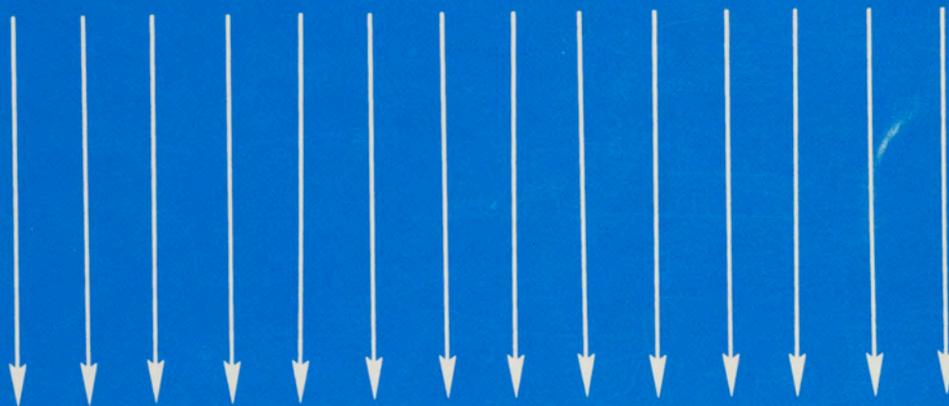


A MATRIX ANALYSIS OF GROWTH POLICY IN AUSTIN



**Lyndon B. Johnson School of Public Affairs
Policy Research Project Report
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A Matrix Analysis of Growth Policies in Austin

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Foreword

The Lyndon B. Johnson School of Public Affairs has established interdisciplinary research on policy problems as the core of its educational program. A major part of this program is the nine-month policy research project, in the course of which two or three faculty members from different disciplines direct the research of ten to twenty graduate students of diverse backgrounds on a policy issue of concern to a government agency. This "client orientation" brings the students face to face with administrators, legislators, and other officials active in the policy process, and demonstrates that research in a policy environment demands special talents. It also illuminates the occasional difficulties of relating research findings to the world of political realities.

This analysis of Austin's growth policies is the product of a policy research project conducted at the LBJ School in 1982-83. Funding for publication was provided by Metro Austin 2000.

The curriculum of the LBJ School is intended not only to develop effective public servants but also to produce research that will enlighten and inform those already engaged in the policy process. The project that resulted in this report has helped to accomplish the first task; it is our hope and expectation that the report itself will contribute to the second.

Finally, it should be noted that neither the LBJ School nor The University of Texas at Austin necessarily endorses the views or findings of this study.

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1. WHY GROWTH?

1.1 REASONS FOR GROWTH

Discussions of policy towards growth in Austin have usually been conducted as debates between the "pro-growth" and the "no-growth" positions. To determine which position is more accurate, it is necessary to understand the reasons for the city's obvious growth. Between November 1982 and January 1983, some of the authors conducted a series of interviews with academicians and businessmen to investigate reasons for growth in Austin. The consensus of these community leaders was that growth is occurring at a rapid rate and will continue to do so in the future. At some time during the past decade, Austin imperceptibly passed the point at which a local decision for or against growth could have had an effect, and at this point, the focus shifted to the management and control of growth. Therefore, the critical policy issue which has emerged is the urgency of channeling this burgeoning growth in the least detrimental direction.

Originally, part of the project was to identify and isolate the reasons for growth so that scenarios for the city's future could be constructed. Professor Walt W. Rostow of the University of Texas argued that factors influencing the growth of the city were interrelated and could not easily be separated.¹ Other interviews confirmed that Austin's growth has been spurred by the interaction of a variety of factors that are less meaningful individually than taken together. The phrase "quality of life" is often used to describe this unique phenomenon.

Austin is unusual because its citizens are interested in preserving the environment despite accelerated growth. John Watson, a local lawyer and developer, said, "Maybe we have the opportunity to write the original book on growth."² Watson also thought that Austin's quest for

a new definition of the American city could serve as a model for growth management. Austin does not conform to the stereotype that cities are large economic units functioning only to enrich a single segment of the population. The decline of older industrial cities has made Austinites aware of the need to reconcile growth with concern for the environment.

In short, Austin's rapid growth has resulted in mixed feelings on the part of its citizens; some promote growth and others vehemently oppose it. It is often difficult to convince Austinites that growth in itself is not inherently good or bad, but that the management and direction of growth can have good or bad effects.³ Emotions have been polarized on these issues for so long that the possibility of managing growth has been minimized. It is important to find methods of implementing judicious growth management, because growth is occurring in spite of all the antagonism and rhetoric. The following sections discuss the factors responsible for the rapid growth of the Austin area.

1.2 TEXAS AND THE SUNBELT

Cities are tied to the regions in which they are located.⁴

Austin's in the way; it's in the path.⁵

In short, the rise of the Sunbelt is the key to growth in Austin. Foreign investors as well as out-of-state businesses are attracted to Austin as part of a general regional phenomenon in which Austin plays a part. While growth in the northeastern United States generally declined in the decade 1970-1980, the Sunbelt region became the nation's fastest-growing area.

A new curiosity about the South grew and was nurtured by the extravagant publicity which filled the press in the middle and late 1970s. Examples of this may be found in 1976 issues of Saturday Review,

Time Magazine, and U.S. News and World Report. Such television programs as "Dallas" and such films as Urban Cowboy and Honeysuckle Rose also romanticized the South and extolled the virtues of southerners. This contrasted with attitudes of the press in earlier times, when such writers as H. L. Mencken portrayed the South as underdeveloped and its inhabitants as "rednecks." Texas benefitted from this publicity and became a magnet for growth.

Austin, located centrally within the state and the booming southwestern market, has been a beneficiary of the growth which has been a Texas phenomenon for the last twelve years. Further, Austin is centered among Texas' three largest cities--Dallas, Houston, and San Antonio--and is less than two hundred miles from each of them. This triangle is in itself a regional growth area, and Austin enjoys fine air, rail, and interstate highway connections to these and other major cities. In fact, David Graeber, Austin architect; Professor C. S. Davies of the University of Texas Geography Department; and Professor Vic Arnold of the University of Texas Bureau of Business Research all concur in their prediction that Austin and San Antonio will merge into one urban corridor by the year 2010. Innovations in transportation could shorten the eighty-two-mile gap between the two cities, and Austin's relatively skilled labor force could balance the less skilled and less expensive labor of San Antonio. Similar developments are foreseen in the corridors between Austin and both Houston and Dallas.

The business climate in Texas is another reason for the state's growth over the last two decades. In 1976, the Fantus Company, a subsidiary of Dunn and Bradstreet, named this business climate the best in the nation. The three most significant factors affecting Texas were its favorable tax structure, its labor laws, and a state government with a very favorable attitude toward business.⁶ In 1981, Alexander Grant and

Co., a national accounting firm, published a report ranking Texas second only to Florida in having the best business environment for general manufacturing in the forty-eight contiguous states.⁷ In 1982, both Chase Econometrics and the Fantus Company rated the Austin SMSA (Standard Metropolitan Statistical Area, which incorporates Austin and surrounding counties) as a prime target for industrial relocation. A growing regional market, efficient transportation facilities, the availability of energy supplies and productive workers, as well as the discovery of natural gas and lignite in the counties east of Austin added to the momentum of the growth.

The Texas legislature has traditionally enacted tax laws favorable to business and industry. According to the 1980 Department of Commerce figures, Texas ranks eighth lowest of all fifty states in its total per capita state tax burden. This favorable situation is due in part to the absence of both corporate and personal income taxes and the influence of the severance taxes on oil, gas, and other natural resources. Furthermore, the average unemployment tax paid by all employers in Texas has traditionally been one of the lowest in the nation.⁸

Texas is one of nineteen states with a right-to-work law, which reads in part that "no person shall be denied employment on account of membership or non-membership in a union." Because of this law and the state's traditions of self-reliance and independence, Texas has proven difficult to unionize. Only North Carolina, South Carolina, and South Dakota have a smaller percentage of the work force that is organized. Only 13.5 percent of Texas' nonfarm labor force held union membership as compared with 27.2 percent nationally. Existing unions are also closely regulated. It is difficult for unions to organize state and federal workers as well, especially since enactment of a 1981 state law that prohibits payroll deductions from state employees' checks except those

specifically authorized by the legislature. This has had the practical effect of preventing the unionization of state employees by preventing a dues checkoff.⁹ Austin's four largest private employers are 100 percent nonunion; indeed, Austin is almost completely nonunion except for the building trades, some printing firms, and some partly organized manufacturers, such as Glastron Boats. The record of work stoppage and lost production due to strikes is virtually zero. In 1981, the state of Texas ranked seventeenth among the states in the least amount of time lost due to work stoppage.

Aside from the right-to-work law, Texas has no state labor relations act, nor does it have a wage-hour law or an antiinjunction act similar to federal statutes.¹⁰ There are only very broad, minimum state occupational health and safety standards.

Texas' philosophical approach to business is also seen in its strong industrial training program. Working with the Texas Education Agency and the Texas Employment Commission, the Texas Industrial Commission has developed an industrial training program designed specifically to meet the immediate manpower needs of industries considering plant location in Texas. The industrial start-up training program consists of five stages:

1. Analysis and identification of firm's immediate start-up labor force requirements;
2. Design of training programs and designation of training institutions;
3. Initial recruiting and screening of work force;
4. Implementation of training program; and
5. Monitoring of the training program to insure accomplishment.

Financing the training program is accomplished through the joint efforts of the incoming industry and the various state agencies.¹¹

The Texas Industrial Commission also recruits both domestic and foreign business to Texas by working with local chambers of commerce and the Texas utility industry. In addition, the State offers a program with up to \$10 million of tax-exempt bonds available for buying land and building facilities.

According to David Spurgin, an economist on Lt. Governor Bill Hobby's staff, the positive business climate favored by Texas state government should not change with the new administration. Governor Mark White has also campaigned against any corporate or personal income tax. Although the state's economy is not expected to grow as rapidly in this decade as in the last, it will probably continue to command a significant share of the national economy. Energy and land resources continue to be viewed as plentiful in the immediate future, and Texas' wage scales remain lower than those of other states. Because of a reduction in the federal share of investment in water development, however, the state will have to concentrate on this area over the next two decades. In every other respect, Texas will continue to be a state which welcomes industry.¹²

1.3 THE SILICON HILLS

Two-thirds of the net immigration to Texas from 1960 to 1975 can be explained by growing job opportunities. As part of a national trend, the electronics industry has relocated from the old manufacturing centers of the North and Northeast to the South and Southwest.¹³ The Austin SMSA became a center for high technology during the period 1965 to 1980. Consequently, manufacturing employment increased by 250,000 jobs. The growth in employment during the present decade is projected at an annual average rate of 3.4 percent.¹⁴

Many secondary level high technology electronics companies formerly located in California have made Austin home. Examples of these

companies are Data General, Digital Equipment, Intel, and Tandem Computers. Such medical firms as Kallestad, Abbott Laboratories, and Carbomedics have also relocated to the area. Defense contractors also contribute to the local economy; Tracor, for example, received two multi-million dollar defense contracts in late 1982. Lockheed began its operations in Austin in January 1983.

At present, semiconductor and computer industries, which are an important part of the Austin economy, are riding a wave of new technology and innovation. "High tech" attracts more "high tech," and once established, it is responsible for the spin-off of satellite industries. As a result of the influx of highly skilled personnel, Texas has created a burgeoning market for itself. Modest housing costs and relatively low land prices have encouraged this growth.¹⁵

Recently several small companies have begun turning out computer software programs for the growing worldwide market of small computer users. Their goal is to tap the software market that is expected to reach \$900 million in sales in 1983 and to grow to roughly \$7 billion within the next five years.¹⁶

The University of Texas is a major contributor to Austin's economy and its phenomenal growth. A national graduate research university ranking among the top twenty institutions in the nation, its library is the eighth largest in the country with over four million volumes. Texas boasts several highly acclaimed academic programs including botany, engineering, business, linguistics, German, astronomy, public affairs, and law.

The University was a major factor attracting the Microelectronics and Computer Technology Corporation (MCC) to Austin. MCC is a private sector joint research and development venture owned by twelve American

microelectronics and computer companies, which will eventually employ several hundred researchers and support staff. Among the attractions to Austin were a site for the MCC facility at the University's Balcones Research Center and expansion of the University's faculty and research facilities in microelectronics and computer technology.

The chamber of commerce has conducted a very selective but relatively low-key recruitment plan in Austin. A selective economic development program solicited only nonpolluting, mostly high-technology industries which led to growth without creating new problems of pollution or social discord. Because Austin has so much to offer as a community, it was never necessary to offer financial incentives or inducements, such as tax abatement or moratorium policies, subsidized financing, or special "discriminatory" municipal regulations.

Lacking deep water transportation and nearby mineral resources, Austin has not attracted petrochemical, refining, chemical, steel, or other heavy industries which could create the social and environmental problems that have occurred in Houston and Port Arthur. Midwest and Gulf Coast industries have been affected by slumping worldwide markets during the current recession, but Austin's high-technology industry, defense contractors, and medical suppliers have remained relatively recession proof. The collapse of the peso and the slump in the oil industry also have not harmed Austin's economy appreciably.

Another reason for the relative stability of Austin's economy and its growth is the presence of the state government in the city. While the legislature meets only once every other year for 140 days, continuing governmental business employs 19 percent of Austin's labor force. There are 120 state and 62 federal agencies located in the city, and their presence has induced 329 regional, state, and national associations to

locate in Austin. State government employees number 90,000 and continue to increase despite recent budget constraints. The state government is Austin's largest single employer.

Federal installations have also grown. Bergstrom Air Force Base has recently expanded, the Veterans' Administration has located its data processing center for all hospitals in Austin, and the Internal Revenue Service maintains a regional center in the southern part of the city. These are substantial facilities employing several thousand people and providing a growing and stable economic base for the city. The high proportion of government payrolls in the city provides a buffer against recessions; the total public sector accounted for 32 percent of Austin's nonagricultural jobs in 1981.¹⁷

Austin bankers are a conservative group who know that Texas has so many advantages commercially and financially and Austin's economy is so strong that they do not have to solicit industrial development by taking undue risks. Because of this financial security, there are only a few venture capital firms in Texas, as opposed to the large established networks found elsewhere, such as California.¹⁸

1.4 QUALITY OF LIFE

Austin has been called "one of the country's most appealing mid-size cities."¹⁹ Its geographical location on the Balcones Escarpment places the city on the edge of the scenic Texas "Hill Country." To the east of the city is the agricultural region of the Blackland Prairie. The Colorado River, which flows through Austin, has been dammed in several places to form Town Lake, located in the center of the city; Lake Austin, on the west side of the city; and Lake Travis, a large recreational area about twenty-five miles from Austin. Because of these lakes Austin is a center for water sports and hosts an "Aqua Festival"

every August featuring boat shows, water ski tournaments, and other sports and entertainment activities.

Perhaps the most well-known natural endowment of the city is Barton Springs. Located in a large city park near the south shore of Town Lake, the springs form a natural pool which was developed into a concrete-sided swimming area in the 1930s.

In addition to its lakes and springs, the city has many parks and greenbelts, some of which are located along the numerous creeks which flow through the city into the Colorado. Sports facilities including swimming pools, tennis courts, golf courses, softball diamonds, and jogging trails are located in parks throughout the city. Austin's mild climate encourages their use nearly year-round.

Austin is a relatively cosmopolitan city for its size, offering cultural activities of many varieties. A traditional country-western music center, the city also hosts visiting performing artists of all types in the restored Paramount Theatre downtown, and in both the new Performing Arts Center and the Special Events Center on the University of Texas campus. Both the University and the City maintain art museums; the University also boasts a historical museum and the LBJ Presidential Library and Museum. A renovated portion of Sixth Street in downtown Austin has become a restaurant and entertainment center as well, providing a lively nightlife for Austinites. These amenities also attract tourists, whose dollars help Austin's economy both directly and indirectly through hotel construction.

All of the cultural and recreational features combine with its natural beauty and climate to make Austin a very attractive city. While economic factors have probably motivated much of the city's growth, these "quality of life" factors have been cited most frequently as

inducements for business location or expansion in the Austin area.

1.5 AUSTIN'S FUTURE

Prognostications made by the people interviewed are based on the acceptance of continued growth. "To grow, but to grow with grace" is the admonition heard from nearly all.²⁰ Their advice for the future revolves around two concepts: continuing the sound economic principles which led to growth in the first place, and avoiding the problems besetting the faltering cities of the North and the wild disarray of such southern cities as Houston. The desire to maintain the delicate tension between the "quality of life" and the strong economic base tempers all predictions for the future.

Arthur Gerlernter, President of AMI Systems, quoted Alvin Toffler's "theory of anticipatory democracy" which uses both citizen participation and futurism to develop a consensus by which to orchestrate growth.²¹ Cooperation among developers, environmentalists, and citizen groups can lead to a new approach to community partnership.²² Citizen awareness must be maintained to prevent Austin from losing its unique position. Austin already boasts an intensely active political community brought together during the Johnson years when the high educational level of the citizenry contributed to an sensitivity toward the quality of life. Such political and civic awareness toward both growth and the environment continues to be needed. By 2000, Austin's SMSA is expected to have a population of one million, and if it then lacks a consensus on growth management policies, the social and economic problems of the northern cities could be repeated here.

As an extension of this philosophy, development of a consensus with San Antonio and the cities in the Interstate Highway 35 (IH-35) corridor about growth management in the region between the two cities is also

needed. Unless intelligent plans are made soon to channel and coordinate this growth, the Houston experience could be repeated. Although each growth experience is unique, benefit can be derived from collaboration among the cities in the region. Besides preventing the erosion of the economic base in the cities, cooperation will enable each city to preserve its own lifestyle and provide a governing mechanism to cope with additional problems.²³ Such cooperation had tentative beginnings in a 1982 conference on growth in the corridor, but more work will be needed to develop and maintain cooperative policies and programs.

Austin must anticipate future problems in order to plan for transportation and other services and to provide for the future infrastructure needs. Loop 1, the Mopac expressway, took thirty-eight years to complete after the initial planning stage. Therefore, long-range planning may need to allow for similar implementation delays in providing for future infrastructure needs. Problems are likely to arise from the inadequate water supply systems, congested streets and expressways, a crowded airport, and inadequate electric generating capacity, water treatment capacity, and public transportation.²⁴

Most of those interviewed agreed that Austin should annex aggressively to include its surrounding areas in the city. Many believe that the city cannot afford not to annex, because annexation will prevent the erosion of the future tax base. The growth of Round Rock is cited as an example of loss of tax base due to the no-growth attitudes of earlier City Councils. Annexation is also necessary to extend the city's extra-territorial jurisdiction (ETJ), which gives the city the power to protect its environment, including the aquifers. Many interviewees felt that a consensus is needed to avoid the previously argumentative and shortsighted approach taken by the City Council and

City staff, an approach which usually leads to patchwork planning and fewer services at higher cost.²⁵

An ideal economy for Austin (or any city) would be recession proof. Therefore, this should be the ultimate goal behind economic growth management. Because cities' economies reflect the national economy, selective recruitment of industry can help develop and maintain a stable economy. Austin has an advantage over the older, industrial cities, since it does not have an inventory of obsolete fixed capital that would require retooling or replacement. Another advantage is that the city is not dependent upon unskilled, labor-intensive industry which can relocate to cheaper labor markets and leave the city depleted. It is vital to continue this type of economy to avoid cyclical growth patterns and the erosion of the economic base.²⁶

Fortunately for Austin, the computer industry, with its highly educated professional work force, is the linchpin of the future. It is important for policymakers to realize that current decisions affect the city's future growth. The wisdom of decisions made by the University of Texas and the Chamber of Commerce fifteen years ago have borne fruit and led to the nearly recession-proof economy of Austin in 1983. These nearly "textbook" strategies which led to broad diversification of the economy were based on an agreement to recruit high-quality industry which would minimize pollution and utilize the skills of the University graduates, and to take advantage of the presence of the state government and the University. If future policies continue the economic trends that have blessed the city so far, Austin will continue to grow and to maintain a stable economy into the twenty-first century.

2. METHODOLOGY AND VARIABLES

2.1 METHODOLOGY

Following the suggestions of those we interviewed, we have assumed that Austin will continue to grow; the question is whether and how that growth can be controlled. The City of Austin planning staff has projected that the population of the Austin SMSA will reach one million by the year 2000. Similar projections have been made by the Texas Department of Water Resources, as discussed in Volume I of this report. These projections will again be employed in our analyses of the effects of growth in this volume. (In Chapter 8 below, we consider what would happen if these projections were wrong.) This report considers several policy options that are available to the city and compares their effects on a number of other factors (dependent variables) which are believed to be important indicators of the effects of growth. Among these are city revenues and expenditures, quality of infrastructure, and protection of the natural environment, which we have seen is an important element of Austin's attractiveness.

The first volume of this report indicated that urban growth is a very complex phenomenon, affected by fiscal, environmental, legal, and political factors. It would not be possible to consider every action that a city could take that would affect growth; indeed, in the first volume of the report we stated explicitly that this analysis could not consider provision of such services as health or education, although these have important effects on the locus of growth. Instead, we have decided to look more closely at policy options in five areas--zoning, infrastructure, environment, annexation, and transportation. In each of these areas, the city is already considering actions similar to those proposed.

The core of our report is a matrix or table that places the policy options along the top and the affected or dependent variables down the side. An idealized version of the matrix is presented in Table 1 so that the reader can see how it is arranged, since it is too large to present on one page. The matrix itself is presented in Table 2. The rest of the report describes the policy options, the dependent variables, and the entries in the matrix--that is, what will happen to the dependent variable if that particular policy option is adopted. Finally, since these options interact with one another, we consider combinations of options from the five areas; we also consider what will happen if we make different assumptions or if certain events occur.

2.2 THE POLICY OPTIONS

The policy options are described in detail in subsequent chapters, which also explain and justify the matrix entries that tell how the policies will affect the dependent variables if selected. Here we present only a very brief outline of each policy, defined fully below.

1. ENVIRONMENTAL POLICY OPTIONS

- a. Enforcement of watershed ordinances and limitation on impervious cover. This policy would limit development in important watershed areas by enforcing already existing ordinances.
- b. City purchase/dedication of sensitive areas. With this policy the City would purchase environmentally sensitive land or require developers to dedicate such land for flood control and aesthetic purposes.
- c. Unconstrained growth. This policy would allow growth to occur in any area of the city regardless of Austin Tomorrow Comprehensive Plan (Master Plan) guidelines which are set out by development areas.
- d. Liberal exception policy to ordinances. This policy would allow exceptions to ordinances to be granted liberally, in response to requests from developers.

2. ANNEXATION POLICY OPTIONS

- a. Annexation at the historic rate (4.5 percent of the city's area annually) in order to fulfill Master Plan objectives.
- b. Annexation at the historic annual rate in areas where past trends indicate population growth will continue.
- c. Annexation of the maximum territory possible annually (10 percent of the city's area).
- d. Strip annexation along major arterials.

3. ZONING POLICY OPTIONS

- a. Current Zoning Ordinance.
- b. Proposed Zoning Ordinance.

4. INFRASTRUCTURE POLICY OPTIONS

- a. No capital recovery fee for infrastructure extensions in newly developed areas.
- b. Current capital recovery fee structure.
- c. Full cost capital recovery fee.

5. TRANSPORTATION FINANCING POLICY OPTIONS

- a. Current transit fare structure.
- b. Differential transit fare structure. In this policy option fares would be adjusted by distance and time of day.
- c. Independent transportation authority.

2.3 THE DEPENDENT VARIABLES

Citizens are concerned about the way in which growth will affect the quality of life in Austin. The dependent variables have been selected to cover a range of factors that are included in "quality of life." They include the city's fiscal soundness, quality of infrastructural services (water, transportation), and environmental quality.

1. ECONOMIC VARIABLES

- a. Population. Population data include the current U.S. Census and projections provided by the City of Austin Planning Department and the Texas Department of Water Resources.
- b. City Revenue. Revenue information was received from City of Austin annual budgets and financial reports. Total revenue includes property tax, sales tax, user fees and charges, utility transfers, and a host of other miscellaneous taxes and fees.
- c. City Expenditures. Services for Austin are included in this category, such as parks and recreation, services, roads, library, and utilities. City expenditure information was gathered from annual budgets and financial reports.
- d. Business Starts and Employment. Information on business starts and employment was provided by the Texas Chamber of Commerce and the Texas Business and Commercial Quarterly.

2. INFRASTRUCTURE VARIABLES

- a. Water and Wastewater Rates. Changes in utility fees may result from policy changes; the direction of movement is indicated by this analysis.
- b. Water Pressure. Adequacy of facilities for water distribution and availability of water supply may both be affected by changes in the policy options, which can alter water pressure.
- c. Water and Wastewater Plant Capacity. Adequacy of water and wastewater treatment plant capacities to meet demand will be affected as policies chosen increase or decrease demand.
- d. Water and Wastewater Transmission Capacity. Adequacy of transmission facilities may also be affected by policy choices.

3. ENVIRONMENTAL VARIABLES

- a. Change in Development/Change in Floodplain. Changes in the amount of development in the critical watersheds will affect the size of the floodplains of the creeks.
- b. Applicability of Environmental Ordinances. Whether or not the ordinances protecting Austin's environment apply to particular areas is affected by policy options, especially annexation and zoning.

- c. Water Quality. Policy changes will affect both the level of pollution in the area's creeks and rivers and the quality of the city's water supply.
- d. Predicted Increase in Industrial Pumpage. New or expanding industries will increase the amount of water usage (and wastewater effluent) from the system.
- e. Effect on Environmentally Sensitive Areas. The Audubon Society has identified areas of the city that are particularly sensitive environmentally; the effects of growth on these areas are analyzed here.

4. LAND-USE VARIABLES

- a. Distribution. Distribution patterns of various types of land use--such as residential, industrial, and commercial--may be changed by differing policy choices.
- b. Density. The density of land development, which is often related to perceived quality of life, can be affected by different policies.
- c. Neighborhood Preservation. Preservation of the character of existing neighborhoods is dependent upon policy choices made.

5. TRANSPORTATION VARIABLES

- a. Automobile Traffic Location. Location of roads used will vary with development.
- b. Automobile Traffic Volume. Roadway congestion and traffic volume will vary by development patterns, time of day, and other factors.
- c. Automobile Level of Service. This variable is defined by a ratio of traffic volume to road capacity, which is described further in the text below.
- d. Mass Transit Location Patterns. Patterns of routes and ridership will be affected by policies chosen.
- e. Mass Transit Level of Service. Policies enacted will affect demand for new transit routes.
- f. Mass Transit Frequency of Service. Demand for mass transit service will influence the number of routes supportable by the system.
- g. Other Mass Transit Options. Policies may encourage or discourage other transit alternatives, such as light

rail, carpools, and commuter rail.

The predicted effects of the policy options on the dependent variables are shown on the matrix, which is explained in Table 1 and presented in full in Table 2, and are described in more detail in the following chapters.

TABLE 1

PROTOTYPE OF MATRIX

P O L I C Y O P T I O N S

	ANNEXATION (4 options)	ZONING (2 options)	INFRASTRUCTURE (3 options)	ENVIRONMENT (4 options)
Dependent Variables				
Economic				
Population				
City Expenditures				
Business Starts/Employment				
Infrastructure				
Water and Wastewater Rates				
Water and Wastewater Pressure				
Plant Capacity				
Transmission Capacity				
Environment				
Change in Floodplain				
Applicability of Environment Ordinances				
Water Quality				
Predicted Increase in Pumpage				
Effect on Sensitive Areas				
Land Use				
Distribution				
Density				
Neighborhood Preservation				
Transportation				
Traffic Patterns				
Volume				
Level of Service				
Mass Transit Patterns				
Level of Service				
Other Transit Options				
Utility of Mass Transit to Auto				

EXPLAINING THE MATRIX

The Policy Option Matrix, shown here in outline and in detail on the following pages, summarizes the major findings of this research project. The cells in this detailed matrix contain descriptions of the effect of a particular policy choice (column) on a feature of civic life (row). We have called the latter elements "dependent variables" because their status depends on which policy is chosen. Because the matrix indicates the effect of only one policy choice at a time, the reader can construct a variety of "scenarios" that combine several policy choices. In that case, the net effect on the dependent variable can be calculated by combining the entries under those choices. Similar kinds of calculations can also be performed for policy options not examined here, or for other dependent variables.

TABLE 2
POLICY OPTIONS - DEPENDENT VARIABLES MATRIX
ENVIRONMENTAL POLICY OPTION

DEPENDENT VARIABLE	ENFORCE WATERSHED ORDINANCE AND LIMIT IMPERVIOUS COVER	CITY PURCHASE/ DEDICATION OF ENVIRONMENTALLY SENSITIVE AREAS	UNRESTRAINED GROWTH	LIBERAL EXCEPTION POLICY TO ORDINANCES
<u>Economic</u>				
Population	(See census tract information.)	(See census tract information).	People would move into any developed area.	More people would come to the Austin area with the businesses in the city. If City encourages high-tech industry, more highly skilled workers would live in Austin.
City Revenues	Slower growth in revenues because of resulting development outside city.	Property tax loss on purchased land will result either in the decreased rate of growth of property tax revenues or in higher property tax rates for others.	Increase in revenues and the rate of growth of revenues, especially in property and sales taxes with growth in Austin and environs. Increase in development in 3-county area, resulting in an increase regional revenue capacity.	Sales and property tax revenue would increase as a result of additional businesses. Regional revenue capacity could increase as a result of location within the city and 3-county area.
City Expenditure	Expenditures will <u>increase</u> because City will provide more services in growth areas away from watersheds; City might also be providing services to people living outside the city who aren't paying for services through property tax.	Expenditures will not increase significantly because of costs of land purchase.	Expenditures would increase with City providing additional fire, police, health and social services, and recreational service throughout the city. Rise in expenditures will be proportionate to increase in revenues.	Expenditures would increase as the City provides additional services to new areas of development.
Business Starts and Employment	Business might locate in other counties.	N/A.	Business starts would increase because of flexibility of location. Employment opportunities would increase as new businesses move into the Austin area.	Business starts would increase because of the resultant flexibility of location within the city. Employment would increase with the increase in business starts.

	WATERSHED ORDINANCE (continued)	PURCHASE (continued)	UNRESTRAINED GROWTH (continued)	LIBERAL EXCEPTION (continued)
<u>Infrastructure</u>				
Water/ Wastewater Rates	Cleaner water. Reduced need for clean-up by treatment plants could lead to reduced rates. Enforcement would lead to corridor growth, less need for expansion in hard-to-serve areas, and cheaper rates. LCRA could become a competitive alternate service provider.	Should not affect rates unless the City uses a rate increase to subsidize expense of purchase.	Service will need to be extended into more expensive areas. Current users would probably subsidize new users through rate increases. Inhabitants outside city limits would pay more.	No effect.
Water/ Wastewater Pressure	No effect.	No effect.	If growth is not met with an expanded water/wastewater system, pressure to many city areas could be reduced.	Depending upon the type of industry (high-tech v. heavy water use), the pressures in different areas may vary.
Water/ Wastewater Plant Capacity	To compensate for growth, plant capacity will still need to be enlarged regardless of how much enforcement helps water quality.	No effect.	Capacity is inadequate now. Scheduled improvements would increase capacity to 250 million gallons per day, definitely mandatory to handle expected growth.	Again dependent upon type of industry, as above. Heavy water use industry may find inadequate service unless improvements are made.
Water/ Wastewater Transmission Capacity	Since it is the weakest link in the water and wastewater system, transmission capacity needs to be improved greatly, regardless of water quality.	No effect.	Capacity in some areas inadequate now; other areas will be shortly. This action would put an unbearable burden on the system.	Same consideration as above.
<u>Environment</u>				
Change in Development and Floodplain	Barton Creek dev. based on water zones; Lake Austin dev. based on slope areas; Williamson Creek dev. based on drainage area.	Most protection offered.	North-South (N-S) corridor ignored. Increase in flood-prone area and impervious cover leads to more runoff.	Likely to be similar to unrestrained growth (at left).
Applicability of Environmental Ordinances	Loopholes will still exist.	Purchase will focus on watersheds.	Increased peak discharges, increased runoff rates, more pollutants.	Watershed areas damaged. Less emphasis on watershed requirements.
Water Quality	Percentage of impervious cover determines runoff rates.	Protection of creek area will protect city drinking water.	Withdrawal of groundwater harms water quality. Development recharge area is especially harmful.	Increased pumpage could reduce quality.

	WATERSHED ORDINANCE (continued)	PURCHASE (continued)	UNRESTRAINED GROWTH (continued)	LIBERAL EXCEPTIONS (continued)
Predicted Increase in Industrial Pumpage	No effect.	No effect.	Expected to increase if industry locates in unsuitable areas. 25 users now. Increase leads to supply and quality problems.	Likely. Similar to unrestrained growth (at left).
Effect on Environmentally Sensitive Areas	Special emphasis on aquifer recharge zone.	Better protection of these areas. Cost will lead to annexation and zoning changes.	Street and road construction could damage these.	These areas could be damaged, especially growth areas IV and V.
Location	CBD (Central business district), N-S corridor, S. Williamson County, N. Hays.	Sensitive areas: W/E, Floodplains higher density development in N-S corridor, S. Williamson, N. Hays.	Affect all roadways. More traffic in sensitive areas/multidirectional traffic flow/more travel to suburban employment sites.	Base industries within corridor and on fringes.
Volume	More traffic entering city from outer regions. Major roadways approach capacity and exceed it during peak hours.	Less volume on roads in sensitive areas. Greater volume on roads in more developed areas.	Substantial volume increases. (See volume/capacity chart.)	Multidirectional traffic flow. Large increase along all thoroughfares to and from industrial centers.
Level of Service	Low. (See capacity chart.)	High on roads in sensitive areas. Lower in other areas.	Low.	Low.
Transit Patterns	N-S corridor.	Not many routes in sensitive areas. Affect routes in N-S corridor.	Austin and surrounding areas.	Austin and surrounding areas.
Level of Transit Service	Routes need to be extended to far reaches of corridor. Higher density will require more frequent service.	No or few routes needed in sensitive areas. Affect routes in N-S corridor.	Existing routes do not extend to growth areas. Need to increase number of routes and frequency of service.	Many potential industrial areas not served by transit. Need increase in number of routes and frequency.
Other Transit Options	Corridor density development more conducive to intensive mass transit service (i.e., commuter rail).	Corridor development conducive to high-intensity mass transit.	Not conducive to commuter rail or similar mass transit options.	Conducive to intensive mass transit with industry located outside corridor.
Utility of Mass Transit to Auto/Parking	High - higher density w/in N-S corridor would discourage auto use and allow for more efficient mass transit.	High - higher density in N-S corridor would discourage auto use and allow for more efficient mass transit.	Low - no mass transit in new growth areas; no alternatives but auto. CBD - higher income housing, greater auto use.	Low - auto use greater due to difficulty of establishing efficient mass transit.

	WATERSHED ORDINANCE (continued)	PURCHASE (continued)	UNRESTRAINED GROWTH (continued)	LIBERAL EXCEPTIONS (continued)
Frequency of Service	Higher frequency as N-S travel encouraged. Unidirectional service.	Similar to watershed ordi- nance (at left).	Seriously re- duced frequency as transit must serve many more areas.	Reduced frequency as transit must serve many areas. Planning made more difficult.

ANNEXATION POLICY OPTIONS

HISTORIC PRIORITIES

DEPENDENT VARIABLES	ANNEX LAND TO FULFILL OBJECTIVES IDENTIFIED IN COMPREHENSIVE PLAN	ANNEX LAND WHERE PAST POPULATION ACTIVITIES ESTIMATES INDICATE MOST GROWTH	MAXIMUM ALLOWABLE ANNEXATION (5-YEAR-PLAN PRIORITY)	STRIP ANNEXATION
<u>Economic</u>				
Population	Population increase along the preferred growth corridor. Increased growth expected in the North.	Substantial population growth due to the availability of services, environmental controls, and zoning regulations.	Substantial population growth. City plans the extension of major public improvements.	Stable population since the area is already inhabited.
City Revenues	Revenues expected to increase due to expanded area and increased value of lands already inside city.	Revenues will increase as City captures tax base. Property taxes will increase as the value of land increases.	Revenues will increase substantially as the City acquires a larger tax base. Property taxes will increase as land values escalate.	Revenues will increase only slightly due to the limited area.
City Expenditures	Expenditures will increase as the City undertakes the task of redevelopment and providing services.	Expenditures increase substantially as the City provides additional services. Residential growth requires more services than areas of commercial growth.	Expenditures will increase substantially as the City provides infrastructure for the newly populated areas.	Stable expenditures since these areas can access already installed services.
Business Starts and Employment	Business starts and therefore employment are expected to increase due to the area's accessibility.	Six percent of the area can be expected to be commercial. Residential population demand will require more small businesses, so employment will increase.	Business starts and employment will increase to accommodate the residential growth. Approximately 6 percent of the area can be expected to be commercial.	Business starts and employment will increase slightly because of the area's desirable location; many new businesses will locate beyond the limit to avoid taxes and controls.
<u>Infrastructure</u>				
Water/Wastewater Rates	Fee increases, since facilities are already available in these areas; any increases not likely to be passed completely through to user.	Slight fee increase likely for new facilities.	Fee inadequate within 3 to 5 years. Capital recovery fee would have to be re-examined.	Capital recovery fee would have to be re-examined; possible disparities likely.
Water Pressure	Facilities and supply appear adequate for areas in this priority.	Facilities need expansion within 5 years.	If "maximum," new sources of water and additional pumping facilities needed in areas of most growth.	Likely to strain facilities in some areas.

	COMPREHENSIVE PLAN (continued)	GROWTH AREAS (continued)	MAXIMUM ANNEXATION (continued)	STRIP ANNEXATION (continued)
Water/ Wastewater Plant Capacity	Little change, since capacity is adequate, but additional plant may have to be built by 1995 since all plants outside of central city.	Facilities require expansion, especially in southwest regions of growth.	Inadequate to handle new demand, if assume "maximum" annexation; new facilities needed in areas of most growth, probably SW 290, FM 1325, and Bergstrom area.	Same as above.
Water/ Wastewater Transmission Capacity	Like the above, little change, but new treatment plant needed to handle inner-city re-development within 15 years.	Same as above	Same as above.	Same as above.
<u>Environment</u>				
Change in Development Change in Floodplain	Will encourage concentrated growth but will also afford protection through imposition of City ordinances.	Will encourage concentrated growth but growth will be controlled by ordinances governing areas potentially uncontrolled without annexation.	Higher annexation rates will give City greater control and the floodplains greater protection from adverse development.	Limited control, as development outside of strip will affect floodplain within the annexed area.
Applicability of Environmental Ordinances	All existing environmental ordinances would apply in annexed areas. Adjacent noncity areas may affect those abiding by ordinances.	Ordinances will apply in any annexed areas.	Most beneficial in imposing ordinances over greatest possible area.	Limited control as development outside of strip will affect annexed area abiding by ordinance.
Water Quality	Dense growth will affect water quality negatively but will be offset by controls imposed by City on the maintenance of water quality.	Concentrated growth effects, offset by water quality standards imposed.	Most beneficial in maintaining water quality standards over greatest possible area.	Limited protection of water quality since noncity areas adjacent to strip may have controls.
Predicted Increase in Industrial Pumpage	Pumpage will not increase; it will merely be within city limits rather than outside of city.	No increase relative to total pumpage.	Possibly some increase due to new industries locating within annexed areas in order to be closer to working population. Controls on development will affect these.	No increase; new industries will avoid annexed area.
Effect on Environmentally Sensitive Areas	Some protection afforded by virtue of preferred corridor, although City does not have ordinance protecting Audubon Society's list of sensitive areas.	More environmentally sensitive areas exposed to growth with no City protection. Overall advantage by annexation, though, in ordinances affecting watersheds.	Greatest amount of protection by those City ordinances that do apply to environmentally sensitive areas. City should accept ordinance protecting those currently not addressed.	Limited protection of environmentally sensitive areas unless annexed for that purpose alone. Adjacent areas will have effect on strip.

	COMPREHENSIVE PLAN (continued)	GROWTH AREAS (continued)	MAXIMUM ANNEXATION (continued)	STRIP ANNEXATION (continued)
<u>Land Use</u>				
Distribution	Residential development would be encouraged first in fully developed areas of the city, second in environmentally nonsensitive areas, and lastly along 183 Northwest east of Loop 360 and south and west of Lake Austin, Dellana, and upper Williamson Creek watersheds. Commercial centers would be preferred for major intersections. Industrial use would be concentrated on Ben White and Ed Bluestein near FM 1325. If the first and second priorities were met, less annexation would be necessary.	Annexation in these areas may encourage or facilitate growth in environmentally sensitive areas specifically west toward Lake Travis. Annexation would also be pursued aggressively north and south along IH-35. Most new growth would be residential.	Land-use distribution would likely expand for all uses, with the greatest proportion of expansion in residential and commercial uses.	Would encourage development along major right-of-ways. Neighborhood residential developments would also be encouraged.
Density	Density increases would be encouraged by policies outlined above. Outlying developments would be planned at (at least) moderate densities in contiguous form.	Increased annexation in these areas may preclude efforts to increase density in fully developed areas.	As services are extended to newly annexed areas, incentives for high density developments may diminish. Strict land-use controls could avoid this.	Little or no effect.
Neighborhood Preservation	Neighborhood "character" could be preserved through zoning and building standards applied to annexed areas. Downtown area would be of highest priority in preservation efforts; older neighborhoods, second in priority.	Same as left column.	N/A.	Neighborhoods could be preserved by identification with "local commercial areas along strip-annexed routes. However, strip annexation could divide formally single neighborhoods as development increases.
<u>Transportation</u>				
Citywide Auto Traffic Patterns				
Location	Corridor development along IH-35 expected.	Growth in north, northwest, and southwest.	Growth in north, northwest, southwest, and southeast.	Little growth encouragement would result in multinucleated city.
Volume	The result will be an increase in volume along IH-35. Central city congestion will intensify as it feeds into the highway.	Central business district congestion. Hwys North IH-35, NW 183, and SW 290 face volume increases.	Severe increase in road use in NW CBD congestion	Increase in use of all roads, especially east/west travel.

	COMPREHENSIVE PLAN (continued)	GROWTH AREAS (continued)	MAXIMUM ANNEXATION (continued)	STRIP ANNEXATION (continued)
Auto Service Level	Poor level of service in CBD. Failing level along IH-35.	Poor level, with severe congestion and im- peded travel along N IH-35, SW 183, and SW 290.	Failing level for N IH-35, NW 183, SW 290, FM 1825, and Bergstrom area.	Uncontrolled growth to spread in less dense manner. All roads to share burden.
Transit Pattern	Corridor develop- ment will necessitate intensified N-S routes. Bus lanes on IH-35 needed.	Bus travel to access NW neighborhoods. Park and ride needed.	Much cross town travel in all directions.	Transit ser- vice to serve more locations as many pop- ulation en- claves sur- round city.
Transit Level of Service	More routes to serve corridor area.	More interneighborhood hood routes.	Interneighborhood and CBD pattern.	Multi- directional bus service.
Frequency of Service	Increased because travel will be un- directional.	Moderate drop in frequency due to in- creased neighborhoods transit must serve.	Decreased due to multiple places transit must serve.	Serious de- crease due to great number of places transit must serve.
Other Services	Commuter rail en- couraged due to north/ south nature of de- velopment.	Little specific en- couragement. Possible inducement of bus lanes and downtown trolleys.	Little specific encouragement. Possible inducement of car pooling.	Little.
Utility of Mass Transit to Auto/Parking	Very high due to con- gested nature of IH-35.	High in downtown area.	High in downtown area.	High in down- town area.

ZONING POLICY OPTIONS

DEPENDENT VARIABLE	CURRENT ZONING ORDINANCE	PROPOSED ZONING ORDINANCE
<u>Economic</u> Population	Population will increase at annual rate of 2.78 percent between 1980 and 2010.	Population will increase. Rate of increase may not be as great as estimated.
City Revenues	Revenue will increase as tax base increases.	1. City concludes there will be no impact on property tax base. 2. Value of land per acre may increase. 3. In worst-case scenario, City would lose \$232,000 and \$250,000 of anticipated revenue in 1985-86 and 1986-87 respectively.
Expenditures	Expenditures will remain the same.	1. Will cost \$748,796 from FY 82-83 to FY 86-87 in general fund revenues to enforce ordinances. 2. If fee for site plan review is increased \$110 to \$160, will cost \$632,974 to implement ordinance from FY 82-83 to FY 86-87.
Business Starts and Employment	No effect.	No effect.
<u>Infrastructure</u>		
Water/Wastewater Rates	No effect.	No effect.
Water Pressure	Can contribute to water pressure problems when unexpected development occurs due to unpredictability of cumulative zoning.	Water pressure improved a small degree in local area due to improved planning ability through elimination of cumulative zoning.
Water/Wastewater Plant Capacity	No effect.	No effect.
Water/Wastewater Transmission Capacity	Difficulty in planning capacity for local needs.	Water/wastewater transmission mains easier to plan following elimination of cumulative zoning. Capacity installed with more certainty of meeting local demand.
<u>Environment</u>		
Change in Development/ Change in Floodplain	Floodplain not addressed. Defers to existing creek ordinance and floodplain provisions of amended City Building Code, 1975. These prohibit building inside 25-year floodplain, allow no residential construction below one foot above 100-year levels when suitable flood-proofing techniques used. Cumulative zoning makes predicting patterns of growth and its consequences for floodplains difficult; hard to consistently enforce other ordinances.	Creek and floodplain provisions still apply; however, Director of Dept. of Public Works may approve nonresidential construction permits in 100-year floodplain if does not contribute to flooding potential of site or other sites in watershed. Noncumulative zoning should make growth patterns more predictable. Facilitates ordinance enforcement and mitigates further floodplain encroachment. Could make variances harder to obtain.

	CURRENT ZONING (continued)	PROPOSED ZONING (continued)
Water Quality	Not addressed. Defers to creek and watershed ordinances, Texas Water Quality Standards, Federal EPA Standards.	
Predicted Increase in Industrial Pumpage	Not directly applicable; will affect location of industry rather than amount.	N/A.
Environmentally Sensitive Areas	Special permit in some sensitive areas required for all uses, review by Parks and Recreational Department (PARC) and environmental Board, granted by council	Generally allows larger lots, lower density in environmentally sensitive areas. Lake Austin District sets uniform requirements for lots within 1000 feet. Downtown creeks, downtown parks, and Town Lake zones limit building height and building materials.
Distribution	Cumulative zoning - uses allowed in one district also allowed in less restrictive district. Increase in mixed and incompatible uses adjacent to one another, e.g., multifamily developments next to offices or retail businesses. More options available for developing nonsingle-family residential parcels of land.	Noncumulative zoning: each district permitted certain uses independent of what uses allowed in other categories. Conditional uses also delineated for each category. More predictability in overall land use. Fewer incidences of incompatibility uses adjacent to one another. Increase in variety of uses throughout the city due to more zoning districts. Options for development on individual parcels of land limited.
Proportion of Impervious Cover	Proportion of impervious cover greater under current ordinance. This applies to all areas except those protected by Lake Austin Watershed Ord., Williamson Creek Watershed Ord., and Lake Austin Peninsula Ord. These ordinances restrict impervious cover. Increase in runoff.	Although amount of impervious cover will increase due to growth of city, overall amount proportionately less under proposed zoning ordinance. New ordinance limits impervious cover in most zoning districts. Increase in runoff but proportionately less than predicted under current ordinance.
Density	Overall density increases. Higher density of mixed and incompatible uses throughout city, e.g., condominiums adjacent to office or general retail. More residential development outside city core. Interim zones with high-density or single-family residences.	Overall density increases. Increased density of mixed uses in DBD may increase density of commercial and office uses. Density of certain uses in some districts declines due to noncumulative aspect, e.g., multifamily developments now restricted to multifamily districts. May result in overall reduction of high-density multifamily developed areas. Development reserve district serves as interim district. Limits density to one dwelling unit per 10 acres.

	CURRENT ZONING (continued)	PROPOSED ZONING (continued)
Neighborhood Preservation	Increase incidences of spot zoning, which undermine stability of existing neighborhoods. Less predictability of uses in and around neighborhoods. Increase in suburban development.	Increase in neighborhood preservation due to non-cumulative aspect. Requirements for site plan reviews for multifamily uses as well as for SF-4, SF-5, SF-6 districts. This ensures compatibility of uses. Addition of buffer districts and requirements where setback and height restrictions for multifamily, commercial, and industrial uses next to residential areas are more strict.
<u>Transportation</u>		
Citywide Auto Traffic Patter		
Location	Use of roadways will be less predictable.	Roadways may be better able to accommodate development and density centers.
Volume	Because mass transit will not be able to serve many people, auto traffic will increase.	Volume of auto traffic may decrease some since mass transit may be used by more people.
Level of Service	Volume to capacity less predictable and generally higher, indicating greater chance of congestion; level of service will decrease.	Traffic volume to road capacity more predictable enabling better planning for road construction; level of service may increase.
Citywide Mass Auto Transit Patterns		
Location	Development will be less predictable, and mass transit will be less able to accommodate potential users.	All development will be more predictable enabling better planning and use of mass transit.
Level of Service and Number of Routes	Can not really be determined; may follow development.	May precede or accompany growth and may increase to accommodate planned growth.
Frequency of Service	May decrease since it may follow development.	May increase as bus lanes and mass transit provisions can be incorporated into planning process for development.
Other Service	Less amenable to other types of service, such as light rail.	More amenable to in-place systems, such as light rail.
Utility of Mass Transit to Auto/Parking	Utility may decrease as developments may be more dispersed.	Better utility as system can be designed for high-density and centralized development. Requirement for continued parking downtown makes auto travel more desirable. Use of transit system may decrease because drivers have available parking.

DEPENDENT VARIABLE	FINANCING INFRASTRUCTURE - WATER & WASTEWATER OPTIONS			
	NO CAPITAL RECOVERY FEE	CURRENT FEE STRUCTURE	FULL RECOVERY FEE	
<u>Economic</u>				
Population	Population will increase regardless of how new service is financed.			
City Revenues	Same as with current structure (at right).	Utility revenue fund increases because of rate hikes needed to cover capital costs. Amount of bonds approved and sold will determine how high fees are.	Water/wastewater capital account increases. Ordinance likely to require that proceeds go toward utility expansion.	
City Expenditures	Revenues from rates and possible money from general fund used to cover bond debts.	Rate revenues combined with fee to cover bond debts.	Ordinance requires proceeds go toward expansion. No subsidy from general fund since total costs recouped.	
Business Starts and Employment	Business will be located in and around Austin regardless of how new service is financed.			
<u>Infrastructure</u>				
Water/Wastewater Rates	Rate increases:			
	1982-83	0.55 percent	1982-83 8.4 percent	No need to increase to finance new service.
	1983-84	7.52 percent	1983-84 0.0 percent	
	1984-85	14.50 percent	1984-85 7.94 percent	
Water Pressure	Not directly related to service extension and cannot be financed with recovery fee revenues. Voters likely to approve separate bonds since convenience and safety are involved.			
Water/Wastewater Plant Capacity and Water/Wastewater Transmission Capacity	Bonds needed for expansion but voters unreceptive because benefits not direct. More MUDs formed to address development needs.	Presently covers less than 1/3 of expansion costs. Bonds still required to finance new service.	New service pays for itself. Capacities keep up with growth. City maintains development control.	
<u>Environmental</u>				
Change in Development/ Change in Floodplain	No effect.	No effect.	No effect.	
Application of Environmental Ordinances	No effect.	No effect.	No effect.	
Water Quality	Water quality problems associated with sewage discharge will be occurring at the current rate.	Both fee structures have the capability of improving water quality by stimulating use of sanitary sewer instead of septic tanks in subdivisions. Also easier financing of public treatment plants would improve their quality and prevent overload. The more cost recovered, the more improvement in water quality.		
Predicted Increase Industrial Pumpage	No effect.	No effect.	No effect.	

	NO CAPITAL FEE (continued)	CURRENT FEE (continued)	FULL RECOVERY FEE (continued)
Effect on Environmentally Sensitive Areas	Provides no protection to environmentally sensitive areas.	Limited protection for environmentally sensitive areas.	If fee structure is designed to direct location of growth, environmentally sensitive areas could more easily be protected.
<u>Land Use</u>			
Distribution	Growth occurs wherever builders want to develop.	Fees not structured to discourage or encourage specific growth pattern.	Possible for fee structure to be designed so that City could encourage growth in desirable areas.
Proportion of Impervious Cover	N/A.	N/A.	N/A.
Density	City loses some developmental control if voters do not approve bonds since developers will opt for MUD functions because City cannot extend new service at will.		City maintains more control over development with its leverage from total authority over new service extensions.

FINANCING INFRASTRUCTURE - TRANSPORTATION OPTIONS

DEPENDENT VARIABLE	CURRENT TRANSIT FARE STRUCTURE	DIFFERENTIAL TRANSIT STRUCTURE	INDEPENDENT TRANSIT AUTHORITY
<u>Economic</u>			
Population	SMSA - current: 700,000 SMSA - year 2000: 1,000,000	SMSA - current: 700,000 SMSA-year 2000: 1,000,000	SMSA - current:700,000 SMSA - year 2000: 1,000,000.
City Revenues	Current funding sources 33 percent - Fares 52 percent - General fund 15 percent - Federal grants	A large proportion of funding will come from fares. Smaller proportions will come from general fund and federal grants.	City general fund portion going to the Transportation Department. Budget could be used for other services because revenues would be raised by sales tax.
City Expenditures	Will rise as operating costs and demand rises.	Will rise as operating costs and demand rises.	Will rise as operating costs and demand rises.
Business Starts and Employment	The current method of financing mass transit is not a significant factor in the incidence of business starts in Austin.	Same as under the current transit fare option.	If an MTA (mass transit authority) resulted in an effective mass transit system, it might encourage business owners to locate in Austin.
<u>Infrastructure</u>			
	No effect.	No effect.	No effect.
<u>Environment</u>			
Change in Development/ Change in Floodplain	No effect.	No effect.	No effect.
Applicability of Environmental Ordinances	No effect.	No effect.	No effect.
Water Quality	Heavy metals in runoff will continue to increase and rise at current rate	Heavy metal deposition and in runoff could continue to rise at almost the current rate.	With increased mass transit and decreased auto use, fewer heavy metals will be deposited and, therefore, fewer will be in the runoff.
Predicted Increase in Industrial Pumpage	No effect.	No effect.	No effect.
Effect on Environmentally Sensitive Areas	Because development will not be influenced to locate near a transit route, more environmentally sensitive areas may be developed since more area overall will be developed.	Because development will not necessarily locate on transit routes, the probability development negatively affecting environmentally sensitive areas will increase.	As an MTA becomes a useful and viable network for transit, denser development will be less likely to affect as many areas.
<u>Land Use</u>			
Distribution	Many single-family houses will be built, and little consideration will be given to increasing density to live nearer mass transit.	If bus routes are increased, people may elect to live in denser developments to be nearer to a transit route.	Distribution of houses should become denser as it becomes advantageous to live and work nearer to a transit route.

	CURRENT FARE (continued)	DIFFERENTIAL (continued)	TRANSIT AUTHORITY (continued)
Proportion of Impervious Cover	At a minimum, the Roadway Plan will be implemented. Impervious cover will increase due to urban and suburban development.	Impervious cover will increase, and if there is any decrease in roadways due to this policy, it may not be noticeable as such.	Roadway Plan will be implemented, but other road expansions may not be necessary as ridership of transit increases. Rail lines may increase, but overall impervious cover may decrease.
Density	Many single-family houses will be built, and little consideration will be given to increasing density to live nearer mass transit	If bus routes are increased, people may elect to live in denser developments to be nearer to a transit route.	Distribution of houses should become denser as it becomes advantageous to live and work nearer to a transit route.
Neighborhood Perservation	No effect.	Discourage residence in high-cost areas.	No effect.
<u>Transportation</u>			
Citywide Auto Traffic Patterns			
Location	All roads and especially feeder roads to the CBD will become more congested.	Roads will become more congested.	Roadways can be designed to serve fewer cars since mass transit will provide for more riders.
Level of Service	Traffic volume to capacity will increase and level of service will decrease; roads will become more congested geometrically.	Roads will become more congested but may be better than under current fare options.	Level of service will increase as fewer people use the roads and instead take transit.
Volume	Volume of auto traffic will increase proportionally to population increase.	Volume of auto traffic will increase almost proportionally to population.	Volume of auto traffic, especially commuter, should decrease as more people use mass transit.
Citywide Mass Transit Patterns			
Location	No noticeable effect although some newer areas of Austin may be served by bus to accommodate increased population.	Routes may be expanded to meet needs of those living further from the city.	Routes will probably be expanded to serve outlying areas as well as provide more coverage of inner city areas.
Level of Service and Number of Routes	A few more routes may be added as city expands or as need is indicated.	Number of routes could increase.	Number of routes will increase a great amount.
Frequency of Service	If demand increases, frequency of service may increase a few routes; frequency of service may decrease if number of routes increases and number of buses remains the same.	Frequency of service could expand if greater need and greater funds provided more buses.	Frequency of service can be increased to serve more riders at more convenient intervals and for more hours of the day.

	CURRENT FARE (continued)	DIFFERENTIAL (continued)	TRANSIT AUTHORITY (continued)
Type of Service	Current system would remain in place with little room for change or expansion. Light rail is unlikely. Greater use of car pools, van pools, or small or company buses may occur.	Other types of service, such as light rail, are not likely under this option.	With the higher tax in place, funds for alternative service, such as light rail or commuter rail, will be available. This becomes a viable option.
Utility of Mass Transit to Auto/Parking	Utility of mass transit will decrease as roads become more congested and buses along with cars must travel more slowly.	Utility could be slightly better than under previous option if routes and service were expanded and more people took the bus.	Utility of mass transit service should be increased as system design improves and service expands to meet more needs.

3. ENVIRONMENTAL POLICY OPTIONS

3.1 DESCRIPTION OF POLICY OPTIONS

Policies that the City can adopt in order to affect Austin's environment range from strict environmental control to little or no environmental control. Out of this range, we have chosen to examine four that represent politically feasible options. An explanation of each of the policies follows:

1. ENFORCEMENT OF WATERSHED ORDINANCES AND LIMITS ON IMPERVIOUS COVER. This policy would limit development in the vital watersheds of Austin, including Barton Creek, Walnut Creek, Williamson Creek, and numerous others, by extending ordinances similar to the existing watershed ordinances to the other watersheds in the Austin area and fully enforcing the existing ordinances. New developments would be limited in the amount of ground area that could be covered by impervious materials.
2. CITY PURCHASE/DEDICATION OF SENSITIVE AREAS. Land would be purchased by the City in the floodplains. By obtaining complete control over the land, the City could prevent uses that may be unfavorable to the environment. The City could also buy special ecological areas. Developers and landowners could be required by the City to dedicate a certain percentage of land for the maintenance of parks and greenbelts. The total amount of acreage affected by this option would be rather small. Under both programs, land acquired by the City would contribute to the city's beauty as well as its ability to manage the floodplain.
3. UNCONSTRAINED GROWTH. The corridor concept as outlined by the Austin Tomorrow Comprehensive Plan would be eschewed in favor of development in the high-market areas of Austin. These areas are often the same ones which possess the greatest degree of environmental sensitivity.
4. LIBERAL EXCEPTION POLICY TO ORDINANCES. Under a policy of liberally granting exceptions to ordinances, the original policy intent could be lost or diluted, forcing the City to respond to short-term needs rather than directing growth under a longer-term plan.

The first two options provide incentives for people to locate outside the city itself, giving the economic benefits of growth to the counties.

An aggressive annexation policy could reduce this effect, however, by subjecting larger areas to stricter environmental controls and at the same time retaining new revenues generated by growth. While the latter two options provide more short-term benefits and also decrease the City's need to enforce difficult environmental ordinances, their long-term effect may be less salutary because they may undermine the very factors that bring people to the city in the first place, such as the quality of life and the ability to travel around the city easily.

3.2 POLICY ASSUMPTIONS

The builders of any scenario must adopt a set of assumptions about factors exogenous to the study as well as about cause-and-effect relations of proposed actions. They do this to limit the number of variables they must consider and to highlight the effects of most interest.

For all of the options considered in this chapter, project participants have assumed that the extent of environmental control will have no effect on the number of people moving to the Austin area SMSA. The distribution, concentration, and density of development will certainly be affected, however.

A second assumption is that although development will be directed into the "preferred growth corridor" under options one and two, more stringent environmental controls will result in the location of industry and housing outside the city. Industry is likely to locate at the ends of the corridor. In contrast, less stringent environmental controls are assumed to result in a random growth pattern throughout the city, particularly in the environmentally sensitive areas.

3.3 EFFECTS ON DEPENDENT VARIABLES OF POLICY OPTION I: ENFORCEMENT OF WATERSHED ORDINANCES AND LIMITATION ON IMPERVIOUS COVER

3.3.1 Economic Variables

POPULATION. No change in population projections is attributable to this policy option, although development patterns and populations of particular political jurisdictions may be affected.

CITY REVENUES. Enforcement of the existing watershed ordinances and their possible extension to include all watersheds would probably encourage development to occur outside the city limits (depending upon annexation policies). Extension of services to outlying areas could be more costly, whether within or outside the city limits. As a result, city expenditures for service provision are likely to exceed the revenues that can be generated through utility rates and property taxes. Slower growth in revenues could occur if new development locates outside the city limits, thus escaping property taxes. Some loss of revenues may occur in watershed areas, which could be compensated by growth in other areas. Whether this will result in a net gain or loss in revenues cannot be determined unless development patterns within and outside the city and annexation policies are known.

CITY EXPENDITURES. Expenditures would increase because the City would provide more services to the growth areas outside the sensitive watersheds.

BUSINESS STARTS AND EMPLOYMENT; REGIONAL REVENUE CAPACITY. Residential and business development might take place outside the city, which would result in less property tax revenue for Austin but increased revenue capacity for the other cities and counties.

3.3.2 Infrastructure Variables

WATER AND WASTEWATER RATES AND CAPACITY. This city option would have a wide range of effects on the infrastructure variables. The most noticeable of these effects is in water and wastewater, for the reasons outlined in the matrix. There is a good possibility that this policy option could result in reduced rates, although they are not, currently, excessively high. The Water and Wastewater Master Plan for the City of Austin states that the rates charged are not adequate to meet the capital costs, providing 83 percent of the capital needed.²⁷ Raising rates too much might induce potential purchasers of city water to turn to alternate service providers, such as the Lower Colorado River Authority.

This policy option should have little effect on either plant or transmission capacity. Improvements need to be made regardless of the policy option chosen because of the growth forecast for the Austin area. City actions will not circumscribe the growth. Many parts of the water and wastewater system are clearly inadequate now.²⁸

3.3.3 Environmental Variables

CHANGE IN DEVELOPMENT AND FLOODPLAINS. If the City of Austin enforces the watershed ordinances, development and growth patterns will follow the restrictions outlined for each watershed. Since each of the three watershed ordinances established restrictions based on the unique characteristics of the area (e.g., soils, geology), no uniform criteria exist for all watersheds as a whole. Instead, the Barton Creek Watershed Ordinance defines five water quality zones as the basis for restricting certain types of development. The Lake Austin Watershed Ordinance relies on slope categories to define levels of development intensity, while the Williamson Creek Watershed Ordinance bases restrictions on the drainage area size. In addition, standards

regarding slope, density, and impervious cover vary with each ordinance. Table 3 contains a comparison of these development restrictions for each ordinance.²⁹

WATER QUALITY. The relationship between these development restrictions ultimately determines the water quality of Austin's creeks. For example, the quality and quantity of stormwater runoff is determined by watershed development conditions.³⁰ These development conditions include the percentage of land covered by impervious materials and land-use density levels, which in turn contribute to the pollutant runoff loads in the creeks following rainfall (see Figure 1).³¹ Therefore, the development criteria established in each ordinance to protect slope, density, and impervious cover standards must ensure that environmental controls in each watershed are effectively implemented. This implementation is not always easy to achieve, as the ordinances themselves demonstrate.

First, the Barton Creek Watershed Ordinance relies on water quality zones to manage development with no attention to the effect that polluted tributaries can have on major waterways. While the critical water quality zones protect the creek bed and its 90 percent contribution to aquifer recharge, the Edwards Aquifer Overlay Zone as shown in the Austin Tomorrow Comprehensive Plan (ATCP) does not cover the entire Edwards Aquifer Recharge Zone.³² This could lead to adverse development on the recharge area that is completely in compliance with zone restrictions.

Second, the Williamson Creek Watershed Ordinance only creates critical water zones for natural waterways, neglecting the impact that man-made channels can have on aquifer recharge.³³ Also, the water quality monitoring systems suggested in the ordinances have not been

TABLE 3. COMPARISON OF DEVELOPMENT RESTRICTIONS IN WATERSHED ORDINANCES

REQUIREMENTS	LAKE AUSTIN WATERSHED ORDINANCE	LAKE AUSTIN PENINSULA ORDINANCE	BARTON CREEK WATERSHED ORDINANCE	WILLIAMSON CREEK WATERSHED ORDINANCE
Watershed Units				
Water Quality Zones	<ul style="list-style-type: none"> No special zones except for 25-year and 100-year floodplains. 	<ul style="list-style-type: none"> Same as LAO. 	<ul style="list-style-type: none"> Major Waterways: channels that discharge directly into Barton Creek and that drain 500 acres or more. Minor Waterways: channels that drain 60 acres or more. Critical Water Quality Zone: lands within 400 feet of the centerline of Barton Creek or within 200 feet of the centerline of a major tributary. Does not include any land beyond the crest of a bluff. Lowlands Zone: lands within 300 feet of the outer limit of the Critical Water Quality Zone. Edwards Aquifer Overlay Zone: all lands not included in Critical or Lowland Zones, and that is located over the Edwards Aquifer recharge zone(?). Uplands Zone: all lands within the Barton Creek Watershed not included in the Critical, Lowlands, or Overlay Zones. Minor Tributary Protection Zone: lands within 150 feet of a minor tributary for the first 1500 feet from the centerline of Barton Creek, and land within 100 feet of that same tributary for the next 1000 feet. 	<ul style="list-style-type: none"> Major Waterway: natural channels that drain 640 acres or more. Intermediate Waterway: natural channels that drain between 320 and 640 acres. Minor Waterway: natural channels that drain between 64 and 320 acres. Critical Water Quality Zone: <ol style="list-style-type: none"> For minor waterways, the zone is defined by the 100-year floodplain, with a maximum width of 100 feet on either side of the centerline of the waterway. For intermediate waterways, the 100-year floodplain also applies, but the zone has a maximum width of 200 feet and a minimum width of 100 feet from the centerline of the waterway. For major waterways, the 100-year floodplain also applies, but the zone has a maximum width of 400 feet and a minimum width of 200 feet. Commercial Buffer Zone (and multifamily development): lands within 70 feet of the outer limit of the Critical Water Quality Zone of a major waterway, and within 100 feet of the outer limit of the Critical Zone of an intermediate waterway.
Development Restrictions	<ul style="list-style-type: none"> Prohibits an adequate building site from including land within the 100-year floodplain of any creek or tributary (or land with slopes of 35% easements, etc.) 	<ul style="list-style-type: none"> Same as LAO. 	<ul style="list-style-type: none"> Maximum development intensities are enumerated for each water quality zone. In the Critical Water Quality Zone and Minor Tributary Protection Zone, only collector street crossings and utilities which can not be reasonably located elsewhere are allowed (along with parks and open spaces). Land may serve as a subdivision lot or a portion of a subdivision lot if in the Critical Zone the City does not acquire such land, provided the development activities abide by the ordinance restrictions. In the Lowland Zone, the above activities are allowed along with development of streets, drainage facilities, fences, and single-family housing of prescribed density. In the Edwards Overlay Zone, allowed uses include alternative urban streets, necessary drainage facilities and utilities, single-family residential units of prescribed density and commercial and non-commercial development within specified limits. 	<ul style="list-style-type: none"> The Critical Water Quality Zones shall remain free of all development and alteration with the following exceptions: <ol style="list-style-type: none"> Major waterways may be crossed by specified arterial streets only as specified by the Austin Roadway Plan. Intermediate waterways may be crossed by arterial and collector streets with no collector crossing within 1 mile of another collector or arterial on the same waterway. Minor waterways may be crossed by arterial and collector streets with no collector street crossing within 2000 feet of another collector or arterial street crossing on the same waterway. Specified utilities (with setbacks from tributaries), fences that do not obstruct flood flows, parks and open space, and specified water quality detention basins are also permitted. Land may serve as a subdivision lot or a portion of a lot in the Critical Zone, provided that development activities abide by ordinance restrictions.

Table 3 (continued)

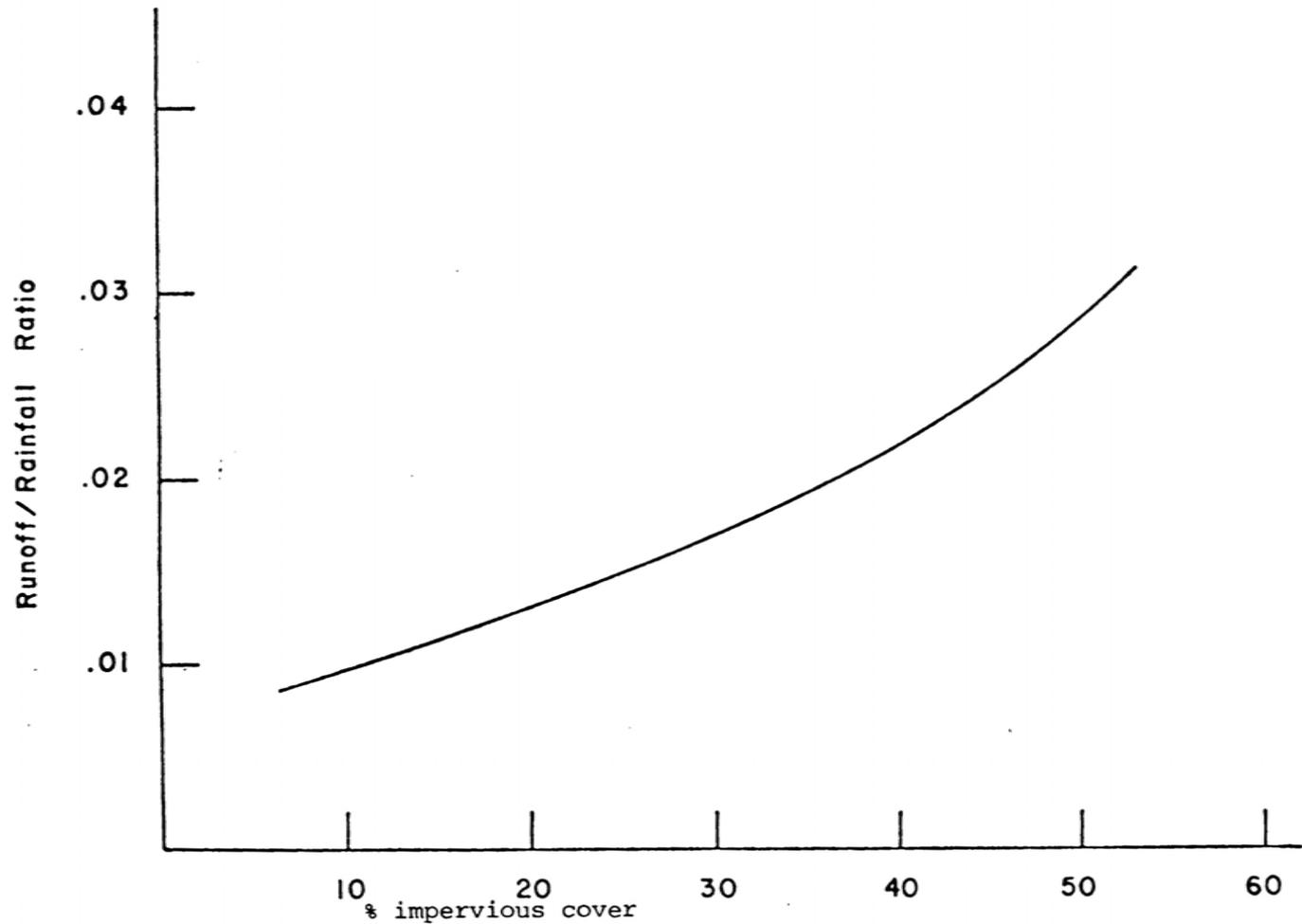
REQUIREMENTS	L.A.W.O.	L.A.P.O.	B.C.W.O.	W.C.W.O.
<p data-bbox="153 320 381 363">Development Restrictions Continued</p> <p data-bbox="126 472 312 533">Development Intensity</p> <p data-bbox="153 555 333 579">Impervious Cover</p> <p data-bbox="153 935 229 959">Density</p>	<ul style="list-style-type: none"> • For slopes 0-15%, impervious cover is limited to 30% or less. • For slopes 15-25%, impervious cover is limited to 20% or less. • For slopes 25%, impervious cover is limited to 10% or less. • Transfers of impervious cover are allowed from steeper slopes to 0-15% slopes, up to a maximum of 40% impervious cover for subdivisions and 80% for commercial site developments. • Impervious cover restrictions are waived with the use of alternative methods. <p data-bbox="410 935 547 959">• Not applicable.</p>	<p data-bbox="795 560 940 584">• Same as LMO-41.</p> <ul style="list-style-type: none"> • 1-acre minimum size for lots using septic tanks or other individual waste disposal systems. • Maximum 1-acre gross average lot size for subdivisions utilizing collective sewer systems, provided that the subdivision is developed pursuant to the "P.U.D." process. If not developed as a P.U.D., the minimum lot size for each subdivision is 1 acre. • Minimum lot width of 125 feet. 	<ul style="list-style-type: none"> • In the Uplands Zone, allowed activities include those allowed in the Critical and Lowland Zones and single-family units of specified density. Within prescribed limits, commercial, non-residential, and other residential development is allowed. • Impervious cover restrictions applicable only to commercial and other non-residential development and residential development other than single-family units. • Such development is allowed in Edwards Overlay Zone if the proposed cover on the site does not exceed 35% and if the average slope does not exceed 15%. • In the Uplands, developments other than single-family units may not have impervious cover in excess of 35%. However, the BMO allows non-single-family development a maximum of 45% impervious cover if development rights are transferred. • Density limits vary with the location of the development. • In the Lowlands Zone, single-family housing may be developed at a density of 1 unit per 3 acres with a minimum lot size of 2 acres. • Each lot or a portion of a lot located partially within the Lowlands Zone and Critical Water Quality Zone shall have at least 2 acres in the Lowlands Zone. • In the Edwards Overlay Zone, single-family housing may be developed at an average density of 1 unit per 3 acres with a minimum lot size of 1 acre. • In the Upland Zone, single-family housing may be developed at an average density of 1 unit or less per 2 acres with a minimum lot size of 3/4 acre. If cluster housing is used, and at least 40% of tract must be left undisturbed and contiguous, then, the average density may be 1 unit per 1 1/4 acres. 	<ul style="list-style-type: none"> • Single and two-family housing development is limited to 40% impervious cover. • Legal lots used for commercial development in Commercial Buffer Zone are limited to 40% impervious cover. • Impervious cover for commercial development may not exceed 65% on slopes, with a gradient of 10-20%, nor may the cover exceed 25% on slopes steeper than 20% gradient. • No multifamily residential development may exceed 65% impervious cover on slopes of 0-20% gradient, nor 25% on slopes greater than 20% gradient. <p data-bbox="1562 935 1699 959">• Not applicable.</p>

REQUIREMENTS	L.A.W.O.	L.A.P.O.	B.C.W.D.	W.C.W.O.
Slope	<ul style="list-style-type: none"> No <u>designation</u> of building sites on slopes greater than 30% gradient. Building foundations on slopes greater than 15% must utilize design and construction practices acceptable to the civil engineering profession. 	<ul style="list-style-type: none"> No <u>construction</u> on slopes greater than 35% gradient. Same as L.A.W.O. 	<ul style="list-style-type: none"> No construction on slopes greater than 35% gradient. In the Edwards Recharge Zone, non-single-family development is prohibited on sites with an average slope steeper than 15%. Bluff: No development of any kind can take place within 50 feet of the crest of a bluff. 	<ul style="list-style-type: none"> Exceptions are allowed for the required swale design flow velocities or depths on lands with greater than 15% slope or less than 2% slope.
Land Alteration and Water Quality Control Clearing Vegetation	<ul style="list-style-type: none"> No clearing is permitted prior to final plat approval except for minimal surveying and testing purposes. Roadway clearing may not exceed twice the roadway surface width or the width of dedicated right-of-way, whichever is less. Clearing for short-run road construction problem areas (not to exceed 300 feet) may be increased to 2.5 times the roadway width, right-of-way permitting. Existing vegetation should be left in place or replaced by a better grade. The natural and traditional character of the land should be maintained. 	<ul style="list-style-type: none"> Same as L.A.W.O. 	<ul style="list-style-type: none"> No filling or clearing within the 100-year floodplain except for plowback areas. No more than 85% of the land shall be cleared in the Upland Zone. No more than 85% of the 60% developable area for commercial developments shall be cleared in the Upland Zone. No clearcutting before final plat approval. No clearing within 50 feet of a bluff crest. 	<ul style="list-style-type: none"> Same as L.A.W.O. Vegetation within the Critical Water Quality Zone may not be disturbed except by certain development activities.
Erosion Control and Construction Sequencing	<ul style="list-style-type: none"> Applications for site development must have: <ol style="list-style-type: none"> construction sequence for erosion prevention; grading and sedimentation control plan; temporary and permanent erosion control plan. 	<ul style="list-style-type: none"> Same as L.A.W.O. 	<ul style="list-style-type: none"> All plats must have a final erosion and sedimentation control plan and restoration plan. All developments must submit control plans and construction sequences. This must include a list of temporary erosion controls, their maintenance and restoration tactics. 	<ul style="list-style-type: none"> Developments which require grading of land shall comply with the soil construction service manual, <u>Erosion and Sedimentation Control Guidelines for Developing Areas in Texas</u>. Must submit erosion and sedimentation control plan.
Drainage	<ul style="list-style-type: none"> Developments must not cause any significant adverse effects on drainage. Drainage plans must comply with guidelines contained in the <u>Austin Drainage Criteria Manual</u>. 	<ul style="list-style-type: none"> Same as L.A.W.O. 	<ul style="list-style-type: none"> Generally the same as L.A.W.O. Special requirements include: <ol style="list-style-type: none"> Final plat must contain a detailed drainage plan and street layout that will guarantee proper drainage. Streets should be avoided for drainage wherever practical and overland flow maximized. At least 300 feet of natural drainage between any storm sewer outlet and Barton Creek or any of its major tributaries. 	<ul style="list-style-type: none"> Generally the same as L.A.W.O. Special requirements include: <ol style="list-style-type: none"> Final plat must contain a detailed drainage plan. Streets and rights-of-way should be avoided as the central drainage network. Natural overland flow should be maximized. Where natural and constructed drainage channels are altered, specific engineering design requirements must be met.

FIGURE 1

PERCENTAGE IMPERVIOUS COVER

Average Runoff/Rainfall Ratio per Rainfall Storm
in Terms of Watershed Imperviousness for Austin
Area Creeks (proposed to be used for Water Quality
Computation only)



Source: City of Austin, Stormwater Quality Modeling Study for Austin Creeks
(Austin, 1983).

implemented, and postdevelopment inspection programs are not being utilized to document and ultimately avoid environmental degradation.

Finally, the legal constraints associated with enforcing regulations within a watershed outside the city limits must be resolved before the watershed ordinances become functional policy tools for managing growth. Since most of the watershed area discussed is located in ATCP Growth Areas IV and V, city action to upgrade and uphold the watershed ordinances must be quick and authoritative. In addition, water quality sampling measures should become more frequent and stringent to ensure compliance.

3.3.4 Transportation Variables

AUTOMOBILE TRAFFIC PATTERNS. This policy option will also have major effects on housing/industrial location and thus on traffic patterns. By restricting development in the sensitive watersheds, higher-density development can be expected in areas in the preferred growth corridor north and south, in areas to the east, and in north Hays and south Williamson counties. Limiting impervious cover will restrict density within the corridor, however, thereby further extending the northern and southern ends. A conservative estimate for the population increase in south Williamson County is from 48,000 in 1983 to 100,000 in 1990 with over 60,000 people commuting to Austin. Roads heavily affected by the commuting include IH-35, U.S. 183, FM 620, FM 1325, and McNeil Road. With traffic entering the city from outer regions along with higher in-corridor use, many major roadways will approach capacity and exceed it during peak travel hours (see Table 4).

MASS TRANSIT PATTERNS. Extending the reaches of the corridor and greater development in the east will necessitate creation of new bus routes to serve these areas. Higher-density development in the north-

Table 4: Planned Roadway Capacity

ROADWAY	LIMITS		ROADWAY PLAN CAPACITY	VOLUMES	
				HIGH	AVERAGE
IH-35	Travis Co. Line	---Howard Ln.	97,000	86,770	75,450
	Howard Ln.	---U.S. Hwy. 183	97,000	90,340	83,750
	U.S. Hwy. 183	---U.S. Hwy. 290	133,000	153,690	144,810
	U.S. Hwy. 290	---Airport Blvd.	169,000	166,760	162,090
	Airport Blvd.	---Colorado River	169,000	163,970	150,276
	Colorado River	---Ben White Blvd.	133,000	147,320	121,604
	Ben White Blvd.	---Travis Co. Line	133,000	123,220	83,372
U.S. HWY. 183	FM 620	---McNeil Rd.	133,000	112,270	89,930
	McNeil Rd.	---Loop 360	169,000	168,340	148,500
	Loop 360	---IH-35	169,000	179,200	134,800
	IH-35	---FM 969	169,000	117,960	104,960
	FM 969	---State Hwy. 71	133,000	86,000	57,550
	State Hwy. 71	---FM 620	90,000	29,290	20,200
U.S. HWY. 290	FM 1826	---Ben White Blvd.	**	68,100	36,300
	Ben White Blvd.	---IH-35	133,000	48,950	44,800
	IH-35	---U.S. Hwy. 183	97,000	72,340	67,100
	U.S. Hwy. 183	---FM 973	60,000	42,320	22,900
STATE HWY. 71	IH-35	---U.S. Hwy. 183	133,000	44,000	39,200
	U.S. Hwy. 183	---IH-35	133,000	53,360	37,200
LOOP 1	FM 1325	---U.S. Hwy. 183	**	73,690	58,000
	U.S. Hwy. 183	---Northland Dr.	133,000	124,520	140,720
	Northland Dr.	---Colorado River	108,000	125,390	114,880
	Colorado River	---Loop 360	72,000	124,130	102,230
	Loop 360	---U.S. Hwy. 290	**	65,000	65,000
LOOP 360	FM 1325	---U.S. Hwy. 183	108,000	65,250	55,400
	U.S. Hwy. 183	---Colorado River	72,000	47,420	45,300
	Colorado River	---FM 2244	72,000	47,070	39,840
	FM 2244	---Loop 1	72,000	30,710	27,860
	Loop 1	---Lamar Blvd.	72,000	54,800	54,800
FM 620	IH-35	---U.S. Hwy. 183	42,000	37,260	20,760
	U.S. Hwy. 183	---RM 2222	28,000	19,240	11,730
	RM 2222	---Mansfield Dam	28,000	17,200	15,980
FM 1325	Travis Co. Line	---Loop 1	90,000	73,300	48,400
	Loop 1	---Kramer Ln.	90,000	44,430	40,000
	Kramer Ln.	---U.S. Hwy. 183	90,000	67,400	57,650
RM 2222	RM 620	---Loop 360	34,000	28,640	23,600
	Loop 360	---Balcones Dr.	34,000	33,650	13,240
RM 2244	Gordon Ln.	---Loop 1	34,000	35,620	18,500
ENFIELD/15th ST.	Lake Austin	---Loop 1	20,000	13,220	9,090
	Loop 1	---Lamar Blvd.	20,000	29,200	29,030
	Lamar Blvd.	---Guadalupe St.	34,000	40,170	36,840
	Guadalupe St.	---IH-35	34,000	30,890	22,270
LAMAR BLVD	Ben White Blvd,	---Oltorf St.	42,000	29,740	22,080
	Oltorf St.	---Colorado River	42,000	29,170	27,940
	Colorado River	---15th St.	28,000	42,530	31,030
	15th St.	---Guadalupe St.	24,000	29,050	21,890
	Guadalupe St.	---U.S. Hwy. 183	42,000	53,830	42,780
	U.S. Hwy. 183	---IH-35	42,000	29,230	18,200
WINDSOR/W. 24th ST	Lake Austin	---Loop 1	14,000	11,620	6,700
	Loop 1	---Lamar Blvd.	20,000	28,990	21,760
	Lamar Blvd.	---Guadalupe St.	20,000	23,100	19,660
38th/38 1/2 STS.	Shoal Creek Blvd.	---Lamar Blvd.	24,000	44,750	39,330
	Lamar Blvd.	---Guadalupe St.	24,000	27,400	26,590
	Guadalupe St.	---IH-35	24,000	28,700	20,340
	IH-35	---Airport Blvd.	14,000	20,320	15,905

** Information unavailable.

SOURCE: Compiled by the project based on data from Joe Gieselmann, "Roadways in Austin", unpublished report, Austin, Texas, 1982.

south corridor will require more frequent bus service. It will also discourage auto use because of greater congestion and make conditions more suitable for an extensive mass transit service such as commuter rail.

3.4 EFFECTS ON THE DEPENDENT VARIABLES OF POLICY OPTION 2: CITY PURCHASE/DEDICATION OF ENVIRONMENTALLY SENSITIVE AREAS

3.4.1 Economic Variables

Property tax revenues would be lost for all land purchased by the City. This would result in a small decrease in the rate of growth of property tax revenues. Expenditures would not increase significantly because of the relatively small amount of land purchased. For instance, the 1982 bond package included provisions to purchase the Storm Tract, which includes a city purchase of thirty-nine acres at a cost to the City of \$1.8 million.

Greenbelts, parks, and other city-owned recreational areas and amenities contribute to the maintenance of Austin's unique quality of life. If the City does not continue to provide these amenities, Austin might lose some of its attractiveness to businesses and individuals as a desirable place to locate. This could have adverse effects on the City's economic base.

This policy option actually affects such a small percentage of land that it has little effect upon the economic variables. Economic variables are likely to be affected only to the extent that the City has to raise additional revenue for the purchase of land areas or chooses to reallocate land from other purposes to carry out this policy.

3.4.2 Environmental Variables

Park land acquisition, especially in and around creeks and waterways, remains the most certain way of assuring the protection of environmentally sensitive areas. In 1980, two grant applications were submitted to federal and state agencies for \$1.4 million for Barton Creek greenbelt acquisition.³⁴ The Lake Austin Plan also includes guidelines for park acquisition. While citizen support of bond packages for park land acquisition has been consistently high, the cost involved in such projects usually requires use of alternative methods for protection of sensitive areas, such as annexation and zoning changes.

Should the City of Austin adopt an aggressive land acquisition program, the areas most likely to benefit would include Bull Creek and Barton Creek. As the largest creek flowing into Town Lake, Barton Creek has a major effect on the quality of Austin's drinking water. Also, protection of the Barton Creek area would in turn protect the quantity and quality of recharge into the Edwards Aquifer since Barton Creek accounts for 90 percent of that recharge.³⁵ Bull Creek at present is subject to intense development pressure and, therefore, acquisition of this area could protect Lake Austin and ensure that the high potential for runoff and erosion following development in the unstable slope region of the creek is never realized.

3.4.3 Transportation Variables

This policy option will result in substantially less development in ecologically sensitive areas, especially in the west and southwest. As a result, more growth will occur within the preferred growth corridor near major highways and in areas in north Hays and south Williamson counties. Thus, many of the same traffic conditions will occur as in the previous policy option. Obviously, less traffic can be expected on roads in such sensitive areas as west RM 2222, Loop 360, and those

within the Barton Creek Diamond than if these were more heavily developed. An increase in traffic can be expected, however, because people may use these roads to bypass more congested roadways in heavily developed areas. Bus routes within the corridor will need to be expanded. This policy is likely to result in higher inner city density, which will allow for a more efficient transit system.³⁶

3.5 EFFECTS ON THE DEPENDENT VARIABLES OF POLICY OPTION 3: UNCONSTRAINED GROWTH

3.5.1 Economic Variables

Because people and businesses could locate in any area of Austin, both city revenues and the rate of growth of revenues would be likely to increase with this option more than with the other policy options, especially from property and sales taxes. Nonetheless, this rate of revenue growth cannot be expected to increase indefinitely. Growth in Austin and its environs would cause an increase in business starts and residential development in the three-county region, which would result in increases in regional revenue capacity.

Expenditures would increase as the City began to provide additional fire, police, health, social, and recreational services throughout the city. The rise in expenditures probably would be proportional to the increase in revenues. Business starts would increase because of flexibility of location under this option. Employment opportunities would increase as new businesses moved into the Austin area.

3.5.2 Infrastructure Variables

Should the City follow an unconstrained growth policy, eschewing the corridor concept outlined in the ATCP, this would certainly affect the water and wastewater variables. Service provision in Areas IV and V

would be a great deal more expensive.³⁷ Depending upon the level and use of capital recovery fees and the reason for service provision, the rates charged would probably be raised to subsidize this growth. Water pressure in many areas of the city might be reduced in order to provide some semblance of balanced service to all customers requesting it. Again, plant and transmission capacity need expansion, in order for the City to follow this option.³⁸ Growth cannot occur at the present service level and treatment plant capacity.

3.5.3 Environmental Variables

Under this policy option, it appears likely that the north-south growth corridor concept will diminish in importance as a planning tool, allowing instead rapid and extensive development throughout the area. As a result, sensitive watersheds in the area will be more heavily developed, contributing to higher peak discharges, higher runoff rates, enlarged flood-prone areas, and increased erosion around creeks. In addition, stormwater sampling studies reveal that moderate-density residential use produces more runoff and higher runoff pollutant loads than low-density residential use.³⁹ Both Boggy Creek and Shoal Creek have experienced flooding and water quality problems as a result of rapid development.⁴⁰ The unstable grade of Bull Creek (i.e., 90 percent of watershed has slopes of 15 percent or more) also gives it a high potential for increased runoff and erosion following uncontrolled development.

Another possible consequence of an aggressive growth policy with few environmental constraints concerns the withdrawal of groundwater from the Edwards Aquifer during development. As the quantity of water available for recharge decreases with accelerated development, the quality of water may also deteriorate from the introduction of bacteria washed from creekbeds during periods of stormwater runoff.⁴¹ Also, the

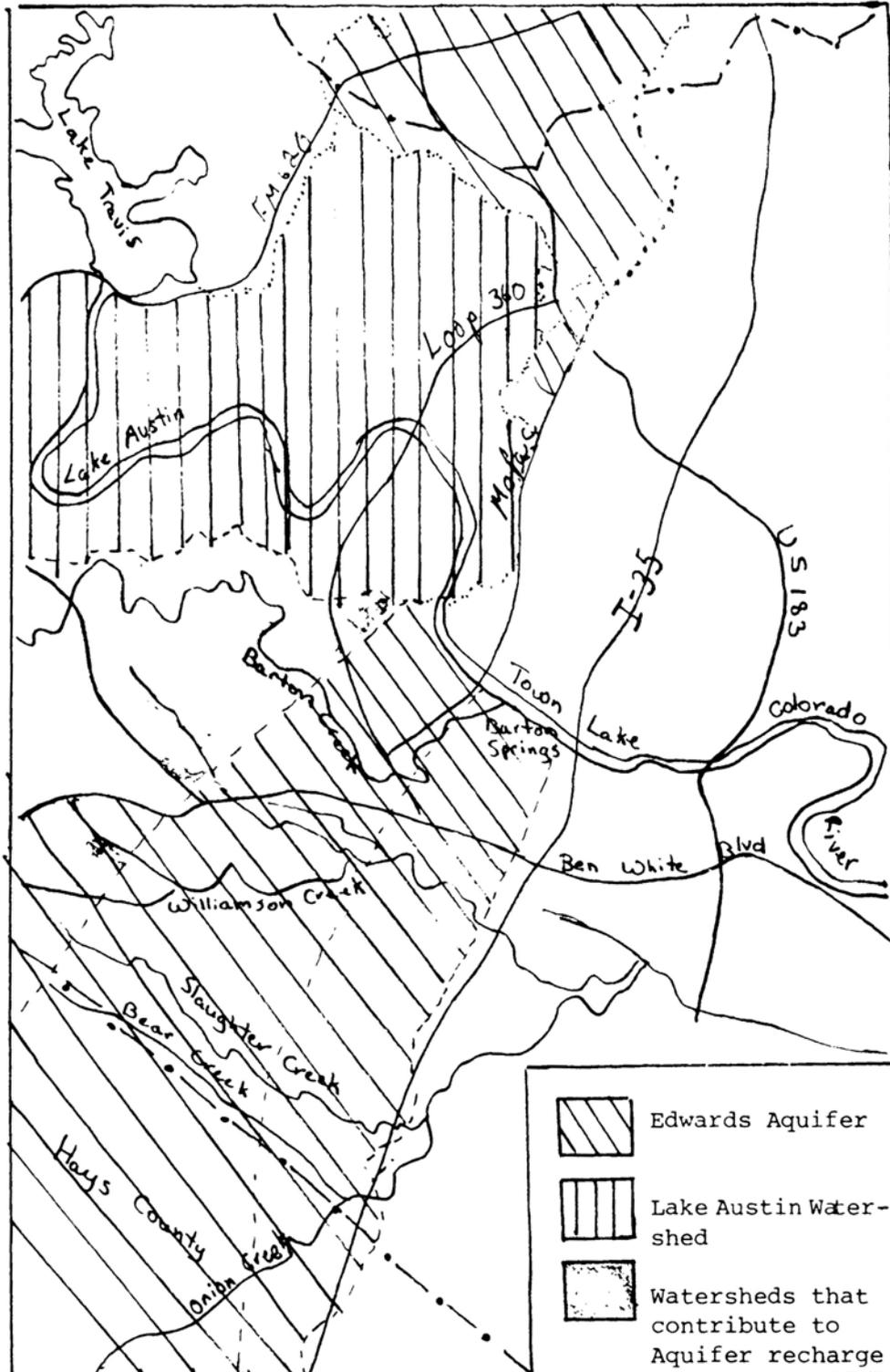
proximity of the recharge area to the aquifer presents another concern for groundwater removal. Intense development in the Williamson Creek and Barton Creek areas could produce especially detrimental effects on water quality and quantity since the Edwards Aquifer underlies these areas and 86 percent of the groundwater that recharges the aquifer is discharged at Barton Springs (see Figure 2).⁴²

Current groundwater pumpage in the Edwards Aquifer is around five million gallons per day. To put this figure in perspective, the average flow at Barton Springs is thirty million gallons per day; the minimum flow was recorded at six million gallons per day during the drought of 1980. Therefore, if the western section of the city experienced rapid and uncontrolled development, a prime concern would be possible water shortages at Barton Springs, ultimately threatening the city's drinking water supply.⁴³

Stormwater samples have shown that as urban development increases (measured by percent of impervious cover), a given rainfall will produce not only greater runoff but also greater pollutant loads. Figures 3, 4, and 5 show this trend for fecal coliform and total suspended solids counts.⁴⁴ Unconstrained growth could invite industrial location in areas unsuited for massive land alteration, utility installations, and highway networks. For example, the predicted industrial growth in Growth Area III by 2005 (see Table 5) suggests that industrial pumpage from the Edwards Aquifer will increase from the present twenty-five major industrial users of the Aquifer.⁴⁵

While industrial pumpage accounted for only 10 percent of the total discharge during 1979-80,⁴⁶ groundwater pumpage is expected to increase because of rapid economic and population growth. In addition, industrial development without environmental constraints could result in

Figure 2. The Edwards Aquifer

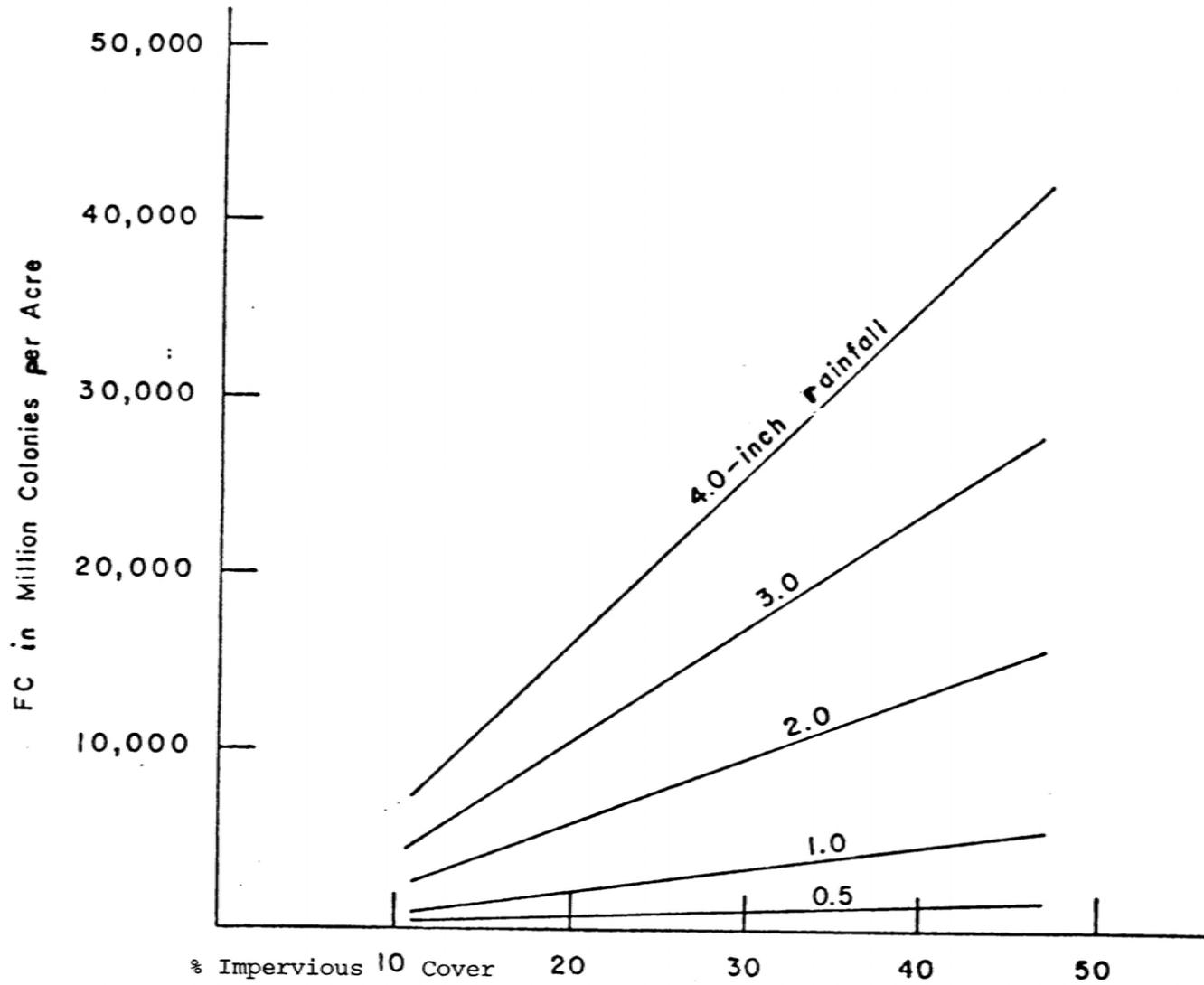


Source: Derived from Austin American Statesman, May 19, 1982.

FIGURE 3

PERCENTAGE IMPERVIOUS COVER

Runoff Pollutant Loading per Rainstorm
in Terms of Imperviousness - Fecal Coliform

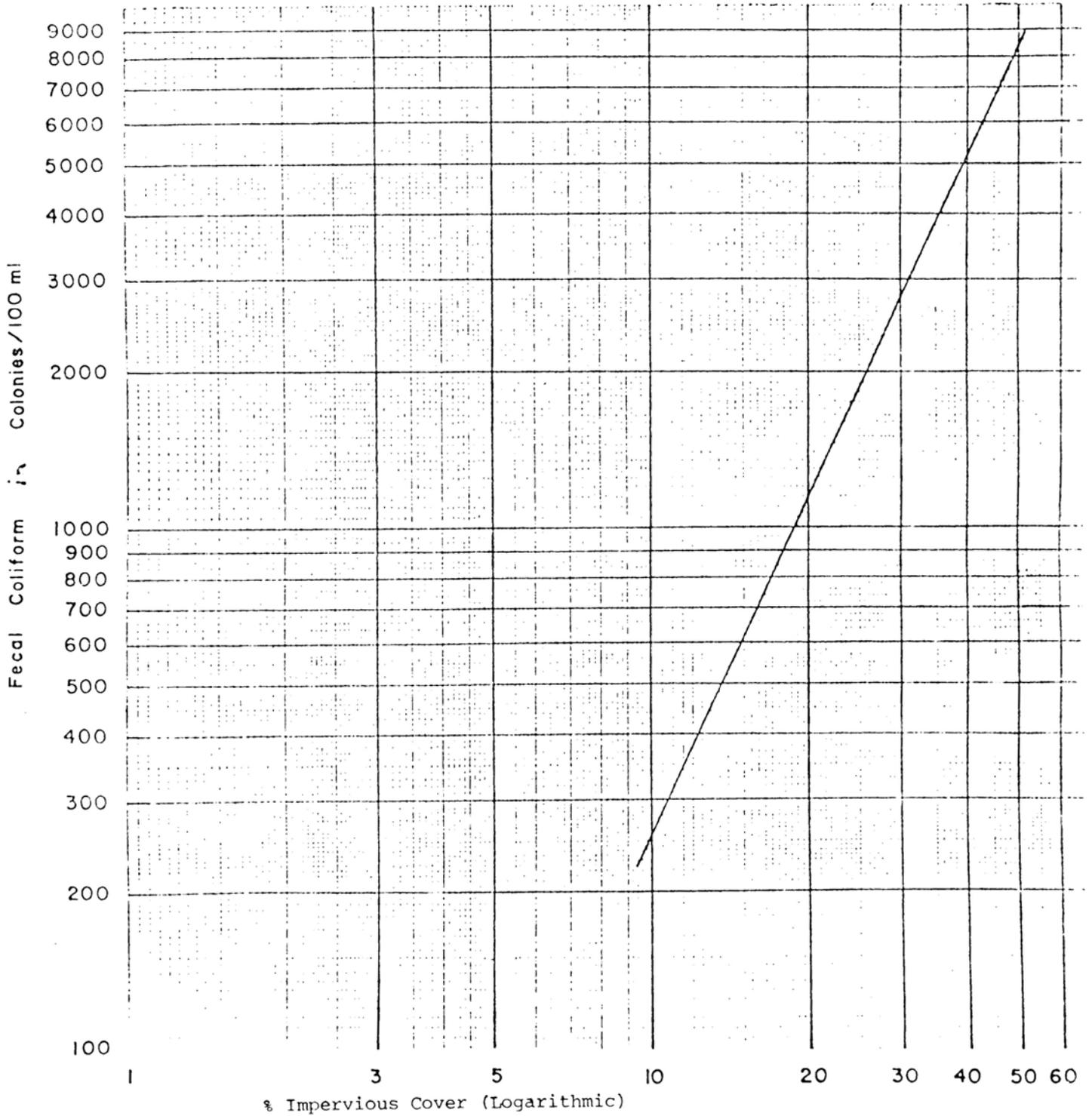


Source: City of Austin, Stormwater Quality Modeling Study for Austin Creeks: Executive Summary (Austin, 1983).

FIGURE 4

PERCENTAGE IMPERVIOUS COVER

Background Water Quality Conditions of Austin Area
Creeks in Terms of Watershed Imperviousness -
Fecal Coliform

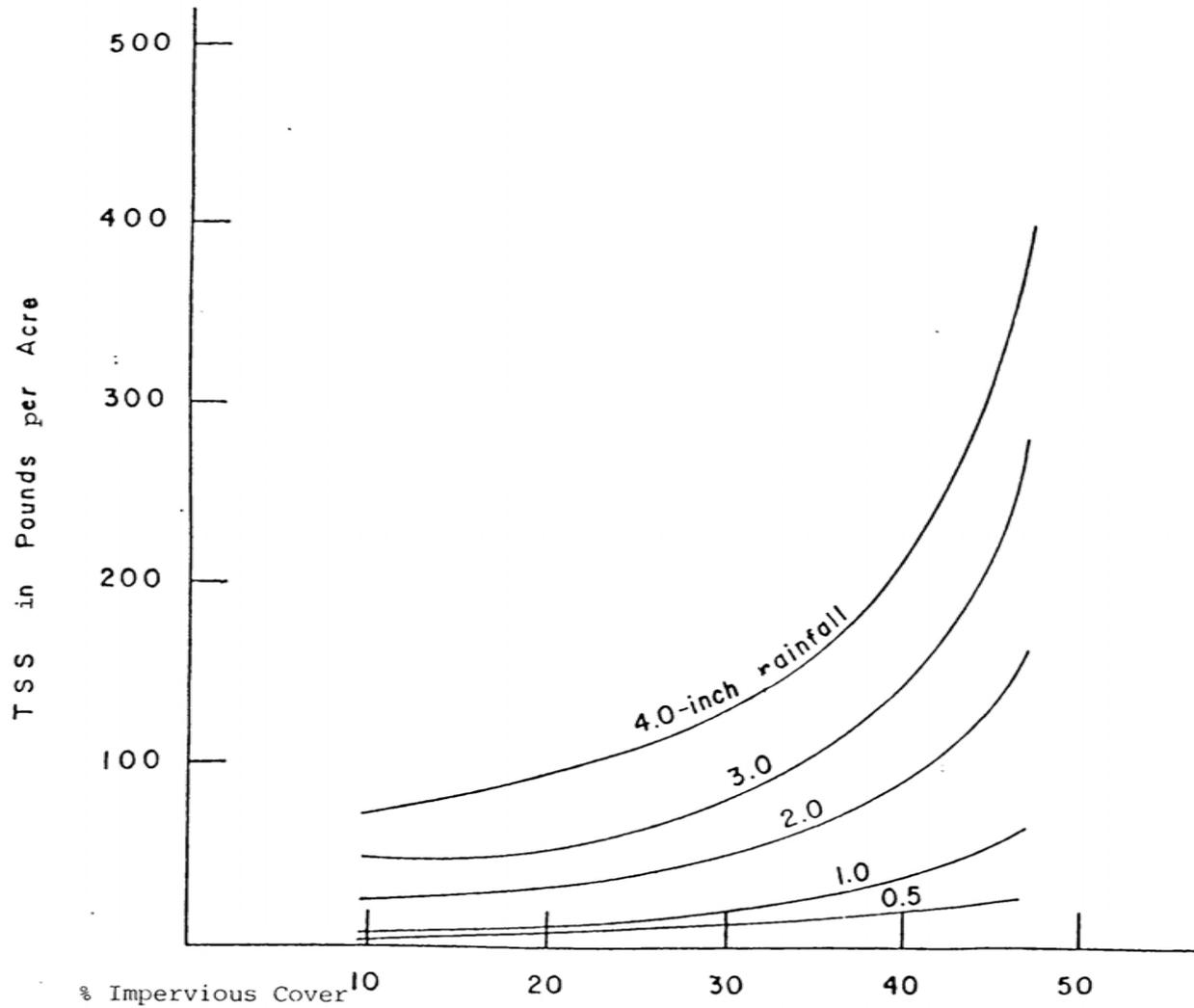


Source: City of Austin, Stormwater Quality Modeling Study for
Austin Creeks: Executive Summary (Austin, 1983)

FIGURE 5

PERCENTAGE IMPERVIOUS COVER

Runoff Pollutant Loading per Rainstorm in
Terms of Imperviousness -- Total Suspended Solids



Source: City of Austin, Stormwater Quality Modeling Study for Austin Creeks: Executive Summary (Austin, 1983).

increased industrial waste discharges into local waterways. These frequently include by-products of oil and grease and toxic materials, and they pose long-term risks to ground water.

Finally, residential and industrial development is accompanied by the expansion of roads, creating such environmental concerns as:

1. Possible flooding by increased impervious cover;
2. Soil erosion by cut-and-fill procedures; and
3. Water quality degradation by development on the Edwards Aquifer Recharge Zone.

Should intense street and road construction, especially east-west thoroughfares, occur as a result of unconstrained residential and industrial growth, specific areas likely to be harmed include:

1. Wild Basin Wilderness, by Loop 360 traffic and Davenport Ranch construction;⁴⁷
2. Growth Area IV, by MOPAC extension to the south; and
3. Edwards Aquifer Recharge Zone, by expected traffic increase (i.e., double by 1995 to 120,000 cars/day) at Ben White and South 1st streets.⁴⁸

3.5.4 Transportation Variables

This policy option will place many stresses on the roadways and mass transportation system. It will result in greater development in ecologically sensitive areas and relatively less density within the corridor. Traffic flow will become more multidirectional as more cars travel to suburban or "satellite" employment/housing areas; however, significant traffic volume will continue to enter the central city. While the amount of employment in the central area is expected to continue to grow, it will comprise only 22 percent of the total area employment by 1995, a drop from 37 percent in 1975.⁴⁹ Compared to total

FIGURE 10

POPULATION ESTIMATES BY GROWTH MANAGEMENT
AREA FOR 1990, 2000, 2005

Growth Management Area	1980	1990	2000	2005
I	65,800	64,300	69,600	72,800
II-N	181,600	221,500	246,100	259,000
II-S	95,000	125,700	146,800	157,500
III-N	14,300	37,300	104,200	147,100
III-S	14,300	23,500	51,600	83,700
IV-SW	5,600	24,000	34,600	36,200
IV-NW	18,300	38,300	48,900	51,000
V-W	20,500	29,700	35,000	36,100
V-E	<u>12,600</u>	<u>17,200</u>	<u>20,700</u>	<u>21,200</u>
Study Area Total	428,000	581,500	757,500	864,600

Sources: U.S. Department of Commerce, Bureau of the Census, Local Review Data for Travis County, 1980. Planning Department, City of Austin, 1981. Water and Wastewater Department, City of Austin, 1981, (Medcalf and Eddy.)

employment in the county, central city employment is getting smaller. Thus, the relative importance of travel to and from the central area of the county will diminish. The amount of travel in the region will practically double given population growth in 1995.⁵⁰ Fifty-eight percent of the traffic growth will occur on the highway system with large volume increases on U.S. 183, Loop 1, IH-35, Ben White Blvd., and FM 1325.⁵¹ Roadways heavily traveled in one sensitive area, the Barton Creek Diamond (BCD), include Loop 360, Bee Caves Rd., Hwy. 71, and Lost Creek Blvd. In the BCD, vehicle trips per day are estimated to increase from the present figure of 157,000 to over 209,000. A great number of these trips will be to the central city, with 40 percent of the home-based work trips to the east.⁵² Among the southwest subdivisions, roads heavily affected include U.S. 290, W. Ben White Blvd., S. Lamar, Westgate Blvd., and Brodie Lane. The volume increase on U.S. 290 is expected to be threefold.⁵³ Many of the roadways will not be able to accommodate the growth despite improvements outlined in the Roadway Plan (see Table 4 above).

With unconstrained growth, bus routes will need to be extended to serve peripheral communities, and frequency of service will need to increase along existing routes. Unconstrained growth will not allow planning control: therefore, it will be extremely difficult to develop a more effective mass transit service. Trip origins and destinations will be widely dispersed, and there will be fewer areas where public transportation can feasibly provide a level of service comparable to the automobile.⁵⁴ As a result, if present land-use and urban-form patterns continue, no transit alternative will serve a significant portion of total person trips under this option. A possibility for improved transit operation exists only if the City controls the degree of urban sprawl.⁵⁵

In areas where no mass transit exists, travel will depend on automobiles, thus intensifying congestion on the roadways. Many of the outlying growth areas, such as the BCD, contain higher-income housing where auto ownership and use is very high.⁵⁶ Mass transit must be very attractive in this area to encourage a decrease in car usage.

3.6 EFFECTS ON DEPENDENT VARIABLES OF POLICY OPTION 4: LIBERAL EXCEPTION POLICY TO ORDINANCES

3.6.1 Economic Variables

Under this policy option, more people would travel into the city as more businesses located there. If the city encouraged high-technology industry, more highly skilled workers would live in Austin. The rate of sales and property tax revenue would increase as a result of additional businesses. Regional revenue capacity would increase as a result of location within both the city and the tri-county region.

Expenditures would increase as the City provided more services to the new areas of development. Business starts would increase because of the flexibility of location within the city provided by the availability of exceptions, leading to an increase in employment.

3.6.2 Infrastructure Variables

The policy option of granting liberal exceptions to many ordinances would provide enticements for industrial growth of any kind, not just the hi-tech/energy industries to which Austin is accustomed. Regardless of rate levels, the water pressure levels in certain city areas may be reduced, depending on the type of industry, its level of water usage, and zoning restrictions. Certainly, without the needed improvements to bring the water and wastewater system above and beyond present capacity, industrial growth of any kind will be limited.

3.6.3 Environmental Variables

Each watershed ordinance allows variances if literal enforcement causes deprivation of privileges or safety enjoyed by similarly situated property with similarly timed development. However, each variance must ensure that the probability of environmental harm is kept at a minimum and that ordinance requirements are maintained as closely as possible. Should the Planning Commission assume a policy of liberal exceptions to ordinances, the likelihood that the environment will be degraded will increase, especially in the Lake Austin Watershed, where a finding of fact is not required by the Planning Commission for each variance granted. Similarly, variances granted for development in the Critical Water Quality Zone of the Barton Creek and Williamson Creek watersheds could possibly harm water quality, since no specific controls are included in each variance for ensuring that water quality is maintained. Finally, watershed areas subject to roadway development would become the largest target for variances, posing an environmental threat if soil, hydrology, and slope characteristics are not adequately considered. An example of this is the proximity of Highway 290 rights-of-way along the Williamson Creek Critical Water Quality Zone.⁵⁷

3.6.4 Transportation Variables

This policy option will allow industries to locate both in and outside the preferred growth corridor. Industrial location has a large impact on traffic patterns by encouraging housing developments nearby and by concentrating traffic flows along thoroughfares between residential areas and industry. Many new industries are expected to develop within a six-mile-wide corridor along IH-35 between Georgetown to the north and Buda to the south. More plants are likely to locate to the east and southeast of the central city along U.S. 183 and Ben White Blvd.⁵⁸

A liberal exception policy could allow plant construction on the western fringe and in the southwest. If industry is not restricted to certain areas, such as the ends of the preferred growth corridor, traffic flows will be multidirectional and lacking in the density and directional movement necessary for more efficient mass transportation. Many potential industrial areas are not served by the present transit system; therefore, the number and frequency of bus routes will need to be augmented. Since it is difficult to establish efficient and frequent mass transit service, there will be greater dependence on auto use.

4. ANNEXATION

4.1 INTRODUCTION

Legal authorization for the City of Austin to govern and regulate activities within its jurisdiction is based on broad powers granted to home rule cities by the Texas Constitution. Austin can therefore enact any law in the interest of the health, safety, morals, and general welfare of the citizens of the city within its boundaries.

Annexation is the legal addition of new territory to a city's corporate limits. The procedures which govern such action in the State of Texas are contained in the Municipal Annexation Act of 1963. The Act first provides a procedure for the determination of jurisdiction over unincorporated areas contiguous to the city's corporate limits and not a part of any other city. This area is known as the city's extra-territorial jurisdiction or ETJ and is established according to city population. Austin, as a city of over 100,000, has an ETJ extending five miles outside the city limits. When a city annexes additional territory, the ETJ expands according to the amount of that annexation, although ETJ expansion may not cross the ETJ of another city. The Act allows the city to extend its subdivision ordinance to all areas within the ETJ. It also permits a city to enter into contractual agreements with the owners of industrial land within the ETJ and to defer their annexation.

Generally, a city may annex territory up to 10 percent of its corporate area per year. If the city chooses not to annex the full amount of authorized territory, the unused portion may be accumulated over three years, up to a maximum of 30 percent of its current area.

A city must provide for two public hearings before it initiates

annexation proceedings, and annexation of the territory under consideration must be completed within ninety days. Municipal services must then be provided to the annexed area within three years. The Act also includes certain limitations on the creation of political subdivisions within the ETJ, provisions for deannexation should the city fail to provide services as stipulated, and regulations regarding the annexation of political subdivisions outside city boundaries in their entirety.

In 1967 the Austin City Council adopted annexation policies for the city which address additional municipal responsibilities reflecting city objectives for providing public facilities and directing growth. The first policy is to annex property at the request of a property owner unless such annexation is adverse to Austin taxpayers. The second policy is to annex in the interest of the community for such purposes as the orderly planning and development of streets, bridges, drainage, utilities, sanitation, and other services. Further policies pertain to provision of services within the ETJ. They discourage the formation of independent utility districts and incorporations within the ETJ and provide capital improvements so as to encourage a physically compact city.

The City of Austin considers active annexation an effective growth management tool which provides for long-range coordination of the extension of municipal services, capital improvements, land-use control, and municipal taxing authority. (References to the City of Austin's decisions and desires are made in this chapter as if the City were a single decisionmaking entity. While there are actually many actors, elected and appointed, for convenience all of these will be collectively referred to as the "City.") It is the City's belief that properly planned annexations with extensions of city services and facilities will

encourage development in annexed areas while discouraging it in more distant areas. The City's major goal is to encourage quality development in order to control urban sprawl and to preserve and enhance Austin's unique environment. This goal requires annexation of most of the growth occurring on the city's fringe. Besides increasing city population, it would bring new growth within the jurisdiction of the city government.

Much of the growth in Austin and Travis County occurs on the fringe of the city. New residential, commercial, and industrial developments, many of which receive some city services, can be annexed to expand the city's tax base. Residents on Austin's periphery enjoy many city benefits for which they do not pay if they remain outside the city limits. By protecting its tax base, Austin can maintain its economic vitality and limit autonomous suburbs. Annexation also allows for the economies of scale necessary to provide a higher level of services. An annexation plan aids in the implementation of desirable growth and development patterns and provides a framework for sound planning and decisionmaking.

In sum, annexation may be proposed to benefit property owners and other residents in an area in order to: (1) provide them with needed urban services; (2) benefit the annexing city by allowing it to capture the expanding tax base generated by growth on the urban fringe; and (3) encourage orderly growth and the economic provision of services. The financial pressures upon central cities plus a growing awareness of the costs that nonresidents using city infrastructure and services create for a city have made the fiscal motivation for annexation more prevalent.

4.2 DESCRIPTION OF ANNEXATION POLICY OPTIONS

In the following descriptive material, four separate annexation policy options are presented for the City of Austin. These are: (1) annexation to fulfill Master Plan objectives; (2) annexation where past population growth has occurred and is expected to continue; (3) maximum allowable annexation; and (4) strip or corridor annexation for growth management. The first two of these represent the City's historical priorities for annexation.

Historically, the City has annexed an average of 4.5 percent of its area annually. The principal criterion for such annexation has been that it be carried out in conformance with the objectives identified in the Austin Tomorrow Comprehensive Plan. The Comprehensive Plan designates five areas in and around Austin according to their development suitability. Municipal services and utilities are to be provided according to the recommendations for each growth management area, which are intended to emphasize land development suitability. Growth Management Area I is the central area of the city, most suitable for further development. Growth Management Area II is land outside the central city but within its 1977 incorporated area. The area receiving third highest priority for urban development is the north-south corridor, roughly coinciding with IH-35, which is outside Austin's 1977 incorporated area. Thus, historically, the City's primary preference for annexation has been Growth Management Area III along IH-35.

The City's second concern has been to annex land where past population activity and estimates indicate the greatest amount of anticipated growth (second option). This policy should allow the City to capture the existing tax base, to extend zoning and building standards, and to provide for the extension of major public improvements to land in Growth Management Area IV of the Comprehensive Plan. This

area is already experiencing a high level of development activity, although it lies outside the preferred growth corridor. It includes five areas: U.S. 183 northwest of the city; the tributary valleys north of Lake Austin and east of Loop 360; the region bounded by Loop 360 and the area south and west of Lake Austin; the Dellana Creek Watershed; and the upper Williamson Creek Watershed.

The third policy option considered is the City's annexation of the maximum allowable territory per year, 10 percent of its existing size annually. This annexation would take place both along the preferred growth corridor and in other areas demonstrating the probability of greatest future growth.

The fourth policy option examined is that of strip or corridor annexation. This secures land for the city along its major arteries. It is useful for extending the ETJ and thus assuring the availability of land for future city expansion; extending subdivision and zoning controls; discouraging incorporations and special districts; and capturing the existing industrial tax base.

4.3 ASSUMPTIONS

Several assumptions are made in the following text. First, it is generally assumed that because of the City's obligation to extend services to new areas, annexation may facilitate growth. However, depending on the perspective of the resident or business seeking to locate in Austin, annexation may be viewed as discouraging growth as it carries with it financial obligations to the City. As mentioned earlier, some businesses enter into contractual agreements with the City for the express purpose of avoiding city taxes for a defined period of time. More specific assumptions accompany each policy option.

In the first option, it is assumed that annexation in accordance with objectives stated in the Comprehensive Plan roughly follows the IH-35 corridor. The second policy option, annexation of territory in which past population activity and estimates indicate the greatest future growth, encompasses IH-35 north to the Williamson County line, northwest 183 between FM 620 and Loop 360, and southwest Highway 290. The maximum allowable annexation policy option targets the following areas for annexation: IH-35 to the Williamson County line; northwest 183 between FM 620 and Loop 360 to FM 2222; southwest Highway 290; FM 1325 to Round Rock; and the Bergstrom area. Finally, the fourth policy option, strip or corridor annexation, is geographically nonspecific.

4.4 EFFECTS OF ANNEXATION POLICY OPTIONS ON DEPENDENT VARIABLES

4.4.1 Economic Variables

POPULATION. The first policy option involves conformance with the objectives of the Comprehensive Plan. Population is expected to increase along the Austin-San Antonio growth corridor. Changes in population density from 1970 to 1980 can be used as an indication of future trends. Over the decade population increased, although in the downtown area population decreased. The greatest population increase was in the area of North IH-35 to the Williamson County line. On the whole, population density by 1980 tracts shows that population is concentrated along the corridor, with an increasing number of people moving north.⁵⁹

The second policy option involves those areas where population activity and estimates indicate the greatest growth. Annexation provides for growth by incorporating into the city both additional population and open spaces that can accommodate future growth. This area involves mostly residential growth which will therefore result in

substantial population increases. Development will occur in this region since the City will bear the burden of financing services. At the moment, population density is low compared to the IH-35 corridor, but over the past decade these areas have shown a substantial population increase as people move out into the suburbs.⁶⁰

If the third option, maximum allowable annexation under the Five-Year Plan, is followed, Austin will annex substantially more land than it has in the past, probably in Growth Management Areas III and IV, where most future population growth is expected. The City's extension of major public improvements into this area would facilitate growth. As pointed out in the discussion of the second policy option, these areas have been experiencing the greatest growth relative to the rest of the city.

The Management and Budget Department of the City of Austin has completed a fiscal impact analysis regarding city annexation of the Oak Hill area and the provision of full municipal services to its residents. The Oak Hill area is southwest of the Austin city limits, around Highway 290. The City recommended maximum allowable annexation, which extends over 3,301.29 acres.⁶¹ In early 1983 the City annexed the undeveloped areas of Oak Hill, leaving the developed portion for future annexation after various political and service delivery issues are resolved.

The Oak Hill study illustrates the fiscal impact of annexation in an area. It identifies numerous variables that make a substantial difference in the fiscal implications of annexation. Oak Hill is an example of possible future implications and trends if maximum allowable annexation is pursued. Population is expected to increase dramatically in Oak Hill. The current population is 2,420, which is expected to increase to 4,830 by 1987 and to 20,030 when fully built. There are currently 1,155 dwelling units in the area; this number is expected to

increase to 2,040 in 1987 and to 8,450 by full buildout.⁶²

Strip annexation, the third policy option, does not have as great an effect on population as the options discussed previously. Under strip annexation, city population will remain stable since the area being annexed is limited in size and usually includes commercial or undeveloped land.

REVENUES. Annexation is undertaken most often for the financial benefit of the annexing city. Tax revenues from the annexed areas are expected to exceed or at least equal service costs. Under the first policy option of annexation to fulfill objectives of the ATCP, property values probably will rise as people and businesses move into the area.⁶³ Increased land value will result in higher property taxes, which are an important revenue source for the city.

Since the city reappraisal in 1980, the value of Austin property has increased by an average of 24 percent. The 1982-83 estimated assessed value of taxable property is 9.8 billion dollars, which at a rate of \$0.52 per \$100 would result in tax revenues of 54 million dollars.⁶⁴ Austin's 1983-84 rates (\$0.62 per \$100 assessed value) represented a 7.98 percent tax increase over the previous year.⁶⁵ The revenue capacity in Travis County may increase as people move out of the city limits, in part to avoid paying higher taxes. If businesses locate outside the annexed areas, their employees will probably follow, since people tend to live near their workplace. Therefore, the magnitude of the revenue increase from increased property tax collections cannot be predicted exactly until development patterns inside and outside the annexed areas are known.

Under the second policy option, which is annexation in areas of

greatest projected growth, revenues will increase as the City captures the expanded tax base. Property taxes will increase because of increased land values in the areas where services were not provided previously and development was sparse. Property tax revenues combined with increased revenues from the sales tax and service charges will assist the City in its attempt to meet the demands of an increased population.

Residents of developing areas on the city fringe tend to have relatively high incomes, while the center city is home for the poor. Data from 1979 show that median household incomes in the areas to be annexed under this policy option are quite high, ranging from \$22,000 up, with the highest being in the northwest region.⁶⁶

Revenue capacity in the three-county jurisdictions will increase for several reasons. Some people may move outside the city limits to escape the tax burden. Others may see growth as destroying the pleasant living environment through a feeling of congestion--too many people, too many cars, and too many houses. This results in increased taxes and services fees. Long-time residents may oppose further growth and oppose paying the price of services for newcomers. Growth outside Austin will result in higher tax and fee revenues in the three-county area.

If Austin chooses the third policy option of maximum allowable annexation under the Five-Year Plan, substantial revenue increases can be expected from the large land area annexed. Land values will increase with the new development, and consequently property tax revenues will escalate (as under the second policy option, but on a larger scale). Income in these areas, especially in the west, is relatively high when compared to other areas.

Revenues in the three-county jurisdictions may increase because in

certain cases, annexation tends to push growth further out. People will move beyond the city limits to purchase cheaper homes on cheaper land. Builders may move out where there are less restrictions and controls.

The Oak Hill study illustrates the magnitude of potential revenues and expenditures in an annexed area. Its fiscal impact analysis is based on current costs of providing services and existing tax, fee, and utility rates which would be implemented after annexation. Areas of expenditures include library, parks and recreation, police, fire, emergency medical service, public works (refuse collection, street maintenance, and street cleaning), and urban transportation. Revenues are generated from library, emergency medical service, and public works fees and taxes.

Under the proposed Plan, annexation of the entire Oak Hill area is expected to result in a revenue/expenditure deficit during the first two years. Beginning in Fiscal Year 1984-85, the area should develop a positive fiscal relationship with the City of Austin, and is projected to provide a favorable net gain of \$127,300 at full development.⁶⁷ A five-year projection shows requirements to total \$2,485,538, while revenues total \$2,247,021, resulting in a net cost of \$238,517. At full development, requirements will total \$3,483,132 and revenues will total \$3,610,413, resulting in net revenues to the City of \$127,281.⁶⁸ Aggregate property values in the area are projected to increase 10 percent per year, while citywide real estate value increases averaged 7 percent in recent years.⁶⁹ The City will not be able to collect property taxes from the area until FY 1984-85 since annexation did not occur prior to the January 1, 1983 deadline.⁷⁰

If Austin practices strip annexation, city revenues can be expected to increase only slightly since the area annexed is small. Many new

businesses may locate beyond the strip limit to avoid taxes and controls. Strip annexations are made mostly as a control measure, and to extend the ETJ.

EXPENDITURES. Under the first policy option, expenditures will increase as the City provides for inner-city redevelopment and services to the corridor along IH-35. The City will have the responsibility of increased code enforcement and development regulation.

If Austin adheres to the second policy option, expenditures can be expected to increase substantially because of the need for the City to provide services. Such areas of residential growth as this require more services than areas of commercial development. The City must provide water and sewer facilities, garbage collection, street improvements, fire and police protection, as well as recreational facilities. Costs for water and sewer service, as well as services supported by the general fund (such as fire and police), are derived by multiplying the respective average per capita costs for the City of Austin as a whole times the number of residents in each area. In addition to bearing the cost of providing services, the City becomes liable for the obligations or bonded indebtedness of the area it annexes if there is a MUD (municipal utility district) in the area.

If Austin follows the third policy option, expenditures will increase to a greater degree than under the first two options. The increased infrastructure needs generated by population growth will require a substantial amount of public funds. Total operating expenses for the City can be expected to increase as well. Since this area includes mainly residential growth, the cost of services will be much higher than in a commercial area.

In Oak Hill, the City will be expected to provide water and

wastewater services. Over a nine-year period, improvements in wastewater facilities will total \$4 million.⁷¹ Water improvements include a ten-year program of funding system upgrading through transfers from current revenues to the CIP. Total present value of the projected improvements exceeds \$20 million. From FY 1984-85 through 1988-89, rate adjustments of up to 1.6 percent per year would be necessary to fund these improvements.⁷²

With the fourth option, strip annexation, expenditures will be minimal since the areas can access nearby installed systems.

BUSINESS STARTS AND EMPLOYMENT. Under the first policy option, annexation will provide new business possibilities. Business starts and therefore employment will both increase. The City will need to hire skilled and unskilled labor to complete the projects.

If Austin annexes in those areas specified under the second policy option, business starts in the area will increase. Growth will include more corporate investment and more jobs. Approximately 6 percent of the area is expected to be commercial or industrial.⁷³ The increased residential population will create the need for small businesses as well. Employment, however, will increase only moderately since the type of new businesses will include shopping centers, chain grocery stores, franchise stores, and service restaurants rather than large factories.

Many new businesses may locate in these areas rather than in the city because larger tracts of land may be available in which to expand. This may result in capital being redirected from the inner city. The new Zoning Ordinance that is being considered by the City Council will extend the zoned central business district south to Barton Springs Road. This will increase the area favorable for business location. If the Zoning Ordinance is passed, therefore, businesses may not be as eager to

move to the suburbs.

If Austin annexes according to the third policy option, business starts will have to increase to accommodate the needs generated by residential growth. A number of diverse small businesses will want to locate in the area; therefore, employment will increase. The same general trend will occur here as discussed in the second policy option, except that in this option a substantially greater amount of land will be annexed.

Strip annexation, on the other hand, does not attract businesses as do the previous two policy options. Although some businesses may locate in the area, many new businesses will locate beyond the strip limit to avoid controls and regulations. Employment will increase modestly if at all.

Overall, the fiscal impact of annexation on an area is very difficult to project. Many variables need to be taken into consideration, such as the level of services already present and the residents' attitudes toward growth. Only approximations of the direction of fiscal impact have been provided, since further details could not be documented. The assumptions made are based on past and current trends.

4.4.2 Infrastructure Variables

The infrastructure dependent variables focus on water issues, which are of vital importance to the development and expansion of the City of Austin. Without an adequate water and wastewater supply and system, it will be impossible to continue the City's housing and business boom. A host of alternatives are available to city policymakers when considering annexation in terms of water and wastewater. Much of the information for this section of the annexation chapter was taken from the Austin

Planning Commission's 1982 Annexation Study and the City's Water and Wastewater Master Plan technical memoranda, written by the Metcalf and Eddy engineering consultants.⁷⁴

Although each policy option has been clearly defined, it is nevertheless difficult to make authoritative predictions about the dependent variables without knowing the exact location of the annexed area or site. General trends and difficulties can be identified and discussed, however.

WATER AND WASTEWATER RATES. As is the case with most of the infrastructure considerations of the first policy option (annexation of land to fulfill objectives identified in the ATCP), the effect of this option on rates is likely to be negligible. This is because the primary element of this first policy option involves redevelopment of the central city, which appears to have adequate infrastructure. Any increases in fees are not likely to be passed on to the user completely, however, since the central city redevelopment is a very high priority and the costs of such infrastructure improvements would probably be subsidized to citizens throughout the city.

If the second policy option were adopted, fees would probably have to increase to account for this infrastructure expansion. It is impossible to quantify such increases with so many uncertainties, however.

Adoption of the third option of maximum allowable annexation would be likely to reveal that current capital recovery fees would be inadequate to pay for increased infrastructure, and the City would probably have to consider a new fee structure or increased capital recovery fees.

Strip annexation, the fourth policy option, is the most difficult to quantify because of the many uncertainties regarding where the action

would take place. Full costs for infrastructure changes are not likely to be passed to users, though, in areas in which the City is attempting to encourage growth.

WATER PRESSURE. Since many of the general aspects of the four policy options have been mentioned earlier, this section and the descriptions of the other two dependent variables that follow will be brief. Water pressure issues are likely to be negligible under the first policy option for many of the same reasons rate issues are. If the second option were adopted, problems could develop if annexation and growth are undertaken faster than facilities are expanded. Without early modifications or changes, water pressure would almost certainly diminish under the third option (maximum allowable annexation). Finally, under strip annexation, the last option, water pressure could vary substantially throughout the city, depending on the area annexed. This could again create an undesirable disparity between different areas of the city.

WATER AND WASTEWATER PLANT CAPACITY. Plant capacities for water and wastewater treatment appear to be adequate under the first policy option, although additional facilities that may be needed would have to be placed outside the area served under this option (the central city). The second policy option includes the northwest and southwest areas of the city, in which there would be room for additional plant capacity, as well as locations for such expansion. Current plant capacity would probably be inadequate to handle the increased demand under the third policy option, and significant changes would have to be considered quickly. Under the last option (strip annexation), plant capacity in selected areas would be strained, depending on the location of the strip, while other areas of the city would be unaffected.

WATER AND WASTEWATER TRANSMISSION CAPACITY. Transmission capacity under the first policy option appears to be adequate for the same reasons outlined in discussions of this option in the previous three sections. Transmission facilities appear to be adequate in the southwest and northwest regions of the city, which are the primary targets of the second option, but additional facilities would almost certainly have to be built under the third option. Under strip annexation, transmission capacities would be adequate in certain areas but inadequate in others, depending on the location of the annexation.

In very general terms, the first two policy options would have the least effect on infrastructure, while the third would have the most. The fourth option presents a great variety of unknowns and probably has the most potential for dangerous effects.

4.4.3 Environmental Variables

In considering annexation strategies, the City of Austin must compare the impact which growth and development have on the environment with the available controls that can be employed to protect that environment. Annexation of a particular area usually ensures greater protection through enforcement of city ordinances. Unfortunately, the environment does not stop at political boundary lines. Uncontrolled growth on a creek will affect areas downstream, despite the latter's compliance with the creek ordinances.⁷⁵ Similarly, waters polluted in an unrestricted area upstream will affect the water serving an area governed by water quality standards. It becomes evident that annexation alone cannot guarantee environmental quality if adjacent or nearby areas are altering that quality, but it is an important means of increasing the City's control.

CHANGE IN DEVELOPMENT/CHANGE IN FLOODPLAIN. By annexing according to

the preferred growth corridor outlined in the Austin Tomorrow Comprehensive Plan, the City is maintaining consistency in working toward its desired environmental goals.⁷⁶ The growth corridor is preferred because of the minimal impact that development there will have on the environment.

Annexation along the growth corridor, as annexation anywhere, will impose city building codes, the Subdivision Ordinance, and the creek ordinances, which will control development on or adjacent to waterways. Development involving increased impervious cover, soil erosion, and vegetation removal will alter a floodplain unless steps are taken to ensure that the particular construction will not produce any additional flow into the waterway. If these ordinances are strictly enforced, development will be directed in such a manner that the floodplain will not increase in size, and the potential for flooding will be minimized. Annexation will ensure application of the ordinances. On the other hand, if annexation takes place only along the growth corridor, development in adjacent areas not governed by the City could result in flooding for those within the city.

Since several areas where growth is expected to occur are outside the preferred growth corridor, protection of the environment is imperative. Annexation of potential growth areas in addition to the growth corridor will provide greater protection overall, even at the historical rate of 4.5 percent annually.

Taking advantage of maximum allowable annexation in areas where the most growth is expected to occur will afford the greatest environmental protection for the city. Flooding will be minimized if the creek and watershed ordinances are properly enforced. To render maximum allowable annexation most effective, the City needs to examine the shape and size

of areas to be annexed in order to avert any possible detrimental effects that adjacent areas could impose.

Strip annexation would have a minimal effect on the floodplain, as ordinances would be imposed within narrow boundaries. Developers could avoid the annexed strip in order to avoid the ordinances. Adjacent uncontrolled areas would threaten to affect the environment within the strip. On the other hand, if the strip were effectively designated for annexation to encourage developers to build elsewhere, and thus to protect the floodplain, this annexation might be very beneficial (e.g., annexation of Lake Austin).

APPLICABILITY OF ENVIRONMENTAL ORDINANCES. Annexation within the preferred growth corridor will ensure that existing environmental ordinances will be applied to those areas. Again, though, there is a risk that adjacent areas where ordinances are not applied may well affect those where they are, particularly if the latter are downstream from the former. Extending annexation to those areas where growth is expected to occur will help immensely in alleviating this problem. The applicability of environmental ordinances will be expanded to include areas where growth is bound to happen, regardless of annexation. By annexing these, the City will be affording greater protection not only for that particular area, but also for Austin as a whole.

The maximum allowable annexation policy option provides the same advantages in greater measure, proportional to the percentage of additional land annexed (approximately 5.5 percent more than the historical average.) This option will result in the maximum protection by city environmental ordinances.

Strip annexation will have a minimal effect, since ordinances will apply within a narrow boundary. The effect may be more dramatic if the

annexation takes place for the purpose of imposing environmental ordinances in an environmentally sensitive area.

WATER QUALITY. While concentrated growth will increase the degradation of the City's water, a trade-off will occur with annexation and the City's consequent ability to apply ordinances for preservation of water quality. Runoff will be limited and monitored, while dumping into waters will be restricted. As explained for previous variables, though, if annexation occurs only within the preferred growth corridor, we must be prepared to contend with adverse effects from adjacent areas.

Annexation of areas where growth is expected to occur will provide increased water quality maintenance, while maximum allowable annexation will afford the best protection possible under the existing ordinance. Strip annexation would offer little or no benefit to water quality, as the controlled area would be extremely limited; water flowing from uncontrolled areas would negate any attempts at water quality preservation within the strip.

PREDICTED INCREASE IN INDUSTRIAL PUMPAGE. Annexation itself will not cause an increase in industrial pumpage. It will change the city's boundaries, thus raising the percentage of pumpage within the city, while reducing that outside the city. All annexation will allow the City to place controls on existing industries and on new industry, although some would probably build outside the city limits to avoid these controls. Only maximum allowable annexation would have a possible effect on industrial pumpage, in that new industry might be persuaded to locate inside the city in order to be within reach of the working population. In this case, an increase in pumpage would take place, and those industries would be subject to city controls.

ENVIRONMENTALLY SENSITIVE AREAS. Some types of environmentally

sensitive areas are protected by city ordinances, whereas others are not. Many of those areas which the Audubon Society lists as environmentally sensitive are not protected in any way. These would not receive increased protection through any form of annexation unless the City changes its policies. Land lying over the Edwards Aquifer, however, would benefit from annexation, as the City has strict limitations on development in relevant watershed ordinances.⁷⁷

For those environmentally sensitive areas protected by ordinances, benefits of annexation would increase as the City approaches the option of maximum allowable annexation (on a continuum of strip-corridor-expected growth-maximum allowable). Protection of those environmentally sensitive areas not protected by ordinances constitutes a more difficult problem. Most of the areas where growth is expected to occur contain a great deal of land which is environmentally sensitive. In reviewing annexation policies, the City would be farsighted to pass an ordinance restricting development harmful to these particular areas. Extending the watershed ordinances to more watersheds would particularly help. Strip annexation would be effective only if it were initiated for the sole purpose of protecting a sensitive area which is covered by the City's ordinances.

In conclusion, the annexation policy option most beneficial for protecting the environment is maximum allowable annexation (10 percent annually). This gives the City the greatest amount of control to enforce existing ordinances which protect the environment. Annexation in the preferred growth corridor alone will afford some protection, but it presents the risk that development in adjacent areas outside the City will adversely affect the annexed area's environment. A more suitable option is to annex land where growth is most expected to occur. This annexation strategy would minimize the detrimental effects of areas not

annexed on annexed areas. Strip annexation will provide limited protection of the environment because of the limited amount of land actually annexed.

In light of the foregoing discussion, protection of the environment would be served best by the following policies:

1. The City should pursue the maximum allowable annexation policy option.
2. The City should adopt an ordinance to protect those areas designated as environmentally sensitive by the Audubon Society, and expand the jurisdiction of the creek ordinances.
3. When considering annexation, the City should explore strategies that will preclude areas not annexed from having a negative environmental impact on annexed areas, to the extent feasible.

4.4.4 Land-Use Variables

Annexation of land devoted to different uses can have profound effects on the fiscal impact of annexed areas on the City of Austin. Since taxes generated by newly annexed parcels will differ according to their use, the City must be aware of the trends and patterns in land use in the ETJ and outlying areas.

In general terms, commercial and industrial uses provide the City with the greatest tax revenues. For this reason it is important to annex areas where strip development along streets and highways is found, or where industrial development is occurring outside the city limits. In addition, land-use controls to avoid environmental damage may be exercised when land is annexed. For residential developments, this means requiring city services. For commercial and industrial uses, it means closer monitoring of waste discharge, environmental impacts, and undesirable health effects. In all land uses, it remains important for the City to be fully aware not only of the fiscal effects of annexation

but also of the gains that can be obtained from controls over contiguous land. The objective of this brief discussion then, is to describe in general terms the trends projected to result from the various policy options as they affect land-use distribution, density, and neighborhood preservation.

DISTRIBUTION. If the goals of the Austin Tomorrow Comprehensive Plan could be met fully, annexation needs would be greatly reduced. This is because new development would occur first in available parcels in the fully developed area, and second in the nonsensitive areas of the city. This pattern of development would tend to keep expansion in the north-south growth corridor and away from areas to the east and west of the city which are not on major highways. Following the Austin Tomorrow Comprehensive Plan would not radically change current land-use distribution in the city, since expansion of all uses, optimally, would be contained in the fully developed area and along the preferred growth corridor. If significant infill (filling of open spaces in developed areas) could be achieved, new residential use could be curtailed in outlying areas. To some extent the same could be true for commercial uses. For industrial uses, however, expansion would be forced into outlying areas because of the large parcels of land needed.

If annexation were pursued actively in areas where estimates indicate the most growth, residential uses would show the greatest proportional change in land area. This is because industries and commercial establishments are somewhat constrained to the city itself out of need for municipal services. Growth occurring in unannexed areas tends to be residential, since nonmunicipal services are frequently adequate to sustain such development.

If the maximum allowable amount of land were annexed by the City each

year, land available for all uses would expand, although it is unclear exactly how the proportions of land in particular uses would be affected. Since this is the most aggressive annexation option given in this report, commercial and industrial uses would probably be more dispersed, and would probably share a greater percentage of total acreage than in the two previous options.

Strip annexation, were it pursued more aggressively than other kinds of annexation, would increase the proportionate acres of land devoted to commercial and, to a lesser degree, industrial uses. Since relatively few acres of residential-use land are found along major thoroughfares, residential uses would not be significantly affected.

DENSITY. Following closely the guidelines of the Austin Tomorrow Comprehensive Plan would result in increased density in all areas of the city. Infill would be encouraged since growth would be contained first to the fully developed area, and second to the north-south corridor. Low density in relatively undeveloped areas in the ETJ would be maintained for a number of years. Optimally, low density in environmentally sensitive areas of the city would not be altered at all. Growth occurring in sensitive areas outside the city, however, would be difficult to control, and high-density development there would have adverse impacts on environmental quality.

Annexing areas where estimates indicate the most growth implies annexation of high-density development, since developers stand to gain by selling a greater number of units in high-demand areas. Since these high-demand areas are frequently in or near sensitive areas, environmental quality may suffer as a result. In addition, annexation of these areas may tend to discourage infill in the fully developed area, especially for residential uses.

Annexation of the maximum allowable acres of land would serve to decrease density in both the fully developed and the new areas of the city. If boundaries are stretched to the limits each year, there is a greater proportion of land available for development, and, consequently, less pressure for infill.

Strip annexation has the general effect of increasing the density of commercial and, to some extent, industrial establishments along major thoroughfares. Since municipal services would eventually be available to strip-annexed areas, a great incentive exists for firms to locate along heavily traveled routes where the establishments would be highly visible.

NEIGHBORHOOD PRESERVATION. Of the three dependent variables under land-use, assessing the impact of the policy options on neighborhood preservation is the most difficult. Since the concept of neighborhoods is somewhat vague in Austin, the notion of preserving these amorphous entities is unclear. For this reason, the effects of some policy options in the matrix on neighborhood preservation are difficult to quantify.

In very general terms, however, it is fair to say that increasing density can have adverse effects on neighborhood identity, since infill in older areas often involves construction of multiunit housing. This creates increased noise, more traffic, and generally changes the "established personality" of a neighborhood. This could be the case with annexation in conformance with the Austin Tomorrow Comprehensive Plan. The effects under the other growth scenarios seem unclear.

Strip annexation, however, can have discernible effects on neighborhood preservation. These could be perceived two ways. One, the aggressive use of strip annexation could establish identification with

certain commercial areas along major thoroughfares, since residential neighborhoods are often found adjacent to the development along the route. On the other hand, dense development along a major route dividing a neighborhood could severely fragment it. In addition, the tranquility desirable in residential development is generally disrupted when major development occurs along adjacent streets. Which of these two outcomes is more likely probably depends on the location, quality, and intensity of the commercial development occurring along the strip.

4.4.5 Transportation Variables

According to the Director of Austin's Planning Department, Richard Lillie, transportation may be Austin's most serious problem.⁷⁸ At first, it could appear that Austin's annexation policy has little effect on transportation. While there is some basis for this belief, the policy option matrix shows that different annexation policies can affect transportation needs in various ways. This conclusion is based on the assumption that annexation facilitates residential development in the annexed area. As discussed in the introduction to this section, the extent and nature of this effect is subject to debate. Nevertheless, if additional population locates in an annexed area, it will contribute to the congestion of the roadways and affect the transportation needs of the residents in the surrounding areas.

With this as the fundamental hypothesis, the matrix projects which roadways will be affected and how, what the impact will be on bus transit, and whether other mass transit options will be encouraged under the four annexation policy options.

In addition to the assumptions pertaining to the policy options selected for study, others have been employed in the transportation sections of this report. Specifically, these assumptions are:

1. The 1980 Austin Roadway Plan has been implemented.
2. The projection relates to the years 1995-2000.
3. The bus system has been altered to serve the routes with the greatest demand.

CITYWIDE AUTO TRAFFIC PATTERNS. As seen in the matrix, the location of citywide auto travel is different for each policy option. While the matrix is self-explanatory, it is important to note the differences between the options. Most significantly, since strip annexation does not manage growth to any significant degree, residential development would be virtually uncontrolled. It is likely that Austin would become a multinucleated city. The sprawl that would occur with this option is similar to what would happen if there were no annexation or growth control except zoning.

The multidirectional growth under a strip annexation alternative contrasts with uni-directional growth under an annexation policy developed to fulfill the objectives of the ATCP. While this may be preferable in terms of control, it may not be preferable in terms of volume and road use.

Under the policy of strip annexation, an increase in the use of nearly all roads may be expected, and all roads will bear part of the burden of Austin's inevitable growth. Under the option conforming with the ATCP, however, the entire Travis County portion of IH-35 will be congested, and the level of service will be unacceptable, as defined in Table 9 (see Chapter 7 below). Central business district (CBD) congestion will be most severe. This severity, however, may also occur under other policy options.

Under the second policy option (annexation of land where past growth and estimates indicate future growth), and the third maximum allowable

annexation, option congestion will occur in the CBD. This is attributable less to the annexation policy and more to the low parking and high-density levels in the downtown areas. In choosing either of these options, areas in the north, northwest, and southwest primarily will be affected. As the matrix details, several portions of U.S. 183, Loop 360, U.S. 290, and IH-35 will be congested, and the level of service will be unacceptable under the second historic priority. Under maximum allowable annexation, it appears that the above will occur, plus additional roads will become congested. While this is true, it must be noted that this congestion could occur if the City annexes any land in the north, northwest, or southwest directions; however, only under the option of maximum allowable annexation will the City be responsible for road maintenance and the provision of transit services in all areas.

CITYWIDE MASS TRANSIT PATTERNS. If the City chose to annex land in compliance with the objectives of the ATCP, transit service could be upgraded and provided more easily. For example, since growth would occur along the corridor, the number of routes could decrease because fewer places would need transit service, and frequency of service could increase.⁷⁹ The opposite would be true under the option of strip annexation. The greater number of areas in which transit service would be required would increase the number of routes needed and decrease the frequency of service.

Mass transit would be required to serve more intraneighborhood areas, as opposed to those along major streets and highways, if Austin chose to annex the second policy option or the maximum allowable annexation option. This growth would occur in the northwest, north, southwest, and southeast. Industrial growth is expected in the southeast areas of the city. As a result, more routes would be required to service neighborhoods and transport residents from the north to the southeast

areas. Hence, the number of routes would increase and the frequency of service would decrease.

Other mass transit systems would be feasible under all the annexation options except strip annexation. This is because the scattered nature of growth projected under strip annexation may not concentrate population enough to make the investment useful to many citizens. Under other options, however, other transit modes would be encouraged. Commuter rail would be encouraged if the City annexed north and south areas, because existing rail lines run in these areas and directions. Further, the congested nature of the CBD under all the annexation alternatives would virtually necessitate downtown trolleys. Similarly, efficiency of mass transit compared to parking in the CBD is high for all annexation options.

In summary, each annexation alternative has different effects on the shape of future transportation needs and systems. Strip annexation, and the scattered growth that would result, causes problems for an adequate transit system and does not encourage mass transit in any way. This is a serious deficiency. Unfortunately, under the other options many important roadways will be congested. This section concludes that there will be serious roadway congestion regardless of the annexation policy Austin chooses.

5. ZONING POLICY OPTIONS

5.1 INTRODUCTION

Zoning is an important land-use planning tool in Austin. Zoning determines what areas of the city may be residential, commercial, industrial, or any mix thereof. Its purpose is to regulate land use so that adjacent uses are compatible.

Many of the goals in the Austin Tomorrow Comprehensive Plan are related to the Zoning Ordinance. Whether one's goal is to facilitate transportation in the city or prevent overdevelopment in neighborhoods, the Zoning Ordinance is involved. Because of its relevance to the implementation of the Comprehensive Plan and the overall design of the city, it has been chosen as a policy issue. In this section we will compare the effects of the current zoning ordinance with the anticipated effects of the proposed ordinance.

One of the most important differences between the current and proposed ordinances is the proposed elimination of cumulative zoning. Under cumulative zoning, districts are classified from most permissive to least permissive, with the most permissive allowing many different kinds of uses, and the least permissive allowing only very specific uses.

At the time of this analysis, the December 1982 recommended revisions to the Zoning Ordinance by the Planning Commission comprised the proposed Zoning Ordinance. Since that time the City Council has begun consideration of the new ordinance, making some modifications to it. One of these was to modify some of the provisions eliminating cumulative zoning. Because the authors believed that the ordinance as proposed was a good policy option for consideration and because it would have been

very difficult to change the analysis each time the City Council modified the proposed ordinance, the ordinance proposed as of December 1982 is the one used as a policy option here.

Under the current ordinance the single-family residence districts are the least permissive. These districts allow developers to build only single-family homes, with differing densities according to the particular district. Schools, churches, farms, and some other low-density uses are also allowed in these districts. Multifamily districts allow for the construction of multifamily housing of varying densities and types, according to the guidelines of each multifamily classification. All uses permitted in single-family districts are also allowed in these districts. These districts are followed by office, retail, commercial, and industrial districts, with each district allowing all uses permitted in the less permissive districts.

The proposed ordinance is noncumulative. Each district specifies allowable uses and does not allow the developer the option of building according to uses in less restrictive districts. The industrial zone in the proposed ordinance thus allows industrial uses, plus a specified range of uses for which variances must be granted. The uses permitted in the commercial and residential districts are not allowed in the industrial districts as they are under the current ordinance.

Future development patterns will be more predictable under the proposed ordinance since cumulative zoning is eliminated. Each district will allow only a few different types of uses instead of the broad range of uses permitted currently. Planning for future services to the district is thus much easier to do, and this improved planning capability is one of the most important differences between the two ordinances.

5.2 ASSUMPTIONS

In order for the ordinance change to have any impact on future growth in the city, the restrictions specified in the proposed ordinance will have to be enforced consistently. The anticipated impacts of the proposed ordinance are based on the assumption that a zoning designation will indeed determine the type of development which will occur on a given piece of property. If variances or zoning changes are too easily granted, then neither the current nor the proposed ordinance will have any great impact on development, and the differences between the two ordinances will be much less significant.

The Zoning Ordinances only regulate uses allowed in a particular district. The Master Plan applies these categories to each parcel of land in the city. Thus any changes specified in the proposed ordinance will only affect the particular uses allowed in a given district. They will not change the zoning classification of any piece of land.

Other city ordinances, such as creek and watershed ordinances, also establish standards for development that are generally stricter than those specified in either Zoning Ordinance. In all cases it is the stricter ordinance that takes precedence.

5.3 EFFECTS OF POLICY OPTIONS ON DEPENDENT VARIABLES

5.3.1 Economic Variables

POPULATION. Regardless of whether cumulative zoning laws are maintained or a stricter Zoning Ordinance is adopted, the population in Austin and the SMSA will increase. The Austin Planning Department predicts that by the year 2000, 1,063,100 people will live in the SMSA. The fastest growth will occur in Hays and Williamson counties.⁸⁰ A stricter Zoning Ordinance in Austin may facilitate faster growth in

these two counties. As more people move into the SMSA, they are likely to be attracted to the more lenient land-use regulations outside the city. There is some evidence that this is occurring in areas immediately outside the city limits. For example, from 1970 to 1980, there was a 71 percent increase in the number of housing units in Austin. Round Rock, one of the closest cities to Austin, had a 401.9 percent increase in the number of housing units in that period. In this period, Travis, Hays, and Williamson counties had 73.4, 75.2, and 113.7 percent increases in the number of housing units, respectively.⁸¹ The effect of zoning restrictions on migration patterns is likely to decrease as suburbs incorporate and enforce Zoning Ordinances or the City annexes most of the outlying areas.

CITY REVENUES. The proposed Zoning Ordinance will have little effect upon the City's revenues and expenditures. City revenues will increase as the population and tax base increase. Zoning is just one of many governmental decisions that may affect property prices and tax base. Other factors are annexation, provision of services, tax rates, and city regulations.⁸² The City estimates that the proposed Zoning Ordinance will have no effect upon the City's tax base since currently developed land constitutes 96 percent of the appraised value of real property in the city.⁸³ Single-family residential housing comprises 53 percent of the City's property tax base. Provisions of the proposed ordinance that reduce the amount of land required for single-family housing will increase the total value of land per acre.⁸⁴ This may increase the tax base. A proposed increase in fees for site plan review will also increase city revenues.⁸⁵

CITY EXPENDITURES. The cost of implementing the proposed Zoning Ordinance will increase the City's expenses for several reasons. The required notification, redrafting, and remapping will require additional

personnel time. Additional staff hours will be necessary because of the increased workload required to administer and implement the new ordinance, develop new administrative procedures, and monitor grandfathered land uses, maintain overlay maps, and review site plans.⁸⁶ In the five-year period from 1982 to 1987, it is estimated that it will cost the City \$748,796 in expenditures to implement the ordinance. If the fees for site review are increased from \$100 to \$160, net cost of enforcement will be \$672,796.⁸⁷

In order to determine the possible effects of the proposed Zoning Ordinance on city revenue, the City's Management and Budget and Tax departments examined twelve recent zoning cases. The study assessed the most negative effects of the proposed Zoning Ordinance. The Department of Management and Budget predicts that the tax base will increase 7 percent per year from improvements to city property and annexation. In the worst-case scenario, the proposed Zoning Ordinance would decrease the rate of increase of net appraised value by 6.4 percent. This would result in .5 percent loss in tax base beginning in fiscal year 1985-86.⁸⁸

Since the proposed Zoning Ordinance makes ample provision for commercial and industrial uses, there should be no effect on employment and business starts. The Zoning Ordinance also should not have an impact upon the unemployment rate.

5.3.2 Infrastructure Variables

WATER AND WASTEWATER. The change in the proposed ordinance which will have the greatest impact on water and wastewater service provision is the elimination of cumulative zoning. Under the old ordinance, for example, a piece of property zoned for commercial use could be developed as retail property, or any less restrictive use, such as multifamily

housing. The difference in water and wastewater services needed by the two different uses is very great. If an eight-acre site were developed commercially, it might need about fifty-two living unit equivalents (LUE) of water daily and produce an equivalent amount of wastewater. One LUE of water is the amount used by an average Austin household (about 3.5 persons) in one day. At an average use of 100 gallons per person per day, a LUE is currently 350 gallons per day. (In the future this level may be lower because of conservation requirements in the building code and other conservation efforts led by the city government.) If the property is instead developed with 300 apartments, it would need about 150 LUE of water, or three times the amount needed under commercial development.⁸⁹ This variation makes planning very difficult.

WATER AND WASTEWATER RATES. There should be no difference in costs to the City (hence in costs to consumers) to supply water and wastewater services under either ordinance. Through the Approach Main Review Process, the City receives information from a prospective developer on water and wastewater transmission needs, and the developer must make a commitment to use these levels of service. If any upgrading of existing transmission mains is necessary, the City can negotiate for compensation, require the developer to lay oversize pipes to serve other customers, or require the developer to provide other services to offset the costs to the City. The City generally does very well in this process and recovers nearly all the costs from the developers. Thus, under the proposed ordinance, even though transmission mains will require upgrading less frequently, the City will not register any great cost savings.⁹⁰ Capital recovery fees, which deal with extensions of water and wastewater service to new areas, are not involved since the Approach Main Review Process regulates only the replacement or improvement of existing mains.

WATER PRESSURE. Problems can arise under the current ordinance when a new development draws more water than the Water and Wastewater Department has planned for. Through the Approach Main Review Process, however, the City is able to require developers to upgrade approach mains to maintain minimum water pressure standards. Though the appropriate size mains would be laid in the first place, under the proposed ordinance, and will be less likely to need upgrading, the water pressure improvements will not be great.

WATER AND WASTEWATER PLANT CAPACITY. Since the proposed Zoning Ordinance affects only the location and not the amount of new development within the city, the overall service level will not change. Hence, the necessary treatment capacity for the system will not be affected.

WATER AND WASTEWATER TRANSMISSION CAPACITY. The proposed ordinance will have its greatest impact on this infrastructure variable. Since the Water and Wastewater Department will be able to plan more accurately for service levels on future development sites, the proper transmission capacities can be installed for given areas of the city. The ordinance itself will not affect overall capacity needs, however.

The Water and Wastewater Department is now frustrated in its efforts to plan for future service levels in particular sections of the city. The proposed Zoning Ordinance, through its elimination of cumulative zoning, eliminates much of this uncertainty, though there is still some uncertainty in planning for the service needs of industrial districts. While residential and retail customers, as well as office developments, have fairly predictable water and wastewater needs, industrial customers do not. One particularly difficult planning problem has been predicting what type of industry will locate near the new Lockheed plant in

Southeast Austin. If several semiconductor companies locate nearby, there will be no excessive demands for water and wastewater service since the manufacturing of semiconductors is a "dry" industry which requires little water. But one metal-finishing plant would require large amounts of water. These differing service needs confound planning for service delivery in the area.

In sum, the new ordinance eliminates more of the uncertainty in water and wastewater infrastructure planning than the old ordinance, but does not alone allow for completely accurate planning.

5.3.3 Environmental Variables

Austin's environmental goals are difficult to achieve under the current cumulative approach to zoning. Noncumulative zoning under the new ordinance increases the predictability of new development locations and thereby facilitates comprehensive environmental planning. Specifically, the new ordinance will control floodplain development better, complement the enforcement of the environmental ordinances, and help protect undeveloped lands.

CHANGE IN DEVELOPMENT/FLOODPLAIN. Development in the floodplain significantly increases the risk of flooding, and it is only through the control of land use in these areas that flood losses can be eliminated.⁹¹ Cumulative zoning has hampered efforts to control floodplain encroachment and plan city projects because it results in unstable development patterns. It is felt that a more comprehensive floodplain policy is necessary; for example, it has been suggested that the current piecemeal approach to floodplain regulation be replaced with floodplain restrictions built into the Zoning Ordinance. These restrictions would aid consistency of enforcement, but would be hampered by the difficulty of mapping the floodplain. A separate floodplain

ordinance overlaid on zones has also been suggested. While such an ordinance would help establish a more comprehensive floodplain policy, it would continue the fragmented approach to policymaking on environmental issues.

The proposed ordinance does not offer a comprehensive floodplain policy but does modify the existing restrictions. Such passive uses as parks in the one-hundred-year floodplain will be allowed.⁹² Certain types of nonresidential construction will also be permitted if approved by the Director of the Department of Public Works under the criterion "that such construction will not contribute to the potential for flooding at the site or any other site in the same watershed."⁹³

Some city officials and informed citizens feel that this nonencroachment criterion is easily manipulatable, so that developments that appear on paper not to change the floodplain often do increase flooding in reality. Noncumulative zoning should lessen floodplain encroachment by making variances harder to obtain. This is accomplished by listing permitted and conditional uses for each district, thus reducing the number of possible uses allowed when variances are granted. The variance process itself remains unchanged, so whether or not variances are harder to obtain depends on how stringently the Planning Commission and the City Council adhere to listed conditional uses in each district when considering variance requests. Additionally, if we assume that conditional uses have been selected with care, then the number of variances granted should be significant within reasonable limits; consistency is still preserved within zones.

The proposed Development Reserve District (DR) will temporarily prohibit development in areas deemed not yet suitable for development, with yearly review of all DR zones to reassess their classifications.⁹⁴

The ordinance is not clear in specifying criteria for determining when development is appropriate on lands zoned DR.

A two-stage approval process for Planned Unit Developments (PUDs), also proposed, will help ensure that the final development plans are consistent with those originally approved in the first "concept plan" stage.⁹⁵ This process requires extensive documentation during both stages of all relevant features of the proposed development and the lot, and it allows the Planning Commission an additional thirty days (not included under current provisions) before rendering its final decision in order to obtain any needed information not included in the application. These features ensure that the final approved plans conform with those originally approved.⁹⁶

Landscaping requirements are strengthened under the proposed ordinance so that 20 percent of the required street yard be landscaped for lots where building permit applications are filed after January 21, 1984, or where lots are previously unplatted, zoned or rezoned, or granted a conditional use permit after July 7, 1982.⁹⁷ Currently, 10 percent of the required street yard must be landscaped. Landscaped areas must be maintained, and parking lots must be buffered from street view.⁹⁸

Open spaces are also required in all developments; street yards, offstreet parking areas, and driveways, which must be provided, do not count as open space. All required open spaces must be permanently maintained.⁹⁹

APPLICABILITY OF ENVIRONMENTAL ORDINANCES. When restrictions pertaining to impervious cover and density in the Zoning Ordinance are in conflict with the watershed ordinances, the more restrictive ordinance always takes precedence. The proposed ordinance places

district-by-district limitations on impervious cover and density, facilitating consistent enforcement.

Austinites have become increasingly aware of the environmental characteristics of the area since the Creek Ordinance was passed in 1974; this awareness is reflected in several aspects of the proposed Zoning Ordinance. For example, in all lots where new developments are proposed (necessitating a site plan review--not all land uses apply), erosion control measures for all lots with average slope in excess of 10 percent must be specified.¹⁰⁰ Erosion control will help to reduce increasing levels of sedimentation in Austin's creeks. High sediment levels choke off some forms of biological life, increase water treatment costs, and may hamper creekbed aquifer recharge. The recently approved drainage maintenance fee should help offset treatment costs; however, because the overwhelming majority of aquifer recharge takes place in creekbeds, reducing sedimentation must be a priority.¹⁰¹

We should reiterate that noncumulative zoning would greatly enhance the consistent enforcement of our environmental ordinances. Taken together, the creek and watershed ordinances, and the landscaping, open space, and erosion control requirements of the proposed ordinance should help control storm runoff levels, reduce total sedimentation in our waterways, and provide a more beautiful city.

WATER QUALITY. While neither the current nor proposed Zoning Ordinances discuss water quality directly, some inferences may be made. Increased traffic volume as growth occurs may contribute to higher levels of lead in our water; these levels may vary according to which watersheds and zones become congested. In addition, erosion controls in the proposed ordinance, together with such restrictions in the creek and watershed ordinances, may help reduce the levels of total suspended

sediment found in the waterways, as previously stated.

PREDICTED INCREASE IN INDUSTRIAL PUMPAGE. This should not be affected by either the current or the proposed Zoning Ordinance. Industrial pumpage is more dependent on the number of industries in the city. Zoning policies in general affect the location, rather than the amount, of industry.

EFFECT ON ENVIRONMENTALLY SENSITIVE AREAS. The current Zoning Ordinance makes little provision for environmentally sensitive areas per se. The major concession the ordinance makes to this concern is the Lake Development District. The Lake Development District in the current ordinance requires all land uses to obtain a special permit from the Council and submit to a review by the Parks and Recreation Board and the Citizens' Environmental Board. In practice, however,

the purpose of the District is not clear and the criteria for the review of special permits are difficult to interpret. The zone designation has been applied only to a few sites near Town Lake which are surrounded by numerous properties with other designations not subject to the special permit requirements."¹⁰²

Blayne-Dyett and Charles Hall Page and Associates, consultants to the City of Austin on the proposed Zoning Ordinance, suggest that a combining district be formed to apply to all lake-related sites (which would provide specific review criteria for the different uses). Their report foresees problems in identifying the purpose and intent of such criteria.¹⁰³ The difficulty in identifying criteria follows logically from the ambiguity of the purpose for having a Lake Development District; the zone tries both to protect and develop the Lake. The zone would be more effective if its primary purpose were more clearly identified. The Lake Austin Watershed Ordinance protects Lake Austin.

The proposed Zoning Ordinance includes more provisions directly

related to protecting sensitive areas than currently exist. Generally, it allows for larger lot sizes and lower densities and amount of impervious cover in more sensitive areas. A Lake Austin District is proposed to limit lot size, impervious cover, construction on slopes, and shore setbacks for lots within one thousand horizontal feet of the Lake.¹⁰⁴

Other new districts proposed to enhance environmental aesthetics include the Downtown Parks Zone, Downtown Creeks Zone, and the Town Lake Zone. These three zones act to promote pedestrian use and public accessibility to creeks and parks while enhancing the scenic character of Town Lake and the downtown area. Each is intended to be used in combination with the central business district and acts through limiting building heights, screening parking entrances, and limiting building materials to those more pleasing to the eye (e.g., less reflective).¹⁰⁵

Beyond this, the proposed Zoning Ordinance also provides for an Agricultural Zone to preserve prime farm lands. These proposed districts, in concert with the specificity of uses allowed in districts, would enhance protection of sensitive areas especially well in combination with other policy choices, such as acquisition of land. The proposed ordinance also regulates impervious cover citywide and requires landscaping and open spaces; these, however, are largely aesthetic benefits, though helpful in mitigating runoff. Larger lots are required in more sensitive areas.

If the proposed Zoning Ordinance is not implemented we can expect development to continue in unpredictable patterns, continued floodplain encroachments as variances are granted for widely divergent uses, and more uncertainty for planners, developers, and citizens alike as the City tries to enforce fragmented policies in a comprehensive fashion.

In the long run, both the quality of the environment and the integrity of the neighborhoods will be damaged if cumulative zoning continues.

Under the proposed ordinance, environmental controls are stronger, though many would say not strong enough. Uses in each district and methods to harmonize between-district uses are clearly spelled out, reducing the likelihood of obtaining variances for vastly divergent land uses from those already in a zone and mitigating between-district eyesores. Planning of new projects and enforcement of ordinances will be easier under the noncumulative approach to zoning.

5.3.4 Land Use Variables

Land use is most directly affected by the City's Zoning Ordinance because the purpose of zoning is to control land use. It is the City's tool for harmonizing land use so that adjacent areas are compatible. Austin's proposed ordinance will increase the predictability of land use in the city, facilitating better planning and increasing the stability in existing neighborhoods.

DISTRIBUTION. Some people are worried that the proposed ordinance will lower land values by placing more restrictive uses on many parcels. This is not necessarily true. The proposed ordinance is not intended to change present designations. If the proposed ordinance passes, current uses will be translated into the use classification most similar to the existing one. Land zoned commercial will remain commercial, and parcels currently residential will stay residential. For commercial and industrial districts, the proposed ordinance will be more restrictive in the sense that less-intensive uses are not allowed in these districts. On the other hand, certain commercial districts may be less restrictive in that the allowable density could be greater.

The primary change in the proposed ordinances is to noncumulative zoning. Primary and conditional uses for each category are clearly listed. This will have an effect on where developments occur. Because less-intensive uses (single-family residences) will not be permitted in more restrictive zones (industrial), there could be a decrease in parcels with mixed uses over time. This will have the most impact by prohibiting multifamily residences from being built on parcels zoned retail or office. The exceptions to this are in the proposed central business district and mixed-use combining districts, where a variety of uses are allowed.

The restrictive element of noncumulative zoning is mitigated by the addition of more single- and multifamily residential use categories. These categories should allow for more varied and efficient uses of the land within the city. Under the present ordinance, the minimum single-family lot size is 5,750 square feet. The proposed ordinance allows for a minimum lot size of 3,600 square feet. This should increase the number of single-family residences and make housing in the city more affordable for low-income families.

In all, the noncumulative approach in the proposed ordinance will result in more compatibility in adjacent land uses and more efficiency of land use. The aggregate growth of land zoned commercial, residential, industrial, and so forth should not be affected, but the variation in land uses within the city will be.

PROPORTION OF IMPERVIOUS COVER. Impervious cover increases the chances for flooding because it shortens the time of runoff and adds to its overall amount due to the inability of the surface to absorb water. It also has a negative effect on water quality because the runoff carries with it the pollutants left on the area covered.

The current Zoning Ordinance has no impervious cover restrictions. Such restrictions are found in the watershed ordinances and therefore apply only to land affected by those ordinances. These include the Lake Austin Watershed Ordinance, the Barton Creek Watershed Ordinance, the Williamson Creek Watershed Ordinance, and the Lake Austin Peninsula Ordinance. Impervious cover restrictions may be imposed in areas not covered by the watershed ordinances as an outcome of contract zoning or a site plan review.

The proposed ordinance restricts the amount of impervious cover allowed in most use districts. An exception might be in the CBD, where 100 percent coverage is allowed. Although the overall amount of impervious cover will increase under both ordinances as the city grows, the growth will be slower under the proposed ordinance. Limits under the proposed ordinance are as follows:

TYPE OF PROPERTY	RANGE OF LIMITS
Residential	20 to 80 percent of lot
Commercial	60 to 100 percent of lot.

DENSITY. Regardless of which ordinance prevails, the density within the city will increase. It is difficult to project how the proposed ordinance will affect this density over the long run.

The most direct impact the new ordinance might have in terms of density is preserving or increasing single-family residential neighborhoods. As mentioned before, the noncumulative nature of the new ordinance protects residential property from incompatible adjacent uses. Incidences of spot zoning will also decline under the proposed ordinance. The new SF-4 zone, allowing for smaller single-family lots, will encourage more housing development in the core of the city. Mixed use, combining districts and the CBD, will preserve and enhance the vitality of the city's core by making it more attractive and practical

to live in these areas.

The noncumulative nature of the ordinance may reduce the density of large multifamily developments in the central city area in the long run. This is because it does not allow for multifamily uses in less restrictive areas. Hence, the availability of such areas may decrease with the proposed ordinance.

The proposed agriculture district will serve to protect open space and agricultural lands from high density by limiting the size of lots to ten acres. The Development Reserve District will replace the interim zoning category, which will impose more strict density limits on newly annexed land. Lots in this category are also limited to ten acres.

The aggregate effects of the two ordinances on density will be minimal. The noncumulative aspect of the proposed ordinance should preserve the purity of the various use districts as the city grows and will allow for more predictability of development density. This will also facilitate the planning of mass transit.

NEIGHBORHOOD PRESERVATION. The proposed ordinance will preserve the integrity of neighborhoods. This is one of the more direct impacts of noncumulative zoning. The proposed ordinance requires site plan reviews for some single-family and all multifamily residential areas. These reviews will help to ensure that unfavorable effects of certain developments do not carry into adjacent uses. Under the current ordinance such a review process takes place on an ad hoc basis.

Buffering through the use of screening, height, and setback requirements is provided in the proposed ordinance whenever commercial and industrial uses abut single-family residential areas. In such cases height is restricted to sixty feet depending on the setback from the

property line.

By increasing the degree of predictability of developments, by requiring buffers for adjacent incompatible uses, and by decreasing the chances for spot zoning, the proposed ordinance will add significantly more to neighborhood preservation over time than the current ordinance.

5.3.5 Transportation Variables

The current and proposed Zoning Ordinances are not designed to address large-scale traffic flow and public transportation issues specifically. Nonetheless, most of the effects are worth mentioning as they confirm and intensify the findings under the other dependent variables. Deductions can be made from the roadway and parking regulations discussed as to their effect on roadway planning and design and on mass transit implementation.

The current Zoning Ordinance addresses transportation issues in Article III, Standards and Requirements, Section 45-30, Off-Street Parking; and Article V, Principal Roadway Areas, Sections 45-57 through 45-61.¹⁰⁶ The proposed ordinance addresses transportation issues directly in Section 5100, Principal Roadway Areas and in Section 5700, Off-Street Parking and Loading Regulations.¹⁰⁷

The current Zoning Ordinance specifies that all land uses in Area I of the Central Business District (CBD) shall provide at least 10 percent of the off-street parking requirements or shall pay \$5000 per space to the Special CBD Parking Fund established by Ordinance No. 781005-E. The same shall apply to Area II of the CBD except that land uses shall provide 40 percent of the off-street parking; land uses in Area III shall provide 25 percent; and in Area IV, 10 percent. Office buildings are required to provide one off-street space per 200 square feet of

gross floor area.¹⁰⁸

The proposed Zoning Ordinance requires that facilities be provided proportional to the need created by each use in order to ensure functionally adequate, aesthetically pleasing, and secure off-street parking and loading facilities. Basically, off-street parking must be provided for any new building or any new use of an existing facility. Special provisions are applicable to central Austin "to recognize and encourage relatively greater mobility and accessibility by transit," and "to promote the construction of appropriately located public parking facilities."¹⁰⁹ Because relative distance to the workplace and the cost of parking figure into the convenience of driving and parking, the priority allocated to off-street parking in the CBD could be an important factor in commuters' decisions to use or switch to mass transit in place of the private automobile. For office and administrative activity, the general off-street parking requirement is one space per 300 square feet.¹¹⁰

The Principal Roadway Areas sections of both ordinances are concerned with site plans, landscape requirements, and safe access and egress.¹¹¹ The effects of these sections on traffic flow and mass transit use are not expected to be significant.

In his presentation to the Austin Tomorrow Ongoing Committee (ATOC) on October 13, 1982, Roger Baker emphasized the importance of integrating zoning policy with transit policy to achieve a high transit ridership.¹¹² Free parking spaces provided at many workplaces are a substantial subsidy for the commuter. Charging for parking that is now free or increasing unreasonably low fees (or not providing parking spaces at all) would greatly encourage mass transit ridership or car- and van-pooling.¹¹³

CITY TRAFFIC PATTERN BY AUTOMOBILE. A notable difference between the two ordinances, the current and the proposed, is the less predictability available to planners in the former. The ability to predict under the proposed Zoning Ordinance will mean that roadway planners may be able to provide better for development and density centers, thereby alleviating some traffic congestion. The volume to capacity of autos will generally be higher because of unexpected and changed (due to rezoning) traffic flow if the current Zoning Ordinance is maintained and the opportunity for greater congestion and an overall decreased level of service is greater. If the proposed Zoning Ordinance is enacted, the level of service for auto traffic may increase slightly.

CITY TRAFFIC PATTERN BY MASS TRANSIT. The same analysis applies to mass transit: the ability to predict under the proposed Zoning Ordinance may enable mass transit planners to align bus routes with demand better, thereby increasing the chance for greater use of the City's mass transit service. The possibility for routes to precede or be installed in conjunction with growth is also greater with the proposed Zoning Ordinance, and established mass transit routes may actually become an incentive for development in some areas. The type of service provided under the existing ordinance is less amenable to changing to other types of transit than bus service because future developments are less predictable. The proposed Zoning Ordinance, however, would be more likely to allow planners to incorporate bus lanes, reversible lanes, and eventually in-place systems, such as light rail, into long-range plans.

UTILITY OF MASS TRANSIT TO AUTO AND PARKING. The utility of using mass transit is better under the proposed ordinance for the reason stated above: more consistent long-range planning can be applied by system designers and riders to increase the opportunities for transit

use. As an increasing number of people use mass transit, especially for their commuter trips during rush hours, there will be fewer cars on the road contributing to congestion. One factor in both the current and proposed Zoning Ordinances does not serve to promote greater use of transit ridership: the provision for parking in the CBD area. If off-street parking were limited even more in this area, people who worked downtown would have greater incentive to use the bus since parking downtown would be difficult and expensive. The proposed ordinance has some reduced and different requirements for the number of off-street spaces which must be provided, however, so that it may encourage more transit use. A notable difference is that the current ordinance requires one off-street parking space for every 200 square feet of office space, while the proposed ordinance requires one space for every 300 square feet in areas other than those specified in CBD exception areas.

In summary, predictions about the differences for transportation between the two ordinances are speculative, but the proposed ordinance probably will encourage more mass transit use and its overall thrust would enable mass transit planners to provide more efficient service for the future.

6. CAPITAL RECOVERY FEE POLICY OPTIONS

6.1 DESCRIPTION OF POLICY OPTIONS FOR FINANCING INFRASTRUCTURE NEEDS

Two different kinds of policies involving infrastructure financing were examined for their effects upon the dependent variables listed in the matrix. They were:

1. the financing of water and wastewater services adequate for a growing area by assessment of a capital recovery fee, a one-time charge per unit for new service intended to defray costs of installation of sewer and water lines and treatment plants; and
2. the financing of a transportation system and network that addresses future transportation needs by various rate structures.

For a more thorough presentation, these two sets of policy options are treated in both this chapter and the next, although both relate to the problems of financing infrastructure needs in a growing city.

6.2 POLICY ASSUMPTIONS

Some general assumptions regarding the capital recovery fee issue should be mentioned to provide consistency and a point of reference within the report. The capital recovery fee was chosen as the policy option for financing water and wastewater infrastructure because it is a policy which has recently been initiated by the City Council, and because its adoption marks further movement in a direction undertaken just a decade ago regarding growth policies in Austin. It is assumed that capital recovery fees provide the means for the City to prevent increases in bonded indebtedness and to slow the increase in utility rates. The fees are intended to direct the costs of growth to those who will directly benefit from it--the builders, owners, and occupants of new structures--and to prevent the costs from being passed on to rate payers in general, including people living on low or fixed incomes and

people unable to afford owning a home. The capital recovery fee concept has been touted by many as a tool to make growth pay for itself.¹¹⁴

The current fees are levied for the purchase of water taps and wastewater connections in new service areas. Since the fees are due before new structures can be hooked up to receive water and wastewater services, they should enhance the City's ability to plan the specific infrastructure requirements of a given area. At least from the time that a building permit is granted, the City should be able to plan for provision of services based on the number of units under construction in a certain area, the approximate number of people to be housed, the amount of the capital recovery fees to be collected, and the physical composition of the area to be served.

The existing capital recovery fee ordinance became effective in September 1982, but little money has been collected because of a grandfather clause which allowed hundreds of applications to be submitted and approved prior to the effective date of the ordinance. The City Council granted exemptions for nonresidential development and water taps already purchased but not yet used. Because the fee had been under discussion for several months before passage, some developers bought quantities of taps in anticipation of the outcome, causing an estimated loss to the City of \$16 million in deferred fees.¹¹⁵

For the first six months after enactment, only developments in the service area outside the city were required to pay the fee, which is just \$500. For the next six months, a 75 percent discount was given on the fee, both in and outside of the city. Every six months thereafter, until September 1984, the discount will drop another 25 percent. The discount will end in September 1984.¹¹⁶

As enacted, the fees are \$2,000 per living unit equivalent, with

certain exceptions having been granted, such as for single-family detached residences smaller than 2,000 square feet.¹¹⁷ A one-unit equivalent is the average number of persons living in a single-family household (currently 3.5). The City measures the living unit equivalent by the size of the water meter installed to serve the structure.¹¹⁸ The Water and Wastewater Department estimates that the present cost to provide infrastructure for new water and sewer services by the City is actually \$7,470 per living unit equivalent, including interest costs.¹¹⁹ Therefore the present fee is not a "full recovery" fee.

The policy options are as follows:

- The No Capital Recovery Fee option, as its name suggests, consists in not having a recovery fee to recapture any of the capital costs associated with the financing of new projects.
- The Present Fee Structure refers to the City's existing recovery fee of \$2,000, which recoups only a portion of capital costs expended for new projects. The same dependent variables are re-examined in light of partial recovery of costs from users.
- The Full Capital Recovery Fee option entails the adoption of a recovery fee which would recapture 100 percent of the costs required to provide new water and wastewater services.

6.3 EFFECTS OF CAPITAL RECOVERY FEE POLICY OPTIONS ON DEPENDENT VARIABLES

6.3.1 Economic Variables

CITY REVENUES AND CITY EXPENDITURES. Part I, Section 12 of the city ordinance which establishes the recovery fee now in effect states that "the use of all fees generated by this Ordinance shall be deposited in a separate fund for Water and Wastewater Capital Improvements for expansion of the Utility System."¹²⁰ By this action revenues from the fee can be allocated to debt service for new growth projects, construction fund costs, or the purchase of new facilities or equipment.

From an accounting standpoint, the nature of the recovery charge, which is intended to defray costs to the City for capital expenditures, precludes it from being credited as a general system revenue. The proceeds from this fee are recorded as gross revenues, and the funds are later transferred to the water and wastewater account for the payment of debt service. This means that general city revenues will only be temporarily affected by any capital recovery fee receipts as long as the ordinance directs expenditure of the fee in the same manner. Consequently, expenditures in other operating areas will not include proceeds from the capital recovery charge, regardless of whether it is a full or partial recovery fee.

Under the No Recovery Fee option, reliance remains on revenue bonds to finance these capital projects. The bonds are paid for by income generated through water and wastewater utility rates. Historically, the income has been sufficient to meet debt service requirements and maintain a reserve fund. This self-sufficiency and the self-contained nature of the utility's accounting system voids any significant effect on general city revenues and expenditures.¹²¹

6.3.2 Infrastructure Variables

Before the adoption of a capital recovery fee, the utility rate structure was uniform throughout the city. Bonds were sold to finance extension of service to new areas. Voters have not been inclined to approve such bonds if they felt this would have a significant effect on their utility rates. Bonds that are approved are likely to be the ones that provide additions and rehabilitation to existing facilities, since there seems to be support for the idea that the provision of "new" services should be financed by those who require them. Increases in plant and transmission capacities essentially result from an extension of services and would therefore not likely be a priority to many voters.

Improving or increasing water pressure constitutes an upgrading of service having direct benefits of convenience and fire safety, even though it may require new pipes and a new pump station, and might have a better chance of approval. Therefore, without a capital recovery fee, plant capacity costs and transmission of the actual cost of new service extensions, and consequently, the reliance on utility fees to cover any bonded indebtedness for such projects, must continue.

Under the Full Capital Recovery Fee, however, all new service requirements would be self-supporting. Service upgrading, paid for by selling bonds, would be the only burden on utility rates. All the water and wastewater facility needs of the citizens of Austin (such as plant capacity, transmission capacity and water pressure) could then be met without raising the monthly rates that all water customers pay.

6.3.3 Environmental Variables

WATER QUALITY. Both the present capital recovery fee structure and the full recovery fee structure increase the possibility of improving water quality by encouraging the use of sanitary sewers instead of septic tank systems in subdivisions. Also, the collection of capital recovery fees makes easier the financing of public treatment plants, which improves their quality and reduces their current overload. The more cost recovered, the more improvement is possible in water quality.

6.3.4 Land-Use Variables

Since at least 1940, the City has repaid to developers the entire cost of extending water and wastewater services to new areas, covering the costs with a promised percentage of monthly water and wastewater service fees.¹²² This full subsidy for new services had the effect of encouraging growth, since the City would reimburse in full developers who built water line extensions. Although the 1940 law was amended

fourteen times between 1940 and 1975 as the area began to grow more rapidly, the City found itself financially burdened by its obligations to repay developers for new line extensions. Furthermore, the practice had led the City to pay for development in new areas without regard to the provisions in the Master Plan calling for more intensive development along a "growth corridor" on either side of IH-35.

In 1973 the City Council voted to discontinue the practice of reimbursement for new water lines when the lines were located outside the city limits. Their action marked the beginning of the use of water and wastewater utility financing as a growth management tool.¹²³ The installation of water lines inside the city was still repaid, only now it was in five equal yearly payments from the operating budget.¹²⁴ A 1979 resolution permitted the City to subsidize 75 percent of the costs for mains outside the city, but it is difficult to determine to what extent development patterns were affected.

When the Water and Wastewater Department originally proposed the consideration of capital recovery fees in April 1981, they recommended that fees be levied according to the growth management areas designated in the Austin Tomorrow Comprehensive Plan adopted in the late 1970s.¹²⁵ Their recommendation was to charge the fees only in growth areas IV and V, which are outside the "preferred growth corridor," because they are deemed more environmentally fragile and less desirable for development. Hence the notion of capital recovery fees as a land management tool was introduced. The fees eventually adopted by the City Council did not address location in the city, yet the concept of capital recovery fees as a tool for directing growth into more desirable locations and patterns is worthy of further examination. Should the City decide to raise the fees to a level approaching a significant true cost reimbursement, it is possible that fee levels in preferred growth areas

could be subsidized by those required in areas less suitable for development. Even if the fees are retained at current levels, restructuring to favor certain growth areas remains an option.

7. TRANSPORTATION POLICY OPTIONS

7.1 INTRODUCTION

Given a choice, most people prefer the convenience afforded by private auto to mass transit options. The advantages of the auto include "relatively high speeds, almost instant availability, door-to-door service, comfortable seating, and privacy."¹²⁶ In addition, the automobile offers several cost economies including savings on operator salaries when the car owner drives himself/herself.¹²⁷ In Austin, operator costs account for 60 percent of the costs of the transit system.¹²⁸ Yet the use of large numbers of cars creates increased levels of air pollution from car exhaust, greater energy consumption, degradation of urban area aesthetics, less than optimal land use, time delays from congestion, and substantial costs for enlarging highways to facilitate traffic flow at peak demand.¹²⁹ A policy decision facing Austin and the surrounding area is how to proceed to accommodate the future transportation needs of area residents to optimize the following goals: reduce congestion to a minimal amount, reduce energy consumption, and reduce auto emissions. The policy choice is between focusing greater financial resources on more and larger roadways or on increased or alternate forms of mass transit. As such, three policy options for funding mass transit have been examined: continuing to operate the mass transit system under the current fare structure, implementing a fare structure with different charges based on length of trip and time of day traveled, and turning the operation and management of the transit system over to an independent transit authority. The option of reduced fares or no fare is not discussed because recent studies have shown that "ridership volumes are consistently more sensitive to service changes than to fare changes."¹³⁰

As Austin has continued to grow, transportation has become an

increasingly important issue. In the past, Austin's transportation plans and needs have been handled by the Urban Transportation Department, a city department financed by money from the General Fund. (The General Fund consists of money from property taxes and various fees; this money is used to provide basic services to citizens.) In addition to supervising the city-owned transit system, the Urban Transportation Department is responsible for traffic operations, transportation planning, facilities design, traffic safety, public transportation, and engineering studies.

The mass transit system is currently owned and managed by the American Transit Corporation (ATC), which is under contract to the City. The City pays the operating and salary costs of ATC, which in turn furnishes management, administrative, and operating personnel. Mass transit programs are developed jointly by the director of the Urban Transportation Department and ATC's general manager.

"Methods of financing transportation" was chosen as a policy issue for financing infrastructure because of the necessity for making policy choices between building more roads and/or increasing mass transit service. The policy decisions are concerned with which funds will be directed into each area. The overall goal is to provide more efficient and less congested traffic flow and movement of people. One trend Austin's policymakers must consider is the increasingly multicenter nature of the city and its reduced orientation toward the central business district for all its needs; peak-hour traffic flows will accordingly become more multidirectional.¹³¹ Nonetheless, about 58 percent of the growth in travel between 1980 and 1995 will occur on the highway system.¹³²

7.2 ASSUMPTIONS

The assumptions made in discussing the transportation financing options are that the roadways discussed in the roadway plan and the bus system will be upgraded to meet demand. For the purposes of this discussion, specialized services have not been included: we assume these services for the physically impaired and the elderly will be continued and are not optional.

7.3 DESCRIPTION OF TRANSPORTATION POLICY OPTIONS

The transportation policy options selected for consideration are:

CURRENT TRANSIT FARE STRUCTURE. This option maintains the existing transit fare structure. It affects city revenues and expenditures, the environment, land-use distribution, density, and impervious cover, and roadway and mass transit expansion assuming that the use of the transit system and roadways changes proportionally as the population changes. As presently operated, almost 70 percent of the bus system operating expenses are subsidized by local and federal funds and grants. Present fares are uniform across the city during all operating hours. If the transit system continues to be financed as it is now and the expected reductions in federal funds occur, both fares and transfers from the General Fund will have to be increased to continue the current level of transit service. If no changes are made, the system will continue to operate at a loss, few people who have other options will elect to ride the bus, or the system will have fewer routes and reduced frequency of service relative to the city's growing population. As congestion increases, people may be persuaded to make one of the simplest moves to reduce congestion and cost of travel: car-pooling.

A side effect of the current transit system is that no provisions are made for area residents outside the city limits. Rush-hour commuters

from the north, west, and south sides of town compound the traffic problems of Austin residents, especially on the highway system. If costs and benefits are clarified and widely publicized, longer-distance commuters may be convinced to use such alternative options as van-pools, car-pools, or private buses. The second policy option considers this in more detail.

DIFFERENTIAL TRANSIT FARE STRUCTURE. If charged a transit fare based on distance and time of day traveled, the user would incur more of the system's operating expenses--that is, commuters would pay a fare more aligned to the actual cost of service. The effects of this policy on the same set of dependent variables are examined below. The differential fare structure is one means by which market mechanisms could be encouraged. In addition to more fare revenues, this option assumes greater attention and response to market demand. The fare structure for this option could be calculated many different ways, but the net effect would be to increase revenues from fares. Accordingly, the transit system would be in a better position to expand or continue the level of service in spite of reductions in federal grants.

Because the fare structure would vary and fares would be charged according to distance and time of day traveled (i.e., greater fares during rush hour), the rider would contribute a proportionally greater amount to total revenues. As in the option of continuing under the current transit fare structure, expenditures and total revenues would rise according to demand and operating costs: but, under this option, the percent of revenues contributed by fares would increase.

One writer feels that many of today's current problems (pollution, congestion, energy consumption) are caused by federal grants which have encouraged too much mobility and by the specificity of grants which have

encouraged a buildup in capital equipment and done little to address the greatest of transit system costs: operator labor.¹³³ Such federal programs as this encourage the purchase of more buses than the market can support, and local expenses are then increased to supply drivers who operate buses at less than efficient rider capacity. Studies indicate that many riders, especially longer-distance riders, would pay more for convenient express service.¹³⁴ In addition, if the market demand determined routes and schedules, the hours and routes operators drove could be changed to fit demand and therefore be more cost effective. Splitting shifts and having operators do other tasks--for example, maintenance, cleaning, and desk jobs during the off-peak hours--are alternative suggestions for making more efficient use of operator labor.

INDEPENDENT TRANSIT AUTHORITY. This policy option features a metropolitan transit authority. Expanded service, both bus and rail, and increased ridership are projected outcomes of implementing this policy.

An independent transit authority could provide an assured and fairly consistent source of funds. The option being discussed in Austin now is a Metropolitan Transit Authority (MTA). Under such a system, an MTA should be able to provide a more efficient, expanded, and higher level of service than the City of Austin now provides. The system would include both more buses and a greater potential for such options as a highly capital-intensive light rail system. An outgrowth of light rail could be higher-density development, both business and residential, along such a route. In a study on the effects of rail transit systems on urban land use, however, one author found that the systems had more effect on the locational decisions people made when moving than on development--that is, if commuting on public transit was important to some people, they moved to apartments and houses close to a rail

line.¹³⁵ The author did find that if a person's place of employment was near a rail line, these people were attracted to residential areas with high quality access to rail transit stations.¹³⁶

Another study on locational decisions based on proximity to the Toronto subway found that population density did not change much during the first few years after the subway was partially completed and opened, but that density increased significantly in nearby neighborhoods after the system was fully operational.¹³⁷ In Toronto, the "highly efficient" transit system consisting of subways, trolleys, and buses is heavily funded by the provincial government and receives little if any funds from the federal government.¹³⁸ Yet the Toronto public transit system attracts almost 76 percent of all rush-hour trips into the downtown area, and land-use planning has been integrated with transit lines providing mutually reciprocal benefits.¹³⁹

Although population density is an important consideration for rapid transit planners, other factors governing a decision include "the shape of the urban area (linear cities are better adapted to rapid transit than circular cities, which require more routes), topography and natural obstacles, and the proportion of the route mileage that can be built on the surface rather than in costly underground tubes."¹⁴⁰ Strict land-use controls in at the planning stage with high service-level public transportation is advocated by Austinites for Public Transportation.¹⁴¹ Commuter trips during peak or rush hour are responsible for most traffic congestion,¹⁴² and increasing the use of mass transit is considered a way of alleviating this congestion.¹⁴³ Debate exists on whether or not an MTA system run by a separate board would enable the City to plan for both transit and growth or would reduce and hinder cooperative and efficient planning. It seems that cooperation could be provided for in the guidelines adopted during the planning and authorization stages.

An MTA is a public entity created to manage, operate, and plan mass transportation in a region. A significant problem in the Austin SMSA area is that the bus system can only serve residents of Austin, when many people who are part of the congestion problem are living outside of the city limits and have no convenient access to mass transit. An MTA has the potential to offer regional services to many more people.

An MTA has legal authority to levy sales taxes and motor vehicle emissions taxes to raise revenues. When a sales tax provides the source of funds, it is commonly at a rate of .5 or 1 percent. The State Comptroller of Public Accounts collects the revenues and disburses them to the transit authority.¹⁴⁴

If an MTA were established it would replace the joint administration of the bus system by the Urban Transportation Department and the ATC.¹⁴⁵ Currently, the Urban Transportation Department's operating budget is funded on an annual basis, which restricts the Department's planning process to one year at a time. Since operation of the bus system is under the auspices of a city department, no provisions for regional services are made. In view of the geographical expansion of the city and the surrounding area, a broader planning scope could reduce much of the congestion caused by long-distance commuters from the north, west, and south of the city. One advantage an MTA offers is that it can be established on a county or multicounty basis and address the transportation needs of the region rather than being limited to city transportation issues.

Of the two usual funding mechanisms for an MTA, a sales tax offers certain advantages. It can be collected not only from city residents, but also from visitors to the city. If a countywide MTA sales tax were in place, it could be collected from an even broader base. This would

result in a more stable funding source for two reasons: (1) revenues collected would be greater than current revenues; and (2) planning would not be tied to an annual budget process, but could occur over a longer time period. Based on such estimates as the following 1981 data, it can be assumed that a sales tax would provide sufficient revenues for the operations, maintenance, and planning of the chosen mass transit system.¹⁴⁶

	<u>Austin</u>	<u>Travis County</u>
Sales Tax		
1 cent	\$21,380,000	\$22,551,250
.5 cent	\$10,690,050	\$11,275,625

Source: Data provided by State Sales Tax Office (mimeo).

Any of the above figures would generate more revenues than the current operating and maintenance expenses of the system.

To keep pace with rising costs, the transit system will require more funds in the future. Two commonly discussed options to raise revenues without an MTA are to increase fares or to raise property taxes. Increasing fares affects all users of the system directly, including those who can least afford increased fares.¹⁴⁷ Raising property taxes would boost the size of the General Fund. However, raising property taxes affects lower income households proportionately more than average income households. Even for an average household, a property tax increase would have a more detrimental effect than a sales tax would, while raising the same amount of revenue (see Table 6).¹⁴⁸

In discussing the comparison of property and sales taxes, students in a Policy Research Project at the Lyndon B. Johnson School of Public Affairs observed the following:

TABLE 6
FINANCING ALTERNATIVES

Sales Tax vs. Property Tax
Impact on Average Household

	<u>Household One</u>	<u>Household Two</u>	<u>Household Three</u>
Household Income	\$10,000.00	\$20,000.00	\$40,000.00
Assessed Value of Dwelling Unit	25,000.00	50,000.00	100,000.00
Property Tax (23.6M)* Increase to Fund Transit (11.8M)*	83.65	167.30	334.60
	41.83	83.65	167.30
Sales Tax (23.6M)* Increase to Fund Transit (11.8M)*	18.40	31.60	124.00
	9.20	15.80	62.00

*23.6M represents the City of Austin's estimate of the revenues a 1¢ sales tax would generate. 11.8M represents the estimate of what a ½¢ sales tax would generate.

Source: Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies for the City of Austin," Policy Research Project Draft Proposal, 1983, chap. 8. Information from the Department of Urban Transportation, City of Austin.

In fact, property tax increases would result in a greater impact on the average household than a sales tax...The difference in the impact is greater for the lower end of the income spectrum. The property tax increase requires approximately five times more from the lower income tax payers than the sales tax requires. It requires two times more from a household having an income of \$40,000 per year.¹⁴⁹

A final advantage of the sales tax is that it is a relatively less regressive tax because it excludes food, housing, and medicine.¹⁵⁰ This benefits households which spend a larger proportion of their income on these commodities.

This report examines effects on applicable dependent variables of the three policy options discussed above: (1) current transit fare structure; (2) differential transit fare structure; and (3) independent transit authority.

7.4 EFFECTS OF TRANSPORTATION POLICY OPTIONS ON DEPENDENT VARIABLES

7.4.1 Economic Variables

POPULATION. Based on projections by the City of Austin Planning Department, the research project assumes that area population will grow to one million by the year 2000. If a widely used, efficient mass transit system were in operation, it might affect the geographical distribution of population by encouraging people to live or work near the system.

CITY REVENUES. Under the existing transit fare structure, revenues to pay operating expenses of the transit system come from three sources: fares provide approximately 33 percent of revenues; the General Fund transfer, 52 percent; and federal grants, 15 percent. Since 1978, federal transportation grants have decreased, while reliance on General Fund transfers has increased. For a description of the current transit

system budget, see Table 7.

The percentage of the General Fund spent on the transit system for FY 1982-83 was 2.9 percent, up from 2.3 percent in FY 1981-82. In dollars, this amounts to \$4.1 million and \$2.7 million, respectively.¹⁵¹ If public transportation were offered by a private provider, this money could be spent on other city services.¹⁵²

Using a differential transit fare structure would increase revenues from fares, thereby effectively reducing the contributions needed from General Fund transfers and/or federal grants to operate the transit system. If federal funding continues to be cut back, this alternate method of funding may be necessary just to maintain the same level of service currently provided without increasing money needed from the General Fund.

If an independent transit authority were established and revenues were raised by a sales tax, revenues from the General Fund transfer would no longer be needed. City personnel costs would be reduced since the City would no longer need to provide for supervision of the Austin Transit Corporation.¹⁵³

CITY EXPENDITURES. Under both the current transit fare option and the differential transit fare option, city expenditures would rise as operating costs and demand rose. Under an MTA, city expenditures would fall as General Fund transfers were eliminated.

Business Starts: Neither the current transit fare nor the differential transit fare option would appear to have a significant influence on the incidence of business starts in Austin. If the establishment of an MTA resulted in an effective mass transit system, business owners might be encouraged to locate in Austin; however, this

TABLE 7
TRANSIT SYSTEM FUNDING

FISCAL YEARS	OPERATING <u>COSTS</u>	SOURCE OF FUNDS		
		<u>GENERAL FUND</u>	<u>FARE BOX</u>	<u>GRANT</u>
1978-79	\$4,407,502	37%	25%	38%
1979-80	5,739,408	35	28	37
1980-81	5,516,298	38	29	33
(est.) 1981-82	6,451,756	43	27	30*
(est.) 1982-83	7,940,000	52	33	15*
(est.) 1983-84	8,575,007	73	22	5
(est.) 1984-85	9,775,508	81	19	0

Source: Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies for the City of Austin," Policy Research Project Draft Proposal, 1983, chap. 8.

Note: Estimates are based on maintaining 1981-82 levels of service and fares.

* Figures have been adjusted from the original table developed by the Department of Urban Transportation by taking into account budget data from the 1982-83 Annual Budget of the City of Austin.

would only be one of several factors considered in such decisions.

Other Texas cities, notably San Antonio and Houston, have approved the establishment of MTAs. In San Antonio, "the creation of an MTA came as part of the total plan to make San Antonio more attractive to business, to coordinate its growth plans with the whole region, and to alleviate the drain on the city's budget."¹⁵⁴ VIA, San Antonio's transit system, serves San Antonio and approximately fourteen incorporated cities.¹⁵⁵ The half-cent sales tax increased funds from \$11.8 million in 1979¹⁵⁶ to \$20.5 million in 1982.¹⁵⁷ There has been a steady growth in net income. Although Houston's MTA has had some management problems, system mileage and ridership have both increased to levels believed to have been impossible under the city budgeted transit system.¹⁵⁸

Despite these exemplary outcomes, establishment of an MTA has some disadvantages. First, it imposes an additional tax on users and nonusers alike. Second, citizens have only indirect control over the board members who make MTA policy. Board members are appointed by such public officials as city council members. Citizens can register disapproval of actions taken by board members with their elected officials, but they can not vote board members out of office.¹⁵⁹

7.4.2 Environmental Variables

Policies which favor devoting more resources to expanding roadways at the expense of a mass transit system will magnify any negative environmental effects created by increased levels of roadway construction and usage. As noted earlier, more cars on the roads would result in increased heavy metal deposits (lead, cadmium, and other metallic by-products of combustion) from car exhaust. During storms, runoff on roadways would therefore contain greater percentages of heavy metals. Because roadway runoff generally flows into storm sewers and

subsequently into Austin's creeks and lakes, the more pollutants would appear in the runoff, and the area water quality and associated environmentally sensitive areas would be degraded. Air pollution levels would also rise proportionally to car use increase.

Continuing mass transit under the current transit fare structure can be expected to result in the least number of trips made by travelers in mass transit and the greatest number of trips made by individuals in cars. Austinites would continue to depend on the private auto as the primary means of transportation, and roadways would have to be widened and improved beyond the scope of the Roadway Plan. Increased roadway development under this policy option would be greatest and the negative environmental effects described above would be worse than the other two options. Either of the other two options could result in increased transit ridership since both would be more responsive to ridership needs and particularly to longer-distance, express trips.

If an MTA were to install a light rail system, the greatest positive environmental effects could occur. An in-place system often attracts greater ridership and increases demand for convenient residential and business locations nearby. This demand should result in denser developments as people trade the benefits of larger single-family units and lots for the benefits of mass transit. Greater transit ridership means less individual auto usage and therefore less polluting emissions and deposits.

7.4.3 Land-Use Variables

Under the current and differential transit fare structures, people would not be encouraged by or convinced of any benefits of living nearer a bus route when the route location could be changed or omitted. Residential development would continue to be designed around the use of

the private auto; developments would not be dense but widespread and would cover more land area overall. More roadways would therefore have to be built to serve these suburbs. Roadways, a portion of impervious cover, would increase. Wilfred Owen found that streets and parking can cover half a downtown area.¹⁶⁰ Problems associated with impervious cover, such as increased flooding and rates of runoff, would be magnified.

If an MTA were established, land-use planning, which incorporates less impervious cover and better planned developments, could follow. The installation of light rail, for example, might encourage people to live nearer the rail lines and therefore promote the predicted benefits.

7.4.4 Transportation Variables

To reiterate, adherence to the current transit system will accomplish little or nothing to prevent increased congestion on all roadways and especially highways and major thoroughfares. Volume of traffic will increase as population increases; however, as traffic volume approaches maximum capacity, traffic congestion may become supersaturated.¹⁶¹ Even if roadways are widened and lengthened, the volume-to-capacity ratio will increase and the level of service will decrease as shown in Table 8.

Citywide auto traffic patterns may not change much even if a differential transit fare structure is implemented which also takes into account market demand. This policy option would be more likely to have a positive effect on roadway congestion, however, as most congestion occurs on major thoroughfares and highways during rush hours. A system of express bus service, although more costly, could obviate some of the worst congestion if used by many longer-distance travelers on a regular basis. To further encourage express bus service, the provision of bus

Table 8

Level of Service: Criteria for Automobile Traffic

$$\frac{\text{Traffic Volume}}{\text{Roadway Capacity}} = \text{Level of Service}$$

DETERMINATION OF LEVEL OF SERVICE

Level of Service	Volume/Capacity Ratio	Average Speed, MPH	
		Rural	Urban
A	.30	Limit	> 30
B	.30-.50	55-60	25-30
C	.50-.75	45-55	20-25
D	.75-.90	35-45	15-20
E	.90-1.00	30-35	15±
F	> 1.00	< 30	< 15

- Acceptable:
- A All traffic movements are the choice of the driver and are not affected by other driver.
 - B Traffic movements are slightly restricted and choice of speed and lane operation is sometimes affected by other drivers.
 - C Maneuverability is restricted by other drivers, but operating conditions are still satisfactory.
- Unacceptable:
- D Travel at more than 15 mph in urban areas and 35 mph in rural areas is possible only for a short period of time.
 - E The maximum possible number of cars is able to pass only at very low speeds and under extremely congested conditions.
 - F Traffic flow is impeded with very low speed and heavy congestions.

SOURCE: Adapted from the Highway Capacity Manual,
Highway Research Board, Washington, D.C., 1965.

lanes for use by buses and car- or van-pools would decrease rush hour travelling time.

Providing bus lanes and bus rights-of-way may be more probable with the financing available to an MTA. Any in-place provisions which demonstrably work to decrease rush-hour traveling time will affect land use and roadways. Roadways can be designed to provide for a lower level of congestion and still provide a higher level of service.

The continuation of current citywide mass transit patterns may eventually result in a decline in the quality of service. If the number of buses does not increase or only increases proportionally as growth increases, the level of service may decrease as the City attempts to expand its route service into new developments and thereby dilutes its frequency of service. The bus system under a differential transit fare structure which responds to market demand could change a great deal. If existing profitable routes were the only ones to continue and more longer-distance express bus routes were installed, the location and number of routes could change significantly. New routes serving the outskirts of town could ferry passengers to the demand location whether it be the central business district or such large employers as Texas Instruments and IBM in the northwest, Motorola in the south, or Bergstrom Air Force Base and Lockheed Corporation in southeast Travis County. Frequency of service could increase during rush hours and decrease at other times of day in response to demand.

The most significant changes, however, could occur under the auspices of an MTA. The financial base and possibility for long-range planning available to an MTA could be the impetus for substantial roadway alterations providing for bus lanes, turn-out lanes, and other roadway improvements. Route expansion and increased numbers of buses and

frequency of service would be fairly well assured. The change from reliance solely on buses to other options, such as light rail or commuter rail,¹⁶² becomes much more feasible if a significant increase in funds is assured (i.e., if a one-cent tax is levied) for heavily capital-intensive construction projects. The first two options would probably never accumulate the capital needed for a rail system of any sort, especially with decreasing federal grants for public transportation.

Under all policy options, such alternative types of service as car-pools, van-pools, and private or company buses could be instigated. These alternatives might become more probable as roadways become more congested and as drivers become more frustrated. In any eventuality, a program emphasizing the benefits of the increased use of car-pools and van-pools for all commuters should be seriously considered as an option to decrease roadway congestion.

Under the first policy option, it will be less convenient to use buses and cars because congestion will be more severe--that is, it will often be level of service E or F during the rush hours, as shown in Table 9. If bus lanes were provided and routes and service frequency were more attuned with market demand, mass transit ridership might increase and highway congestion decrease; it could become more convenient for both drivers and users of the bus, although express bus utility might surpass car utility. Under the MTA system, if buses and other transit options are used more than private autos, the utility of bus to auto will increase even more.

Parking is another important factor in transportation planning. One way to discourage use of individual cars is to restrict the amount of parking available in the CBD area and at the work place, and to charge

ROADWAY	LIMITS		ROADWAY PLAN CAPACITY	VOLUMES		VOLUME/CAPACITY		LEVEL OF SERVICE/1	
				HIGH	AVERAGE	HIGH	AVERAGE	HIGH	AVERAGE
IH-35	Travis Co. Line	---Howard Ln.	97,000	86,770	75,450	0.89	0.78	D	D
	Howard Ln.	---U.S. Hwy. 183	97,000	90,340	83,750	0.93	0.86	E	D
	U.S. Hwy. 183	---U.S. Hwy. 290	133,000	153,690	144,810	1.16	1.09	F	F
	U.S. Hwy. 290	---Airport Blvd.	169,000	166,760	162,090	0.99	0.96	E	E
	Airport Blvd.	---Colorado River	169,000	163,970	150,276	0.97	0.89	E	D
	Colorado River	---Ben White Blvd.	133,000	147,320	121,604	1.11	0.91	F	E
	Ben White Blvd.	---Travis Co. Line	133,000	123,220	83,372	0.93	0.63	E	C
U.S. HWY. 183	FM 620	---McNeil Rd.	133,000	112,270	89,930	0.84	0.68	D	C
	McNeil Rd.	---Loop 360	169,000	168,340	148,500	1.00	0.88	E	D
	Loop 360	---IH-35	169,000	179,200	134,800	1.06	0.80	F	D
	IH-35	---FM 969	169,000	117,960	104,960	0.70	0.62	C	C
	FM 969	---State Hwy. 71	133,000	86,000	57,550	0.65	0.43	C	B
	State Hwy. 71	---FM 620	90,000	29,290	20,200	0.33	0.22	B	A
U.S. HWY. 290	FM 1826	---Ben White Blvd.	**	68,100	36,300	**	**	**	**
	Ben White Blvd.	---IH-35	133,000	48,950	44,800	0.37	0.34	B	B
	IH-35	---U.S. Hwy. 183	97,000	72,340	67,100	0.75	0.69	D	C
	U.S. Hwy. 183	---FM 973	60,000	42,320	22,900	0.71	0.38	C	B
STATE HWY. 71	IH-35	---U.S. Hwy. 183	133,000	44,000	39,200	0.33	0.29	B	A
	U.S. Hwy. 183	---IH-35	133,000	53,360	37,200	0.40	0.28	B	A
LOOP 1	FM 1325	---U.S. Hwy. 183	**	73,690	58,000	**	**	**	**
	U.S. Hwy. 183	---Northland Dr.	133,000	124,520	140,720	0.94	1.06	E	F
	Northland Dr.	---Colorado River	108,000	125,390	114,880	1.16	1.06	F	F
	Colorado River	---Loop 360	72,000	124,130	102,230	1.72	1.42	F	F
	Loop 360	---U.S. Hwy. 290	**	65,000	65,000	**	**	**	**
LOOP 360	FM 1325	---U.S. Hwy. 183	108,000	65,250	55,400	0.60	0.51	C	C
	U.S. Hwy. 183	---Colorado River	72,000	47,420	45,300	0.66	0.63	C	C
	Colorado River	---FM 2244	72,000	47,070	39,840	0.65	0.55	C	C
	FM 2244	---Loop 1	72,000	30,710	27,860	0.43	0.39	B	B
	Loop 1	---Lamar Blvd.	72,000	54,800	54,800	0.76	0.76	D	D
FM 620	IH-35	---U.S. Hwy. 183	42,000	37,260	20,760	0.89	0.49	D	B
	U.S. Hwy. 183	---RM 2222	28,000	19,240	11,730	0.69	0.42	C	B
	RM 2222	---Mansfield Dam	28,000	17,200	15,980	0.61	0.57	C	C
FM 1325	Travis Co. Line	---Loop 1	90,000	73,300	48,400	0.81	0.54	D	C
	Loop 1	---Kramer Ln.	90,000	44,430	40,000	0.49	0.44	B	B
	Kramer Ln.	---U.S. Hwy. 183	90,000	67,400	57,650	0.75	0.64	D	C
RM 2222	RM 620	---Loop 360	34,000	28,640	23,600	0.84	0.69	D	C
	Loop 360	---Balcones Dr.	34,000	33,650	13,240	0.99	0.39	E	B
RM 2244	Gordon Ln.	---Loop 1	34,000	35,620	18,500	1.05	0.54	F	C
EMFIELD/15th ST.	Lake Austin	---Loop 1	20,000	13,220	9,090	0.66	0.45	C	B
	Loop 1	---Lamar Blvd.	20,000	29,200	29,030	1.46	1.45	F	F
	Lamar Blvd.	---Guadalupe St.	34,000	40,170	36,840	1.18	1.08	F	F
	Guadalupe St.	---IH-35	34,000	30,890	22,270	0.91	0.66	E	C
LAMAR BLVD	Ben White Blvd.	---Oltorf St.	42,000	29,740	22,080	0.71	0.53	C	C
	Oltorf St.	---Colorado River	42,000	29,170	27,940	0.69	0.67	C	C
	Colorado River	---15th St.	28,000	42,530	31,030	1.52	1.11	F	F
	15th St.	---Guadalupe St.	24,000	29,050	21,890	1.21	0.91	F	E
	Guadalupe St.	---U.S. Hwy. 183	42,000	53,830	42,780	1.28	1.02	F	F
	U.S. Hwy. 183	---IH-35	42,000	29,230	18,200	0.70	0.43	C	B
WINDSOR/W. 24th ST	Lake Austin	---Loop 1	14,000	11,620	6,700	0.83	0.48	D	B
	Loop 1	---Lamar Blvd.	20,000	28,990	21,760	1.45	1.09	F	F
	Lamar Blvd.	---Guadalupe St.	20,000	23,100	19,660	1.16	0.98	F	E
38th/38 1/2 STS.	Shoal Creek Blvd.	---Lamar Blvd.	24,000	44,750	39,330	1.86	1.64	F	F
	Lamar Blvd.	---Guadalupe St.	24,000	27,400	26,590	1.14	1.11	F	F
	Guadalupe St.	---IH-35	24,000	28,700	20,340	1.20	0.85	F	D
	IH-35	---Airport Blvd.	14,000	20,320	15,905	1.45	1.14	F	F

/1 See Table 8 for explanation of letter code.

** Information unavailable.

SOURCE: Compiled by the project based on data from Joe Gieselman, "Roadways in Austin", unpublished report, Austin, Texas, 1982.

higher rates for any parking that is available. The downtown merchants may object to policies aimed at restricting downtown access by private cars, although the proliferation of shopping malls already provides convenient alternatives for drivers in private vehicles. The downtown retailers may prefer parking costs to be established under a rate structure that favors downtown retail activity. A whole reassessment of transportation priorities in the downtown area may be appropriate. Parking is currently subsidized by companies and businesses which provide free parking for their employees or provide parking at much less than the actual cost. Charging workers for parking that is now free would be another incentive for employees to consider car- and van-pools as well as mass transit.

8. SENSITIVITY ANALYSIS AND RECOMMENDATIONS

8.1 SENSITIVITY ANALYSIS

Up to this point, most of the information and recommendations included in this study have assumed various factors regarding Austin's growth. While these assumptions are important in making academic analyses, they should also be approached with a certain degree of caution. The reader should be aware that assumptions regarding such factors as growth trends and population forecasts cannot be verified in advance of the fact. While both necessary and useful, a degree of uncertainty should be recognized as an inherent limitation in this kind of exercise. Nonetheless, an additional exercise can be included to amplify the usefulness of the study, without actually changing the assumptions already made. The exercise is known as a sensitivity analysis and is conducted in an effort to include a variety of different assumptions that might change the long-range trends cited in the original analysis.

For the purposes of this brief conclusion, two different assumptions will be made about the future conditions governing Austin's growth. The first is a more liberal assumption about population growth in the city. Included under this assumption are a number of probable externalities as well as policy options that would either exacerbate or mitigate the negative effects of a more rapid rate of population growth. The second assumption made in this sensitivity analysis is that Austin would face a severe water shortage at some point in the near future. In addition to examining the danger of depleting the Edwards Aquifer, a number of policy options are offered in an effort to protect and conserve the region's water supply in the case of an extended drought period.

8.1.1 Population Growth

Previously, this report has assumed that Austin's population will rise to one million by the year 2000. Population estimates can never be certain--what would happen, however, if the population exceeded one million by 15 percent? Based on the previous analysis, we would expect the following things to occur:

1. The city limits would expand in all directions until meeting other jurisdictions, such as Round Rock. Population density would increase along with the expansion.
2. Environmental impacts would be felt--namely, aquifer contamination; an increase in impervious cover, and a slowdown in the recharge of the aquifer.
3. Increased demand for water.
4. Property damage due to flooding.
5. Increased traffic congestion on the roadways.
6. Difficulty in maintaining and expanding infrastructure to support the new growth.
7. Gentrification of East Austin.

Although occurrence rates of these outcomes cannot be predicted exactly, we can specify combinations of city policies which, if implemented, would mitigate some of the negative effects of a greater-than-expected rate of population growth.

The most effective combinations would be the following:

1. Strong annexation: This is the foundation for all other city policies in that it provides the legal basis for exercising city powers. It gives the City the legal authority to make decisions on environmental, fiscal, and transportation policies.
2. Full capital recovery fee: Its major impact is that it directs the cost of growth to new owners and builders by making them pay for the water and sewer services they require. Without a full or partial fee, current residents bear the costs of new growth.

3. Proposed Zoning Ordinance: This ordinance departs from cumulative zoning and allows for greater control and planning by specifying how districts can be developed. For example, if a district is zoned residential it cannot be developed commercially.
4. Enforce watershed ordinances: This would protect the aquifer and prevent damage to environmentally sensitive areas.
5. Deed restriction: For newly acquired pieces of land with historical and environmental value, use or development restrictions are placed in the deed. This may reduce the price of the land, so that there will be less incentive to sell to developers.
6. Minimize exemptions: Under current policies, developers are given an inordinate amount of flexibility in bypassing zoning, building, and environmental restrictions. Consistency in this area would greatly enhance the value of existing codes and ordinances.
7. Alter service provision requirements for annexed areas: In mostly undeveloped areas the requirement to provide all services within three years to a few residents, especially if the annexed area doesn't fully develop that quickly, may be very costly to the City.

Overall, the full implementation of these actions would result in a city that is environmentally and fiscally sound.

We have also chosen three combinations of city policies that would be ineffective in managing growth and protecting the environment. The first of these combinations would include the following: a historic (low) annexation rate, unconstrained growth, no capital recovery fee, and the old Zoning Ordinance. Following these policies would result in great expense to the City since the tax base would not be captured while residents in adjacent areas would continue to make use of many city services. The lack of the capital recovery fee would continue to place the burden of new growth on existing city residents rather than on the developers demanding the new services. Relying on the old Zoning Ordinance would continue to restrict growth management control, as well as produce undesirable mixtures of land use.

A second combination would be strong annexation and no capital recovery fee. This would result in even higher expenditures for the City than in the previous example because more areas would have legal claim to municipal services. The lack of the capital recovery fee would, again, shift a very heavy burden onto residents of the city to finance services provided to new developments.

The third combination includes the current annexation rate, a capital recovery fee, implementation of the new Zoning Ordinance, and enforcement of watershed ordinances. Because it would be more expensive to live in the city as a result of the fees and environmental controls, people would choose to locate outside the city limits. This would result in little planning control over new growth outside the City's jurisdiction. Whether or not the City later chose to annex these areas, it could suffer from their lack of environmental controls. In addition, a potential tax base would be lost and would represent a double drain on city finances because residents in outlying areas would continue to use such city services as transportation and recreation.

8.1.2 Drought

An area of major concern to the residents of Austin is whether we will have sufficient water to meet our future needs. In the event of a drought, we can expect dramatic differences in our capability of handling it, depending on the city policies that we pursue. Because strong annexation affords the City greatest control, it would be the most effective policy. For example, if rationing became necessary, more people would be under the jurisdiction of the City and thus would have to comply with rationing controls. If strict environmental controls were implemented with strong annexation, the likelihood of the Edwards Aquifer drying up would be minimized. If these environmental controls restricted the amount of impervious cover, it would be easier for the

aquifer to recharge, and recovery from the drought would be faster.

Encouragement of heavy water-use industry would result in increased pumpage and thus less water for residential use. If an extended drought reduced the amount of growth that came to Austin and we were operating under full annexation without a capital recovery fee, severe financial problems could be expected. There would be a loss of tax revenues from people who had been expected to move to Austin and a resultant danger of being unable to pay off bonds.

Again, a policy of strong annexation accompanied by strict environmental controls on development and, in this case, water use appears to be the most beneficial in responding to a drought situation. As above, without annexation of developed (or developing) areas outside the current city limits, environmental or water controls alone might result in more adverse effects, since uncontrolled development outside the city could harm Austin's environment and water supply.

If we have been successful in outlining some of the possible inputs and outcomes in an improved planning process for the City of Austin, then we have fulfilled the major goal of this project. This sensitivity analysis has considered possible growth scenarios under assumptions different from those made in earlier stages of this project. The authors hope that this increases the value of the initial findings and supplements the more specific variable manipulations of the matrix. Whether the reader is interested in these broad changes in assumptions, in policy options targeting very narrow issues, or in alternative assumptions of his/her choosing, both the matrix and this sensitivity analysis should provide a basis for understanding and further analysis of unexpected factors in Austin's growth. We would encourage use of the matrix as a tool for analysis, using the same assumptions we did, or

changing them as was done in the sensitivity analysis.

8.2 INSTITUTIONAL CONSTRAINTS

Before concluding, we would like to raise another issue of importance to this study. Although we have examined many different topics and provided several perspectives on the policy issues facing the City of Austin, there remain several factors which appear to be integral to the understanding and management of growth in the city. These remaining factors can be labeled neither recommendations nor predictions. They relate to the more rigid aspects of the current growth planning process, the institutional constraints which deserve attention and comment but may not be changed easily. Such factors are integral in formulating comprehensive policy, however, and merit at least brief discussion.

These institutional issues and their relationships to Austin's future are listed below. We submit them in the hope they will result in an improved growth management climate for the City of Austin:

1. Integrate the planning process: The current fractionalized planning process incorporates too many separate offices and organizations, while providing too few forums for cooperative efforts. The result frequently is that groups that should be pooling ideas and perspectives compete at the cost of rational, timely policies and decisions. This increases costs for both the City and industries or developers, often needlessly.
2. Enforce the Master Plan: As it currently stands, the Master Plan is only a loose guideline for the City to direct growth. Frequently, actual outcomes in the many areas covered by the Plan are very different from the recommendations provided in the document. If the Plan could be given the force of law (ordinance), the planning process would be greatly simplified since residents and developers would know in advance what could be (or could not be) done on a particular parcel. They would have to abide by the rules, but it would be less costly in the long run if enforcement were certain.
3. Prevent discharge into Lake Austin and Lake Travis: This would require a change in state law, the ramifications of which remain unclear. As of now, there appears to be no

guaranteed way to restrict discharge into two of the City's most valuable sources of drinking water.

4. Establish a Metropolitan Transit Authority: A regional planning organization for mass transit would greatly enhance the feasibility of public transit as an alternative to automobile dependency. This would improve both the traffic outlook and the air quality standards in the city. It would also provide an additional source of financing from the authority an MTA has to levy a sales tax.
5. Consolidate environmental ordinances: The current dispersion of environmental ordinances may serve to discourage their enforcement. If the ordinances could be consolidated, fewer exceptions would probably be granted, and the consistency of compliance would be increased. Such revisions would be a monumental task for the City Council initially, but would later result in time saved, and money saved for the developers, who currently must follow different policies in each watershed. This cost reduction might make compliance more palatable as well.
6. Lengthen MUD formation period: This would require a change in state law, and, again, the ramifications for other cities is unclear. In Austin, this would give the City greater flexibility in offering alternatives to MUD formation, which sometimes serves to undermine outlined growth control strategies. The City is under a very pressured situation with the current time limit, making it difficult to develop viable alternatives to MUDs. A longer period between MUD application and approval would give the City needed time.

8.3 SUMMARY AND RECOMMENDATIONS

This Policy Research Project has considered many variables relating to fiscal and environmental factors in Austin's growth. Some of these were more sensitive to policy changes than others. We cannot conclude dramatically with a statement of the single best way to save Austin's fragile environment and special quality of life, while maintaining fiscal soundness for the city and participating in the inevitable growth of the region. Rather, we have found that neither a futile attempt to stop growth nor an aggressive strategy to attract it will really change the trends in Austin's future. What is needed is thoughtful, careful planning and management of the City's current and potential resources. These include the creeks, Barton Springs, the lakes, and the aquifer, as

well as the human resources of the University. If the city's resources are managed well, the city will continue to be "livable," attractive, and unique.

Our recommendations begin with one strong caveat: without annexation of most of the developed (and potentially developable) land around the city, Austin is likely to suffer serious fiscal and environmental consequences. Annexation is costly, since services must be provided to the area, but it also results in revenue increases from the expanded tax base it brings into the city, especially in the long run. It is imperative, however, for the City of Austin to annex land in order to impose environmental controls without allowing development to circumvent them.

Once the City has expanded its boundaries to encompass the developed area, consistent enforcement of planning, zoning, and environmental ordinances is necessary or they will fail to achieve the intended purposes. Too often exceptions have been granted for specific purposes; continuance of this policy could both hurt Austin's environment and increase development costs.

Finally, the institutional constraints discussed above must be addressed by the City if growth is to be managed well. While the issues raised here represent only a few concerns relative to growth management, we feel they represent important constraints to a rational growth policy. We recommend attention to the issues raised, whether or not our specific suggestions are adopted.

This PRP has attempted to assess fiscal and environmental factors influencing Austin's growth. Specific policies may change with predictable or surprising results, regardless of our analysis. The hope that the framework that was developed in this report, using the policy

option/dependent variable matrix, was and will continue to be usefull to both interested citizens and city officials. If the activity merely helps decisionmakers and voters to analyze the issues better and make more informed judgements, we will consider the effort successful and worthwhile. More is hoped for, of course, in terms of our recommendations for desirable policy choices and combinations, but we leave to the political process and Austin's citizenry those final decisions.

¹Interview with Walt W. Rostow, Professor, Department of Economics, The University of Texas at Austin, Austin, November 5, 1983.

²Interview with John Watson, Real Estate Developer and Lawyer, Austin, December 17, 1982.

³Interview with Denis Kavanagh, Canadian Real Estate Developer, Austin, January 6, 1983.

⁴Interview with Robert Wilson, Assistant Dean, Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin, Austin, December 1, 1982.

⁵Interview with Victor Arnold, Director, Bureau of Business Research, The University of Texas at Austin, Austin, November 10, 1982.

⁶Texas Association of Business, Executive Digest, 12, (January 5, 1976), pp. 1-4.

⁷Ibid., 17, (February 1, 1982), p.6.

⁸Interview with Camille Dvorsky, Analyst, Lieutenant Governor's Office, Austin, February 10, 1983.

⁹Frank Parker, "Opinion: Why Unions Don't Appeal to Texans," Texas Business (October 1981): 33.

¹⁰Austin Chamber of Commerce, Austin: The Good Life In Texas (Austin, 1982), p. I-17.

¹¹Texas Industrial Commission, Texas Industrial Start-Up Training Program (Austin, 1982).

¹²Interview with David Spurgin, Economist, Lieutenant Governor's Office, Austin, January 6, 1983.

¹³Interview with Robert Wilson, December 1, 1982.

¹⁴Interview with Richard Lillie, Director, Department of Planning, City of Austin, Austin, November 3, 1982.

¹⁵Interview with Robert Wilson, December 1, 1982.

¹⁶Kirk Ledendorf, "A Micro-Boom is Blossoming in Austin," Austin American-Statesman, October 25, 1982, p. B6.

¹⁷The Christian Science Monitor, March 31, 1982, p. B6.

¹⁸Interview with William McFarland, Vice-President, First City Bank, Austin, January 6, 1983.

¹⁹Christian Science Monitor, March 31, 1982, p. B1.

²⁰Interview with Cactus Pryor, Media Personality, Austin, January 12, 1983.

²¹Interview with Arthur Gerlernter, President, AMI Systems, Austin, December 10, 1982.

²²Interview with Jared Hazleton, Director, Texas Research League, Austin, November 16, 1982.

²³Interview with David Graeber, Architect, Austin, November 10, 1982.

²⁴Interview with Dan Davidson, former Austin City Manager and Vice-President of The Nash Phillips-Copus Company, Austin, January 7, 1983.

²⁵Interview with Robert Wilson, December 1, 1982.

²⁶Professor Norman Glickman, informal talk at the Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin, Austin, October 27, 1982.

²⁷Water and Wastewater Master Plan, City of Austin, (Boston: Metcalf and Eddy, Assoc., Inc., 1982), "Financial Framework," p. 8.

²⁸*Ibid.*, "Existing Water Facilities, pp. S1-S10; Existing Wastewater Facilities," pp. S1-S5.

²⁹Kent S. Butler, Austin's Watershed Ordinances: A Comprehensive Analysis (Austin: Community and Regional Planning Program, School of Architecture, University of Texas, 1981), p. 12.

³⁰City of Austin, Stormwater Quality Modeling Study for Austin Creeks (Austin, 1983), p. 12.

³¹*Ibid.*, p. 9.

³²Butler, Austin's Watershed Ordinances, p. 5.

³³*Ibid.*, p. 56.

³⁴Austin Tomorrow Ongoing Committee, Monitoring Report (Austin, 1981), p. 30.

³⁵Interview with Raymond Slade, Assistant Subdistrict Chief, U. S. Geological Survey, February 11, 1983.

³⁶Austin Transit System, System Route Map, December 1982.

³⁷Water and Wastewater Master Plan, City of Austin, "Financial Framework," , pp.S1-S5.

³⁸Ibid., "Existing Water Facilities," pp. S1-S10; "Existing Wastewater Facilities," pp. S1-S5.

³⁹City of Austin, Stormwater Study, p. 5.

⁴⁰Ibid., p. 7.

⁴¹Interview with Maureen McReynolds, Director of the Office of Environmental Resource Planning, Austin, February 22, 1983.

⁴²Interview with Raymond Slade, February 11, 1983.

⁴³Raymond Slade, "Our Water-Quality and Quantity," presented at a conference, "Austin: City Unlimited," Austin, May 19, 1982.

⁴⁴City of Austin, Stormwater Study, pp. 1, 10, 11, 18.

⁴⁵City of Austin, The Growth Management Scenario, (Austin, 1982), pp. 7, 8, C-3, C-4.

⁴⁶Based upon data provided by Texas Department of Water Resources, January 1983.

⁴⁷City of Austin, Parks and Recreation Department, Lake Austin Corridor Recreation Study, Austin, August, 1981, pp. 13-15.

⁴⁸Austin American-Statesman, March 5, 1983, p. B1.

⁴⁹Austin Transportation Study, Analysis of Austin's Alternative Futures (Austin, July 13, 1976), p. 15.

⁵⁰Steve Lockwood, Alan Voorhies, and Associates, Narrative of Consultant's Presentation: Transportation Implications of Austin's Alternative Futures, Austin, June 30, 1976, unpublished report.

⁵¹Joseph P. Gieselman, "A Discussion about the Northern and Southern Extensions of Loop One," Austin Transportation Study, (Austin, March 1981), p. 22.

⁵²City of Austin, Urban Transportation Department, Barton Creek Diamond Area Roadway Study, Austin, n.d., p. 18.

⁵³Ibid.

⁵⁴Austin Transportation Study, Austin's Alternative Futures, p. 25.

⁵⁵Ibid.

⁵⁶Urban Transportation Department, Barton Creek Diamond Area Roadway Study, p. 16.

⁵⁷Butler, Austin's Watershed Ordinances (Austin, 1981), p. 43.

⁵⁸Joseph Gieselman, "Year 2000 Population and Employment Distribution within the Austin Transportation Study Area: Data and Methodology," Austin Transportation Study, (Austin, July 1982), p. 5.

⁵⁹City of Austin, Census Report No. 10 (Austin, February 1983), "Density," pp. 134 and 137.

⁶⁰Ibid.

⁶¹City of Austin, Office of the Director of Management and Budget, "Fiscal Impact Analysis and Services Management Plan, Oak Hill

Annexation," (Austin, November 1982), p. 2.

⁶²Ibid.

⁶³City of Austin, Planning Commission, Annexation Study, 1982, (Austin, 1982), pp. 35-36.

⁶⁴City of Austin, 1982-83 Proposed Financial Plan, (Austin, 1982), p. 496.

⁶⁵Peggy Vlerebome, "2 City Budget Totals Likely to be Close," Austin American Statesman, September 27, 1982, p. B2.

⁶⁶City of Austin, Census Report No.9, (Austin, December 1982), p. 129.

⁶⁷City of Austin, Director of Management and Budget, "Fiscal Impact Analysis and Services Management Plan, Oak Hill Annexation," p. 1.

⁶⁸Ibid., Attachment C.

⁶⁹Ibid., Attachment B.

⁷⁰Ibid., p. 8.

⁷¹Ibid.

⁷²Ibid.

⁷³Interveiw with Brian Schuller, Planner, Planning Department, City of Austin, March 24, 1983.

⁷⁴City of Austin, Planning Commission, Annexation Study, 1982; City of Austin, Water and Wastewater Master Plan, technical memoranda,

prepared by Metcalf and Eddy, Inc., Boston, May 1982.

⁷⁵Austin City Code, 1983, chaps.9-10 and 13-3.

⁷⁶City of Austin, Department of Planning, Austin Tomorrow Comprehensive Plan (Austin, 1980), p. 35.

⁷⁷Austin City Code, chaps 9-10 and 13-3.

⁷⁸Interview with Richard Lillie, November 3, 1982.

⁷⁹It is important to note the inverse relationship between the number of routes and the frequency of service. This relationship is caused by the finite number of city buses.

⁸⁰City of Austin, Planning Department, "Population Projections for the Austin SMSA by County, 1980-2010," Austin, September 1982.

⁸¹City of Austin, Census Report No. 1, (Austin, September 1981), p. 2.

⁸²City of Austin, Department of Management and Budget, "Fiscal Impact of Proposed Zoning Ordinance," Austin, January 13, 1983, p. 5.

⁸³*Ibid.*, pp. 1-6.

⁸⁴*Ibid.*, pp. 7-11.

⁸⁵*Ibid.*, p. 2.

⁸⁶*Ibid.*, pp. 16-17.

⁸⁷*Ibid.*, pp. 1-2.

⁸⁸Ibid., pp. 12-13.

⁸⁹Interview with Jack Dougherly, Senior Staff Engineer, Austin Water and Wastewater Department, Austin, March 9, 1983.

⁹⁰Interview with Kent S. Butler, Associate Professor, Department of Community and Regional Planning, The University of Texas at Austin, Austin, April 7, 1983.

⁹¹Committee on Natural Disasters, Commission on Engineering and Technical Systems, National Research Council, The Austin, Texas, Flood of May 24-25, 1981: Summary (Washington, D.C.: National Academy Press, 1982), pp.18-19.

⁹²City of Austin, Planning Commission, Recommended Revisions to Austin's Zoning Ordinance, December 7, 1982 (Austin, 1982), p. 140.

⁹³Ibid., p. 128

⁹⁴Ibid., pp.103-105.

⁹⁵Blayney-Dyett and Charles Hall Page and Associates, Working Paper: A Review of Problems, Issues, Concerns, and Opportunities related to Revision of Austin's Zoning Ordinance, (San Francisco, California, April 15, 1980), pp.23-25. (Consultant's report.)

⁹⁶City of Austin, Planning Commission, Recommended Revisions, Addendum, pp. 7-10.

⁹⁷Ibid., pp. 159-160.

⁹⁸Ibid., p. 161.

- ⁹⁹Ibid., p. 127.
- ¹⁰⁰Ibid., pp. 216-218.
- ¹⁰¹Butler, Austin's Watershed Ordinances, p. 54.
- ¹⁰²Blayney-Dyett and Charles Hall Page and Associates, Working Paper, pp. 45-46.
- ¹⁰³Ibid., p. 46.
- ¹⁰⁴City of Austin, Planning Commission, Recommended Revisions, pp. 41-43.
- ¹⁰⁵Ibid., pp. 116-18.
- ¹⁰⁶City of Austin, Zoning Ordinance, chap. 45, Austin City Code, (Austin, December 1982).
- ¹⁰⁷City of Austin, Planning Commission, Recommended Revisions.
- ¹⁰⁸City of Austin, Zoning Ordinance, pp. 153-157.
- ¹⁰⁹Ibid., p. 173.
- ¹¹⁰Ibid., p. 189.
- ¹¹¹City of Austin, Zoning Ordinance, pp. 85-94; and City of Austin, Planning Commission, Recommended Revisions, p. 142.
- ¹¹²Roger Baker, "Neighborhood Protection and Transportation Corridor Development Scenario," documentation presented to the Austin Tomorrow Ongoing Committee, Austin, October 13, 1982.

¹¹³John R. Meyer and Jose A. Gomez-Ibanez, Autos, Transit, and Cities, (Cambridge: Harvard University Press, 1981), pp. 293-94.

¹¹⁴Peggy Vlerebome, "Recovery Fee Trickling In," Austin-American Statesman, March 29, 1983, p. B2.

¹¹⁵Ibid.

¹¹⁶Ibid.

¹¹⁷City of Austin, Ordinance No. 821216-H, December 16, 1982, pt. 1

¹¹⁸Ibid., p. 3.

¹¹⁹Carl M. Schwing, Director, Water and Wastewater Department, City of Austin, Memorandum, July 29, 1982, p. 2.

¹²⁰Ibid.

¹²¹Schwing, Memorandum, July 29, 1982, p. 6.

¹²²City of Austin, Water and Wastewater Department, Financing Utility Line Extension in Austin: A Proposal for a Growth Management Oriented Cost Participation Policy (Austin, February 1981), p.8.

¹²³Ibid., p. 9.

¹²⁴Ibid.

¹²⁵Schwing, Memorandum, July 29, 1982, Attachment A.

¹²⁶Meyer and Gomez-Ibanez, Autos, Transit and Cities, p. 278.

¹²⁷Ibid.

¹²⁸Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies for the City of Austin," Policy Research Project Draft Report, 1983, chap. 8.

¹²⁹Meyer and Gomez-Ibanez, Autos, Transit, and Cities, pp. 290-91.

¹³⁰George Kraft, "The Potential of Free Transit in Transportation Planning," in Out of Cars/into Transit: The Urban Transportation Planning Crisis, ed. Andrew Hamer, Research Monograph No. 65 (Atlanta: Publishing Services Division, School of Business Administration, Georgia State University, 1976.)

¹³¹Joe Gieselman, "Extensions of Loop 1," p. 20.

¹³²Ibid., p. 22.

¹³³Meyer and Gomez-Ibanez, Autos, Transit, and Cities, p. 291.

¹³⁴Ibid., pp. 280-81.

¹³⁵David E. Boyce, "Impact of Federal Rail Transit Investment Programs on Urban Spatial Structure," in The Urban Impacts of Federal Policies, Ed. Norman J. Glickman Baltimore:Johns Hopkins, 1980), p. 414.

¹³⁶Ibid., p. 420.

¹³⁷Meyer and Gomez-Ibanez,Autos, Transit, and Cities, p. 117.

¹³⁸Neal Pierce, Editorial, Austin American-Statesman, January 27, 1982.

¹³⁹Ibid.

¹⁴⁰Wilfred Owen, Transportation for Cities (Washington, D.C.: The Brookings Institution, 1976), p. 24.

¹⁴¹Baker, "Neighborhood Protection."

¹⁴²Meyer and Gomez-Ibanez, Autos, Transit, and Cities, p. 187.

¹⁴³Ibid., p. 212.

¹⁴⁴Vernon's Annotated Texas Statutes, Article 1118x, Secs. 6A,6B, Supp. 1963-1982, p 370.

¹⁴⁵Interview with Chuck Barnes, Grants Coordinator, Austin Transit System, Urban Transportation Department, City of Austin, Austin, April 15, 1983.

¹⁴⁶Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies," chap. 8, pp. 20-21.

¹⁴⁷Ibid., p. 22.

¹⁴⁸Ibid., p. 24.

¹⁴⁹Ibid., p.24.

¹⁵⁰Ibid., p. 22.

¹⁵¹Interview with Nicholas Meiszer, City Manager, City of Austin, Austin, April 14, 1983.

¹⁵²Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies," chap. 8, p. 18.

¹⁵³Ibid.

¹⁵⁴Ibid., p. 15.

¹⁵⁵Ibid.

¹⁵⁶VIA, "Annual Report VIA, 1978-1980," San Antonio, 1981, p. 9.

¹⁵⁷VIA, "Annual Report VIA, 1981-1982," San Antonio, 1983 p. 13.

¹⁵⁸Lyndon B. Johnson School of Public Affairs, "Alternative Service Delivery Strategies," chap. 8, p. 17.

¹⁵⁹Ibid., p. 19.

¹⁶⁰Wilfred Owen, The Accessible City, (Washington, D.C.: Brookings Institution, 1972), p. 96.

¹⁶¹Meyer and Gomez-Ibanez, Autos, Transit, and Cities, p. 186.

¹⁶²Boyce defines the different rail modes as follows: Light rail is characterized by operation of streetcar-type vehicles, often in short trains, on exclusive or semiexclusive, at-grade or grade-separated rights-of-way. Their speeds are substantially higher, and a higher frequency of service is typically offered, than for a streetcar. Streetcars are characterized by operation of individual vehicles at grade in mixed traffic at relatively low speeds and fairly high frequencies. Rail rapid transit is characterized by operation of heavier, high-platform cars, usually in trains, on exclusive, grade-separated facilities, with stations. Service is generally frequent and at regular intervals. All rail modes are electrically powered except commuter rail, which may use electric or diesel-powered heavy rail cars operating over facilities which are often shared with other rail

services. Service is typically at irregular intervals and less frequent than rapid transit, with the primary service being offered in peak commuting periods. (Boyce, "Transit Investment Programs," pp. 400-401.)

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