportation phase of the entire study. Land use data obtained, however, in this phase of the development study will

be suitable for the use of development planning as well as transportation planning.

Population Data

Population data have been presented in the Hammer report. It is being made adaptable as an input to the transportation study. Distribution of the population by zones, the character of the population, school enrollment, and population trends are items that will obtain particular attention in this phase of the study.

Utility Systems

An inventory will be made of the communities' utility systems with special emphasis being given to water, storm and sanitary sewerage, gas mains, and electrical power.

Development Controls

Zoning regulation and classification, subdivision regulations, capital improvement programs, urban renewal projects and anticipated utility projects are important in the development phase of planning. Accurate information on the above mentioned items is essential to the development inventory.

Financial Structure

Present operating revenues and debt retirement program are an essential part of development inventory. Even more important and essential are projected operating revenues and potential for additional capital expenditures. Availability, type, and amount of potential funding are most essential in the preparation of an overall plan.

The Neighborhood Analysis

The socio-economic characteristics of the neighborhood have obvious importance in development planning. These socio-economic characteristics are important also in transportation planning. Their effect on production and distribution of traffic is an item that must be considered. Results of the neighborhood analysis will be helpful in future synthesized studies since these results will provide more accurate data upon which relationships between socio-economic characteristics and trip-production distribution can be established.

Interim Reports

Following completion of the individual phases of the project, interim reports will be prepared. The Hammer report on economic base and population is now in circulation and is one of the many proposed interim reports.

Reports on the origin-destination study, the travel inventory, the status of planned transportation facilities, the inventory of various transportation facilities, community goals and objectives, standards and criteria for plan selection, travel demand forecasts, neighborhood analysis, and traffic assignment procedure are some of the interim reports that will be prepared as the data are available. The synthesized traffic study will be evaluated at an appropriate stage in the more refined traffic analysis.

A sufficient number of copies of the interim reports will be prepared for the desired distribution of the sponsoring authorities.

GENERAL DISCUSSION OF THE APPLICATION OF DATA PROCESSING

The inventory and analysis operations of both the transportation and development phases of the Louisville Area Study have created a massive data processing task. Through electronic data processing (EDP) this task can be completed in a more rapid and accurate manner.

The transportation study consultant, Vogt, Ivers and Associates, a member of the Transportation Planning Computer Program Exchange group, will make use of a large number of programs written for computers of various sizes and speeds. Data editing and summarizing, trip generation, trip distribution, and traffic assignment are among the tasks that will utilize a family of suitable computer programs.

The Louisville and Jefferson County Planning and Zoning Commission is employing EDP in the preparation of development data for the Louisville Area Study. The commission has engaged the consulting services of Dr. Richard Duke, a specialist in the area of development planning applications of EDP. The commission has under consideration the use of mathematical simulation models similar to the traffic models used in the transportation portion for metropolitan development studies.

DEFINING THE PROBLEMS

Upon completion of the inventory phase of the study, a complete picture should be available of existing transportation and development conditions based on this integrated body of information. Reliable estimates can be made of future transportation and development conditions. By comparing the existing and anticipated conditions with appropriate standards, it is possible to determine the extent of deficiencies. When existing deficiencies are pinpointed, it is then the responsibility of this metropolitan study to outline the appropriate course of action.

GOALS AND OBJECTIVES FOR REGIONAL AREA DEVELOPMENT

After a review of the inventory reports by public and private groups, a statement of community goals and objectives must be formulated. Such decisions as the desired form for future development (strong central city versus the central core with highly concentrated satellites, for example), level of service for utilities and transportation facilities, and general zoning requirements are among the items that must be considered in formulating goals and objectives. The standards and criteria are then established in order that the overall goals and objectives may be achieved.

ALTERNATIVE PLANNED PREPARATION

Alternative transportation plans will be prepared and quantitatively analyzed based on related alternative land use plans. Each plan will be developed in sufficient detail to evaluate stability and relative cost. After the evaluation of the alternative plans, any necessary adjustments will be made in the basic assumptions and the determination of future travel demand will be revised as necessary. This feedback will continue until the analysis, testing and evaluation indicate when a desirable transportation network has been reached for each land use plan. Each reasonable alternative plan will be analyzed and compared with each other alternative plan to determine the optimum transportation network and associated land use plan.

SUBMISSION OF POSSIBLE RECOMMENDED PLAN

The recommended plan will be submitted to policy leaders for discussion so that the plan in its finalized form will achieve the broad support of all affected areas. The subcommittee on metropolitan development will have a large influence in the determination of the recommended plan.

REFINE AND TEST THE ACCEPTED PLAN

Upon acceptance of the recommended plan by policy leaders and the community in general, efforts will then be made to refine and test this plan. Estimates of costs for development and transportation facility construction must be set out. Recommendations will be made for the coordination and implementation of the various elements of the recommended plan. Priorities of proposed projects must be stated. Methods for financing of proposed projects must be established. Transportation

revenues and taxing programs must be studied and outlined. Planning and land use legislation, if needed, must be effected.

PLAN IMPLEMENTATION

The final report of the study must include recommendations as to an organization and a system for continuing the studies and for implementing the plan. Provisions must be made for a continued collection and analysis of inventory data and a continued review and refinement of the general plan. The public must be sold on the accepted metropolitan plan. Efforts throughout the present phases of the study to keep the public informed should be of great value in the all important final public acceptance of the plan.

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