

DEVELOPING AND PARTIALLY IMPLEMENTING TRAFFIC
CALMING MEASURES TO REDUCE CUT-THROUGH TRAFFIC ON
FOREST LANE IN PINETOP-LAKESIDE, ARIZONA

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A Practicum Report
Submitted in Partial Fulfillment
Of the Requirements for the Degree of
Master of Science
In Applied Geospatial Sciences

Northern Arizona University
Department of Geography, Planning and Recreation
December 2016

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ABSTRACT

DEVELOPING AND PARTIALLY IMPLEMENTING TRAFFIC CALMING MEASURES TO REDUCE CUT-THROUGH TRAFFIC ON FOREST LANE IN PINETOP-LAKESIDE, ARIZONA

KATHRINE M. NUNN

Forest Lane is a residential street in Pinetop-Lakeside, Arizona. Residents living along the street have been complaining for many years about cut-through traffic passing through their neighborhood. Due to the location of the road, residents of neighboring subdivisions utilize Forest Lane as a short cut to seemingly easier access points of State Route 260 (SR260). Perceptions of residents along Forest Lane included higher traffic volumes and speeds over the allowed speed limit of 25 miles per hour.

This Practicum Project focused on evaluating the resident's perception, researching traffic calming measures for residential streets and developing potential solutions for traffic calming measures by considering needs of residents along Forest Lane as well as the general public. It included public input meetings with residents, potential design solutions for reduction of traffic volume, and implementation of a solution that was accepted by the Pinetop-Lakeside Town Council.

**LETTER OF SIGNIFICANT CONTRIBUTION FROM ON-SITE PRACTICUM
SUPERVISOR**

To whom it may concern,

It is my pleasure to write a letter of significant contribution for Kathrine Nunn. Kathrine was given the opportunity to lead the Forest Lane project. She came up with design solutions for traffic calming measures to ease traffic on a neighborhood road that had become a short cut for many visitors and local residents of the community.

Kathrine showed her creativity and organization by presenting design solutions to town management, the Town Council, and the public. She organized public meetings, prepared visuals for the meetings and listened to the concerns of the residents on Forest Lane. She then revised her designs accordingly with the concerns.

Kathrine worked with the Public Works director to reconfigure a five-way intersection into a four-way intersection. This reconfiguration was constructed. After the measure was implemented, traffic counts did not result in significant volume reduction, but the measure did create a safe intersection and reduced speed at the apex of a corner—making it less convenient to use Forest Lane as a short cut.

Kathrine presented her final recommendations to the Town Council to add speed cushions to Forest Lane. This recommendation to place speed cushions along Forest Lane was not approved, but may be approved by future councils.

Kathrine's creativity, flexibility, and determination show she will be an excellent public servant in the future. NAU should be proud to have her be among their graduates.

Regards,

A handwritten signature in blue ink, appearing to read 'Evelyn M. Racette', written over a faint, illegible stamp.

Evelyn M. Racette

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Chapter 1 – Introduction

The practicum project outlined in this report resulted from an internship with the Town of Pinetop-Lakeside. During the course of this internship the residents of Forest Lane approached Town staff addressing cut-through traffic that had been an issue for many years. The recently adopted General Plan for the Town of Pinetop-Lakeside addresses traffic calming measures in the Circulation Element and the Town Code actually emphasizes it.

Nevertheless, in the history of Pinetop-Lakeside Town Council priorities, cut-through traffic was not a high priority item. Rather, finding the money to budget road repair and maintenance. Change in administrative leadership opened the door for Forest Lane residents to address their concerns.

This paper explains the practicum process based on evaluation of residents' perception regarding traffic speed and volume, research of traffic calming measures for residential streets and development of potential solutions for traffic calming measures. Solutions were considered with the needs of residents along Forest Lane in mind as well as the general public. This practicum includes review of literature regarding traffic calming measures, community involvement, and traffic count studies. Furthermore, informational material such as maps, images, staff reports, invitations and relevant emails are included.

Purpose

The purpose of this practicum project was to find potential solutions to reduce cut-through traffic on Forest Lane. The components of this practicum project included researching, evaluating, and implementing design solutions for traffic calming measures on Forest Lane in Pinetop-Lakeside as partial fulfillment of the requirements of a Master's of Science degree in Applied Geospatial Science. The practicum included public input meetings with residents, staff reports and presentations at Town Council meetings as valuable real life experience in a professional local government environment.

Project Background

Pinetop-Lakeside is a small rural town in north-eastern Arizona located in the White Mountain region. The town attracts large numbers of residents from the Phoenix and Tucson areas due to its high elevation of 6,800 feet and, thus cooler summers. Many of these seasonal visitors are retirees that own summer homes in Pinetop-Lakeside and spend half of the year in the cooler mountain region and the other half in the valley. Others spend their summer vacations in the White Mountains and eventually retire in Pinetop-Lakeside.

Pinetop and Lakeside were originally two separate municipalities incorporated in 1984 as Pinetop-Lakeside. At time of incorporation, the population count was approximately 2,300. (Town of Pinetop-Lakeside/Navajo County Regional Plan, 2001) For the next thirty years, the Town's population increased to 4,282 (2010 Census Summary File 1). However, the population increases during summer months due to seasonal residents and summer visitors. As shown in Table 1, approximately 83 percent of vacant homes in 2014 are available for seasonal, recreational, or occasional use according to the 2010 -2014 American Community Survey 5-Year Estimates (American Community Survey 5-Year Estimates B25004). This means just for 2014 that the population during summer months may have increased approximately 43 percent to about 6,100 based on the 2010 Census number. Many of these vacant housing units are located in subdivisions rather than along the commercial corridor surrounding State Route 260 (SR260).

Year	Total Housing Units	Total Vacant	Vacant for Seasonal Use
2009	3,091	1,345	1,207
2010	3,336	1,414	1,191
2011	3,551	1,580	1,315
2012	3,324	1,542	1,281
2013	3,423	1,678	1,446
2014	3,567	1,858	1,548

Table 1 - Housing
(Source: US Bureau of Census. American Community Survey)

Forest Lane is a small residential street, 21' wide and approximately ¼ of a mile long (Figure 1). The road has two travel lanes and no sidewalk or bike lane. Although not a collector street, it is used by motorists familiar with the area to cut through from

SR260 to Woodland Road or vice versa. A large part of the traffic consists of residents and contractors traveling in and out of nearby subdivision developments (Figure 2). Especially residents in the Woodland Hills subdivision utilize Forest Lane as a cut-through on their way to drop off children at school or to travel to shopping areas located along SR260.



Figure 1 - Vicinity

Residents of Forest Lane have been asking the Town of Pinetop-Lakeside to come up with solutions to reduce the traffic volume in their street since many years. In fact, residents would like to close Forest Lane for through traffic and transform it into a dead end street. However, this request creates controversy because residents on neighboring roads would be impacted as well. Considering the potential of conflict within a neighborhood, the proposed practicum project focuses on researching potential solutions, with the inclusion of public input, to reduce through traffic that may accommodate the entire neighborhood.

Due to seasonality of traffic in Pinetop-Lakeside and therefore potential fluctuation in traffic counts, it is difficult to promote the need for traffic calming measures

in general. For Forest Lane in particular, since traffic counts show an average of 400 vehicles per day which places the street just within the margin of the Average Annual Daily Travel (AADT) for rural local roads of the Federal Highway Administration (FHA, 2013: 23).



Figure 2 – Subdivision Traffic

Chapter 2 – Literature Review

Literature Review

Cut-through traffic is a common matter of conflict in residential neighborhoods. However, is there a solution that would fit every neighborhood? Or, would it require a different approach depending on spatial and population factors? This literature review will explore the opportunities and constraints of solutions for cut-through traffic that could apply in the case of Forest Lane in Pinetop-Lakeside, Arizona. Besides searches for traffic calming, shared streets, and community involvement, a traffic study for the Town of Pinetop-Lakeside as well as documentation for traffic counting are included in this literature review.

1. Traffic Calming and Shared Streets

Since traffic calming and creating safe environments for pedestrians and bicyclists are very closely related this section of the literature review contains material that covers both aspects.

According to Ewing the expression “traffic calming” origins from the German word “Verkehrsberuhigung” established in the late 1970’s (Ewing, 1999). European countries experimented since the 1960’s with measures to transform streets into safer environments specifically for pedestrians and bicyclists. One of the earliest attempts originated in the Netherlands that transformed low volume streets into extensions of residential front yards. This design was named “Woonerf” and included elements such as different paving, street furniture, and parking bays. The speed on these roads was reduced to approximately 9mph to provide a speed acceptable for pedestrians and bicyclists. The Woonerf concept lead to further design improvements all over Europe and eventually resulted in traffic calmed streets such as “Tempo 30 Zone” in Germany and “20 – mph Zone” in Great Britain.

In the United States the Woonerf concept was mainly applied in mixed use development but not so much for strictly residential areas which supports the statement made in the *Pedestrian Facilities Users Guide – Providing Safety and Mobility* which implies that walkability in a community is supported by mixed-use developments and usually discouraged by zoning for predominantly low density residential development (Collarte, 2012), (Zegeer et al, 2002). This condition is premeditated for conflict in case of increase in traffic volumes along a usually quiet road. To encourage walking, it is

important to provide a safe and appealing walking environment for pedestrians. This can be accomplished by implementing traffic calming design elements and design speed reduction. *The Woonerf Concept* explores the potential of an actual Woonerf design for a residential street in Somerville, Massachusetts (Collarte, 2012). The positive effects of Woonerven in Europe such as reduction of speed with increased levels of safety, efficient use of space, increased socialization, beautification of the street could be applied to improve livability for residents. Collarte works with guidelines established by European countries to accomplish these effects. These guidelines include design elements such as a distinct entrance to the street, elimination of curbs, utilize traffic calming measures, provide on-street parking, and incorporate outdoor furnishing as well as landscaping.

As traffic calming was explored in municipalities throughout the United States, emphasis was placed on separation between traffic volume control and speed control. For example, Ewing refers to traffic calming as response to cut-through traffic and speeding in local neighborhoods (Ewing, 1999). The same approach is recommended by *Road Diet Informational Guide* which recommends “traffic calming or other mitigation measures” (Knapp, 2014: 22) for streets that are affected by cut-through traffic.

This response is based on physical alterations of the traffic environment to change driver’s behavior. The same concept is applied in the *Best Practices Design Guide* of the Federal Highway Administration (FHWA) where volume control measures include full street closures, half street closures, median barriers, and forced turn islands (Kirschbaum et al, 2001). Speed control measures are speed humps, speed tables and raised crosswalks, raised intersections, textured pavement, roundabouts, neighborhood traffic circles, chicanes, lateral shifts, and chokers, curb extensions at intersections, as well as center island narrowing. However, Ewing emphasizes that each street is unique and therefore to be assessed based on this uniqueness. For example, traffic calming measures in the Royal Highlands neighborhood in San Diego, CA, a combination of speed humps and street closures resulted in a combined change in total traffic of -77% (Ewing, 1999: 19). Ewing states: “Street closures are the most commonly used cure for cut-through traffic. They are also the most controversial.” (Ewing, 1999: 20) As traffic calming is applied in more and more communities throughout the country, the tendency to apply speed control measures for traffic volume control is apparent. This is especially the case under consideration of controversial street closures. For example, after a road closure in a Seattle neighborhood traffic was diverted to other streets in this

neighborhood and caused conflict between residents. Removal of the closure and application of chicanes in several streets of this neighborhood instead reduced the traffic volume within.

The distinction between volume and speed control seems to be more interconnected by 2006. The *Federal Highway Administration University Course on Bicycle and Pedestrian Transportation* makes no distinction between volume or speed control measures (FHWA, 2006). But, rather points out that often traffic calming measures are combined for different results. For example, using curb extensions and raised pavement to create a gateway for a neighborhood with the result of slowing traffic down as well as preventing drivers to cut through this neighborhood.

As certain traffic calming measures seem to work better than others, measures such as speed humps or road closures may create conflict with emergency responders. Since the goal of fire departments and ambulances is to reach the emergency site as fast as possible, any obstructions or closures may hinder the accomplishment of this goal. Furthermore, speed humps and other vertical measures pose extreme strain on the suspension system of fire trucks. As a solution for emergency responders such as the fire department, the *Urban Street Design Guide* points out that speed cushions as street design elements are very well suited for accommodating emergency responder vehicles such as fire trucks (NACTO, 2013: 55). The cushions are spaced to fit the wheel base of fire engines and therefore eliminate the reduction of speed and consequently loss of emergency response time.

Besides adding traffic calming measures to streets, it may be of benefit to emphasize these measures with landscaping or other means. Ewing points out that some communities had positive results with this combination by emphasizing attention to the traffic calming measures by combining speed humps with landscaped curb extensions. However, landscaped elements also need to be maintained and potential costs need to be budgeted or, an agreement with residents along the street needs to be arranged. For example, the city of Seattle provides funding for the initial installation and then the neighborhood maintains the landscaped areas.

For a thoughtful planning process for functional designs it is important to also include geometric and operational designs (Knapp, 2014). The geometric design considers factors that include the plan, profile and cross section of the project. And the operational design considers factors that affect interaction of different users. For a

geometric design that would include considerations about the size of the largest design vehicle that may use the street.

Since many municipalities are attempting to keep the costs for traffic calming measures low, it is common that temporary measures such as bollards and planters are used to test for the best solutions. One of the first steps is often just police enforcement and neighborhood speed watch. However, Ewing as well as the *Urban Street Design Guide* (NACTO, 2013: 88) point out that there is a risk of disapproval when these temporary measures are aesthetically unpleasing. On the other hand, installing permanent solutions can become easily very costly since traffic calming requires several test phases to observe which measure actually has the desired outcome. This goes hand in hand with principles mentioned in the *Citizens Guide for Better Streets* and the *Road Diet Informational Guide as Context Sensitive Solutions (CSS)* which consider the community context of a transportation project. CSS approaches are based on “seven qualities of design excellence” (Knapp, 2014: 14) which include principles such as agreement of all stakeholders, provision of a safe environment for users, or design and building phases of the project does not negatively affect the community.

As installations are implemented, either temporary or permanent, it is extremely important to pay attention to signage. Drivers as well as bicyclists need to be alerted of upcoming changes in traffic patterns, such as humps or chicanes. Although Ewing states that the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) does not provide exact guidance on traffic calming measures, it should be attempted to find the most fitting solution to prevent potential claims and law suits.

2. Community Involvement

One of the concerns expressed in most of the reviewed literature regards public involvement. For example, Collarte emphasizes the importance of public involvement as well as support from public officials to plan and implement a Woonerf (Collarte, 2012). Or, the *Road Diet Informational Guide* from 2014 (Knapp, 2014). Earlier publications such as *A Citizen's Guide to Better Streets* that was published by the Project for Public Spaces also emphasizes the importance of citizens to actively engage in transportation planning as a way to change from the paradigm of prioritizing vehicular traffic over pedestrian and bicyclist needs (Toth, 2008).

This guide promotes to re-think streets as public spaces that can be used by any kind of transportation mode, which is similar to the concept of Woonerven as space to

socialize. The approach of public engagement in transportation planning also supports the tendency of CSS by encouraging transportation planners to consider transportation as well as a community's need for quality of life instead on focusing strictly on guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO). Furthermore, this new flexibility in transportation planning looks at low-impact and low-cost improvements first which works well with temporary installations for traffic calming solutions. *A Citizens Guide to Better Streets* goes even further in stating that the guidelines are only aids to select the level of service (LOS) and it would be perfectly fine for planners to choose a lower level of service for vehicular traffic and perhaps a higher LOS for pedestrian and bicycle traffic. However, liability claims have a better chance to be dismissed if the changes are based on design and construction standards with thoughtful flexibility.

3. Town of Pinetop-Lakeside Traffic Study

In 2007 a study for the Southern Navajo/Apache County Transportation Plan was performed including the transportation system for the Town of Pinetop-Lakeside (Wilson & Company, 2007). The portion focused on the Town is called "Community Transportation Plan". In 2005 Pinetop-Lakeside conducted a Population Growth Projection (Wilson, 2007) that resulted in numbers from approximately 3 to 7 percent annual growth. Based on this projection, the transportation planning had been conducted with a population projection range of 3 to 4 percent annual growth.

The study emphasizes the special socioeconomic conditions for Pinetop-Lakeside due to a large number of seasonal summer homes. This is reflected in lower occupancy number of dwelling units (DU) according to the 2000 Census. Although the study suggest several improvements to the transportation network by adding lanes to some of the collector roads due to projected population growth, it may needs adjustments based on the actual population figures in 2015. The same applies to the suggestion for additional traffic lights based on increased traffic expectations. To acquire correct traffic forecasts, traffic and population counts of years after the study need to be performed.

4. Traffic Count Studies

As the traffic study for the Town of Pinetop-Lakeside shows, traffic counts provide an important tool for planners regarding changes in street design (Knapp, 2014). One method of collecting traffic statistics is performed with traffic counters. Highway studies performed by the Department of Transportation are usually done with permanently installed traffic counters. TimeMark states in their *Road Tube Counter Basics* brochure: “Road tube counters are better for temporary, relatively short-term traffic studies rather than permanent installation.” (TimeMark, 2014: 3)

The Town of Pinetop-Lakeside owns two mobile counters that can be placed at desired locations. The traffic counters owned by the Town of Pinetop-Lakeside are Gamma models from TimeMark Incorporated. Road tubes are the sensors for these counters which forward air waves towards the counters when a tire runs over a tube (TimeMark, 2014). This air wave is then transformed into an electrical signal which is stored in the counter. When the traffic study is finished, the counter can be connected to a computer and files transferred for further analysis. The count results are recorded strikes as time stamped data. This data then provides the basis for different analysis performed with VIAS, the software program supplied with the counters. Studies focused on volume, axle classification, speed, gap, and per vehicle can be performed with VIAS, where each study then can be adjusted to more detail or options on axles or volume. Once the studies are selected, analysis and reports are available to the user as well.

However, before placing the counters, the road tube configuration has to be determined. This depends on the kind of study is selected, either vehicle or axle studies. Once the layout has been determined, there are a few considerations necessary to find the right location and properly setup the tubes. In regards to areas such as intersections, curves, and driveways TimeMark recommends keeping a distance of at least 50 feet from intersections to prevent problems caused by turning, accelerating, or braking vehicles. The problems caused due to turning vehicles also applies to driveways and curves which should be avoided as set up areas as well.

To provide the most data accuracy and precision for the traffic study, it is necessary to avoid tube layout errors such as different tube lengths. In this case the air pulses would reach the counters at different times and therefore provide incorrect speeds and axle lengths. Also, it is very important to correctly measure the distance between the tubes to receive proper analysis results.

In conclusion, the literature review provided ample answers to the questions of whether one solution would fit any traffic calming issue or if solutions need to be adjusted to local situations. Although earlier literature treated traffic calming measures as volume and speed measures, traffic calming gradually evolved to combined measures catered to individual situations. Also, testing temporary measures before permanent installations mostly turned out to be a successful method for successful solutions.

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Chapter 3 – Practicum Process

Since the approach of traffic calming measures is in general a trial and error process and often combines measures that emphasize traffic volume as well as speed reduction, this practicum is documented in chronological order involving Phases of design solutions, either temporary or permanent. However, to provide an overview of potential options applicable to Forest Lane, potential design solutions will be discussed first.

Potential Design Solutions

Figure 3 provides an overview of the intersection at the northern end of Forest Lane, including Pineview Lane and Westway Lane. Westway Lane is unpaved and intended to give property and utility access. It is intersected by Pineview Lane and Forest Lane with Forest Lane terminating at this intersection. Both, Pineview and Forest Lane are two lane residential streets without sidewalks or bicycle lanes. As displayed in Figure 3, this intersection constitutes a five-way intersection, without any stop or yield signs. Drivers were able to travel through this intersection without delays due to traffic regulating signage.

Since this seemed to be a hazard for vehicular as well as pedestrian and bicyclist traffic, the earliest potential design solution included a modification of this intersection. It provided stop signs and was the least invasive traffic calming solution (Figure 3). Due to the layout of the three streets to each other, traffic from Westway Lane did not have to stop at all unless vehicles approached from Forest or Pineview Lane. By changing the angle of the curve and setting the Westway Lane outlet back the intersection would be modified into a four-way intersection requiring traffic to slow down when taking a turn. Additionally, a four-way stop would inconvenience traffic to cut through Forest Lane.

The second solution proposed chicanes on Forest Lane additionally to an intersection modification. This intersection modification would be the same as the proposed in the first solution including the four-way stop. However, this proposal adds chicanes along Forest Lane to inconvenience cut-through drivers further. Although chicanes are considered traffic calming measures regarding speed, they seem to be more successful in volume control rather than speed control (Ewing, 1999: Appendix A). The study referred to listed traffic calming measures in 41 cities with valuable data

collected on 285 streets. On 2 percent of the streets chicanes were installed which resulted in 26 percent less average volume of vehicles per day. The average 85th Percentile Speed was only reduced 14 percent.

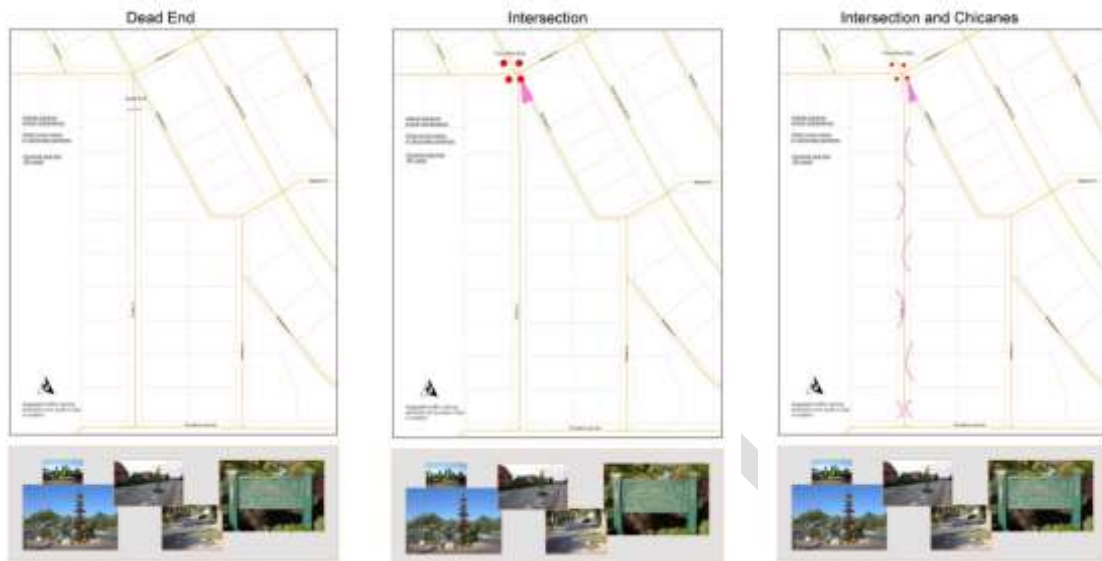


Figure 3 – First Potential Design Solutions
(Source for images: Google Images)

As a third option, the harshest solution, would be to close one end of Forest Lane for vehicular traffic and turning it into a dead-end street. However, this proposal would inconvenience the entire neighborhood, including residents along Forest Lane and may create animosity due to conflict of interest. Although street closures are widely used, they are known to be extremely problematic (Ewing, 1999: 20).

Fourth, installation of speed cushions on Forest Lane as traffic calming measure in addition to a modified intersection at Forest Lane, Pineview Lane and Westway Lane could be a potential solution to reduce speed and volume drastically. Although speed cushions are generally used for speed reduction, they also seem to be successful in reducing traffic volume (Ewing, 1999: Appendix A). Speed cushions are larger than speed humps and smaller than speed tables. However, they may be the most expensive traffic calming measure and may not receive approval of the Pinetop-Lakeside Town Council.

Phase I

The first phase of this practicum project involved the following activities which will be discussed in detail below:

1. Research of potential design solutions to reduce traffic volume;
2. Public meeting to discuss these potential design solutions with residents of Forest Lane and neighboring streets;
3. Installment of a temporary design solution;
4. A traffic count to collect traffic volume data.

1. Research

For many years residents along Forest Lane have complaint about increased cut-through traffic. In 2014 the newly hired Town Manager became aware of the ongoing problem and teamed up with staff to find potential solutions. Part of finding these solutions was to analyze whether the cut-through traffic issue was caused by volume or speed. More precisely, was there an issue in vehicle volume or speed, or both?

In winter of 2014/15 traffic counts performed by the Pinetop-Lakeside Police Department with a Radar Speed Sign resulted in approximately 400 vehicles per day. Surprisingly, the recorded vehicle speeds indicated that speed was not an issue on Forest Lane, rather volume. Once it was determined that volume and not speed created the discomfort for residents of Forest Lane, further research regarding traffic calming measures was focused on volume reduction. Priorities in defining traffic calming design solutions included cost effectiveness, flexibility, and successful solutions in other communities.

Cost effectiveness was determined as a priority due to the strained Town budget. That said, flexibility became a priority as well to find a cost effective solution. Perhaps to test temporary installments for effectiveness before permanently constructing traffic calming measures. Therefore, the third priority involved research of successfully implemented traffic calming measures on streets in other communities.

Three design options that had potential to be installed as temporary measures to avoid high costs for the Town were developed based on the reviewed literature. One option was to transform Forest Lane into a dead-end street as the most aggressive

solution. Second, modify the intersection of Forest Lane, Pineview Lane, and Westway Lane from a five-way to a four-way intersection and add four-way stop signs. And, additionally, construct chicanes along Forest Lane to break up the straight line and force drivers to slow down while maneuvering around the chicanes. The third option would just include the before mentioned intersection modification without the chicanes and therefore constitute the least invasive measure.

2. Public Input Meeting

In June 2015 invitations were mailed out to residents of Forest Lane and neighboring streets (Appendix B). The meeting was scheduled for July 8, 2015 at 5:15pm at the intersection of Forest Lane, Pineview Lane, and West Way Lane. It was intended to discuss potential traffic calming measures with the immediate neighborhood. The target group was selected from residents living on Forest Lane and neighboring streets. Approximately thirty interested citizens attended and provided Town staff with their input and ideas.

As expected, residents of Forest Lane asked for the most drastic solution, such as transforming the road into a dead-end street. Whereas residents of neighboring streets were opposed to drastic measures that would cut their routes through Forest Lane off. Residents of neighboring streets that also utilize Forest Lane were strongly opposed and expressed concerns whether a measure such as a road closure would serve the broader public or perhaps only a small group. The opinions expressed indicated the need for a diplomatic approach and mediation in the attempt to find an appropriate traffic calming solution.

As the meeting progressed, a mutual consent was reached by going forward with option three as a temporary installation. This option would modify the currently five-way intersection of Forest Lane, Pineview Lane, and Westway Lane into a four-way intersection. And, additionally place four-way stop signs at the newly modified intersection (Figure 4). To determine whether traffic volumes would be reduced due to the measure, Town staff agreed to perform a traffic count following the intersection modification. If a change in traffic volume was the result, the Town would transform the temporary installation into a permanent design.

3. Temporary Design Solution

On July, 15, 2015 a temporary intersection modification and stop signs were implemented (Figure 5). Before the temporary modification of the intersection, Westway Lane intersected the intersection of Pineview Lane and Forest Lane. This configuration created a five-way intersection. Once the southern portion of the Westway Lane access was modified, the former five-way intersection was transformed into a four-way intersection (Figure 4).

To accomplish this modification, traffic cones were placed in the intersection with ropes attached to force drivers into a wider turn as before. Additionally, temporary stop signs were placed at all streets, replacing the yield signs on Westway Lane (Figure 5). Purpose of this temporary modification was to inconvenience drivers through stop signs and wider turns. Whereas before drivers were able to quickly cut through the intersection without delay.

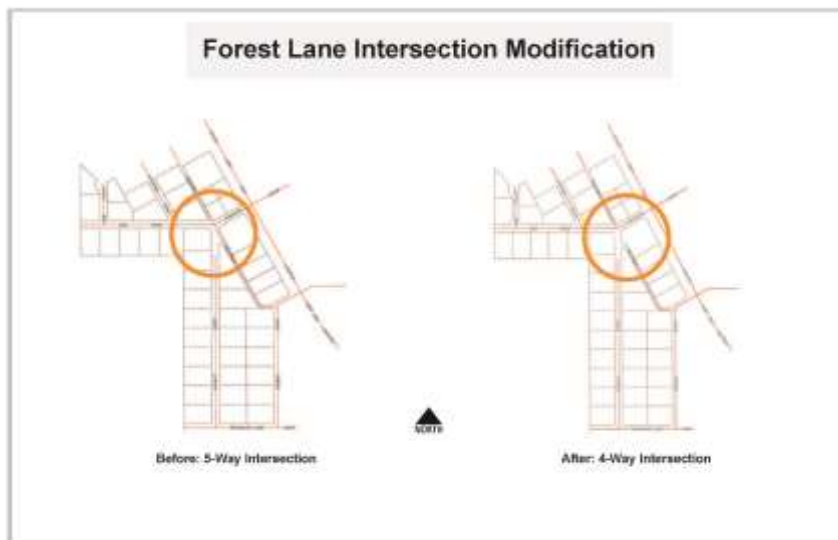


Figure 4 – Intersection Modification

4. Traffic Counts

As agreed at the Public Input meeting on July 8, 2015, a traffic counter was placed on Forest Lane. The count was performed with a TimeMark traffic counter, model Gamma, from July 20 until July 26, 2016. Two tubes were connected to the counter for more detailed data collection, such as determination of speed as well as size of vehicles.

After data had been collected it was retrieved from the counter and analyzed with VIAS 2 software provided by TimeMark. The weekly daily average traffic count for Forest Lane turned out to be 429 vehicles. Traffic volume between Monday and Friday averaged at 477 vehicles per day.



Pineview Lane looking east towards Forest Lane



Forest Lane looking south towards Westway Lane intersection



Westway Lane looking south towards Pineview Lane intersection



Forest Lane looking north towards Pineview Lane intersection

Figure 5 – Temporary Intersection Modification

Discussion

Phase I can be considered the initial assessment of the situation, potential solutions, and temporary implementation of one traffic calming measure. Due to the fact that Forest Lane residents had previously approached the Pinetop-Lakeside Town Council unsuccessfully in regards to cut-through traffic, any discussion about potential measures to reduce the traffic volume was enthusiastically embraced.

During conversations and the Public Input meeting the issue of speeding drivers through Forest Lane seemed to be the major concern. Although staff explained several times that only two cars were speeding during the first traffic study, residents still felt that vehicles were too fast. With 25 miles per hour as posted speed limit, pedestrians may have the perception of higher speeds as they are walking next to traffic without any buffering.

In regards of traffic volume, Forest Lane residents felt that a majority of the cut-through traffic consisted of contractors commuting to and from the adjacent subdivisions (Figure 2). It is quite possible that contractor trucks use Forest Lane as a cut-through route to the neighboring subdivisions due to ongoing constructions. However, there is no evidence that these contractor trucks constitute the highest volume of the cut-through traffic on Forest Lane. There is however a tendency of subdivision residents to cut-through Forest Lane simply due to the perception that Forest Lane seems to be a short cut.

Once the temporary intersection modification was in place, driver behavior was compliant with the stop signs. Perhaps mostly due to the unfamiliarity with the new signage and wider turn. However, observations made by staff and residents during the following days indicated that drivers became quickly familiar with the modifications and started to ignore the stop signs.

Implementation of a temporary intersection modification allowed staff to evaluate the effectiveness of the measure before committing to costly changes that may have not been successful. Furthermore, the temporary measure was a faster means for the Town of Pinetop-Lakeside to express concern for public input in planning matters. Residents of Forest Lane observed that their complaints were addressed by the Town. On the other hand, citizens opposing any traffic calming measures were not too offended due to the temporary installation

Traffic counts performed with the temporary intersection modification in place actually resulted in higher daily traffic volumes than the count performed in winter 2014/2015. Although traffic counts are a widely applied measure to evaluate the effectiveness of traffic calming measures, it is difficult for municipalities such as Pinetop-Lakeside that have population fluctuation between winter and summer months.

Thus, the traffic count performed after the temporary intersection modification could not be used as comparison to the previous count in winter of 2014/2015. The latter traffic count was executed by the Pinetop-Lakeside Police Department with a Radar Speed sign. And, although verbally confirmed that approximately 400 vehicles per day were counted, it is highly unlikely because a traffic count performed with a TimeMark Gamma Traffic Counter in November 2015 (Chart 1) resulted in a weekly average daily traffic count of 130 vehicles. Any access to the traffic count data collected by the Police Department in winter 2014/2015 was lost due to a leaking battery that destroyed the counter's data storage device.

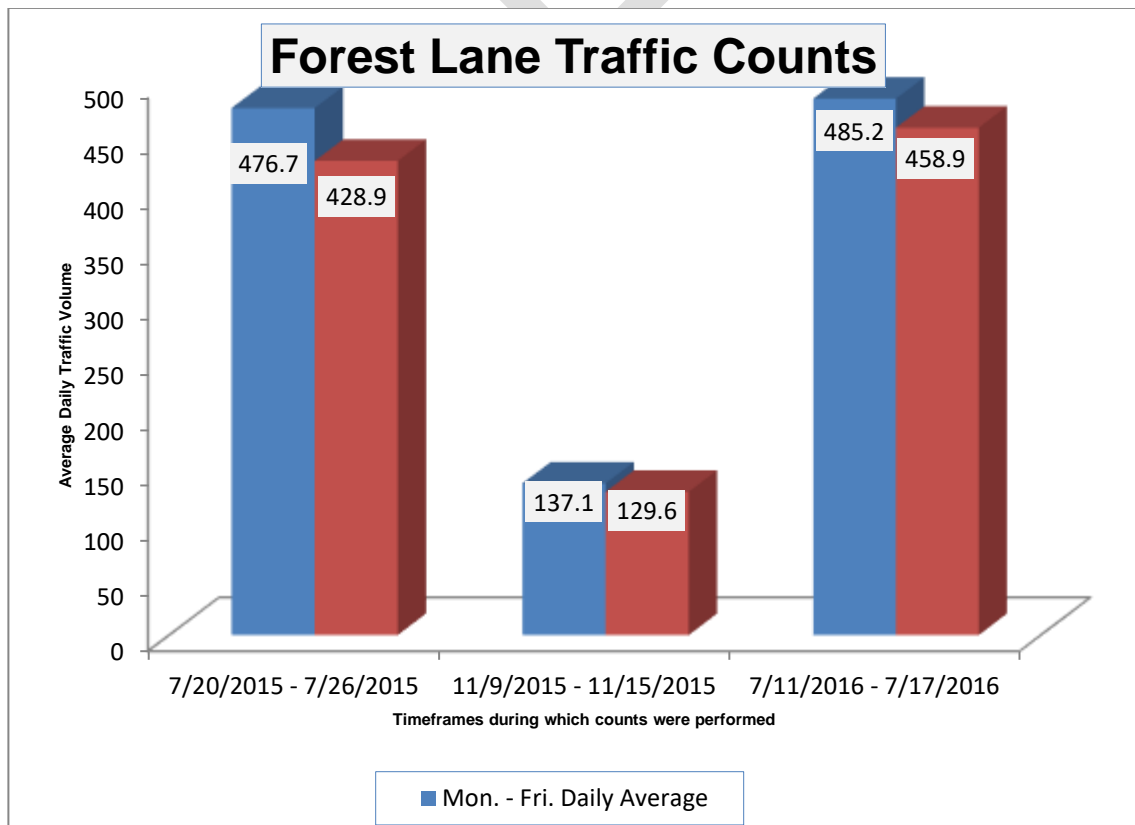


Chart 1 –Traffic Counts

Phase II

The second phase of this practicum project involved the following activities which will be discussed in detail below:

1. Permanent intersection modification;
2. Research;
3. Council Decision Request.

1. Permanent Intersection Modification

After implementation of temporary traffic calming measures in Phase I, the Town decided in September 2015 to permanently modify the intersection into a four-way intersection with four-way stop signs. This permanent modification included extension of the existing sidewalk in the ADOT Right of Way as well as permanent stop signs. The curb was extended to accommodate the temporary modification (see Figure 6).

Although the measure may not have been the most efficient method to reduce cut-through traffic, it was seen as a successful measure to transform a confusing five-way intersection into a four-way intersection. Traffic violations such as running stop signs may still occur as observed during the temporary installation in Phase I. However, the Pinetop-Lakeside Police Department has the means now to enforce the stop signs and cite drivers for not properly coming to a full halt at the intersection.

2. Research

One of the concerns regarding the proposed design solutions for Forest Lane was potential difficulties for snowplows and emergency responder vehicles to experience complications with chicanes or a dead end street. Chicanes or dead ending Forest Lane could increase the time for emergency responders. Snow plow drivers would need adequate space to turn around on a dead end street and chicanes could result in damage of the chicanes due to limited sight.

Further research into traffic calming measures lead to the option of speed cushions. Speed cushions are considered an alternative to speed humps or bumps and speed tables with the advantage of convenient spacing for emergency responder

vehicles (Figure 10). Furthermore, installation of speed cushions is flexible and thus supports temporary installment for efficiency testing.

Evaluation of traffic data in appendix A of Traffic Calming: State of the Practice indicated that speed cushions were rarely used by communities. However, the study shows a 30 percent reduction in traffic volume in the street speed cushions were implemented on (Table 2). Considering that the study is from 1999, the use of speed cushions as traffic calming measure may be more common at the present.



Pineview Lane looking east towards SR260



Pineview Lane looking south-east towards Westway Lane



Forest Lane looking south



Forest Lane looking north towards Pineview Lane

Figure 6 – Permanent Intersection Modification

To get the best results regarding reduction of traffic volume on Forest Lane, it was determined that nine speed cushions would be sufficient. This is based on the table provided by TrafficLogix, a business that sells speed cushions (Figure 7). With a width

of approximately 21', the option of three speed cushions was selected to discourage drivers from avoiding the speed cushions and perhaps driving over the shoulder.

	Number of streets/blocks in study	Average 85 th percentile speed change	Average volume (Vehicles/Day) change
Speed humps or tables*	194	-21%	-18%
Chicanes or chokers*	7	-14%	-26%
Speed cushions*	1	-20%	-30%
Other measures	85		
Total number of streets/blocks	287		

*Sole measure

Table 2 – Changes due to Traffic Calming Measures

(Source: Traffic Calming: State of the Practice)

Studies represented in Traffic Calming: State of the Practice used an average minimum distance between speed humps of 244' to a maximum average of 537'. Considering the length of Forest Lane being ¼ of a mile, the speed cushions should be placed approximately 300' apart to emphasize slower speeds. This strategy might eventually make Forest Lane unattractive as a cut-through street.

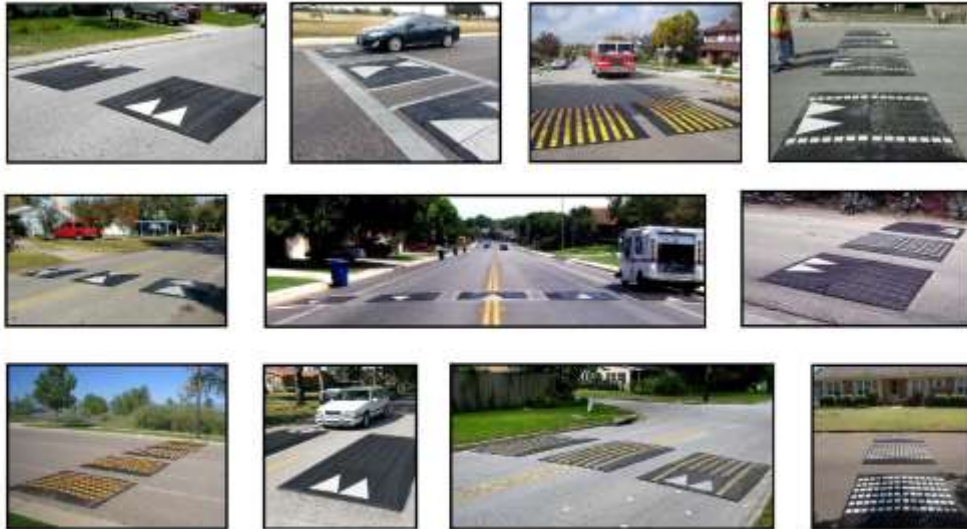


SPEED CUSHION SUGGESTED QUANTITY AND GAP SPACING

These speed cushion quantity suggestions and their respective spacing gaps shown in nominal dimensions, reduce hazardous water damming, allow for drainage and permits an unobstructed path for Emergency Response Vehicles. A trained traffic control specialist, planner or designer should always be consulted or retained for more precise cushion quantities, gaps and cushion placement.

ROAD WIDTH Feet	CUSHION QUANTITY	CURB GAP Inches	CUSHION Inches	GAP Inches	CUSHION Inches	GAP Inches	CUSHION Inches	GAP Inches	CUSHION Inches	GAP Inches	CUSHION Inches	CURB GAP Inches
18	2	18	72	36	72							18
20	2	24	72	48	72							24
22	3	12	72	12	72	12	72					12
24	3	12	72	24	72	24	72					12
26	3	12	72	36	72	36	72					12
* 28	3	18	72	30	72	30	72					18
28	3	24	72	36	72	36	72					24
30	4	12	72	16	72	16	72	16	72			12
32	4	12	72	24	72	24	72	24	72			12
34	4	15	72	30	72	30	72	30	72			15
36	4	18	72	36	72	36	72	36	72			18
38	5	12	72	18	72	18	72	18	72	18	72	12
40	5	12	72	24	72	24	72	24	72	24	72	12
42	5	18	72	27	72	27	72	27	72	27	72	18
44	5	28	72	28	72	28	72	28	72	28	72	28
46	5	32	72	32	72	32	72	32	72	32	72	32

* Alternate



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Figure 7 – Speed Cushion Gap Sheet
(Source: Traffic Logix.com)

3. Council Decision Request

Although the purchase of speed cushions did not require a decision of the Pinetop-Lakeside Town Council, potential for conflict influenced the decision to bring the purchase in front of the Town Council. It also gave the public an opportunity to express their approval or concerns of the planned traffic calming measure.

Three quotes were acquired before the Town Council meeting date that ranged from \$8,031.09 from TrafficLogix to \$12,226.72 from RubberForm. All offers included shipping and hardware without installation, which was planned to be executed by Public Works staff. The attached Council Decision Request (Appendix B) was handed out to members of the Pinetop-Lakeside Town Council in the official Town Council meeting package as agenda item number 8 (Appendix C) for their review before the actual meeting date of October 1, 2015. The Council Decision Request recommended the purchase of nine speed cushions for Forest Lane as traffic calming measure.

On October 1, 2015 the Council Decision Request was presented to the Pinetop-Lakeside Town Council as a Power Point Presentation (Appendix D). After the presentation public input was permitted and provided opportunities for Forest Lane residents to express their concerns regarding cut-through traffic to the Town Council.

Public input was not limited to Forest Lane residents and consequently opinions were raised against speed cushions from the public that felt Forest Lane was not a private road but rather for everyone to use and that speed cushions would be a nuisance. The Town Council discussion ranged from complete rejection to request for more data. It seemed that the notion during this discussion tended to be based on potentially cheaper solutions or, perhaps property owners paying for traffic calming measures.

The Town Council discussion was concluded by asking staff to provide less costly traffic calming solutions such as elimination of left turns onto SR260 from Pineview Lane and the request to inquire with residents on Forest Lane whether they are willing to pay for the speed cushions. Furthermore, staff was asked to provide more traffic count data to the council (Appendix E).

Discussion

Phase II represents a significant turn in options for the Town of Pinetop-Lakeside administration to assist Forest Lane residents with traffic calming measures. Although research indicated that speed cushions would be a potentially successful solution, the Pinetop-Lakeside Town Council was hesitant to approve speed cushions as a traffic calming measure and postponed the agenda item.

This hesitation of the Town Council to move forward with the purchase and implementation of speed cushions as traffic calming measure could have been caused by a range of different factors, such as reluctance to be the first community in the region to apply traffic calming measures. Or, creating a precedent that may lead to more requests for installation of speed cushions as traffic calming measure, which the Town may not have funding for. Due to the political positions the Town Councilors occupy, there could have been concerns to meet constituents' expectations.

Although the measures requested by the Town Council such as No-Left-Turn signs and traffic counts were executed, the approach to implement speed cushions as a traffic calming measure on Forest Lane was discarded by the administration.

Phase III

The third and last phase of this practicum project involved the following activities which will be discussed in detail below:

1. Temporary change in traffic pattern;
2. Traffic count.

1. Temporary change in traffic pattern

On November 23, 2015 Public Works Department staff installed a No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane to prevent traffic from cutting-through Forest Lane. This solution was chosen to fulfill one of the Town Council request from October 1, 2015 (Appendix E).

In fact, the Mayor instructed the Town Manager to install two No-Left-Turn signs. One at the Forest Lane and Woodland Lake Road intersection, and one at the Pineview Lane and SR260 intersection. However, placing a No-Left-Turn sign at the intersection of Pineview Lane and SR260 would have encroached in the Right-Of-Way of the Arizona Department of Transportation (ADOT). Furthermore, placing no left turn signs at both intersections would have inconvenienced residents of the approximately 100 households within the Forest Lane neighborhood.

As soon as the sign was installed calls, emails, and visits from concerned citizens started pouring in. Feedback by citizens that use Forest Lane as a cut-through was mostly negative with comments such as, "Most stupidest thing I have ever seen. Streets are for driving." Many citizens made the effort to visit staff at Town Hall to express their discontent about the change in traffic pattern. The general opinion seemed to be that the Town of Pinetop-Lakeside catered to a small group without considering the needs of the general population. However, calls and emails prevailed.

Within three days, the No-Right-Turn sign was stolen, most likely by an upset driver. Considering the uproar caused by this change in traffic pattern, the No-Right-Turn sign will not be replaced or other solutions pursued. It also is important to notice, that many complaints came from residents of the Woodland Hills subdivision which was built after the Forest Lane neighborhood was established.

2. Traffic Count

On November 9, 2015 a TimeMark Gamma traffic counter was placed on Forest Lane to monitor traffic as a follow up to the Pinetop-Lakeside Town Council request from October 1, 2015 to collect additional data. The counter was removed on November 16, 2015 and data was evaluated with VIAS software. The weekly average daily traffic volume for this time frame was 130 cars (Chart 1).

Although the traffic count shows a significant reduction in volume, it is highly unlikely to be the result of the intersection modification installed earlier in the year. Rather, due to the typical drop in population during winter months.

Discussion

For the most part, this last phase was addressing the Pinetop-Lakeside Town Council requests for additional traffic data and cheaper traffic calming solutions. The traffic count returned with lower numbers than the count performed in July of 2015. However, the reduced volume was predictable due to the seasonal population change that occurs in Pinetop-Lakeside after Labor Day. It is in fact an indicator that cut-through traffic on Forest Lane is reduced 70 percent during winter months and may be taken into consideration whether it is necessary to implement any more traffic calming measures on Forest Lane.

The temporary change in traffic pattern was intended by the Town Council to explore a cost effective measure to reduce the traffic volume on Forest Lane. In fact, a No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane was a far more intrusive measure than the planned installation of speed cushions. However, it would have only regulated cut-through traffic from Woodland Lake Road. Drivers would have still been able to cut-through coming from SR260 through Pineview Lane and going towards Woodland Lake Road. Furthermore, No-Left/Right Turn signs actually have been evaluated by the Street Transportation Division of the City of Phoenix, AZ with maintenance issues such as vandalism (Figure 8).

Residents of the Woodland Hills subdivision south of Forest Lane felt targeted by the measure and voiced their concerns and anger immediately after installation of the No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane. Although speed cushions would have inconvenienced the driving experience on Forest Lane for

the cut-through traffic, they most likely would have not had the intense disapproval of affected drivers. And, residents of Forest Lane would have had the satisfaction of a traffic calming measure that also affected speed which was still one of the concerns.

Table 3.4. Generalized Assessment of Traffic Calming Measures. (Phoenix, AZ)

Traffic Management Device	Traffic Reduction	Speed Reduction	Noise and Pollution	Safety	Traffic Access Restrictions	Emergency Vehicle Access	Maintenance Problems	Level of Violation	Cost
Speed Bumps	Possible	Limited	Increase Noise	No Documented Problems	None	Minor Problems	None	Not Applicable	Low
STOP Signs	Unlikely	None	Increase	Unclear	None	No Problems	None	Potentially High	Low
NO LEFT/RIGHT TURN Signs	Yes	None	Decrease	Improved	No Turn(s)	No Problems	Vandalism	Potentially High	Low
One-Way Street	Yes	None	Decrease	Improved	One Direction	One Direction	None	Low	Low
Chokers	Unlikely	Minor	No Change	Improved For Pedestrians	None	No Problems	Trucks Hit Curbs	Not Applicable	Moderate
Traffic Circle	Possible	Likely	No Change	Unclear	None	Some Constraint	Vandalism	Low	Moderate
Median Barrier	Yes	None	Decrease	Improved	Right Turn Only	Minor Constraint	None	Low	Moderate
Forward Turn Classification	Yes	Possible	Decrease	Improved	Some	Minor Constraint	Vandalism	Potentially High	Moderate
One-Direction	Yes	Likely	Decrease	Improved	One Direction	Minor Constraint	Vandalism	Potentially High	Moderate
Diagonal Dividers	Yes	Likely	Decrease	Improved	Thru Traffic	Some Constraint	Vandalism	Low	Moderate
Cal-de-Bac	Yes	Likely	Decrease	Improved	Total	Some Constraint	Vandalism	Low	High

Source: Street Transportation Division, City of Phoenix, AZ.

Table 3 – Traffic Calming Measures (Ewing, 1999)

(Source: Traffic Calming: State of the Practice)

After all, Forest Lane residents felt that a No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane was not sufficient. In their opinion the Town of Pinetop-Lakeside had not met their needs with just limiting traffic in one direction. In fact, they requested a No-Left-Turn sign at the intersection of Forest Lane and Woodland Lake Road to prevent traffic from cutting through the street. This request was denied by the Town Manger considering the hardship for the entire neighborhood.

The Town’s effort in reducing traffic volume on Forest Lane ended with the theft of the No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane. However, a potential traffic signal installation at the intersection of Woodland Lake Road and SR260, as discussed in Potential Future Design Solutions may reduce cut-through traffic due to easier access to SR260 from the Woodland Hills subdivision.

Potential Future Design Solutions

Although it was determined by the Town Manager not to pursue the installation of traffic calming measures on Forest Lane, future Town Council elections may result in a completely new set of Counselors and thus political agendas. If this were the case, traffic calming measures as a means to promote pedestrian and bicyclist friendly environments could be on the agenda again.

Traffic calming measures are certainly promoted in the 2015 General Plan for the Town of Pinetop-Lakeside as well as the Town Code. The General Plan specifically lists the implementation of traffic calming measures as implementation measures in the circulation goals (Town of Pinetop-Lakeside, 2015:2). And, the Town Code emphasizes discouragement of through traffic in the Subdivision Chapter (Town of Pinetop-Lakeside, 2015:16.24.070 B and E).

Due to the potential reevaluation of traffic calming measures for Forest Lane and streets of Pinetop-Lakeside in general, potential future design solutions will be discussed below:

1. Potential implementation of a traffic signal in partnership with ADOT and the Town of Pinetop-Lakeside;
2. Speed Cushions;
3. Chicanes.

1. Traffic Signal

One of the causes for cut-through traffic on Forest Lane is created because drivers are trying to avoid the intersection of Woodland Lake Road and SR260. It is generally more difficult to cross SR260 at this intersection because of the curvature of the road at this location. Crossing SR 260 at the intersection of Pineview Lane is less challenging because the road forms a straight line. During summer months traffic volumes on SR 260 are much higher than in winter which increases waiting times for drivers to cross the four-lane highway. Cutting through Forest Lane gives drivers the option to enter SR 260 from Pineview Lane.



Figure 8 – Cut-Through Traffic Intersections
 (Source: Google Maps)

Correspondence between ADOT and the Town of Pinetop-Lakeside administration in 2007 indicates that the Town had an opportunity to partner with ADOT and install a traffic light at the intersection of SR 260 and Woodland Lake Road.

According to the Regional ADOT Traffic Engineer, the signal warrant evaluation at the intersection of SR 260 and Woodland Lake Road “met the federal warrants for signalization.” (Letter from Chuck Gillick, P.E., Regional Traffic Engineer, Northern Traffic Engineering Region to Kelly Udall, Town Manager, Pinetop-Lakeside, April 23, 2007)

As further correspondence between the Town’s Public Works Director and the Regional ADOT Traffic Engineer shows, the Town’s administration was planning to pursue the partnering with ADOT to install a traffic signal at the intersection of SR 260 and Woodland Lake Road (Letter from Tom Thomas, Public Works Director, Pinetop-Lakeside to Chuck Gillick, April 27, 2007). According to Chuck Gillick’s correspondence to Tom Thomas, ADOT’s funding for the construction of a traffic signal at the intersection would constitute 66% and the Town’s contribution would be 33% (Letter from Chuck Gillick to Tom Thomas, May 3, 2007). However, the Town of Pinetop-Lakeside at that time decided not to proceed with these plans.

Since a traffic signal at this intersection would provide a safer environment for traffic to cross and eventually reduce cut-through traffic on Forest Lane, negotiations with ADOT have been regained. In November 2015 the Town Manager sent correspondence to the ADOT District Engineer inquiring whether ADOT would reconsider negotiations about installing a traffic signal at the intersection of SR260 and Woodland Lake Road (Appendix F). The ADOT North East District Engineer responded positively to the request and indicated that a traffic count would be a possibility in summer of 2016. A traffic signal study has been scheduled for July 2016 to assess the intersection for the potential construction of a traffic signal (Appendix F).

2. Speed cushions

Although dismissed by the Town Administration, speed cushions would be an option with great potential to reduce cut-through traffic on Forest Lane. It would also be in accordance with the 2015 General Plan of the Town of Pinetop-Lakeside. Although the argument could be posed that rural local streets should accommodate between 15 and 400 AADT, and serve travel over short distances, implementation measures for the Element of the General Plan asks for implementation of traffic calming devices (Town of Pinetop-Lakeside, 2015: 2).

Speed cushions would be a viable option as traffic calming measure for Forest Lane due to their feature of accommodating emergency responder vehicles, such as Fire Engines. Whereas speed bumps or speed tables require emergency services to drive over, speed cushions have a width of 72" which is less than the wheel track of Fire Trucks and Ambulances (Figure 10). However, their width is too large for other vehicles to avoid the hump. Although speed cushions mostly slow down traffic, they also reduce volume due to the inconvenience they pose on drivers using roads as cut-through (Ewing, 1999).

Besides the potential benefits for Forest Lane residents, the speed cushions could be also moved to other locations with the intention of traffic calming. Especially, if a traffic signal will be implemented at the intersection of SR260 and Woodland Lake Road, speed cushions may not be necessary any more on Forest Lane.



WHEEL TRACK: The measurement between the center point of both front tires.

Speed Cushions are another vital method in traffic calming. One very important factor of a speed cushion is the overall width. It must be wide enough to affect the speed of most vehicles, yet narrow enough not to impede Emergency Response Vehicles. A speed cushion width of 72" such as those manufactured by Traffic Logix, minimizes, if any, delays of these ERV's. Wheel Track is one important measurement in determining the value of a speed cushion. The chart displayed below shows that very few vehicles, apart from ERV's, can straddle a 72" wide speed cushion thus creating, as intended, an area to slow vehicles to safer speeds yet minimizing, if any, the speeds of emergency response vehicles. Any traffic calming device such as a speed hump or speed table whose widths are wider than 72" will then have an effect on all vehicles. The wheel track measurements shown are from various manufacturers published specifications.

AUTO	Wheel Track (Inches)	AUTO	Wheel Track (Inches)	TRUCKS	Wheel Track (Inches)
ACCORD	61	FOCUS	61	EXPRESS	68
AUDI	62-65	FUSION	63	F-150	67
BMW	60-63	TAURUS	66	F-250/F350	68
LA CROSSE/REGAL	62	MUSTANG	62	FRONTIER	62
VERANO	60	INFINITI	60-62	GMC 1500/2500/3500	69
CADILLAC	60-62	JAGUAR	61-64	RAM 1500	68
CANARD	64	JETTA	60	RAM 2500	69
CORVETTE	63	LEXUS	60-64	SILVERADO	69
IMPALA/MALIBU	62	MERCEDES	60-64	TACOMA	61
CHALLENGER/CHARGER	63	ALTRIA/MAXIMA	62	TITAN	68
CHRYSLER 200	62	SENTRA	60	TRANSIT	69
CHRYSLER 300	63	CAMRY/AVALON	61	TUNDRA	68
DAIT	62	COROLLA	60		
AMBULANCE	Wheel Track (Inches)	FIRE TRUCK	Wheel Track (Inches)	SUV	Wheel Track (Inches)
F-450 CHASSIS	75	H & W	74-83	EQUINOX	63
GMC CHASSIS	75	PIERCE	76-84	ESCAPE	62
LIFE LINE	72-75	FREIGHTLINER	75-79	EXPEDITION/EXPLORER	67
DEMERS	75-79	KENWORTH	75-79	SEQUOIA	68
		INTERNATIONAL	75-79	SUBURBAN/TAHOE	68
		SPARTAN	75-79	YUKON/YUKON XL	68
				LAND CRUISER	65



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Figure 10 – Wheel Track Table for Speed Cushions
(Source: Traffic Logix.com)

3. Chicanes

One of the potential traffic calming measures considered for Forest Lane but never pursued were chicanes (Figure 3). According to the studies referred to in Traffic Calming: State of the Practice, traffic volume on streets with chicanes was reduced 26 percent. Thus, ranging very closely near the success rate of 30 percent reduction in traffic volume of speed cushions in that same study.

Chicanes could be a successful solution to reduce the traffic volume on Forest Lane because the road is only 21' wide. By designing the width of the chicanes sufficient to block one lane and force drivers to watch oncoming traffic, Forest Lane would become inconvenient for cut-through and thus have a good chance of reducing traffic volumes. In combination with a traffic light at the intersection of SR 260 and Woodland Lake Road, drivers would perhaps choose the latter intersection instead of cutting through Forest Lane.

Chapter 4 – Conclusions

Summary and Conclusions

Although this practicum project was intended to develop and implement traffic calming measures on Forest Lane in Pinetop-Lakeside, the political environment permitted only the partial implementation of a traffic calming solution. The practicum project was started in spring of 2015 and was concluded by winter of the same year. It developed in three phases which started with research of potential traffic calming solutions, a public input meeting, temporary intersection modification, and a traffic count as an intended tool to measure the success of the traffic calming measure.

The second phase moved along with implementation of a permanent intersection modification, research of additional volume control measures, and ended with a Town Council Decision request to purchase and install nine speed cushions on Forest Lane. This can be considered a turning point in pursuing further traffic calming measures due to the hesitation of the Pinetop-Lakeside Town Council to move forward with implementation of successful traffic calming measures on Forest Lane.

Phase III concluded the practicum project with an unsuccessful temporary change in traffic pattern on Forest Lane due to vandalism. The installed No-Right-Turn sign at the intersection of Forest Lane and Pineview Lane was stolen by upset drivers and never replaced by the Town. A traffic count performed in November of 2015 resulted in approximately 70 percent lower volume than the count performed in August of the same year.

In regards to traffic counts as tool to evaluate vehicular speed and volume, challenges during the practicum surfaced due to malfunctioning counters. Although noted that traffic counts during winter of 2014/2015 resulted in volumes of approximately 400 vehicles per day, it was impossible to retrieve the actual data from the Pinetop-Lakeside Police Department. The battery of the counting device leaked and destroyed any data stored in the counter. Personnel involved in the data collection had left and only an approximate number was provided.

Later counts performed with traffic counters from the Pinetop-Lakeside Public Works Department showed a significant difference in volume. The counts in November of 2015 are approximately 34 percent lower than the counts performed in winter 2014/2015. Due to this difference in traffic volume the count could not be used to

determine whether the traffic calming measure was actually successful. Traffic counts performed during summer months of 2015 and 2016 are not significantly different and counts for summer 2014 do not exist.

Although the Town Code and General Plan for the Town of Pinetop-Lakeside clearly supports traffic calming, further promotion of this planning approach needs to be addressed. Traffic calming measures to prevent cut-through traffic and incorporating pedestrian needs are actually part of the Subdivision Title in the Town Code (16.24.070 (B) and (E)). Considering the sections of the Town Code and the General Plan that support multi-modal transportation, it may be valuable to make an argument in future Council Decision Requests regarding traffic calming measures such as speed cushions. As in the case of Forest Lane, the option of implementing speed cushions may then be reconsidered and perhaps approved by the Town Council. However, approval of the Town Council depends heavily on the agenda of each Council Member for their political constituents. Therefore, it is important for staff to present a Council Decision Request to find the right timing regarding the Town Council political priorities.

Personal Reflection

This practicum project has been an excellent experience to become familiar with the complexity of planning. In fact, it provided a variety of opportunities (1) to perform planning tasks, (2) to learn about the importance of comprehensive planning, and (3) to learn about the function of staff as advisors to the Town Council as well as Commissions.

Tasks such as research of traffic calming measures, writing Council Decision Requests, or gathering statistical data were directly related to classes taken during the degree program. Throughout the Practicum Project it became apparent that the Town of Pinetop-Lakeside was an example of municipalities with poorly designed subdivision regulations. Had there been the requirement for new developments to provide a traffic impact analysis, staff could have anticipated the effects on neighboring streets and acted accordingly. However, at the time subdivisions in the Forest Lane neighborhood were approved, regulations requiring a traffic impact analysis were non-existent in the Town Code. As of today, the Town of Pinetop-Lakeside has a chapter of the Town Code dedicated to subdivision regulations that require a traffic impact analysis for every development.

The third opportunity to learn about the importance of planning staff as advisor to Town Councilors and Commissioners was by far the most valuable and challenging. Due to an extreme political agenda of several Town Council members and a very focused effort of those Council members to discredit the then current Town Manager, it turned out to be particularly difficult for staff to balance interests of Forest Lane residents and the Council members' agenda. In general, any Council Decision Request that was supported by the Town Manager was destined to be discarded based on conflicts between some Council members and the acting Town Manager. The Council Decision Request for speed cushions on Forest Lane was one of the fatalities resulting from this less than ideal political environment. Shortly after completion of the practicum, the Town Manager was terminated. This was followed by a complete turnover of the Pinetop-Lakeside Town Council, with only one Council member of seven retaining their seat during the 2016 Pinetop-Lakeside Town Council election.

As challenging as this experience of serving as a staff advisor to the Town Council might have been, it certainly provided a better understanding of a planner's role in a municipal environment, as was repeatedly brought up in many occasions during course work in the MS Applied Geospatial Sciences degree program. In fact, the practicum project in a small community like Pinetop-Lakeside provided the advantages of learning many aspects of planning because staff is exposed to a wide variety of tasks, whereas a practicum experience with a larger municipality may have been more limited due to the greater specialization of planning tasks in different departments or divisions.

APPENDIX A

PUBLIC INPUT MEETING INVITATION

You're Invited

TOWN OF PINETOP-LAKESIDE

Public Input Meeting

What: Public Input Meeting regarding Forest, Pineview, and Westway Lanes
When: July 8th at 5:15 PM
Where: Intersection of Forest, Pineview, and Westway Lanes

For more information please call 928-368-8696



PINETOP/LAKESIDE
Celebrate the Seasons

DR

**APPENDIX B
COUNCIL DECISION REQUEST**

**COUNCIL DECISION REQUEST
(CDR)**

MEETING DATE: October 1, 2015

SUBJECT: Speed Cushion Purchase Discussion and Council Directive

DEPARTMENT/PRESENTER: Kathrine Nunn, Planning Technician

RESOLUTION **ORDINANCE** **PUBLIC HEARING** **OTHER**

BACKGROUND SUMMARY: Forest Lane property owners requested traffic calming solutions for their neighborhood. The Town of Pinetop-Lakeside staff has researched traffic calming measures to reduce traffic volume on Forest Lane (Attachment A). Several scenarios were presented and discussed (Attachment B). Upon careful research speed cushions as traffic calming measures were selected as a viable solution.

DISCUSSION: To evaluate potential solutions for traffic calming measures on Forest Lane the Town of Pinetop-Lakeside staff has researched and discussed different options. In 2007 a traffic signal at the intersection of Woodland Lake Road and SR260 was considered but not implemented. This traffic signal, if it had been implemented would have potentially diverted some of the cut-through traffic from Forest Lane onto SR260. However, to apply measures that could be implemented in the near future, the following options were analyzed. One of the solutions discussed was restricting traffic to only turn in one direction when entering or exiting Forest Lane. However, as it may reduce the volume on Forest Lane, it also would inconvenience not only cut through traffic but the residents on Forest Lane. Another potential solution would be to transform Forest Lane into a dead end street. This option would impact emergency services' time to arrive as fast as possible at an emergency location and therefore cannot be recommended. The third option would be to implement chicanes on Forest Lane. However, this would require construction and may not be as effective (Attachment C). The fourth option, speed cushions are a viable option for traffic calming due to their modular set up and therefore accommodation of emergency service vehicles such as fire trucks (Attachment D). Furthermore, installation of speed cushions can be temporary as well as permanent. In case of adverse weather conditions such as intense snow, the speed cushions could be removed for more efficient snow plowing.

Considering the circulation goals of the 2015 General Plan for Pinetop-Lakeside, in particular implementation measure 5 of the Circulation Element to "Implement traffic calming devices to increase transportation safety," installing speed cushions on Forest Lane would give the Town an opportunity to study the opportunities and challenges of traffic calming design elements (Attachment E). Although no accidents involving pedestrians or bicyclists have been reported on Forest Lane, residents have addressed staff with safety concerns walking on Forest Lane due to

the volume of traffic. Since speed cushions are flexible modules that can be removed, the Town could utilize them not only on one road but due to their flexibility in any street that needs traffic calming measures. Once it is determined that speed cushions as a traffic calming measure works in a particular street, more could be purchased and installed.

The high traffic count of over 400 Average Daily Traffic (ADT) (Attachment A) evaluates Forest Lane as a minor collector according to the Highway Functional Classification Concepts, Criteria and Procedures of the Federal Highway Administration (FHA). Based on this determination, the Town would have to provide the necessary improvements to bring Forest Lane up to design standards of a minor collector. According to the 2007 Community Transportation Plan for the Town of Pinetop-Lakeside, this would include widening both travel lanes to 12' add a bike lane of 6' on each side of the road and sidewalks (Attachment F). However, the Town's Right of Way currently only incorporates 50' therefore this option would not apply.

FINANCIAL ANALYSIS:

- Three estimates have been acquired by staff with two resulting quotes and one unanswered. For effective implementation 9 speed cushions are required (Attachment G). The estimated costs for the cushions including hardware and shipping range from \$8,031.09 provided by Traffic Logix, Inc. to \$12,226.72 provided by RubberForm. The costs will be covered by funding allocated from the Highway User Revenue Fund (HURF). Installation will be performed by Public Works staff.

LEGAL IMPLICATIONS: N/A

RECOMMENDATION: Staff recommends implementation of speed cushions as traffic calming measure for Forest Lane.

SUBMITTED BY:

TOWN MANAGER REVIEW AND SIGNATURE:

APPENDIX C

MEETING AGENDA FOR TOWN COUNCIL MEETING ON 1 OCTOBER, 2015

DRAFT 3



PINETOP-LAKESIDE TOWN COUNCIL
NOTICE OF REGULAR MEETING AND AGENDA
THURSDAY, OCTOBER 1, 2015

Pursuant to Arizona Revised Statutes Section 38-431.02, notice is hereby given to the members of the Pinetop-Lakeside Town Council and to the general public that the Council will hold a meeting open to the public on Thursday, October 1, 2015, beginning at 6:00 p.m., in the Pinetop-Lakeside Town Council Chambers located at 1360 N. Niels Hansen Lane, Pinetop-Lakeside, Arizona.

Addressing the Town Council: Persons wishing to address the Town Council shall fill out a Request to address the Town Council form, and give it to the Town Clerk, and shall use the microphone at the podium. Please wait to be recognized, go to the podium and state your name and address.

- a. Items Not on the Agenda: Members of the public may speak under Call to the Public on any topic NOT on the agenda. Remarks are limited to 3 minutes and no discussion will be had at this time.
- b. Agenda Items: Public comment will be taken at the beginning of each agenda item, after the subject has been announced by the Mayor and explained by staff. Any citizen, who wishes, may speak one time for 5 minutes on each agenda item before or after Council discussion. Questions from Council members, however, may be directed to staff or a member of the public through the Mayor at any time.

Any prayer/invocation that may be offered before the start of regular Council business shall be the voluntary offering of a private citizen, for the benefit of the Council and the citizens present. The views or beliefs expressed by the prayer/invocation speaker have not been previously reviewed or approved by the Council, and the Council does not endorse the religious beliefs or views of this, or any other speaker. A list of volunteers is maintained by the Town Manager's Office and interested persons should contact the Town Manager's Office for further information.

Members of the Pinetop-Lakeside Town Council will attend either in person or by telephone conference call or other technologic means.

AGENDA:

Call to order, roll call and ascertain quorum.

1. Pledge of Allegiance and Invocation.
2. Recognition of Paul Esparza, Community Development Director, for 18 years of dedicated service to the Town of Pinetop-Lakeside.

3. Recognition of John Vuolo, Parks and Recreation Director, for 22 years of dedicated service to the Town of Pinetop-Lakeside.
4. Mayor's Proclamation of October 2015 as Breast Cancer Awareness Month in the Town of Pinetop-Lakeside.
5. Mayor's Proclamation of October 2015 as Domestic Violence Awareness Month in the Town of Pinetop-Lakeside.
6. Consent Agenda:
 - A. Action Minutes of the Regular Meeting held on September 17, 2015; and
 - B. Council Decision Request to enter into a Joint Partnership Agreement with ADOT consisting of right-of-way (ROW) acquisition and the design and construction of a multiuse pathway, connecting existing facilities to the State Route (SR) 260, and a multiuse bridge over Billy Creek; and
 - C. Council Decision Request to approve an Agreement with Arizona Game and Fish Department extending the regional White Mountain trail system within the Town of Pinetop-Lakeside boundaries.
7. Discussion/Information re: Town Code review of Residential Care Facilities in the Town of Pinetop-Lakeside.
8. Discussion/Information/Legal Action re: Council Decision Request to purchase and install Speed Cushions on Forest Lane.
9. Save Our Park Update and Report by Norris Dodd.
10. Discussion/Information/Legal Action re: Council Decision Request and Resolution No. 15-1355 approving an appraisal of Woodland Park by the USDA Forest Service.
11. Discussion/Information/Legal Action re: Council Decision Request and Ordinance No. 15-390 amending current Town Code Chapter 8.16, "Fireworks," and adopts the following:
 - A. Town Code Chapter 8.16, "Fireworks."
12. Discussion/Information/Legal Action re: Council Decision Request and adoption of Resolution No. 15-1356 that approves the following documents to be a Public Record for adoption by reference:
 - A. Town Code Chapter 8.16, "Fireworks."
13. Current Events:
 - A. Current Events and Town Council Reports on all Council Appointed Committees, Community Organizations and Affiliates.
 - B. Recent and/or Upcoming Town Events and Activities.

14. Future Agenda Items.
15. Call to the Public. This is a business meeting of the Town Council. The Town values and welcomes public input. Please address the Council as a whole and not individual Council Members. Do not address staff or members of the audience. Council action on items brought up in Call to the Public is limited by the Open Meeting Law. The Council may direct staff to study the matter and reschedule for further consideration at a later date. Items on the agenda will not be heard or discussed in Call to the Public. Individuals are limited to three (3) minutes.
16. Discussion/Information/Legal Action re: Council Decision Request to enter into an Employment Agreement with Leah Chavez, Town Clerk. Pursuant to A.R.S. Section 38-431.03 (A)(1) and A.R.S. Section 38-431.03 (A)(4) the Town Council may vote to enter into Executive Session to discuss this item.

The Town Council may vote to hold an executive session for the purpose of obtaining legal advice from the Town Attorney on any matter listed on the agenda pursuant to A.R.S. § 38-431.03(A)(3).

Dated this 25th day of September 2015.

PINETOP-LAKESIDE TOWN COUNCIL

/s/Leah Chavez, CMC, Town Clerk

A copy of agenda background material provided to Council Members, with the exception of material relating to possible executive sessions, is available for public inspection at the Town Clerk's Office, 1360 N. Niels Hansen Lane, Monday-Friday, 8:00 a.m. - 5:00 p.m.

AMERICANS WITH DISABILITIES ACT: The Town of Pinetop-Lakeside intends to comply with the A.D.A. If you are disabled or physically challenged and need special accommodations to participate, please contact the Town Clerk at (928) 368-8696 ext. 223 at least 48 hours prior to the meeting.

APPENDIX D

TOWN COUNCIL POWER POINT PRESENTATION – 10/01/2015

DRAFT 3



Speed Cushions as Traffic Calming Solution

Eng 2015

October 2015

Kathrine Nunn, Planning Technician,
Community Development Department



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Background

- Request for traffic calming on Forest Lane
- High traffic volumes averaging 479 cars per day



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Discussion

- **Three scenarios for potential solutions:**
 - Modified intersection
 - Modified intersection and Chicanes
 - Dead end



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- **Modified intersection**



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- **Modified intersection and Chicanes**



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- Dead end



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Other Options

- Traffic signal at intersection of Woodland Lake Road and SR260
 - ➔ Planned for 2007 but not implemented
- One direction turns only
 - ➔ Would inconvenience residents
- Dead end street
 - ➔ Would impact emergency services
- Chicanes
 - ➔ Requires construction and results may not be satisfying



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Further research

Traffic Calming: State of the Practice (1999)

	Percentage of streets in study	Average 85th Percentile Speed change	Average volume (Vehicles/Day) change
Speed humps or tables	68%	-21%	-18%
Chicanes and chokers	2%	-14%	-26%

* The study lists traffic calming measures in 41 cities with valuable data collected on 285 streets.

* Speed cushions are only used on one street resulting in -20% change of the 85th Percentile Speed and -30% change in volume.

* 85th percentile speed – the speed at or below which 85 percent of vehicles travel. (http://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa10001/#c2)



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Speed Cushions

- Modular setup
- Accommodate fire trucks
- Can be easily removed

WHEEL TRACK: The measurement between the center point of both front tires.

Speed cushions are available with wheel track spacing that will accommodate 90% of a speed cushion in the wheel width. It is not the wheel track that affects the speed of most vehicles, but the wheel track for heavy emergency response vehicles. A speed cushion width of 12" will allow most vehicles to pass through safely. A very large emergency vehicle's wheel track would require measurement or adjustment of the size of a speed cushion. The wheel track for most emergency response vehicles, apart from fire trucks, is around a 12" wheel track. This cushion is designed to give fire trucks the extra space they need. If you're the speed of emergency response vehicles, the width of the wheel track is a critical factor in determining the size of a speed cushion. The wheel track measurement should be taken from the center of the front wheel to the center of the front wheel.

Vehicle	Wheel Track	Wheel Track	Wheel Track	Wheel Track
1999-2000 Ford F-150	58"	58"	58"	58"
1999-2000 Ford F-250	58"	58"	58"	58"
1999-2000 Ford F-350	58"	58"	58"	58"
1999-2000 Ford F-450	58"	58"	58"	58"
1999-2000 Ford F-550	58"	58"	58"	58"
1999-2000 Ford F-650	58"	58"	58"	58"
1999-2000 Ford F-750	58"	58"	58"	58"
1999-2000 Ford F-850	58"	58"	58"	58"
1999-2000 Ford F-950	58"	58"	58"	58"
1999-2000 Ford F-1000	58"	58"	58"	58"
1999-2000 Ford F-1100	58"	58"	58"	58"
1999-2000 Ford F-1200	58"	58"	58"	58"
1999-2000 Ford F-1300	58"	58"	58"	58"
1999-2000 Ford F-1400	58"	58"	58"	58"
1999-2000 Ford F-1500	58"	58"	58"	58"
1999-2000 Ford F-1600	58"	58"	58"	58"
1999-2000 Ford F-1700	58"	58"	58"	58"
1999-2000 Ford F-1800	58"	58"	58"	58"
1999-2000 Ford F-1900	58"	58"	58"	58"
1999-2000 Ford F-2000	58"	58"	58"	58"
1999-2000 Ford F-2100	58"	58"	58"	58"
1999-2000 Ford F-2200	58"	58"	58"	58"
1999-2000 Ford F-2300	58"	58"	58"	58"
1999-2000 Ford F-2400	58"	58"	58"	58"
1999-2000 Ford F-2500	58"	58"	58"	58"
1999-2000 Ford F-2600	58"	58"	58"	58"
1999-2000 Ford F-2700	58"	58"	58"	58"
1999-2000 Ford F-2800	58"	58"	58"	58"
1999-2000 Ford F-2900	58"	58"	58"	58"
1999-2000 Ford F-3000	58"	58"	58"	58"
1999-2000 Ford F-3100	58"	58"	58"	58"
1999-2000 Ford F-3200	58"	58"	58"	58"
1999-2000 Ford F-3300	58"	58"	58"	58"
1999-2000 Ford F-3400	58"	58"	58"	58"
1999-2000 Ford F-3500	58"	58"	58"	58"
1999-2000 Ford F-3600	58"	58"	58"	58"
1999-2000 Ford F-3700	58"	58"	58"	58"
1999-2000 Ford F-3800	58"	58"	58"	58"
1999-2000 Ford F-3900	58"	58"	58"	58"
1999-2000 Ford F-4000	58"	58"	58"	58"
1999-2000 Ford F-4100	58"	58"	58"	58"
1999-2000 Ford F-4200	58"	58"	58"	58"
1999-2000 Ford F-4300	58"	58"	58"	58"
1999-2000 Ford F-4400	58"	58"	58"	58"
1999-2000 Ford F-4500	58"	58"	58"	58"
1999-2000 Ford F-4600	58"	58"	58"	58"
1999-2000 Ford F-4700	58"	58"	58"	58"
1999-2000 Ford F-4800	58"	58"	58"	58"
1999-2000 Ford F-4900	58"	58"	58"	58"
1999-2000 Ford F-5000	58"	58"	58"	58"
1999-2000 Ford F-5100	58"	58"	58"	58"
1999-2000 Ford F-5200	58"	58"	58"	58"
1999-2000 Ford F-5300	58"	58"	58"	58"
1999-2000 Ford F-5400	58"	58"	58"	58"
1999-2000 Ford F-5500	58"	58"	58"	58"
1999-2000 Ford F-5600	58"	58"	58"	58"
1999-2000 Ford F-5700	58"	58"	58"	58"
1999-2000 Ford F-5800	58"	58"	58"	58"
1999-2000 Ford F-5900	58"	58"	58"	58"
1999-2000 Ford F-6000	58"	58"	58"	58"
1999-2000 Ford F-6100	58"	58"	58"	58"
1999-2000 Ford F-6200	58"	58"	58"	58"
1999-2000 Ford F-6300	58"	58"	58"	58"
1999-2000 Ford F-6400	58"	58"	58"	58"
1999-2000 Ford F-6500	58"	58"	58"	58"
1999-2000 Ford F-6600	58"	58"	58"	58"
1999-2000 Ford F-6700	58"	58"	58"	58"
1999-2000 Ford F-6800	58"	58"	58"	58"
1999-2000 Ford F-6900	58"	58"	58"	58"
1999-2000 Ford F-7000	58"	58"	58"	58"
1999-2000 Ford F-7100	58"	58"	58"	58"
1999-2000 Ford F-7200	58"	58"	58"	58"
1999-2000 Ford F-7300	58"	58"	58"	58"
1999-2000 Ford F-7400	58"	58"	58"	58"
1999-2000 Ford F-7500	58"	58"	58"	58"
1999-2000 Ford F-7600	58"	58"	58"	58"
1999-2000 Ford F-7700	58"	58"	58"	58"
1999-2000 Ford F-7800	58"	58"	58"	58"
1999-2000 Ford F-7900	58"	58"	58"	58"
1999-2000 Ford F-8000	58"	58"	58"	58"
1999-2000 Ford F-8100	58"	58"	58"	58"
1999-2000 Ford F-8200	58"	58"	58"	58"
1999-2000 Ford F-8300	58"	58"	58"	58"
1999-2000 Ford F-8400	58"	58"	58"	58"
1999-2000 Ford F-8500	58"	58"	58"	58"
1999-2000 Ford F-8600	58"	58"	58"	58"
1999-2000 Ford F-8700	58"	58"	58"	58"
1999-2000 Ford F-8800	58"	58"	58"	58"
1999-2000 Ford F-8900	58"	58"	58"	58"
1999-2000 Ford F-9000	58"	58"	58"	58"
1999-2000 Ford F-9100	58"	58"	58"	58"
1999-2000 Ford F-9200	58"	58"	58"	58"
1999-2000 Ford F-9300	58"	58"	58"	58"
1999-2000 Ford F-9400	58"	58"	58"	58"
1999-2000 Ford F-9500	58"	58"	58"	58"
1999-2000 Ford F-9600	58"	58"	58"	58"
1999-2000 Ford F-9700	58"	58"	58"	58"
1999-2000 Ford F-9800	58"	58"	58"	58"
1999-2000 Ford F-9900	58"	58"	58"	58"
1999-2000 Ford F-10000	58"	58"	58"	58"



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Speed Cushions

- 2015 General Plan Circulation Element
 - Measure 5: "Implement traffic calming devices to increase transportation safety."
- Opportunity for Town to study traffic calming design elements
- Speed Cushion set is flexible to be removed from one street and installed on another street as needed



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Challenges

- Traffic volume needs to be decreased
- ADT over 400 qualify as Minor Collectors (FHA)
- Design standard requires width of 60'



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Financial Analysis

- Quotes range from \$8,031.00 to \$12,227.00
- Funding for cushions through Highway User Revenue Fund (HURF)
- Installation by Public Works staff

SPEDS CUSHION SUGGESTED QUANTITY AND GAP SPACING

These specifications were developed by the manufacturer to provide a general estimate of the number of cushions required for a given project. Actual quantities may vary based on site conditions, vehicle speed, and other factors. It is recommended that a site visit be conducted to determine the exact quantity and gap spacing required for a specific project.

Speed (mph)	Vehicle Type	Recommended Cushion Quantity	Recommended Gap Spacing (ft)
10	Passenger Car	10	10
15	Passenger Car	15	15
20	Passenger Car	20	20
25	Passenger Car	25	25
30	Passenger Car	30	30
35	Passenger Car	35	35
40	Passenger Car	40	40
45	Passenger Car	45	45
50	Passenger Car	50	50
55	Passenger Car	55	55
60	Passenger Car	60	60
65	Passenger Car	65	65
70	Passenger Car	70	70
75	Passenger Car	75	75
80	Passenger Car	80	80
85	Passenger Car	85	85
90	Passenger Car	90	90
95	Passenger Car	95	95
100	Passenger Car	100	100
10	Light Truck	10	10
15	Light Truck	15	15
20	Light Truck	20	20
25	Light Truck	25	25
30	Light Truck	30	30
35	Light Truck	35	35
40	Light Truck	40	40
45	Light Truck	45	45
50	Light Truck	50	50
55	Light Truck	55	55
60	Light Truck	60	60
65	Light Truck	65	65
70	Light Truck	70	70
75	Light Truck	75	75
80	Light Truck	80	80
85	Light Truck	85	85
90	Light Truck	90	90
95	Light Truck	95	95
100	Light Truck	100	100
10	Medium Truck	10	10
15	Medium Truck	15	15
20	Medium Truck	20	20
25	Medium Truck	25	25
30	Medium Truck	30	30
35	Medium Truck	35	35
40	Medium Truck	40	40
45	Medium Truck	45	45
50	Medium Truck	50	50
55	Medium Truck	55	55
60	Medium Truck	60	60
65	Medium Truck	65	65
70	Medium Truck	70	70
75	Medium Truck	75	75
80	Medium Truck	80	80
85	Medium Truck	85	85
90	Medium Truck	90	90
95	Medium Truck	95	95
100	Medium Truck	100	100
10	Heavy Truck	10	10
15	Heavy Truck	15	15
20	Heavy Truck	20	20
25	Heavy Truck	25	25
30	Heavy Truck	30	30
35	Heavy Truck	35	35
40	Heavy Truck	40	40
45	Heavy Truck	45	45
50	Heavy Truck	50	50
55	Heavy Truck	55	55
60	Heavy Truck	60	60
65	Heavy Truck	65	65
70	Heavy Truck	70	70
75	Heavy Truck	75	75
80	Heavy Truck	80	80
85	Heavy Truck	85	85
90	Heavy Truck	90	90
95	Heavy Truck	95	95
100	Heavy Truck	100	100



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Conclusion

- Staff recommends implementation of speed cushions as traffic calming measure for Forest Lane



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APPENDIX E
TOWN COUNCIL MEETING MINUTES – 10/01/2015

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ACTION MINUTES OF THE
REGULAR MEETING OF THE TOWN COUNCIL
October 1, 2015

The Pinetop-Lakeside Town Council held a Regular Meeting on Thursday October 1, 2015, at 6:00 p.m. in the Pinetop-Lakeside Council Chambers located at 1360 N. Niels Hansen Lane, Pinetop-Lakeside, Arizona.

Mayor Smith called the meeting to order at 6:01 p.m.

Roll call was taken as follows:

ROLL CALL:	PRESENT	ABSENT		PRESENT	ABSENT
Mayor Greg Smith	_X_	_____	Dara Vanesian	_X_	_____
Vice Mayor Pat Place	_X_	_____	Michael Wilber	_X_	_____
Roger Williams	_X_	_____	Leslee Wessel	_X_	_____
Stephanie Irwin	_X_	_____			

STAFF PRESENT:

Evelyn Racette, Town Manager; Leah Chavez, Town Clerk; Matt Patterson, Public Works Director; Kathrine Nunn, Planning Technician; Paul Esparza, Community Development Director; John Vuolo, Parks and Recreation Director; Mary French-Jones, Grant Coordinator.

ITEM NO. 6, CONSENT AGENDA:

The Consent Agenda consisted of the Action Minutes of the Regular Meeting held on September 17, 2015; and Council Decision Request to enter into a Joint Partnership Agreement with ADOT consisting of a right of way (ROW) acquisition and the design and construction of a multiuse pathway, connecting existing facilities to the State Route (SR) 260, and a multiuse bridge over Billy Creek; and Council Decision Request to approve an Agreement with Arizona Game and Fish Department extending the regional White Mountain trail system within the Town of Pinetop-Lakeside boundaries.

COUNCILMEMBER IRWIN MOVED TO APPROVE THE CONSENT AGENDA AS PRESENTED. COUNCILMEMBER WILLIAMS SECONDED THE MOTION AND IT CARRIED UNANIMOUSLY.

ITEM NO. 7, TOWN CODE REVIEW OF RESIDENTIAL CARE FACILITIES IN THE TOWN OF PINETOP-LAKESIDE:

COUNCILMEMBER WESSEL MOVED TO ENTER INTO EXECUTIVE SESSION AT 6:38 P.M. FOR THE PURPOSE OF OBTAINING LEGAL ADVICE FROM THE TOWN ATTORNEY PURSUANT TO A.R.S. § 38-431.03 (A)(3). MAYOR SMITH SECONDED THE MOTION AND IT CARRIED 4-3 WITH VICE MAYOR PLACE, COUNCILMEMBER VANESIAN AND COUNCILMEMBER WILLIAMS OPPOSED.

MAYOR SMITH RECONVENED THE REGULAR MEETING AT 6:50 P.M.

ITEM NO. 8, COUNCIL DECISION REQUEST TO PURCHASE AND INSTALL SPEED CUSHIONS ON FOREST LANE:

MAYOR SMITH MOVED TO POSTPONE THE AGENDA ITEM FOR FURTHER REVIEW BY STAFF TO INCLUDE THE IMPACT FEE FUNDING POTENTIAL AND FURTHER STUDY OF THE POTENTIAL OF NO LEFT TURNS. COUNCILMEMBER VANESIAN SECONDED THE MOTION AND IT CARRIED UNANIMOUSLY.

ITEM NO. 10, COUNCIL DECISION REQUEST AND RESOLUTION NO. 15-1355 APPROVING AN APPRAISAL OF WOODLAND PARK BY THE USDA FOREST SERVICE:

COUNCILMEMBER WESSEL MOVED TO ADOPT RESOLUTION NO. 15-1355 APPROVING AN APPRAISAL OF WOODLAND PARK BY THE USDA FOREST SERVICE. COUNCILMEMBER PLACE SECONDED THE MOTION AND IT CARRIED 6-1 WITH COUNCILMEMBER VANESIAN OPPOSED.

ITEM NO. 11, COUNCIL DECISION REQUEST AND ORDINANCE NO 15-390 AMENDING CURRENT TOWN CODE CHAPTER 8.16 "FIREWORKS" AND ADOPTS THE FOLLOWING TOWN CODE CHAPTER 8.16 "FIREWORKS.":

MAYOR SMITH MOVED TO ADOPT ORDINANCE NO. 15-390 AMENDING CURRENT TOWN CODE CHAPTER 8.16 "FIREWORKS" AND ADOPT NEW TOWN CODE CHAPTER 8.16 "FIREWORKS." COUNCILMEMBER IRWIN SECONDED THE MOTION AND IT CARRIED 5-2 WITH VICE MAYOR PLACE AND COUNCILMEMBER WILLIAMS OPPOSED.

ITEM NO. 12, COUNCIL DECISION REQUEST AND RESOLUTION NO. 15-1356 THAT APPROVES THE DOCUMENT KNOWN AS TOWN CODE CHAPTER 8.16 "FIREWORKS" AS A PUBLIC RECORD:

COUNCILMEMBER IRWIN MOVED TO ADOPT RESOLUTION NO. 15-1356 APPROVING THE DOCUMENT KNOWN AS TOWN CODE CHAPTER 8.16 "FIREWORKS" AS A PUBLIC RECORD. COUNCILMEMBER WILBER SECONDED THE MOTION AND IT CARRIED 5-2 WITH VICE MAYOR PLACE AND COUNCILMEMBER WILLIAMS OPPOSED.

ITEM NO. 16, COUNCIL DECISION REQUEST TO ENTER INTO AN EMPLOYMENT AGREEMENT WITH LEAH CHAVEZ, TOWN CLERK.

COUNCILMEMBER WESSEL MOVED TO ENTER INTO EXECUTIVE SESSION AT 8:24 P.M. MAYOR SMITH SECONDED THE MOTION AND IT CARRIED 4-3 WITH VICE MAYOR PLACE, COUNCILMEMBER VANESIAN AND COUNCILMEMBER WILLIAMS OPPOSED.

MAYOR SMITH RECONVENED THE REGULAR MEETING AT 8:58 P.M.

THE MEETING ADJOURNED AT 8:59 P.M.

Dated this 7th day of October 2015.

PINETOP-LAKESIDE TOWN COUNCIL

/s/Leah Chavez, CMC, Town Clerk

APPENDIX F

SR260 – WOODLAND LAKE ROAD TRAFFIC LIGHT CORRESPONDENCE

DRAFT 3



Intermodal Transportation

Douglas A. Ducey, Governor
John S. Hallikowski, Director
Dallas Hammit, State Engineer
Steve Boschen, Division Director

November 23, 2015

Evelyn Racette
Town Manager
1360 N. Neils Hansen Ln
Pinetop-Lakeside, AZ. 85929

Subject: Woodland Lake Road, traffic signal

Dear Ms. Racette:

Thank you for your correspondence regarding traffic concerns at the intersection of SR 260 and Woodland lake Road.

A traffic study was completed on the referenced intersection in 2007, and as you mention in your letter, the town of Pinetop-Lakeside decided not to pursue the signal even though at the time it met warrants. Since 2007 the analysis methodology has changed. For this reason a new study will need to be pursued as per your request.

Historical traffic count data indicates that June, July and August have the highest traffic counts, and it is likely that the intersection would reflect that. The earliest date that traffic counts could be done is May, since traffic counters need to be placed across the roadway and this cannot be done during snow months.

Since July is probably the period when this area sees the most congestion, a traffic signal study will be scheduled for July. Counts will take place on a Tuesday, Wednesday or Thursday so as not to be influenced by Holiday traffic.

I will plan to schedule a meeting with you as soon as the study is complete to discuss the findings.

Please contact me with any remaining questions. (928) 524-5404

Sincerely,

Lynn Johnson P.E.
North East District Engineer



November 5, 2015

Lynn Johnson, P.E.
District Engineer
MD H700
2407 E. Navajo Blvd.
Holbrook, AZ 86025

RE: Traffic Signal at Intersection of SR260 and Woodland Lake Road

Dear Lynn,

As per our conversation during the TAC meeting on Tuesday, I would like to inquire about a potential traffic signal at the intersection of SR260 and Woodland Lake Road.

To my understanding, there have been discussions between ADOT and the Town of Pinetop-Lakeside in 2006 to construct a traffic signal at above mentioned intersection. I also understand that the Town's administration at that time stepped back from the project for reasons with which I am not familiar.

However, I would like to see a traffic signal implemented at this particular intersection for the following reasons:

- The intersection of SR260 and Woodland Lake Road is considered an "Intersection with a high number of accidents" according to the Pinetop-Lakeside Pedestrian Safety and Transportation Study performed by LIMA & Associates in 2010. Implementing a traffic signal at this intersection would provide a safer environment for cars turning onto SR260. Furthermore, it would add an additional point for pedestrians to safely cross SR260.
- A traffic signal at the intersection of SR260 and Woodland Lake Road would potentially reduce cut-through traffic on Forest Lane. Many drivers avoid left turns at this intersection and rather take Forest Lane to turn left at the intersection of SR260 and Pineview Lane due to easier access.

Although the Town of Pinetop-Lakeside and ADOT did not come to an agreement regarding a traffic signal at the intersection of SR260 and Woodland Lake Road, I would appreciate you reconsidering the implementation of a traffic signal at this particular intersection for the above mentioned reasons.

Thank you for your careful consideration of this matter.
Regards,

Evelyn Racette
Town Manager

1360 N. Niels Hansen Lane • Pinetop-Lakeside, AZ 85929
(928) 368-8696 • TTY Relay (800) 842-4681 • Fax (928) 368-8528
www.pinetoplakesideaz.gov



Janet Napolitano
Governor
Victor M. Mendez
Director

Arizona Department of Transportation
Intermodal Transportation Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Sam Eilers
State Engineer

May 3, 2007

Mr. Tom Thomas, Public Works Director
Town of Pinetop-Lakeside
1360 N. Niels Hansen Lane
Lakeside, Arizona 85929

Dear Tom,

Thank you for your letter of April 27, 2007. Please be advised that funding for a project to install a traffic signal at SR 260 Jct. Woodland Lake Road will be split between the Town (33%) and ADOT (66%). We will submit this location to the managers of the Statewide Signal & Lighting fund for inclusion. Once a signal is constructed, as usual, ADOT will maintain and the Town will pay power costs.

In regard to recessed markers, we will add SR 260 through Pinetop-Lakeside to our list of candidate locations. When contracts and scheduling are worked out, we will let you know when these installations will occur.

Regarding posted speed limits, on the southside of Pinetop or elsewhere, they should be set to levels that are respected. The fact that initial sampling shows 85 percentile levels south of Pine Lake Road to be 54-55 mph, is an indication that the 50 mph speed limit is not respected any more than the 35 mph speed limit through town. We have honored the Town's differing opinion against raising posted speed limits and will continue to do so in this case. It is our opinion that a step-down speed limit for northbound traffic to 40 or 45 mph would do little to affect driver behavior.

The traffic signal warrant analysis for Pine Lake Road, although it failed to meet minimum Federal warrant levels, can be used by the Town to gauge impacts the new subdivision that you mentioned will have on the SR 260/Pine Lake Road intersection. We hope you find it a useful tool in determining what requirements to levy on the developer. It should be noted that any future signalization at Pine Lake Road and SR 260 will require reconstructing the SW corner to better define operational pathways. The presence of open, unrestricted access to the Circle K store at this corner creates confusing entry paths to the intersection. Developer funding of these significant changes to the intersection geometrics should be considered.



Please send a return letter that states the Town agreement with the conceptual costs splits and post construction responsibilities defined above.

Sincerely,



Chuck Gillick, P.E., Regional Traffic Engineer
Northern Traffic Engineering Region
1801 S. Milton Road, Flagstaff, Arizona 86001
(928) 779-7545

CPG/DPK/dk
Attachment
Rick Powers
Lynn Johnson
Kelly Udall
Joyce Padilla
Tamera Richards
TE file
LOC file





April 27, 2007

Chuck Gillick, P.E.
Regional Traffic Engineer
Northern Traffic Engineering Region
1801 S. Milton Rd.
Flagstaff, AZ 86001

Dear Chuck:

I am responding to your letter to Kelly Udall dated April 23, 2007, regarding four separate actions between the Town and ADOT.

With regards to the signal light at Woodland Lake Road, we would like to proceed with this project. We have placed it as an action item in our CIP for 2009.

As for the offer to install reflective recessed pavement markers, I have on a number of occasions, spoken to Lynn Johnson indicating we were very much in favor of this action and would welcome it whole-heartedly. We were not aware that we needed to respond in writing, but in any case, please consider this letter as a positive response to that offer.

We are definitely against raising the speed limits on the highway. Our concern was that the distance from the 50 mph and the 35 mph was rather close, mainly because of the intersection at Pinelake Road. Pinelake Road is where the Pinetop Fire Department accesses Highway 260 and where there has been several near misses, as the highway curves near that point and is on a downhill slope. Thus, we requested the signal at that location when we received the response you noted in your letter. In any case, there is a subdivision that is being proposed at the south end of Pinelake Road and we believe that once the subdivision is built the intersection may warrant a signal at that time. If ADOT would like to take a proactive approach to this condition we would certainly support that action.

Thank you for your interest in these areas. I hope I have addressed your concerns. If not, please call me at (928) 368-8885 ext. 238.

Sincerely,

Tom Thomas
Public Works Director

1360 N. Niels Hansen Lane • Pinetop-Lakeside, AZ 85929
(928) 368-8696 • TDD (928) 368-8802 • Fax (928) 368-8528
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RECEIVED
MAY 03 2007
NORTHERN REGION
TRAFFIC ENGINEERING



Arizona Department of Transportation
Intermodal Transportation Division
 206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Janet Napolitano
 Governor
 Victor M. Mendez
 Director

April 23, 2007

Sam Eilers
 State Engineer



Mr. Kelly Udall, Town Manager
 Town of Pinetop-Lakeside
 1360 N. Niels Hansen Lane
 Lakeside, Arizona 85929

Dear Mr. Udall,

I am writing today to follow-up on four separate actions between the Town and ADOT. We have yet to receive responses to letters sent to the Town between July and October of last year (attached) regarding these four actions.

In regard to the two signal warrant evaluations, undertaken at the Town's request, at the junction of SR 260 with Woodland Lake Road and at Pine Lake Road, only the Woodland Lake Road evaluation met Federal warrants for signalization. We will wait until the middle of May 2007 for a response that indicates the Town's interest or disinterest in pursuing a joint signalization project. If none is received we will notate the lack of response in our file and drop the matter from consideration.

Similarly, our offer to install reflective, recessed pavement markers at no cost to the Town will also be dropped from consideration in mid-May. The posted speed limit on SR 260 south of Pine Lake Road is the same as it was prior to the Pinetop-Hon Dah project that created a median-separated four lane highway. The Town expressed to us in early 2006 their opinion that a step-down speed zone should be created between the existing 50 mph and 35 mph zones. It is our professional opinion, after obtaining initial speed sampling, that the posted speed limit is inappropriately low for the multi-lane highway. A formal study to bring the posted speed limit into better compliance with observed 85th percentile speeds is the best way to correct the situation. From past experience, we have learned that the Town of Pinetop-Lakeside prefers to have a posted speed limit through town that is lower than 85th percentile speeds. Even though this is contrary to ADOT's normal practice in setting speed limits on State highways, we have honored the Town's wishes. We are unwilling to expend the resources to evaluate Pinetop-Lakeside speed limits if your agency is against ever raising posted speed limits.

Sincerely,

Chuck Gillick, P.E., Regional Traffic Engineer
 Northern Traffic Engineering Region
 1801 S. Milton Road, Flagstaff, Arizona 86001
 (928) 779-7545

CPG/DPK/dk
 Attachments

Cc: Rick Powers
 Lynn Johnson
 TE/LOC files





Janet Napolitano
Governor
Victor M. Mendez
Director

Arizona Department of Transportation
Intermodal Transportation Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

David P. Jankofsky
Deputy Director

October 25, 2006

Mr. Tom Thomas, Public Facilities Director
Town of Pinetop-Lakeside
1360 N. Niels Hansen Lane
Lakeside, Arizona 85929

Dear Tom,

Our new Maintenance Supervisor at Indian Pines, Joyce Padilla, has proposed SR 260 through the town limits of Pinetop-Lakeside as a candidate location for the installation of recessed, retro-reflective pavement markers. This was due to citizen complaints she has received about the lack of striping visibility at night. Our office receives a limited annual budget for the installation and maintenance of recessed pavement markers. We will add this section of SR 260 to our installation schedule unless the Town has any objections. Please discuss this with your Manager and Council and advise of their opinion. Due to rigid temperature and moisture specifications, we are limited to a narrow window for installations in your area during summer months, so there is plenty of time to consider this before responding. We will look forward to your response.

Sincerely,

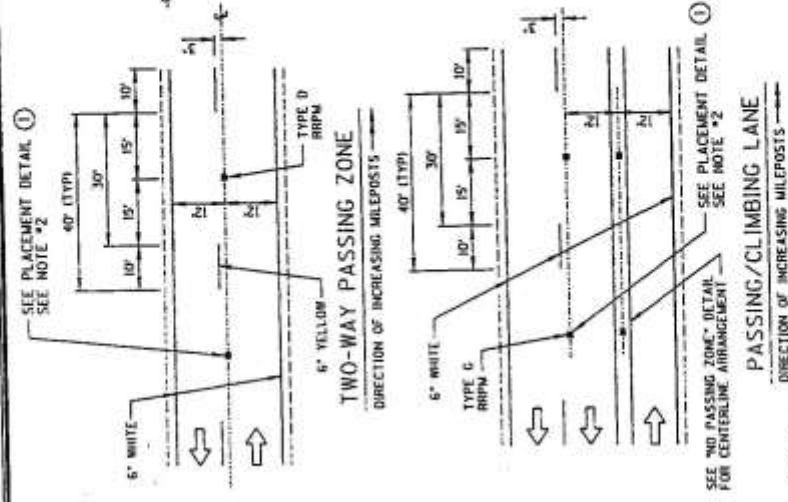

Dennis Kiefer, Transportation Engineering Specialist
Northern Traffic Engineering Region
1801 S. Milton Road, Flagstaff, Arizona 86001
(928) 779-7552 dkiefer@azdot.gov

Attachments

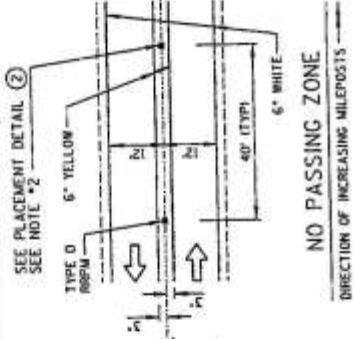
cc: Lynn Johnson
Joyce Padilla
Tom Tesch
John Bolson
TE file ✓
LOC file



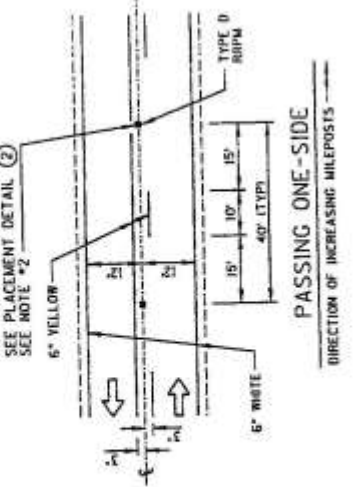
DATE	BY



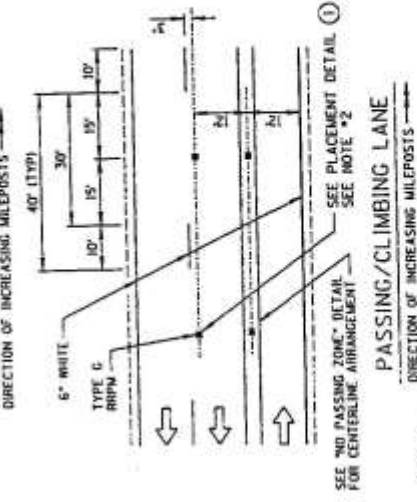
TWO-WAY PASSING ZONE



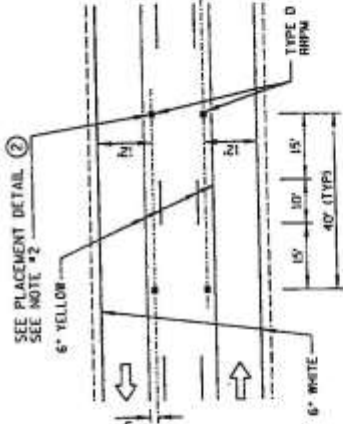
NO PASSING ZONE



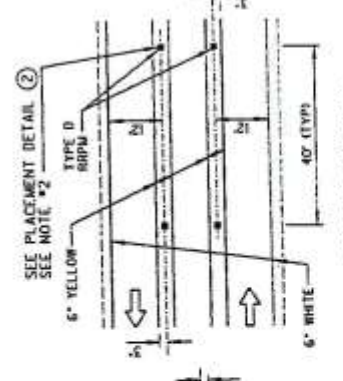
PASSING ONE-SIDE



PASSING/CLIMBING LANE



TWO-WAY LEFT-TURN LANE



STRIPED MEDIAN

- NOTES:
1. THE SPACING CONFIGURATION USED FOR THE RETRO-REFLECTIVE PAID PAVEMENT MARKERS (RRPM) SHALL FOLLOW THE CRITERIA STATED IN SHEET 4 OF 9 OF THIS STANDARD DRAWING.
 2. PLACEMENT DETAILS ① AND ② ARE SHOWN ON SHEET 9 OF 9 OF THIS STANDARD DRAWING.

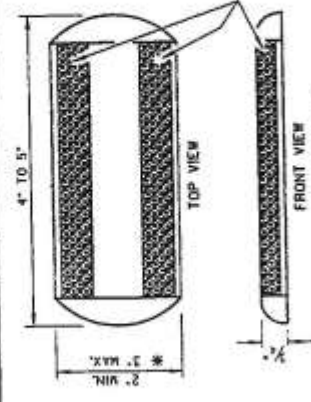

 CALIFORNIA
 DIVISION OF HIGHWAYS
 STANDARD DRAWING
 RETRO-REFLECTIVE PAID PAVEMENT MARKERS (RRPM)
 FOR UNDIVIDED HIGHWAYS
 M-19

SHEET 6 OF 9
NOT TO SCALE

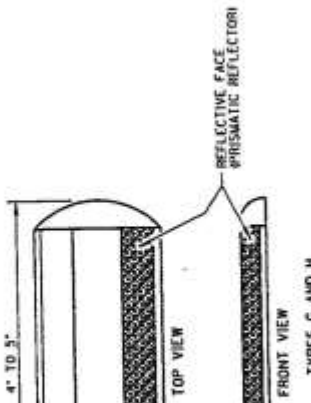
Revised also

...current_sids\M-19f.dgn 02/14/2002 01:21:54 AM

DATE	BY	CHECKED

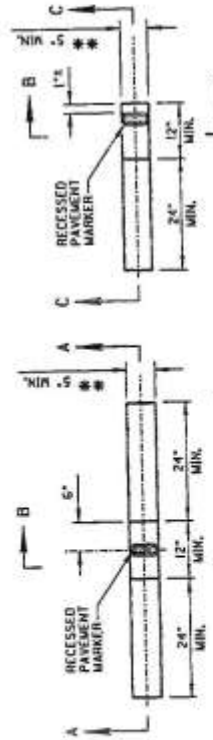


TYPES C AND D

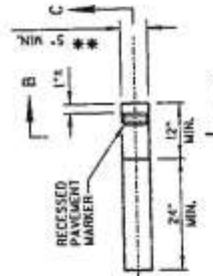


TYPES G AND H

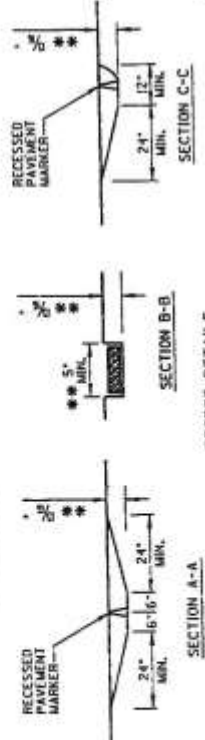
RECESSED PAVEMENT MARKERS



TYPES C AND D



TYPES G AND H



SECTION C-C

- NOTES:
1. SHAPE OF MARKER SHOWN IS FOR INFORMATION ONLY. THE ACTUAL CONFIGURATION OF MARKERS CAN VARY INCLUDING THE SHAPE AND TYPE OF REFLECTING SURFACE.
 2. TYPE C (CLEAR ON ONE SIDE/RED ON ONE SIDE) MARKERS ARE REFLECTORIZED AND INTENDED FOR USE WITH ONE-WAY TRAFFIC AS ON RAMPS AND DIVIDED HIGHWAYS.
 3. TYPE D (YELLOW ON BOTH SIDES) MARKERS ARE REFLECTORIZED AND INTENDED FOR USE WITH TWO-WAY TRAFFIC.
 4. TYPE G (CLEAR ON ONE SIDE) MARKERS ARE REFLECTORIZED AND INTENDED FOR USE WITH ONE-WAY TRAFFIC.
 5. TYPE H (YELLOW ON ONE SIDE) MARKERS ARE REFLECTORIZED AND INTENDED FOR USE WITH TRAFFIC.
 6. APPROVED CIRCULAR CERAMIC MARKERS 5 INCHES IN DIAMETER AND 1 INCH IN HEIGHT WITH METALLIC REFLECTIVE FACE(S) MAY BE USED IN GROOVES. CORRESPONDING INCREASES IN THE DEPTH OF THE PAVEMENT GROOVE.
 7. FIT PHYSICAL DIMENSIONS OF MARKER SELECTED.

DATE	BY	CHECKED

ARIZONA DEPARTMENT OF TRANSPORTATION
 HIGHWAY CONSTRUCTION DIVISION
 STANDARD DRAWINGS
 RECESSED PAVEMENT MARKER DETAILS
 M-18

NOT TO SCALE

RECESS DETAILS



Arizona Department of Transportation
Intermodal Transportation Division
 206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Janet Napolitano
 Governor
 Victor M. Mendez
 Director

David P. Jankofsky
 Deputy Director

October 4, 2006

Mr. Tom Thomas, Public Facilities Director
 Town of Pinetop-Lakeside
 1360 N. Niels Hansen Lane
 Lakeside, Arizona 85929

Dear Tom,

In response to your letter of request dated July 10, 2006, traffic signal warrant studies were conducted by this office at the junctions of SR 260/Woodland Lake Road and SR 260/Pine Lake Road. Copies of these studies are enclosed. The studies reveal that federal warrants for signalization are met at Woodland Lake Road but not at Pine Lake Road.

In order to pursue a joint project to install a traffic signal at Woodland Lake Road and SR 260, participation from the Town is needed. This participation from the Town will involve funding 1/3 of the construction costs of the project and payment of monthly power costs for the new signal after installation. ADOT's participation will cover 2/3 of the construction costs and maintenance of the new signal after installation. Accurate costs will be determined during the design phase of the project.

A formal letter of commitment from the Town is requested. Once received, scoping for the project at Woodland Lake Road can be initiated. A legal agreement between the Town and ADOT will be drafted after 95% design plans are produced that contain an engineer's estimate of the project costs. An effort will be made to consolidate all the currently existing IGA's between the Town and ADOT for the operation of individual traffic signals on SR 260 in the Town limits into one master IGA.

We will look forward to the Town's response.

Sincerely,

 Chuck P. Gillick, P.E., Regional Traffic Engineer
 Northern Traffic Engineering Region
 1801 S. Milton Road, Flagstaff, Arizona 86001
 (928) 779-7545 cgillick@azdot.gov

CPG/DPK/dk
 Enclosures

Cc: Rick Powers
 Lynn Johnson
 Dave Duffy
 TE file
 SIG file





Arizona Department of Transportation
Intermodal Transportation Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Janet Napolitano
Governor
Victor M. Mendez
Director

David P. Jankofsky
Deputy Director

July 14, 2006

Mr. Tom Thomas, Public Facilities Director
Town of Pinetop-Lakeside
1360 N. Niels Hansen Lane
Lakeside, Arizona 85929

Dear Tom,

In regard to your letter of July 10, 2006, pleased be advised that our office will undertake traffic signal warrant studies for the SR 260 junctions at Woodland Lake Road and Pine Lake Road. As resources permit, we will try to schedule and collect traffic volume data during the current summer tourist season. Without providing a guarantee, it is anticipated that these studies can be completed by the end of the year. We will keep you posted.

Regarding the speed limit transitioning issue in South Pinetop, in accordance with our phone conversation today, we will await a response to my letter also dated July 10, 2006.

Sincerely,

Dennis Kiefer, Transportation Engineering Specialist
Northern Traffic Engineering Region
1801 S. Milton Road, Flagstaff, Arizona 86001
(928) 779-7552 dkiefer@azdot.gov

cc: Rick Powers
Lynn Johnson
Jeff Balk
TE file
LOC file





July 10, 2006

Dennis Keafer, ADOT Traffic Engineer
Flagstaff District Office
Arizona Department of Transportation
1801 S. Milton Road
Flagstaff, AZ 86001

Dear Dennis:

As you may recall, a few months ago we requested you look at transitioning the speed limit between Buck Springs and Pinelake Road. I have not heard back from you on the request and was wondering if you might give me a status report on any progress made.

Also, with the increase in traffic and growth we are experiencing, we would, at this time, request a traffic signal warrant study be done at the intersection of Highway 260 and Woodland Lake Road, and at Highway 260 and Pinelake Road. A response to this request would be appreciated as soon as possible.

Thank you for your assistance.

Sincerely,

Tom Thomas
Public Facilities Director

cc: Larry Vicario, Mayor
Kelly Udall, Town Manager
Richard Powers, ADOT Globe District Engineer

RECEIVED

JUL 13 2006

NORTHERN REGION
TRAFFIC ENGINEERING

1360 N. Niels Hansen Lane • Lakeside, AZ 85929
(928) 368-8696 • TDD (928) 368-8802 • Fax (928) 368-8528
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Janet Napolitano
Governor
Victor M. Mendez
Director

Arizona Department of Transportation
Intermodal Transportation Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

David P. Jankofsky
Deputy Director

July 10, 2006

Mr. Tom Thomas, Public Facilities Director
Town of Pinetop-Lakeside
1360 N. Niels Hansen Lane
Lakeside, Arizona 85929

Dear Tom,

Earlier this year you called to relay a request from your Police Department for a step-down speed zone for northbound traffic on SR 260 south of Pine Lake Drive where the posted speed limit goes from 50 mph to 35 mph. It may seem like we've forgotten this request, but in fact it has opened a small can of worms. Radar speed sampling (see attached diagram) indicates the 85th percentile speeds in the posted 50 mph zone south of Pine Lake Drive support a 55 mph speed limit. The 50 mph zone is 1.83 miles in length and was carried over from when the highway was a two-lane facility. It appears that this zone should be raised to 55 mph. If it is, then a 45 mph step-down zone for northbound traffic would be more appropriate by allowing reductions of 10 mph from one zone to another.

Past experience with speed limits in Pinetop-Lakeside make us hesitant to suggest raising the 50 mph zone to 55 mph, even though it would better comply with our Department's speed zoning concepts. Further radar sampling would have to be done and a formal study produced before a change of this magnitude could be made. We won't waste the time and resources on doing this however, if the Town will not support the change. Please discuss with your Police and Town Manager and let us know whether to proceed with this.

Sincerely,


Dennis Kiefer, Transportation Engineering Specialist
Northern Traffic Engineering Region
1801 S. Milton Road, Flagstaff, Arizona 86001
(928) 779-7552 dkiefer@azdot.gov

cc: Rick Powers
Lynn Johnson
Jeff Balk
TE file
LOC file



APPENDIX G – PRACTICUM WORK LOG SUMMARY

June 2015	Researched traffic calming measures. Start of Practicum Phase I <ul style="list-style-type: none">• Developed first potential traffic calming solutions.
July 2015	Practicum Phase I continued <ul style="list-style-type: none">• Organized public input meetings;• Performed traffic count;• Assisted Public Works staff with implementation of temporary intersection modification.
September 2015	Start of Practicum Phase II <ul style="list-style-type: none">• Assisted Public Works staff with implementation of permanent intersection modification;• Researched additional traffic calming measures;• Acquired quotes from companies that produce speed cushions.
October 2015	Practicum Phase II continued <ul style="list-style-type: none">• Prepared Town Council Decision Request;• Presented at Town Council meeting.
November 2015	Start of Practicum Phase III <ul style="list-style-type: none">• Assisted Public Works staff with implementation of temporary change in traffic pattern;• Performed traffic count.
December 2015	Researched potential traffic light installation.
January 2016	Completed further research for potential traffic calming measures; Researched demographic and historic data for practicum paper; Prepared figures and tables for practicum paper.
October 2016	Submitted initial practicum draft for review.

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DRAFT