City of Millbrae Neighborhood **Traffic Calming Policy** September 2020









Neighborhood Traffic Calming Program

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1. INTRODUCTION

The Institute of Transportation Engineers defines Traffic Calming as the combination of physical measures that reduce motor vehicle use's adverse effects, alter driver behavior, and improve non-motorized street users' conditions. The goals include increasing quality of life, incorporating users' preferences and requirements, creating safe streets, reducing motor vehicles' adverse effects, and promoting pedestrian, bicycle, and transit use. Traffic calming involves strategies and solutions that may reduce vehicular speeds, cut-through traffic, and improve all residents' safety in the neighborhoods.

The report is further organized into the following chapters:

- Introduction A brief of the project origin, goals and objectives, and the definition of traffic calming
- Implementation Process Discussion on stakeholder groups, examples of implementations, source of funding, and process of implementation
- Traffic Calming Measures Detailed evaluation of measures by Tier and the four E approach, followed by a comprehensive description of each measure with its positive, negative aspects and implementation thresholds
- Concept Design Exploring potential traffic calming remedies for selected locations

1.1 Background

The City of Millbrae often receives requests from residents to address traffic-related issues such as vehicular speed, pedestrian safety, congestion, and other concerns in their neighborhoods. Additional measures may be requested when residents feel that the current traffic control devices are not adequate to tackle the concerns like speeding, excessive traffic volume, delays, traffic noise, pedestrian and bicyclist safety, and illegal vehicular movement. Thus, the current inconsistencies in the application of traffic calming strategies will be eliminated by developing a Traffic Calming Toolbox.

Thus, the City of Millbrae has initiated a comprehensive program to handle neighborhood traffic requests through a systematic approach. The Traffic Calming Toolbox is a well-defined toolbox to effectively utilize the most appropriate solutions for the current traffic-related concerns in the City of Millbrae. This document outlines the broader approach of four E – Education, Empowerment, Enforcement, and Engineering. This approach will enrich residents' understanding of traffic calming in general, and each solution's pros/cons before requesting the City's assistance. It will also assist the City staff by offering the most appropriate solution to





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effectively address a community's concern without negatively impacting the neighboring streets.

These strategies are grouped into three Tiers, where Tier I involves basic studies and improvements while Tiers II and III involve more comprehensive solutions. By utilizing this broader approach, the City intends to address traffic calming concerns with the most effective and least intrusive solution first (Tier I) and seek out more costly improvements only when appropriate (Tiers II and III). Education, enforcement, and empowerment strategies will be deployed to reduce the need for more elaborate physical enhancements.

1.2 Traffic Calming

Traffic Calming is an approach to preserve and improve residents' safety within neighborhoods by reducing traffic volumes, vehicular speeds, and enhancing the quality of life through traffic calming measures. The Institute of Transportation Engineers, a global organization of over 17,000 transportation professionals in over 90 countries, defines Traffic Calming as "a combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users."

Over the past 100 years, streets were only designed to ensure smooth traffic flow and not with other street functions. It is only in the past 25 years that traffic calming initiatives have grown to consider other purposes. Traffic engineers and planners have explored and implemented various solutions in response to ongoing complaints from residents. These efforts, to a certain degree, have helped address the traffic safety concerns in many cases. It is common to see that the traffic-related problems are relocated to nearby streets after installing traffic calming devices, or the initial positive effect of the original improvements wears off. The measures discussed in this document are the most effective solutions from the collaboration of four E – Education, Empowerment, Enforcement, and Engineering.

Vehicular speeds are detrimental to roadway users' safety, and the severity of the crash-related injuries increases significantly with speed. The chances of survival drop dramatically, from 90 percent to 10 percent, when a pedestrian is hit by a vehicle traveling at 40 MPH speed compared to at 20 MPH. Therefore, proper attention to reducing traffic speeds is critically essential. Many cities have learned that physical modifications can be more effective from decades of experience when provided along with the four E.

This document is developed to act as a guide for the City Staff, elected officials, and residents to become acclimated to the policies and procedures for successful implementation of traffic calming solutions that will benefit Millbrae residents and businesses with a variety of traffic





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safety-related concerns. This program's success hinges on each stakeholder's proper engagement; further details are provided in Chapter II.

1.3 Project Goals and Objectives

The Traffic Calming Program's primary objective is to improve the safety of Millbrae residents by incorporating strategies to reduce traffic volume and speed. This project aims to assess Millbrae's traffic-related concerns, reduce the adverse effects of vehicles, modify motorist behaviors, and improve pedestrians' and bicyclists' environment. The aims are achieved by researching various traffic calming strategies effectively utilized by cities and states across the nation and ultimately developing a robust traffic calming toolbox to assist Millbrae in addressing these issues.

Key goals of the Traffic Calming Toolbox development are:

- Utilize the four "E" approach Education, Empowerment, Enforcement, and Engineering, to expand the available strategies and tools to address traffic calming concerns
- Formulate effective policies that can be applied consistently throughout the City while reviewing traffic-related complaints and making necessary improvements
- Identify methods of engaging the community in the decision process before installing traffic calming devices
- Develop a systematic approach to prioritize the allocation of limited City funds for traffic calming improvements

Well-crafted Traffic Calming programs and active engagement of neighborhoods are keys to documenting traffic-related problems and developing solutions that benefit residential areas without creating negative impacts on nearby communities.

1.4 Benefits

A comprehensive Traffic Calming Program can increase road safety, comfort, and mobility for pedestrians, bicyclists, and vehicular travels. It reduces environmental impacts and creates a livable community. The program fulfills its overall transportation vision outlined in various planning documents like Bicycle and Pedestrian Transportation Plan (2009), General Plan 2040, and Millbrae Station Area Specific Plan. Implementation of a traffic calming program that balances the four "E"s can bring numerous benefits, including:

 Improve driver attention and awareness, and change driving behavior that brings long term benefits





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- Enhance safety for all users auto, transit, bicyclists, and pedestrians
- Encourage non-auto modes of transportation such as walking and bicycling
- Encourage citizen involvement with neighborhood traffic management in the City
- Provide a fair and consistent process to address public concerns about traffic
- Enhance the livability of residential neighborhoods

1.5 The Four E

Previously, most cities only focused on *Engineering* solutions to tackle neighborhood traffic concerns. As time changed, solving such issues required various strategies that involved a more elaborate approach that now includes Education, Empowerment, and Enforcement. All four E are now used extensively to deal effectively with traffic calming issues. Each strategy is discussed below:

Education

Educational materials are essential to inform residents about the City's traffic calming related policies and procedures, basic rules of the road, how different devices operate, and other traffic-related topics. Through this program, the intent of education is to instruct people in all age groups how to use the public streets and enjoy their travel experience safely. Additionally, this approach informs the public of the pros and cons of various traffic calming devices, applicability, and associated costs, so that they can engage in a useful dialogue with the City staff in determining what solutions could work in their neighborhood. In each Tier presented in the Toolbox in **Appendix A**, educational measures are available for implementation to achieve this goal.

Empowerment

Traditional traffic calming strategies rely heavily on the first three "E", but this document considers the addition of Empowerment. Public empowerment allows community members to take the initiative and have an active role in solving traffic-related problems. Many cities across the nation have engaged their communities in such programs and achieved impressive results towards reduced speeds and enhanced public street safety.

Enforcement

Enforcement is a tool that deters motorists from speeding and unsafe driving behavior. This can be accomplished by selective enforcement by the City's Police Department. Measures of enforcement range from portable trailers that measure motorists' speed to increased patrol and citation issuance. Enforcement can effectively create awareness of vehicle speeds and traffic safety in the neighborhoods.





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Engineering

Most traffic calming solutions require engineering analysis followed by specific physical improvements on streets or sidewalks. The engineering solutions discussed in this document include physical improvements, roadway diet strategies, signage improvements, and unique treatments. The advantages and disadvantages of these strategies, along with the approximate cost range, are also provided. While some engineering solutions are relatively simple and inexpensive, most strategies require significant funding. Therefore, other strategies should be explored without being overly dependent on engineering solutions.

1.6 The Three Tiers

The traffic calming solutions are presented in three Tiers:

- Tier I Low-cost improvements that require little or no engineering design and construction
- Tier II Improvements that require some engineering analysis, design, and construction
- Tier III Relatively significant improvements that require extensive analysis, design, community outreach, and funding





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This section outlines various policies and procedures relevant to the Traffic Calming Program.

2. BACKGROUND STUDIES AND BEST PRACTICES

The following sections introduce some traffic safety programs from other cities to enhance people's knowledge about traffic safety and reduce fatal accidents for all transportation modes.

2.1 Street Smarts Program

Developed by the City of San Jose in 2002, the Street Smarts program is an extensive traffic safety education campaign to change motorist behaviors regardless of traffic calming measures and make streets more accessible and safer for pedestrians and bicyclists. The program aims to reduce vehicle speed and enhance neighborhood street safety using sound engineering, practical education, and proactive enforcement strategies. The program offers multilingual courses in English, Spanish, and Vietnamese that operate on the grassroots level in schools and neighborhoods. The courses involve educational booklets, safety videos, classroom training, and select traffic safety events that improve users' skills in all age groups, whether driving, walking, or bicycling. San Jose's Street Smarts Initiative may have contributed to a significant reduction in injury crashes along city streets since the program's inception. The rate of injury crashes per 1,000 residents dropped from 4.5 in 2002 to 2.4 in 2014 – a 47 percent reduction.

The Street Smarts program comprises three hours of driving, pedestrian, and bicycle behavior education along with a Neighborhood Kit that includes lawn signs, safety tips, driving quizzes, bumper stickers, and other educational materials. The media campaign includes radio messages at peak hours, print articles in magazines, and posters on transit shelters and bus backs. The San Jose Sharks team also promotes the program by displaying messages at their events. For schools, the Street Smarts Back-to-School Traffic Safety Committee partners with City Departments and American Automobile Association (AAA) and distributes flyers to students and parents. Enforcement in school zones is also established. Along with flyers and banners, the campaign also organizes events for school students to teach safe practices.

With the program's success, the City of San Jose offered to provide the Street Smarts branding and related intellectual resources to other cities at no cost. Many cities across California have rolled out their own Street Smarts program utilizing San Jose's theme. Some of the agencies are as follows:

- San Ramon Valley Street Smarts includes the City of San Ramon, the Town of Danville, Contra Costa County, and the San Ramon Valley Unified School District
- Cities of San Francisco, Davis, Santa Rosa, Napa, Benicia, Cupertino, and Salinas





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- Transportation Authority of Marin
- West Contra Costa County Safe Communities Program
- Santa Clara County Traffic Safe Communities Network
- Monterey County Health Department

Besides, several cities across the nation have initiated their own Street Smarts programs reflecting local branding preferences and approaches.

The City of Millbrae will explore the development of a similar program to address traffic safety matters for the neighborhoods and the collectors and arterials where the majority of traffic-related crashes and resulting injuries occur.

2.2 Vision Zero Initiatives

According to the National Highway Traffic Safety Administration, nearly 40,000 people are unnecessarily killed on the streets all over the nation, with over 2 million suffering from severe injuries. In 2017 alone, almost 6,000 pedestrians and 800 bicyclists were fatally involved in roadway crashes, accounting for 15% of all fatalities. There has been a steady rise in such fatalities over the last five years. Traffic deaths cause personal traumas and affect the community as a whole, where so many fear for their safety on the streets and feel no liberty in mobility, leading to a compromise in public health.

Thus, with a commitment to traffic safety for all users and eliminating fatalities from all transportation modes, the Vision Zero initiative was established in Sweden in 1997. Following its global success, many cities in the US, such as New York, Chicago, Portland, San Diego, San Jose, San Francisco, San Antonio, Los Angeles, Santa Barbara, and Seattle. The initiative believes that traffic deaths are preventable and that we should account for human mistakes; saving lives is not expensive.

In Millbrae, during five years between January 2013 and December 2017, there have been 229 crashes in the local roads; 69 involved pedestrians and 15 involved bicyclists.

Portland, OR

Although Portland's traffic fatality rate is one of the lowest in the country, the City intends to achieve zero deaths or serious injuries as they feel that "One Death on Our Streets is Too Many." Through their Vision Zero initiative, they aim to develop and implement a multi-faceted approach that is safe and easy to use by people of all ages, while providing safe and affordable transportation options. Portland aims to achieve this in ten years through —





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- Street Design that encourages safe behavior and offers facilities to accommodate all travel modes
- Complete Street network that supports the most vulnerable users like pedestrians and bicyclists through separation, and speed reduction
- Educate the population who respect and protect one another as they share streets
- Enforcement of traffic safety laws with a focused effort on high crash roadway segments and at places with the most vulnerable users

San Diego, CA

With more people walking and biking, the City of San Diego has taken the initiative to achieve zero fatalities by 2025. The City's Vision Zero plan aims at reducing traffic deaths to zero by deploying various engineering, educational, and enforcement strategies. Among many other initiatives, the plan includes adopting a Complete Streets Policy, updating the Comprehensive Pedestrian Crossing Policy, completing the Citywide Sidewalk Assessment, the launch of a Safety Education Program, and increased enforcement in school zones.

Seattle, WA

The City of Seattle considers safety for people walking and biking as their top priority. The City aims to commit to a goal of zero fatalities by 2030. Thus, the Vision Zero initiative, through context-sensitive engineering and thoughtful enforcement patrols, streets would be redesigned to reduce risks and improve conditions for everyone. This would be achieved by integrating safety efforts recommended in Pedestrian, Bicycle, Transit, and Freight Master Plans with targeted educational outreach to address behavioral issues.

Los Angeles, CA

Through their Vision Zero initiative, the City of Los Angeles pledged to achieve zero traffic deaths by 2025. The Initiative anchors in a data-driven approach that identifies proven methods and solutions to decrease traffic deaths by designing and operating a road system that accounts for human error. The City believes that although human error is unpredictable, traffic deaths are preventable. For a safe system, engineering, education, enforcement, and evaluation are essential with human life as the priority. Analysis of collision data found that children, seniors, pedestrians, and bicyclists were most prone to fatal and severe injuries.





3. IMPLEMENTATION PROCESS

3.1 Roles and Responsibilities

The City

The City is responsible for maintaining a transportation system that provides safe access for various travel modes. The City's **Public Works Department** will continue to accept traffic-related concerns from the community and utilize the most appropriate approaches identified in this document. The staff will conduct critical field reviews, complete investigations, receive community feedback, design improvements, and identify construction funding. The staff will coordinate with other City departments (e.g., Fire and Police) and regional agencies (e.g., public transit) that may have an interest or service impact due to the proposed traffic calming improvements. It is expected that the available budget will be limited, and not all recommended improvements can be implemented in a fiscal year. Staff will maintain a list of projects with priorities for future implementation as funds become available. The **Traffic Safety Committee** will review and approve (if appropriate) all Tier III solutions. Any roadway narrowing or other features that may impact emergency response times must be reviewed and approved by the **Fire Department** before construction. The role of the **City Council** is to adopt and support consistent application of this Neighborhood Traffic Calming Program, allocate funds through the annual budgeting process, and approve any future program revisions.

The Community

The community acts as the informant to the City, sharing any traffic-related issues and concerns that negatively affect their safety and livability. To make this program successful, the community must become more engaged in understanding the traffic calming issues and identifying solutions that are beneficial to the community, without negatively impacting other neighborhoods within the City. Since some solutions may have negative impacts, a specific level of community support through initial application and/or petitions is essential before making any physical improvements. Additionally, the program intends that the residents spread the message within their neighborhoods regarding the benefits of slowing traffic on the city streets and enhancing everyone's safety and livability.

3.2 Project Needs Assessment and Screening

The NTCP aims to provide solutions to traffic-related concerns fairly and consistently throughout the City. Therefore, a well-structured process to receive, review, analyze any concerns, and develop solutions is crucial to its success. Once a traffic-related concern or





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complaint is received, the City will review the request, analyze the existing conditions, and determine appropriate remedies. If the City staff determines that the request should be addressed through the Neighborhood Traffic Calming Program (NTCP), submitting an NTCP Application will be required. Upon receipt of the Application, the City will collect necessary data, make field observations, identify appropriate solutions, and develop an implementation plan for the affected neighborhood's input. Any physical improvements are completed after the required feedback and approval from the affected residents are received. Following the implementation plan's approval, it would be put into action, and traffic conditions would be reevaluated to gauge initial effectiveness.

3.3 Community Engagement and Support

The program requires community support at two stages; Application and Petition, included as part of **Appendix A**. As shown on the process flowcharts on pages 15 and 16, an Application is required before beginning any Tier II and Tier III improvements. The Application will assure that the traffic-related problem being addressed is not just a "perceived" problem by one individual; it is a concern commonly shared by several residents. Thus, an Application is processed before the beginning of any evaluation. This will result in an evaluation of Tier I measures' concerns and implementation if such concerns are validated through engineering analysis based on City, State, and Federal traffic safety guidelines. To initiate an evaluation for traffic calming, the residents must obtain signatures from at least 20% of the property owners within the block/blocks (or within 500') where traffic calming evaluation is being requested. If the community provides negative feedback on the implemented Tier I measures, the City may ask the community to file a petition to conduct a comprehensive traffic analysis for a possible Tier II or Tier III solution. At least 67% of the residents within 500' of the proposed traffic calming location. For example, construction of a traffic diverter or a set of speed bumps may require the neighborhood to sign a petition supported by 67% or more residents affected by the project. The City may organize community meetings to inform the community of their findings and consult with the Traffic Safety Commission and Fire Department to gather input and develop the final strategies.

During the evaluation and project development, the community will be involved in different ways. Such engagement could happen via one-on-one conversations, block-club meetings, or larger community meetings. The plan aims at implementing a community-driven process where the City staff acts as a liaison, providing professional expertise and guiding on procedural matters. Once an engineering analysis is complete, the staff will suggest the most appropriate solutions to the community. The community will secure necessary support through a formal





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petition process approved by the City. A community may choose to participate in any educational or empowerment solutions irrespective of the status of engineering analysis and recommendations.

3.4 Identification of Solutions

After receiving a complaint, the City's Public Works Staff will utilize the toolbox and the process outlined above to identify all potential solutions from the three tiers (Tier I, Tier II, Tier III). The screening process is the first step for any traffic safety concern, as it will determine the types of strategies likely to remedy the problem. The process will also determine the required level of community support.

The most common, simpler concerns and problems are typically addressed in Tier I, where solutions are low-cost and do not require extensive data collection, analysis, design, or community engagement. Tier II and III strategies are implemented where Tier I solutions are not likely to be effective. They also require additional data collection, engineering analysis, design, community engagement, petitions, etc. Typically, Tier II and III solutions require much higher staffing resources and funding and take longer from project inception to completion. Such solutions may also provide benefits that last for a longer duration than most Tier I improvements.

3.5 Project Prioritization

The City has limited funds available through the annual budgetary process. It is expected that the number of requests for improvements will far exceed the number of projects funded in a given year. Therefore, a project prioritization methodology has been established to determine most to least concerning problems.

The table below displays the scoring criteria developed for the City of Millbrae that determines the level of concern for a location. These are preliminary criteria subject to advance discussion and considerations by the City. Additionally, it stresses the importance of speeds, accidents, volumes, schools, and pedestrian generators and includes supplementary items relevant to traffic calming. Through a prioritization structure, the City can budget funding efficiently and provide improvements at appropriate locations.





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Table 1. Scoring Criteria for Traffic Calming Consideration

Criteria	Criteria Point Definitions	
85 th percentile speed	2 points for every 1 MPH above the posted speed limit (85 th percentile speed must be at least 5 MPH over the posted speed limit to be considered for traffic calming)	35
Crash History	3 points for each preventable crash within the last three years	25
Traffic Volumes	1 point for 0-500 average daily traffic 2 points for 501-1,000 average daily traffic 3 points for 1,001 – 1,500 average daily traffic 4 points for 1,501 – 2,000 average daily traffic 5 points for > 2,000 average daily traffic	5
Cut-through Traffic	4 points if at least 25% of traffic volumes is cut-through 2 points for each additional 5% (Up to 40% max)	10
Vicinity to Schools	5 points if street fronts or provides access to a school, or if street is a designated Safe Route to School	10
Pedestrian Generators	5 points if location is within 1,000 feet of a major transit access point or a civic facility	5
Additional Concerns	2 points if visibility restrictions result from roadway geometry 2 points if segment is a designated Bike Route or a pedestrian corridor 2 points if street has no sidewalks 2 points if segment is > 1,000 feet in length 2 points if segment is > 40 feet in width	10
Total		100

3.6 Implementation

Tier I improvements require minimal field observations and almost no data collection and community outreach. Additionally, most Tier I improvements are not extensive physical modifications and, therefore, least expensive. Hence, implementation takes less time and resources. In contrast, most Tier II and III improvements require specific data collection, design, neighborhood outreach, and funding. Some Tier II and III improvements may require before and





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after data collection to evaluate the improvements' effectiveness. Although the steps involved in the implementation process may differ depending upon the nature of the concerns and level of community interest, most will require collaboration among the City staff, residents, businesses, and other entities such as school districts. The typical implementation process may take a few weeks for Tier I improvements to several months or years for a Tier II or III improvements depending on community support and funding availability.

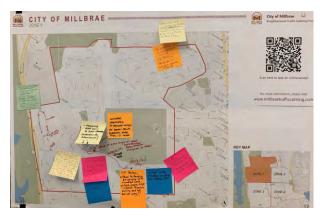
As a step to learn about the traffic-related issues within the City of Millbrae, two community workshops and an online survey was conducted. A project website (www.millbraetrafficcalming.com) was developed to promote the online survey and inform residents about the project and upcoming events. The purpose of the first workshop held on July 18, 2019, was to gather input on community concerns related to traffic safety. The attendees were explained about traffic calming and its

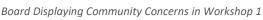
importance along with the role of the community. The



Project Website

residents then expressed their traffic-related concerns and identified locations that directly impact their neighborhoods.







Community Workshop 1 Attendants

The purpose of the second community workshop held on October 10, 2019, was to gather more feedback on traffic-safety concerns from the community. The participants also provided input on improvements recommended based on the information collected in the first community workshop.





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Group Discussion in Community Workshop 2

A pilot improvement program was developed, as per the comments received, and Tier I, II, and III solutions have been proposed to be implemented on intersections and roadway segments with most concerns. The details on the selected locations, the solutions proposed, and the concept drawings can be found in **Appendix B**.

3.7 Post Project Evaluation

Since Tier II and III solutions require significant staffing and funding resources, they are implemented on a selective basis. For major projects, the Public Works Department may conduct a "post evaluation" to ascertain whether the traffic calming solutions have effectively addressed the primary concerns and if additional measures are required. Besides, such evaluations will guide the City staff if the current practices and policies are effectively address the traffic calming concerns or some refinements may be necessary. For projects that require such evaluation, pre, and post-implementation data will be collected, including vehicular speeds, crash history, traffic volumes, amount of cut-through traffic, etc. Such data collection will typically occur at least three to six months after completing the project to normalize traffic patterns. Besides this quantitative data, additional qualitative data may also be collected through interviews and surveys that will suggest if the traffic calming solutions have successfully addressed the concerns.

Many traffic calming devices are relatively easy to design and install. If they do not produce the desired effect, it is possible, in some cases, to relocate them to a location where they can be more effective. It is also possible to fine-tune certain specifications to achieve the desired effect





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at future locations. Examples of such movable devices include speed lumps, radar feedback signs, and various traffic safety signs. A before/after data collection for such devices helps determine if any adjustments or relocations are necessary. On the other hand, many traffic calming solutions, such as bulbouts, circles, and chokers, are expensive and involve significant physical alterations. Since such devices' relocation is not practical and cost-prohibitive, a post-evaluation may not be necessary solely for the potential relocation purpose. Although, pre and post studies do help with appropriate design modifications that would yield desired results for future installations

3.8 Process Flow Chart

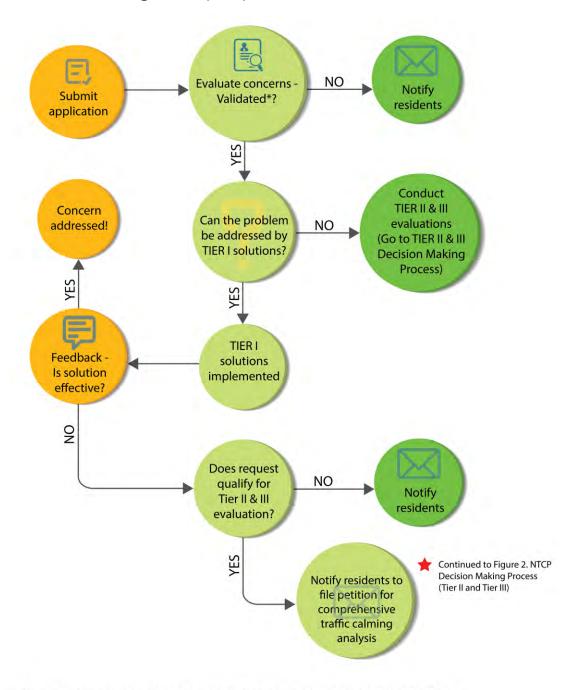
One of this program's key goals is to engage Millbrae residents and businesses in developing and implementing traffic calming solutions. Therefore, the process must be clear, consistent, and easy to follow. A Flow Chart provided below depicts a typical review and approval process for various traffic calming related requests.





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Figure 1. NTCP Decision Making Process (Tier I)



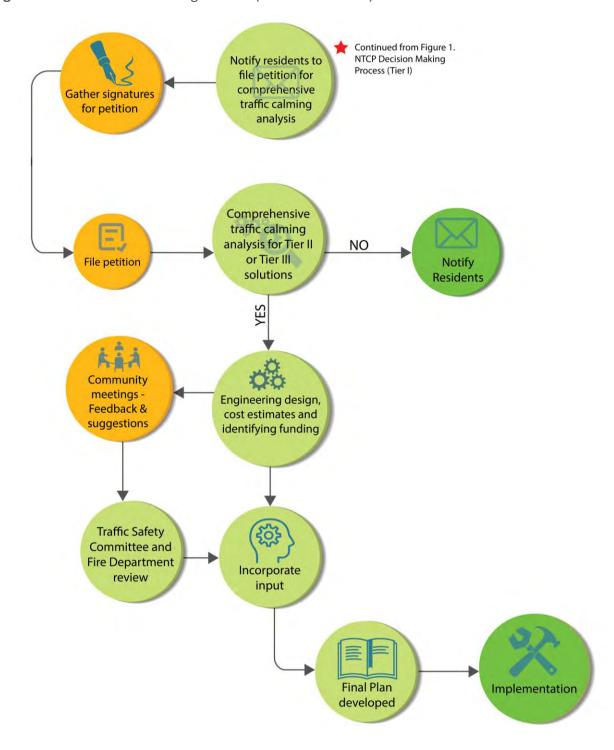
^{*} Determined through engineering analysis conducted by the City based on City, State and Federal guidelines





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Figure 2. NTCP Decision Making Process (Tier II and Tier III)







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4. TRAFFIC CALMING MEASURES

The Millbrae Neighborhood Traffic Calming Program identifies various solutions in four "E" categories and three different tiers. Through this approach, the City can evaluate traffic safety-related concerns, identify appropriate solutions, garner community support, prioritize projects, and implement when funds become available.

The following sections discuss each Tier and types of improvements associated with them. An in-depth explanation is provided for Tier II and Tier III's strategies to increase clarity and understanding of the measure and typical applications. **Appendix A** contains a toolbox with numerous solutions and strategies, relevant graphics, specific advantages and disadvantages, and implementation cost.

Some of the measures would be implemented in phases. High-cost measures such as Bulbouts, Chicanes, and Traffic Circles would be implemented temporarily using rubber curbs, stripes, and bollards to determine their effectiveness. If successful, these temporary measures would be replaced with high-cost permanent ones.

4.1 Tier I

All concerns are first evaluated for Tier I solutions since these are the most basic strategies. They do not require extensive engineering review, stakeholder input, or education on these measures' pros and cons. The traffic calming measures associated with Tier I tend to be low-cost and easy to install. These solutions do not require City Council approvals and post evaluations.

Education

Under Tier I, valuable educational material is provided to the public, informing them of various traffic, pedestrian, and bicycle safety matters. Materials include disseminating information via brochures, website, and videos, either general in nature or focused on a specific travel mode. Distribution of educational materials focuses on all age groups and provides a gentle reminder of the rules of the road. With increased exposure to educational material and periodic reinforcement, noticeable change in driver behavior can be achieved. This also translates into improved safety for pedestrians and bicyclists.

Empowerment

Empowering the public with useful information on the benefits of traffic calming, available strategies, and City's policies and procedures is a valuable tool included in this program. There





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are limited opportunities for public empowerment due to the basic nature of Tier I complaints and concerns.

Enforcement

Tier I concerns do not rely heavily on law enforcement, but providing site presence at locations with repeated complaints of traffic violations can be employed to increase compliance with traffic and parking regulations. The presence of law enforcement and the issuance of warnings result in lower speeds and a safer environment for all users. It can also promote improved relationships between community and law enforcement as they work together to solve basic traffic-related concerns.

Engineering

Upon receiving notification from the public, City staff shall perform necessary field observations to assess the existing conditions and develop any basic, low-cost solutions that can be implemented immediately. Such improvements include replacing faded or damaged signs; repainting curbs, pavement markings, and crosswalks; trimming trees that cover traffic signs, etc.

Tier I concerns can also be addressed by installing new signs to increase awareness of an area. Signs displaying speed limits, pedestrian crossings, and shared bike facilities are examples of Tier I engineering improvements. Installation of additional signs should be carefully reviewed since unnecessary signs cause sign pollution and add to ongoing maintenance costs.

4.2 Tier II

Tier II solutions are explored once a determination is made that the Tier I strategies may not adequately address the traffic calming-related concerns. Under this Tier, additional evaluation based on field observations and data collection are required. Tier II improvement also requires some community outreach and support since these strategies may involve physical enhancements that may not be supported by the entire community. While more expensive than Tier I, Tier II improvements are less expensive than Tier III.

Education

Under Tier II, increased emphasis is placed on education. Measures employed consist of safety meetings and workshops that require community involvement. A safety campaign like Street Smarts may also be considered. Safety-related training and workshops could be provided at





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schools for different age groups and modes (walking, bicycling, and driving for senior students). Additional discussion on various educational opportunities is provided in the following pages.

Empowerment

Tier II is where community engagement and empowerment are duly considered. Since staffing resources are limited, it is prudent to empower interested community members with necessary education on traffic calming matters and become community liaison for better collaboration and coordination between residents and the City Hall. This strategy involves providing residents with the necessary education and tools to extend the traffic safety education within their community without having the City staff present at every meeting and training workshop. The volunteering community members can encourage additional community members to receive the City staff's necessary training and begin educational outreach to a broader community on their own. This community empowerment approach could bring noticeable results over the long term.

Enforcement

Enforcement measures in Tier II include increased patrols and the issuance of citations for a traffic infraction. When traffic concerns cannot be addressed through other measures, increasing patrols may bring about safer transportation operations. By issuing citations, police officers reinforce the importance of compliance with traffic and parking regulations and the negative impacts of non-compliance.

Engineering

When Tier I strategies are not fully effective, the City staff shall perform necessary field observations and collect data to identify appropriate Tier II solutions. Engineering improvements available under Tier II are road diets (lane narrowing), electronic speed feedback signs, and flashing beacons or lighted crosswalks.

4.3 Tier III

Tier III strategies typically require additional field observations, data collection, public outreach, and community support before their implementation. Tier III traffic calming strategies involve increased presence, physical alterations, and much more expensive solutions that may alter traffic flows, roadway configurations, and driver behavior.





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Education

Tier III educational measures further extend Tier I and Tier II strategies. They are a more intensive and focused set of options with specific goals. Such strategies include focused safety training, bike rodeos, school safety workshops, and other events where safety training can be provided to smaller groups with closer attention. Various Street Smarts presentations, including educational videos, are also included in Tier III education.

Empowerment

Tier III empowerment strategies offer options such as forming of neighborhood traffic safety committees and rolling out safety initiatives such as the Pace Car Program. Like block-clubs, traffic safety committees focus on individual neighborhoods where residents can collaborate and identify problems and specific solutions for their community. A Pace Car Program, where volunteering residents sign a pledge to drive at or below the posted speed limit, has been successful in many cities, including Seattle, Salt Lake City, Palo Alto, San Leandro, El Cerrito, and Capitola. Tier III empowerment programs bring significant benefit to the neighborhood as the community engagement and acceptance of traffic calming strategies are widespread.

Enforcement

Tier III enforcement strategies involved stepped-up efforts from the Tier II enforcement and may include focused enforcement and sting operations. Focused enforcement provides police presence at specific locations and times in which the most problematic conditions are observed. Sting operations allow major problems to be identified and addressed with increased police enforcement within a shorter period of time. These methods effectively alert the community that traffic safety is a high priority to the City and that the City is committed to full compliance with traffic regulations and observing safety practices.

Engineering

Tier III Engineering solutions involve significant physical improvements at high costs. Tier III engineering solutions are explored when other strategies have failed to completely address traffic-related concerns due to the required staffing, capital costs, and long-term physical alterations. Traffic calming improvements and strategies available under this tier require additional field observations, data collection, and analysis. Community engagement and review are equivalently essential before and after the completion of improvements. Some engineering improvements available for Tier III are chokers/chicanes, speed humps/lumps, raised crosswalks/intersections, corner bulb-outs, traffic circles, medians, and half- or full-street closures.





Neighborhood Traffic Calming Program

4.4 Traffic Calming Toolbox

Table 2. List of Traffic Calming Measures

Measures	Tier	
Community Engagement	I, II	Empowerment
Centerline, Edgeline, Parking Lane Striping	I	Engineering
Targeted Speed Enforcement	I	Enforcement
Speed Legends	I	Engineering
Signage	I	Engineering
Bott's Dots / Raised Reflectors	I	Engineering
High Visibility Crosswalk	I	Engineering
Increased Patrol and Warning/Citations	I	Enforcement
Decorative Surfacing	I	Empowerment
Lawn Signs	I	Empowerment
Pop-Up Traffic Calming Demonstration	I	Education
Angled Parking	II	Engineering
Speed Feedback Signs	II	Engineering
Flashing Beacons	II	Engineering
Road Diet (Bike Lanes and Striped Medians)	II	Engineering
Temporary Speed Bump	II	Engineering
Striped Bulbouts with Bollards	II	Engineering
Striped Chicane with Bollards	II	Engineering
Striped Traffic Circle with Bollards	II	Engineering
Street Smarts Program	III	Education
Pace Car Program	III	Empowerment
Full/Detached Bulbouts	III	Engineering
Two-Lane Chokers	III	Engineering
Median Islands/Pedestrian Refuges	III	Engineering
Traffic Circles	III	Engineering
Lateral Shifts	III	Engineering





Neighborhood Traffic Calming Program

Measures	Tier	
Chicanes	III	Engineering
Speed Bumps	III	Engineering
Raised Crosswalks	III	Engineering
Raised Intersections	III	Engineering
Diagonal Diverters	III	Engineering
Partial Closures	III	Engineering
Full Closures	III	Engineering
Forced Turn Islands	III	Engineering





Neighborhood Traffic Calming Program

5. REFERENCES

Traffic Calming

- Alameda County Neighborhood Traffic Calming Program, July 2011
- City of San Jose: Traffic Calming Toolkit
- Town of Los Altos Hills: Traffic Calming Guide, May 2014
- Traffic Calming State of the Practice by Institute of Transportation Engineers (ITE) and Federal Highway Administration (FHWA)
- City of Oceanside Neighborhood Traffic Calming Program, February 2011
- City of Palo Alto Neighborhood Traffic Calming Program
- City of Pleasanton: Traffic Calming
- City of San Diego: Taming Neighborhood Traffic
- Smart Growth America
- NACTO National Association of City of Transportation Officials

Vision Zero

- City of San Jose
- City of Los Angeles
- City of San Francisco
- City of Seattle
- City of San Diego
- City of San Antonio
- City of Portland
- City of New York
- City of Chicago

Street Smarts Program

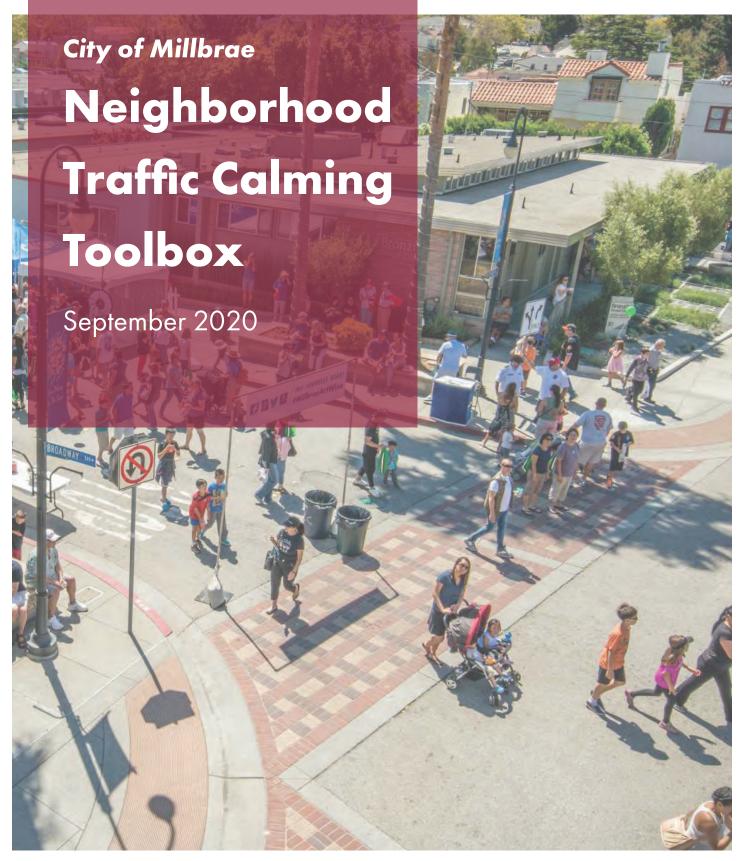
- San Ramon Valley Street Smarts
- Cities of San Francisco, Davis, Santa Rosa, Napa, Benicia, Cupertino and Salinas
- Street Smarts Marin, County of Marin
- West Contra Costa County Safe Communities Program
- Santa Clara County Traffic Safe Communities Network
- Monterey County Health Department



APPENDIX A. City Of Millbrae Neighborhood Traffic Calming Program Toolbox









ABOUT THIS TOOLBOX

The City of Millbrae Neighborhood Traffic Calming Toolbox contains traffic calming options, application and review processes made convenient for Millbrae's residents and City staff to identify the right measures and implement traffic calming on neighborhood streets.

Prepared for: City of Millbrae

Prepared by: TJKM Transportation Consultants (TJKM



INTRODUCTION

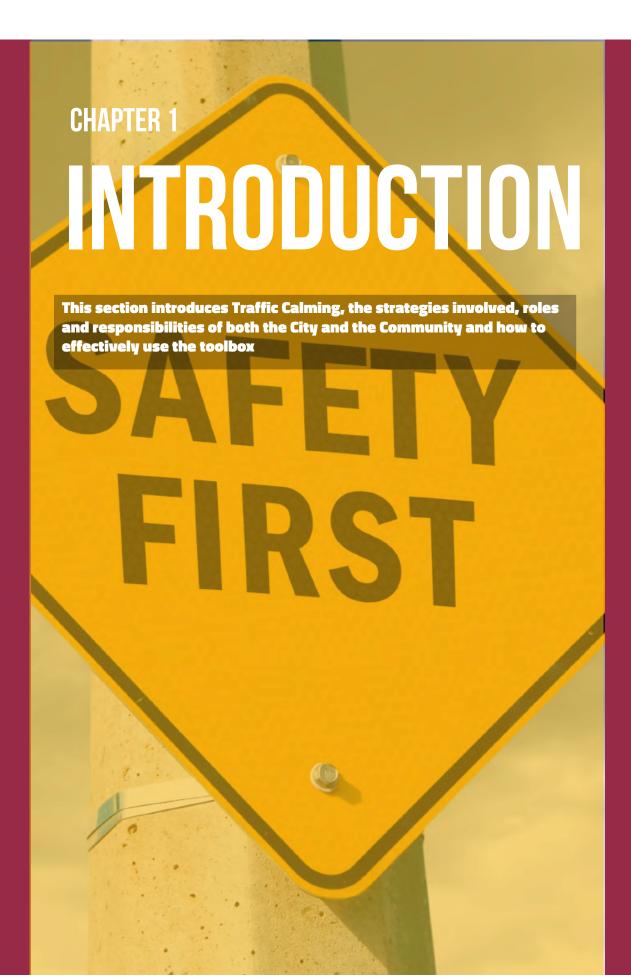
DECISION MAKING
PROCESS
9

LIST OF MEASURES
& DETAILS 15

APPLICATION & PETITION FORMS 37



CONTENTS



WHAT IS TRAFFIC CALMING?



TRAFFIC CALMING IS DEFINED AS A PROCESS TO REDUCE VEHICULAR SPEEDS AND MANAGE CUT-THROUGH TRAFFIC. IT COMPRISES OF STRATEGIES AND SOLUTIONS TO IMPROVE SAFETY FOR ALL USERS; MITIGATE IMPACTS ON RESIDENTIAL NEIGHBORHOODS, SCHOOL ZONES AND ENHANCE QUALITY OF LIFE FOR RESIDENTS OF A CITY.

The City of Millbrae has developed its first comprehensive Neighborhood Traffic Calming Program (NTCP) that provides a toolkit containing effective solutions to tackle the existing concerns. Achieved with the assistance of community outreach and collaboration, this document is developed as a guide for City staff, elected officials and residents to become acclimated to the policies and procedures for successful implementation of traffic calming solutions.

Program will benefit the City in various perspectives, including:

- Improve driver attention and awareness, and attempt to change driving behavior that brings long term benefits
- Enhance safety for all users motorists, transit riders, bicyclists, and pedestrians
- Encourage non-motorized modes of transportation such as walking and bicycling
- Encourage citizen involvement with neighborhood traffic management in the City
- Provide a fair and consistent process to address public concerns
- Enhance livability of residential neighborhoods

THE FOUR E'S

Recognizing that not all traffic safety concerns can be mitigated by Engineering solutions or physical improvements, this toolbox explores traffic calming strategies and solutions in four proven categories – Education, Empowerment, Enforcement, and Engineering.

EDUCATION

Instructing residents of all age groups through educational materials and events regarding the importance of neighborhood traffic safety and applicability of various traffic calming devices

EMPOWERMENT

Strategies that involve community members to take initiative and have an active role in solving traffic related concerns in their own neighborhoods through various outreach efforts

ENFORCEMENT

Involving appropriate level of enforcement of various traffic and parking regulations to minimize recurring violations



ENGINEERING

Physical improvements along city streets and sidewalks that improve traffic safety



STRATEGIES IN 3 TIERS



TIER I

Low-cost improvements that require little or no engineering design and construction



TIER II

Improvements that require some engineering analysis, design, and construction



TIER III

Requires extensive analysis, design, community outreach and funding



DETAILED TRAFFIC CALMING MEASURES AND THEIR EVALUATION THRESHOLDS ARE PROVIDED IN THIS DOCUMENT STARTING FROM PAGE 15.



ROLES AND RESPONSIBILITIES

NTCP is a community-driven program, which highly depends on the collaboration between City staff and the community. The chart below shows the roles that City staff and community members play in the planning and implementation of traffic calming solutions:

THE CITY

Provide safe access to all travel modes

Address traffic-related concerns

Identify funding

Conduct field reviews, investigate and recieve feedback

THE COMMUNITY



Act as informant



Share traffic-related concerns



Participate in identifying traffic calming issues



Provide support through applications/petitions

HOW TO USE THE TOOLBOX?

This toolbox provides guidelines which are intended for City staff and residents in identifying problems and providing solutions for traffic-related issues in the neighborhoods.

For the residents,

- Read Step 1 on Page 10 to understand how the community helps in the process
- See **Figure 1 on Page 12** to understand step by step how Tier I tools are determined
- See Figure 2 on Page 13 to understand step by step how Tier II & III tools are determined
- Go to **Chapter 3** to view the list of measures in each Tier (I, II & III) and their pros/cons to get a broad idea
- Go to **Attachment** to fill out an application form!

For the City staff,

- Review Step 2 on Page 11 to understand how the city can identify the right tools
- See **Figure 1 on Page 12** to understand step by step how Tier I tools are determined
- See Figure 2 on Page 13 to understand step by step how Tier II & III tools are determined
- See **Table 1 on Page 34** for the Traffic Calming Matrix to screen and identify approprite measures for traffic-related issues
- See **Table 2 on Page 35** for the scoring criteria for prioritization of projects

CHAPTER 2

DEGSION MAKING

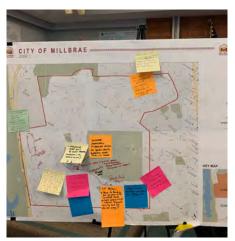
PROCESS

The decision making process demonstrates a step-by-step method on how a traffic safety concern is notified to the City staff and how the staff and community play their roles in improving traffic safety and enhancing quality of living in their neighborhood.

STEP 1: **COMMUNITY INITIATED PROCESS**

NTCP seeks community support and participation in two steps – Application and Petition*. This process is initiated when residents submit their request to the City staff to ivestigate speeding, cut-through traffic or traffic safety concerns. An Application assures that the problems and issues being evaluated are not "perceived" by one individual but are common concerns shared by a few more residents. Thus, an Application is processed prior to the







beginning of any evaluation. This will result in evaluation of concerns and implementation of Tier I measures if such concerns are validated through engineering analysis based on City, State and Federal traffic safety guidelines. If the community provides negative feedback of the implemented Tier I measures, the City may ask the community to file a petition to conduct a comprehensive traffic analysis for a possible Tier II or Tier III solution. The City may organize community meetings to inform the community of their findings and consult with Traffic Safety Commission and Fire Department to gather input and develop the final set of strategies. Flowcharts in Figure 1 and Figure 2 illustrates the above mentioned steps in more details.



STEP 2: IDENTIFYING THE RIGHT TOOLS

To identify the most feasible tools for a traffic safety issue, it is important to screen the problem to determine the type of strategies



that are available and implementable. After an issue is validated through engineering analysis based on City, State and Federal traffic safety guidelines, the Public Works Department identifies the potential tools from one of the three available tiers of solutions (Tier I, Tier II or Tier III).





AFTER THE EVALUATION OF AN APPLICATION, THE TOOLBOX IS USED TO IDENTIFY POTENTIAL SOLUTIONS FROM THE 3 TIERS.

Tier I includes the low-cost, simple solutions that can be easily addressed and implemented. These solutions do not require extensive data collection, design, analysis, or community engagement. If Tier I solutions are not effective, Tier II and III strategies are explored. It requires higher staffing resources, funding and longer time for completion to implement Tier II and III tools. Additional data collection, engineering analysis, community engagement is also required. It may also



involve filing a petition from the community to conduct a comprehensive analysis. Most Tier II and III improvements require physical improvements.

Figure 1. NTCP Decision Making Process (Tier I)

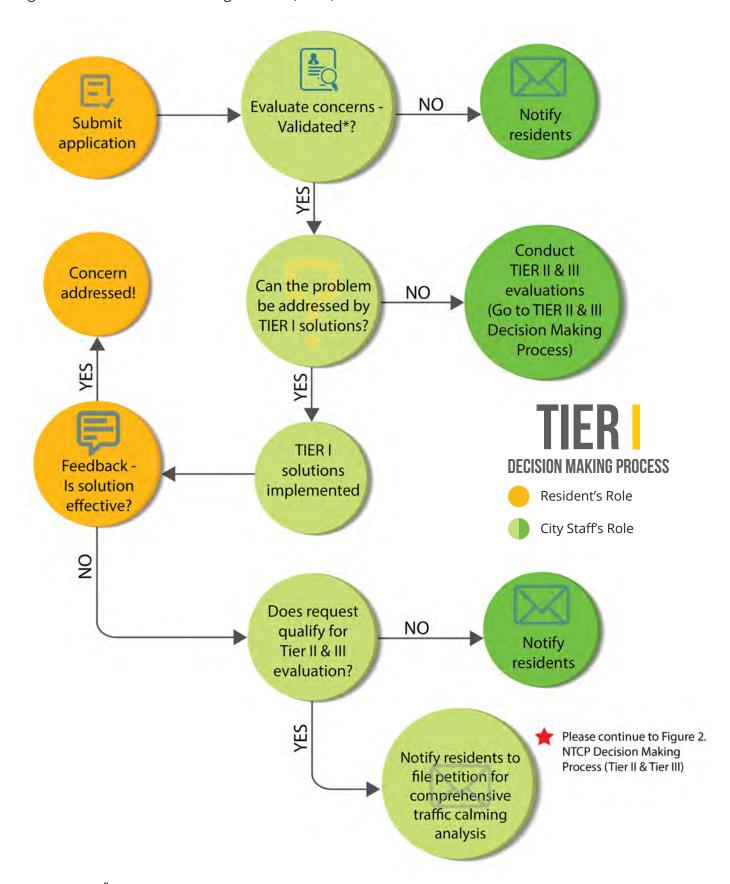
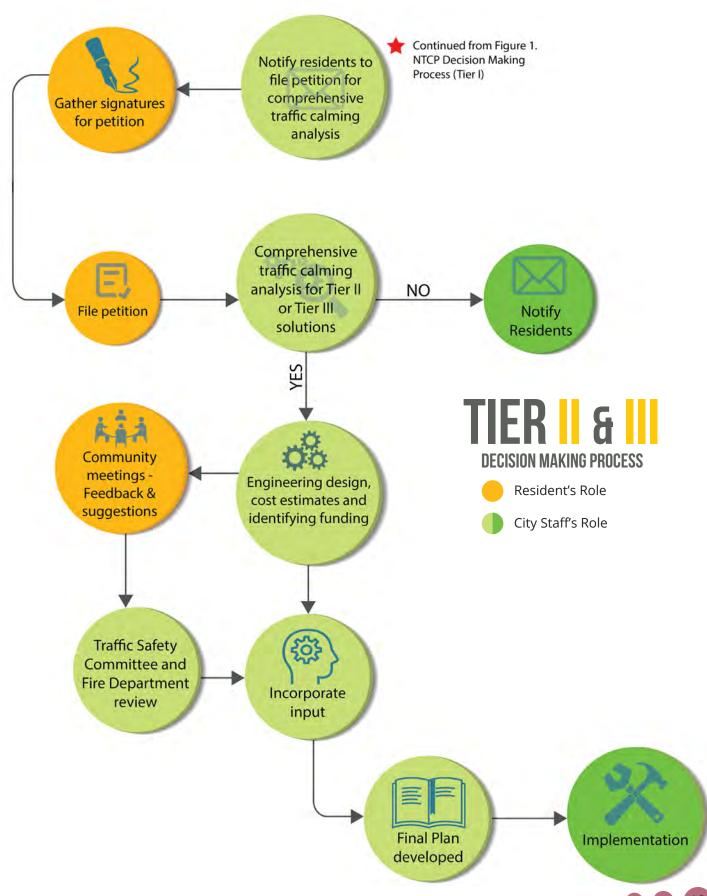


Figure 2. NTCP Decision Making Process (Tier II & III)





CHAPTER 3

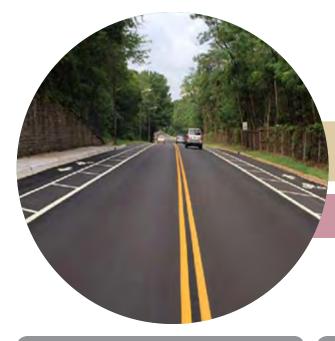
MEASURES

STOF

BDETAILS

This section summarizes the list of feasible traffic calming solutions for the City of Millbrae neighborhoods, as well as illustrations that <u>provide conceptual idea of each measure.</u>

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CENTERLINE, EDGELINE, PARKING **LANE STRIPING**

Edgeline/Centerline striping creates narrowed roadways to slow vehicle speeds.

Suitable for:

- Residential streets
 - Collector streets

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic* Volumes below 10,000.
- Speed limit below or equal to 35 mph.
- Street width greater than or equal to 15 feet.

Approx. Cost

\$0.50 - \$1.00 per linear foot of striping

Approval

City's discretion to approve, provided that criteria are met.

TARGETED SPEED ENFORCEMENT

A portable speed feedback sign setup on-street to alert drivers to vehicle speeds.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Locations with speeding concerns
- High pedestrian activity areas

Not Suitable for:

- Intersections
- Significant roadway curvature

Implementation Threshold

- Average Daily Traffic* Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$5,000 - \$15,000

Approval







SPEED LEGENDS

Speed legends are used to inform drivers of the current speed limit.

Suitable for:

- Residential streets
- Collector streets

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$250 - \$500 / ea

Approval

City's discretion to approve, provided that criteria are met.

SIGNAGE

Signage improves awareness to speed limits, pedestrians, and other potential hazards.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Locations with speeding concerns
- High pedestrian activity areas
- Significant roadway curvature

Not Suitable for:

Intersections

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$250 - \$ 500 / ea

Approval







HIGH VISIBILITY CROSSWALKS

Ladder markings and defined crosswalk widths heighten awareness of pedestrian crossings.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Arterial streets
- Mid-block crossings
- Intersection crosswalks
- High pedestrian activity areas

Not Suitable for:

Low pedestrian volume locations

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$3.00 - \$4.50 / linear foot of striping

Approval

City's discretion to approve, provided that criteria are met.

BOTTS' DOTS/RAISED REFLECTORS

Botts' dots provide tactile feedback to drivers moving across travel lanes.

Suitable for:

- School zones
- Residential streets
- Collector streets
- T-Intersections

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$1,500 - \$2,000 / ea

Approval

60% residents need to approve









LAWN SIGNS

Signs installed on front lawns that are used to remind drivers to drive slowly.

Suitable for:

- School Zones
- Residential streets
- Collector streets

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 1,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

Approval

Varies

N/A



INCREASED PATROL AND WARNINGS/CITATIONS

Increased patrol and warnings/citations can effectively reduce speeding and inappropriate driving.

Suitable for:

- Residential streets
- Collector streets
- Locations with speeding concerns

Not Suitable for:

Not applicable

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

Varies

Approval







TER



DECORATIVE SURFACING

Colorful and decorative pavement markings to draw driver attention and slow down traffic.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Locations with speeding concerns
- Mid-block crossings
- Intersection crosswalks
- High pedestrian activity areas

Not Suitable for:

Low pedestrian volume locations

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

Varies

Approval

City's discretion to approve, provided that criteria are met.

POP-UP TRAFFIC CALMING DEMONSTRATION

Involve community members to demonstrate traffic calming devices through temporary installations.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Locations with speeding concerns

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 1,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

Varies

Approval





ANGLED PARKING

Angled parking narrows travel lanes to slow vehicle speed and increases parking supply.

Suitable for:

- Downtown areas
- Commercial areas
- Mixed-Use areas
- Residential streets
- Collector streets

Not Suitable for:

Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 3,000.
- Speed limit below or equal to 35 mph.
- Street width greater than or equal to 48 feet.

Approx. Cost

Varies

Approval

City's discretion to approve, provided that criteria are met.

SPEED FEEDBACK SIGNS

Speed feedback signs are permanently installed to alert drivers of their driving speeds.

Suitable for:

- School zones
- Residential streets
- Collector streets
- Arterial streets
- Locations with speeding concerns
- High pedestrian activity areas

Not Suitable for:

- Intersections
- Significant roadway curvature

SPEED YOUR SPEED

Implementation Threshold

Average Daily Traffic Volumes below 10,000.

Speed limit below or equal to 35 mph.

Approx. Cost

\$5,000 - \$15,000 / ea

Approval









FLASHING BEACONS

Flashing beacons warn drivers of pedestrians at an uncontrolled crossing location.

Suitable for:

- School Zones
- Mixed-use areas
- Residential streets
- Collector streets

Not Suitable for:

Not applicable

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$15,000 - \$25,000 / ea

Approval

City's discretion to approve, provided that criteria are met.

ROAD DIET (BIKE LANE, MEDIAN)

Road diet replaces a number of travel lanes with other modal facilities and slow vehicle speeds.

Suitable for:

- School Zones
- Collector streets
- Downtown areas
- Residential areas
- High bicycle/pedestrian traffic

Not Suitable for:

Not Applicable

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Street width greater than or equal to 48 feet.
- Speed limit below or equal to 35 mph.

Approx. Cost

Varies

Approval





RUBBER SPEED BUMPS

Rubber speed bumps slow driver speeds with vertical roadway deflections.

Suitable for:

- Residential streets
- Persistent speeding
- High cut-through volumes

Not Suitable for:

- Collector streets
- Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$2,000 - \$4,000 / ea

Approval

City's discretion to approve, provided that criteria are met.

STRIPED BULBOUTS WITH BOLLARDS

Bulbouts slow vehicle speeds with the impression o a narrowed roadway.

Suitable for:

- Downtown streets
- Residential streets
- Collector streets
- Arterial streets
- High pedestrian activity areas
- Long pedestrian crossing distances

Not Suitable for:

- Low pedestrian activity areas
- Narrow streets

Implementation Threshold

- Average Daily Traffic Volumes below 1,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$3,500 - \$7,500 per intersection

Approval





TEMPORARY TRAFFIC CIRCLES

Low cost alternative to permanent Traffic Circles require drivers to slowly maneuver through an intersection.

Suitable for:

- Residential streets
- Collector streets
- Locations with speeding concerns
- High accident rate

Not Suitable for:

- Horizontal curvature
- Vertical curvature

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

\$5,000 - \$8,000 / ea

Approval

City's discretion to approve, provided that criteria are met.

STRIPED CHICANES WITH BOLLARDS

Low cost alternative to permanent Chicanes require drivers to slowly maneuver through high speeding roadways.

Suitable for:

- Wide residential streets
- Collector streets
- Downtown areas
- Significant roadway curvature
- Locations with speeding concerns

Not Suitable for:

Narrow roadways

......

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Street width greater than or equal to 48 feet.
- Speed limit below or equal to 35 mph.

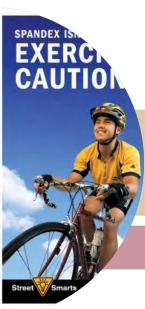
Approx. Cost

\$5,000 - \$7,500 / ea

Approval







STREET SMARTS PROGRAM

Traffic safety education program designed to build awareness, offer safety tips, and change driver behavior to help make our streets safer.

Suitable for:

- Downtown streets
- Residential streets
- Collector streets
- High pedestrian activity areas

Not Suitable for:

Low pedestrian activity areas

Implementation Threshold

Petition Process

Approx. Cost

Varies

Approval

City's discretion to approve, provided that criteria are met.

PACE CAR PROGRAM

Residents pledge to drive at 25 mph, requiring following vehicles to drive at lower speeds, and thereby slowing traffic in the neighborhood.

Suitable for:

- Downtown streets
- Residential streets
- Collector streets
- High pedestrian activity areas

Not Suitable for:

Low pedestrian activity areas



Implementation Threshold

Petition Process

Approx. Cost

Varies

Approval







FULL/DETACHED BULBOUTS

Bulbouts slow vehicle speeds with the impression of a narrowed roadway.

Suitable for:

- Downtown streets
- Residential streets
- Collector streets
- Arterial streets
- High pedestrian activity areas
- Long pedestrian crossing distances

Not Suitable for:

- Low pedestrian activity areas
- Narrow streets
- High truck volumes

Implementation Threshold

- Average Daily Traffic Volumes below 1,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

≥ \$50,000 per intersection

Approval

City's discretion to approve, provided that criteria are met.

TWO-LANE CHOKERS

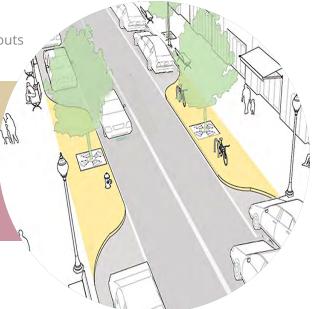
Two lane chokers function similarly to bulbouts but at mid-block locations.

Suitable for:

- Wide streets
- High cut-through volumes

Not Suitable for:

- Emergency access routes
- High on-street parking demand
- High bicycle volumes



Implementation Threshold

- Average Daily Traffic Volumes below 1,000.
- Speed limit below or equal to 35 mph.
- Street length greater than/equal to 1,500 feet.

Approx. Cost

\$25,000 - \$50,000 / pair

Approval





MEDIAN ISLAND/ PEDESTRIAN REFUGE

Pinchpoint in the center of the roadway that reduce travel lane width and pedestrian crossing distances.

Suitable for:

- Wide residential streets
- Collector streets
- Mid-block crossings
- Long crossing distances
- High pedestrian activity areas
- Locations with speeding concerns

Not Suitable for:

Narrow roadways

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

Varies

Approval

City's discretion to approve, provided that criteria are met.

TRAFFIC CIRCLES

Traffic Circles require drivers to slowly maneuver through an intersection.

Suitable for:

- Residential streets
- Collector streets
- Locations with speeding concerns
- High accident rate

Not Suitable for:

- Horizontal curvature
- Vertical curvature

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

≥ \$25,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.







ROUNDABOUTS

Roundabouts require drivers to slowly maneuver through an intersection operating with yield control.

Suitable for:

- Collector streets
- Arterial streets
- Locations with speeding concerns
- High accident rate

Not Suitable for:

- Horizontal curvature
- Vertical curvature

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

≥ \$50,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.

LATERAL SHIFTS

Lateral shifts force drivers to make slight maneuvers, resulting in slower vehicle speeds.

Suitable for:

- Residential streets
- Collector streets
- **Arterial Streets**
- Locations with speeding concerns

Not Suitable for:

High vehicle volumes

Implementation Threshold

- Average Daily Traffic Volumes below 10,000.
- Speed limit below or equal to 35 mph.
- Street width greater than or equal to 15 feet.

Approx. Cost

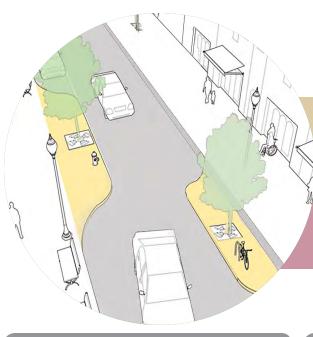
Varies

60% residents need to approve + City's discretion to approve, provided that criteria are met.

Approval







CHICANES

Chicanes functions similarly to lateral shifts and require less roadway reconfigurations.

Suitable for:

- Wide residential streets
- Wide Collector streets

Not Suitable for:

- Arterial streets
- Emergency access routes
- High on-street parking demand
- High bicycle traffic

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.
- Street length greater than/equal to 1,500 feet.
- Street width greater than or equal to 15 feet.

Approx. Cost

\$25,000 - \$50,000 / pair

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.

ASPHALT SPEED BUMPS

Asphalt speed bumps slow driver speeds with vertical roadway deflections.

Suitable for:

- Residential streets
- Persistent speeding
- High cut-through volumes

Not Suitable for:

- Collector streets
- Arterial streets

Implementation Threshold

- Average Daily Traffic Volumes below 3,000.
- Speed limit below or equal to 30 mph.

Approx. Cost

\$7,000 - \$10,000 / ea

Approval

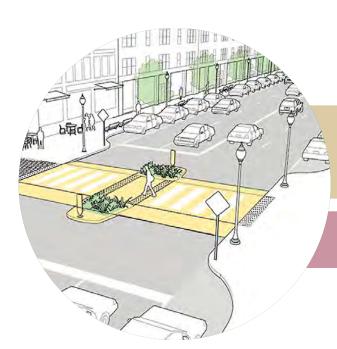
60% residents need to approve + City's discretion to approve, provided that criteria are met.







ER II



RAISED CROSSWALKS

Raised crosswalks slow driver speeds with vertical deflections and emphasis of pedestrian right-of-way.

Suitable for:

- School zones
- Residential streets
- Mid-block crossings
- High pedestrian activity areas

Not Suitable for:

- Arterial streets
- Intersections

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.
- Grade below or equal to 8 percent.

Approx. Cost

\$10,000 - \$20,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.

RAISED INTERSECTIONS

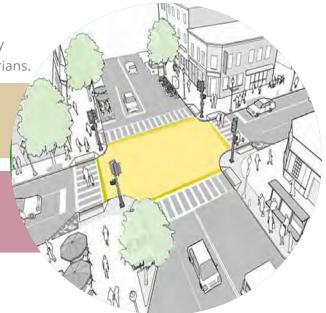
Raised intersections slow drivers speed by emphasizing a "shared zone" with pedestrians.

Suitable for:

- Downtown areas
- High pedestrian activity areas
- High vehicle speeds

Not Suitable for:

- Residential streets
- Collector streets
- Arterial streets



Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Speed limit below or equal to 35 mph.

Approx. Cost

≥ \$50,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.





DIAGONAL DIVERTERS

Diagonal diverters reduce traffic entering neighborhoods by permanently detouring certain routes.

Suitable for:

- Residential streets
- Locations with speeding concerns
- Limited access desired

Not Suitable for:

- Arterial streets
- Collector streets if significant traffic diversion anticipated

Implementation Threshold

- Average Daily Traffic Volumes below 5,000.
- Greater than 25% non-local traffic.

Approx. Cost

≥ \$25,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.

PARTIAL CLOSURES

Partial closures reduce traffic in neighborhoods by restricting one direction of traffic.

Suitable for:

- Residential streets
- Locations with speeding concerns
- Limited access desired

Not Suitable for:

- Arterial streets
- Collector streets if significant traffic diversion anticipated

Implementation Threshold

- Average Daily Traffic Volumes below 500.
- Greater than 25% non-local traffic.

Approx. Cost

≥ \$25,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.







FULL CLOSURES

Full closures reduce traffic entering neighborhoods by restricting vehicular access.

Suitable for:

- Residential streets
- Locations with speeding concerns
- Limited access desired

Not Suitable for:

- Arterial streets
- Collector streets if significant traffic diversion anticipated

Implementation Threshold

- Average Daily Traffic Volumes below 500.
- Greater than 25% non-local traffic.

Approx. Cost

≥ \$25,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.

FORCED TURN ISLANDS

Raised concrete islands separate turning traffic from through traffic at an intersection.

Suitable for:

- Residential streets
- Collector streets
- Locations with speeding concerns
- Limited access desired

Not Suitable for:

Not applicable

traffic

Implementation Threshold

- Average Daily Traffic Volumes below 500.
- Greater than 25% non-local traffic.

Approx. Cost

≥ \$25,000 / ea

Approval

60% residents need to approve + City's discretion to approve, provided that criteria are met.



Table 1. Traffic Calming Matrix

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	- - -	Y	
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æ	RAFFIC CALMING	MATRIX			ď	Appropriate	W	May be considered	Not Appropriate		Not Applica		
4	T. Constant		- 1	roblem		Residential		Non-Residential	Roadway	Roadway Classification	Bus or Emergency	Other	A Commission of the Commission
#	lypes of Measures	Speeding Volume	c Vehicle	le Pedestrian nts Safety	Noise	Midblock Intersection	Boundary Midblock of Area	ock Intersection	Local Streets	Collectors	Response Route	Considerations	Approximate Cost
	1.1 Centerline, Edgeline, Parking Lane, Median Striping	•	0			•	•	•	ADT < 10,000; Speed Limit < 35 mph; Street width ≥ 15 feet	ADT < 50,000; Speed Limit ≤ 35 mph; Street width ≥ 15 feet	•	None	\$0.50 - \$1.00 per linear foot of striping
	1.2 Targeted Speed Enforcement	•	<u> </u>	•	•	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$5,000 - \$15,000
	1.3 Speed Legends	•	0	0	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$250-\$500
	1.4 Signage	•	0	0	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$250-\$500
HE HE	1.5 High Visibility Crosswalks		0	•	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$3.00 - \$4.50 per linear foot of striping
	1.6 Botts Dots / Raised Reflectors	0		•	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$1,500 - \$2,000
	1.7 Lawn Signs	•	0	•	0	0	•	0	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	Varies
	1.8 Increased Patrol and Warnings/Citations	•	•	•	•	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	Varies
	1.9 Decorative Resurfacing		0	•	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	Varies
	1.10 Pop-Up Traffic Calming Demonstration	•	0	•	•	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	Varies
	2.1 Angled Parking	•	0	0	0	•	•	•	ADT < 2,000; Width ≥ 48 feet; Speed Limit ≤ 35 moh	ADT < 2,000; Width ≥ 48 feet; Speed Limit ≤ 35 mph	•	Not with bike lanes	Varies
	2.2 Speed Feedback Signs	•	0	0	•	0	0	0	ADT < 10,000; Speed Limit < 35 mph	ADT < 50,000; Speed Limit < 35 mph	•	None	\$5,000 - \$15,000
	2.3 Flashing Beacons		0	•	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph	ADT < 50,000; Speed Limit ≤ 35 mph	•	None	\$15,000 - \$25,000
	2.4 Road Diet (Bike Lane, Median)	•	0	•	0	•	•	•	ADT < 10,000; Width ≥ 48 feet; Speed Limit ≤ 35 mph	ADT < 50,000; Width ≥ 48 feet; Speed Limit < 35 mph	•	None	Varies
TER II	2.5 Rubber Speed Bumps	•	•	•	•	•	•	•	ADT < 2,000; Speed Limit ≤ 30 mph;	ADT < 2,000; Speed Limit ≤ 30 mph;	•	Grade ≤8%	\$2,000 - \$4,000 per location
	2.6 Striped Bulbouts with Bollards	•	0	•	0	•	•	•	ADT < 1,000; Speed Limit < 35 mph	ADT < 1,000; Speed Limit ≤ 35 mph	•	None	\$3,500 - \$7,000 per location
	2.7 Temporary Traffic Circle	•	•	•	0	•		0	ADT < 5,000; Speed Limit ≤ 35 mph	ADT < 5,000; Speed Limit ≤ 35 mph	•	Grade ≤8%	\$4,000
	2.8 Striped Chicanes with Bollards	•	0	0	0	•	•	•	ADT < 5,000; Speed Limit ≤ 35 mph; Length ≥ 1,500 feet; Street width ≥ 15	ADT < 5,000; Speed Limit < 35 mph; Length ≥ 1,500 feet; Street width ≥ 15	•	Grade ≤8%	\$5,000 - \$15,000
	3.1 Street Smarts Program	•	0	•	0	•	•	•	reet Petition Process	reet Petition Process		None	Varies
	3.2 Pace Car Program	•	0	•	0	•	•	•	Petition Process	Petition Process	•	None	Varies
	3.3 Ful/Detached Bulbouts	•	0	•	0	•	•	•	ADT < 1,000; Speed Limit < 35 mph	ADT < 1,000; Speed Limit ≤ 35 mph	•	None	≥ \$50,000 per intersection
	3.4 Two-Lane Chokers	•	0	0	0	•	•	•	ADT < 1,000; Speed Limit ≤ 35 mph; Length ≥ 1.500 feet	ADT < 1,000; Speed Limit ≤ 35 mph; Length ≥ 1,500 feet	•	None	\$25,000 - \$50,000
	3.5 Median Island/Pedestrian Refuge	•	<u> </u>	•	0	•	•	•	ADT < 1,000; Speed Limit ≤ 35 mph	ADT < 1,000; Speed Limit ≤ 35 mph	•	None	Varies
	3.6 Traffic Circles	•		•	0	•	•	0	ADT < 5,000; Speed Limit < 35 mph	ADT < 5,000; Speed Limit < 35 mph	•	Grade ≤8%	> \$25,000
	3.7 Roundabouts	•	•	•	•	•	•	•	ADT < 5,000; Speed Limit < 35 mph	ADT < 5,000; Speed Limit < 35 mph	•	Grade ≤ 6%	> \$50,000
	3.8 Lateral Shifts	•	0	0	0	•	•	•	ADT < 10,000; Speed Limit ≤ 35 mph; Street width ≥ 15 feet	ADT < 50,000; Speed Limit ≤ 35 mph; Street width ≥ 15 feet	•	Grade ≤ 10%	Varies
IER II	3.9 Chicanes	•		0	0	•	•	•	ADT < 5,000; Speed Limit < 35 mph; Length ≥ 1,500 feet; Street width ≥ 15	ADT < 5,000; Speed Limit < 35 mph; Length ≥ 1,500 feet; Street width ≥ 15	•	Grade ≤8%	\$25,000 - \$50,000
	3.10 Asphalt Speed Bumps	•	•	•	•	•	•	•	ADT < 2,000; Speed Limit ≤ 30 mph;	ADT < 2,000; Speed Limit ≤ 30 mph;	•	Grade ≤8%	\$7,000 - \$10,000 per location
	3.11 Raised Crosswalks	•	•	•	•	0	0	•	ADT < 5,000; Speed Limit < 35 mph	ADT < 5,000; Speed Limit < 35 mph	•	Grade ≤8%	\$10,000 - \$20,000
	3.12 Raised Intersections	•	•		•	•	•	•	ADT < 5,000; Speed Limit < 35 mph	ADT < 5,000; Speed Limit ≤ 35 mph	•	Grade ≤ 8%	≥ \$50,000 will vary
	3.13 Diagonal Diverters	•	0	0	0	•	•	•	ADT < 5,000; > 25% non-local traffic	•	•	None	25000
	3.14 Partial Closures	•	0	0	0	•	•	•	ADT < 500; > 25% non-local traffic	•	•	None	≥ \$25,000
	3.15 Full Closures	•	0	0	0	•	•	•	ADT < 500; > 25% non-local traffic	•	•	None	> \$25,000

PRIORITIZATION

The vast number of requests received by City staff might not mach up to the limited fund available every year. Thus, it is imperative to establish a project priority list to allocate resources and funds more effectively. The NTCP includes a formal and consistent process that places emphasis on speeds, accidents, volumes, schools, and pedestrian generators pertinent to traffic calming. This process will assist the City and the Millbrae community to identify safety concerns, develop solutions and prioritize implementation based on funding availability. The proposed process and scoring criteria are summarized in the **Table 1**.

Table 2. Proposed Process and Scoring Criteria

	Criteria	Point Definitions	Points Available
- - - - - -	85th percentile speed	2 points for every 1 MPH above the posted speed limit (85th percentile speed must be at least 5 MPH over the posted speed limit to be considered for traffic calming)	30
A A	Crash History	3 points for each preventable crash within the last three years	30
	Vicinity to Schools	7.5 points per school if street fronts or provides access to a school, or if street is a designated Safe Route to School	15
ıdary	Pedestrian Generators	10 points if location is within 1,000 feet of a major transit access point or a civic facility; or peak hour pedestrian volume at any adjacent intersections exceeds 100	10
Secondary	Traffic Volumes	1 point for every 500 average daily traffic or portion thereof till 2,000 average daily traffic; 5 points for > 2,000 average daily traffic	5
	Cut-through Traffic	2 points if at least 25% of traffic volume is cut-through; 1 points for each additional 5% (Up to 40% max in total)	5
	Additional Concerns	 1 point if visibility restrictions result from roadway geometry; 1 point if segment is a designated Bike Route or pedestrian corridor; 1 point if street has no sidewalks; 1 point if segment is > 1,000 feet in length; 1 point if segment is > 40 feet in width 	5

Total 100



ATTACHMENT

CEAR DE LA CONTROL DE LA CONTR

STOP WHEN 1

Petition and application forms are included in this section. For more information please visit our website at www.millbraetrafficcalming.com or contact City of Millbrae Public Works at (650) 259-2339



STEP 1: APPLICATION FOR EVALUATION NEIGHBORHOODTRAFFICCALMINGPROGRAM

Mana a					
Name	Em	ail Address		Phone Number	
Street Address				Zip Code	
Locations and Concerr	ns				
	from		to		
Street Name		Cross Street		Cross Street	
	from		to		_
Street Name		Cross Street		Cross Street	
	from		to		
Street Name		Cross Street		Cross Street	
Types of Concerns (Selec	t all that				
☐ Excessive Traffic☐ Cut-through Traffic		□ Speeding□ Limited Visibility		☐ Illegal Parking	
_		Limited visibility			
		conditions and develop soluti e traffic operations and enhar			eighborhood Traffic
Neighborhood Suppor			<u> </u>	,	
To initiate an evaluation for t within the block/blocks wher block, at least four signatures signatures. For more informa or call (650) 259-2393. The Er	raffic calmi e traffic cal s must be c ation, pleas ngineering 8	ng, you must obtain signature ming evaluation is being requ ollected. If needed, please use e visit <u>https://www.millbraetra</u> & Transportation staff will rev	ested. For e an addition efficcalming iew and re	example, if there are 20 a onal sheet of paper to col g.com, email at <u>pwadmin</u> spond to your inquires in	iddresses in the lect more @ci.millbrae.ca.us,
Print Name	Stree	t Number / Street Nan	ne	Signature	
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NTCP@millbrae.gov Subject Line: "Traffic Calming

Application"

OR

Submit the completed form via mail to: City of Millbrae Public Works Department -621, Magnolia Avenue, Millbrae, CA 94030



STEP 2: PETITION FOR NEIGHBORHOOD TRAFFIC CALMING PROGRAM

The City staff has conducted an evaluation in response to the application submitted on _____ (mm/dd/yyyy). The evaluation shows that the following traffic calming measures may improve traffic operations and enhance safety.

Locations			Measures
Street Name	from	to	
Su cec name		Cr 655 5t. eet	
Street Name	_ from	Cross Street	
	from	to	
Street Name	Cross Street	Cross Street	
			allation of these traffic calming
	ocations. Include the Primary Co <i>port for the above mentione</i>	_	OTE: Your signature on this petition neighborhood.
# Print Name	Street Number /		Signature
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For more information, visit
www.millbraetrafficcalming.com
Contact us at
(650) 259-2393
pwadmin@ci.millbrae.ca.us

