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16. Abstract

As part of a project funded by the Texas Department of Transportation (TxDOT) to examine methods of improving transportation planning techniques, the need to decrease the burden on the planning staff in smaller urban areas (populations less than 200,000) was addressed. In many cases, these smaller areas may not have the financial or personnel resources to determine growth using the traditional models or methods. An existing technique (the Delphi process) was modified to establish a procedure for allocating projected growth at the zone level. A qualitative measure of each zone's growth potential relative to the other zones in the area was established and used to allocate the projections of population and employment. The Delphi process can provide good results in a short time frame which provides the benefit of accelerating the overall planning process. The Delphi process is based on an iterative process. A panel of local experts and involved citizens participated in the process to reach a consensus.

A pilot project was conducted in the Longview, Texas, area in the summer of 1992 to examine the ability of the Delphi process to allocate future growth. The pilot project employed a three-tiered process in allocating the area's projected population and employment growth (for the year 2015) to 219 traffic analysis zones. Benefits of the Delphi process include reduced costs to the MPO in both time and money; social, political, and legal advantages of basing the allocations on a panel consensus; and the advantages of involving members of local agencies and committees during the allocation process. Support software and a user's manual are currently under development for TxDOT.

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GROWTH ALLOCATION BY THE DELPHI PROCESS

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Improving Transportation Planning Techniques
Research Study Number 2-10-90-1235

Sponsored by

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in cooperation with the

U. S. Department of Transportation
Federal Highway Administration

Texas Transportation Institute
The Texas A&M University System
College Station, Texas

February 1993

METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	2.54	centimeters	cm
ft	feet	0.3048	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	6.452	centimeters squared	cm^2
ft^2	square feet	0.0929	meters squared	m^2
yd^2	square yards	0.836	meters squared	m^2
mi^2	square miles	2.59	kilometers squared	km^2
ac	acres	0.395	hectares	ha
		MASS (weight)		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.0328	meters cubed	m^3
yd^3	cubic yards	0.765	meters cubed	m^3

Note: Volumes greater than 1000 L shall be shown in m^3.

		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

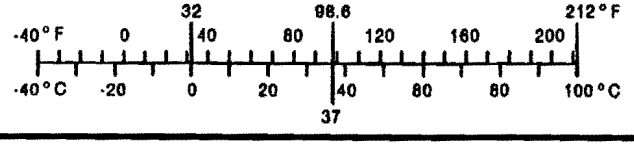
These factors conform to the requirement of FHWA Order 5190.1A

*SI is the symbol for the International System of Measurements

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
yd	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	millimeters squared	0.0016	square inches	in^2
m^2	meters squared	10.764	square feet	ft^2
yd^2	kilometers squared	0.39	square miles	mi^2
ha	hectares (10,000 m^2)	2.53	acres	ac
		MASS (weight)		
g	grams	0.0353	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams (1000 kg)	1.103	short tons	T
		VOLUME		
mL	millimeters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	meters cubed	35.315	cubic feet	ft^3
m^3	meters cubed	1.308	cubic yards	yd^3

		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



ABSTRACT

As part of a project funded by the Texas Department of Transportation (TxDOT) to examine methods of improving transportation planning techniques, the need to decrease the burden on the planning staff in smaller urban areas (populations less than 200,000) was addressed. In many cases, these smaller areas may not have the financial or personnel resources to determine growth using the traditional models or methods. An existing technique (the Delphi process) was modified to establish a procedure for allocating projected growth at the zone level. A qualitative measure of each zone's growth potential relative to the other zones in the area was established and used to allocate the projections of population and employment. The Delphi process can provide good results in a short time frame, which provides the benefit of accelerating the overall planning process. The Delphi process is based on an iterative process. A panel of local experts and involved citizens participated in the process to reach a consensus.

A pilot project was conducted in the Longview, Texas, area in the summer of 1992 to examine the ability of the Delphi process to allocate future growth. The pilot project employed a three-tiered process in allocating the area's projected population and employment growth (for the year 2015) to 219 traffic analysis zones. Benefits of the Delphi process include reduced costs to the MPO in both time and money; social, political, and legal advantages of basing the allocations on a panel consensus; and the advantages of involving members of local agencies and committees during the allocation process. Support software and a user's manual are currently under development for TxDOT.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. George B. Dresser, Ph.D., was the Principal Investigator for the project.

IMPLEMENTATION STATEMENT

The process presented in this report is intended for use by urban areas with populations of 200,000 persons or less. It is designed to be conducted by the MPO or city staff and to require little or no assistance from outside agencies. Software and a user's guide are currently under development as a portion of Project 2-10-90-1235 funded by the Texas Department of Transportation (TxDOT). The software will run independent of other programs and will be designed with minimal computer hardware requirements.

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INTRODUCTION

The allocation of future growth is one of the initial and most important steps in developing the input data for trip generation models. The allocation of population and employment growth has a direct impact on travel demand modeling. These zonal allocations also influence future land use plans, future infrastructure improvements, and city zoning ordinances. It is important, therefore, that any method of allocating future growth should reflect the area's growth potential as accurately as possible.

PROPOSED GROWTH ALLOCATION PROCEDURE

In an attempt to decrease the burden on the planning staff in smaller urban areas which may not have the financial or personnel resources to allocate growth using traditional models or methods, an existing technique, the Delphi process, was modified to provide a qualitative measure of an area's potential for growth at the zone level. A qualitative measure of each zone's growth potential was established relative to the other zones in the area and used to allocate projections. The allocation of growth is predicated on the characteristics of zones which give them a greater or lesser potential for growth. Additionally, the Delphi process can provide good results in a short time frame which provides the benefit of accelerating the overall planning process. The Delphi process can be made available to cities and metropolitan planning organizations (MPOs) by the Texas Department of Transportation (TxDOT) in the form of a package consisting of self-contained software and a user's manual.

DELPHI PROCESS -- AN OVERVIEW

The Delphi inquiry techniques were originally developed during the mid- to late 1960's by a team of researchers at the RAND Corporation. Their objective was to design a set of techniques which could solicit and collate the opinions of a group of individuals, resulting in the most reliable consensus possible. The basic characteristics of these techniques were anonymity of the panel members, statistical observations of the responses given by the panel members, and controlled feedback to the panel. These characteristics

are incorporated into an iterative process which permits and encourages the reassessment of previous responses. One of the greatest advantages of the Delphi techniques is that they provide a means of retaining the more desirable features of committee meetings while avoiding some of the characteristic behavioral and administrative problems associated with committees.

The decision to use the Delphi process was based on these features and on the flexibility of the process. The Delphi process can be tailored to fit almost any set of circumstances. It has been used in modified forms for many different applications from Sea Grant policy decisions in Michigan in the early 1970's to evaluating future highway projects in New Mexico in 1989. While the primary goal of the process is to achieve a consensus, it can also be used to identify issues which may have conflicting viewpoints and can aid in reaching compromises on those issues.

PILOT PROJECT: LONGVIEW

In order to more thoroughly examine the applicability of the Delphi process to allocating future growth, a pilot project was conducted in the Longview area. The objective of this pilot project was to allocate the area's projected population and employment growth for the year 2015 to the traffic analysis zone level. There were three basic stages to the pilot project: preparation for the Delphi process, administration of the Delphi process, and evaluation of the results. Figure 1 illustrates the flow of the overall Delphi process.

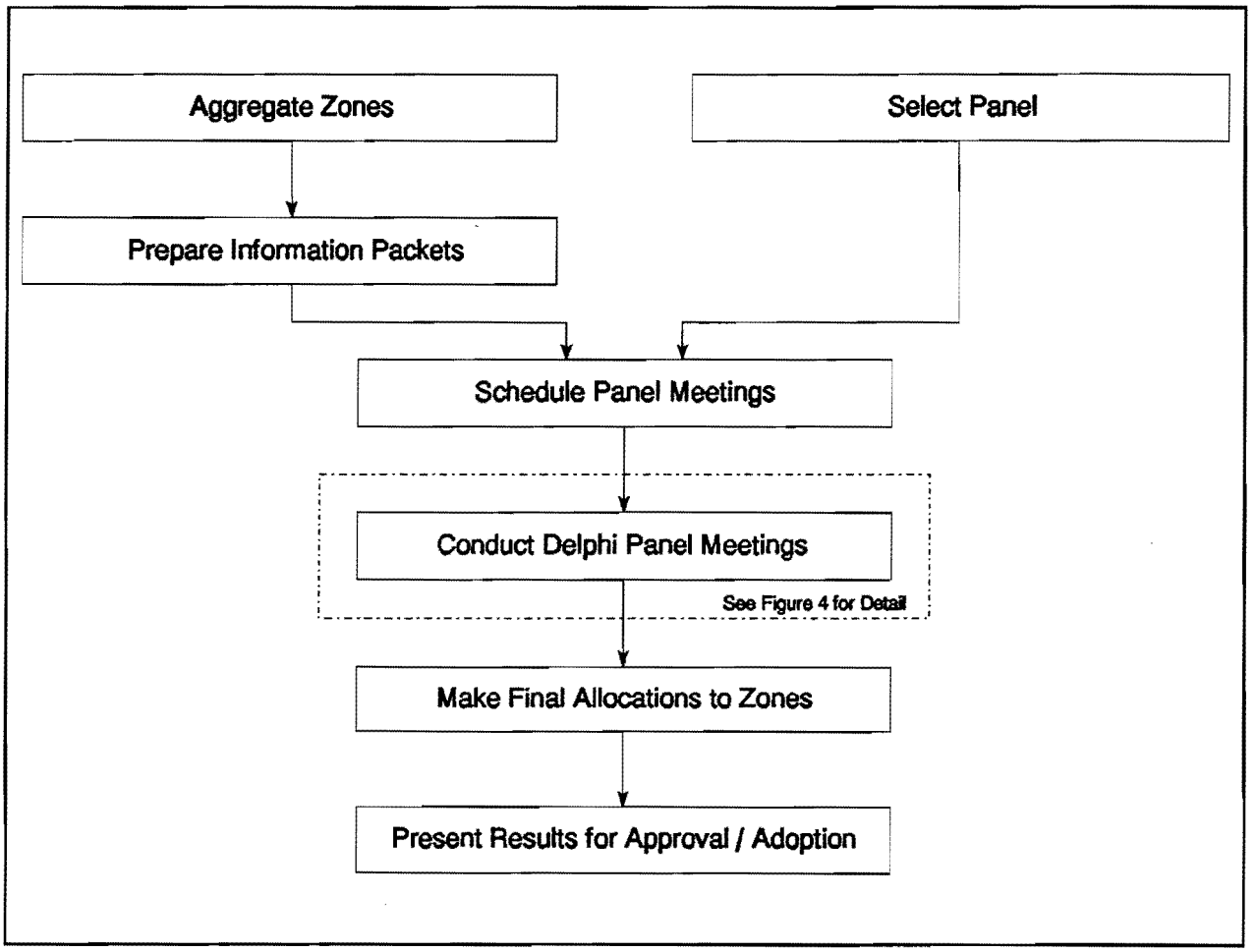

Figure 1. Flowchart of overall Delphi process procedure.

DELPHI PROCESS PREPARATION

Preparation for the process can be broken down into four major categories: selecting panel members, aggregating traffic analysis zones, preparing information packets, and scheduling meeting times and locations. The preparation for the Delphi process was a joint effort between the Longview city planner and transportation planner (hereafter referred to as the Longview staff) and the Texas Transportation Institute (TTI).

Panel Selection

The panel selection was the responsibility of the Longview staff. Recommendations regarding panel size and background were made to the Longview staff. A target panel size of 30 members was established with the desired panel being a multi-disciplinary collection of individuals familiar with the Longview area. The following disciplines were recommended to the Longview staff as a guideline for selecting the panel members:

- Engineers
- Planners
- Elected officials
- School officials
- MPO members
- Real estate brokers
- Bankers
- Employers (basic, retail, and service)
- Developers (commercial and residential)

The Longview staff used several sources in creating a list of potential panelists. The resulting list was compiled based on recommendations from the director of planning and operation, the city planner, and the transportation planner. Members of the Strategic Planning Economic Development Committee, Planning and Zoning Commission, and the local Economic Development Study Committee were invited to participate on the panel. A list of citizens who had expressed interest and willingness to serve on these and various

other committees, but who had not been selected, was obtained from the Longview public information director. From this list, persons with the recommended backgrounds were contacted and invited to participate on the panel. In addition to these sources, representatives from the local school districts, county commissioners, two former city council members, a water utility employee, and several local builders and engineers were asked to participate. A personal phone call was made to each of the potential panelists by the Longview staff to briefly explain the process and the expected time involved and to invite them to participate. About 40 percent of those contacted declined to serve due to conflicting vacations or family obligations. A letter of confirmation was sent to 28 persons who agreed to participate on the panel. Of the 28 persons who agreed to participate, two did not attend the orientation meeting or any of the allocation meetings. The composition of the panel is shown in Table 1.

Table 1
Occupations of Pilot Project Panel Members

Occupation	Number of Panel Members
Accountant	1
Attorney	1
Banker	1
Building Contractor	2
Chamber of Commerce Member	1
City Official/Administrator	2
County Commissioner	2
Engineer	3
Manager/Administrator (Basic / Service / Retail)	3
Medical Center Administrator	1
Political Appointee	1
Real Estate Broker	2
School Official/Administrator	3
Transportation Services Administrator	1
Utilities Administrator	2
Total	26

Aggregation of Traffic Analysis Zones

Although the goal of the growth allocation process is to allocate projected growth to the traffic analysis zones, the number of zones in even a small urban area would be overwhelming for a panel of this nature to deal with. The Longview MPO area (which includes rural areas outside the Longview city limits in addition to the city of Longview) is divided into 219 traffic analysis zones. For this reason the traffic analysis zones were aggregated into allocation districts with the desired number of districts being between five and 10. The quantity and boundaries of the allocation districts were determined by the Longview staff, taking into consideration natural geographic boundaries, traffic analysis zone boundaries, zone population and employment characteristics, and county and city boundaries. A total of six districts were established with the district boundaries corresponding to zone boundaries in almost all cases, the exception being zones which were divided by the county line.

It was decided that an intermediate allocation level was required between the district level and the zone level. Following the initial rounds of the Delphi process in which the growth was allocated to the district level, a second level was established. The panel members were asked to examine each of the 219 traffic analysis zones and indicate whether there was or was not a potential for change in that zone. Areas were established based on the same considerations used in creating the district boundaries and the responses provided by the panel regarding the potential for change. Five of the six districts were divided into six areas, and the remaining district was divided into five areas. This resulted in a total of 35 areas which the panel was asked to consider in the later stages of the process.

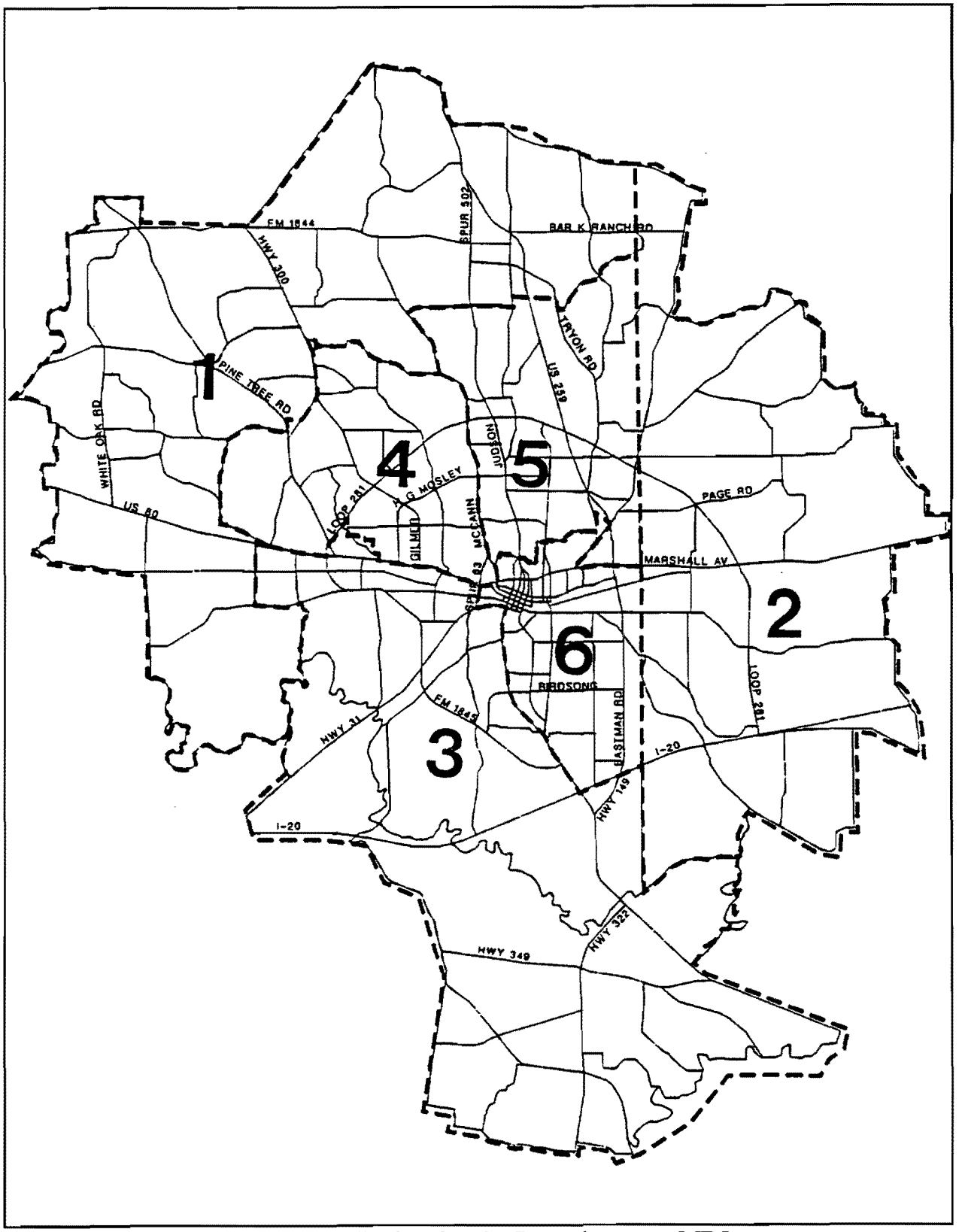

Figure 2. Growth allocation districts for the Longview area MPO.

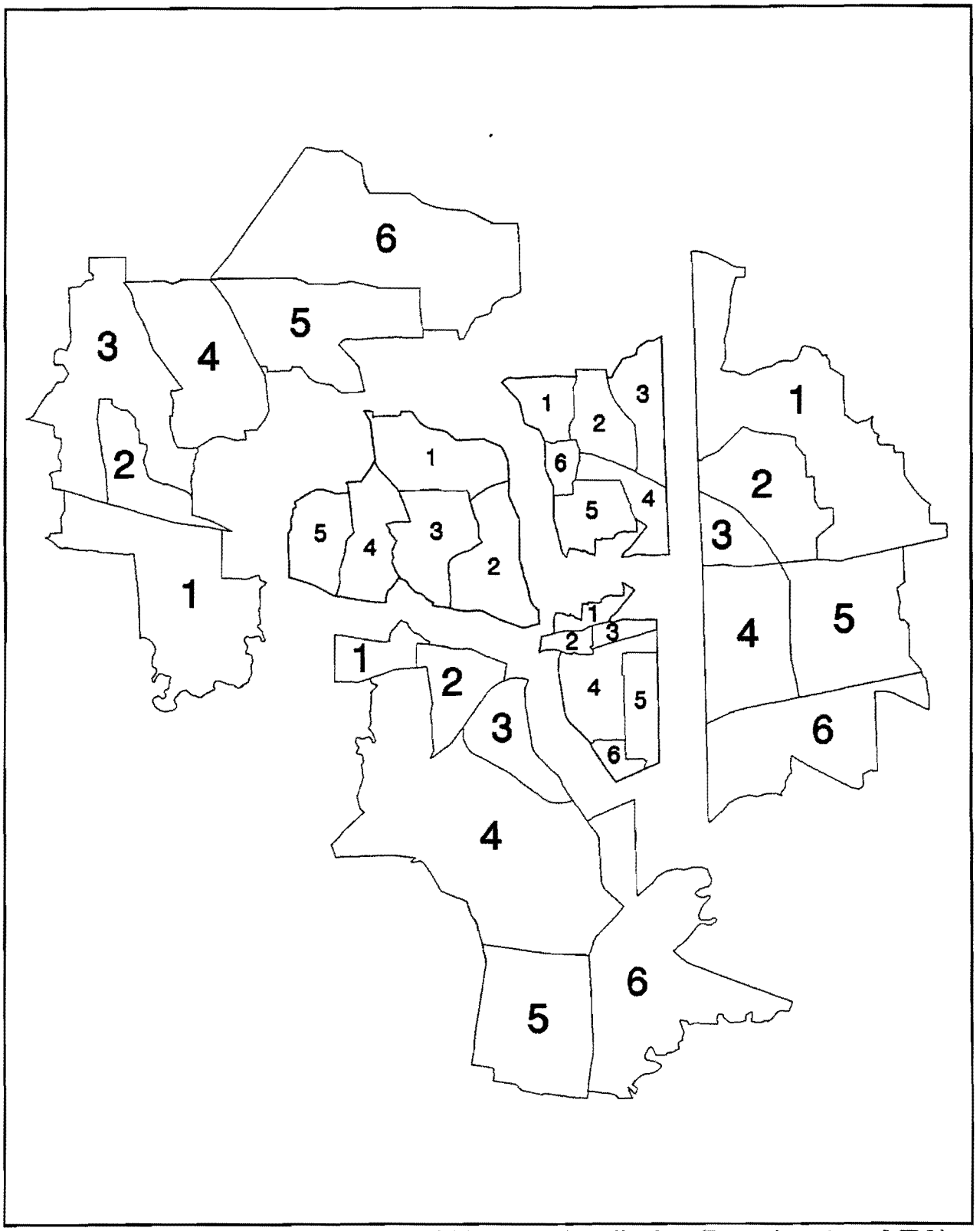

Figure 3. Growth allocation areas within allocation districts (Longview Area MPO).

Information Provided to Panel

In order for the panel members to be able to use the best possible judgment, it was necessary to provide them with as much current and historical information as possible with regard to population, employment, land use, and projected population. The task of compiling this information was greatly facilitated by the fact that most of the information was available on the Geographic Information System (GIS) maintained by Longview. This information was given to the panel at the beginning of the orientation meeting.

Historical Population and Employment

Historical population and employment figures were presented to the panel in several formats. A table showing the 1980 census population, 1990 census population, net change, and percentage change for each of the six districts and the total for the MPO area was provided in the information packet. A map was also provided showing the percentage change in each of the six districts to give the panel members a graphical reference for recent growth in the area. In addition to the 1980 and 1990 population figures, historical population from 1900 to 1990 for each decade for Gregg County, Harrison County, and the city of Longview was obtained from the census data in the Texas Almanac and provided in the form of a line graph.

Basic, retail, and service employment figures for Gregg County, Harrison County, and the Longview-Marshall Metropolitan Statistical Area (MSA) were obtained from the Texas Employment Commission (TEC) data in the Texas Almanac and presented as line graphs. These figures reflected 1959, 1970, 1980, 1982, 1984, 1986, 1988, and 1990 employment and illustrated the employment growth trends in the area. Maps were also provided for each employment category indicating the locations and concentrations of employment for 1990.

Base Year Population and Employment

Population and employment information for the base year 1990 were compiled by the Longview staff and provided to the panel in tabular form. This table contained population, occupied dwelling units, median household income, undeveloped acreage, and basic, retail, and service employment by district. The figures used in this table were consolidated from

the detailed traffic analysis zone information used as trip generation variables in the 1990 Longview MPO urban transportation study.

Projected Population and Employment Growth

Although the Longview staff had developed population and employment projections for the year 2015, the projections were not final and had not been formally adopted by the city. Projections for population were developed by the Longview staff using a cohort survival method. Employment projections were then determined using the Longview staff population projection and regional employment projections from the Bureau of Economic Analysis and Woods and Poole. Another set of population and employment projections commissioned by the city and prepared by the consulting firm of Perryman and Associates was also being completed as the process was beginning. The Perryman projections were received the day before the Round 2 meeting. Several members of the panel were aware of the Perryman projections and kept turning the discussion at the meeting to the differences between the Longview projections and the Perryman projections. In order to keep the process moving smoothly, a solution was reached which appeased those few panel members without compromising the integrity of the process. Since the figures for population and employment for the year 2015 had not been formally adopted by the city and MPO, both sets of figures were used. These figures were presented to the Delphi panel as a high estimate (developed by Perryman and Associates) and a low estimate (developed by the Longview staff) for population and for basic, retail, and service employment. During the course of the Delphi process, the population projections developed by the Longview staff were slightly revised. The allocations made prior to the revisions were updated to reflect the revised projections. The revised projections and allocations were carried forward from that point.

Base Year Land Use and Future Land Use

Base year land use, future land use, and related zoning information were included in the information packets in three different tables, and wall maps were available at each meeting for the panel to use as references. One table provided detailed information by

district for base year and future land use. Two additional tables provided zoning requirements and zoning classification by district.

Schedule

During a preliminary meeting with the Longview staff on May 7, 1992, the decision was made to conduct weekly Delphi panel meetings at 7:00 p.m. on weekdays. An orientation meeting was held on June 4. It had been estimated that six to eight meetings would be necessary to complete the process which would result in the meeting schedule continuing through July. The meeting day varied from week to week due to conflicting meetings of the city council and other committees and a limitation on available meeting locations.

DELPHI PROCESS METHODOLOGY

The Delphi process as modified for use with growth allocation consists of an introductory meeting, four to eight meetings where panel members complete questionnaires and exchange information, and an evaluation meeting. Figure 4 illustrates the questionnaire and allocation methodology of the growth allocation process. Beginning with the second round, feedback is provided to the panel regarding the responses and results from the previous round. Panel members are given the opportunity to review the information and revise their responses if they wish. As a consensus is reached at each allocation level, the process advances to the next allocation level, and the process is repeated.

Although the panel members are responsible for establishing a qualitative measure for the growth potential of the districts and areas, they do not directly determine the growth allocations. The growth allocations are made by the agency conducting the Delphi process based on calculations made using the panel responses. In the Longview pilot project, all calculations during the questionnaire portion of the Delphi process (shown inside the dashed area in Figure 4) were completed by TTI. The procedure used for making the allocations are discussed in a later section of this report.

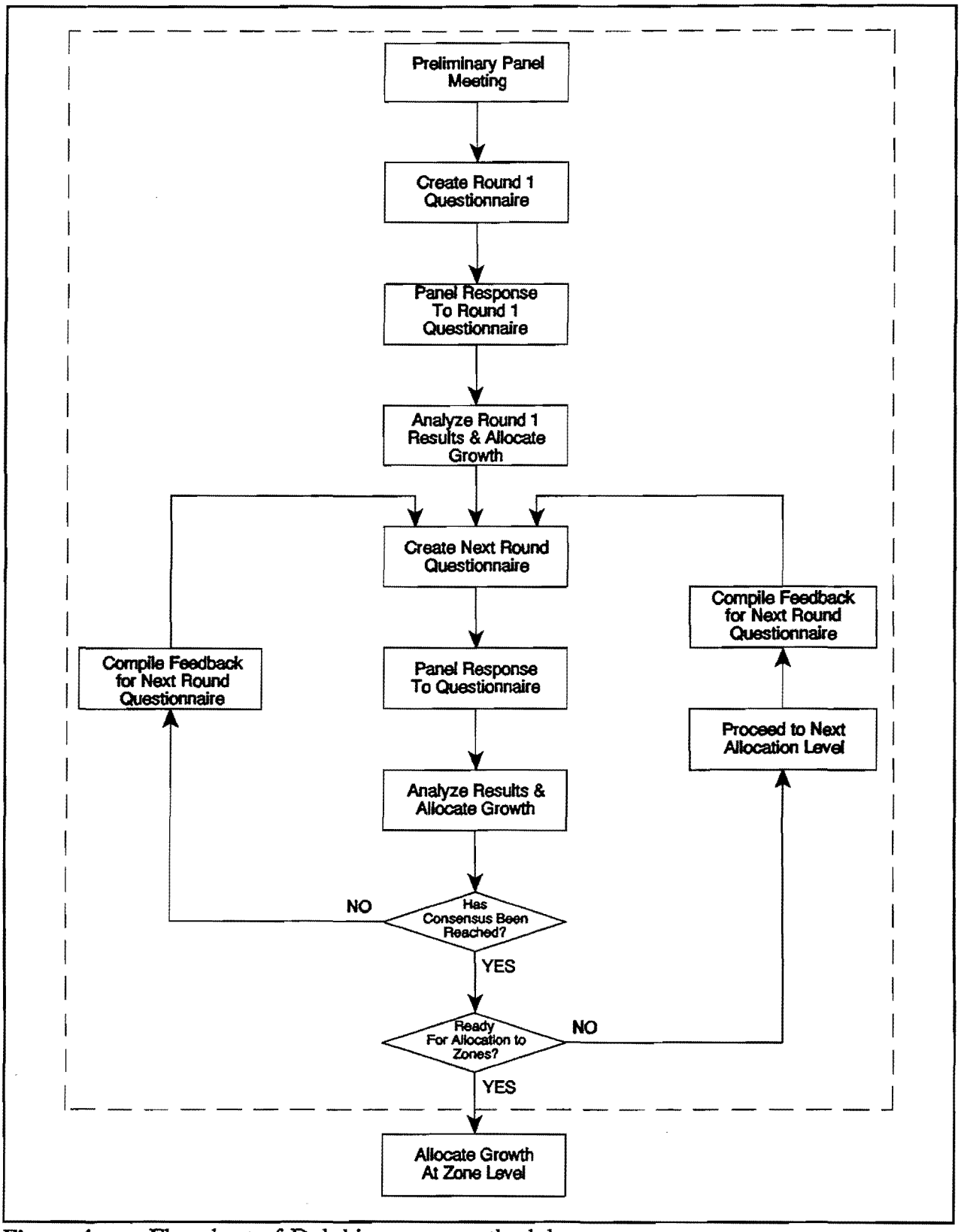

Figure 4. Flowchart of Delphi process methodology.

Questionnaire Format

During the course of the pilot project, several different questionnaire formats were used. Some of the changes in format were made in order to obtain responses on new information as the process progressed. Other changes were made in an attempt to simplify the questionnaires in response to panel comments on the format of the questionnaires. In making theses changes, great care was taken to ensure that changes were not made between similar rounds in the process which might bias the panel responses. These changes are detailed in the following sections.

Orientation Meeting

The purpose of the orientation meeting was primarily to acquaint the panel with the Delphi process and to distribute the packets containing the population, employment, and land use information. Therefore, few panel responses were solicited during this meeting. The only information obtained from the panel during this meeting was biographical background information.

Allocation of Growth at the District Level

During the first two rounds of the Delphi process, the panel was asked to consider the growth potential of the six districts. Determining the population and employment growth potential for each of the districts is the first step in allocating the future growth. Panel members were first asked to provide a self-evaluation of their familiarity with the Longview area using the following scale:

1) Unfamiliar
2) Slightly Familiar
3) Generally Familiar
4) Very Familiar
5) Expert or Actively Studying

The same scale was used throughout the questionnaire each time the panel members were

asked to evaluate their familiarity with the given issue.

The first round questionnaire was divided into four sections: population growth potential, basic employment growth potential, retail employment growth potential, and service employment growth potential. Panel members were first asked to rate the importance of 13 factors which might influence growth in one or all of the districts using the following scale:

1) Little or No Importance
2) Minor Importance
3) Considerable Importance
4) Very Great Importance

The panel members were also asked to rate their familiarity with the factors. The goal of asking the panel members to rate the factors was to gather information on their perceptions of what influences growth and, more importantly, to put the panel members in a frame of mind in which they would consider what factors actually affect the growth potential, rather than giving an arbitrary or "gut" response, when rating each district's growth potential.

Each section then required the panel member to rate the potential for each type of growth (i.e., population and basic, retail, and service employment) for each of the six districts using the following rating scale:

-1) 10% or Greater Decrease
0) Stable (No Change)
1) 10% Increase
2) 25% Increase
3) 50% or Greater Increase

The panel members were also asked in each section to rate their familiarity with each type of growth in that district and to rank the districts from 1 to 6 with a ranking of 1 being the least likely to grow and 6 being the most likely to grow. The purpose for this ranking was

to ask for the same basic information regarding growth potential in a different format in order to provide a means of verifying that the panel members were interpreting the questions correctly.

Following the questions relating to the potential for growth, the panel members were asked to make a judgment regarding what level of growth activity would occur during each of three projection time periods: 1990 to 2000, 2000 to 2010, and 2010 to 2015. The following scale was used to evaluate the level of activity:

-1) Decrease
0) No Growth
1) Slight Growth
2) Moderate Growth
3) Considerable Growth

The levels of growth during each time period which were calculated from the responses to this question were compared to the actual intermediate projections developed by the Longview staff.

Space was also provided on every page for comments. Panel members were provided with space in each section of the questionnaire following the factors which might influence growth and encouraged to provide additional factors. These additional factors and comments were used to stimulate discussion at the next meeting.

The Round 2 questionnaire format was essentially the same as the questionnaire used in Round 1. Format changes consisted of the removal of the questions dealing with the factors influencing growth and the district rankings and the addition of the feedback from the Round 1 responses. Feedback was given to each panel member in the form of panel high and low responses, the median and mode of the panel responses, and that panel member's previous responses. Space was provided to allow the panel member to revise the previous response and to make any additional comments.

A new section was also added asking the panel members to indicate which traffic analysis zones they felt had no significant potential for change (either positive or negative).

This information was used in conjunction with other characteristics of the zones to establish the area boundaries for allocating growth within each district.

Each panel member was also provided with an information packet containing the quantitative allocations and growth distributions over the 25-year time period (1990 to 2015) calculated by TTI using the panel's qualitative responses from Round 1.

Allocation of Growth at the Area Level

After two rounds of questionnaires at the district level, a consensus was reached; and the panel was ready to proceed with the area allocations. Based on comments made by some of the panel members at the end of the Round 1 meeting, and the fact that the time required to complete the Round 1 questionnaire exceeded the time originally estimated, the decision was made to change the format at this level of the process. The format of the questions remained basically the same, but the presentation of the questions was changed.

A map of each district showing the area boundaries in that district was placed on a separate page along with the questions pertaining to those areas. A map of the Longview area showing the relative location of each district was also placed on each page. This format provided an immediate visual reference for the panel members without having to use additional maps. The questions regarding the potential for the four types of growth in the areas were worded the same as in previous rounds, and the same rating scale was used.

A second section of the Round 3 questionnaire presented the allocation distributions as a percentage of total calculated from the Round 2 responses and asked the panel members to either agree or disagree with the allocation percentages. In cases where panel members disagreed with the percentage for a district, they were asked to indicate whether it should be higher or lower than the value given and to indicate another district which should lose or receive the resulting difference.

The Round 4 questionnaire was virtually identical to the Round 3 questionnaire. The only significant difference was the addition of the feedback from the prior round showing the high and low panel responses, the median and mode of the panel responses, and that panel member's previous responses. The panel members were again allowed to compare their previous responses to the panel responses and to make any changes they wished. They

were also provided with revised district allocation percentages and asked if they agreed or disagreed.

During both Round 3 and Round 4, information packets were provided to the panel members with the questionnaires. These information packets contained the most current revisions of the growth allocation calculations made by TTI based on the panel responses from the prior round.

Allocation of Growth at the Zone Level

After reviewing the results of the Round 4 questionnaire, it was apparent that the panel had reached a consensus on the allocations at the area level. The allocation to the traffic analysis zone level was performed by the Longview staff taking into consideration the available land in each area's zones and the future land use plan for the city of Longview. The adjusted results were then aggregated back to the area and district levels, and maps showing the amount of growth at the area level were prepared for each of the four growth categories and for total employment.

Evaluation of the Process by the Panel

The Round 5 questionnaire was designed to allow the panel to evaluate the overall process. Panel members were provided with an information packet containing final allocation figures and percentages in tabular form at both the district and zone level. A presentation of the final allocations was also made to the panel using the maps showing the amount of growth for each of the four categories. The panel was asked to evaluate and comment on items such as the effectiveness of the process, the types of questionnaire formats used, the information packets provided to the panel, the meeting format, the meeting schedule, and the final allocations.

Meeting Format

The basic format for the Delphi process panel meetings was consistent throughout the entire meeting schedule. In all cases the meetings were intended to be as informal as possible. The meetings were structured to begin with an overview of the goals for that

particular meeting followed by an open discussion by the panel. Information pertinent to that round of the process was presented, the information packet for that round was reviewed, and discussion was encouraged. The questionnaire format for that meeting was then outlined, and the remainder of the meeting was devoted to responding to the questionnaire.

Orientation Meeting

The first meeting with the panel was the most formal of the meetings. Introductions were made by the Longview staff as well as a presentation to the panel on the transportation planning process and the necessity and difficulties in allocating future growth. An overview of the Delphi process and the panel objectives were then presented by TTI. The Longview staff distributed the information packets and explained the contents of the packets; this was followed by an open discussion. The panel members were informed of the meeting schedule, and the meeting ended with closing comments by the Longview staff.

Growth Allocation Questionnaire Rounds

Meeting formats for the growth allocation rounds were essentially the same. An atmosphere of informality was provided in which panel members felt free to ask questions or offer comments at any time and also to move about the meeting room for refreshments or to ask questions on a one-to-one basis of either the Longview or TTI staff. Each meeting began with an explanation of the information packet for that round followed by an open discussion. This was followed by an overview of the current questionnaire and the feedback provided from the previous round results. The panel members were then given as much time as they required to complete the questionnaire.

Evaluation of the Process by the Panel

The format for the final panel meeting followed the same pattern as the questionnaire meetings -- presentation and open discussion followed by the completion of the questionnaires. However, after the final allocations were presented, there was considerably more discussion than in prior meetings. The discussion primarily focused on the overall process and the quality of the allocations generated by the panel.

PROCESSING AND EVALUATION OF RESPONSES

The following sections detail the steps and decisions involved in processing the questionnaire responses and calculating the growth allocations. Panel responses during each of the questionnaire rounds provided a qualitative measure of relative growth potential. These qualitative responses were then processed by TTI following each round to obtain quantitative values for relative growth potential which were in turn used to allocate the total growth. All calculations and data manipulations were performed by TTI using a series of spreadsheets. Spreadsheets were used to process the pilot project results due to the ease with which format and calculation changes can be made.

Orientation Meeting

Due to the nature of the orientation meeting, no calculations were necessary. Processing the responses from this meeting consisted of compiling information provided by the panel members on the biographical background sheets. Each panel member on the list was then randomly assigned a number from 1 to 28. This number was used on all subsequent questionnaires and feedback to insure the anonymity of each panelist.

Allocation of Growth at District Level

During the first two rounds of the Delphi process, the questionnaires concentrated on the allocations at the district level. Table 1 shows the allocation of projected population and employment for the year 2015 calculated from the panel responses following each round. Table 2 shows the same allocations as a percentage of the total. Panel responses for Round 1 and Round 2 were in the form of a growth potential rating for each district. The following process was the initial method used to determine the projected growth distribution at the district level following the first round of the Delphi process.

Step 1 The arithmetic mean and median were calculated from the responses given by the panelists. These two values were averaged to reduce the influence of any extreme responses.

$$\frac{(\textit{Mean of panel responses}) + (\textit{Median of panel responses})}{2} = \%\ \textit{Growth of district}$$

$$\frac{(-3.412) + (0)}{2} = -1.706$$

Step 2 The population for the base year for each district was increased or decreased by the percentage obtained in Step 1.

$$(\textit{Base year district population}) * (1 + (\%\ \textit{Growth of district})) = \textit{Unscaled projected district population}$$

$$16{,}991 * (1 + (-0.01706)) = 16{,}701$$

Step 3 The calculated populations for each of the districts were summed to obtain an unscaled projected population.

$$\sum \textit{Unscaled projected district populations} = \textit{Total calculated population projection}$$

$$13{,}848 + 7{,}914 + 10{,}416 + 31{,}301 + 18{,}597 + 16{,}701 = 98{,}777$$

Step 4 The calculated population and the projected population were used to scale the populations for each district using the following calculation:

$$\frac{(\textit{Calculated district population})}{(\textit{Total calculated population})} * (\textit{Projected population}) = \textit{Scaled district population}$$

$$\frac{16{,}701}{98{,}777} * 107{,}539 = 18{,}183$$

Step 5 The growth of each district was calculated using the following equation:

$$\frac{(\textit{Scaled district population}) - (\textit{Base year district population})}{(\textit{Base year district population})} * 100\% = \%\ \textit{Growth}$$

$$\frac{18{,}183 - 16{,}991}{16{,}991} * 100\% = 7.02\%$$

Due to concerns from the panel that the growth in some districts should be negative, the method was revised to allow the scaled values to be positive or negative based on the responses of the panel. The revised method was applied to the Round 1 responses here for the purpose of comparison and used in Round 2 and all subsequent calculations. An asterisk (*) is used to indicate changes to the initial calculation method.

Step 1 The arithmetic mean and median were calculated from the responses given by the panelists. These two values were then averaged to reduce the influence of any extreme responses.

$$\frac{(\textit{Mean of panel responses}) + (\textit{Median of panel responses})}{2} = \%\ \textit{Growth of district}$$

Round 1:

$$\frac{(-3.412) + (0)}{2} = -1.706$$

Round 2:

$$\frac{(-1.882) + (0)}{2} = -0.941$$

Step 2 The population for the base year for each district was then increased or decreased by the percentage obtained in Step 1.

*(Base year district population) * (1 + (% Growth of district)) = Unscaled projected district population*

Round 1:

$$16{,}991 * (1 + (-0.01706)) = 16{,}701$$

Round 2:

$$16{,}991 * (1 + (-0.00941)) = 16{,}831$$

Step 3 The calculated populations for each of the districts were summed to obtain an unscaled projected population.

$\sum$ *Unscaled projected district populations = Total calculated population projection*

Round 1:

$$13{,}848 + 7{,}914 + 10{,}416 + 31{,}301 + 18{,}597 + 16{,}701 = 98{,}777$$

Round 2:

$$13{,}716 + 7{,}949 + 10{,}362 + 31{,}291 + 19{,}074 + 16{,}831 = 99{,}223$$

* **Step 4** The net change was calculated between the calculated population projection and the base year population for each of the districts and the total.

District 6:

Round 1:

$$16{,}701 - 16{,}991 = -290$$

Round 2:

$$16{,}831 - 16{,}991 = -160$$

Total:

Round 1:

$$98{,}777 - 89{,}610 = 9{,}167$$

Round 2:

$$99{,}223 - 89{,}610 = 9{,}613$$

* **Step 5** The net change was calculated between the total projected population and the base year total population.

$$107{,}539 - 89{,}610 = 17{,}929$$

* **Step 6** The net change to reach the calculated population and the net change to reach the projected population were then used to scale the populations for each district using the following calculation:

$$\frac{(\textit{Net change of district pop.})}{(\textit{Net change of calculated pop.})} * (\textit{Net change of projected pop.}) = \textit{Scaled change of district pop.}$$

Round 1:

$$\frac{-290}{9{,}167} * 17{,}929 = -567$$

Round 2:

$$\frac{-160}{9{,}613} * 17{,}929 = -298$$

* **Step 7** The total projected population in each district was calculated by adding the scaled change in district population to the base year district population.

Base year population + Scaled change of district population = Projected district population

Round 1:

$$16{,}991 + (-567) = 16{,}424$$

Round 2:

$$16{,}991 + (-298) = 16{,}693$$

Step 8 The percent growth of each district was then calculated using the following equation:

$$\frac{(\textit{Scaled district population}) - (\textit{Base year district population})}{(\textit{Base year district population})} * 100\% = \%\ \textit{Growth}$$

Round 1:

$$\frac{16{,}424 - 16{,}991}{16{,}991} * 100\% = -3.34\%$$

Round 2:

$$\frac{16{,}693 - 16{,}991}{16{,}991} * 100\% = -1.75\%$$

Following Round 2, the means of the panel responses from the two rounds were compared using a z statistical test to determine if the means were statistically different. The means of the panel responses from the two questionnaires were statistically the same for a confidence level of 99 percent. This statistical result along with the fact that the panel members would still be allowed to make adjustments to their responses for the district growth potential prompted the decision to advance the process to the next level.

As a part of the Round 3 and Round 4 questionnaires dealing with growth allocation at the area level, panel members could also agree or disagree with the allocations at the district level derived from Rounds 1 and 2. Where a panel member disagreed with a district allocation, they were asked to indicate whether that district should have a larger or smaller allocation and which other district should be adjusted in the opposite direction. That panel member's previous round responses for the affected districts were adjusted by one rating level in the appropriate direction, the district allocations were recalculated, and the new allocations were carried forward. As the figures presented in Table 2 indicate, some changes were made to most of the district allocations in all categories during Round 3. Following Round 3, the panel agreed with the allocation of basic employment and retail employment, and no further adjustments were made to those district allocations. However, there were still some minor changes made to the population and service employment district allocations. Although adjustments were made during Rounds 3 and 4, these adjustments were relatively minor as indicated by the small changes in percent of total from one round to the next. The largest change in percent of total was only 2.3 percent, and all of the remaining changes were less than 1.5 percent.

Table 2
Comparison of District Allocations Following Each Round of Delphi

POPULATION

District	1990	Estimated 2015 Allocation				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	14,299	15,076	14,960	17,426	17,480	18,670
2	7,018	8,616	8,755	8,759	9,531	9,642
3	10,177	11,340	10,522	10,523	10,529	10,529
4	25,734	34,077	34,349	31,861	31,966	31,388
5	15,391	20,247	22,260	22,275	22,621	21,897
6	16,991	18,183	16,693	16,691	15,413	15,413

BASIC EMPLOYMENT

District	1990	Estimated 2015 Allocation				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	1,835	2,090	2,044	1,988	1,988	1,989
2	1,982	2,380	2,572	2,358	2,358	2,357
3	10,813	11,653	11,696	12,092	12,093	12,094
4	978	1,151	1,130	1,056	1,056	1,056
5	942	1,099	1,083	1,032	1,032	1,034
6	3,505	3,658	3,505	3,505	3,505	3,505

RETAIL EMPLOYMENT

District	1990	Estimated 2015 Allocation				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	621	524	531	654	655	654
2	417	434	445	445	445	446
3	1,224	1,188	1,244	1,244	1,244	1,243
4	3,738	4,459	4,424	4,293	4,293	4,293
5	3,558	4,355	4,217	4,221	4,222	4,222
6	2,433	2,350	2,451	2,452	2,451	2,452

SERVICE EMPLOYMENT

District	1990	Estimated 2015 Allocation				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	1,408	1,624	1,599	1,625	1,659	1,659
2	311	368	364	374	378	378
3	1,443	1,592	1,503	1,503	1,513	1,512
4	2,838	3,771	3,951	3,921	4,086	4,086
5	3,440	4,632	4,829	5,069	5,096	4,795
6	6,493	7,493	7,235	6,987	6,750	7,049

Table 3
Comparison of District Allocations Following Each Round of Delphi
As Percentage of Total

POPULATION

District	1990	Estimated 2015 Allocation (% of total)				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	13.7	14.0	13.9	16.2	16.3	17.4
2	7.8	8.0	8.1	8.1	8.9	9.0
3	11.3	10.5	9.8	9.8	9.8	9.8%
4	31.0	31.7	31.9	29.6	29.7	29.2
5	17.2	18.8	20.7	20.7	21.0	20.4
6	19.0	16.9	15.5	15.5	14.3	14.3

BASIC EMPLOYMENT

District	1990	Estimated 2015 Allocation (% of total)				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	9.5	9.5	9.3	9.0	9.0	9.0
2	10.4	10.8	11.7	10.7	10.7	10.7
3	51.6	52.9	53.1	54.9	54.9	54.9
4	5.3	5.2	5.1	4.8	4.8	4.8
5	4.9	5.0	4.9	4.7	4.7	4.7
6	18.3	16.6	15.9	15.9	15.9	15.9

RETAIL EMPLOYMENT

District	1990	Estimated 2015 Allocation (% of total)				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	4.2	3.9	4.0	4.9	4.9	4.9
2	3.5	3.3	3.3	3.3	3.3	3.4
3	10.2	8.9	9.3	9.3	9.3	9.3
4	32.1	33.5	33.2	32.3	32.3	32.3
5	29.7	32.7	31.7	31.7	31.7	31.7
6	20.3	17.7	18.4	18.4	18.4	18.4

SERVICE EMPLOYMENT

District	1990	Estimated 2015 Allocation (% of total)				
		Round 1	Round 2	Round 3	Round 4	Adjusted
1	8.7	8.3	8.2	8.3	8.5	8.5
2	1.9	1.9	1.9	1.9	1.9	1.9
3	9.1	8.2	7.7	7.7	7.8	7.8
4	18.0	19.4	20.3	20.1	21.0	21.0
5	21.6	23.8	24.8	26.0	26.2	24.6
6	40.7	38.5	37.1	35.9	34.6	36.2

Allocation of Growth at Area Level

Rounds 3 and 4 of the questionnaire process concentrated on the allocation of growth at the area level. The procedures used in processing the responses for the district allocations from Rounds 1 and 2 were used in processing the responses for area allocation. Calculations were made by TTI using the revised method of converting the responses to an actual allocation, and the means were tested statistically following Round 4 to determine if there had been a significant change between Round 3 and Round 4. When no apparent statistical differences were found between Round 3 and Round 4 responses, the process advanced to the next phase, the allocation of the area growth to the traffic analysis zone level.

Allocation of Growth at Zone Level

It was felt that the large number of zones in the urban area would be too tedious and overwhelming for the panel to deal with in the context of a meeting atmosphere. Also, it was reasonable to assume that the panel members would not be as familiar with specific zones at that level of detail as with areas and districts on a more general scale. Therefore, allocation of the growth from the area level to the traffic analysis zone level was performed by the Longview staff. Allocations at the area level were distributed to the zones in that area within the constraints of available land, future land use plan, and expected densities. The panel allocations were first considered at the area level. If the growth allocated to that area could be absorbed by the zones in that area, no reductions were made to that area. If the growth allocated to that area could not be absorbed by the zones, surrounding areas were considered to determine if the excess growth could be shifted to those areas. In the event that the growth allocated to the areas in a given district could not be absorbed by the areas in that district, the adjacent areas in the adjacent districts were considered as possible targets for the excess.

As shown in Tables 4 and 5, some minor adjustments were necessary in allocating the growth to the zone level. Excess growth allocated to District 4 and District 5 was shifted to District 1 and District 2. Table 4 shows the comparison of the panel allocations and the

adjusted allocations at the district level. The percentage of adjustment ranged from a decrease in District 5 of 3.2 percent to an increase in District 1 of 6.8 percent. The difference in percentage of the total projected population ranged from a reduction in District 5 of 0.7 percent to an increase in District 1 of 1.1 percent. The conclusion can be made that the change in percentage of total at the area level and the district level is a more relevant measure of the impact of the adjustments made to the panel allocations than the actual percent of raw adjustment. This is illustrated by the results provided in Table 5. As indicated by the figures in Table 5, the percentage of adjustment between the panel allocation and the adjusted allocation ranged from a reduction in Area 2 in District 5 of 10.4 percent and an increase in Area 5 in District 1 of 19.3 percent. However, when the change in percentage of total district population is analyzed, the percentage change ranged from a reduction of 2.6 percent in Area 4 of District 4 to an increase of 2.0 percent in Area 1 of District 4. The areas exhibiting the largest positive and negative percentage of adjustment (District 1/Area 5 and District 5/Area 2) resulted in a change in the percentage of total population in those areas of only 1.3 percent and -0.9 percent, respectively. The largest positive and negative effect on the allocations in terms of the change in the percentage of the district total occurred in District 4. This relationship becomes even more apparent when reviewed at the district level. Using District 1 as an example, the adjustment in population allocation results in an increase of 1,190 persons, which is 6.8 percent of the panel allocation of 17,480. However, this is only 1.1 percent of the entire projected population of 107,539 persons for the year 2015. This is a relatively insignificant change in the overall growth allocation.

The comparison between the panel allocations and the adjusted allocations for basic and retail employment as given in Tables 4, 6, and 7, provide additional support for using of this technique in the growth allocation process. In distributing the basic and retail employment growth, the panel allocations were completely compatible with the constraints imposed at the district level; no adjustments to the district allocations were needed. At the area level, some minor shifts were required within the areas in District 5 for retail employment. These adjustments were not a direct result of excess allocation to these areas but were instead due to the fact that new retail development had already begun in Area 2

and Area 3, and the panel allocations were not sufficiently large enough to reflect this growth.

A similar situation occurred when distributing the area allocations to the zone level for service employment. Due to the concentration of service oriented businesses in District 6 consisting mainly of hospital and medical practices as well as banking and government offices, the growth allocated to this area was increased slightly from the growth allocated by the panel. The adjustment was made by reducing the service employment in District 5 by 300 jobs and allocating those 300 jobs to Area 2 in District 6. This reallocation of 300 jobs amounted to only 1.5 percent of the total service employment projection of 19,480 for the year 2015 in the Longview MPO area. Some minor redistribution was also made among the areas in District 5 and District 4. The results for the service employment allocation are given in Tables 4 and 8.

Evaluation of the Process by the Panel

Following the allocation to the zone level, the Delphi process proceeded to the final phase. Although not necessary to the allocation of future growth, the evaluation questionnaire was considered to be an important phase in the pilot project because it allowed the panel members to provide information which may be used to refine and improve the process.

Table 4
Comparison of District Allocations Before and After Adjustments

District	1990 Population	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	14,299	17,480	18,670	1,190	6.8	16.0	16.3	17.4	1.1
2	7,018	9,531	9,641	110	1.2	7.8	8.9	9.0	0.1
3	10,177	10,529	10,529	0	0.0	11.4	9.8	9.8	0.0
4	25,734	31,966	31,388	-578	-1.8	28.7	29.7	29.2	-0.5
5	15,391	22,620	21,898	-722	-3.2	17.2	21.0	20.3	-0.7
6	16,991	15,413	15,413	0	0.0	19.0	14.3	14.3	0.0
Total	89,610	107,539	107,539	0	0.0	100.0	100.0	100.0	0.0
Smallest Value					-3.2%	7.8%	8.9%	9.0%	-0.7%
Largest Value					6.8%	28.7%	29.7%	29.2%	1.1%

District	1990 Basic Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1,835	1,989	1,989	0	0.0	9.1	9.0	9.0	0.0
2	1,982	2,357	2,357	0	0.0	9.9	10.7	10.7	0.0
3	10,813	12,094	12,094	0	0.0	53.9	54.9	54.9	0.0
4	978	1,056	1,056	0	0.0	4.9	4.8	4.8	0.0
5	942	1,034	1,034	0	0.0	4.7	4.7	4.7	0.0
6	3,505	3,505	3,505	0	0.0	17.5	15.9	15.9	0.0
Total	20,055	22,035	22,035	0	0.0	100.0	100.0	100.0	0.0
Smallest Value					0.0%	4.7%	4.7%	4.7%	0.0%
Largest Value					0.0%	53.9%	54.9%	54.9%	0.0%

District	1990 Retail Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	621	654	654	0	0.0	5.2	4.9	4.9	0.0
2	417	447	447	0	0.0	3.5	3.4	3.4	0.0
3	1,224	1,243	1,243	0	0.0	10.2	9.3	9.3	0.0
4	3,738	4,293	4,293	0	0.0	31.2	32.3	32.3	0.0
5	3,558	4,222	4,222	0	0.0	29.6	31.7	31.7	0.0
6	2,433	2,452	2,452	0	0.0	20.3	18.4	18.4	0.0
Total	11,991	13,311	13,311	0	0.0	100.0	100.0	100.0	0.0
Smallest Value					0.0%	3.5%	3.4%	3.4%	0.0%
Largest Value					0.0%	31.2%	32.3%	32.3%	0.0%

District	1990 Service Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1,327	1,659	1,659	0	0.0	8.4	8.5	8.5	0.0
2	311	378	378	0	0.0	2.0	1.9	1.9	0.0
3	1,443	1,512	1,512	0	0.0	9.1	7.8	7.8	0.0
4	2,838	4,086	4,086	0	0.0	17.9	21.0	21.0	0.0
5	3,440	5,095	4,795	-300	-5.9	21.7	26.1	24.6	-1.5
6	6,493	6,750	7,050	300	4.4	41.0	34.7	36.2	1.5
Total	15,852	19,480	19,480	0	0.0	100.0	100.0	100.0	0.0
Smallest Value					-5.9%	2.0%	1.9%	1.9%	-1.5%
Largest Value					4.4%	41.0%	34.7%	36.2%	1.5%

Table 5
Comparison of Population Area Allocation Before and After Adjustments

District	Area	1990 Population	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel %of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1	1,163	1,174	1,174	0	0.0	8.1	6.7	6.3	-0.4
	2	2,715	2,773	2,773	0	0.0	19.0	15.9	14.9	-1.0
	3	2,606	3,262	3,262	0	0.0	18.2	18.7	17.5	-1.2
	4	4,716	6,154	6,652	498	8.1	33.0	35.2	35.6	0.4
	5	1,373	1,874	2,235	361	19.3	9.6	10.7	11.9	1.2
	6	1,726	2,243	2,574	331	14.8	12.1	12.8	13.8	1.0
	Total	14,299	17,480	18,670	1,190	6.8	100.0	100.0	100.0	0.0
2	1	1,440	2,492	2,562	70	2.8	20.5	26.1	26.6	0.5
	2	1,371	2,335	2,375	40	1.7	19.5	24.5	24.6	0.1
	3	1,596	1,866	1,866	0	0.0	22.7	19.6	19.4	-0.2
	4	1,481	1,547	1,547	0	0.0	21.1	16.2	16.0	-0.2
	5	516	626	626	0	0.0	7.3	6.6	6.5	-0.1
	6	614	665	665	0	0.0	8.7	7.0	6.9	-0.1
	Total	7,018	9,531	9,641	110	1.2	100.0	100.0	100.0	0.0
3	1	1,014	1,014	1,014	0	0.0	10.0	9.6	9.6	0.0
	2	1,157	1,146	1,146	0	0.0	11.4	10.9	10.9	0.0
	3	3,496	3,459	3,459	0	0.0	34.3	32.8	32.8	0.0
	4	1,245	1,259	1,259	0	0.0	12.2	12.0	12.0	0.0
	5	851	1,092	1,092	0	0.0	8.4	10.4	10.4	0.0
	6	2,414	2,559	2,559	0	0.0	23.7	24.3	24.3	0.0
	Total	10,177	10,529	10,529	0	0.0	100.0	100.0	100.0	0.0
4	1	3,343	4,457	5,009	552	12.4	13.0	14.0	16.0	2.0
	2	5,027	5,339	5,810	471	8.8	19.5	16.7	18.5	1.8
	3	6,056	7,940	7,339	-601	-7.6	23.5	24.8	23.4	-1.5
	4	8,028	10,115	9,115	-1,000	-9.9	31.2	31.6	29.0	-2.6
	5	3,280	4,115	4,115	0	0.0	12.8	12.9	13.1	0.2
	Total	25,734	31,966	31,388	-578	-1.8	100.0	100.0	100.0	0.0
5	1	1,655	3,150	3,150	0	0.0	10.8	13.9	14.4	0.5
	2	1,069	2,896	2,596	-300	-10.4	6.9	12.8	11.8	-1.0
	3	924	1,617	1,743	126	7.8	6.0	7.2	8.0	0.8
	4	3,278	5,380	5,380	0	0.0	21.3	23.8	24.6	0.8
	5	6,080	6,925	6,529	-396	-5.7	39.5	30.6	29.8	-0.8
	6	2,385	2,652	2,500	-152	-5.7	15.5	11.7	11.4	-0.3
	Total	15,391	22,620	21,898	-722	-3.2	100.0	100.0	100.0	0.0
6	1	2,124	2,169	2,169	0	0.0	12.5	14.1	14.1	0.0
	2	439	419	409	-10	-2.4	2.6	2.7	2.7	-0.1
	3	185	174	174	0	0.0	1.1	1.1	1.1	0.0
	4	10,194	8,738	8,746	8	0.1	60.0	56.7	56.7	0.1
	5	2,340	2,289	2,296	7	0.3	13.8	14.9	14.9	0.0
	6	1,709	1,624	1,619	-5	-0.3	10.0	10.5	10.5	0.0
	Total	16,991	15,413	15,413	0	0.0	100.0	100.0	100.0	0.0
District Total		89,610	107,539	107,539	0					
Smallest Value						-10.4%	1.1%	1.1%	1.1%	-2.6%
Largest Value						19.3%	60.0%	56.7%	56.7%	2.0%

Table 6
Comparison of Basic Employment Area Allocations Before and After Adjustments

District	Area	1990 Basic Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1	1,156	1,294	1,294	0	0.0	63.0	65.1	65.1	0.0
	2	181	182	182	0	0.0	9.9	9.1	9.1	0.0
	3	66	67	67	0	0.0	3.6	3.4	3.4	0.0
	4	220	228	228	0	0.0	12.0	11.4	11.4	0.0
	5	90	93	93	0	0.0	4.9	4.7	4.7	0.0
	6	122	125	125	0	0.0	6.6	6.3	6.3	0.0
	Total	1,835	1,989	1,989	0	0.0	100.0	100.0	100.0	0.0
2	1	137	148	148	0	0.0	6.9	6.3	6.3	0.0
	2	96	126	126	0	0.0	4.8	5.3	5.3	0.0
	3	138	149	149	0	0.0	7.0	6.3	6.3	0.0
	4	1,231	1,421	1,421	0	0.0	62.1	60.3	60.3	0.0
	5	228	304	304	0	0.0	11.5	12.9	12.9	0.0
	6	152	209	209	0	0.0	7.7	8.9	8.9	0.0
	Total	1,982	2,357	2,357	0	0.0	100.0	100.0	100.0	0.0
3	1	2,308	2,417	2,417	0	0.0	21.4	20.0	20.0	0.0
	2	1,247	1,447	1,447	0	0.0	11.5	12.0	12.0	0.0
	3	2,264	2,326	2,326	0	0.0	20.9	19.2	19.2	0.0
	4	563	648	648	0	0.0	5.2	5.4	5.4	0.0
	5	67	76	76	0	0.0	0.6	0.6	0.6	0.0
	6	4,364	5,180	5,180	0	0.0	40.4	42.8	42.8	0.0
	Total	10,813	12,094	12,094	0	0.0	100.0	100.0	100.0	0.0
4	1	125	137	137	0	0.0	12.8	13.0	13.0	0.0
	2	252	287	287	0	0.0	25.8	27.2	27.2	0.0
	3	329	352	352	0	0.0	33.6	33.3	33.3	0.0
	4	243	251	251	0	0.0	24.8	23.8	23.8	0.0
	5	29	29	29	0	0.0	3.0	2.7	2.7	0.0
	Total	978	1,056	1,056	0	0.0	100.0	100.0	100.0	0.0
5	1	72	86	86	0	0.0	7.6	8.3	8.3	0.0
	2	47	56	56	0	0.0	5.0	5.4	5.4	0.0
	3	18	23	23	0	0.0	1.9	2.2	2.2	0.0
	4	308	340	340	0	0.0	32.7	32.9	32.9	0.0
	5	323	350	350	0	0.0	34.3	33.9	33.9	0.0
	6	174	179	179	0	0.0	18.5	17.3	17.3	0.0
	Total	942	1,034	1,034	0	0.0	100.0	100.0	100.0	0.0
6	1	262	262	262	0	0.0	7.5	7.5	7.5	0.0
	2	1,549	1,549	1,549	0	0.0	44.2	44.2	44.2	0.0
	3	482	482	482	0	0.0	13.7	13.7	13.7	0.0
	4	739	739	739	0	0.0	21.1	21.1	21.1	0.0
	5	384	384	384	0	0.0	11.0	11.0	11.0	0.0
	6	89	89	89	0	0.0	2.5	2.5	2.5	0.0
	Total	3,505	3,505	3,505	0	0.0	100.0	100.0	100.0	0.0
District Total		20,055	22,035	22,035	0					
Smallest Value						0.0%	0.6%	0.6%	0.6%	0.0%
Largest Value						0.0%	63.0%	65.1%	65.1%	0.0%

Table 7
Comparison of Retail Employment Area Allocations Before and After Adjustments

District	Area	1990 Retail Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1	51	52	52	0	0.0	8.2	8.0	8.0	0.0
	2	119	120	120	0	0.0	19.2	18.3	18.3	0.0
	3	123	125	125	0	0.0	19.8	19.1	19.1	0.0
	4	210	236	236	0	0.0	33.8	36.1	36.1	0.0
	5	56	58	58	0	0.0	9.0	8.9	8.9	0.0
	6	62	63	63	0	0.0	10.0	9.6	9.6	0.0
	Total	621	654	654	0	0.0	100.0	100.0	100.0	0.0
2	1	29	31	31	0	0.0	6.9	6.9	6.9	0.0
	2	53	63	63	0	0.0	12.7	14.1	14.1	0.0
	3	75	89	89	0	0.0	18.0	19.9	19.9	0.0
	4	153	157	157	0	0.0	36.7	35.1	35.1	0.0
	5	49	49	49	0	0.0	11.8	11.0	11.0	0.0
	6	58	58	58	0	0.0	13.9	13.0	13.0	0.0
	Total	417	447	447	0	0.0	100.0	100.0	100.0	0.0
3	1	296	300	300	0	0.0	24.2	24.1	24.1	0.0
	2	353	363	363	0	0.0	28.8	29.2	29.2	0.0
	3	238	242	242	0	0.0	19.5	19.5	19.5	0.0
	4	122	123	123	0	0.0	10.0	9.9	9.9	0.0
	5	25	25	25	0	0.0	2.0	2.0	2.0	0.0
	6	190	190	190	0	0.0	15.5	15.3	15.3	0.0
	Total	1,224	1,243	1,243	0	0.0	100.0	100.0	100.0	0.0
4	1	612	695	695	0	0.0	16.4	16.2	16.2	0.0
	2	1,014	1,182	1,182	0	0.0	27.1	27.5	27.5	0.0
	3	1,654	1,951	1,951	0	0.0	44.3	45.4	45.4	0.0
	4	416	423	423	0	0.0	11.1	9.9	9.9	0.0
	5	42	42	42	0	0.0	1.1	1.0	1.0	0.0
	Total	3,738	4,293	4,293	0	0.0	100.0	100.0	100.0	0.0
5	1	95	101	101	0	0.0	2.7	2.4	2.4	0.0
	2	21	31	406	375	1209.7	0.6	0.7	9.6	8.9
	3	21	23	56	33	143.5	0.6	0.5	1.3	0.8
	4	417	514	514	0	0.0	11.7	12.2	12.2	0.0
	5	881	905	899	-6	-0.7	24.7	21.5	21.3	-0.2
	6	2,123	2,648	2,246	-402	-15.2	59.7	62.7	53.2	-9.5
	Total	3,558	4,222	4,222	0	0.0	100.0	100.0	100.0	0.0
6	1	330	335	335	0	0.0	13.6	13.6	13.6	0.0
	2	939	956	956	0	0.0	38.6	39.0	39.0	0.0
	3	156	159	159	0	0.0	6.4	6.5	6.5	0.0
	4	643	635	635	0	0.0	26.4	25.9	25.9	0.0
	5	91	91	91	0	0.0	3.7	3.7	3.7	0.0
	6	274	276	276	0	0.0	11.3	11.3	11.3	0.0
	Total	2,433	2,452	2,452	0	0.0	100.0	100.0	100.0	0.0
District Total		11,991	13,311	13,311	0					
Smallest Value						-15.2%	0.6%	0.5%	1.0%	-9.5%
Largest Value						1209.7%	59.7%	62.7%	53.2%	8.9%

Table 8
Comparison of Service Employment Area Allocations Before and After Adjustments

District	Area	1990 Service Emp.	2015 Panel Allocation	2015 Adjusted Allocation	Adjustment	% Adjustment	1990 % of Total	2015 Panel % of Total	2015 Adjusted % of Total	Diff. in % of Total
1	1	113	122	122	0	0.0	8.5	7.4	7.4	0.0
	2	243	367	367	0	0.0	18.3	22.1	22.1	0.0
	3	111	128	128	0	0.0	8.4	7.7	7.7	0.0
	4	117	221	221	0	0.0	8.8	13.3	13.3	0.0
	5	671	740	740	0	0.0	50.6	44.6	44.6	0.0
	6	72	81	81	0	0.0	5.4	4.9	4.9	0.0
	Total	1,327	1,659	1,659	0	0.0	100.0	100.0	100.0	0.0
2	1	19	19	19	0	0.0	6.1	5.0	5.0	0.0
	2	37	44	44	0	0.0	11.9	11.6	11.6	0.0
	3	30	60	60	0	0.0	9.6	15.9	15.9	0.0
	4	198	228	228	0	0.0	63.7	60.3	60.3	0.0
	5	13	13	13	0	0.0	4.2	3.5	3.5	0.0
	6	14	14	14	0	0.0	4.5	3.7	3.7	0.0
	Total	311	378	378	0	0.0	100.0	100.0	100.0	0.0
3	1	362	381	381	0	0.0	25.1	25.2	25.2	0.0
	2	355	374	374	0	0.0	24.6	24.7	24.7	0.0
	3	364	383	383	0	0.0	25.2	25.3	25.3	0.0
	4	186	188	188	0	0.0	12.9	12.4	12.4	0.0
	5	19	19	19	0	0.0	1.3	1.3	1.3	0.0
	6	157	167	167	0	0.0	10.9	11.1	11.1	0.0
	Total	1,443	1,512	1,512	0	0.0	100.0	100.0	100.0	0.0
4	1	249	368	368	0	0.0	8.8	9.0	9.0	0.0
	2	795	1,300	1,195	-105	-8.1	28.0	31.8	29.3	-2.6
	3	1,071	1,654	1,704	50	3.0	37.7	40.5	41.7	1.2
	4	660	701	756	55	7.8	23.3	17.2	18.5	1.3
	5	63	63	63	0	0.0	2.2	1.5	1.5	0.0
	Total	2,838	4,086	4,086	0	0.0	100.0	100.0	100.0	0.0
5	1	197	305	527	222	72.8	5.7	6.0	11.0	5.0
	2	130	252	231	-21	-8.3	3.8	4.9	4.8	-0.1
	3	36	36	196	160	444.4	1.1	0.7	4.1	3.4
	4	1,341	2,212	1,716	-496	-22.4	39.0	43.4	35.8	-7.6
	5	1,195	1,346	1,359	13	1.0	34.7	26.4	28.3	1.9
	6	541	944	766	-178	-18.9	15.7	18.6	16.0	-2.6
	Total	3,440	5,095	4,795	-300	-5.9	100.0	100.0	100.0	0.0
6	1	805	813	813	0	0.0	12.4	12.0	11.5	-0.5
	2	3,298	3,555	3,855	300	8.4	50.8	52.7	54.7	2.0
	3	124	126	126	0	0.0	1.9	1.9	1.8	-0.1
	4	1,720	1,710	1,710	0	0.0	26.5	25.3	24.3	-1.1
	5	378	377	377	0	0.0	5.8	5.6	5.3	-0.2
	6	168	169	169	0	0.0	2.6	2.5	2.4	-0.1
	Total	6,493	6,750	7,050	300	4.4	100.0	100.0	100.0	0.0
District Total		15,852	19,480	19,480	0					
Smallest Value						-22.4%	1.0%	0.7%	1.3%	-7.6%
Largest Value						444.4%	63.7%	60.3%	60.3%	5.0%

PARTICIPATION RATE

Although the participation rate varied from round to round, the overall participation rate was slightly less than the 50 percent originally anticipated. Of the 28 persons who agreed to participate in the process, 12 persons (43 percent) responded to 4 to 5 of the questionnaires, 6 persons (21 percent) responded to 2 to 3 of the questionnaires, and 10 persons (36 percent) responded to 0 to 1 of the questionnaires. These percentages suggest that in order to have responses from 25 to 30 persons during each round, the target size for the panel should be 60 to 70 persons. Based on comments provided by the panel members who returned the evaluation questionnaire, it is possible that some of the eight panel members who did not participate after the first two rounds may have been bewildered by the amount of information provided to them and by the length of the first two meetings. Revisions made to the format of the questionnaires during the later rounds of the process significantly reduced the duration of the meeting. This would likely result in a higher overall participation rate in future applications of the Delphi process. If the assumption is made that 50 percent (four) of these persons would have participated in a total of 4 to 5 rounds of the process, the participation rate increases to 57 percent. This would lower the target size of the initial panel to 45 to 50 persons in order to receive an average of 25 to 30 responses in each round of the process. This is a more practical size for the panel both from the standpoint of seating a panel of qualified individuals and of administering the process.

RESPONSE OF LOCAL GOVERNMENT AND COMMITTEES

Following the final meeting of the Delphi panel, the results of the growth allocation process were presented to the MPO Technical Committee, the Planning and Zoning Commission, and the MPO Steering Committee. The responses of these groups were important in evaluating the usefulness of the process as a tool for developing allocations which will be accepted by the political bodies involved in the planning process. Reaction to the allocations may also be viewed as an indication of their level of confidence in the growth allocations.

MPO Technical Committee

The first group to receive a presentation of the growth allocations was the MPO Technical Committee. This committee is composed of persons whose jobs are related to the planning and implementation of transportation projects and whose expertise lies in transportation and planning. Although they have no formal policy making power, they are responsible for making recommendations to the MPO Steering Committee which does determine policy. One of the members of this committee served as a panel member during the growth allocation process. A presentation of the results was made to the committee by the Longview staff. During the meeting the committee members were very positive toward the process and the results. At one point following the presentation, one of the committee members who is a Longview city official made the suggestion that the allocations be adopted for use in other city and utility planning processes, in addition to the transportation planning process.

Planning and Zoning Commission

A second presentation was made to the Longview Planning and Zoning Commission. Although the commission would not be making any formal adoption of the allocations, it was important for this group to accept the allocations since the growth allocations, land use plan, and zoning map are all related. Two members of the commission participated in the Delphi process and were very positive in their responses to other commission members. This gives support to one of the goals of the process: by involving members of various bodies involved in the planning process in the allocation of future growth, there will be support for the allocations later in the approval stages of the planning process. The overall response to the process and the resulting allocations was once again very positive.

MPO Steering Committee

The final presentation of the growth allocations was made to the MPO Steering Committee. This group is responsible for setting policies related to transportation in the MPO area and is composed of elected officials from the municipalities included in the MPO and Longview city officials from upper level management positions, such as the city

manager, city planner, and director of public works. One member from this committee served on the Delphi panel. As in the previous presentations, considerable interest in the process and a strong positive reaction from the committee was expressed. Following the presentation by the Longview staff, the committee voted unanimously to adopt the allocations.

ADVANTAGES OF THE DELPHI PROCESS

There are several benefits inherent in the design of the Delphi process. The most important benefits relate to costs to the MPO in both time and money; the social, political, and legal advantages of basing the allocations on a panel consensus; and the political advantages of involving members of local agencies and committees during the allocation process.

TIME AND COST SAVINGS AND ACCELERATION OF PLANNING PROCESS

Since the Delphi process is not a computer model, it does not display any of the problems inherent in the models or modeling process. Of the benefits provided by the Delphi process, perhaps the most apparent are the time and financial savings due to its speed and simplicity. When using computer models for growth allocation, the model must be calibrated for use in the specific study area. This calibration process normally requires the services of a consultant for many months to prepare the model for use, followed by the actual modeling for the area, resulting in considerable expense for the local MPO. In contrast, the Delphi process can be conducted by the local staff in a period of two to three months or less, thereby eliminating the expense and time associated with the computer modeling process. Also, the fact that the goal of the Delphi process is to achieve a consensus means that the Delphi process could be considered to be a self-calibrating process. The time savings provided by the Delphi process over a computer model will vary from area to area but will probably save six months to a year or more. In areas where it is desirable to complete the planning process within the period of a political term, the six months saved using the Delphi process could mean the difference between approval or rejection of the plan.

The previous growth allocations used by the MPO were generated by the Longview staff over a period of three months. Although this is only one month longer than the time required for the Delphi process, it still required considerably more staff hours than the Delphi process. Most of the time spent during the Delphi process is not due to the actual time required to conduct the meetings and process the responses; it is due to the decision

to allow one week between meetings and due to scheduling problems which prevent the meetings from being held more frequently. Conceivably, meetings could be scheduled twice per week, and the process could be completed in approximately half the time. However, it is likely that it would be difficult to find persons who would be able or willing to devote their time twice each week to participate on the panel.

PANEL CONSENSUS REGARDING ALLOCATIONS

Another advantage of the Delphi process is the reliance on a group consensus to obtain a qualitative measure of the relative growth potential of different areas of the MPO area and to estimate the future growth allocations. While the strength of computer models is their ability to process a large volume of input data and eventually obtain growth allocations, one of the most attractive features of the Delphi process cannot be incorporated into a computer model -- the human factor. The experience, perception, intuition, and judgment of people familiar with more subjective issues in the area such as lifestyles, policy issues, and other factors too numerous to list or even adequately identify, is a benefit which should not be overlooked. The interaction between the panel members and the exchange of ideas allows the panel to reach a much more informed consensus than would be possible for one or two individuals. This results in panel input which is more responsive to local social and political issues.

On the legal side of the equation, it is generally much easier to support figures which are the result of citizen input rather than the decisions of two or three members of a local staff if the figures are ever challenged. It is a generally accepted legal tactic that one of the best ways to discredit a project or policy decision is to discredit the numbers on which that project or decision is based. Where community involvement can be shown in establishing the numbers on which policies are based, a stronger foundation is created for projects and decisions resulting from those policies.

INVOLVEMENT OF LOCAL AGENCIES AND COMMITTEES

Perhaps one of the strongest advantages of the Delphi process is the opportunity to involve members of local agencies and committees which must at some point adopt or

approve the allocations or plan. By inviting these committees and agencies to appoint a committee member to participate as a member of the Delphi panel during the allocation process, a bond is created with that agency or committee. Later in the planning process, when the growth allocation or plan is before that body for approval, the participating member will most likely be an advocate of the allocation or the plan since that individual was directly involved in determining the allocations. In fact, the panel member will probably have kept the agency or committee informed of the progress and results throughout the allocation process, and obtaining the approval may be nothing more than a formality.

This was indeed the situation in the Longview pilot project. The MPO Technical Committee appointed one member from the committee to participate on the Delphi panel, the Planning and Zoning Commission appointed two members, and the MPO Steering Committee appointed one member to the panel. During the presentation of the final allocations by the Longview staff to these groups, the members who had participated in the Delphi interjected numerous positive remarks, and the responses from the groups were very positive. The MPO Steering Committee voted unanimously to adopt the growth allocations obtained during the Delphi process.

In addition to the previously mentioned appointees from local bodies and members of the community who were invited to participate on the panel, several other local committees appointed members to the panel. The Strategic Planning Economic Development Committee (formed by the city of Longview to study transportation issues related to economic development) appointed four members of their committee to participate in the Delphi process. Another city sponsored committee, the Southside Economic Development Study Steering Committee, appointed one representative to the Delphi panel who did not participate after the Round 1 meeting. The director of the Chamber of Commerce, who was also formerly the director of planning for Longview, participated in all of the Delphi meetings. Two other members of the Delphi panel, although not currently serving on any committees, had formerly served on the city council and as members of the Planning and Zoning Commission.

EVALUATION BY THE PANEL

Results of the panel evaluation indicated an overwhelmingly positive response to the process. Of the 14 panel members who completed the Round 5 questionnaire, seven had participated in every meeting, five had participated in all but one meeting, and the two remaining panel members had participated in fewer than three of the previous meetings. The 12 panel members who participated in all or most of the meetings felt that the process had been effective in obtaining and conveying their opinions to the city staff and that their participation as citizens on the Delphi panel had been an effective means of communicating information to the city staff. The responses from the two remaining panel members were split on these issues; one gave a positive response agreeing with the rest of the panel, and the other gave a negative response indicating that the process and the involvement of citizens was not effective. The response regarding the meeting format was also very positive with all but one of the 14 panel members indicating that they thought the meetings were productive and effective. In evaluating the questionnaire formats, the majority of the panel members felt that the format used in the third and fourth rounds was the better of the two formats. Of all the questions asked in the evaluation, perhaps the most important was whether or not the panel members felt that the allocations calculated using the panel responses were an accurate reflection of the panel's opinions. In answer to this question, the overall response of the panel was that they agreed that the allocations were an accurate reflection of the panel's opinions. Of the eight panel members who completed the evaluation questionnaire, none disagreed with the allocations.

RECOMMENDATIONS

Several important modifications resulted from the pilot project. The most substantial change in the process was implemented during the pilot project. Panel members felt that the Round 1 questionnaire was too lengthy. As a result, the questionnaires for Round 3 and Round 4 were streamlined considerably. A recommendation for future applications of the Delphi process is that the format of the questionnaires should be kept as simple as possible.

A second recommended change is to administer a brief questionnaire during the orientation meeting asking the panel members to consider the factors affecting the different types of growth. In addition to reducing the length of the Round 1 questionnaire, this would serve to prime the panel and stimulate the panel to begin thinking about future growth in the area prior to the first round. The open discussion at the beginning of the first round would likely be more productive as a result.

The third recommendation resulting from the pilot project is to use a target panel size of 45 to 50 members. This, combined with the changes to shorten the questionnaire format, should result in a better participation rate and, therefore, a larger and more consistent sample size from round to round.

SUMMARY

As with any computer model used to allocate future growth, the only true test of the allocations generated by the Delphi process are the actual growth patterns over time. However, due to the time and financial savings associated with the Delphi process and the speed with which results can be obtained, the Delphi process can be utilized as frequently as needed to update and maintain future growth allocations.

REFERENCES

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Ludlow, John D., Evaluation of Methodology in the University of Michigan's Sea Grant Delphi Inquiry, Sea Grant Technical Report #22, The University of Michigan Sea Grant Program, February 1972.

Ludlow, John D., Substantive Results of the University of Michigan's Sea Grant Delphi Inquiry, Sea Grant Technical Report #23, The University of Michigan Sea Grant Program, March 1972.

APPENDIX

Delphi Process Questionnaires

BIOGRAPHICAL BACKGROUND INFORMATION

The following background information is only for the use of the Texas Transportation Institute and will be used to group panelists with similar backgrounds in order to aid in evaluating the results of the Delphi. In instances where comments made by a panelist are being provided to the rest of the panel for information purposes, the panelist will be referenced by a number and only the most general background information will be provided. For example, background information might be given for panelist number four as "an engineer with 10-20 years of experience in planning". Every possible precaution will be taken to maintain the anonymity of the commenting panelist.

This information is entirely voluntary and you may choose not to answer certain questions or choose not to answer any of the questions without affecting your participation on the panel. However, any information which you can provide will be appreciated.

Name _____

Age _____

Sex (circle) M F

Number of years living in the Longview area? _____

Occupation? _____

Number of years of experience in that occupation? _____

Number of years working in the Longview area? _____

Home address _____

_____

Home phone _____

Business address _____

_____

_____

Business phone _____

Longview Area Delphi Survey

Round 1 Questionnaire

June 15, 1992

SELF EVALUATION

Indicate with an **X** the one phrase which comes closest to expressing your familiarity with current development trends in the Longview area.

Scale for Self Evaluation

- ☐ (1) Unfamiliar
- ☐ (2) Slightly Familiar
- ☐ (3) Generally Familiar
- ☐ (4) Very Familiar
- ☒ (5) Expert or Actively Studying

The rating scale (1 to 5) will also be used in the following questions to allow you to indicate your familiarity with more specific issues present in the area.

FACTORS AFFECTING POPULATION GROWTH

This section of the questionnaire pertains to factors which may affect population growth in one or more of the study area districts or the study area as a whole. Using the rating scale below, rate the importance of the following factors. Also, indicate your familiarity with the factors using the familiarity scale. If there are other factors which you feel will have an influence on growth, please list them in the space provided on the next page.

Rating Scale for Factors Affecting Future Growth

0 Little or No Importance
1 Minor Importance
2 Considerable Importance
3 Very Great Importance

Familiarity Scale

1 Unfamiliar
2 Slightly Familiar
3 Generally Familiar
4 Very Familiar
5 Expert or Actively Studying

Factor Affecting Population Growth	Importance Scale 0 to 3	Familiarity with Factor 1 to 5	Districts Affected							Comments
			All	1	2	3	4	5	6	
1) Improvements made to the local transportation system										
2) Availability of developable land										
3) New industry										
4) Availability of water										
5) Availability of utilities										
6) Schools										
7) Property taxes										
8) Subdivision ordinances/Zoning										
9) Accessibility to and availability of retail/service oriented businesses										
10) Construction of new roads to serve undeveloped areas										
11) Available housing										
12) Housing cost										
13) Neighborhood integrity										

Other Factors Affecting Population Growth (any district)	Comments

POPULATION GROWTH POTENTIAL OF DISTRICTS

Using the information provided and your personal knowledge and experience, please indicate what you consider to be the population growth potential of each of the six districts by placing the appropriate number from the rating scale in the spaces provided. Also indicate your familiarity with the individual districts using the familiarity scale, and make comments regarding any of the districts which might provide information which could be helpful to the rest of the panel. Related information is provided on pages 1, 4, 5, and 7-15 in the information packet.

Rating Scale for Population Growth Potential of Districts

- -1 10% or Greater Decrease
- 0 Stable (No Change in Population)
- 1 10% Increase
- 2 25% Increase
- 3 50% or Greater Increase

Familiarity Scale

- 1 Unfamiliar
- 2 Slightly Familiar
- 3 Generally Familiar
- 4 Very Familiar
- 5 Expert or Actively Studying

District	Population Growth Potential Scale -1 to 3	Familiarity with District Scale 1 to 5	Comments
1			
2			
3			
4			
5			
6			

ORDERING OF DISTRICTS BY POPULATION GROWTH POTENTIAL

Using a scale of 1 to 6 (1 indicates the least likely to grow and 6 indicates most likely to grow) indicate the order of the districts according to population growth potential. Assign only one district for each of the scale values in the table.

Scale	District	Comments
1 (least likely to grow)		
2		
3		
4		
5		
6 (most likely to grow)		

DISTRIBUTION OF POPULATION GROWTH OVER PROJECTION TIME PERIOD

In this section of the questionnaire you are asked to make a judgement regarding what level of growth activity will occur during each of the population projection time periods. Place the number which most accurately describes your response in the appropriate space for each district and time period.

Responses

-1 Decrease in Population
0 No Growth
1 Slight Growth
2 Moderate Growth
3 Considerable Growth

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)			Comments
	1990-2000	2000-2010	2010-2015	
1				
2				
3				
4				
5				
6				

FACTORS AFFECTING BASIC EMPLOYMENT GROWTH

This section of the questionnaire pertains to factors which may affect basic employment growth in one or more of the study area districts or the study area as a whole. Using the rating scale below, rate the importance of the following factors. Also, indicate your familiarity with the factors using the familiarity scale. If there are other factors which you feel will have an influence on growth, please list them in the space provided on the next page.

Rating Scale for Factors Affecting Future Growth

0 Little or No Importance
1 Minor Importance
2 Considerable Importance
3 Very Great Importance

Familiarity Scale

1 Unfamiliar
2 Slightly Familiar
3 Generally Familiar
4 Very Familiar
5 Expert or Actively Studying

Factor Affecting Basic Employment Growth	Importance Scale 0 to 3	Familiarity with Factor 1 to 5	Districts Affected							Comments
			All	1	2	3	4	5	6	
1) Improvements made to the local transportation system										
2) Availability of developable land										
3) New industry										
4) Availability of water										
5) Availability of utilities										
6) Schools										
7) Property taxes										
8) Subdivision ordinances/Zoning										
9) Accessibility to and availability of Population and support businesses										
10) Construction of new roads to serve undeveloped areas										
11) Available housing										
12) Housing cost										
13) Neighborhood integrity										

Other Factors Affecting Basic Employment Growth (any district)	Comments

BASIC EMPLOYMENT GROWTH POTENTIAL OF DISTRICTS

Using the information provided and your personal knowledge and experience, please indicate what you consider to be the basic employment growth potential of each of the six districts by placing the appropriate number from the rating scale in the spaces provided. Also indicate your familiarity with the individual districts using the familiarity scale, and make comments regarding any of the districts which might provide information which could be helpful to the rest of the panel. Related information is provided on pages 1, 4, 5, 7, and 16-20 in the information packet.

Rating Scale for Basic Employment Growth Potential of Districts

- -1 10% or Greater Decrease
- 0 Stable (No Change in Basic Employment)
- 1 10% Increase
- 2 25% Increase
- 3 50% or Greater Increase

Familiarity Scale

- 1 Unfamiliar
- 2 Slightly Familiar
- 3 Generally Familiar
- 4 Very Familiar
- 5 Expert or Actively Studying

District	Basic Employment Growth Potential Scale -1 to 3	Familiarity with District Scale 1 to 5	Comments
1			
2			
3			
4			
5			
6			

ORDERING OF DISTRICTS BY BASIC EMPLOYMENT GROWTH POTENTIAL

Using a scale of 1 to 6 (1 indicates the least likely to grow and 6 indicates most likely to grow) indicate the order of the districts according to basic employment growth potential. Assign only one district for each of the scale values in the table.

Scale	District	Comments
1 (least likely to grow)		
2		
3		
4		
5		
6 (most likely to grow)		

DISTRIBUTION OF BASIC EMPLOYMENT GROWTH OVER PROJECTION TIME PERIOD

In this section of the questionnaire you are asked to make a judgement regarding what level of growth activity will occur during each of the basic employment projection time periods. Place the number which most accurately describes your response in the appropriate space for each district and time period.

Responses

-1 Decrease in Basic Employment
0 No Growth
1 Slight Growth
2 Moderate Growth
3 Considerable Growth

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)			Comments
	1990-2000	2000-2010	2010-2015	
1				
2				
3				
4				
5				
6				

FACTORS AFFECTING RETAIL EMPLOYMENT GROWTH

This section of the questionnaire pertains to factors which may affect retail employment growth in one or more of the study area districts or the study area as a whole. Using the rating scale below, rate the importance of the following factors. Also, indicate your familiarity with the factors using the familiarity scale. If there are other factors which you feel will have an influence on growth, please list them in the space provided on the next page.

Rating Scale for Factors Affecting Future Growth

0 Little or No Importance
1 Minor Importance
2 Considerable Importance
3 Very Great Importance

Familiarity Scale

1 Unfamiliar
2 Slightly Familiar
3 Generally Familiar
4 Very Familiar
5 Expert or Actively Studying

Factor Affecting Retail Employment Growth	Importance Scale 0 to 3	Familiarity with Factor 1 to 5	Districts Affected							Comments
			All	1	2	3	4	5	6	
1) Improvements made to the local transportation system										
2) Availability of developable land										
3) New industry										
4) Availability of water										
5) Availability of utilities										
6) Schools										
7) Property taxes										
8) Subdivision ordinances/Zoning										
9) Accessibility to and availability of Population and support businesses										
10) Construction of new roads to serve undeveloped areas										
11) Available housing										
12) Housing cost										
13) Neighborhood integrity										

RETAIL EMPLOYMENT GROWTH POTENTIAL OF DISTRICTS

Other Factors Affecting Retail Employment Growth (any district)	Comments

ORDERING OF DISTRICTS BY RETAIL EMPLOYMENT GROWTH POTENTIAL

Using a scale of 1 to 6 (1 indicates the least likely to grow and 6 indicates most likely to grow) indicate the order of the districts according to retail employment growth potential. Assign only one district for each of the scale values in the table.

Scale	District	Comments
1 (least likely to grow)		
2		
3		
4		
5		
6 (most likely to grow)		

DISTRIBUTION OF RETAIL EMPLOYMENT GROWTH OVER PROJECTION TIME PERIOD

In this section of the questionnaire you are asked to make a judgement regarding what level of growth activity will occur during each of the retail employment projection time periods. Place the number which most accurately describes your response in the appropriate space for each district and time period.

Responses

-1 Decrease in Retail Employment
0 No Growth
1 Slight Growth
2 Moderate Growth
3 Considerable Growth

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)			Comments
	1990-2000	2000-2010	2010-2015	
1				
2				
3				
4				
5				
6				

FACTORS AFFECTING SERVICE EMPLOYMENT GROWTH

This section of the questionnaire pertains to factors which may affect service employment growth in one or more of the study area districts or the study area as a whole. Using the rating scale below, rate the importance of the following factors. Also, indicate your familiarity with the factors using the familiarity scale. If there are other factors which you feel will have an influence on growth, please list them in the space provided on the next page.

Rating Scale for Factors Affecting Future Growth

0 Little or No Importance
1 Minor Importance
2 Considerable Importance
3 Very Great Importance

Familiarity Scale

1 Unfamiliar
2 Slightly Familiar
3 Generally Familiar
4 Very Familiar
5 Expert or Actively Studying

Factor Affecting Service Employment Growth	Importance Scale 0 to 3	Familiarity with Factor 1 to 5	Districts Affected							Comments
			All	1	2	3	4	5	6	
1) Improvements made to the local transportation system										
2) Availability of developable land										
3) New industry										
4) Availability of water										
5) Availability of utilities										
6) Schools										
7) Property taxes										
8) Subdivision ordinances/Zoning										
9) Accessibility to and availability of Population and support businesses										
10) Construction of new roads to serve undeveloped areas										
11) Available housing										
12) Housing cost										
13) Neighborhood integrity										

Other Factors Affecting Service Employment Growth (any district)	Comments

SERVICE EMPLOYMENT GROWTH POTENTIAL OF DISTRICTS

Using the information provided and your personal knowledge and experience, please indicate what you consider to be the service employment growth potential of each of the six districts by placing the appropriate number from the rating scale in the spaces provided. Also indicate your familiarity with the individual districts using the familiarity scale, and make comments regarding any of the districts which might provide information which could be helpful to the rest of the panel. Related information is provided on pages 1, 4, 5, 7, 16-19, and 22 in the information packet.

Rating Scale for Service Employment Growth Potential of Districts

- -1 10% or Greater Decrease
- 0 Stable (No Change in Service Employment)
- 1 10% Increase
- 2 25% Increase
- 3 50% or Greater Increase

Familiarity Scale

- 1 Unfamiliar
- 2 Slightly Familiar
- 3 Generally Familiar
- 4 Very Familiar
- 5 Expert or Actively Studying

District	Service Employment Growth Potential Scale -1 to 3	Familiarity with District Scale 1 to 5	Comments
1			
2			
3			
4			
5			
6			

ORDERING OF DISTRICTS BY SERVICE EMPLOYMENT GROWTH POTENTIAL

Using a scale of 1 to 6 (1 indicates the least likely to grow and 6 indicates most likely to grow) indicate the order of the districts according to service employment growth potential. Assign only one district for each of the scale values in the table.

Scale	District	Comments
1 (least likely to grow)		
2		
3		
4		
5		
6 (most likely to grow)		

DISTRIBUTION OF SERVICE EMPLOYMENT GROWTH OVER PROJECTION TIME PERIOD

In this section of the questionnaire you are asked to make a judgement regarding what level of growth activity will occur during each of the service employment projection time periods. Place the number which most accurately describes your response in the appropriate space for each district and time period.

Responses

-1 Decrease in Service Employment
0 No Growth
1 Slight Growth
2 Moderate Growth
3 Considerable Growth

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)			Comments
	1990-2000	2000-2010	2010-2015	
1				
2				
3				
4				
5				
6				

Longview Area Delphi Survey

Round 2 Questionnaire

June 23, 1992

GROWTH POTENTIAL OF DISTRICTS

Using the information provided from Round 1, your previous responses, and the responses of the panel as a whole, please re-evaluate the growth potential of each of the six districts for Population, Basic Employment, Retail Employment, and Service Employment. If you do not wish to change your previous response, please enter your previous response in the "Current Response" column.

Rating Scale for Population Growth Potential of Districts

-1 10% or Greater Decrease
0 Stable (No Change in Population)
1 10% Increase
2 25% Increase
3 50% or Greater Increase

POPULATION GROWTH POTENTIAL

District	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response	Comments
1			1.19	0	1	3	
2			1.32	0.4	1	3	
3			0.32	-1	0	3	
4			1.21	-1	1	3	
5			1.52	-1	1.75	3	
6			-0.34	-1	0	1	

BASIC EMPLOYMENT GROWTH POTENTIAL

District	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response	Comments
1			0.88	0	1	3	
2			1.53	0	1	3	
3			1.29	0	1	3	
4			0.76	-1	1	3	
5			1.06	-1	1	3	
6			-0.06	-1	1	1	

RETAIL EMPLOYMENT GROWTH POTENTIAL

District	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response	Comments
1			0.71	0	1	2	
2			0.71	0	1	2	
3			0.29	-1	0	1	
4			1.44	0	2	2	
5			2.21	1	2	3	
6			0.18	-1	0	2	

SERVICE EMPLOYMENT GROWTH POTENTIAL

District	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response	Comments
1			0.76	0	1	2	
2			0.94	0	1	2	
3			0.53	0	0	2	
4			1.65	0	2	3	
5			1.88	0	2	3	
6			0.47	-1	1	2	

DISTRIBUTION OF GROWTH OVER PROJECTION TIME PERIOD

Using the information provided from Round 1, your previous responses, and the responses of the panel as a whole, please re-evaluate the level of growth activity over the projection time periods for each of the six districts for Population, Basic Employment, Retail Employment, and Service Employment. If you do not wish to change your previous response, please enter your previous response in the "Current Response" column.

Responses

-1 Decrease in Population
0 No Growth
1 Slight Growth
2 Moderate Growth
3 Considerable Growth

POPULATION GROWTH

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)																	
	1990-2000						2000-2010						2010-2015					
	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response
1			1.41	1	1	3			1.76	1	2	3			1.47	0	2	2
2			1.41	1	1	3			1.71	1	2	3			1.47	0	1	3
3			0.71	-1	1	2			0.88	-1	1	3			0.88	-1	1	3
4			1.65	0	2	3			1.24	0	1	2			0.82	0	1	3
5			2.06	1	2	3			1.71	1	2	3			1.44	0	1	3
6			-0.29	-1	0	1			-0.18	-1	0	1			0.06	-1	0	1

BASIC EMPLOYMENT GROWTH

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)																	
	1990-2000						2000-2010						2010-2015					
	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response
1			1.06	0	1	3			1.24	0	1	3			1.06	0	1	3
2			1.44	1	1	2			1.69	1	2	3			1.44	1	1	3
3			1.13	0	1	2			1.56	0	2	3			1.31	0	1	3
4			0.81	0	1	2			0.75	0	1	2			0.63	0	0	2
5			1.44	0	1	3			1.38	0	1	3			1.06	0	1	2
6			-0.19	-1	0	1			0	-1	0	1			0.13	-1	0	1

RETAIL EMPLOYMENT GROWTH

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)																	
	1990-2000						2000-2010						2010-2015					
	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response
1			1	0	1	2			1.18	0	1	2			1.12	0	1	2
2			1	0	1	2			1.30	0	1	3			1.24	0	1	3
3			0.47	-1	1	1			0.53	-1	1	1			0.59	-1	1	2
4			1.65	0	2	2			1.53	0	2	3			1.29	0	1	2
5			2.41	1	2	3			2.06	1	2	3			1.71	1	2	3
6			0.12	-1	0	1			0.29	-1	0	1			0.41	-1	0	1

SERVICE EMPLOYMENT GROWTH

District	Level of Growth During Indicated Time Period -- Scale (-1 to 3)																	
	1990-2000						2000-2010						2010-2015					
	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response	Your Current Response	Your Previous Response	Group Avg.	Lowest Response	Group Median	Highest Response
1			0.71	0	1	2			0.88	0	1	2			0.82	0	1	2
2			0.88	0	1	2			1.12	0	1	2			1.06	0	1	3
3			0.59	-1	1	2			0.47	-1	1	1			0.41	-1	0	1
4			1.47	0	1	3			1.41	0	2	2			1.24	0	1	2
5			2	0	2	3			1.71	0	2	3			1.35	0	1	2
6			0.35	-1	0	2			0.65	-1	1	2			0.53	-1	1	2

POTENTIAL FOR CHANGES WITHIN ZONES

The next six pages relate to the potential for change within each district's zones. Evaluate the growth potential for each zone for Population, Basic Employment, Retail Employment, and Service Employment. Place an X in the appropriate box in cases where you feel the zone DOES NOT have any significant potential for change.

For example: if you feel that Zone 25 has potential for population and service employment to change but does not have any significant potential for basic or retail employment to change (i.e., stable), you would mark Zone 25 as shown.

Zone	Pop.	Basic	Retail	Service
24				
25		X	X	
26				

DISTRICT 1 ZONES

Zone	Pop.	Basic	Retail	Service
105				
120				
121				
122				
123				
124				
125				
126				
144				
145				
146				
147				
148				
149				

Zone	Pop.	Basic	Retail	Service
150				
151				
152				
153				
154				
155				
162				
163				
164				
165				
166				
167				
168				
169				

Zone	Pop.	Basic	Retail	Service
170				
171				
172				
191				
192				
193				
194				
195				
196				

Zone #	Comments

DISTRICT 2 ZONES

Zone	Pop.	Basic	Retail	Service
42				
43				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
57				
60				

Zone	Pop.	Basic	Retail	Service
195				
196				
197				
199				
200				
201				
202				
203				
204				
205				
215				
216				
217				
218				

Zone	Pop.	Basic	Retail	Service
219				
220				
221				

Zone #	Comments

DISTRICT 3 ZONES

Zone	Pop.	Basic	Retail	Service
56				
57				
58				
70				
71				
72				
73				
80				
81				
82				
83				
84				
85				
87				
89				

Zone	Pop.	Basic	Retail	Service
90				
92				
93				
94				
95				
96				
97				
98				
99				
100				
101				
102				
103				
104				
106				

Zone	Pop.	Basic	Retail	Service
107				
108				
109				
110				
111				
112				
113				
114				
115				
116				
117				
118				
119				
129				
130				

Zone #	Comments

DISTRICT 4 ZONES

Zone	Pop.	Basic	Retail	Service
30				
127				
128				
131				
1132				
133				
134				
135				
136				
137				
138				
139				
140				
141				
142				

Zone	Pop.	Basic	Retail	Service
143				
156				
157				
158				
159				
160				
161				

Zone	Pop.	Basic	Retail	Service

Zone #	Comments

DISTRICT 5 ZONES

Zone	Pop.	Basic	Retail	Service
173				
174				
175				
176				
177				
178				
179				
180				
181				
182				
183				
184				
185				
186				
187				

Zone	Pop.	Basic	Retail	Service
188				
189				
190				
191				
197				
198				
199				
204				
205				
206				
207				
208				
209				
210				
212				

Zone	Pop.	Basic	Retail	Service
213				
214				
215				
217				

Zone #	Comments

DISTRICT 6 ZONES

Zone	Pop.	Basic	Retail	Service
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

Zone	Pop.	Basic	Retail	Service
22				
23				
24				
25				
26				
27				
28				
29				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				

Zone	Pop.	Basic	Retail	Service
44				
45				
46				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
74				
75				
76				
77				
78				
79				
88				

DISTRICT 6 ZONES

Zone #	Comments

Longview Area Delphi Survey

Round 3 Questionnaire

July 9, 1992

ALLOCATION OF GROWTH

Based the panel responses from Round 2, growth allocations have been calculated for each of the districts for Population, Basic Employment, Retail Employment, and Service Employment. The following tables show the actual 1990 distributions as a percent of the total and the high and low estimates for 2015 as a percent of the total. Using the information packets provided, indicate whether or not you feel the allocations are reasonable. If you feel that the allocations are reasonable place an X in the "Agree" column. If your feel that the allocation should be higher or lower place an X in the appropriate column. Notice that if you respond that a district should have a lower allocation there must be a district which should have a higher allocation and vice versa.

Population

District	1990	2015		Agree	Disagree	
		Low	High		Should be Lower	Should be Higher
1	13.7	13.9	14.0			
2	7.8	8.2	8.2			
3	11.3	9.8	9.5			
4	31.0	31.9	32.1			
5	17.2	20.7	21.4			
6	19.0	15.5	14.8			

Basic Employment

District	1990	2015		Agree	Disagree	
		Low	High		Should be Lower	Should be Higher
1	9.5	9.3	9.0			
2	10.4	11.7	13.3			
3	51.6	53.1	55.0			
4	5.3	5.1	5.0			
5	4.9	4.9	4.9			
6	18.3	15.9	12.8			

Retail Employment

District	1990	2015		Agree	Disagree	
		Low	High		Should be Lower	Should be Higher
1	4.2	4.0	3.4			
2	3.5	3.3	3.0			
3	10.2	9.4	7.1			
4	32.1	33.2	36.1			
5	29.7	31.7	37.0			
6	20.3	18.4	13.4			

Service Employment

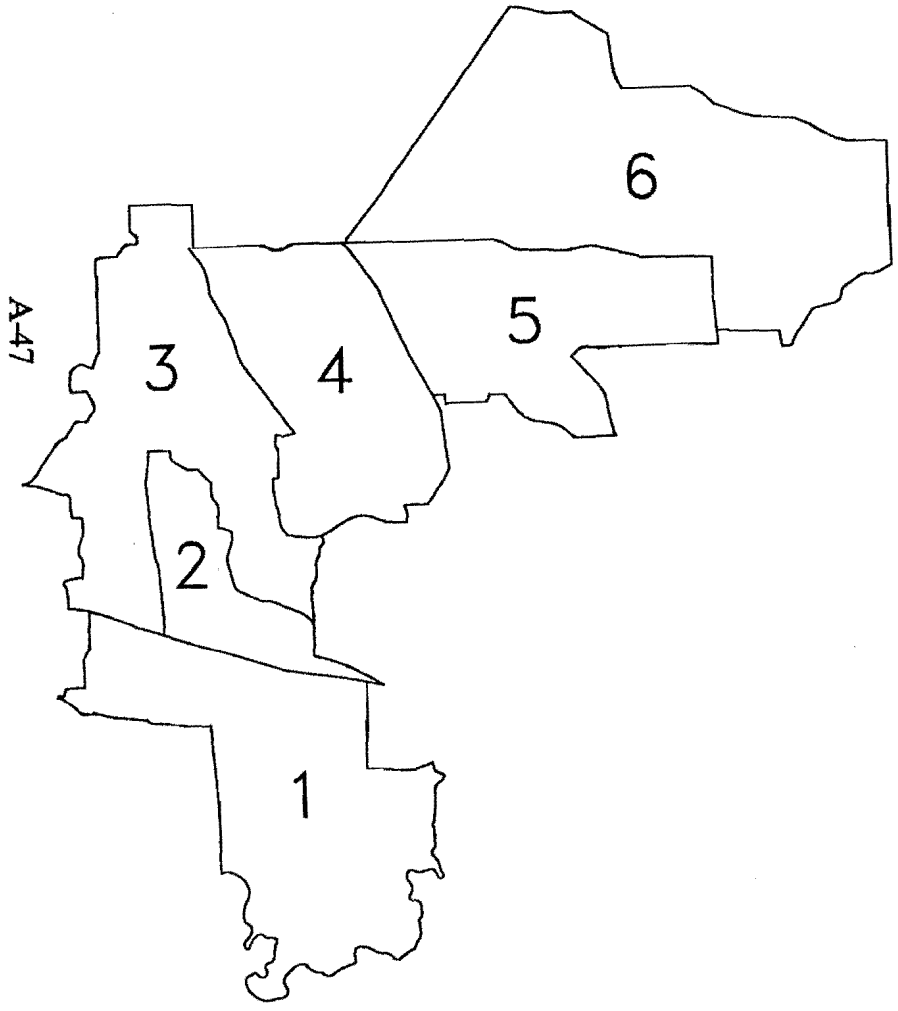
District	1990	2015		Agree	Disagree	
		Low	High		Should be Lower	Should be Higher
1	8.7	8.2	7.6			
2	1.9	1.9	1.7			
3	9.1	7.7	6.0			
4	18.0	20.3	23.3			
5	21.6	24.8	28.9			
6	40.7	37.1	32.5			

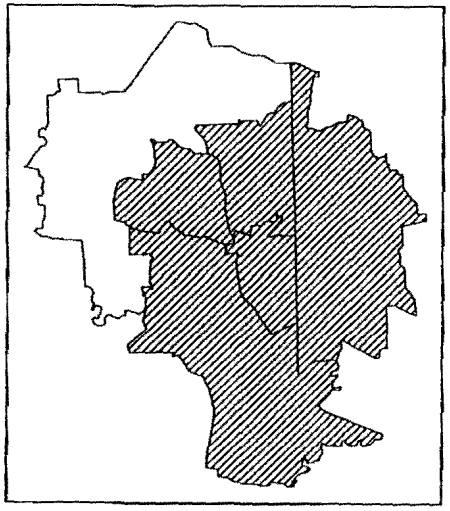
GROWTH POTENTIAL OF AREAS

Using the panel responses from Round 2, the zones within each district have been grouped into areas. Please evaluate the growth potential of each area within the districts for Population, Basic Employment, Retail Employment, and Service Employment.

Rating Scale for Growth Potential of Areas

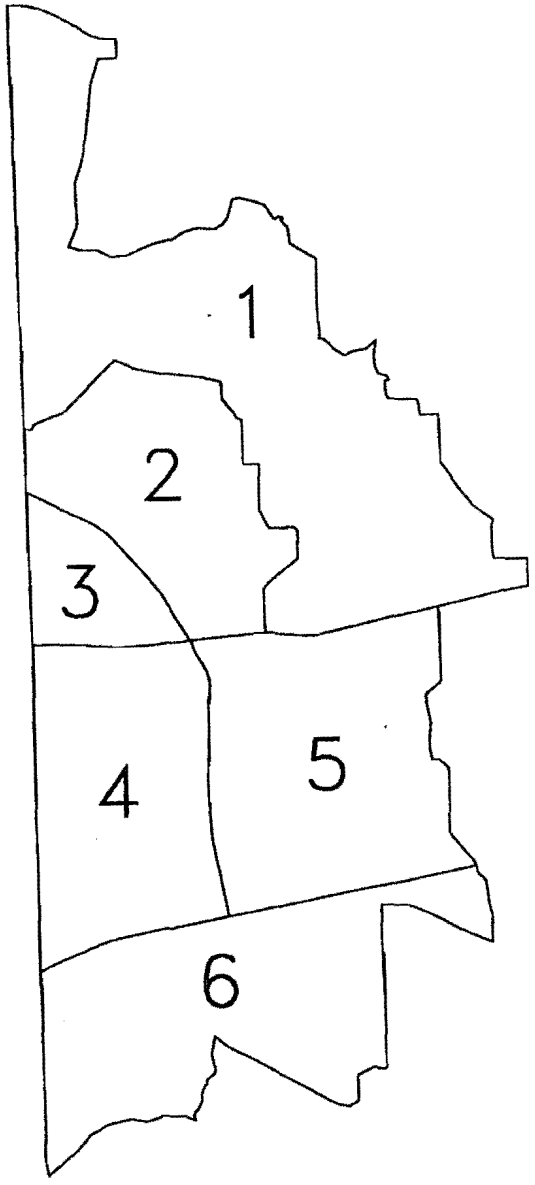
-1 10% or Greater Decrease
0 Stable (No Change)
1 10% Increase
2 25% Increase
3 50% or Greater Increase

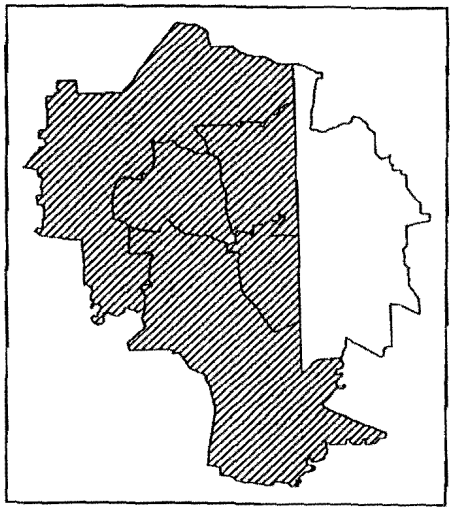




DISTRICT 1

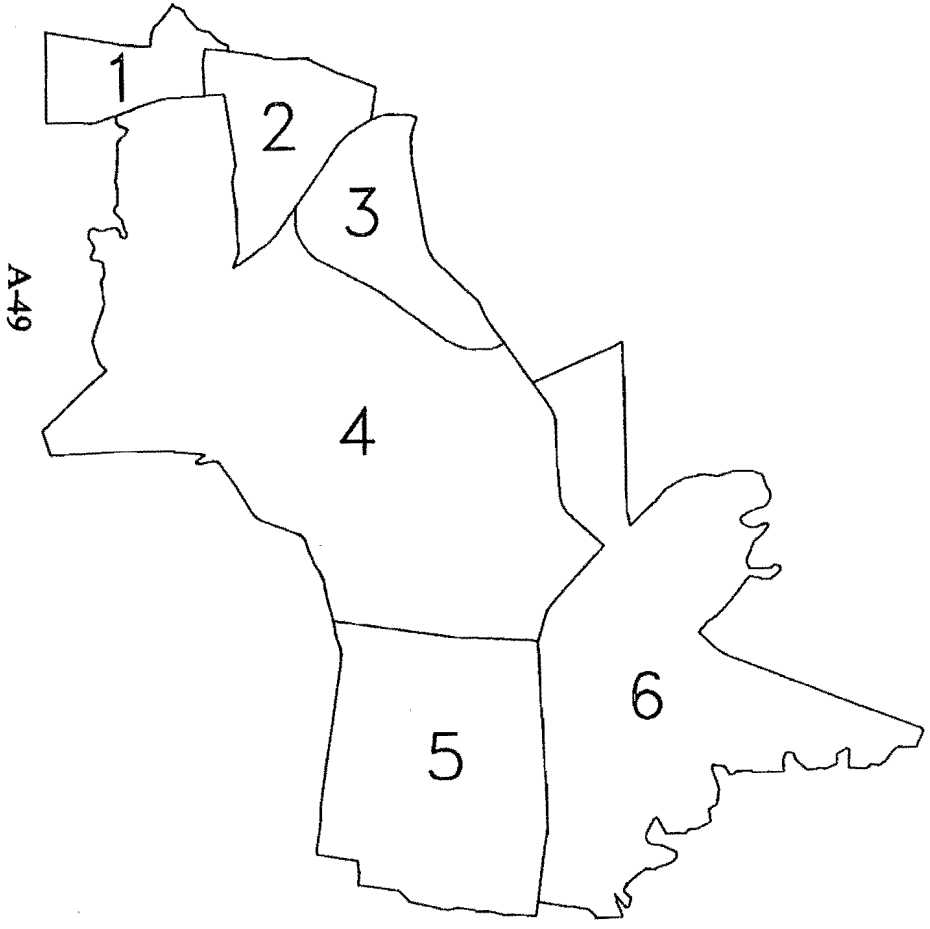
Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				
6				

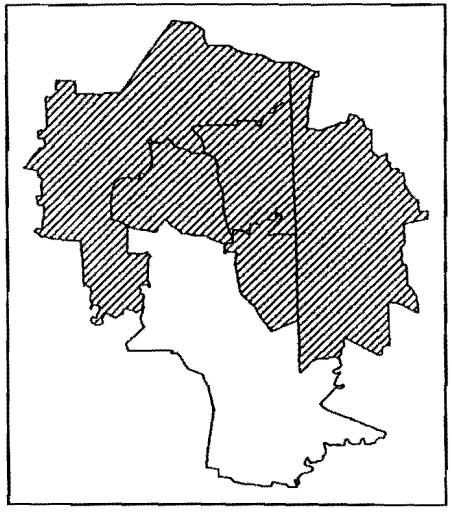




DISTRICT 2

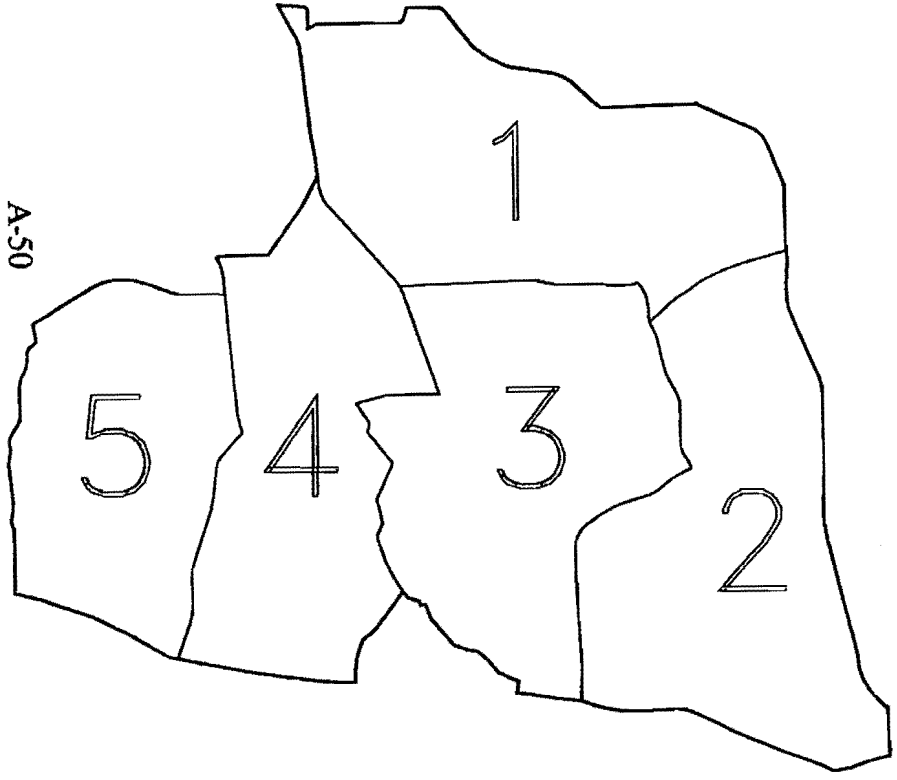
Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				
6				

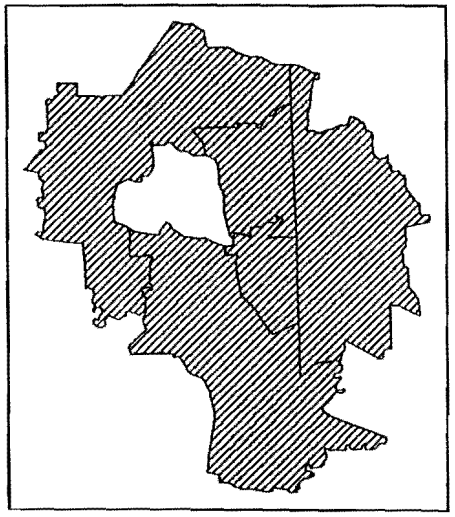




DISTRICT 3

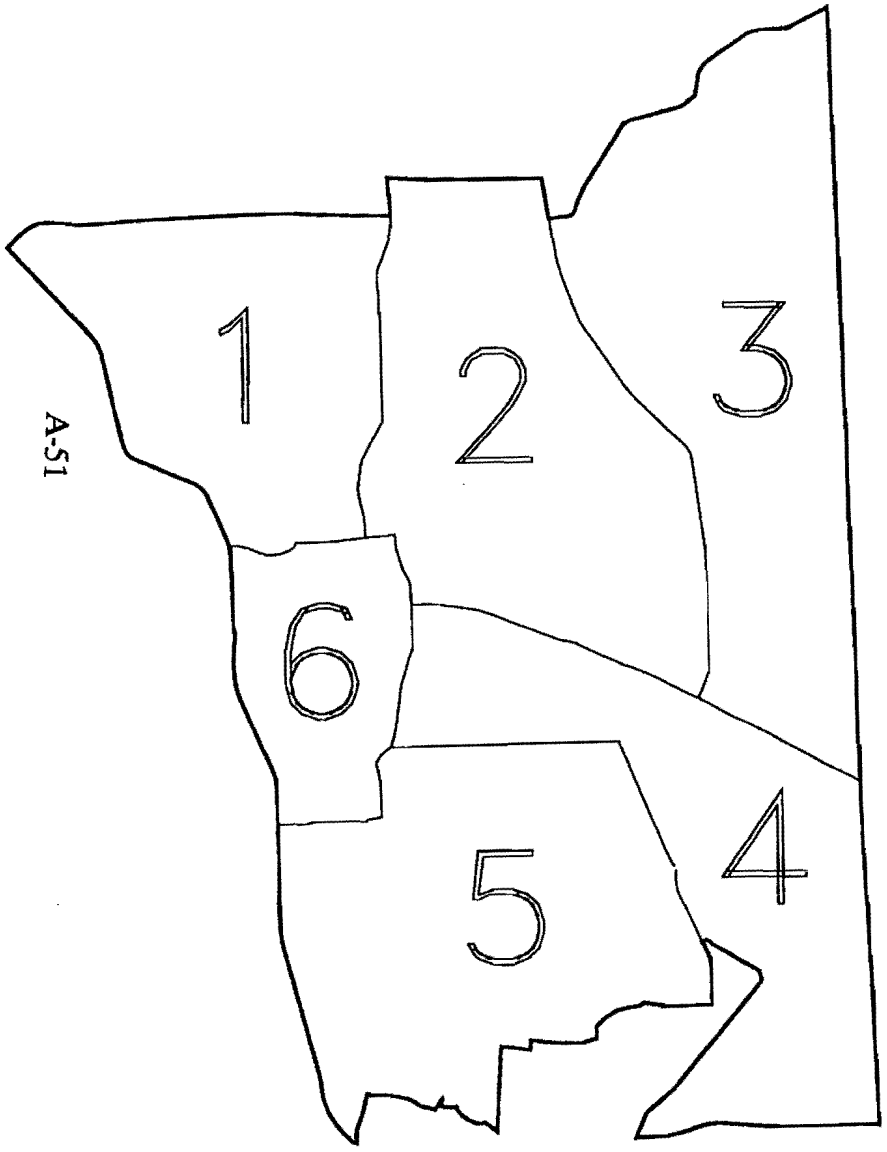
Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				
6				

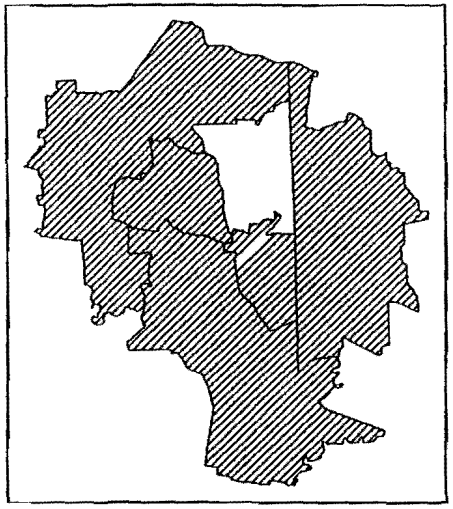




DISTRICT 4

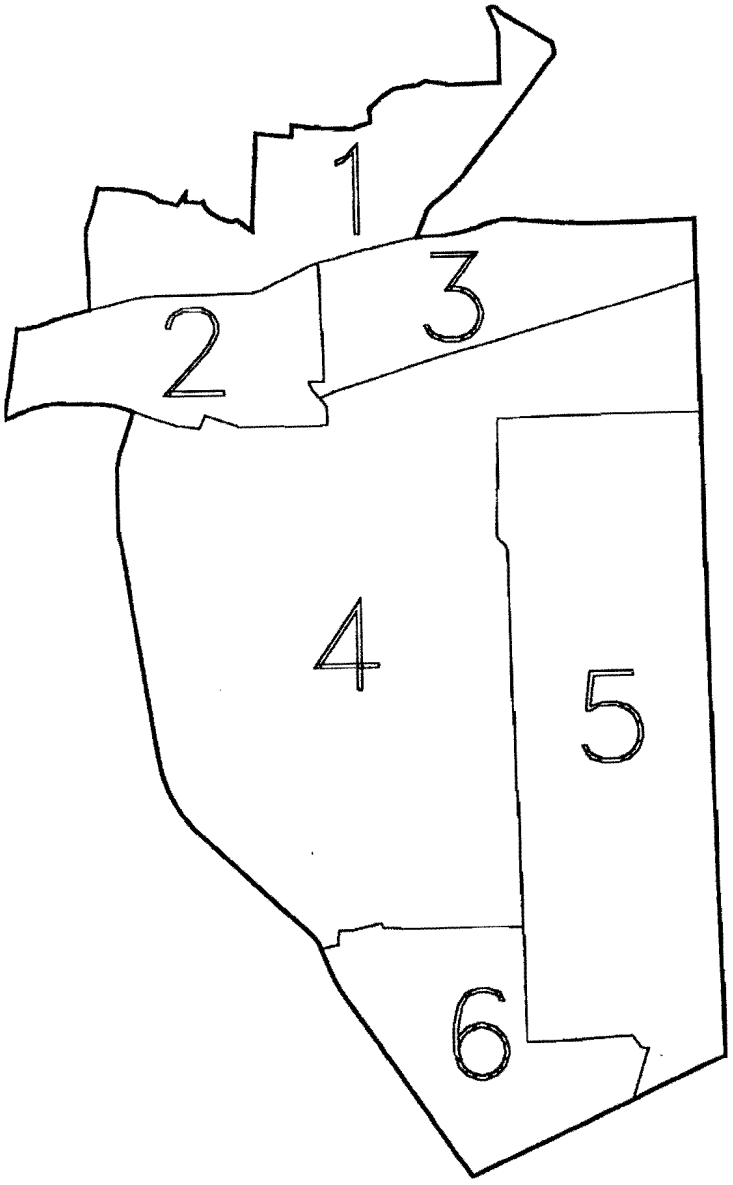
Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				

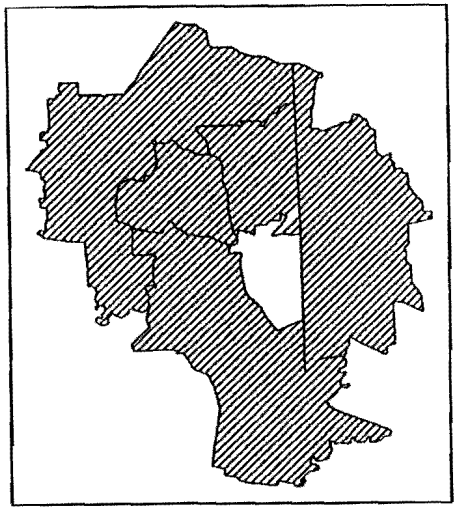




DISTRICT 5

Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				
6				





DISTRICT 6

Area	Population	Basic Employment	Retail Employment	Service Employment
1				
2				
3				
4				
5				
6				

Longview Area Delphi Survey

Round 4 Questionnaire

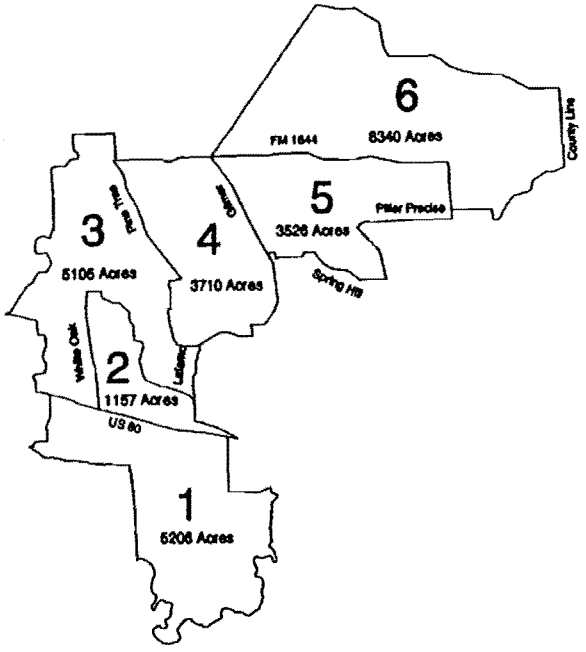
July 21, 1992

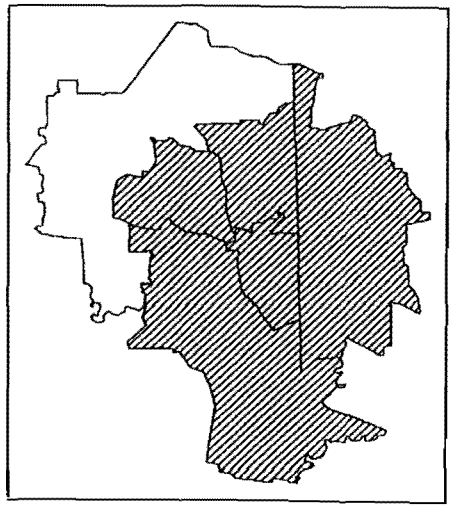
GROWTH POTENTIAL OF AREAS

Using the information provided from Round 3, your previous responses, and the responses of the panel as a whole, please re-evaluate the growth potential of the areas within each of the six districts for Population, Basic Employment, Retail Employment, and Service Employment. The acreage shown in the areas of each district map represents the undeveloped acreage within each area. If you do not wish to change your previous response, leave the "Current Response" column blank.

Rating Scale for Growth Potential of Areas

-1 10% or Greater Decrease
0 Stable (No Change)
1 10% Increase
2 25% Increase
3 50% or Greater Increase





DISTRICT 1

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.11	-1	0	1
2			0.33	0	0	1
3			0.67	0	1	2
4			1	0	1	2
5			1.33	0	1	3
6			1	0	1	3

BASIC EMPLOYMENT

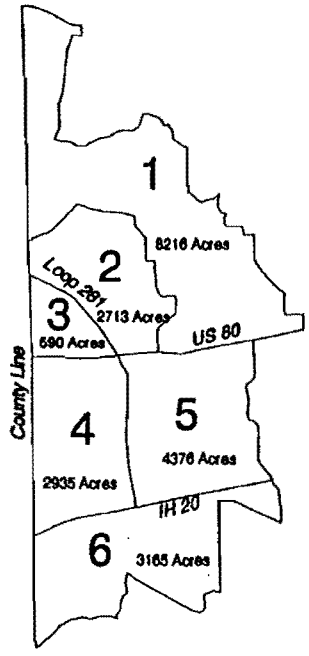
Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.44	-1	1	1
2			0.22	0	0	1
3			0.44	-1	0	2
4			0.44	0	0	2
5			0.44	0	0	2
6			0.44	0	0	2

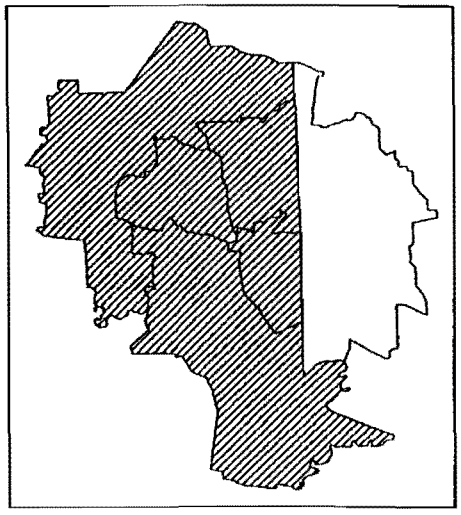
RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.11	-1	0	1
2			0.11	-1	0	1
3			0.22	-1	0	1
4			1	0	1	2
5			0.33	-1	0	2
6			0.22	-1	0	2

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0	-1	0	1
2			0.22	-1	0	1
3			0.22	-1	0	1
4			0.78	0	1	2
5			0.22	-1	0	2
6			0.22	-1	0	2





DISTRICT 2

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.78	0	1	2
2			0.67	0	1	2
3			0.22	0	0	1
4			-0.11	-1	0	1
5			0.44	0	0	1
6			0	-1	0	1

BASIC EMPLOYMENT

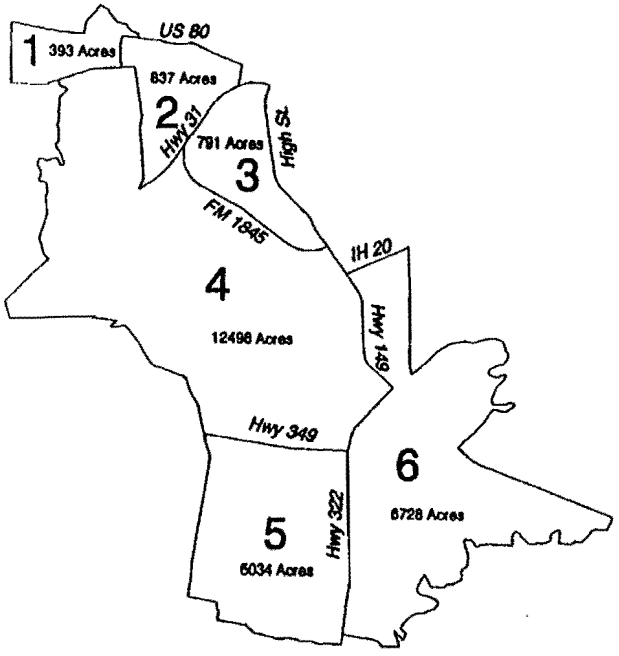
Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.44	0	0	1
2			0.44	0	0	1
3			0.11	0	0	1
4			0.44	0	0	2
5			0.78	0	1	2
6			0.89	0	1	2

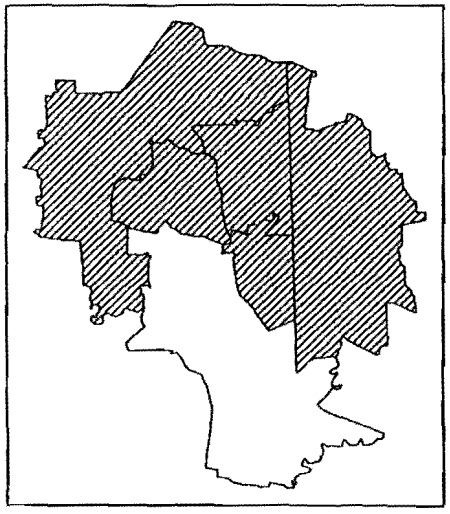
RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.33	0	0	1
2			0.78	0	1	3
3			0.78	0	1	2
4			0.33	0	0	1
5			0.22	0	0	1
6			0	0	0	0

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.33	0	0	1
2			0.56	0	0	2
3			0.67	0	0	2
4			0.11	0	0	1
5			0.44	0	0	2
6			0.22	0	0	1





DISTRICT 3

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			-0.22	-1	0	0
2			-0.11	-1	0	1
3			-0.22	-1	0	0
4			-0.11	-1	0	0
5			0.56	-1	1	1
6			0.33	-1	0	1

BASIC EMPLOYMENT

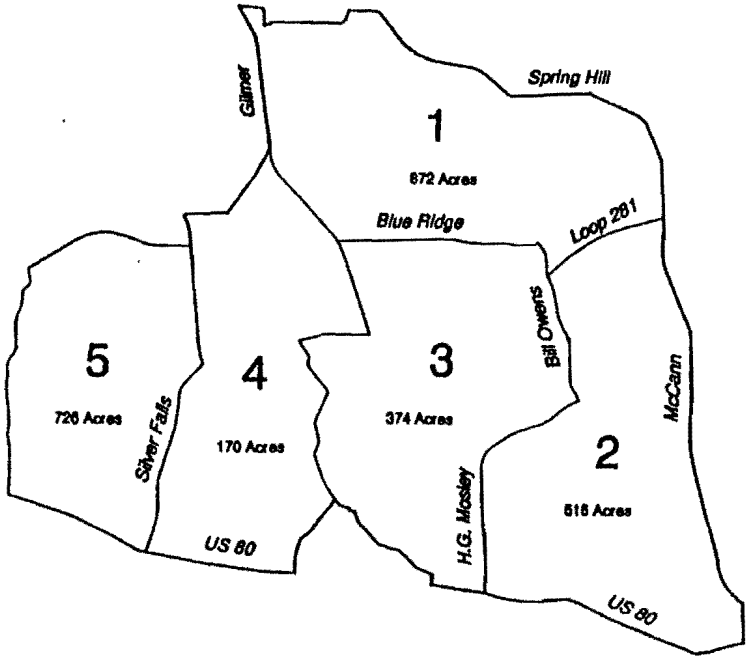
Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.11	0	0	1
2			0.56	0	1	1
3			0.33	0	0	1
4			0.67	0	1	1
5			0.56	0	1	1
6			1	0	1	3

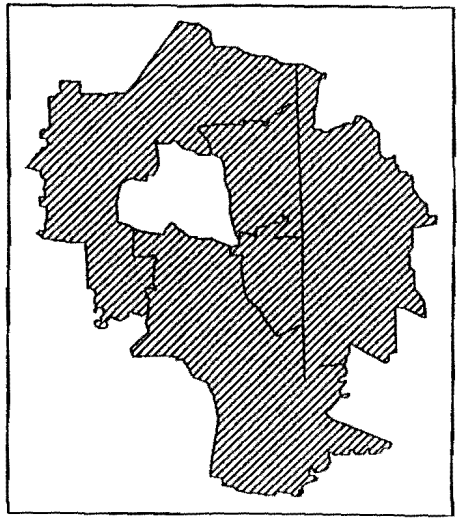
RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.33	0	0	1
2			0.33	0	0	1
3			0	-1	0	1
4			0	0	0	0
5			0	-1	0	1
6			0	0	0	0

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.22	0	0	1
2			0.11	0	0	1
3			0.22	-1	0	1
4			0	0	0	0
5			-0.11	-1	0	0
6			0.22	0	0	2





DISTRICT 4

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			1.22	0	1	2
2			0.56	0	0	2
3			0.78	0	1	2
4			0.44	0	0	1
5			0.56	0	0	2

BASIC EMPLOYMENT

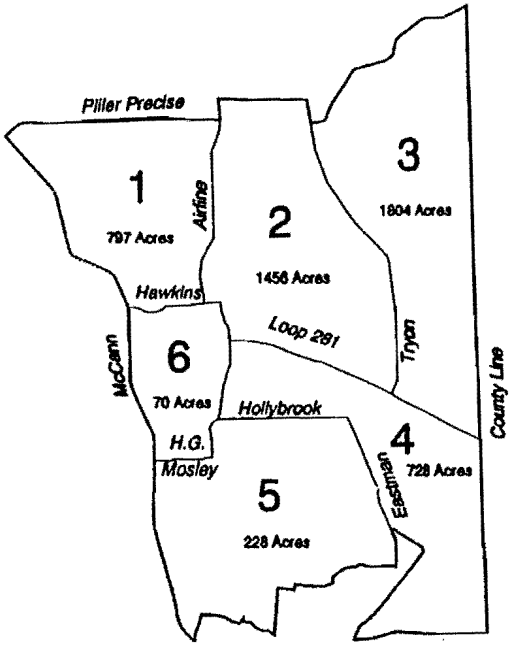
Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.11	0	0	1
2			0.22	0	0	1
3			0.11	0	0	1
4			0	-1	0	1
5			0	0	0	0

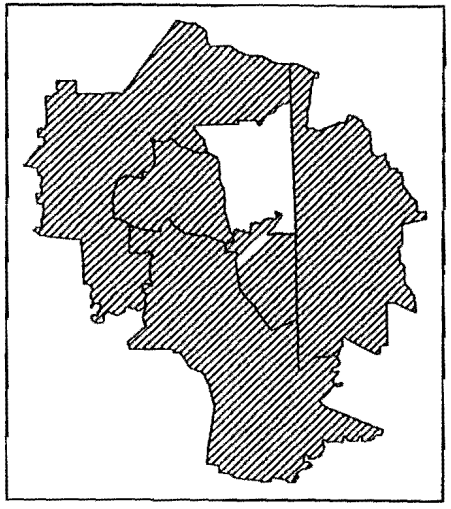
RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.44	0	0	1
2			0.556	0	1	1
3			0.67	0	1	2
4			0.33	0	0	1
5			0.11	0	0	1

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.44	0	0	1
2			0.67	0	1	1
3			0.89	0	1	2
4			0.22	0	0	1
5			0.11	0	0	1





DISTRICT 5

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			1.33	0	1	3
2			1.78	1	2	3
3			1.11	0	1	3
4			0.67	0	1	1
5			0.33	0	0	1
6			0.22	0	0	1

BASIC EMPLOYMENT

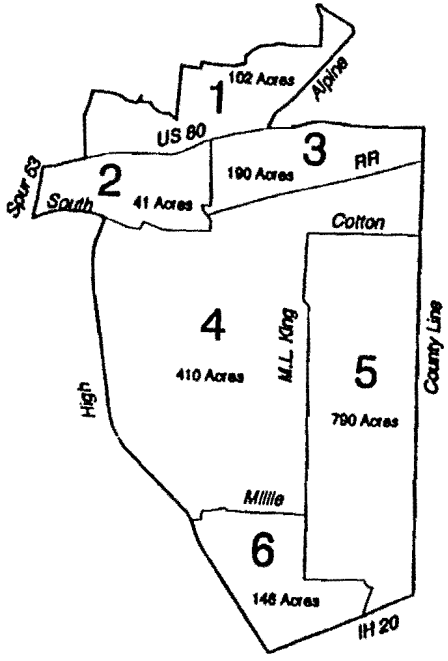
Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.44	0	0	1
2			0.44	0	0	2
3			0.44	0	0	1
4			0.33	0	0	2
5			0.33	0	0	2
6			0	0	0	0

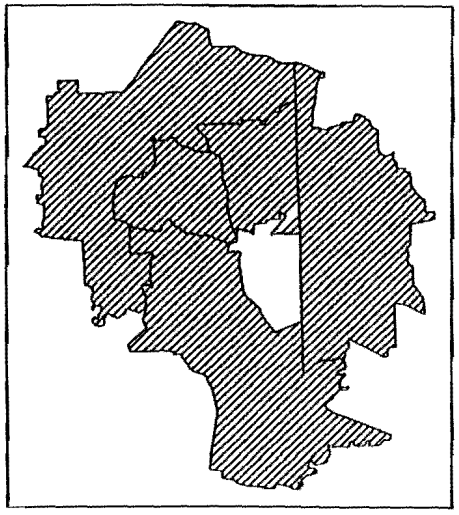
RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.56	0	0	2
2			1.56	0	2	3
3			0.56	0	0	2
4			1.11	0	1	3
5			0.22	0	0	1
6			0.78	0	1	2

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.56	0	1	1
2			1.11	0	1	2
3			0.33	0	0	2
4			0.78	0	1	2
5			0.33	0	0	1
6			0.44	0	0	1





DISTRICT 6

POPULATION

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			-0.22	-1	0	0
2			-0.33	-1	0	0
3			-0.33	-1	0	0
4			-0.56	-1	-1	0
5			-0.11	-1	0	0
6			-0.22	-1	0	0

BASIC EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0.11	0	0	1
2			0	-1	0	1
3			0	-1	0	1
4			-0.22	-1	0	0
5			0.22	-1	0	1
6			0	-1	0	1

RETAIL EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0	-1	0	1
2			-0.22	-1	0	1
3			0.11	-1	0	1
4			-0.22	-1	0	0
5			0.11	-1	0	1
6			0.11	0	0	1

SERVICE EMPLOYMENT

Area	Your Current Response Scale -1 to 3	Your Previous Response	Group Average	Lowest Response	Group Median	Highest Response
1			0	0	0	0
2			0.56	0	1	1
3			0.33	0	0	1
4			-0.33	-1	0	0
5			0	-1	0	1
6			0.11	-1	0	1

Longview Area Delphi Survey

Round 5 Questionnaire

July 30, 1992

EVALUATION OF DELPHI PROCESS

Your help in evaluating the Delphi process is an important step in developing the process for use in other areas. Please answer the following questions and provide comments where applicable. Circle the number which most accurately expresses your response to the statement. Thank you for your participation and cooperation in this process.

Rating Scale:

-3	Strongly Disagree
-2	Disagree
-1	Somewhat Disagree
+1	Somewhat Agree
+2	Agree
+3	Strongly Agree

	Disagree			Agree		
The Delphi process is effective in obtaining, combining, and displaying the opinions of informed people so that their judgments can be used by city planners.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

The participation of Longview area citizens on a Delphi panel has been an effective method of communicating information to city planners.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

	Disagree				Agree	
The presentation of information and results from the previous round at the beginning of each meeting was helpful in completing the questionnaire for that meeting.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

The open discussion at the beginning of each meeting was helpful in bringing out issues which might have been overlooked by some panel members who might not have been familiar with a specific area or event influencing growth in an area.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

Having the panel's average, median, high, and low responses from the previous round to compare to my previous answers was helpful in evaluating my responses during Round 2 and Round 4 of the process.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

	Disagree				Agree	
The format used for Round 1 and Round 2 questionnaires using only tables was the better of the two formats.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

The format used for Round 3 and Round 4 questionnaires showing the map of the district and areas was the better of the two formats.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

The allocations calculated using the panel responses are an accurate reflection of the panel's opinions.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

It would have been helpful to have been able to fill out the questionnaires at home and return them by mail rather than during the meeting.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

	Disagree					Agree
I felt more comfortable dealing with numbers (estimated population, estimated employment, and undeveloped acres), rather than percentages, when evaluating the growth potential of a district or area.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

I felt more comfortable dealing with percentages (percent of total estimated population, percent of total estimated employment, and percent change), rather than numbers, when evaluating the growth potential of a district or area.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

Some form of compensation for the time spent participating in the process would have been appropriate.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

	Disagree					Agree
January through May would have been the most convenient months for me to participate in the process.	-3	-2	-1	+1	+2	+3
June through August would have been the most convenient months for me to participate in the process.	-3	-2	-1	+1	+2	+3
September through December would have been the most convenient months for me to participate in the process.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

Mornings would have been the best time of day for me to attend meetings.	-3	-2	-1	+1	+2	+3
Afternoons would have been the best time of day for me to attend meetings.	-3	-2	-1	+1	+2	+3
Evenings would have been the best time of day for me to attend meetings.	-3	-2	-1	+1	+2	+3

Comments: _____

_____

I would be willing participate in a similar Delphi process in the future. Yes No

Comments: _____

_____

The following space is provided for comments on the final district and area allocations or any other comments which you feel might be helpful in improving the Delphi panel process.

_____

_____

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