

4-2002

The Policies of implementing traffic calming in the Las Vegas Valley

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THE POLICIES OF IMPLEMENTING
TRAFFIC CALMING IN THE
LAS VEGAS VALLEY

By

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A professional paper submitted in partial fulfillment
of the requirements for the

**Master of Public Administration
Greenspun College of Urban Affairs**

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April 2002**

ABSTRACT

THE POLICIES OF IMPLEMENTING

TRAFFIC CALMING IN THE

LAS VEGAS VALLEY

By

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DR. E. Lee Bernick, Committee Chair
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This paper illustrates how policies that relate to traffic calming devices are implemented in the Las Vegas Valley. Traffic calming is the attempt to achieve calm, safe, environmentally improved conditions on streets, and the lowering of speeds. Traffic calming measures reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. An analysis of The Nevada Revised Statutes was conducted to understand state directives pertaining to the implementation of policies at municipal levels of government. The study investigated how four governments (Las Vegas, North Las Vegas, Clark County, and Henderson) implement traffic calming measures in the Las Vegas Valley. The study consisted of personal interviews using a standard set of questions. Two of the governments have developed written policies. One of the governments claimed to have a policy, but it is not written, and the fourth claimed to

not have a policy. The role of the Traffic Engineer in the problem identification, formulation, adoption, implementation, and evaluation stages of traffic calming are unique to each political setting. The study found different levels of support for the use of traffic calming measures within each government studied.

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INTRODUCTION

The most significant advancement in daily transportation was the invention of the automobile, commonly referred to as a car. Since the invention of the automobile it has quickly become a significant part of American culture. According to the US Department of Transportation there are over 190 million licensed drivers and over 218 million registered motor vehicles in America today

Refer to Chart 1, Licensed Drivers, Vehicles, and Population of the United States, in appendix.

The number of vehicles driving on our roadways has increased by 40 percent in the last 20 years. Today 67 percent of the overall US population are licensed drivers.

During the 1950s the automobile was being promoted as the ideal mode of transportation for daily commutes, long trips, and the family vacation. The privately owned car is easy to access, able to provide delivery in a timely manner, and reasonably economical to operate. These features caused the popularity of the automobile to grow.

The historical actions of government itself created an ever increasing demand to provide a transportation network of roadways capable of delivering a reasonable level of service to the motoring public. Roadways are a high cost item, vehicles create great amounts of emissions, and accidents involving automobiles present safety hazards to other motorists and to other users of the roadways, such as bicyclists and pedestrians. As a result, safety, economic, and environmental issues concerning automobile travel and transportation networks that support them have become major topics of discussion at all levels of government.

The Federal Government began establishing interstate roadway systems for the primary purpose of moving goods and services over long distances between states. The State Governments began establishing state highways that linked cities and the interstate systems. Local and municipal governments participated in the construction of inter-city roadways for the purpose of interconnecting individual lots of land with the highways. The roadway systems that were created from all this construction were designed for cars and trucks.

As more cars traveled the roadways adverse fallout from their use began to present problems. People became concerned about the environment established by the use of automobiles. Urban America began to notice that the roadway system was not exclusively for the use of cars. It became apparent that pedestrians, bicyclists, and also children at play in residential areas were entitled to use of public lands including the roadways. The sharing of safe roadways is a major point of concern by many people as apparent by the formation of special interest groups such as Mothers Against Drunk Drivers, MADD, and the teaching of driver education in public schools. The citizens of America looked to government for services and legislation to control the motoring public.

A key concern of citizens and politicians alike is safety. As more and more people began commuting by car the accident rates involving privately owned vehicles increased. Property damage claims and injury to humans from automobile accidents also increased. Citizen concerns over safety invoked policy makers to establish legislation to govern the use and design of roadways within their jurisdiction.

Traffic calming has become an important component of traffic management. Traffic calming is the attempt to achieve calm, safe, environmentally improved conditions on streets, and lower speeds. The accepted definition of traffic calming, by transportation professionals, is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. This research seeks to understand the policies and legislation pertaining to the initiation and implementation of traffic calming devices within the Las Vegas Valley.

LITERATURE REVIEW

Public Policies

Public policies occur at all levels of government. At the state and municipal levels of government policies may not affect people on a global level but they do affect the lives of all people who live within or near the jurisdictional boundaries. Whether it is at the federal, state, or local level of government political activities affect the lives of people on a daily basis.

In many instances a policy can be perceived as a methodical way of daily routine. A policy can be implied or explicitly provided in formal text. Policies can be management directives or statements of principle which convey management's intent with regard to functions (Moule & Giavara, 1995).

Public policy can be defined in a variety of ways. Richard Rose(1963) suggested that policy be considered a long series of more-or-less related activities. This definition indicates that policy is a course or patterns of activity and not just a decision. The definition of a policy by others includes not only actions but also decisions. In an attempt to define policy, scholars have provided concepts in lieu of a specific definition. In addition Anderson(1975) indicates that policy is a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern. A key concept of this definition is that a perceived problem exists. For example, within a residential setting the residents in that area may see high volumes of traffic or excessive speeds on the roadway as a problem.

It is important to understand that public policies are not random acts but they are established goal orientated actions. Policies provide guidelines for the actions and decisions of government officials. Public policy can even be a legislative action that dictates the required participation of nongovernmental personnel. Public policy can be either a positive or negative concept. For example, a positive concept would be to take action upon an identified problem. A negative concept would be when government decides not to take action upon a problem. The negative concept of not taking action is in itself an action. Lastly, it is important to understand that policy is authoritative in nature since it often is supported by law.

To understand the issues surrounding the development of policy toward traffic calming it must first be understood that traffic calming is a legitimate activity of government. The need for traffic calming policies exists when problems are presented, for example a problem can be in the form of a citizen complaint or a high

accident rate area identified by police reports. Traffic calming is a central activity for government in the development of roadways for multimodal uses. It is important to review the conventional policy process for us to understand traffic calming measures as public policy.

Policy Process

The policy process consists of a sequence of five basic stages. These stages are problem formation, formulation, adoption, implementation, and evaluation. These five steps are not an exclusive list of elements in the policy process. Each process will consist of events and elements that are unique to a government's circumstances.

The problem formation portion of the policy process is usually assumed as a preexisting condition. This assumption leads to neglect of problem analysis and the process forgoes complete evaluation. Neglect of problem evaluation presents the opportunity for flaws in policy initiation or an incomplete policy. The problem itself dictates the characteristics of the policy process and if the problem is not properly defined the assessment of policy effectiveness is compromised. For policy purposes, a problem can be formally defined as a condition or situation that produces a human need, deprivation, or dissatisfaction, self-identified or identified by others, for which relief is sought (Jones, 1970). The key to problem analysis is that a situation or condition is a problem only if it motivates people to action. If a

condition is accepted by the public and does not evoke action then, according to the stated definition, a problem does not exist.

Existence of a problem does not guarantee that any action of a positive or negative nature will be initiated. However, a lack of concern or unawareness pretty much guarantees the absence of action. When a problem is identified it must enter the political arena before any action can begin. The entrance into the political arena is accomplished by getting on an agenda. An agenda is basically a list of matters or the problems that will be discussed by the public officials that provide serious or active attention (Anderson, 1975).

A problem can enter the political arena in many ways. First of all, leaders of government can bring issues onto the agenda by use of position. Political influence by politicians can be the result of concern for the citizens, special interest, or desire to obtain political favor from colleagues or the public. Second, an issue can be placed on the agenda due to a crisis, a spectacular event, or a natural disaster. Third, it is a result of protest activity or riots, including violence, which bring problems to the attention of public officials and achieve agenda placement. Fourth is when issues and concerns are brought to the attention of the media. Issues that are highlighted by the media can achieve agenda status or can achieve a higher priority if already on the agenda. There are many ways in which issues get in the political arena and are limited only by imagination.

Formulating a policy includes the construction of an acceptable and viable proposal of procedures for dealing with the problems presented by the public. It is important to understand who is involved in the development of public policy

proposals. Most policy proposals are developed by career or appointed officials within administrative departments and agencies. However, these personnel are only a portion of the players involved in the formulation process. In many cases an advisory commission has substantial influence on the direction of a formulating policy. Legislators and other elected politicians are also involved in policy formation. Sometimes on the basis of their own interest they formulate and suggest proposed courses of action. Interest groups also play key roles in both policy initiation and formation. Policy formulation in a sense, is the result of compromise between both private interest and public officials.

The process of formulation includes two basic activities. The first activity is to decide if any action is to be taken. The second activity is to decide what action is to be taken once it is decided that any action should be taken. It is important to realize the difference between a policy decision and a routine decision. A policy decision will significantly affect the content of a maturing public policy and a routine decision involves the day to day application of existing policy and procedures. The policy decision stage is typically meshed with the formulation process of policy development and the adoption process. A policy decision requires action by some official person or bodies to approve, modify, or reject a preferred policy alternative. Furthermore a policy decision is usually the preferred alternative of a variety of decisions, some routine and some not so routine, made during the operation of the policy process. Many, if not most, policy decisions made by public authorities exercising broad discretion are made under circumstances in which only a small

portion of the general public understand the particular issues much less understand the consequences of the decisions.

As mentioned the formulation process and the adoption process of policy development are closely related or meshed together and in some cases the difference is obscured. The formulation process is generally the formulation of the alternatives available for dealing with a problem and who is involved during the alternative identification stage. The adoption process is how the alternative is adopted or enacted. In many cases the adoption is a specific decision.

Adoption of the policy process requires decisions. Key elements of policy decision making include gathering and evaluating available information and resources. Students of public policy have identified multiple methods that government officials can utilize to make decisions. Three common methods for decision making are the rational, incremental, and mixed scanning methods. The rational method is the best known theory of decision making, and also perhaps the most widely accepted. The rational method requires that a given problem be identified and separated from other problems. The information pertaining to the desired output or objective is then identified. Each alternative is evaluated for maximum efficiency and the possible consequences. The decision-maker must then choose an alternative that provides the most desired outcome. The incremental method differs from the rational method such that many goals or objectives are identified and intertwined instead of singled out. The decision-maker then generates a limited number of alternatives and only considers a few of the possible consequences for each alternative. The incremental method gets its name by the fact

that the decision and the alternative is continually refined in increments. The mixed-scanning process is a hybrid combination of the rational and incremental decision process. The mixed-scanning process permits decision-makers to utilize both rational and incremental theories in different situations. Mixed-scanning is a compromise approach that combines both rationalism and incrementalism.

Whether the chosen decision process is rational, incremental, or mixed-scanning in nature, those who make decisions from available alternatives must have some basis for their choices.

Policy Implementation: It must be kept in mind during implementation that the content of policy and its impact on those affected may be substantially modified, elaborated, or even negated during the implementation stage. It is often quite difficult, if not impossible, to neatly differentiate the adoption of policy from the implementation of policy, similar to the formation of policy and the adoption of policy are not easily differentiated. There is indeed, much truth in the aphorism that policy is made as it is being administered and that it is being administered as it is being made (Mazmanian and Sabatier, 1983).

In the United States, as in most political systems, public policy is implemented primarily by a complex system of administrative agencies. These agencies perform most of the day-to-day work of government and thus influence citizens more directly in their actions than do any other governmental units. It is necessary for policy analyst to be concerned with administration because agencies often have much discretion in carrying out the policies under their jurisdiction. When policy, therefore, is viewed as a "course of action," its substance is affected by how it is administered.

How it is administered depends on many factors within the agency and the complexity of the policy itself. These factors include leadership of the organization, mindset of the leaders, financial resources, communication, and public acceptance (Anderson, 1975).

Communication is crucial in successful implementation of a policy. First of all members of the organization must be informed of the existence of the policy. Conveyance of this information should also include ownership or responsibility of the policy action. The information should be distributed through as many channels as possible and each employee should be informed of their role in helping the organization succeed in establishing procedures (Zairi, 1999).

A policy only confers upon an agency the authority to take action. How efficient the agency is or what the agency actually accomplishes will be effected by the political setting which it is located and the amount of political support it receives. Basically the political environment has great bearing on how an agency exercises its discretion and accomplishes its programs.

The last stage of the policy process is the policy evaluation stage. The evaluation stage is a patterned sequence of activities concerned with the estimation, assessment, or appraisal of policy. These activities also include content, implementation and effects of policy upon the environment. As a functional activity, policy evaluation can and does occur throughout the policy process and does not just occur as a final step. Evaluation activity during the policy process may restart policy in order to continue, modify, or eliminate current policy. During policy

evaluation administrators make judgments concerning the value or effects of certain policies and procedures.

There are three types of policy evaluations including impact, strategy, and monitoring. Impact evaluation is an overall assessment of impact and effectiveness. The emphasis is on determining the extent to which policy is successful in achieving basic objectives and on the comparative evaluation against other programs. Strategy evaluation is an assessment of the relative effectiveness of program strategies and variables. The emphasis is on determining which strategies are most productive. Project monitoring is an assessment of individual projects through site visits and other activities with the emphasis on managerial and operational efficiency (Wholey, 1970).

Assessment of the policy should be performed on a regular basis. The information from the assessment allows administrators to make informed decisions as to the viability of continued support for any particular policy. Review of the policy processes and procedures provides the administrator with the information needed to refine each step of any process. Refinement of the steps at all levels on a continuing basis allows for maximum output with minimum input.

It is important to understand the difference between policy output and policy outcome. Policy outputs are basically the things government does. The things they do usually consist of resources and support. The outcomes are the result of what government has done. For example, if government implements a neighborhood traffic management program this would be an output. If streets became safer

because drivers on that street slowed down and drove more defensively that would be the outcome.

A major concern of policy evaluation is trying to determine the impact of policy on real life conditions. Determining the actual impacts or results of a policy is a very difficult task. With any policy it is important to know what accomplishments are desired. Other elements include the how it is done and the progress towards attainment of the objectives. During the measurement of accomplishment it must be determined that not only has a change in real life occurred but the changes that do occur are a result of the policy.

Traffic Calming Definition

To help the public, transportation professionals, municipal staff, and politicians communicate effectively about traffic calming; a common understanding of traffic calming is necessary. Professional traffic engineers had developed many definitions for traffic calming. For example, traffic calming was defined as the attempt to achieve calm, safe, environmentally improved conditions on streets. But this definition did not go far enough. Traffic calming also encompassed the lowering of speeds and that the lowering of speeds was an integral part of the definition. To establish a uniform definition of traffic calming the Institute of Transportation Engineers (ITE) developed a definition. Ian Lockwood developed the ITE accepted definition of traffic calming which was published in the July 1997 issue of the ITE Journal on page 22. Lockwood states, "Traffic calming is the combination of mainly

physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users". This definition is narrow enough to define what traffic calming is and what it is not, yet it is broad enough to allow the growth necessary for the dynamic society of transportation.

Types of Traffic Calming Measures

There are two different types of alteration, or controls, available for roadway design. These are active and passive alterations, or controls. The active alterations are measures that place active physical barriers of different degrees within the travel path of motorist. Active controls effect driver behavior and are self-enforcing due to the interaction with drivers. They create visual and physical impressions that the road is not exclusively for motorized traffic and that it must be shared with pedestrians, cyclist, and other users including children at play. Passive alterations include controls that do not place barriers or prevent physical actions. Due to the lack of any physical barriers passive actions depend upon police enforcement and driver heed for conformity.

Active traffic calming measures include design controls such as speed bumps, speed tables, rumble strips, diagonal diverters, cul-de-sacs, semi-diverters, traffic circles, chokers, neck downs, chicanes, interrupted sight lines, and protected parking.

Characteristics of Active Traffic Calming Measures

Speed bumps or speed tables are raised humps within the surface of the road that extend across the traveled pathway. They normally are approximately 5 inches in height. A speed table must be long enough for the front and rear wheels to be on the top of the table at the same time. Speed tables are usually about 12 feet long along the crown and can be comfortably crossed at approximately 20 miles per hour. A speed bump is usually less than 3 feet long along the crown. Speed humps reduce speeds and have also been known to reduce volumes.

See Table 1, Traffic Calming Measures, in the appendix.

Rumble strips are sections of rough pavement within the road. Rumble strips cause vibrations within the crossing vehicle and tend to evoke a heightened level of alertness. The vibrations also tend to cause a reduction of speed, as the level of vibration is proportional to speed. Rumble strips have been noticed to reduce accidents when placed in advance of stop signs. The changes in surface are sometimes objectionable by cyclist but can be avoided by providing a smooth by pass lane. Rumble strips are not recommended in residential areas because the noises produced by rumble strips have been noticed to disturb the adjacent residences within neighborhood areas.

A diagonal diverter is a barrier that is placed diagonally across an intersection. The intersection is then converted into two unconnecting streets making a sharp turn. This application has been known to reduce speeds in the immediate vicinity of the curve but the primary function is to reduce traffic volumes. Diagonal diverters

are ideal for reducing or totally eliminating cut through traffic within residential areas. However, it usually increases the distance of travel routes

Within some established residential areas volumes of traffic become so problematic streets are either converted to cul-de-sacs or dead end streets. This type of complete barrier system has been proven extremely effective in reducing traffic volumes by eliminating through traffic. The disadvantage of this application is usually high cost and the area needed to provide a turn radius. Dead ends and cul-de-sacs are one of the most expensive and least desirable applications for traffic calming due to issues involving emergency vehicle access.

The use of semi-diverters, neck downs, chicanes and protected parking provide for both reductions in speed and volume. When used in conjunction with each other a variety of arrays can be provided. A semi-diverter is a barrier to traffic at the intersection of two streets in which one direction of the street is blocked, but traffic from the opposite direction is allowed to pass. A semi-diverter only blocks half of a street and is easily violated. Semi-diverters are usually incorporated when one direction of flow is being used by cut through traffic. A neck down is similar to a semi-diverter except it is positioned at mid block and allows space for two-way travel for a portion of the block. Protected parking provides a raised island projecting out from the curb. The islands create protected parking bays that tend to reduce the speed of traffic rather than the volume, as do semi-diverters. However, a reduction in volume is not uncommon. Chokers are similar to semi-diverters or neck downs, depending on if they are used at the intersection or mid block. They can also be alternated from side to side on a street creating what is called a chicane. Chicanes

are a form of curb extension, which alternate from one side of the street to the other side of the street.

Traffic circles or roundabouts is a raised island, usually landscaped, and located in the center of an intersection. This application is recommended for use on collector and non-arterial streets. They have been very effective in reducing speeds and traffic accidents without diverting traffic onto residential streets. The accident reduction is believed to be from the fewer number of conflict points. Traffic circles are cheaper to maintain than traffic signals but generally require a more space to install.

Interrupted or obstructed sight lines can be created through the use of any of the previously mentioned measures. Obstructing the sight lines with a mixture of the previously mentioned applications and some landscaping can create the effect of a "residential" or "pedestrian" street. The concept is to equalize the right of way between the motorist, cyclist, pedestrian, and child at play. This can be achieved by eliminating the sidewalks and curbs and the entire surface being paved. Streets are then broken into sections with the use of planters, benches, walls, barriers, and/or mounds. The streets could also be signed to warn motorist that they are entering a pedestrian area.

Passive Traffic Calming Measures

Passive controls include designs that incorporate signage, delineation, and other traffic control devices such as traffic signals. Passive controls do not present an

obstacle to drivers therefore the power that is possessed with this type of control is through respect, police action, and perceived dangers when not heeded. For example speed limit signs are posted but many drivers abide these signs as a result of respect or fear of police action. Other controls such as traffic signals are heeded as a result from both fear of police action and the resulting injuries from collisions that are likely to occur if not respected.

Emergency Vehicles and Traffic Calming Measures

The objectives of traffic calming include the reduction of traffic speeds and volumes. As the objectives stated are desired this also impose strains on emergency response vehicles. The objectives of emergency response vehicles include minimum response times. The decreased speeds imposed by traffic calming devices, particularly speed bumps or speed tables are a concern to emergency officials. To make a complete assessment of the impacts on emergency vehicles other information would be required:

- The types of emergency vehicles being evaluated.
- The desirable route speeds where the calming devices are to be located.
- Possible effects of geography.
- The demand of services within the region.
- The availability of alternate routes.

When any traffic calming program is being considered emergency response times must be included at the beginning of the process. Although emergency response times and their routes are a critical component of a traffic calming concept it is beyond the scope of this report to further analyze them.

TRAFFIC CALMING IN THE LAS VEGAS VALLEY

Research Methods

This research seeks to understand the policies and legislation pertaining to the initiation and implementation of traffic calming devices within the Las Vegas Valley. A case study of traffic calming in the valley was performed. The study included four governments in the Las Vegas Valley: Las Vegas, Henderson, North Las Vegas, and Clark County. The Boulder City government was excluded from the study because of government size and its unique geographic location within the Las Vegas metropolitan area. The purpose of the study was to evaluate the policies toward traffic calming programs and improvements. This study was conducted during February, 2002. The study consisted of personal interviews with the Traffic Engineer or the Traffic Engineer's representative in each of the four agencies*. The representatives from all four agencies interviewed were happy to participate in the

* This study was approved by the University of Nevada Las Vegas Office for the Protection of Research Subjects.

interviews and informed me that all information is available to the public. The personal interview consisted of eleven questions that were asked of each agency. The shortest interview lasted approximately ten minutes and the longest interview lasted approximately 30 minutes. The questions used for the interview are presented in the Appendix. Each question was asked and notes were openly taken during the questioning process.

The Las Vegas Valley is an urban area with an approximate population of 1.4 million people. There are five local governments within the urban area of the Las Vegas Valley: Las Vegas, Henderson, North Las Vegas, Clark County, and Boulder City. All entities within the Las Vegas Valley are of Commissioners or Mayor and Council type governments with a Manager. The Manager's Office is responsible for the day-to-day operations of government. The Managers' staff tracks the progress of various projects, monitors the activities of the departments, and maintains intergovernmental relationships with the Federal, State and other local governments.

Legislation Allowing Policy Establishment

Within the State of Nevada the primary code governing state legislation, entities, and other municipalities of government are The Nevada Revised Statutes (NRS). The Nevada revised Statutes provide legislation that grants local government the authority to establish policy and procedures that govern the everyday activities of citizens. The NRS also provides the power for local entities to establish guidelines

and laws for use of transportation networks that are not a part of the state highway or federal interstate system.

An investigation of the Nevada Revised Statutes (NRS) concerning the legal issues of formulating and implementing policies at the municipal level was conducted. Information pertaining to policy legislation at a municipal level is provided within the NRS. The NRS defines many elements of administration and legislation for local governments within the state of Nevada. The NRS chapters in many cases provide for the limits and freedoms of government power within the state in explicit terms but also allows for implicit interpretation. For example within NRS chapter 267 titled Commission Form of Municipal Government it is stated what constitutes a commission form of government. This chapter of the NRS also provides a copy of the required certificate of charter. The chapter also states in explicit terms the power to determine policy. NRS 267.010 Section 1b reads;

All powers of the city are vested in a governing body, members of which are elected by the qualified electors of the city, which enacts local legislation, adopts budgets, determines policies, and appoints a city manager, who executes the laws and administers the municipal government.

This section explicitly allows for policy determination but implicitly allows interpretation by not defining specific policies or legislation.

In another section of the NRS, Chapter 408: Highways and Roads states;

To declare, in general terms, the powers and duties of the board of directors, leaving specific details to be determined by reasonable regulations and declarations of policy which the board may promulgate.

Once again it is stated that the power to create policy is granted, but limitations of those policies are not defined.

Further research of the NRS show that a "Street Project" is addressed within Chapter 271 titled Local Improvements. NRS Chapter 271.255 states;

"Street Project" means any street, including without limitation grades, regrades, gravel, oiling, surfacing, macadamizing, paving, crosswalks, sidewalks, driveway approaches, curb cuts, curbs, gutters, culverts, drains, sewers, manholes, inlets, outlets, retaining walls, bridges, overpasses, tunnels, underpasses, approaches, artificial lights and lighting equipment, parkways, grade separators, traffic separators and traffic control equipment, and all appurtenances and incidentals (or any combination thereof), including real and other property therefore.

Indeed within NRS Chapter 271, under the general procedures for local improvements, it is stated that projects of this type are allowed at the discretion of the governing body. There are no limitations or laws governing how policies concerning street improvements are to be incorporated or designed.

Information Obtained from Research

First, the research assesses the existence of established policy toward traffic calming measures in local governments. It was determined that Las Vegas and Clark County had formal written policies that had been accepted by the governing body. Las Vegas has a 67 page manual titled "Streets, A User's Manual, Your Guide to the Las Vegas Neighborhood Traffic Management Program" that was adopted in September of 2001. The manual presents the vision, available measures, characteristics of measures, and information on the implementation of the measures. The City of Las Vegas's manual indicates that the city is committed to assisting neighborhoods with the installation of traffic calming measures by virtue of the fact that the manual presents information on available public funds that have

been established for this purpose and that meetings are conducted to gather citizen input. It is apparent within the manual generated by Las Vegas that city administrators support a positive approach to installation of active traffic calming measures.

Clark County has a policy titled "Neighborhood Traffic Management Policy for Local Residential Streets" that was adopted by the Board of County Commissioners in April 1999. The Clark County policy presents the objectives of the neighborhood traffic management program, the policies pertaining to residential streets, typical processes, and required criteria for installation of measures. In contrast to the policies within Las Vegas, the Clark County policy establishes high criteria thresholds such as stipulating that a super majority must be presented by petition to even qualify for consideration and that dedicated public funds are not currently available. It is apparent within the policy adopted by Clark County that a negative approach to installation of active traffic calming measures are supported by the county staff.

Of the other two governments, North Las Vegas had an established procedure of which was followed but was not expressly written, and Henderson claimed to not have a policy or procedure. The verbal explanation of the policy within North Las Vegas seemed to indicate that city staff primarily supports the use of police enforcement and passive traffic calming measures to accomplish goals. The Henderson government claimed to not have a policy or procedure and indicated that a board had been formed for the purpose of evaluating traffic issues but approval for the board had not gone before council so it did not officially exist.

Las Vegas, North Las Vegas, and Clark County reported that a citizen complaint qualified as problem identification to initiate the required studies prior to installing traffic calming measures at any particular sight. Clark County reported that the complaint had to be in the form of a signed petition consisting of at least 66 percent of the property owners within a cordoned area of approximately 200 residences to be identified as a problem. Las Vegas and North Las Vegas stated that a single citizen's complaint, in writing or by a phone call, was sufficient criteria to identify a problem and initiate a study or evaluation action. Las Vegas and North Las Vegas also reported that a city official or staff member based upon their professional judgement could identify a problem. Henderson reported that the only study to this date has consisted of a feasibility study in a specific test area that was designated by elected officials, therefore it was assumed that the only identifiable problem in Henderson to this date was based upon an elected official's opinion.

After the criteria that defined a perceived problem was met the decision to install or not to install a device must be made. Las Vegas and Clark County said that the average speeds or volumes based upon the average daily traffic were evaluated. Both stated that the average speeds had to exceed 35 miles per hour and the average daily volume had to be at least 1000 vehicles per day within a residential area. Both Las Vegas and Clark County reported that some engineering judgment had to be exercised to "weigh" the need for any measure if the factors within the studies showed that data represented close figures, or when one threshold was met but the other was unusually off balance. Clark County also reported that other factors had to be met, such as the route could not be a designated emergency

response or CAT bus route. North Las Vegas stated that citizen input, such as submitted ideas, and legal measures, such as more police enforcement, were evaluated prior to making a decision. Henderson stated that since a policy does not exist a determining threshold does not exist. However, Henderson did state that a point system was being reviewed and actions would be based upon the assigned points, point assignments would be based upon speeds, volume, and geometric design. Of the four agencies interviewed one did state that on many occasions the decision was dictated to the traffic department by the Director or by higher levels of authority.

Budgeting is extremely important to all officials and administrators in government operations. When asked about the role cost of installation played in the selection of various available traffic calming measures Las Vegas, Henderson, and North Las Vegas stressed that it was important to ensure that the measure would be effective in solving the problem or any associated cost would be a waste of resources. Clark County simply stated that the device or methods installed were based entirely on resource availability. Although a formal cost to benefit ratio analysis was not performed all agencies stated that a sound engineering assessment of the benefits in relation to the expended cost were evaluated to ensure that performance of the measure would deliver the desired results.

Clark County stated that funding for installation of measures is also by resource availability. Henderson said that installation funding had to be at neighborhood expense. Las Vegas reported that a special program called the neighborhood traffic management program is funded with approximately \$250,000 per year for

installation of measures to achieve calming and safety on residential streets. North Las Vegas reported that installation funds come from various sources such as grant money from regional and state sources or general funds from the budget. After installation of measures all four governments stated that the maintenance of installed measures is funded by the yearly budget allotted for the maintenance of all street operations.

As noted earlier, under implementation the complexity or ease of alternatives play an important role in the decision process. A question was asked how the ease of installation determined the choice of one measure over another. Las Vegas and North Las Vegas stated that ease of installation did not have a bearing on the choice of available options, but it did have a great influence on the amount of time that was required to install any measure. Henderson stated that ease of installation would only influence the choice if the existing physical conditions presented an obstacle that hampered operations such as the use of a speed hump on a residential road in a mountainous area, a speed hump would not be practical in area that had grades in excess of 5 percent. Clark County stated that ease of installation had no bearing on the decision.

Citizen satisfaction and acceptance of traffic calming measures is an important element of a successful policy. Any installation that is unwanted by the area residents would not be practical or beneficial. Unwanted actions could create a new problem and at best be a waste of resources. Henderson reported that at least two thirds of area residents had to be in agreement for the installation of any measure. Las Vegas stated that prior to any installation a traffic review board is convened to

ensure that all residents in the area are satisfied with the decision or are presented with the opportunity to voice their concerns. North Las Vegas said that citizens are generally satisfied with staff recommended solutions provided action is performed in a timely manner and they are informed of the actions prior to initiation of installations. Clark County simply stated that 100 percent of the property owners in the area had to be in agreement prior to any installation. This condition even stipulated that it was based upon each household and that property owners that did not actually live in the neighborhood were excluded.

I wanted to know how the evaluations of actions were performed within the agencies. The last question asked was, "When installed, do you go back and evaluate the impact of the technique?" This question was to determine if the success or failure of a specific measure is analyzed. Clark County reported that they would evaluate the impact of traffic calming measures but that the regimen was unknown because no devices have ever been installed. Henderson and North Las Vegas reported that pre-evaluation and post evaluation tests are performed but any long-term analysis would be performed only if complaints or problems were reported as previously mentioned. Las Vegas reported that a pre-installation evaluation is performed then approximately two months after installation a follow up evaluation is performed, a long term impact is evaluated after approximately one year to determine success under static conditions.

Discussion

The offices within an agency often have much discretion in carrying out the policies under their jurisdiction. When policy is viewed as a "course of action" its substance is affected by how it is administered. Therefore, in many cases, how it is administered reflect the ideals of the personnel responsible for the offices. Traffic calming policies in the Las Vegas Valley are in large part a reflection of the administrator responsible for these programs. Each of the policies that exist, or don't exist, within the Las Vegas Valley directly represents the appointed individual in charge of this section, or office, within each entity. Traffic calming and transportation related types of policy are greatly influenced by the appointed Traffic Engineer and their representatives. For example, the City of Las Vegas has a written policy and active measures installed, specifically speed humps. This is a result of the City of Las Vegas having a Traffic Engineer that supports the installation of active measures. Clark County has a written policy, but no measures currently exist. The Traffic Engineer in charge of traffic operations within Clark County does not support the installation of active traffic calming measures, specifically speed humps. North Las Vegas stated that a policy existed, not a written policy per se, that supports passive traffic calming measures but does not aggressively support the use of active measures. These policy decisions are tailored by the appointed administrators' opinions. This tailoring comes about by the fact that enforcement responsibility of these policies originate at the Traffic Engineer's level within the organization.

It is the Traffic Engineer's decision how to interpret policy during the administration of policy. The manner in which the Traffic Engineer interprets policy could be the result of personal experiences such as the state or country in which that person was raised, professional experiences such as years of education or previous employment, commitment to the community, organizational context, or response to political pressure such as directives by higher authority. The variations of policy within each of the four agencies studied differ because of such reasons. Thus, my findings support the notion that policy is greatly determined by the administrator in charge of enforcement.

The information obtained from the interviews indicates that initiation of any action is the result of an identified problem. Each organization has different threshold criteria to identify a problem. A problem must be identified before a government will take action.

The information indicated that the formulation stage of the public policy process currently exist in Henderson. A board has been formed for the purpose of evaluating traffic issues but the board has not been approved at this time. The formulation stage of the process is further supported by the information that a system is being reviewed that would establish criteria thresholds based upon assigned points from varying factors such as speed, volume, and geometric design of the transportation system.

The adoption phase of the public policy process could be justified by reiterating the information that was previously presented to justify that Henderson was currently formulating its policy. Henderson stated that a board had been formed and a criteria

threshold based on a point system is being reviewed. This could very easily indicate that a policy is entering or has entered the adoption phase. This obscurity supports the previous statement that the formulation or adoption phases can not always be identified.

The implementation of each policy within the Las Vegas Valley reflects the ideals of each administration in charge of implementation. These ideals are shown in the types of measures acceptable to the Traffic Engineer and the thresholds that are established during the formulation. Take for instance that Clark County has a written policy but no known measures installed within their jurisdiction. It is within their prerogative to interpret data and thresholds as they see fit. It just so happens that the criteria set forth for implementation of a measure has to date not been met. This could be viewed as a restriction deployed during the act of implementation.

As presented within the interview data, the evaluation process consists of impact being measured by follow up studies to ensure that the desired effects are achieved. Although only Las Vegas provided for reevaluation after a long period of time all agencies stated that sites are monitored for subsequent complaints. It would be important to note that within government the lack of subsequent complaints by citizens would indicate a successful program.

In sum, varying stages of the policy process exist in all four of the participating agencies. While it is difficult to identify the stages of policy within the Las Vegas Valley, the information obtained indicates that key characteristics of the policy process identified in published literature can be seen.

CONCLUSIONS

First, research on the policies concerning traffic calming is that the policy process is very dynamic in nature as apparent in the ongoing policy process in both Henderson and North Las Vegas. The processes consist of many undefined areas that allow for the feedback from ongoing activities to be evaluated and reinserted back into the process to adjust for an ever-changing environment through the ability to interpret criteria on a case by case basis based upon "sound engineering judgement".

Second, in addition to being an ever evolving process it is also a very complex process. Throughout the entire process it is often difficult to distinguish a single stage within the process from any others. Identification of the formulation or adoption stage of the policy process could not be confidently determined in Henderson. As with Henderson the formulation or adoption stages may be executed separately or simultaneously throughout the process.

Third, traffic calming is not the result of any one individual and that the participants involved in the process may not be identifiable. This includes the individuals involved in any each stage of the process or the individuals during the process as a whole. None of the four governments specifically stated whom made decisions or how many people were involved in the policy process. Although responsibility of an office can be isolated to the department head, the origin of many decisions by both administrators and politicians can not be traced.

Fourth, problem identification, formulation, adoption, implementation, and evaluation stages of the process are unique to each political setting. Different local governments implement traffic calming policy differently. Their decisions reflect the environment of that government. The entire process reflects the desires and goals of the players involved in the process. Also each stage of the process itself is unique to the individuals involved in that particular stage of the process. The actual writing of the policy may be performed by a consultant or by city staff. Much of the content will reflect the thoughts and ideals of those individuals. The official adoption of the policy is usually by the elected officials and will be altered to fit their ideals prior to final acceptance. The implementation may then be at a departmental level. Their interpretation of the policy will then be noticed in the enforcement. Therefore each individual within each stage of the process will be a part of the policy and the policy itself will be the composite of each element.

Fifth, the policy process within an organization can provide information about the organization itself. If the policies within an organization are very aggressive in nature then the organization could be viewed as aggressive in solving identified problems. Conversely an organization that has very vague policies would probably be hesitant to act or respond to identified problems, these types of organizations would probably also be the type to use a nondecision action.

Sixth, each of the four governments interviewed in the Las Vegas Valley administers their traffic calming policies differently. This could be the result of the ideals interred within the Traffic Engineer or the administrator in charge of implementation of the policy.

Limitations and Recommendations

One limitation of this research is the number of local governments. A study using more governments throughout the United States could indicate that the Las Vegas Valley is an anomaly. Conversely, another limitation is that no single one was studied in-depth. Discussions with more of the actors in local government including elected officials and administrators could provide for greater understanding of the role of the local environment.

Each agency in the Las Vegas Valley was in various stages of the policy process and each stage can easily morph into another stage as decisions specific to a case arises. The policy process in the Las Vegas Valley is ever-changing as the interpretations of vague elements within the policies are altered to suit the administrators making the decisions. Therefore it is my recommendation that a written policy be adopted by government that clarifies when, where, and how traffic calming measures should be implemented. It is also recommended that the policy provide literature that educates and informs the public on the use of available traffic calming devices.

INTERVIEW QUESTIONS

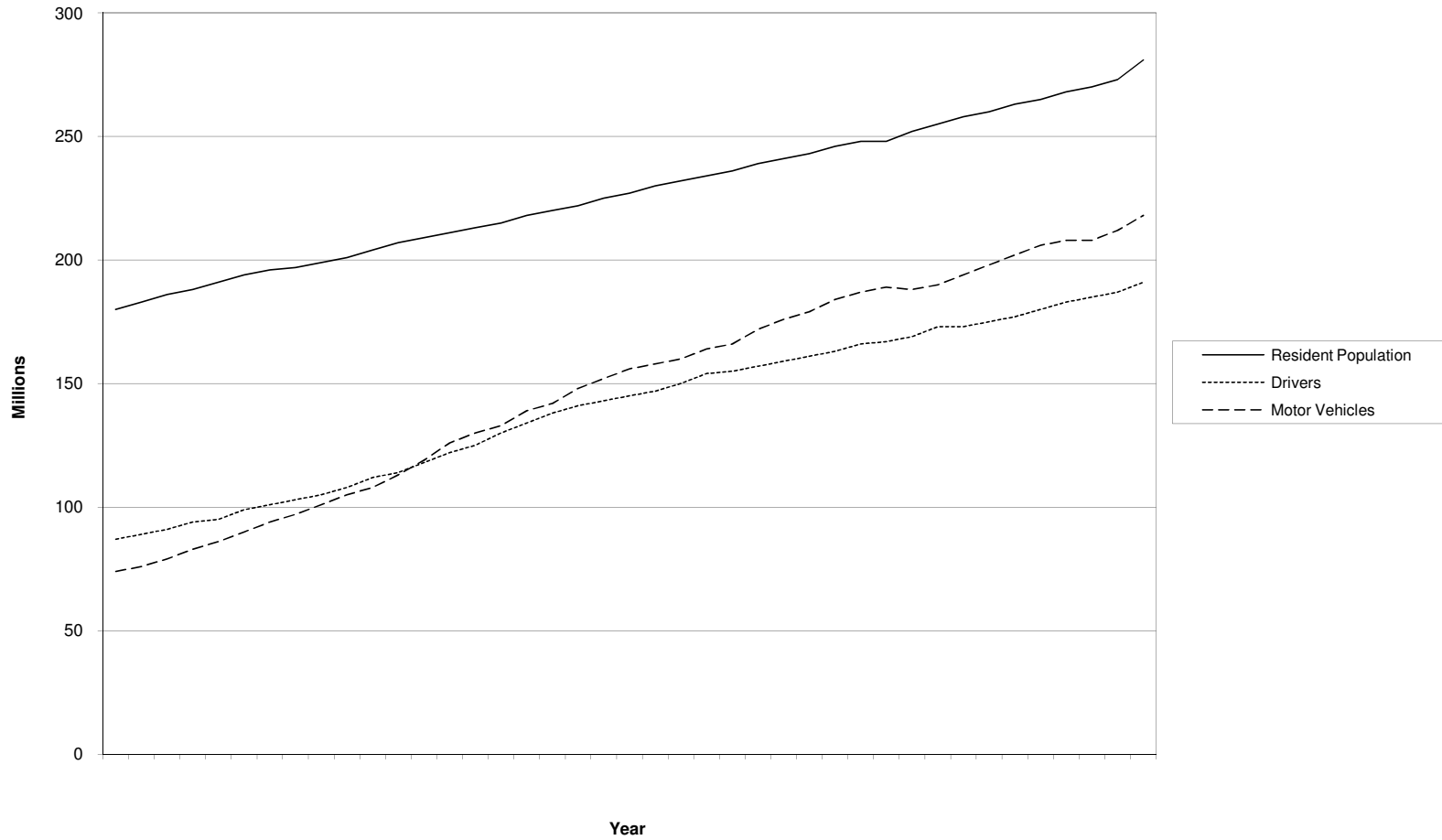
Interview questions for the purpose of gathering information on traffic calming measures within the Las Vegas Valley.

1. Do you have a formal policy or decision guide concerning the installation and maintenance of traffic calming measures?
If yes. Please describe:
2. What initiates a study/evaluation for the need to install traffic calming measures?
3. What criteria from the information in the study determines if implementation of traffic calming measures are justified? What criterion substantiates the installation of a traffic calming measure?
4. What is the criteria threshold that determines to install, or not install, a traffic calming measure?
5. What role does cost of installation play in selection of measures?
6. What role does ease of installation play in selection of measures?
7. What role does citizen/customer satisfaction and acceptance play in selection of measures?
8. How is installation of a traffic calming measure funded?
9. How is maintenance of a traffic calming measure funded?
10. Who installs/maintains traffic calming measures?
11. When installed, do you go back and evaluate the impact of the technique?
How do you evaluate the success or failure of a specific measure?

TABLE 1 – TRAFFIC CALMING MEASURES

Type	Measure	Advantages	Disadvantages
Active controls	Speed bumps or speed tables	Reduces speed and volumes	Reduces speeds of emergency vehicles
	Rumble strips	Self enforcing	Creates noise
	Diagonal diverter	Reduces volumes	Increases traveling distance
	Cul-de-sacs or dead ends	Reduces volumes	Expensive and prevents emergency access
	Semi-diverters	Reduces volumes	Increases length of emergency access routes
	Traffic circles or roundabouts	Reduces speed and accidents	Large area needed for installation
	Chokers, neck downs, and Chicanes	Reduces speed and volumes	Costly to install. Not suitable for some applications
	Interrupted sight lines	Reduces speed	Cost commensurate with design
	Protected parking	Reduces speed	Costly to install
Passive	Signage	Low cost	Can be ignored
	Delineation	Low cost	Can be ignored
	Traffic signals	Extremely effective in controlling traffic	Costly to install, maintain and operate

CHART 1 – LICENSED DRIVERS VEHICLES AND POPULATION OF THE UNITED STATES



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