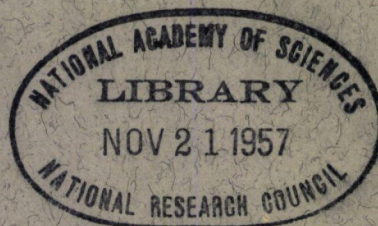


HIGHWAY RESEARCH BOARD

Bulletin No. 31

Highway Planning



Presented at the
Twenty-Ninth Annual Meeting

1950

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BULLETIN 31

PLANNING

HIGHWAY AND THOROFARE PLANNING AND PROGRAMMING IN
RELATION TO URBAN PLANNING AND DEVELOPMENT

by

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Presented at the
Twenty-Ninth Annual Meeting of
Highway Research Board
December 1949

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FOREWORD

Highway planners and urban planners have had proven to them the need for planning highway and other major thorofare facilities in urban areas, with consideration to their influence on the future growth and development of these areas.

One purpose of the present paper is to serve as a reminder of this need.

The suggested "Scope of Major Thorofare Planning in Urban Areas", appearing in Part II of this paper is offered as an outline, at least, of an overall technique for applying the generally-accepted objectives.

Planning of the suggested scope would establish a much stronger legal and technical basis for regulations for controlling access and roadside development and protecting planned improvements, than the basis for many of such regulations now in effect. Due to the need for protection of our investment in these facilities and for reserving land needed prior to acquisition, considerable importance assigns to such regulations. These regulations and their applicability for various purposes are discussed in Part III.

I

HIGHWAY PLANNING IN URBAN AREAS

Within the last ten years or so, the need for improvement of that portion of our State highway systems found within urban areas has been established. It is now known that routes near and within all sizable urban areas are among the most important links in the system of highways throughout the nation and are more in need of improvement than those in purely rural areas, considering their present condition and adequacy and benefits to be obtained from improvement. It is further recognized that trunk highways in urban areas are also usually the thoroughfares carrying the heavier local traffic flows and that, as such, they are a component part of local major thoroughfare systems.

The Importance of Urban Areas in Highway Planning

This concept is expressed in the 1939 report "Toll Roads and Free Roads", wherein data from the planning surveys conducted by most of the State highway departments a short time before were utilized for the purpose of the report.

This report went beyond the subject of toll roads. Attention was extended to highway improvement and highway protection problems in the urban areas and their fringes, among other things. This was a logical outgrowth of the finding that such centers, as generators of the major portion of the traffic on highways, deserve first attention for improvement planning, incidentally confirming the view that many professional planners, municipal officials and city dwellers had long held.

Report of ASPO Committee on Highways and Transportation in 1940

In 1939 the formation of a committee on Highways and Transportation by the American Society of Planning Officials was inspired by the publication of "Toll Roads and Free Roads". The committee was composed of five men in the city planning and traffic engineering fields: Harry F. Aumack, Burton W. Marsh, D. Grant Mickle, Ladislav Segoe, and I. S. Shattuck, Chairman.

In presenting a report entitled "Highways and Transportation in Relation to Each Other and to Other Planned Development" to the National Conference on Planning held in San Francisco in 1940, this committee found the following material in "Toll Roads and Free Roads" of particular value from a planning standpoint:

The various data from the highway planning surveys and their analyses. The estimates of probable usage and revenues of a toll system and the conclusion that such a system would not be feasible from a revenue standpoint and would not solve the highway transportation problem of the United States.

The conclusion that all except very small urban areas cannot be "by-passed", since they are the major sources and destination points of highway traffic.

The suggestion that planning of highways and other urban improvements should be sufficiently related so that one will not block the other, when carried out.

Recognition of the need for highway protection by the following means, (a) control of access and abutting land uses, (b) adequate design of the highway itself such as: sufficient width of right-of-way, incorporation of service streets for local access and local traffic and parking; and (c) utilization of excess condemnation where marginal land acquisition is required for protection.

The proposed 26,700 mile primary highway system for the United States, and the high standards of design and construction recommended for this system.

The exposition of the problem of acquiring and holding land for future highway purposes and other public purposes and the suggested Federal Land Authority to be empowered to secure land in advance of construction, to hold it, and to release to the Federal, State and local governmental bodies as needed.

References to the Importance of Urban Areas

The importance of urban areas was confirmed and further emphasized in the 1944 report "Interregional Highways" and in various other reports, statements and papers by highway authorities. Many of the latter have appeared in the Proceedings, Bulletin and Research Reports of the Highway Research Board.

Two tables appearing in "Interregional Highways" (House Document No. 379, 78th Congress, 2d Session, U. S. Government Printing Office, 1944) tell the story of the importance of our urban areas as generators of traffic found on highways.

Table 1 gives, for each major region in the country, the percentage of traffic on main highways having either origin or destination, or both, in urban areas.

Table 2 shows that large cities attract the majority of traffic on the highways approaching them, and that even very small cities, those having populations of from 2,500 to 10,000, attract more than half of this traffic.

TABLE 1

Analysis of the origins and destinations of traffic on main highways as shown by highway planning survey data for one State in each of seven geographic regions. (From Table 8, page 41, "Interregional Highways").

Region and State	Percentage of all traffic Having Various O's and D's		
	O and D Both urban	O or D Urban	O and D Both rural
	Percent	Percent	Percent
All regions, average	49.6	36.6	13.8
New England: New Hampshire	35.3	49.1	15.6
East North Central: Ohio	67.5	29.7	2.8
West North Central: Nebraska	49.1	37.9	13.0
South Atlantic: West Virginia	60.3	25.9	13.8
East South Central: Tennessee	57.8	34.7	7.5
Mountains: Utah	8.7	59.1	32.2
Pacific: Oregon	23.4	46.6	30.0

TABLE 2

Proportions of traffic bound to and beyond cities of various populations as shown by origin-and-destination surveys on highways approaching 27 cities. (From Table 14, page 60, "Interregional Highways").

Population Group	Number of Cities	Traffic bound to the city	Traffic bound beyond city
		Percent	Percent
Less than 2,500	6	49.3	50.7
2,500 to 10,000	6	56.7	43.3
10,000 to 25,000	3	78.1	21.9
25,000 to 50,000	5	79.0	21.0
50,000 to 100,000	2	83.8	16.2
100,000 to 300,000	2	81.6	18.4
300,000 to 500,000	2	92.8	7.2
500,000 to 1,000,000	1	95.8	4.2

Typical of additional references by highway authorities to the importance of urban areas are these statements made by J. Carl McMonagle, Director, Planning and Traffic Division, Michigan State Highway Department, (Highway Research Board, Bulletin No. 6, 1946):

- p. 37 "It has long been recognized that the nation and the state have a vital interest in those highways that have a predominantly transportation function. In recent years it has been realized that this interest extends over the transportation highways into and through the cities" . . . "It was found (from highway planning survey data) that a large part of highway transport is between the cities; a smaller portion is between the cities and their contributory rural areas for marketing, shopping, social recreation, and the distribution of goods; a small fraction is entirely rural"

"It can be presumed that the states are primarily interested in the arterial streets that radiate from the center of the city and extend through suburban and rural areas to similar cities and metropolitan centers,"

"A majority of the traffic on the radiating arterial streets is composed of local movements between and among the districts of the city and the outlying population centers that comprise the marketing area."

Highway Planning in Relation to Urban Planning and Urban Development

The planning relationship is expressed in the findings of the Bureau of Public Roads and the National Interregional Highway Committee in "Interregional Highways", as presented in the chapter, "Locating the Interregional Routes in Urban Areas". The findings may be summarized, as follows:

That the interregional routes must be so located as to conform to the future shape as well as to the existing pattern of cities.

That they will exert a powerful force upon the future shape and it is highly important that this force be so applied as to promote a desirable urban development. That unwise location of routes might not be sufficiently powerful to prevent a logical future city development, but would certainly retard or unreasonably distort such development, and,

That for beneficial utilization of this force, the interregional routes should be conceived as part of a planned network of major thoroughfares of all kinds and a basic part of the planned development of the cities themselves.

The force that main highways have exerted in the shape of cities in the past is illustrated in Figure 1.

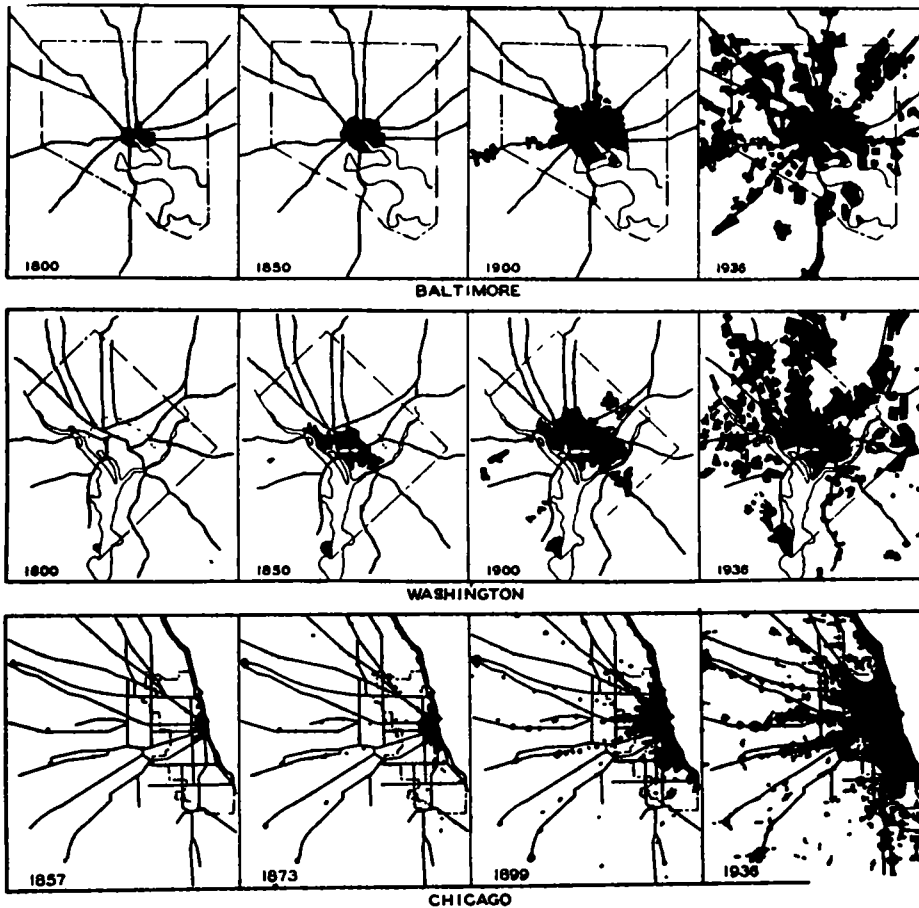


Figure 1. Expansion of Cities Outward Along Main Highways
(Reproduced from Figure 26, page 55, "Interregional Highways".)

Many highway planning professionals and urban planning and housing professionals are on record with recommendations and suggestions on this subject, many of which stem from the material in "Interregional Highways". The more significant of these are to the effect that express highways and other primary routes, properly planned, can provide the reference needed in urban development and redevelopment, can define the major elements (areas of different land uses) of which cities are composed, can influence neighborhood and community-center development, and can provide rights-of-way for

express transit routes. It is generally agreed that the planning of highways, of other transportation facilities and of over-all urban development should be related.

The ASPO Highways and Transportation Committee, in its 1940 report previously referred to, agreed that highways and other major thoroughfares should be parts of a long-range plan of transportation facilities of all kinds, including mass transportation facilities, traffic engineering improvements and parking facilities, and that such plan should in turn be in accord with a master plan of development of the entire urban region.

Examples of Cooperation in Highway Planning and Urban Planning

In some urban areas the State highway departments, with the assistance of the Bureau of Public Roads, have conducted modern origin and destination traffic surveys (and sometimes parking surveys) in conjunction with going urban planning programs. The common purpose was to secure traffic data as the basis for the planning of highways and other major thoroughfares, which could in turn be related to the planning of overall urban development.

Recent examples are the large cities of Cincinnati and Kansas City and the small cities of Albert Lea, Minnesota and Port Huron, Michigan. The cooperation, in the case of Albert Lea is probably unique in that it included the joint preparation and submission to the City government, by a planning consultant and the State Highway Department, of a complete master plan.

The Master Plan -- Albert Lea was a joint report to the City Council of that City by I. S. Shattuck, Planning Consultant, and the Minnesota Department of Highways, in cooperation with the U. S. Public Roads Administration - October, 1948.

The consultant was retained by the City to prepare a master plan. The Minnesota Department of Highways, at the request of the City Council and as part of the planning program, conducted origin and destination traffic studies and a central business district parking survey. When the various individual plans comprising the master plan were in preliminary form the Consultant and the highway authorities, with the approval of the City Council, agreed to prepare and submit a joint report on the master plan.

The experience with this unique venture proved of mutual benefit to the participants in that it led to a clearer understanding by each party of the theoretical and practical aspects of the other's planning problems and a deeper appreciation of their effects on planning objectives, than could otherwise have been gained.

The planned network of highways and other major thoroughfares contained some significant features that could not have been discerned on the basis of traffic figures alone. Traffic analyses revealed that the previously held impression of the relative need for various thoroughfare improvements was in error.

II

SCOPE OF MAJOR
THOROFARE PLANNING¹ IN URBAN AREAS

Recognition of the development-shaping potentialities of modern thorofare facilities leads to a consideration of the means of directing this power in order that it may be of beneficial influence upon the future shapes of cities. It is obvious that highways and other major thorofares, to serve the urban development desired in the future, must be planned together and that their improvement must be so programmed as to encourage this development. For determining this desirable future development comprehensive urban land use planning, at least is required.

In suggesting the scope of major thorofare planning¹, as it will be called in this section, consideration was given to the probability that the planning of future urban development as a frame of reference will not be carried on in most places unless made an integral part of the thorofare planning program.

While much urban planning is now under way in American cities, the cases of truly comprehensive planning are not numerous. Very few cities have prepared land use plans of satisfactory scope for major thorofare planning and general urban planning purposes. No material change in this condition is anticipated in connection with urban redevelopment planning, so it is improbable that a more favorable condition will apply to major thorofare planning.

Mr. Walter Blucher, Executive Director of the American Society of Planning Officials, fears that few cities will undertake comprehensive planning as a basis for urban redevelopment, even though the Housing Act of 1949 makes such planning a prerequisite for Federal-Aid for local redevelopment plans. This fear is voiced in an editorial in the August 1949 issue of the news letter of the ASPO.

Scope of Major Thorofare Planning in Urban Areas

The suggested scope of such planning is presented in the following outline:

- A. Preparation of a long-range plan of a complete major thorofare network, and corollary facilities, including:
 1. All thorofares, in the City and its environs, for serving the present and future major streams of through and local traffic and mass transportation, including Interstate Highways and other primaries, and secondaries.

¹ "Highway Planning" is not as appropriate a term as "major thorofare planning" for the purpose of this discussion. The latter includes major thorofares of all kinds, including highways.

8.

2. Traffic engineering improvements and regulations designed to make the best and most efficient use of present and future facilities, and
3. Curb and off-street parking and loading facilities designed for present and future demand.

and based upon:

1. The results of a comprehensive origin-destination traffic survey and a parking survey, projected into the future.
 2. The present and probable future extent of mass transportation demand, and
 3. The planned development of the entire area of ultimate urbanization.
- B. Preparation of a land use plan for the entire area, of such scope as to satisfy these purposes and uses;
1. Establishing a pattern of future development - the future areas for the major kinds of land uses, with their probable ultimate population densities.
 2. Adjusting projected future traffic and mass transportation demand to this pattern.
 3. Indicating the physical relationship between the proposed major thoroughfare pattern and the proposed land use pattern, and
 4. Establishing requirements for layouts of future minor streets and roads in relation to the network of present and future major thoroughfares.

and based upon:

1. Comprehensive land use survey, and maps and analyses of existing land uses.
2. Data on such physical, economic and other local conditions and trends, as may influence the direction and extent of future urban growth and expansion, and
3. Results of comprehensive origin-destination traffic and parking surveys, and preliminary sketches of a proposed major thoroughfare system.

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



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LAND USE PLAN

LEGEND






FOR LAND USE AREAS HAVING NO POPULATION

- PUBLIC - PARKS, PLAYGROUNDS, SCHOOLS 
- SEMI-PUBLIC - INCLUDING AREAS TO BE RECLAIMED FOR PUBLIC OR PRIVATE USE AND OTHER NON-POPULATED AREAS 
- MAJOR THOROFARE - EXISTING STREET 
- IN NEW RIGHT OF WAY 
- RAIL LINE - EXISTING 
- PROPOSED 



LEGEND

FOR LAND USE AREAS HAVING ASSIGNED POPULATION DENSITIES

RESIDENTIAL

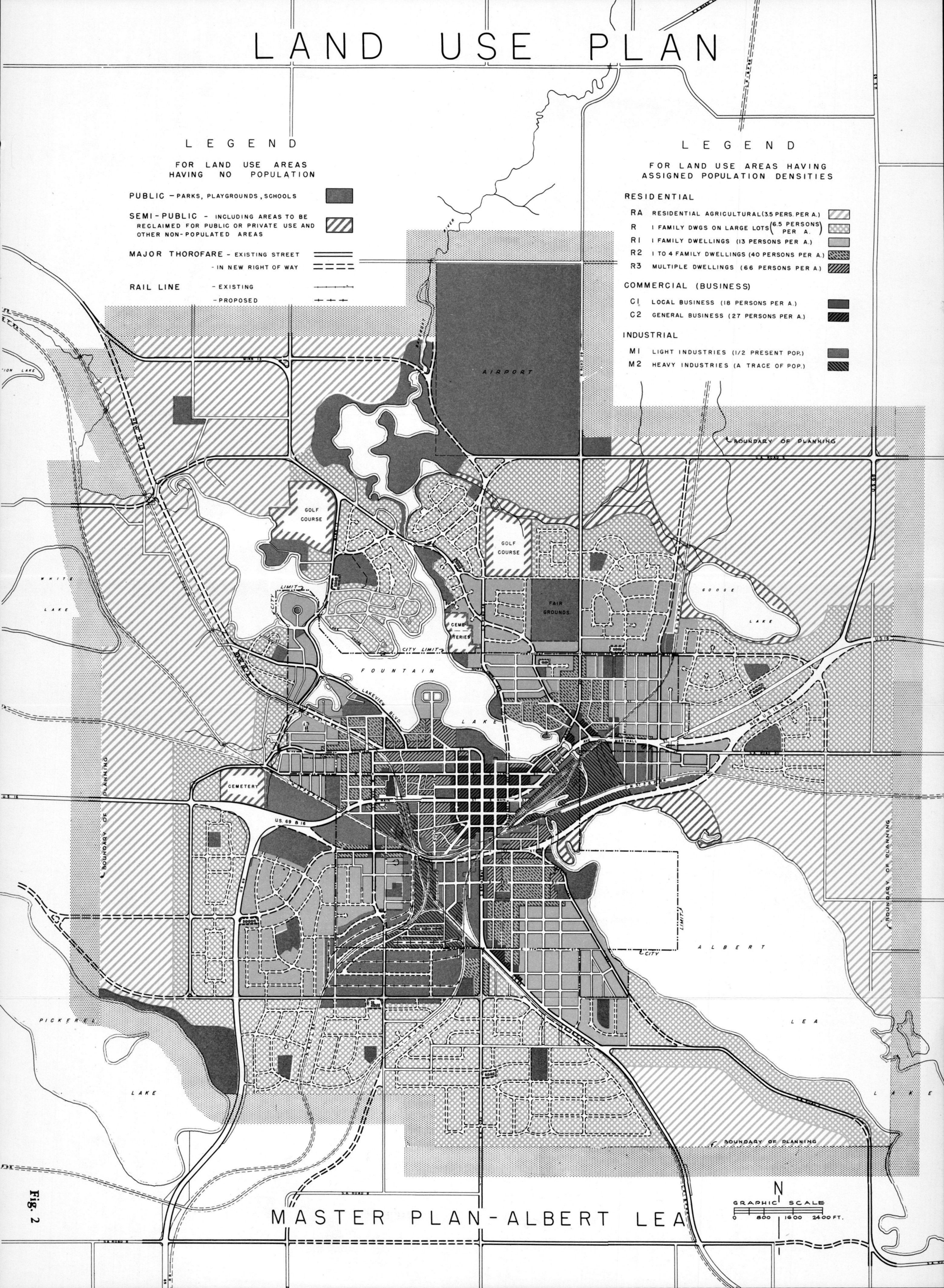
- RA RESIDENTIAL AGRICULTURAL (35 PERS. PER A.) 
- R 1 FAMILY DWGS ON LARGE LOTS (6.5 PERSONS PER A.) 
- R1 1 FAMILY DWELLINGS (13 PERSONS PER A.) 
- R2 1 TO 4 FAMILY DWELLINGS (40 PERSONS PER A.) 
- R3 MULTIPLE DWELLINGS (66 PERSONS PER A.) 

COMMERCIAL (BUSINESS)

- C1 LOCAL BUSINESS (18 PERSONS PER A.) 
- C2 GENERAL BUSINESS (27 PERSONS PER A.) 

INDUSTRIAL

- M1 LIGHT INDUSTRIES (1/2 PRESENT POP.) 
- M2 HEAVY INDUSTRIES (A TRACE OF POP.) 



MASTER PLAN - ALBERT LEA



Fig. 2

- C. Adjustment of the major thoroughfare plan and the land use plan after considering them in relation to each other.
- D. Preparation of a program of construction of major thoroughfares and corollary facilities over a future period of from six to ten years, with consideration to relative importance of these and other public works and improvements, and their financing.
- E. Establishment of ultimate geometric design of programmed thoroughfare facilities and ultimate right-of-way needs, and determination of design of first-stage construction.
- F. Preparation, and submission to local governments, of proposals for planning regulations controlling thoroughfare access and roadside development, and protecting programmed improvements.

The proposed scope contains nothing original or novel; it is just a suggested outline of overall technique, based on generally-accepted objectives.

The proposed planning regulations are the subject of an entire section of this paper. The adequacy of origin-destination traffic surveys and parking surveys for planning purposes will be considered in the last section. The proposed land use plan, construction program considerations and design considerations, will be explained briefly now.

The Land Use Plan and its Bases

The Land Use Plan of Albert Lea, Figure 2, is of the required scope for purposes of major thoroughfare planning and other urban planning. Essential features are:

1. Definition of the entire area of future urbanization - this is the area within the band labeled "boundary of planning" on the figure.
2. Establishment of a pattern of future development within this boundary, consisting of designated areas for several kinds of residential, commercial, industrial, public and semi-public land uses, superimposed upon which are the lines of major thoroughfares, railways, and minor streets, both existing and proposed.

3. Distribution of ultimate population densities within the various land use areas.

The services of a qualified urban planner would, of course, be required to prepare a land use plan for a given area, and to determine the scope of a comprehensive land use survey and other studies required as the bases. The basic data and studies for the Albert Lea Land Use Plan may be given as typical. These were:

A land use survey, consisting of observing and recording the existing use of each structure and of each parcel of land within the city and within a predetermined area around it.

A map, or maps showing all the individual land uses in colored symbols and other notations established for the purpose. Quantitative analyses of existing land uses, of which Table 3, prepared for this purpose in Albert Lea, is representative. Investigation and determination of those physical and other conditions affecting local circulation and influencing planning for urban expansion, and mapping and describing such things for study purposes (see Figure 3, illustrating such conditions in Albert Lea).

Rough studies of business and industrial development trends and population trends and the factors influencing these trends.

Studies like the following are required for establishing the location and pattern of major thoroughfares, future minor streets and railways, which are shown superimposed on the land use pattern in Figure 3.

Preliminary studies of optimum major thoroughfare arrangement for serving present and proposed future land uses.

Studies of optimum major thoroughfare arrangement to meet present, and projected future, traffic demand, including local bus or street car traffic.

Consideration of present and possibly future locations of rail lines and various transportation terminals.

Street design studies for future residential subdivisions and even for future industrial areas, for obtaining a desirable physical relationship between them and major thoroughfares and rail lines. (This was done quite carefully in Albert Lea. Designed streets for future development are shown in dash lines on the land use plan).

TABLE 3
LAND USES WITHIN ALBERT LEA

Use	Number of Parcels	Area in Acres	% of Area of all Urban Type Uses	% of Developed Area	% of Land Area of City
RESIDENTIAL			<u>% of Total Residential</u>		
1 Family Dwellings	2,373	405.18	82.60	54.78	30.44
2 Family Dwellings	425	66.64	13.52	9.01	5.01
3 & 4 Family Dwellings	83	11.96	2.44	1.61	0.90
Multi-family Dwellings (over 4)	45	7.80	1.44	0.86	0.47
Total Residential	2,926	491.58	100.00	66.26	36.82
BUSINESS - INDUSTRIAL			<u>% of Total Bus. - Ind.</u>		
Retail Business	288	29.03	15.59	4.01	2.23
Light Industrial	110	35.11	19.54	4.75	2.63
Heavy Industrial & R.R.	30	116.50	64.87	15.75	8.75
R.R. (Separately)		93.58	52.11	12.65	7.03
Total Bus. - Ind.	428	180.64	100.00	24.51	13.61
PUBLIC			<u>% of Total Public</u>		
Schools (Bldgs. & Plgd's)	11	17.46	27.56	2.36	1.31
Other Public Buildings	9	3.50	5.53	0.58	0.32
Park, Playgrounds, Etc.	17	27.18	43.51	3.72	2.07
Miscellaneous Areas	2	15.19	23.40	2.00	1.12
Total Public	39	63.33	100.00	8.66	4.82
SEMI-PUBLIC					
Churches, Institutions	21	4.87	100.00	0.57	0.31
Total Semi-Public	21	4.87	100.00	0.57	0.31
TOTAL URBAN TYPE USES	3,414	740.42		100.00	70.32
Streets and Alleys		312.10			23.45
TOTAL DEVELOPED AREA		1,052.52		100.00	79.01
Farming	1	7.25			0.54
Vacant	888	272.22			20.45
TOTAL LAND AREA OF CITY	4,303	1,331.99			100.00
Water Area		365.11			
TOTAL AREA OF CITY	4,303	1,697.10			

- NOTES: 1. Public "miscellaneous uses" include the city dump and municipal parking lot.
2. Residential multi-family uses include Prefabville which has 27-1-family dwellings. It also includes 1 tourist home and 2 lodging houses.
3. No cemeteries within the city.
4. The "Number of Parcels" does not include railroad parcels.

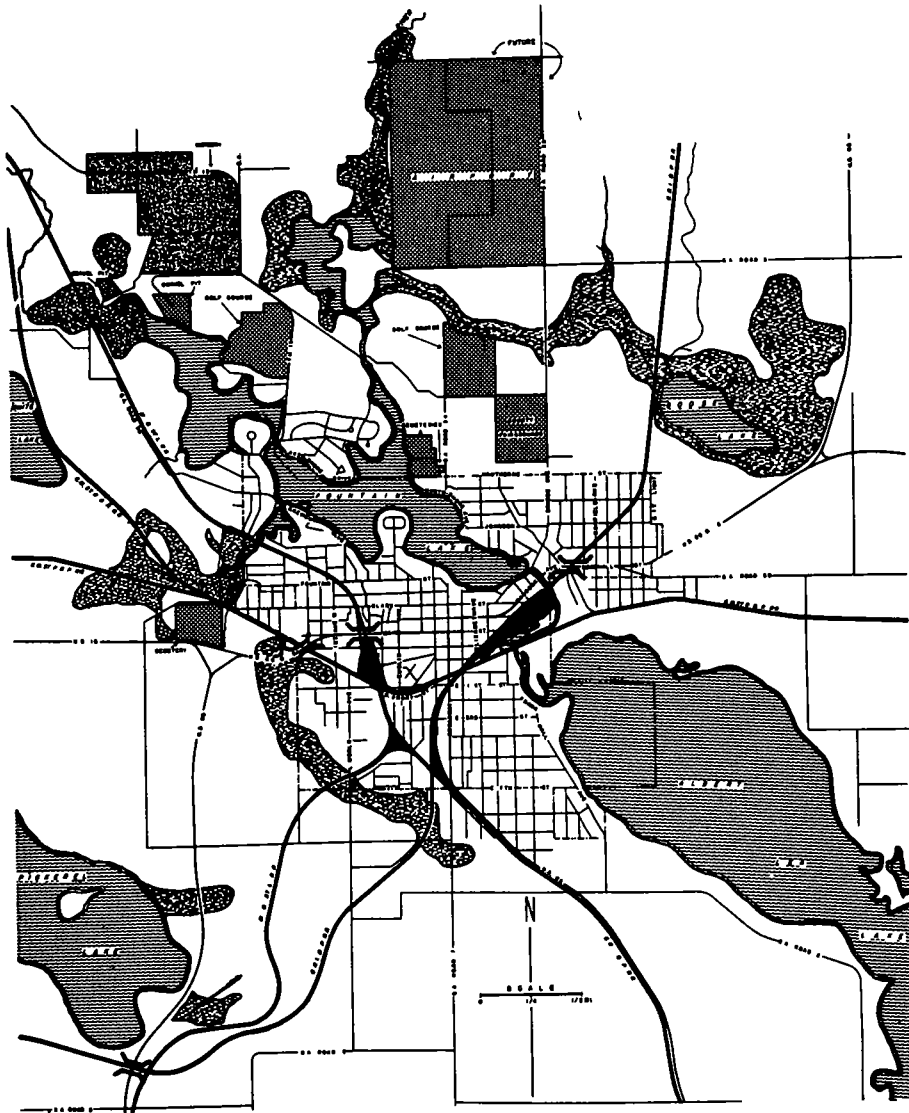


Figure 3. Land Uses and Physical Features--Albert Lea and Vicinity--Affecting Local Circulation and Influencing Planning for Urban Expansion, Including Prominent Land Uses, Water Areas and Areas Having Poor Drainage.

It is believed that a plan prepared on the bases established by a competent urban planner, following the general specifications herein, would serve the purpose of major thoroughfare planning in all except possibly some of the larger areas.

Incidentally, the proposed land use planning would doubtless satisfy the condition in the Housing Act of 1949 for financial aid for urban redevelopment, namely; that a local redevelopment plan be in conformity with "a general plan for the development of the locality as a whole."

Even with the incentives for local governments to undertake comprehensive planning, many of them will do little. The State highway departments, with the cooperation of the Bureau of Public Roads, may have to make their own arrangements for undertaking urban major thoroughfare planning in these places, if they should desire to proceed on the suggested basis.

The job in most cities under 50,000 population, or even under 100,000 population, would not be of such magnitude or complications as to be impossible. There is a large field in these cities and the need for comprehensive major thoroughfare planning of the suggested scope is critical in many of them.

There is no lack of need for comprehensive major thoroughfare planning in many of the smaller cities. Sometimes the problems they present are irritatingly complex, such as, for instance, those due to physical characteristics of the site. Wherever physical characteristics have acted to retard post growth they may be obstacles in planning trunk highways and local circulation facilities.

The features illustrated in Figure 3 are obstructions to free circulation in the City of Albert Lea. They cause the "Neighborhood unit" theory of planning to be impractical for full application. They have so constricted existing development that the City may break out at its seams in any of several directions.

These cities are particularly vulnerable to mistakes in planning. The construction of superior highway facilities has often assumed an importance not commensurate with the need for other traffic improvements and other public works. Improper location of such facilities or premature programming of construction have a stronger tendency to distort development and to disturb economic stability, than in larger places. Conversely, these facilities in the proper location, provided according to priority in a broad program of construction of all public works and improvements, tend to direct urban development along desirable and economic lines much more definitely than in the larger places.

The field is large. The Interstate Highway System, as presently conceived, serves most of the cities of 10,000 population and over, and many of lesser population. In 1940 there were 985 cities between 10,000 and 100,000 population and 1,950 cities between 5,000 and 100,000. Only 91 cities had populations of 100,000 or more.

Design of Primary Thorofare Facilities

Highway design, including fixing the ultimate character of the improvement, its geometric design, and right-of-way needs for protective purposes and various ultimate purposes, is distinctly within the scope of major thorofare planning.

The ASPO Committee on Highways and Transportation, in its 1940 report, referred to the known fact that there can be no fixed rule or standard establishing width and design features of highways (meaning all primary thorofares). The problem resolves itself into a determination of just what each highway is to accomplish and specification of those accomplishments in minimum terms. This report lists the following typical specifications:

1. The planned capacity of the highway in terms of vehicles per hour and day, average and peak loads.
2. The rate of speed at which traffic is to be moved.
3. The character of the traffic to be carried; trucks and freight traffic, passenger cars only, mixed traffic. Are transit operations to be accommodated?
4. The present and future character of the district traversed by the highway and the degree of protection necessary for the district and for the highway (each may detract from the value or efficiency of the other).
5. The type and frequency of access points.
6. Intersections requiring grade separations in the first instance, and ultimately.
7. The provision of service streets for abutting property, where required or desirable.
8. The closing of existing intersecting streets, where necessary.
9. The provision of extra width permitting redesign of abutting properties to provide usable sites in harmony with the character of the surrounding districts.
10. The use of accelerating and decelerating lanes, center dividing strips, traffic islands, etc.

The accepted technical criteria, rather than the size of a particular city, determines the kind of ultimate design of major thoroughfares, of course. In smaller cities, where costly limited access facilities are thus found to be required ultimately, but cannot be financed at the outset except at the expense of other needed improvements, stage construction must be programmed. Every possible legal and financial means to preserve or acquire land needed for the full improvement must then be utilized, however.

Programming of Construction

The Bureau of Public Roads estimates that improvement of the urban sections of the National System of Interstate Highways, costing more than 5 billions of dollars, must be undertaken within the next 20 years, at the longest. Major thoroughfare planning for long-range purposes in urban areas should look ahead at least this long, but note the following comment in a truly long-range plan.

A truly long-range plan, geared to a plan of ultimate land uses, would ordinarily be a plan for an indeterminate period of time in the future, but longer than 20 years. Some of its features would remain indefinite and hazy until crystallized or altered as the need becomes apparent with the passage of time. A twenty-year plan should more properly be called a short-range plan. Few, if any, of its features would be other than those obviously needed. The only precise features, as to exact right-of-way needs and details of proposed improvement, however, would be those included in the construction program.

Exceptions to the statement as to precise right-of-way needs might be made in special cases, one being where land subdivision is pending and future right-of-way dedication or reservation could be accomplished under subdivision control procedure.

A construction program of desirable scope is one that would include such improvement of major thoroughfares and corollary facilities as would meet the more immediate needs, say those over a period of from six to ten years. The improvements in this program should be selected with regard to their probable effects on present and planned development. In assigning priorities this should be considered as well as the need for the improvements, in relation to the need for other local public works and improvements, their estimated cost on the same basis, and the estimated financial resources available for all needed improvements.

Each year, or each biennium, the construction program should be extended for one or two years ahead, as the case may be.

III

PLANNING REGULATIONS FOR CONTROLLING
HIGHWAY ACCESS AND ROADSIDE DEVELOPMENT AND
FOR PROTECTING PLANNED HIGHWAYS

Regulations for controlling highway access and roadside development are in furtherance of these now generally recognized requirements:

That the performance of existing main thoroughfares, in terms of transportation service, must be improved, and must be maintained at this higher level, and,

That new facilities must be so protected against certain adverse conditions, that their designed performance will not deteriorate with the passage of time.

Other planning regulations are for the purpose of reserving land needed for planned major thoroughfares.

Regulations for these purposes are not satisfactory as to technical and legal validity unless based upon adopted plans and program, including, at least, a major thoroughfare plan, a land use plan, and a program of proposed thoroughfare construction.

Controlling Highway Access and Roadside Development

The need for this control is stressed in the 1947 Public Roads Administration Booklet, "Public Control of Highway Access and Roadside Development." The instruments of authority discussed therein are: controlled access design, marginal land acquisition, acquisition of highway development rights, restriction of ribbon development, and land use controls. The planning regulations discussed herein are the same as the "land use controls", except that there are more of them than are recognized in this booklet.

Various state highway departments have been more or less active in promoting the adoption of certain planning regulations by local governments. Such efforts are too limited, however, when they are pointed only at local zoning for various purposes.

Zoning is not altogether satisfactory, legally, if applied only for the purpose of establishing building set-back lines and land use restrictions along strips of land abutting highways, as has often been done, or advocated. It would be preferable to consider zoning as primarily applicable to regulate permissible land uses, the maximum density of population, and minimum yards and other open spaces needed for adequate light and air and traffic safety, and to utilize other regulations under other procedures for establishing building set-back lines and for controlling highway access. These are explained under the next subject.

Protecting Planned Major Thorofares

In planning enabling legislation granting local governments the power to exercise subdivision control and to adopt regulations establishing new street lines and building set-back lines along existing streets, a prerequisite to the exercise of such power is the preparation and adoption of that portion of the master plan covering major thorofares. On such bases these regulations, and zoning, are of a more lasting quality -- they are definitely more than just temporary expedients.

The regulations most applicable for establishing building set-back lines and to control highway access in connection with the subdivision of land are also those needed to preserve land for planned improvements. These are:

1. The establishment of the lines of new and widened streets under what is termed the "Official Map" procedure or the "Mapped Improvements" procedure.
2. Requiring the dedication or reservation of land for planned major thorofares, and requiring such subdivision design as will provide for controlled access to such thorofares, under subdivision control procedure.

"Official Map" and "Mapped Improvements" Procedures

In some states, like in Minnesota, such lines can be established by municipalities by what is called the "Official Map" procedure, when desiring "to extend or reserve any lands for streets or other public use." Building permit control is then exercised, this action being subject to appeal to a Board of Appeals.

In some other states, like in Michigan, under the "Mapped Improvements" procedure, detailed and precised plats, based on features of any major portion of a master plan (a major thorofare plan, for instance), can be adopted. Such plats may show "the exact location of the proposed future outside lines of 1 or more new, extended or widened streets -- (etc.) --".

Procedures designed to bring about the same result, are provided for in planning enabling legislation in other states. Some legislation applies to counties and to townships as well as to municipalities. The experience in Pennsylvania, where such planning regulations have successfully withstood the test of the courts over a long period of time, is probably best known.

"Subdivision Control" Procedure

In enabling acts authorizing the exercise of subdivision control by local governments for planning purposes, two prerequisites to the assumption of this authority are (1) the adoption of a major thorofare plan and (2) the adoption of a set of subdivision regulations. The latter can impose requirements like these on new land subdivisions:

1. That major thorofares in proposed land subdivision be in such locations and of such widths as are established in the plan of major thorofares.
2. That subdivision design be such as to provide only for essential access to it from major thorofares. Design features in furtherance of this requirement may be; an arrangement of subdivision streets and blocks having long blocks paralleling major thorofares, provision of local service streets adjoining major thorofares, or the platting of lots rearing, rather than fronting, such thorofares, and,
3. That land required for planned major thorofares be dedicated or be reserved for the purpose.

There are a number of examples of subdivision regulations throughout the country. Some of them have been operating for more than a decade.

In Port Huron, Michigan, the City Plan Commission recently caused a master plan to be prepared. The first portion of the master plan to be adopted was the Major Thorofare Plan. This was followed by adoption of Land Subdivision Regulations. In these it is provided that "Hereafter all subdivisions which are wholly or partly within the corporate limits of the City shall conform to these regulations -- (and) -- shall conform to those parts of the master plan of the City which have been adopted by the Plan Commission prior to the filing of a preliminary plat of a subdivision, or, pending such adoption, to the preliminary plans of the Plan Commission; and in all cases shall conform to any detailed and precised plats and to any plans made by the Plan Commission for the most advantageous development of the City."

One of the design standards in these regulations is that "The location, width and alignment of major thorofares and highways -- shall conform to the major thorofare plan or other plan of the Plan Commission completed or under way." It is further stipulated that subdivision streets "-- shall intersect existing or planned major thorofares at infrequent intervals only ---".

Another design requirement is that "Sizes of commercial and industrial blocks and lots shall be sufficient for the principal uses proposed and all required accessory uses including automobile parking space and commercial vehicle parking and loading space off the street."

The Problem of Multiple Local Governments in the Larger Urban Areas

The regulations under discussion are all local planning regulations that must be adopted, administered and enforced by local governments. The basic plans and programs must have similar action.

The problems in the larger urban areas, where action by multiple local governments is required, obviously are complicated. They are recognized in the report "Interregional Highways", wherein the need for the creation of metropolitan authorities for planning all major thoroughfares in urban areas on a comprehensive territorial basis, is discussed.

There are, however, the following ways in which local planning and zoning can be applied more or less comprehensively on a territorial basis, according to existing enabling legislation in different states:

- Regional planning
- County planning
- County zoning
- State planning
- Joint planning, by several local governments
- Extraterritorial planning
- Extraterritorial subdivision control

A source of information dated several years ago shows that regional planning, or county planning, or both, was authorized in some 25 states at that time. Extraterritorial subdivision control by all cities, or by specified cities only, was authorized in about the same number of states. The distance such control could extend beyond city boundaries varied considerably in the different states, ranging from 1 to 6 miles. It was 3 miles or more in 18 states, however.

Summary-Applicability of Planning Regulations

Since these are police power regulations, legal validity for the proposed purpose, as well as technical validity, is a test of applicability.

Zoning, for only the special purpose of establishing building set-back lines and regulating frontage uses along highways, and having no planning as a basis, is obviously of somewhat doubtful legal and technical validity, and whenever used should be regarded as only a temporary expedient.

Zoning that is comprehensive as to regulations and as to area covered and that is based on at least an adopted major thoroughfare plan and an adopted land use plan, is a more valid instrument, and more permanently applicable.

In states having enabling legislation for establishing regulations under the "official map" procedure, the "mapped improvements" procedure or some similar procedure, it is without doubt preferable to use such procedures to establish building set-back lines along existing thoroughfares and to establish the planned lines of new thoroughfares.

The "appeal" opportunity given in these procedures should be noted. Upon appeal, an applicant can be given relief from the restrictions if it is found that such relief is required by considerations of justice and equity and other considerations.

Following is an excerpt from the Mapped Improvements Act of Michigan (Act 222, P.A. 1943):

"Any such ordinance shall provide that the zoning board of appeals, if the municipality has such a board, or if not, that a board of appeals created for the purpose in such ordinance, shall have the power on appeal filed with it by the owner of such land to authorize the granting of a permit for and the erection of a building, or structure, or part thereof, within the lines of any such mapped street, park, playground, or other public ground in any case in which such board finds, upon the evidence and arguments presented to it on such appeal, (a) that the entire property of the appellant located in whole, or in part, within the lines of such mapped street, park, playground, or other public ground cannot yield a reasonable return to the owner unless such permit be granted, and (b) that, balancing the interest of the municipality in preserving the integrity of the adopted map, and the interest of the owner of the property, in the use and benefits of his property the granting of such permit is required by considerations of justice and equity. Before taking any such action, the board of appeals shall hold a public hearing thereon, at least 10 days' notice of the time and place of which shall be given to the appellant by mail at the address specified by the appellant in his appeal petition. In the event that the board of appeals decides to authorize a building permit and erection, it shall have the power to specify the exact location, ground area, height, and other details and conditions of size, character and construction, and also the duration of the building, structure, or part thereof to be permitted.

Legislation in some of the states provides that comprehensive planning of development be followed by the preparation, annually, of public improvement programs over a future period, usually six years. In such cases this should be the time over which the planning regulations for reserving land for such improvements should apply. Timing must be with consideration to the reasonableness of such regulations, if tested in the courts.

Subdivision regulations are considered necessary because they supplement the other regulations and go a step further; they require not only conformity of new subdivisions to planned major thoroughfares, as to width and alignment, but also a layout of subdivision streets and blocks that will relate properly to these facilities as to access. They are for the purpose of mutual protection of planned improvements and the subdivision development itself.

For technical and legal validity, subdivision regulations must, of course, be competently drafted, be based on an adopted major thoroughfare plan, and be applied and administered reasonably. It might be deemed unreasonable, in some cases, to require the dedication of full widths of future or widened major thoroughfares, as they would be in excess of the access and circulation needs within the subdivision. In this event the reservation of such width for an agreed upon length of time prior to acquisition, might be required.

IV

ADEQUACY OF BASIC TRAFFIC SURVEYS
FOR PLANNING PURPOSES

It is generally conceded that the preferred type of basic traffic survey is the home-interview type origin-destination survey. This well known type obtains extensive information on personal trips by automobiles and by street cars and busses, including origin and destination of each trip, purpose and supplemental data.

Many now believe that in the smaller cities, say those of less than 50,000, other standard types may be considered as adequate. These have been under study by the Highway Research Board Project Committee on Origin-Destination Survey Techniques, and it is believed that a report as to their adequacy will be available soon.

It should be noted that other types are far less desirable than the home-interview type in areas where mass transportation is important, as there is no coverage of mass transportation trips, unless by a separate survey.

Parking Survey Included in Scope of Planning

In some of the earlier origin-destination surveys in urban areas, the home-interview schedule in use called for extensive information on automobile parking. The experience with these showed the sponsoring highway authorities and city authorities that satisfactory parking information for parking planning purposes can be obtained only by conducting a separate parking survey, like that specified in the October 1949 Parking Study Manual of the Bureau of Public Roads.

Such a survey is, therefore, within the scope of the suggested urban area major thoroughfare planning.

Extension of Scope to Include Land Use Data

It is suggested that the land use survey, one of the required bases for a land use plan, be used for the purpose of sample selection for the home-interview type origin-destination survey.

In traffic surveys conducted on a dwelling unit sample basis, any error that may be due to the sample selection procedure should be avoided, but this can be eliminated only by making a field survey to identify all dwelling units. This field survey should include collection of such additional land use data as are required for land use planning purposes.

In the smaller urban areas, when origin-destination surveys of other than the home-interview type are conducted, separate land use surveys would be required. Since completely accurate dwelling unit information need not be specified in such places, however, the desired information could be obtained in the field in a fraction of the time per unit of area required for a dwelling unit and land use survey conducted for sample selection purposes.

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