VEHICLE TRAFFIC FLOW AND CONTROL IN THE HUNING CASTLE NEIGHBORHOOD AND SURROUNDING AREAS

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Executive Summary:

Since 1975 much work has been done to control vehicular traffic in the Huning Castle neighborhood. Detailed measurements and studies of the traffic flow brought about the existing control program. The program achieved significant positive results, but some traffic problems were left unsolved. With the City’s recent interest in improving the Tingley Beach area, including the traffic flow, there are opportunities to correct these long-standing problems.

The traffic problems in the area started in the mid 1960s as the West Side began to grow. With the neighborhood generally open to traffic flow, commuters began finding attractive routes through the area. By 1975 flow-through traffic had reached intolerable levels with over 3500 vehicles flowing through the neighborhood each workday. Speed along the long, straight streets was also a problem with over 50% of the traffic travelling 10 mph or more over the limit.

A Huning Castle team initiated a study of the traffic situation in 1975 with the objective of finding solutions. In 1978 the city joined the neighborhood in the effort. This traffic control team identified three principal morning/evening commuter routes through the neighborhood:

1) From Central & Rio Grande to Coal/Lead & downtown via:
   San Pasquale, Park and San Carlos/San Patricio. (Route 1)
2) From Central & Rio Grande to Alcalde & Tingley southbound via:
   San Pasquale, Laguna and Kit Carson. (Route 2)
3) From Central & Rio Grande to Silver & downtown via:
   San Pasquale, Park, and Silver. (Route 3)

The team also identified heavy volume and speed on 14th Street as a major problem. However, the city decided not to include 14th Street into the control program saying that it was needed to carry traffic between Central and Lead/Coal.

The team’s fundamental approach to controlling traffic was to add resistance to the neighborhood commuter routes while improving bypass routes that would carry the commuters around the neighborhood. The resistance had to be sufficient to discourage commuter traffic but not so oppressive as to disrupt neighborhood traffic. Diversers were chosen as the principal device for traffic volume control. Speed controls included stop signs and speed limit reductions.

Three diverters along Alcalde were chosen to redirect traffic from Route 1 around the neighborhood via Alcalde and Tingley. A fourth diverter at Park and Silver discouraged Route 3 traffic out of the area and onto Central Avenue. A solution for Route 2 was designed, but never implemented because it required traffic control devices at the corner of Tingley and Alcalde, which was outside the area. The city wanted to constrain the control program to the Huning Castle neighborhood only. A compromise solution for Kit Carson included “No Through-Traffic” signs at each end of the street. Stop signs were
added throughout the area to control speed. Speed limits were reduced on Park and San Pasquale.

The traffic control program was implemented in 1980 and resulted in an overall reduction of 60% of the traffic volume in the area. Traffic speed was also reduced throughout the area resulting in the large majority of vehicles travelling at or below the speed limit.

Recently, the city has proposed a number of changes in the traffic flow around Tingley, some of which offer opportunities to improve traffic flow through the area while others could create new traffic problems.

One of the proposals includes a new entrance to the zoo via Tingley, which could reduce traffic on 10th Street between Coal and Central. Three proposals have been made to modify the intersection at Alcalde and Tingley.

Fourteenth Street, which is seriously overburdened by fast moving, high volume traffic, has been a long-standing problem. Commuters using the street as a conduit between Central and Lead/Coal plague the street’s residents. Adding resistance along 14th and providing a bypass route could improve the situation. Resistance could be added with a traffic circle at Park and 14th, and/or a diverter at 14th & Lead, and/or stop signs and traffic humps along the street. Tenth Street to Central, with traffic reduced due to the Tingley entrance, would then have the capacity to handle some of the commuter flow that is currently overburdening 14th Street. If the traffic signals along Central could be speed limit synchronized, this 10th Street-to-Central route has potential to off load 14th of some of its traffic volume.

The three options proposed by the city for Alcalde and Tingley could negatively impact the neighborhood because all of them would alter the bypass route specifically created to carry commuters around the neighborhood. However, modifying the intersection for positive results is possible: Restricting northbound Tingley traffic from turning right to Alcalde coupled with a diverter that forces westbound Alcalde traffic to turn northbound onto Tingley would help discourage the last remaining commuter routes out of the Huning Castle area.

The situation at Alcalde and Tingley, with respect to the Huning Castle neighborhood has been well studied. Predictions about the impact of various changes to that intersection can be made with a reasonable degree of certainty. However, the same cannot be said for 14th Street at this time. Traffic patterns in this area need to be carefully studied to assess whether the proposed changes would have the intended positive effects without creating collateral problems, such as irritating neighbors trying to enter or exit the area or overburdening a neighboring street. Volume, speed, and flow-through studies should be conducted on all of the streets currently involved with the corrections on 14th Street.

The existing traffic plan in HC was carefully conceived and implemented. It has worked well for nearly 20 years. The same approach should be used in addressing the remaining problems in and around the Huning Castle neighborhood, especially on 14th Street.
Introduction:

Since 1975, much work has been done in the Huning Castle (HC) neighborhood to control traffic volume and speed. As a result, the area now enjoys the benefits of one of the most comprehensive neighborhood traffic control programs in the city.

The control program was based on detailed studies including a quantitative analysis of the traffic flows within the HC neighborhood and surrounding areas. The main purpose of this report is to document the activities involved in those efforts so that these experiences can serve as a baseline for any new work that is contemplated. Also, it might provide a model for approaching future traffic control problems.

I have organized the report for a logical presentation of the information. First, I will provide some historical context for the existing traffic control program in the neighborhood. I will describe the situation before the traffic control program was instituted.

Second, I will present the theoretical approach to the control program along with the control methods that were available to us at the time. A summary of the political process used to gain approval for the control program will be presented, including some of the difficulties in obtaining an agreement within the neighborhood and surrounding areas.

Next, I will explain the final traffic control program as it exists today. I will discuss the purpose of each of the control devices in the context of the approach. The control devices that were subsequently installed will also be discussed. Additionally, I will describe the traffic controls that were proposed as part of the original plan but which were never approved. Specifically, I will discuss the situation on 14th Street in some detail because we had hoped to make it part of our original traffic control program, but the idea was rejected by the city.

I will then discuss my observation of today’s situation and present my thoughts about the potential traffic impacts that might occur if traffic patterns are altered due to improvements and/or developments at Tingley and the Zoo.

The volume and speed of traffic along 14th street will also be discussed in detail. Since I am lacking recent quantitative information about the cause of today’s problems on 14th, most of this discussion will be based on knowledge gained from studies in the early 1980s. I believe the fundamental situation has not significantly changed and that much of the historical information will still be applicable.

Finally, I will present some ideas for reducing traffic volume on 14th street, Kit Carson and San Pasquale without significantly impacting traffic volume on the other streets. Both the benefits and the potential drawbacks of the proposals will be presented.
Background on Street Design and Operation in the Huning Castle Area

Before I begin discussing the historical traffic patterns in the area, I would like to describe the general street design and layout. What I will present is a description of how the streets are designed to operate. I will use terms that are different from the official city designations. The reason for the difference is that when we, the city/neighborhood traffic control team, began to study the details of the traffic flow in the area, we realized the single street designation, such as “residential” is inadequate to properly explain the flow patterns. Therefore, we developed some terms to describe the actual situation. I will provide a description of each term so that there is a common understanding.

In the mid 1970s, when we began this study, all of the streets in the HC area and most of the adjoining streets were designated “residential.” By definition, a residential street should carry the traffic for the residents located on that street. In reality, some streets act to accumulate traffic from the smaller streets and then move the traffic in/out of the area.

The street type definitions we created for our study of the Huning Castle and surrounding neighborhoods include: neighborhood accumulator, and pseudo neighborhood accumulator. We also referred to streets by their traditional definitions in 1979 including residential, arterial, and collector.

Outlined below are the definitions we applied to each of these different types of streets in 1978.

*Residential* streets, as described earlier, are designed to carry traffic only from the residents who reside on the street as well as guests of those residents. Typically a residential street will carry less than 300 cars per day. These streets are usually narrow and have homes on both sides. Parking is usually not restricted.

*Neighborhood accumulator* streets carry the traffic of street’s residents as well as traffic from residents on adjoining streets that are entering or exiting the area. A neighborhood accumulator is often wider than a residential street to minimize the impact of the additional traffic flow on the adjacent homes. When more narrow streets are used as accumulators, low-density residential use properties are restricted on one side. Typically these streets have restricted parking on one side (usually the non-residential side) to allow freer flow of traffic. Traffic volume on these streets range from 700 to 2500 cars per day, depending on the design.

*A pseudo neighborhood accumulator* is a term we used to describe those streets that were designed as residential streets but which were operating as neighborhood accumulators. These streets typically were narrow, had adjacent low-density residences on both sides, and carried as much traffic as a designed neighborhood accumulator.

*A collector* is a street that collects traffic from neighborhood accumulators and moves it to another region or major street, such as an arterial. These streets typically are wider than residential streets, often have restricted parking on one side, and sometimes carry one-way flows. Usually, these streets have higher density residential, commercial or
industrial properties adjacent to it. A collector may carry many thousands of cars per
day.

An *arterial* is a major traffic carrier, usually a major highway that flows through a city. It is usually very wide, typically 4-lanes or more. Stoplights are abundant for most of its route through the city. Most of the adjacent properties are commercial with some occasional high density residential. These streets carry tens or hundreds of thousands of cars per day.

Figure 1 shows how the traffic control team’s described street operations in the Huning Castle Neighborhood in the late 1970s. These historic street designations may or may not coincide with today’s official street designations.

![Figure 1](image-url)

Figure 1. Street types in the Huning Castle and Surrounding Areas - Late 1970s

The heavy green line (#1) shows the *arterial* Central Avenue that is located on the northern boundary of the area. The medium weight red lines with cross hatches (#2) show the residential streets designed to operate as *neighborhood accumulators*. These wide streets include Park Ave, San Pasquale, and Laguna. The medium weight blue lines with dots (#3) show more narrow residential streets designed to operate as *neighborhood accumulators*. These include Chacoma west of San Pasquale, Kit Carson, and 14th Street. All of these residential streets, with the exception of 14th, have restricted low-density residences on one side. All have restricted parking on one side. The medium weight
brown solid lines (#4) are *collectors*. These include Lead and Coal. One might think that Alcalde should be included as a collector. But in those days, it was not intended as such. The lightweight, dashed magenta lines (#5) show the residential streets that have assumed the role of a *pseudo accumulator*. These include Raynolds, 14th Street from Central to Iron, as well as Gold Ave. It is interesting to note that Gold, an obvious designed residential street, was converted to one way many years ago to enhance its role as an accumulator for the Raynolds neighborhood.
Historical Traffic Patterns and Associated Problems in the Neighborhood

During the 1950s through the mid 1960s traffic was relatively light through the neighborhood. In those days, the West Side was sparsely developed and Central Avenue provided most of the traffic flow for commuters travelling east/west every day. Even though the neighborhood was generally open to flow-through traffic on all of its perimeters, traffic in the area was generally confined to the neighborhood (i.e., residents coming/go ing from/to their homes).

By the mid 1960s, traffic flow-through the neighborhood began to increase. This increase was first noticeable in terms of speed. Because of the relative lack of stop signs, especially on San Carlos and San Patricio, speeding was the first traffic problem in the area to be addressed. A group of citizens, led by Charles Menicucci, organized an effort to have stop signs installed on San Carlos and San Patricio, both at Raynolds. This helped to mitigate the problem and traffic was generally not seen as a problem for the next five years.

In the early 1970s, growth on the West Side of Albuquerque was exploding. The additional commuters placed burdens on the Central arterial and people began to seek more pleasing alternate routes for commuting from the West Side to the downtown and near heights areas. A number of commuter routes developed through the Huning Castle neighborhood. Traffic volume, especially during rush hours was becoming a burden for neighborhood residents. During rush hour, backing out of a driveway on one of the neighborhood streets used by commuters would often include a 30-60 second wait for traffic to clear.

Traffic speed was also dangerously high. On San Patricio, for example, over 50% of the cars flowing during rush hour were travelling 10 miles or more over the speed limit, and 25% were more than 20 miles or more over the limit. The combination of heavy volumes of traffic and high speeds created a serious threat to the fundamental character and integrity of the neighborhood.

In addition, recreational drag racing began to appear along the long, straight streets that were unimpeded with stop signs. Drag racing, especially late at night, was becoming popular on Park, between 14th and Laguna, as well as on San Carlos and San Patricio, between Raynolds and Park. With impunity, dragsters would line up two abreast at the end of the street and race to the other end, sometimes reaching speeds of 80 mph.

By 1975, the situation had become so intolerable that residents demanded action. I led a vocal group demanding relief. The newly formed Huning Castle Neighborhood Association called several public meetings to discuss the problem. A city Traffic Engineer representative attended these meetings, but initially was unsympathetic because he felt it was the city’s job to enhance traffic flow rather than impede it. The city initially resisted the neighborhood’s requests for assistance, and at one point even refused to measure traffic volume on the streets.
As a consequence, I organized a team of residents to conduct our own studies of the situation. I built an electronic traffic volume counter, similar to the city’s machines. We placed the counter on most of the streets in the area, collecting volume for weekdays and weekends. We organized teams of people to record speeds using walkie-talkies and stopwatches, and we recorded speed on all major streets for four periods throughout the day. We also organized flow-through studies, in which we stationed people at every point of entry to the neighborhood and recorded the licenses of all vehicles entering or exiting the area. From these data, we identified the commuter routes in the area.

After analyzing the data, we concluded that commuter flow-through traffic was the most serious problem we faced. And ridding ourselves of these paths became our main objective. We also realized that the long, straight streets invited speeding in the area that imperiled residential safety. Reducing overall speed was a secondary objective.

Figure 2 shows the commuter routes we identified. The most prominent route is shown by the solid red lines, labeled “Route 1.” This path, which was used by commuter’s daily and carried about 1500 cars per day (1500 on San Carlos and 1400 on San Patricio). The morning rush hour portion of the path was from Central & Rio Grande, to Chacoma, to San Pasquale, to Park, to San Patricio to Coal. The commuters on this route were typically West Side residents and downtown business people or employees. In the afternoon, the path was reversed. Those same commuters used Lead to San Carlos to find their morning path back out to Central. About 75% of the total volume on the streets
was from commuter traffic. Weekend counts dropped to about 700 cars per day, still unacceptably high.

Route 1 was a favored path for commuters because of the ease of traversing the neighborhood and the difficulty of other paths to/from their destination. Lead, for example, fed directly onto San Carlos with only two stops until Central Ave. The alternate route was Alcalde to Tingley to Central. However, Alcalde traffic was stopped at San Patricio (San Patricio traffic fed directly through to Coal with no stop) and again at Tingley. The intersection at Central and Tingley was very poorly designed, making a turn west during rush hour nearly impossible. In the morning, commuters only had two stops through the neighborhood between Central & Rio Grande and 8th Street &Coal.

A second commuter path (dotted magenta line labeled “Route 2”) was also predominantly used during rush hours, and consisted of people who lived in the northern sector of the city and worked on the south side. The morning path began at Central & Rio Grande and continued to Chacoma, to San Pasquale, to Laguna, to Kit Carson, to Alcalde west, to Tingley southbound. In the afternoon the path was exactly reversed. About 900 cars per day traveled on these streets, with about 50% of it being commuter traffic using Route 2. Weekend volume was about 650 cars per day.

The third major route is shown by the crosshatched, brown line labeled “Route 3.” This was also a commuter route for West Side and Old Town residents who worked downtown. This path starts at Central and Rio Grande, follows the same path as the other routes to Park, and then diverts along Silver, which leads directly downtown. The identical path was used morning and evening.

Speeding was a problem on some of the Raynolds Area streets. The most serious problems were on Silver and also along Gold. Gold was a particular problem because it allowed one-way flow, was straight, and had no stops from Raynolds to 8th Street.

Silver, east of 14th had a similar speeding problem. They also had a volume problem directly related to commuter Route 3, which flowed through the HC area and into the Raynolds neighborhood. Of course, displacing Route 3 would benefit both Raynolds and HC.

We also found that traffic volumes and speed on 14th Street were very high and we hoped that control of the traffic on 14th be included in our study. We conducted some studies of the flow-through traffic on 14th as part of our efforts in the HC area. We discovered that at least one commuter route existed along 14th. This route originated from as far as 2nd Street on Lead and flowed west to 14th Street to Central. A significant portion of the path continued on to Lomas. Another path originated in the downtown neighborhoods north of Central and Lomas and flowed south on 14th to Coal. However, commuter routes along 14th did not appear to comprise the overwhelming majority of the traffic volume, as was the case in the HC neighborhood. We estimated that about 50% of the 14th Street traffic flow was from commuters. However, we did discover that the volumes of traffic along 14th were high. I do not recall the exact counts for the streets and I don’t have any written records. However, I do remember that the counts were in the thousands, in the
range of 3000-4000 vehicles per day. This implied that if the commuter flows could be stemmed, significant volume reduction could be realized.

However, we also discovered from the flow-through studies in the HC neighborhood, that a significant portion of the traffic on 14th was from neighbors living in either Raynolds or HC neighborhoods. They used 14th as a major inlet/outlet to Central and especially to Lomas. Within the HC area, there are two other paths to Lomas—one is via Laguna and the other is via San Pasquale. If an HC resident wants to exit the area for a destination on Lomas downtown, 14th Street is the easiest path among the three. However, both San Pasquale and Laguna had sufficient flow volumes for neighborhood accumulator streets and we did not want to raise the ire of those residents, especially along Laguna, by putting more traffic on those streets.

The situation from the Raynolds neighborhood, however, is different. Fourteenth Street is virtually the only outlet to Lomas. The only other path to Lomas near downtown from the center of Raynolds is via 10th Street. But this involves meandering through a number of residential streets in the Downtown neighborhood with several turns and numerous stops. Today, the path cannot be reversed because a southbound vehicle on Luna is prohibited from making a left turn back onto 10th Street.

We concluded, therefore, that any plan for 14th Street would have to remove the commuter path without obstructing its access for Raynolds and HC residents.

As we collected data we presented them to the city engineers, the administration, and our city Councilor, Pat Baca. Pat was supportive and was instrumental in obtaining the city’s attention to the problem. By 1978, the city assigned a traffic engineer to our team with the directive to develop a solution. We, in turn, hired our own traffic-engineering consultant to advise and assist us as we dealt with the city. Essentially, we used this consultant to corroborate the veracity of the city’s suggestions. At that time trust was not at the foundation of our relationship. After our relationship was more firmly established and mutual respect and trust were garnered, we dismissed the consultant.

The city corroborated our finding with some data collection of their own. Their speed and volume counts were very similar to ours. By 1979, we were actively engaged in a team effort to find a solution. Our objectives were very specific:

1) To reduce traffic volume on all of the streets in the neighborhood to the designed volume.
2) To reduce the average speed of traffic through the area so that at least 75% of all traffic was within the speed limit.
3) To accomplish the first two objectives without increasing the volume on any other street in the area by more than 15% above their historic levels.

The city was very keen regarding objective #3. They clearly indicated that they would not tolerate “trading the problem on one street for another on an adjacent street.” We wholeheartedly agreed.
We proposed to develop a traffic program for both the HC and Raynolds neighborhoods simultaneously. We believed that the traffic flow patterns in the two neighborhoods work together and that a most effective control would involve both areas. We especially were concerned about 14th Street, with both speed and volume problems.

The city agreed to consider speed controls for the Raynolds neighborhood. However, they rejected the idea of including 14th Street in the program. At that time they believed that 14th was serving a useful purpose to move traffic between two corridors. Also, there was little political pressure for traffic control from 14th Street residents—certainly little relative to the severe pressures the HC neighborhood was creating. At one point, one of the traffic engineers suggested that the top volume of 14th Street was “10,000 vehicles per day.” And that the street was “nowhere near the limit.” We agreed, therefore, to develop plans to deal with the speed and volume on 14th, but to wait until we were done with the interior HC neighborhood to attempt to implement it.
Theoretical Approach to Traffic Control in the Huning Castle Neighborhood

The traffic team considered ways to achieve the objectives. With the help of consultants and after referring to published reports on traffic control (mostly from Europe), we theorized that traffic flow was similar to the flow of water and electricity. That is, each seeks the path of least resistance.

With this model, we set forth our fundamental approach: **We would add significant resistance to the commuter paths through the neighborhood while reducing resistance on the alternate paths around the neighborhood. In short, we would simply move the commuters to a different path—one outside the area.**

As the neighborhood/city team, we considered three types of control devices for reducing traffic volume. These included:

- **Traffic diverters** located at intersections, in which traffic on half of a street would be stopped and/or traffic on the other half would be forced to turn a specific direction.
- **Barricades**, in which traffic at an intersection would be prevented from entering another street. This would create a cul-de-sac.
- **Signs** prohibiting through traffic.

The city was opposed to barricades because the narrow streets and adjacent private properties would make the creation of cul-de-sacs, required in front of a street-ending barricade, too expensive. They also opposed signage because of problems with enforcement, but agreed to use them as a last resort. We finally settled on diverters as our primary tool for creating resistance in the neighborhood routes, which would reduce volume.

We proposed three controls for speed reduction including:

- **Stop signs,**
- **Speed limit reduction**
- **Speed bumps.**

The city rejected speed bumps due to fear of liability, mainly from motorcyclists who might lose control of their vehicle when they hit the bump. They were also reluctant to reduce speed limits, suggesting that it was unenforceable. Later they agreed to apply some limited speed reductions, especially on the accumulator streets. Stop signs were agreed upon as the primary means to control speed.

The debate about stop signs extended beyond their use in controlling speed, which was a well-established fact. In fact, we discussed at length whether stops could be used to reduce volume. At that time, it was accepted that stops had little effect on volume. However, I presented a European study that showed that multiple stops on a short route could effectively reduce volume, especially if alternate paths were provided to the commuter. However, the approach could not be effectively applied in the HC
neighborhood because we did not have the density of intersections on our commuter routes to place a sufficient number of stop signs in the path. Stop signs can only be installed at intersections.
Development and Implementation of the Traffic Control Program

We began developing a comprehensive control program by addressing each commuter route independently, developing a proposed solution, and then identifying negative consequences. Negative consequences would include the creation of a significant increase of traffic volume on another street in the area, or adversely inconveniencing residents from entering or exiting the area.

Once a solution for each commuter route was developed, then the solutions would be simultaneously placed in a simulated neighborhood traffic system and the combined effect would be assessed. I developed a mathematical model derived from flow engineering techniques for use in predicting the impact of various controls on flow volume. It was a useful tool in performing the assessment. However, since the model was not verified, we decided that it would be a secondary method to assess the control system’s effectiveness. The primary method would be engineering intuition.

After working for about 12 months, we developed a comprehensive control plan involving the techniques outlined above. We were able to essentially eliminate route 1 (San Pasquale, San Carlos, to Coal & reverse), and route 3 (San Pasquale, Park, to Silver & reverse) with strategically placed diverters. However, a solution to route 2 (San Pasquale, Kit Carson, Alcalde, Tingley) remained elusive. We could not identify a way to use diverters on this path without severely impacting residential ingress or egress. We suggested making changes to the flow patterns on Tingley at Alcalde, the only workable solution we identified, but the city was resistant to do so because it was outside the neighborhood traffic control area. The main problem was that Kit Carson was operating as a neighborhood accumulator street and it had to remain free and open to do its intended job. Secondly, it is adjacent to a public park, which requires free access from the public. As a consequence, we were left with the placement of “no through-traffic” signs at each end of the street, which the city reluctantly agreed to install after all other options were exhausted.

The problems involving Kit Carson were so severe that special discussion is warranted. During this process, two of the three commuter paths had relatively easy solutions that we quickly identified. Finding a solution for Route 2 remained a vexing problem. And as time passed without an acceptable solution emerging, residents along this pathway began to place heavy pressure upon the team to either find an acceptable solution or abandon the whole project. We worked on the Kit Carson problem for nearly a year without identifying a way to meet our objective. It was a very tumultuous time in which some of the team members, including me, were threatened with physical violence and death. Harvey Buchalter, who still lives on Kit Carson, eventually quelled the situation through an outstanding diplomatic effort. He made a personal and impassioned plea for his neighbors to accept a compromise solution for route 2 (signage), which would then allow the entire neighborhood to reap the overall benefits from area-wide traffic reduction. In 1980, they accepted.

To control speed, new stop signs were installed in strategic locations in both HC and Raynolds neighborhoods.
Before the city would actually install the system, we were forced to petition the entire neighborhood. The city demanded at least a 3/4 majority of all of the residents to agree to the plan. This may seem extreme, but in those days, the city had never tried to control traffic on the scale we were proposing. In fact, traffic control of the type we were proposing was anathema to traditional traffic engineering approaches. In our petition, we captured about 85% approval of the residents. No petitions were needed from the Raynolds neighborhood because only stop signs were being installed.
A Description of How the Control Program Works.

Figure 3 shows the traffic controls that were installed as part of the comprehensive program within the HC neighborhood. The code is as follows: “D” designates a diverter, “S” is a stop sign, “NT” is a “no through-traffic” sign, “SR” is speed reduction and “SL” designates an improved stop light/intersection.

Diversers were installed along Alcalde at San Carlos, San Patricio, and Escalante. Each diverter prevents traffic from turning north from Alcalde into the neighborhood. Traffic exiting onto Alcalde from San Carlos as well as San Patricio force traffic to turn west on the one-way portion of Alcalde.

The diverter at San Carlos is the principal control for traffic on the afternoon portion of Route 1. The diversers on San Patricio and Escalante protect those streets from picking up traffic that is diverted from San Carlos. We believed, and we later proved, that Kit Carson was too far removed from San Carlos and had too much resistance to absorb a significant amount of the diverted afternoon traffic.

The diverter at San Patricio at Alcalde had a second function because it operated in conjunction with the diverter island installed on Alcalde directly to the south. The San Patricio diverter forces east bound morning traffic to turn west onto Alcalde. The diverter island keeps that traffic from U-turning back south and onto Coal.

This system of diversers effectively eliminated Route 1 from the neighborhood.
Route 3 was eliminated with a diverter at Silver and Park that prevented south bound traffic on Park from turning right onto Silver.

Speed reduction was achieved through the strategic placement of stop signs throughout the HC area. Stop signs were also added in the Raynolds neighborhood on Gold at 10\textsuperscript{th} and Silver at 10\textsuperscript{th}. Four-way stops were installed on Park (at Raynolds and at 16\textsuperscript{th}) and San Pasquale & Chacoma. Speed limits were reduced by 5 mph on San Pasquale and Park. Stops were also installed along Kit Carson (at Franz Huning and at Raynolds) in addition to the “no through-traffic” signs. A four-way stop was installed at San Patricio and Franz Huning.

The result of the control program is presented in Figure 4. Route 1 (solid red line) was effectively shunted onto Tingley and around the area. Route 3 (crosshatched brown line) was essentially eliminated, but we are unsure of what alternative path those commuters are using. Some studies suggested they may be using Central. Unfortunately, Route 2 (via Kit Carson) was not eliminated, but the volume was reduced. The path still exists today.

Traffic flows on the alternate routes were verified with a combination of flow-through studies and volume counts. We found, for example, that traffic flow on Alcalde/Tingley increased by almost an identical amount to amount of reduction along the old Route 1 through HC. The diversion of Route 3’s traffic to Central could not be verified because the volume on Central is so heavy that the addition of 400 vehicles per day could not be
resolved within the normal variation of traffic volume. However, we know that after the traffic control program was installed the commuters were still travelling between their homes and work, and there was no measurable increase on any HC or Raynolds streets that would indicate that a neighborhood street had assumed the route. By deduction, we concluded that it was diverted onto Central, Lomas or another path outside the two neighborhoods. We did not pursue it any further.

Table 1 below shows the traffic volume counts that we recorded on various streets before and after the traffic control program (1979 vs. 1982). All counts are average, 24-hour weekday totals. In total, the project eliminated about 3000 cars per day from the neighborhood, about a 60% reduction. I do not have any historic counts for Silver Ave. However, the reduction in the counts on Park reflects the elimination of Route 2.

Table 1. Traffic Volume in the Huning Castle Area

<table>
<thead>
<tr>
<th>Date</th>
<th>Kit Carson</th>
<th>Escalante</th>
<th>San Patricio</th>
<th>San Carlos</th>
<th>Park</th>
<th>San Pasquale</th>
<th>Laguna</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>915</td>
<td>197</td>
<td>1430</td>
<td>1555</td>
<td>1138</td>
<td>5096</td>
<td>704</td>
</tr>
<tr>
<td>1982</td>
<td>752</td>
<td>206</td>
<td>306</td>
<td>361</td>
<td>722</td>
<td>2093</td>
<td>721</td>
</tr>
</tbody>
</table>

Figure 5 shows a graphical comparison of the traffic volumes before and after the traffic control program.

![Vehicle Volume in Huning Castle Area](image)

In the mid 1990s, a refinement was made to the control program. An attempt was made to reduce traffic along Chacoma between Rio Grande and San Pasquale. Several temporary measures were tried on the intersection at Chacoma and Rio Grande including a barricade and a diverter. Neither was successful, but not because it did not serve its purpose in removing traffic. Rather, it created enough inconvenience for residents and
Country Club members, that a compromise was developed. The final solution was to create a two-lane diversion system that causes traffic in both lanes to make two opposing sharp turns from Rio Grande to Chacoma (or vice versa). This successfully reduced traffic volume a small, but noticeable amount without creating any inconveniences to area residents or Country Club users.
Remaining traffic problems and potential threats to the neighborhood

The existing traffic control program in the Huning Castle neighborhood has operated successfully for nearly 20 years. However, recent proposed improvements in the Tingley and Zoo areas have given rise to concern about potential impacts of new traffic in the area.

Moreover, several problems that existed in 1979 still exist today. One that is particularly noteworthy is the heavy flow and high speed of traffic on 14th Street, which has always exceeded the normal limits for a neighborhood accumulator street. Another problem is a perception that the traffic volume on Kit Carson is increasing.

The city has proposed several modifications to the traffic flow patterns to accommodate the Tingly improvements. Several suggestions include closing Alcalde at Tingley or placing diverter at that intersection that would control traffic from/to Alcalde onto/from Tingley. The potential impact of these changes on the neighborhood will be discussed later.

The proposed changes in the traffic flow has created concern in the neighborhood that the existing traffic flows will be altered due to the improvements and additional traffic could be introduced into the neighborhood. As a result, the HC neighborhood association has developed a committee to investigate the situation, monitor the city’s progress, and advise the city on neighborhood concerns. The creation of this report is one of the actions instituted by the association to help educate all of the parties about the existing control program and its operation.

Additionally, the association has begun to measure fundamental information about the traffic flow in the area to create a baseline of information and to assess whether traffic patterns and volume have changed in the last twenty years. As a result, the association recently asked the city to record traffic volume in the Huning Castle area. The association has also organized a team of people to record data on vehicles flowing through the area to determine what commuter routes currently exist throughout the area. This information will be compared against the historical information to assess whether any differences have evolved over the past twenty years.

The results of the recent volume counts are presented in Table 2, seen below. The data in this table are in the same order as the ones in Table 1 (historical counts) so that a comparison can be easily made. Table 3 presents counts from other streets in the area but which have no comparisons to the 1980 era.

Table 2. Year 2000 Traffic Volumes

<table>
<thead>
<tr>
<th>Time</th>
<th>Kit Carson</th>
<th>Escalante</th>
<th>San Patric</th>
<th>San Carlos</th>
<th>Park</th>
<th>San Pasqu</th>
<th>Laguna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday</td>
<td>865</td>
<td>211</td>
<td>230</td>
<td>236</td>
<td>684</td>
<td>2176</td>
<td>757</td>
</tr>
<tr>
<td>Saturday</td>
<td>780</td>
<td>138</td>
<td>178</td>
<td>163</td>
<td>548</td>
<td>1863</td>
<td>672</td>
</tr>
<tr>
<td>Sunday</td>
<td>689</td>
<td>151</td>
<td>155</td>
<td>135</td>
<td>499</td>
<td>1632</td>
<td>647</td>
</tr>
</tbody>
</table>
The data in Tables 2 and 3 are presented visually in the graphs presented in Figures 6 and 7.

![Street Volume in Huning Castle Area - YR 2000](image)

![Volume on Other Huning Castle Streets - 2000](image)
Table 3. Year 2000 Traffic Volumes, Other Streets

<table>
<thead>
<tr>
<th>Time</th>
<th>15th</th>
<th>Los Alamos</th>
<th>Chacoma W</th>
<th>Chacoma E</th>
<th>Alcalde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday</td>
<td>309</td>
<td>183</td>
<td>1473</td>
<td>206</td>
<td>4588</td>
</tr>
<tr>
<td>Saturday</td>
<td>250</td>
<td>158</td>
<td>n/a</td>
<td>182</td>
<td>3701</td>
</tr>
<tr>
<td>Sunday</td>
<td>218</td>
<td>136</td>
<td>n/a</td>
<td>102</td>
<td>3083</td>
</tr>
</tbody>
</table>

Figure 8 shows a visual comparison of the volume of traffic in the area in 1982 and 2000.

The volume on most of the streets are virtually unchanged. The counts on both San Patricio and San Carlos have apparently been reduced. However, I believe that some of the difference can be explained with the location of the counts. In 1982 we performed the counts on those streets between Raynolds and Alcalde, which is the part of the streets that would be affected by neighborhood traffic exiting the area off of Raynolds onto Alcalde. The recent counts were performed further north, near Franz Huning, which is not used as much by neighborhood traffic. The differences in the historic and recent counts on these streets are not significant because the total volume is low.

The only significant change is on Kit Carson where the volume has increased about 15% or roughly 110 vehicles per day. A corresponding increase can be seen on San Pasquale—about 90 vehicles per day. It is not unexpected that these two streets might show parallel increases in volume because commuter traffic that uses Kit Carson usually also uses San Pasquale (see previous sections for a complete explanation).
The other streets in the area, including 15th, Los Alamos, and Chacoma East of San Pasquale are all carrying traffic loads appropriate for residential streets.

Chacoma East of San Pasquale, is carrying a reasonably heavy load even for a neighborhood accumulator. The same can be said for Kit Carson. However, as explained in a previous section, the load on these streets are coupled with traffic on Route 2, which was reduced, but not eliminated, by the existing traffic control program. I estimate that 200-300 cars per day on Kit Carson and San Pasquale can be attributed to vehicles using Route 2. Reducing or eliminating this commuter path through the neighborhood remains a worthy goal.

The traffic volume on Alcalde is nearing 4600 vehicles per day on weekdays. Much of this is commuter traffic travelling between Central and the Lead/Coal corridor. I believe that a significant portion of this commuter traffic would attempt to take a path through the neighborhood if this route were eliminated, or if its flow resistance is significantly increased.

At the time of this writing, I had no counts for 14th Street, and I have no written record of the historical counts. However, my recollection is that the volume on this street was several thousand per vehicles day, higher than is desirable for a neighborhood accumulator. I expect that traffic volume today is even higher. An additional problem along this route is speed, which coupled with the volume, creates an uncomfortable environment for the adjoining residents. Significant reduction of overall speed and some reduction of volume should be priorities for the residents and the city.

Finally, I believe it is appropriate to discuss the potential traffic threats from a high or medium density residential development on the vacant property adjacent to Central between Laguna and 15th. A development at this location could place additional traffic burdens on a number of streets in the area including: 14th, 15th, 16th, Los Alamos, and Laguna.

The fundamental problem is that any high-density residential property will first attract a large number of people, most of whom own at least one car. Many of these people will enter and exit the area daily. For those wishing to access Central, an exit onto Laguna northbound makes the task easy. Although they can return along the same route, they would have to U-turn at 16th Street to gain access to the parking lot. Or they might turn south onto 16th to gain access to 15th Street for entry into the parking lot (essentially use the HC neighborhood as a backside shortcut between Laguna and 15th Street).

On the opposite side of Laguna, 15th Street, there is no center median to restrict passage, so they can enter and exit freely. However, access to Central at 15th is difficult at all times and there would be strong incentive to travel south on 15th to reach Los Alamos where they would turn left to gain access to 14th Street. Then they would turn left to access Central or right to access the Lead/Coal collector system. Although the total volume of traffic might be rather modest and would be time-of-day dependent (morning and evening), it would impact streets that now carry virtually no traffic (15th and Los
Alamos) and would place an even greater load on a street that is already overburdened (14th).

There is no easy solution to this problem. If such an apartment complex were to be built, the neighborhood could mitigate the traffic impact by insisting on parking lot access directly from Central with a turning lane. If parking lot access is off of Central, then I would suggest it be placed on 15th Street. The Central and 15th Street intersection should be modified with a demand actuated stop light that would allow easy access to Central.

If other measures fail, some type of diverter system placed on Los Alamos or 15th Street may be needed to protect that local area. This carries a risk because it could be inconvenient for residents, including Park Plaza residents who use Los Alamos for parking.
HC Flow-Through Study and the Evolution of a New Commuter Route

On September 27, 2000, the HC Neighborhood Association measured traffic flow through the neighborhood. I designed this data collection procedure to duplicate as closely as possible two identical efforts nearly 20 years ago. The results confirmed the continued existence of Route 2, which has existed since 1980. However, it also identified a new route that has evolved since then. This route is exactly opposite to Route 2, with commuter traffic entering the neighborhood at Kit Carson and Alcalde and exiting at San Pasquale and Chacoma in the morning. In the evening, commuters returning home enter the neighborhood at Chacoma and San Pasquale and exit at Kit Carson and Tingley. A large majority of this commuter traffic uses Tingley south of Alcalde as part of the route.

The results of the data collection effort are presented in the following Table 4 below.

Table 4. Results of the Recent Flow-Through Study in HC Neighborhood

<table>
<thead>
<tr>
<th></th>
<th>Vehicles Entering HC Area</th>
<th></th>
<th>Vehicles Exiting HC Area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From:</td>
<td></td>
<td>At:</td>
<td></td>
</tr>
<tr>
<td>Chacoma &amp; San Pasquale</td>
<td>Exited at:</td>
<td>Total vehicles exiting</td>
<td>Exit at:</td>
<td>Total vehicles entering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% of Total</td>
<td>At:</td>
<td>% of Total</td>
</tr>
<tr>
<td>Kit Carson &amp; Alcalde</td>
<td>27</td>
<td>43</td>
<td>Kit Carson &amp; Alcalde</td>
<td>19</td>
</tr>
<tr>
<td>Park &amp; 14th Street</td>
<td>16</td>
<td>25</td>
<td>Park &amp; 14th Street</td>
<td>9</td>
</tr>
<tr>
<td>San Carlos &amp; Alcalde</td>
<td>11</td>
<td>17</td>
<td>San Carlos &amp; Alcalde</td>
<td>8</td>
</tr>
<tr>
<td>Silver &amp; 14th Street</td>
<td>9</td>
<td>14</td>
<td>Silver &amp; 14th Street</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total: 63</td>
<td>100</td>
<td>Total: 36</td>
<td>100</td>
</tr>
</tbody>
</table>

Huning Castle Morning Vehicle Flow Through Pattern (7:15-8:45 am, 27 Sept 00)

Huning Castle Evening Vehicle Flow Through Pattern (4:15 pm-5:45 pm, 27 Sept 00)

The table shows the total number of vehicles that were confirmed on various routes. A dashed-line box highlights the route with the most traffic. For example, in the upper left hand corner, the total number of vehicles that flowed on the morning portion of Route 2 was 27, which comprised a total of 43% of the total vehicles that flowed into the area. One should note that in this study the absolute number of vehicles is not important and no implications can be made relative to the volume on the streets. The only relevant statistic is the relationship of one commuter path to another. For instance, in the
example provided above, the most significant factor is that Kit Carson is carrying a large portion of the flow-through traffic load relative to other streets. Thus a flow-through path is identified. In the afternoon, this Route 2 path is reversed, as expected (see the lower right hand quadrant of Table 4).

The new commuter path on Kit Carson is seen in the data in the upper right hand and lower left hand quadrants of Table 4. This new path has no corollary to 1982. It may also explain why there is a noticeable increase in volume on Kit Carson in 2000 from 1982 (see Figure 8). Figures 9 and 10 show old Route 2 and the new commuter path that has evolved.

On October 6th I conducted an additional study of the traffic flow situation at Kit Carson and Alcalde. The objective of the study was to verify that the old and new commuter routes through the neighborhood (Old Route 2 and the newly identified commuter route) were closely coupled to Tingley traffic flows south of Alcalde. I spent 30 minutes at the intersection in the morning and evening, in the heart of the rush hour traffic. I sat on the corner so that I could observe where vehicles came from when they entered Kit Carson and where they proceeded to when they exited Kit Carson. The results are presented in Table 5.

Table 5. Results of Source/Destination Analysis at Kit Carson and Alcalde

<table>
<thead>
<tr>
<th>Morning (7:20 am - 7:50 am)</th>
<th>Afternoon Traffic Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicles Entering Kit Carson</strong></td>
<td><strong>Vehicles Exiting Kit Carson</strong></td>
</tr>
<tr>
<td><strong>Came from:</strong></td>
<td><strong>Proceeded to:</strong></td>
</tr>
<tr>
<td>Westbound Alcalde</td>
<td>Tingley southbound</td>
</tr>
<tr>
<td>Alcalde from Northbound Tingley</td>
<td>Iron southbound</td>
</tr>
<tr>
<td>Northbound Iron</td>
<td>Eastbound Alcalde</td>
</tr>
<tr>
<td>Total: 22</td>
<td>Total: 28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evening (4:30 pm - 5:00 pm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicles Entering Kit Carson</strong></td>
</tr>
<tr>
<td><strong>Came from:</strong></td>
</tr>
<tr>
<td>Westbound Alcalde</td>
</tr>
<tr>
<td>Alcalde from Northbound Tingley</td>
</tr>
<tr>
<td>Northbound Iron</td>
</tr>
<tr>
<td>Total: 24</td>
</tr>
</tbody>
</table>

As can be seen, the majority of the vehicles entering Kit Carson in both the morning (new evolved route) and evening (old Route 2), came from northbound Tingley (compare the upper left and lower right quadrants of the Table 5 above). Similarly, a majority
vehicles *exiting* in the morning (old Route 2) and the evening (new route), proceed to Tingley southbound (compare the lower left and upper right quadrants of the Table 5 above). The results confirm that Tingley Drive, south of Alcalde is part of the commuter paths through the neighborhood. They also suggest that appropriate traffic control at Tingley and Alcalde could discourage or eliminate these neighborhood commuter routes and could result in lower volumes of traffic through the HC neighborhood.
Proposed controls to mitigate existing problems

As noted in the previous discussion, there are two traffic problems in the HC neighborhood. The first problem is the continued existence of Route 2 (via Kit Carson) and the evolution of a new commuter route on Kit Carson as discussed previously. The second problem is the volume and speed of the traffic on 14th Street.

The recent proposals for changes in Tingley traffic offer an opportunity to improve both situations identified above. As will be explained later, the proposed changes that can have an impact include: 1) the opening of an access to the Zoo from Tingley, and 2) the modification of the intersection at Alcalde and Tingley.

Considerations for Commuter Routes Through the Huning Castle Neighborhood:

The city is considering four options for the intersection at Alcalde and Tingley. One option is full closure of Alcalde at Tingley and another is to make no changes. The other two options would allow traffic to flow from Tingley to Alcalde and vice versa, but with some restrictions.

One of these other options would use a diverter system to force westbound Alcalde traffic to turn northbound to Tingley. Northbound Tingley traffic would be allowed to turn onto Alcalde or proceed north on Tingley to Central. However, it would restrict southbound Tingley traffic from Central from turning onto Alcalde eastbound.

The last of the four options would allow west bound Alcalde traffic to either turn right or left onto Tingley. Northbound Tingley traffic would be restricted from turning right onto Alcalde and would force it to proceed to Central on Tingley. However, this option too would restrict southbound Tingley traffic from turning eastbound on Alcalde.

The city’s goals are noble—to reduce overall volume along the Lead/Coal corridor through the Raynolds neighborhood. However, thousands of commuters use Tingley-Alcalde-Lead/Coal each day, some of whom used to flow-through the HC neighborhood. Adding resistance along this route (such as diverters) without providing an adequate alternate route could create increased traffic in the HC neighborhood.

The option not to change the existing intersection would have no effect on the neighborhood.

The option to close Alcalde at Tingley could have catastrophic consequences for the neighborhood. As explained earlier, Alcalde and Tingley play a major role in carrying commuter traffic that would otherwise be seeking routes through the neighborhood. This is the low resistance alternate path around the neighborhood (Route 1). Closure of Alcalde at Tingley could place an additional 2000 vehicles per day onto 14th Street, Park, San Pasquale, San Carlos and Chacoma. Although the exact impact is not certain, this would be a high-risk option for the neighborhood and not in its best interests.
The other options described above could also create significant problems for the neighborhood because they would cut off portions of a route that carries commuters around the neighborhood (e.g., Route 1 as described previously). With no alternate route around the neighborhood, these commuters would seek a path through the neighborhood and possibly increase traffic volumes on San Pasquale, San Carlos, and Park by 500-1000 vehicles per day. These options also are not in the best interests of the neighborhood.

An option that was not considered, but which would have benefit to the neighborhood, is a diverter at Alcade and Tingley that would restrict southbound Alcalde traffic to a right turn onto northbound Tingley AND would prohibit a right turn from northbound Tingley onto Alcalde. Figure 11 shows how I envision the intersection would be redesigned.

This option, which I will call “Alcalde Option 5,” would not affect the bypass commuter routes around the neighborhood but would discourage or eliminate all of the commuter routes that still exists in the neighborhood (Route 2 as well as all of the new commuter route that has evolved). This is a control option that I strenuously argued for in 1980. It was the only option that we had conceived that could attenuate the traffic volume of Route 2 while meeting all of the requirements for access to Kit Carson Park and ingress and egress for the neighborhood. The city rejected the idea because they wanted the control program limited to the confines of the HC neighborhood.

If implemented, Alcalde Option 5 could reduce the total volume on Kit Carson, Chacoma and San Pasquale by 400-450 vehicles per day. This estimate assumes that about half of the volume on Kit Carson consists of commuters. Half of the total volume is around 430 vehicles. The commuters who normally use the HC area via Route 2 and the new route would be displaced to the Central-Tingley roadways.

Considerations for 14th Street:

The situation on 14th Street is more complex. The fundamental approach I advocate is to remove some or all of the commuter traffic without displacing it to adjoining streets in unacceptable levels and without creating intractable impediments to residents of HC or Raynolds trying to enter or leave their neighborhoods. Additionally, controls should be implemented to reduce the speed of traffic, especially on the long stretch of 14th Street between Gold and Central.
The plan presented here purports to accomplish both of these objectives and is similar to the one that our traffic control team developed in the early 1980s. We presented the plan to the city several times up to 1984. However, that plan was never officially considered by the city because the prevailing wisdom was to avoid restricting traffic flow on 14th Street. However, with the proposals to provide an entry to the Zoo via Tingley, the plan, which was marginally workable at that time, has more possibilities now. More importantly, the city now seems to be open to considering some controls on 14th Street.

This plan assumes that a commuter path exists from the Old Town and west downtown areas along Central to 14th to Lead/Coal. I believe this to be true, but it has not been verified recently.

Let me explain the basic concept of the plan first and follow with an explanation of how the Zoo entrance at Tingley fits into it. This plan would create a low resistance path to Central via 10th Street. Simultaneously, resistance would be placed on 14th Street. Some of the commuter traffic that now uses 14th between Central to Lead/Coal, will instead choose to use Central to 10th to Lead/Coal and the reverse.

I want to note that the original version of this plan called for 8th Street to serve as the conduit to/from Central. Eighth Street would have been appropriate in this role because of the limited impact additional traffic would have on residences. However, the closure of 8th Street just north of Gold Ave eliminated this possibility. As a result, attention was focused on 10th Street.

Tenth Street is the only reasonable alternative route to displace commuters who are using 14th Street. The only other available path to Central from Lead/Coal is at 5th Street, which would place commuters on Central Avenue in the center of downtown--an unattractive prospect.

When this 10th Street plan was first conceived, the major concern was the political backlash that would be created by displacing vehicles from 14th onto 10th. Unfortunately, traffic on 10th was already heavy due to the Zoo. And since 10th was the major published route into the zoo, no control measures could implemented on 10th to compensate for the additional flow of Lead/Coal to Central commuters. This contributed to the reasons that the city never seriously considered it.

However, the recent proposal for an alternate entrance to the Zoo creates a new opportunity. This new entrance would remove traffic from 10th Street, which would compensate for any additional flows from 14th. If additional reductions are needed, a street closure could be effected on 10th at Coal as shown in Figure 12. There appears to be sufficient street width on 10th South of Coal to create a cul-de-sac with minimal impact to the sidewalk areas.

To complete this plan, several improvements are needed on 10th Street as well as Central Ave. to reduce resistance for commuters. These include the following:
1) Remove the stop signs for 10th Street traffic at Silver.
2) Replace the 4-way stop at 10th at Park with a traffic light that favors 10th Street traffic.
3) Time-synchronize for two-way traffic the signal lights along Central between 10th and San Pasquale, including the demand actuated ones. In the region noted, Central would operate like Candelaria does between Carlisle and Wyoming. Time synchronization will also tend to control the speed of traffic along Central because it would reward traveling at the speed limit with a continual stream of green lights. Presently, travel on Central between 10th Street and Rio Grande is an irritating experience due to the apparently unsynchronized series of timed and demand-actuated signals. I don’t believe it would work as a commuter bypass route in its present configuration.

4) Place stops on 10th & Coal that would stop Coal/Lead traffic.
5) Place signs on the corners of 10th at Lead/Coal to encourage the use of 10th to Central.

I have developed three options to modify Fourteenth Street. The first is as follows:

1) Place a four-way stop at Park Avenue (see Figure 13).
2) Place a traffic hump 75 yards north of Park Avenue.
3) Place a traffic hump about 75 yards north of Los Alamos.

A second option, which involves a traffic circle, is as follows:

1) Place a traffic circle at Park Avenue (see Figure 14).
2) Place a traffic hump about 75 yards north of Los Alamos.
I do not know the efficacy of a traffic circle relative to reducing traffic volume. However, I know it is very effective in reducing speed. It is also effective in discouraging large vehicles, such as buses and large trucks. Traffic circles are very popular in the eastern US and some have been installed in Albuquerque. I believe that there is sufficient room to place the circle at Park and 14th. And if so, it could prove to be an effective traffic control tool.

The third option I have conceived involves the following:

1) Place a four way stop at Park and 14th
2) Place a diverter at 14th and Lead that would prevent westbound Lead traffic from turning right or north onto 14th. Southbound traffic on 14th would still be allowed to flow through the intersection or to turn right onto Alcalde (see Figure 15)

I listed this option last because I believe it carries the most risk. There is no question in my mind that it will have a profound impact on the volume of traffic in the area. I believe it could cut volume by 30% or more. The risk is in raising the ire of residents of HC and Raynolds who will find it more difficult to reach their homes from Lead. Neighbors who normally turn right off of Lead to northbound 14th Street to home will be diverted to 13th Street to Silver to 14th Street. Additionally, for the folks living near 13th and Silver, traffic will be increased considerably. In spite of the problems, I believe it is worth consideration, especially if we can confirm that a commuter path does exist. It is clearly a case of weighing the costs versus the benefits.
Any of the options (or combinations thereof) will add resistance to 14th Street for flow-though commuters and will also slow traffic.

The combination of an attractive alternative path for commuters coupled with additional resistance on the existing route should reduce the traffic load on 14th. Moreover, it may not increase the load on 10th, depending on how many vehicles the new Zoo entry displaces and how many of the 14th Street commuters use the new route. This should help quell any outcry from the residents in the Raynolds neighborhood.

This plan also has the advantage of potentially reducing commuter volume on 14th without significantly affecting ingress and egress to and from the HC and Raynolds neighborhoods.

I want to reiterate that this plan makes an assumption about the commuter traffic on 14th. This should be confirmed with a flow-through study, which I can help design. In addition, the neighborhood situation in the Raynolds area will need careful assessment to insure that 10th is capable of handling the proposed traffic flows and that these flows will not create collateral problems that will result in public outcries. Lastly, the plan assumes that the light signals along Central, including the demand actuation signals, can be time synchronized to the speed limit to improve the travel experience along this street. In 1982 I was told that the city did not have the capability to synchronize the lights due to inadequate conduits for communication cabling.

Depending on the outcome of all of these assessments, the actual viability of the plan can be assessed. At a minimum, this proposal may create some innovative thinking that may result in the reduction of traffic on 14th Street.
Conclusions and Recommendations

- The existing traffic plan in HC was carefully conceived and implemented. It has worked well for nearly 20 years. Additionally, it provides a model for how traffic control programs can be developed and implemented.

- The existing control program within HC did not address all of the problems in the area: Two problems still exist: 1) A commuter route through the HC neighborhood, and 2) High traffic volume and speed on 14th Street.

- The proposed changes to the Tingley traffic flow offers both threats and opportunities to the neighborhood. The neighborhood could be impacted by three of the four options proposed by the city. The proposed closure of Alcalde at Tingley could be especially problematic because it cuts off bypass commuter routes around the neighborhood. The diverter I designed for the intersection could benefit the neighborhood by reducing two commuter routes along Kit Carson without impacting any of the other bypass routes. The fourth option proposed by the city (i.e., no change) would have no effect on the area.

- The proposed Tingley entrance to the Zoo provides an opportunity to create an alternate route for some of the commuter traffic along 14th Street. It appears theoretically possible to accomplish this objective without increasing (and perhaps even decreasing) the existing volume on 10th Street. It will also allow 14th Street to continue to operate unimpeded as a conduit to Central and Lomas for the residents in the HC and Raynolds neighborhoods. This plan would depend on improving the traffic flow on Central Avenue by synchronizing the light signals so that it can act as a commuter bypass for the neighborhood.

- Additional study of the 14th Street situation is needed to refine the control program design proposed in this report. A flow-through study of the type recently completed with the HC neighborhood is one of the studies needed to confirm the existence of commuter paths along 14th Street.