

Planning Decisions and Public Attitudes About Roadway Operation

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Information about public needs and perceptions can help the engineer to anticipate and deal with public and political reactions to roadway planning and operational decisions. A Texas frontage road study conducted in 1986 and 1987 offered such insight. The specific concern was conversion of two-way frontage roads to one-way operation and the public opposition generated by such changes. Interviews to determine the attitudes held by certain segments of the public about frontage road management were conducted with 121 individuals in 15 small- and medium-size cities that have freeway frontage roads. The attitude survey indicated that various segments of the public have differing outlooks on the management of the frontage road network. Safety considerations were appreciated more readily by more of the groups than were operational factors such as delay. Coordinated planning could have prevented problems from arising. In a broader setting the survey indicated that engineering values and concerns may not be shared by others who are affected by the decisions the engineer makes. Comments made during the survey will inform the engineer of concerns expressed by others. By anticipating these concerns, the engineer and planner can plan so that problems do not arise in the first place, design in ways to minimize public opposition, and deal with existing situations in ways that placate opposition. Although Texas freeway frontage road patterns may not be common in other parts of the country, the observations and conclusions from the interviews have a broad range of applications.

Many engineers and planners working with streets and highways can muse about situations in which they acted according to "engineering and planning principles" only to be blindsided by sectors of the public taking quite different approaches to the situation. A few of these experiences can make one wary of dealing with the public, for as any government worker knows, no one ever calls to say things are all right; calls are made to protest what has been done. Although dealing with the public can be full of surprises, perhaps more so for engineers than for planners, an understanding of the attitudes and perspectives of key public groups can help one anticipate public concerns. By anticipating these public concerns, the engineer and planner can plan so that the problems do not arise in the first place, design in a way to minimize public opposition, and deal with existing situations in ways that placate opposition as much as possible.

A study conducted in 1986 and 1987 investigated certain aspects of frontage road operation in Texas. One part of this study (1) consisted of conducting interviews to determine the attitudes held by certain segments of the public about frontage road operation. The information gained through this study

can help the engineer to anticipate and deal with public and political reactions to roadway planning and operational decisions.

Texas freeway frontage road operational patterns may not be similar to those in other parts of the country. However, the observations and conclusions from these interviews should be considered when planning and operating all roadway networks, not just frontage roads.

BACKGROUND

Texas freeways often are designed with entry and exit ramps connecting with frontage roads. Frontage roads in the major metropolitan core areas usually are one-way; most other frontage roads are two-way, even when entry and exit ramps connect the main lanes with the frontage road. The access and mobility provided by the freeway frontage road system often will stimulate adjacent commercial, industrial, and residential development. Such development is found both near large urban areas and in medium-size "stand-alone" towns. Traffic volumes on frontage roads in undeveloped areas usually are low, but subsequent land development creates higher traffic volumes.

The traffic situations created by higher volumes on two-way frontage roads include such problems as congestion at frontage road intersections with crossing streets. There is also the potential for accidents where the freeway ramps intersect the two-way frontage road. (In Texas the ramp traffic has the right-of-way at intersections with the frontage road.)

The engineering solution to these operational and safety problems often is conversion to one-way frontage roads. However, proposals to change the frontage roads to one-way operation can draw protests from local individuals who feel that the proposed change will have detrimental effects on them.

A review of literature showed that a number of reports have examined the economic aspects of freeway, frontage road, and access characteristics. A report by Woods (2) examined certain operational and safety problems of the ramp-frontage road intersections. However, none of these studies combined the impacts on traffic with impacts on local business to formulate an overall strategy for addressing short-range or long-range needs, both administratively and operationally.

SCOPE OF RESEARCH

In an attempt to better define the problems associated with frontage road conversion from two-way to one-way operations and, ultimately to propose effective solutions, the Texas State

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Department of Highways and Public Transportation (SDHPT) asked the Texas Transportation Institute (TTI) to conduct Study 402, "Warrants for One-Way Frontage Roads." One of the main foci of the study was the identification of opinions and attitudes about governmental operation of the frontage roads—specifically, the conversion of two-way frontage roads to one-way operation.

SURVEY METHODOLOGY

A project advisory panel composed of SDHPT staff was formed to help the TTI research team identify issues and concerns of SDHPT relative to directional conversion of freeway frontage roads. Since the emphasis of this research project was on the conversion of frontage roads from two-way to one-way operations, the panel suggested that the attitude surveys should be conducted in the locations where conversion to one-way frontage road operations is likely to occur or has recently occurred in Texas: municipalities in the urbanizing fringe of large metropolitan areas and small- and medium-size stand-alone urban areas. To better define the nature of the perceptions and attitudes relative to freeway frontage roads, informal interviews were conducted with city staff, council members, and developers in selected communities.

A draft survey questionnaire was then developed. Many of the questions/statements utilized a five-point semantic scale (strongly agree, agree, no opinion/no preference, disagree, and strongly disagree), so the participants responded by expressing levels of agreement or disagreement to a specific statement. The categorical responses produced by semantic scaling permitted a statistical analysis of the attitudes of the different interest groups. Open-ended questions were also employed in the survey to follow up on certain topics and to provide the respondents with the opportunity to express any opinion or observation relative to the subject of two-way and one-way freeway frontage roads.

The questionnaire was revised after being pretested in the field. Finally, the questionnaire was administered, primarily through personal interviews, although a few were completed by telephone or by mail. Overall, people from 15 Texas cities participated in the survey questionnaire. These cities were either in the developing fringe of a large metropolitan area or were mid-size stand-alone cities. The frontage roads found in these cities were categorized by one of the following:

1. The city had either all or a substantial number of two-way frontage roads.
2. The city had converted the frontage roads in its central portion to one-way.
3. The city had always had one-way frontage roads on almost all segments.

Opinion interviews were conducted in the summer and fall of 1986 and the winter of 1987.

In addition to people from various Texas cities, the interview was also administered to 12 members of the advisory panel during a meeting held in October of 1986. The responses of the panel were compared with those of the individuals interviewed around the state. This comparison offers insight into how the attitudes of highway professionals may agree with or differ from the attitudes of the public with whom the highway professionals may interact.

SURVEY POPULATION

Interviewees were identified through contact with the city staff. City staff were asked to name those individuals who represented the leadership within their area of interest and the community. For example, a city staff member was asked to identify city council members who exhibited a substantial interest in traffic and circulation issues and to whom other council members generally defer on such matters. Similarly, the city staff member was asked to name those individuals in business and real estate who were most visible in their area and whose lead typically was followed by others. In some cases city council members also had business or real estate interests or were developers. In these cases their attitudes as council members were solicited.

Owners and managers of businesses abutting the freeway frontage road were interviewed by TTI staff. These businesses included service stations, restaurants, motels, and automobile dealerships. The interviews were made with actual owners or managers with authority, such as the local manager of a national motel chain.

The following groups of citizens were surveyed:

- City staff, 19;
- City council members, 34;
- Real estate appraisers, 11;
- Real estate and development interests, 24; and
- Owners and managers of abutting businesses, 33.

A total of 121 people were interviewed.

As interviews were conducted, the results were compared periodically. This comparison indicated that the results did not change with additional interviews. Whereas a larger sample size would provide somewhat greater precision in confidence limits on the proportions of responses, the increase was not considered to be worth the considerable expense that would have been involved to obtain an even larger sample.

SURVEY RESPONSE ANALYSIS

A summary analysis of selected survey questions follows. Each question is presented as it appeared on the interview form.

Table 1 presents a statistical summary of the issues addressed and the attitudes evaluated. Respondents are categorized by type of frontage roads found in their city. The percent agreeing or strongly agreeing with the statement and the confidence limits are listed.

Table 2 is a similar summary by type of survey participant. The percent agreeing or strongly agreeing is listed. Those disagreeing, strongly disagreeing, or with no opinion compose the rest of the sample.

Preference for One-Way/Two-Way Frontage Roads

1. How do you classify your preference for one-way compared to two-way traffic on freeway frontage roads in urban areas?

Strongly favor one-way	Somewhat favor one-way	No preference	Somewhat favor two-way	Strongly favor two-way
Why? _____				

TABLE 1 SUMMARY COMPARISON OF ATTITUDES

Statement	Proportion Agreeing With Statement						Advisory Panel
	<u>All respondents</u>		<u>Two-way(1)</u>		<u>One-way(2)</u>		
	%	limits(3)	%	limits(3)	%	limits(3)	
1. Favor one-way	52	45-59	50	40-60	55	43-66	92
2a. One-way hurts businesses at A and D	90	85-95	89	82-95	92	86-98	58
2b. One-way hurts businesses at B and C	39	32-46	31	22-40	50	38-62	8
3. Two-way safer	3	0-5	3	0-6	3	0-5	17
4. One-way higher capacity	55	47-62	54	44-64	55	43-66	83
6. Opposition increases with time	93	89-97	93	88-97	92	86-98	92
7. Build w/o frontage roads	14	9-19	13	6-19	16	7-24	17
8. Failure to develop back-up system	56	49-64	57	47-67	55	43-66	75

(1) Respondents where some or all freeway frontage roads are two-way

(2) Respondents where freeway frontage roads have been converted to one-way or have always been one-way

(3) Lower and upper 90% binomial confidence limits

A slight but not statistically significant majority of all respondents (52 percent) indicated a preference for one-way frontage roads. The percentage preferring one-way frontage roads was not significantly different for locations with two-way frontage roads versus locations with one-way frontage roads. The percentage (92 percent) of the advisory panel who favored one-way was much higher than the overall percentage.

Analysis of the responses by category of respondents indicated that there was a significant difference between the attitudes of the different groups of individuals. As Table 2 indicates, the majority of city staff (90 percent) and council members (68 percent) favored one-way freeway frontage roads. The proportions of staff and council favoring one-way frontage roads were significantly larger than 50 percent.

Appraisers indicated a preference for one-way freeway frontage roads. However, business people, real estate people, and developers generally preferred two-way operation.

Effect of Conversion on Business

2. In reference to Figure 1:

2a. Conversion of a two-way frontage road to one-way will have a detrimental effect on "highway-oriented" businesses (service stations, motels, and restaurants) at Locations A and D.

Strongly Agree No opinion Disagree Strongly disagree

2b. Conversion of a two-way frontage road to one-way will have

TABLE 2 COMPARISON OF ADVISORY PANEL RESPONSES AND THOSE OF INTERVIEWEES

Statement	Advisory Panel	Interviewees			
		Total	City	City	All
			Staff	Council	Others
	%	%	%	%	%
1. Favor one-way frontage roads	92	52	90	68	34
2a. Agree, businesses upstream/downstream of ramp will be hurt	58	89	68	88	96
2b. Agree, businesses between off-ramp and on-ramp will be hurt	8	39	21	38	44
3. Agree, two-way safer	17	3	0	0	4
4. Agree, one-way has higher capacity	83	55	84	62	43
6. Agree, the longer two-way is maintained, more opposition to change to one-way	92	92	100	82	96
7. Agree, build freeways w/o frontage roads	17	14	31	15	9
8. Agree, two-way frontage roads lead to failure to develop alternate routes	75	56	68	59	52

a detrimental effect on highway-oriented businesses (service stations, motels, and restaurants) at locations B and C.

Strongly agree Agree No opinion Disagree Strongly disagree

The vast majority (90 percent) of all respondents believed that conversion to one-way operation would be detrimental to businesses located downstream of an on-ramp or upstream of an off-ramp. There was little if any difference between the groups of respondents. Further, those residing in areas where the frontage roads were two-way had views that were similar to those where the frontage roads were one-way. During the interviews, 21 interviewees offered the unsolicited comment that the site upstream of the freeway exit ramp would be hurt

more than the site downstream of the entrance ramp. It is possible that others of the 108 that agreed or strongly agreed with the given statement shared that opinion but did not make the comment.

Only 39 percent believed that the conversion from two-way to one-way frontage roads would have a detrimental effect on businesses located downstream of an off-ramp or upstream of an on-ramp. There were significant differences among the opinions of the various groups. Owners and managers differed from the other groups in their opinion that conversion to one-way traffic would be detrimental to businesses in these locations. Where the frontage roads always were one-way or were converted to one-way, a slightly higher proportion (50 percent) believed that one-way traffic is detrimental to businesses located between off- and on-ramps. However, the difference

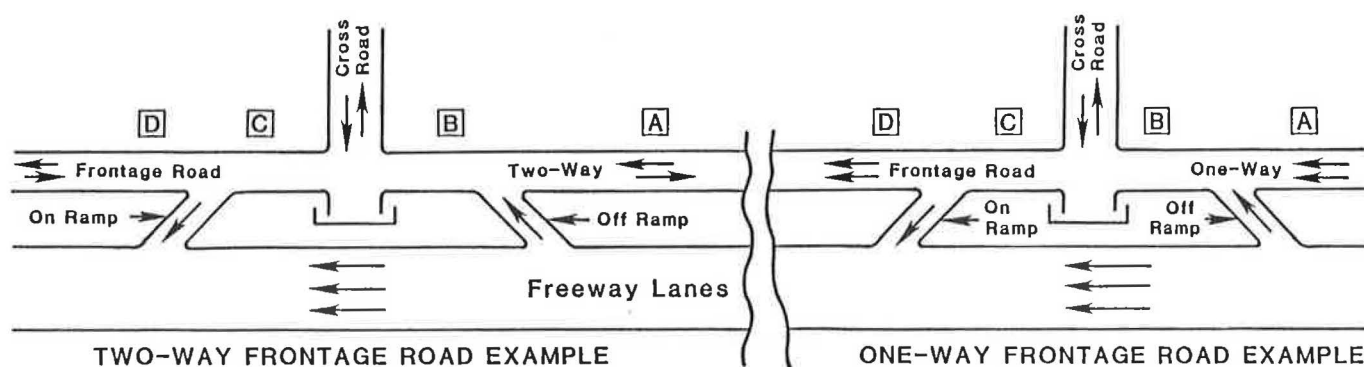


FIGURE 1 Sketch accompanying Question 2.

between respondents at one-way and two-way locations was not significantly different at the 90 percent confidence level.

The percentage of the advisory panel who felt that one-way operation would be detrimental to businesses was much smaller than that of the public. This was especially true regarding businesses located between an off-ramp and an on-ramp.

Two-Way Frontage Roads Are Safer

3. Two-way frontage roads are safer than one-way frontage roads.

Strongly agree	Agree	No opinion/ Don't know	Disagree	Strongly disagree
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An overwhelming and statistically significant majority of respondents (85 percent) recognized that safety-wise, two-way freeway frontage roads were inferior to one-way. The chi-square analysis indicated that there were no significant differences among the different groups of respondents. The wording of this statement could be construed to conclude that two-way was considered to be as safe as one-way. However, the comments made during the interviews indicated that most persons, including those who preferred two-way frontage roads, recognized that one-way was safer.

One-Way Frontage Roads Have Higher Capacity at Intersections

4. The intersection of a frontage road and a cross street can carry more traffic after the frontage road is changed from two-way to one-way traffic.

Strongly agree	Agree	No opinion/ Don't know	Disagree	Strongly disagree
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A slight majority (55 percent) agreed that the intersection of a frontage road and a cross street could carry more traffic when the frontage roads were one-way. The capacity advantage of one-way frontage roads was much less appreciated than the safety advantage.

The chi-square test indicated that there were significant differences among the different groups of respondents. City staff and, to a lesser extent, city council members tended to recognize the capacity issue. The other groups appeared to have no general recognition of the increase in capacity with one-way operation compared to two-way.

The percentage of the advisory panel holding the opinion that capacity is higher with one-way frontage roads (83 percent) was significantly higher than that of the survey participants (55 percent).

Effects of Conversion on Land Values

5. What effect does the conversion from two-way to one-way traffic have on the value of properties along the frontage road?

Responses can be categorized as follows:

	City		Land		Total No.
	No.	%	No.	%	
Conversion will be detrimental	11	21	27	40	38
Conversion will cause a short-term decline	11	21	6	9	17
Conversion will hurt some but not others	9	17	13	19	22
Conversion will hurt some and benefit others	9	17	9	13	18
Conversion will have little or no effect	7	13	8	12	15
Conversion will be beneficial	2	4	1	1	3
Don't know	3	6	4	6	7
No response	1	2	0	0	1
Total	53		68		121

The "land" interests (abutting owners, real estate and development interests, and real estate appraisers) were much more likely to predict a detrimental effect on real estate values due to conversion than were the "city" interests (staff and council). Among owners, 16 of 33 (48 percent) believed conversion would be detrimental; among realtors and appraisers, 11 of 35 (31 percent) felt this way.

Opposition to Change Increases with Time

6. The longer that two-way traffic is maintained on a freeway frontage road, the more opposition there is to a change to one-way.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
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Nearly 93 percent of the total survey responded that the longer that two-way traffic is maintained, the more opposition there is to a change to one-way flow. There were no significant

differences among the different groups of respondents or between locations where frontage roads were one-way or two-way.

Freeways Should Be Built with Frontage Roads

7. Freeways should be built with entry and exit ramps but without frontage roads.

Strongly agree	Agree	No opinion/ Don't know	Disagree	Strongly disagree
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A sizable proportion (78 percent) of the respondents indicated that freeways should originally be built with frontage roads. There was no significant difference between the groups of respondents, although some staff, council members, and business people expressed a preference for diamond interchanges without frontage roads. Although the difference was not statistically significant at the 10 percent significance level, freeways without frontage roads were more acceptable in areas where frontage roads are two-way than where they are one-way.

Failure to Develop Backup Street System

8. The presence of two-way frontage roads will lead to a failure to develop a supporting street system of alternative routes to the frontage road.

Strongly agree	Agree	No opinion/ Don't know	Disagree	Strongly disagree
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Explain _____

A slight but not statistically significant majority (56 percent) indicated that the presence of two-way frontage roads will lead to a failure to develop a supporting street system of alternative routes to the frontage road. However, a sizable majority of the real estate people/developers (71 percent) and city staff (68 percent) were of the opinion that two-way frontage roads did indeed retard the development of a supporting street system. City council members (59 percent) also expressed this view.

SELECTED SURVEY COMMENTS

The survey included open-ended questions to follow up on some of the semantically scaled questions and to obtain individual opinions and comments. The following comments were selected to provide additional insight into the public's view of freeway frontage road management.

Influence in Making the Decision to Change

The decision to convert a two-way frontage road to one-way is not only an engineering decision but also a political one. Various interests affected by the conversion will form opinions about the proposed conversion and then express those opinions to their political leaders. A council member may then arrive at a position based on pressure from various interest groups.

The following comments express a range of attitudes that affect political realities.

- "Two-way would be nice, but I hope I'm not so mercenary over the dollar." Comment from an abutting owner favoring one-way.

- "I get more pressure from people who pay taxes [abutting property owners] than from people that drive." Comment by a council member favoring two-way.

- "If you didn't have property owners along the frontage road, then the state would not have worries about conversion." Comment from a realtor favoring two-way.

The State's Role

Some interviewees made comments about the role of the state in operating frontage roads. The following selection of comments reflects a wide range of philosophical perspectives.

- "SDHPT should establish some standards as to when one-way or two-way frontage roads are to be used." Comment by a businessman.

- "If the frontage road is going one-way, then [SDHPT] should have done it from the beginning." Comment by a council member (a professor).

- "Eliminate uncertainty; set up frontage road, then don't change it." Comment by a developer.

Negative Attitudes

Comments made by business owners and others in opposition to conversion to one-way show that one-way operation is perceived to be, and in fact may be, detrimental to some businesses in given situations.

- "If I had known that this frontage road was going to be converted to one-way [in the future], I would not have opened up here." Comment by an abutting owner favoring two-way.

- "I developed this business under two-way frontage road conditions and want it to stay two-way." Comment by an abutting owner favoring two-way.

- "People have complained about getting to my business [which is on a one-way frontage road]." Comment by an abutting owner favoring two-way.

- "I know of a location rejected by a motel because the frontage road was one-way." Comment from a real estate agent favoring two-way.

- "I have seen conversion to one-way cause a child care business to fail." Comment from an appraiser favoring two-way.

One owner of a local restaurant located along a frontage road that had been converted to one-way did not want to be interviewed but did complain about the conversion. He believed that a sizable portion of his patrons had previously reached the restaurant by driving in the contraflow direction on the two-way frontage road and now no longer came because of the extra distance down to the next crossover and back under one-way operation.

Positive Attitudes

The comments of some who had experienced conversion to one-way frontage road operation show that the perception of problems in advance of conversion may be much worse than the reality after conversion.

- “We thought that the change to one-way would hurt (business) but it didn’t.” Comment by an auto dealer on a frontage road that was changed from two-way to one-way traffic.

- “Conversion to one-way does not hurt (detrimental to business/property value) as much as people think.” Comment by a real estate appraiser.

- “Our business does not suffer due to one-way frontage roads because we are a specialty business.” Comment by an abutting owner on a one-way section who favors two-way.

- “Previous conversion to one-way didn’t affect the price of the site bought just after conversion.” Comment by an abutting owner who favors two-way.

Backup Street System

Comments about the absence and presence of backup street systems to the frontage roads (i.e., alternative routes) reveal a variety of perceptions. Some of the interviewees do believe that the presence of frontage roads inhibits development of the street circulation system whereas others do not.

- “If the bypass frontage roads were one-way instead of two-way, the street [a proposed parallel, minor arterial] would have been built.” Similar statements were made by two city council members and by the developer of one of the abutting subdivisions.

- “The problem with converting from two-way is that the paralleling supporting roadways were not planned for.” Comment from a council member favoring one-way.

- “It is hard to get people to vote money [for a backup road] when the frontage road exists.” Comment from a developer favoring one-way.

Freeway Effects on Circulation

In addition to comments about the backup street system, a number of survey participants offered unsolicited comments about the state of ramp configurations, frequency of streets crossing the freeway, and the effects of the freeway upon vehicular circulation.

- “Freeways create an urban barrier, interrupting the circulation patterns.” Comment by a staff person favoring two-way.

- “I’m concerned with the excessive distance between crossing streets, especially in urban areas.” Comment by a council member favoring one-way.

- “In urban areas with plenty of crossovers, one-way would not have a real impact.” Statement by a mayor.

A number of interviewees expressed concern with the availability of roads crossing the freeway. A higher frequency of crossovers makes one-way frontage roads more acceptable.

Comfort and Safety

Motorists may feel vaguely uncomfortable or outright unsafe when driving on two-way frontage roads with connecting entry and exit ramps. Motorists from out of state or large metropolitan areas may be used to one-way frontage roads only; they can be surprised by a two-way frontage road.

- “Two-way is more convenient but more dangerous.” Comment by a council member favoring one-way.

- “A number of bad experiences with two-way can cause people to change their minds and favor one-way.” Comment from an appraiser favoring one-way.

In one city an unfortunate fatal accident related to two-way operation seemed to be a major factor in convincing local leaders to choose conversion to one-way operation.

CASE STUDIES

In a few instances the local people being interviewed related case histories of two-way frontage road conversion to one-way to the interviewers. These case histories show what can go wrong.

Reviewing the city files revealed that those who oppose conversion are more likely to attend city council meetings; the proponents may only write or call their council member. Recorded instances of a business person putting public interests ahead of personal business interests were rare.

The lack of alternative or backup routes caused some interesting situations. The leaders in one town recognized that there was exclusive reliance on the two-way frontage road. However, the new alternate street was long delayed because competing development interests could not agree on a route for a street parallel to the frontage road.

In one city residents have successfully opposed the completion of the backup street, not wanting through traffic in their area. Thus, the subdivision relies entirely on the frontage road for access. Since a backup street is not in place, millions of dollars are being spent on overpasses to reduce the circuitry of travel that will result from conversion to one-way frontage roads.

Residents of one west Texas city solved the problem of roundabout routes after conversion to one-way frontage roads. They simply drove through a vacant lot to reach their destination. Rainwater-filled tire ruts are clearly visible in photographs of the route. In the same city an alley used to overcome roundabout routes had a peak-hour count of over 250 vehicles.

A few comments indicated that some motorists deliberately drove the wrong way on a one-way frontage road to avoid the indirect routes present in the one-way system. In the two cities where this comment was made, backup or alternative circulation routes were sorely lacking.

CONCLUSIONS

This survey was successful in reporting attitudes of various segments of the public toward frontage road management. The attitudes of various key groups were sometimes in con-

flict. The process of identifying public attitudes about frontage road management also revealed attitudes concerning the management of the roadway system in general. Engineers, planners, and other public officials can be more effective if they understand both the issues and the various players in roadway decision processes: the elected officials, developers, and affected property owners or tenants.

Different Groups May Have Incompatible Perspectives

Different interest groups that the engineer in government must serve can have perspectives that are different and sometimes incompatible with the engineering perspective. The engineer may be concerned with an orderly or logical roadway pattern, whereas the business person may be concerned with the welfare of his or her business concern. A particular situation may be one small part of an engineer's job but may affect the entire livelihood of a business person.

Engineers and planners may have perspectives that differ from those of others owing to education, tendencies to absorb peer group values, different psychological compositions of individuals who tend to enter different occupations, or other factors. Whatever the cause, tension and conflict can be exacerbated if the engineer is not aware of fundamental differences in values and perspectives among different individuals and groups.

Engineers need to prepare for the political side of engineering. The nature of governmental engineering employment may limit exposure to other interest groups and thus deny the engineer the opportunity to consider different perspectives and different ways of thinking. In particular, most business people and developers place a high value on perceived access to their site. They can be expected to take a vested-interest view; many will not be satisfied by an overall analysis showing benefits to the public in general.

The outlook of the advisory panel engineers differed from that of the business persons and developers on a number of issues. On the other hand, the engineering advisory panel shared some perspectives with city staff, such as on preference for one-way frontage roads, effect on businesses, safety, capacity, and two-way frontage roads leading to a failure to develop a backup street system. City council members generally were more attuned to the advisory panel perspective, although less so than city staff interviewees, most of whom were engineers and planners.

When state engineers see a need within a city, advance contact and identifying shared views with potential allies—city staff, city council, and citywide groups—can help withstand the often intense opposition a few intense individuals can generate. If the public officials can identify those who share their views and encourage them to be as active as the opposition, the political environment may be more conducive to implementing needed improvements.

Some Concerns Are Shared, Some Are Not

From time to time the engineer will take controversial actions. When a need for action is explained to the council or the

public, some issues will be better understood than others. For instance, traffic safety is a substantial concern that most people recognize. Also, accident information is readily understood by most individuals. Location-specific data such as conflict analysis, erratic maneuvers, and "near misses" may be convincing evidence in addition to accident data.

On the other hand, capacity and operational advantages of certain roadway options do not appear to be generally understood. This means that such data should be presented in as simple and nontechnical a manner as possible or perhaps should be avoided altogether.

One important desire of the business person, a desire perhaps not shared by the engineer or planner, is for a clear, unchanging set of government regulations. The business person wants to know what to expect. One developer said, in effect, "I don't care what you do, just make everybody play by the same rules and don't change them."

Fair Hearing for All Sides

It is also desirable, if not essential, to make those individuals who believe that a change will adversely affect them believe that they have received a fair hearing and that their individual concerns have been addressed. Based on experiences involving public works projects, it appears that the following are essential in dealing effectively with the portion of the public that has a vested interest in a change from two-way to one-way frontage road operations.

1. Provide the opportunity for individuals to freely express their concerns and develop a belief on their part that their concerns are appreciated. Experience indicates that this is best accomplished in an open, informal meeting where it is made clear that the purpose is to obtain information and for individuals to express their concerns and that no decision has yet been made.
2. Address the concerns of each individual in a factual, easy-to-understand manner.
3. Proceed to a formal public hearing only after a thorough study has been made of the problems and advantages of one-way versus two-way frontage road operations.

Such a procedure has been effective in ameliorating opposition where the decision is controversial among a few individuals but the general public has not become involved. The engineer may need assistance or training to adequately address situations where public participation is called for.

Roadway Impacts

Traffic engineers recognize the ways that development can affect the street system, and many cities require a traffic impact analysis for new development. But by the same token, roadway changes can affect nearby businesses and landowners.

The survey results indicate that the potential for the greatest negative impact resulting from conversion to one-way operation is to those tracts of land located upstream of an exit ramp or downstream of an entry ramp (i.e., outside of the diamond interchange area). It appears that businesses that

are unique or that have relatively little competition will not be affected greatly even if they are situated in the area outside of the diamond interchange. An automobile dealership situated upstream of an exit ramp would be expected to fare better than a local restaurant if the frontage road were converted to one-way. The business that relies on convenient access, such as a fast-food establishment, may be hurt by conversion to one-way operation.

To Delay or Not To Delay

There are cases in which the opposition to a roadway improvement may subside with time. But waiting also can allow the city structure to become more dependent upon the network as it is. This study indicates the clear perception by most that a change from two-way to one-way traffic should be undertaken as soon as possible because opposition may increase with time.

Coordinated Planning Could Prevent Problems from Arising

Land use planning must be coordinated with roadway facility planning. Many of the problems and adverse reactions to conversion to one-way frontage roads result from an apparent lack of such planning. The same can be said for a number of traffic operations problems.

More attention to land planning and land development along the freeway corridor could produce long-term benefits. Needed conversions to one-way operation would be more acceptable to various interest groups if the affected area were not totally reliant on the frontage road for access and circulation. Planning and regulation are necessary to ensure that these alternative routes are in place when needed. The process for governmental approval of land plats or building permits along a two-way frontage road should provide for written notification to the applicant that the frontage road may be converted to one-way in the future. This notification should be on record in the event of future questions. The state agency should coordinate roadway layout planning with local governments.

In structural design practice, redundant or backup members are provided so that all of the design "eggs" are not placed in one basket. In a somewhat similar way, the roadway/land use system designed without redundancy can fail when an unexpected traffic operational load is imposed. When the frontage road (or any road) is converted to one-way, a great deal of inconvenience to the traveler can result from increased circuitry of travel when no backup or alternative road serves the area or there are infrequent cross streets. Unless a backup roadway network is already in place before the frontage roads are built, the mere provision of frontage roads can prevent other redundant roads from being built.

Preference for Frontage Roads

The interviewees preferred freeways having ramps connecting with frontage roads to freeways and ramps without frontage roads. As the survey progressed, the interviewer noted that the few who opposed frontage roads seemed to have accents from other parts of the country. The interviewer began to ask opposing respondents where they were from, and most were from other states. Although the study did not address this issue, it could be that the preference for the ramps connected with frontage roads simply reflects what most of the people were used to.

SUMMARY

These interviews showed that the engineer and planner can expect to have views and concerns that are significantly different from those who may be affected by engineering and planning decisions. The reported comments give the engineer insight into some concerns held by certain key groups—concerns the engineer may not have considered. Planning and regulation of development could lessen the chance of conflict between the engineer/planner managing the roadways and elements of the public.

The frontage road interview results offer the engineer and planner an understanding of the attitudes and perspectives of key public groups about both frontage roads and roadways in general. By understanding and anticipating public concerns, the engineer and planner can plan so that the problems do not arise in the first place, design in a way to minimize public opposition, and deal with existing situations in ways that placate opposition as much as possible.

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