Citrus Heights Multi Modal Transportation Safety Program (MMTSP)

Program Guide

Adopted December 10, 2020



MMTSP funded by a grant from the California Department of Transportation (Caltrans)

Caltrans

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TOOLE DESIGN

Abstract

The Multi Modal Transportation Safety Program (MMTSP) is a policy document that updates the 2001 Neighborhood Traffic Management Program (NTMP). The content contained herein is based, in part, on review of the 2001 NTMP, as well as traffic calming national best practices. The MMTSP is the result of cooperative efforts between industry leaders, the Citrus Heights Police Department, Citrus Heights General Services Department, the Sacramento Metropolitan Fire District, and the community. Resources used in developing this policy manual include the Institute of Transportation Engineers (ITE) Traffic Calming State of the Practice, similar traffic calming programs and policies from cities across the nation, as well as the previous NTMP.

This manual represents a collaborative effort between City management, staff, and stakeholders to develop a citywide policy to better address citizen concerns and outline an open and transparent process on how multi modal traffic calming projects are identified, prioritized, and implemented.

Acknowledgements

City of Citrus Heights City Council

Jeannie Bruins

Bret Daniels

Porshe Middleton

Steve Miller

Jeff Slowey

City of Citrus Heights Staff

Leslie Blomquist, City Engineer

Mary Poole, Operations Manager

Mike Pettinato, Sr Database and Application Analyst

Michelle Parker, Program Assistant

Daniel Cruz, Assistant Engineer

Freida Morales, Engineering Technician II

Citrus Heights Police Department

Shaun Gualco, Traffic Sergeant

Sacramento Metropolitan Fire District

Diana Schmidt, Fire Inspector II

Crishana Fields, Deputy Fire Marshall

MMTSP Champions

Chad Singleton

Aimee Pfaff

Susan Pointer

Melanie Stephens

Consultant Team

Iain Conway, Steer

Sarah McMinimy, Steer

Kavina Patel, Steer

Hank Kaplan, Steer

Juliana Jaramillo, Steer

Adam Vest, Toole Design

Joel Shaffer, Toole Design

Frank Proulx, Toole Design

Hugh Kelley, Toole Design

Laura Krull, Toole Design

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Program at a Glance

The City is working to make roads in our community safer for everyone who uses them, with the goal of making sure our neighborhoods are safe places to walk, drive, bike and roll. The MMTSP updates the 2001 NTMP and improves the way the City addresses traffic and safety concerns raised by residents.

Key program outcomes:

- A clear and transparent process for residents to submit and track street safety requests relating to issues such as speeding, cut-through traffic, and other safety issues in our neighborhoods
- A prioritization tool to help the City prioritize residents' street safety requests
- A toolbox of countermeasures for the City to address specific types of problems, which includes guidelines for how best to apply countermeasures
- Community resources for residents to promote safety in their neighborhoods



Abbreviations

- **ADT** - Average Daily Traffic
- **CHPD** - Citrus Heights Police Department
- **CIP** - Capital Improvement Program
- **FHWA** - Federal Highway Administration
- **GSD** - General Services Department
- **ITE** - Institute of Transportation Engineers
- **MMTSP** - Multi Modal Transportation Safety Program
- **MUTCD** - Manual on Uniform Traffic Control Devices
- **NTMP** - Neighborhood Traffic Management Program
- **SACOG** - Sacramento Area Council of Governments
- **SMFD** - Sacramento Metropolitan Fire District

1 Introduction



The Multi Modal Transportation Safety Program (MMTSP)

The Multi Modal Transportation Safety Program (MMTSP) is a comprehensive street safety program, that was developed with grant funding provided by the California Department of Transportation (Caltrans) through a Sustainable Communities Transportation Planning Grant.

The MMTSP is intended to provide an equitable and transparent process for the City to receive, prioritize and evaluate community requests for neighborhood-level traffic calming improvements.

At the onset of MMTSP implementation, there was a backlog of nearly 900 requests for street safety improvements on residential and collector streets throughout the City. The MMTSP includes a prioritization tool that will take the existing backlog of requests along with new requests coming in and rank them based on criteria developed with community input. Once ranked, the City will focus on the top scoring request locations to develop and implement improvement measures.

While the MMTSP's prioritization process focuses on residential and collector local streets, the City recognizes the importance of arterial street safety, and addresses these larger corridor issues through the Capital Improvement Program (CIP) process.

The MMTSP also recognizes the importance of community engagement in the overall Program success. Thus, a key goal of the MMTSP is to energize community involvement in street safety. There were several street safety champions who were active in the MMTSP development. Their leadership provided significant assistance and support to the Program development. An engaged group of Champions will be critical to ongoing implementation success.

MMTSP Goals

The MMTSP has the following goals:

- A clear and transparent process to receive complaints, identify appropriate strategies to address issues (countermeasures), and outline when and how changes will be made.
- A way to prioritize citizen requests to address speeding, cut-through traffic, and other safety issues in their neighborhoods.
- A catalog of safety improvement strategies and "counter"measures to address specific types of problems including guidelines for how to best apply different safety countermeasures.
- A package of the above program features to form a "tool" to allow the City to quickly respond to citizen requests and track the status of requests anywhere in the process.
- A "tool box" of information and resources for residents to promote safety in their neighborhoods.



Program Background

The City regularly receives requests from the community for new signs, striping, crosswalks, speed humps, traffic calming and traffic enforcement. The majority of these requests are in response to resident concerns of vehicle speeds and right-of-way violations on local residential and collector streets.

The City receives these street safety and enforcement requests from the public through multiple online service request platforms, City and police mobile reporting applications, in-person reports at City Hall, comments to the police department and/or to City staff at community meetings, and phone and email requests to the traffic engineering department and police department.

The City has received an increasing number of requests each year, as shown in Figure 1.1. The growing number of requests combined with limited resources to address them necessitated the development of a more efficient process to receive, prioritize and evaluate requests.

Requests were previously categorized by what the resident wanted to see, such as enforcement, speed bumps, stop signs or other signage, and general traffic calming. A set of new, issue-driven, categories have been developed, with the following classifications:

- Speeding
- Crossing Safety
- Reckless Driving
- Failure to Stop or Yield
- Sight Distance
- Cut Through Traffic
- Inadequate/Missing Street Lighting
- Inadequate/Missing Sidewalk or Bike Lanes
- Intersection Safety
- Other

Prior to the MMTSP, each request was screened by the City's Traffic Committee to determine potential countermeasure treatments to install, if any, which requires significant staff time and resources. Notably missing from the process was a step to prioritize reported problems before dedicating limited staff and financial resources to analysis and development of potential solutions.

The MMTSP includes the Prioritization Tool, which allows the City to focus on the top ranking issues as determined by community-driven criteria, such as whether the location is near a school or other sensitive use, and/or whether there is existing lighting, sidewalk or bicycle infrastructure, etc.

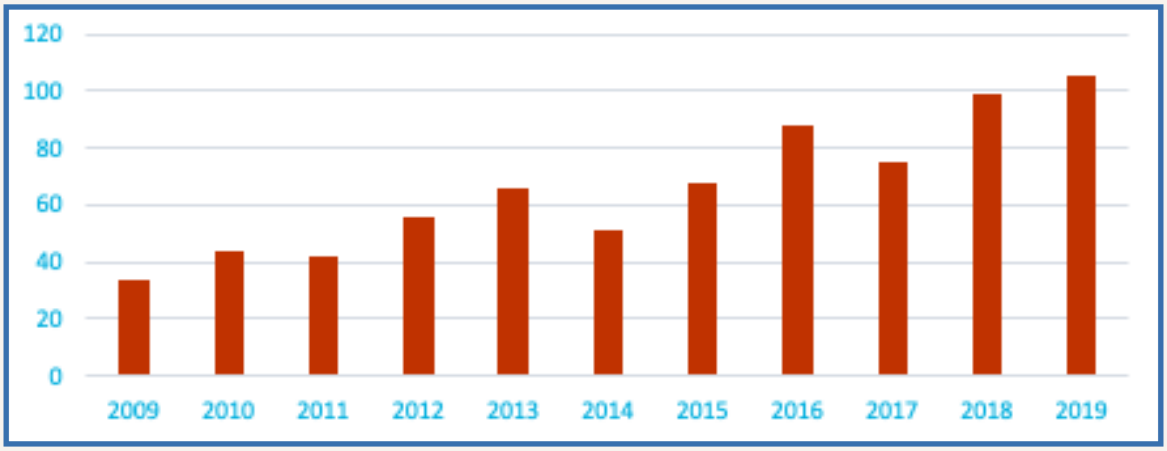


Figure 1.1 Annual Resident Safety Requests (2009-2019)



Developing the Program

The Multi Modal Transportation Safety Program (MMTSP) includes guidelines and procedures to initiate and evaluate requests. In addition, development of the MMTSP included the following action items:

- Identifying collision patterns, trends and "hot spots"
- Developing prioritization methodology and tool
- Conducting significant community engagement
- Evaluating and prioritizing past resident concerns
- Researching methods and potential funding sources for implementation

Arterials vs Local Streets

Safety "hot spots" tend to show up on arterials. For example, the following hot spots were identified as part of the collision trend analysis component of the project:

- Old Auburn and Sunrise
- Greenback and Auburn

The prioritization methodology recognizes locations on arterials and provides data to support City efforts to obtain funding to address those areas. Examples of recent projects where this type of data has been useful are shown below:

- Old Auburn Road Complete Streets Project (including Sunrise and Old Auburn)
- Various Signals and Intersection Safety Program, which addresses multiple intersections throughout the City as well as pedestrian safety at Greenback and Auburn

However, the intent of the prioritization tool is to target neighborhood residential and collector streets:

- The prioritization tool categorizes local residential and collector streets separately, so as to prioritize them for improvements and allow the City to program the improvements based on the ranking levels determined by the tool.
- Improvements will be programmed in the CIP and incorporated into maintenance programs as well.
- Enforcement, education and neighborhood engagement are universal "countermeasures" that the MMTSP recommends on a citywide basis as well for location specific issues.

Program Timeline

- **Oct 2019** — Community Workshop #1 & Champion Orientation
- **Nov 2019** — WALKshops
- **April 2020** — Community Workshop #2
- **Sept 2020** — Draft MMTSP & Tools
- **Sept 2020** — Community Workshop #3
- **Dec 2020** — Final MMTSP & Tools



Community Engagement

The MMTSP was prepared through a stakeholder and community-driven process as a way of building awareness about the MMTSP and establishing transparency in the process and community ownership in the Program.

Program development included three community workshops as well as pop up activities at related City and School District events to promote participation in, and understanding of, the MMTSP.

The progression of workshops was structured intentionally to build participant understanding of the inputs and constraints that go into the MMTSP, starting with a refocus from solution-providing to a problem-definition foundation. Using this issue-based approach, participants were shown how requests would then be prioritized, with the highest ranking locations being aligned with safety countermeasures that respond to the problems identified.

Community understanding and participation was further advanced through an online survey and information on the City's website. The online survey was critical to understanding safety preferences of the community.

Participation in the workshops varied, but the workshops were designed so that participation in any single workshop allowed participants to quickly get up to speed and, in the case of the last workshop, experience the entire community-based process in engaging ways, whether they were part of the previous workshops or not.

The second and third workshops were held virtually, recorded and posted to the MMTSP website for public review as well.

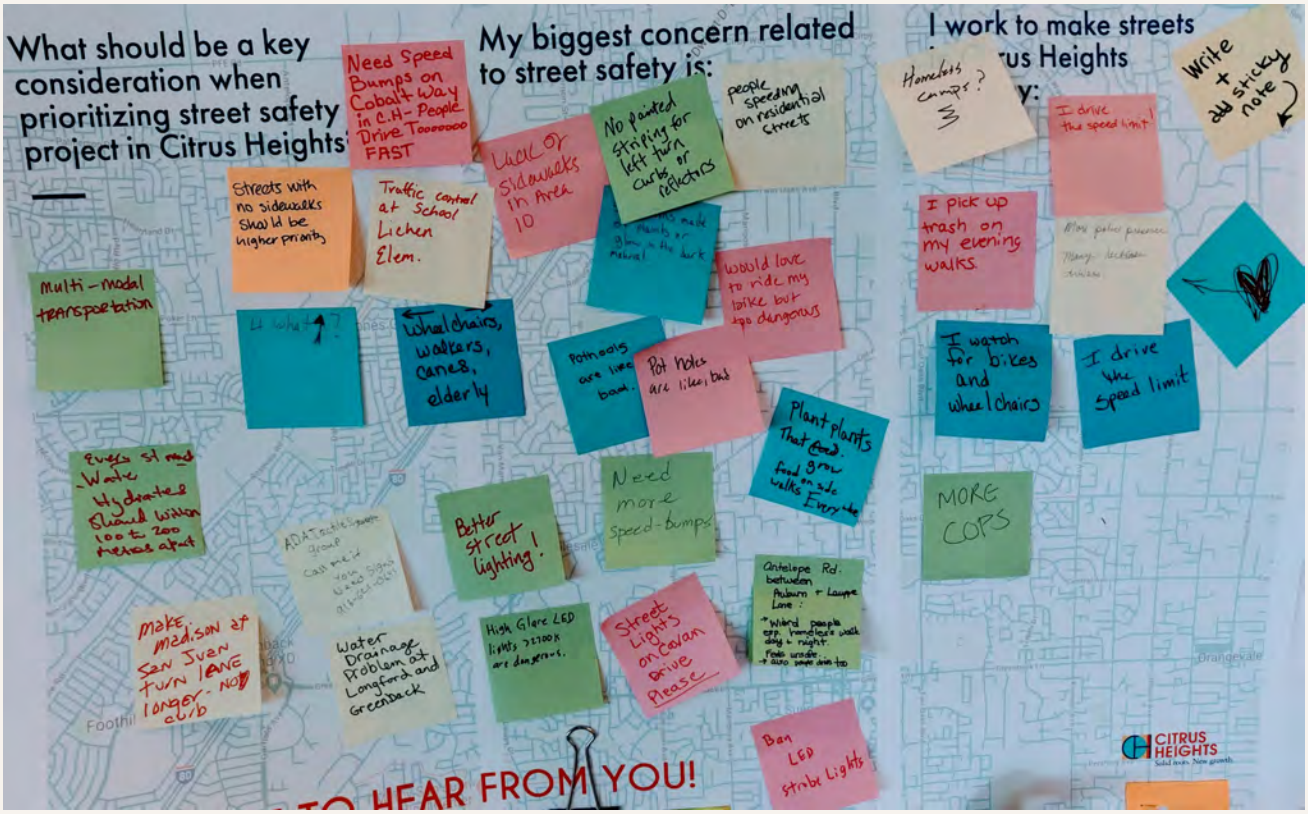


Figure 1.2 Interactive Board from Community Workshop #1

Community Champions

A unique feature of the MMTSP development was the engagement of Community Champions in the process. Residents interested in participating in the MMTSP in a more focused and active way were invited to a Champion Orientation in October, 2019, where the concepts of "Walkshops" was introduced.

Walkshops are organized field trips to selected locations throughout the City, where participants could observe and note traffic patterns, modes of travel, and infrastructure status (such as whether or not sidewalks, bike lanes, lighting, striping, etc. exist and in what condition).

In the case of the initial MMTSP Champion Walkshops, a series of locations was provided, where Champions and neighbors could observe and experience areas where different traffic calming countermeasures had been implemented as well as areas where no improvements have yet been installed.

Champions completed and submitted workbooks from the field trips documenting their findings and they were able to utilize this knowledge to provide additional, informed feedback throughout the MMTSP development process. The Champions also provided direct input to staff along the way, and assisted with engagement and energizing neighbors and community members to contribute as well.

The MMTSP development "Champions" were closely involved throughout the course of the Program development. They helped to get the word out about meetings, workshops, the online survey, and they provided educated input about issues in their neighborhoods, throughout the City, as well as providing general considerations to include in the MMTSP prioritization tool, such as equity.

The idea that everyone can be a Champion is embedded within the MMTSP. The Program recognizes that while more active, formal Champions were involved in crafting the MMTSP, the role of neighborhood street safety champions is one everyone can embrace. To that end, the MMTSP brand and character series were created and will continue to be employed to bolster community engagement as the MMTSP is implemented. Section 4 discusses the tools and resources available for community use to support the culture of street safety for all modes throughout the City.



Figure 1.3 Image from Community Workshop #1, October 2019

Stakeholder Interviews

Interviews were conducted for the MMTSP with key stakeholders in the City.

The Citrus Heights Police Department provided information on their speed radar trailer program, the effectiveness of ongoing enforcement efforts and the collision reporting process.

The City's Engineering Division provided details on implemented countermeasures in the City and their effectiveness. Information on public receptiveness of different countermeasures was also provided.

The Sacramento Metropolitan Fire District (SMFD) provided information on emergency routes and the effect of various countermeasures on emergency response.



2 Priorization Process



Prioritization Process Overview

The MMTSP includes a two-step process for prioritizing and evaluating community requests.

First, the location of a request is scored, using the prioritization tool. Prioritization scores are based on contextual characteristics, such as proximity to schools, whether the street has a bike lane and whether there is a crash history at that location.

Then, if a request has been scored as a higher priority location, it is analyzed further to determine the need for improvements, based on engineering and economic judgment.

This methodology applies only to requests on local streets and collectors. Requests for safety improvements on arterial streets have a different set of potential solutions and will be collated as part of the MMTSP for evaluation through a separate process.

Community Preferences

A critical part of developing the prioritization tool was finding out about the community's safety preferences.

An online survey was conducted from mid-December 2019 through January 2020 to residents about the prioritization of traffic management and general safety improvements.

The survey included 16 questions focusing on prioritization factors, with additional questions related to mode of travel, desired resources and tools, travel mode choice, and safety. Key takeaways from the survey included:

- Schools were ranked as the most important destination near which to propose safety improvements, followed by senior centers, transit stops, and parks/libraries.
- Traffic speed was ranked as the most important street safety factor to address, followed by traffic volumes, street lighting, pedestrian facilities, and bicycle facilities.
- Street attributes, crash trends, and number of resident requests were ranked as the most important factors in prioritization of requests.

Step 1: Prioritization Anlaysis

The MMTSP prioritization tool uses several criteria to score requests. Some data is input automatically (i.e. criteria with GIS data) and others are input manually by City staff (i.e. criteria without readily available GIS data).

Criteria have been selected using the results of the community survey and input at community workshops.

Criteria are assigned weights (high, medium/high, medium, low/medium, and low) based on the relative importance. Criteria and weights are based on feedback from the online community survey and input from community meetings. Proximity of requests to key destinations (e.g., school zones, senior centers/housing, transit stops, community centers/services, and commercial/retail) as well as attributes of streets on which requests are made (e.g. presence of pedestrian and bicycle facilities) achieve higher scores.

The MMTSP prioritization tool is anticpated to be run every 6 months. Once requests are prioritized and scored, they will displayed on an interactive map, which wil be linked from the City's MMTSP webpage:

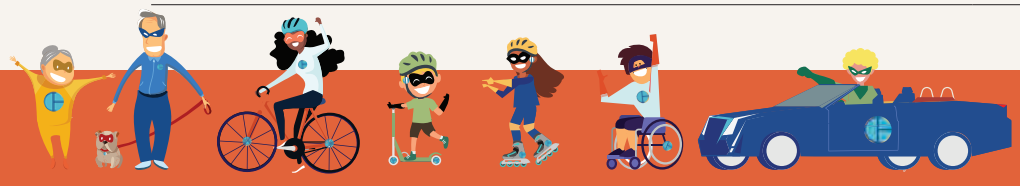
http://citrusheights.net/945

Table 2.1, on the next page, shows how the community's preferences are used to develop prioritization scores for each request.



Table 2.1: Criteria Used in Prioritization Tool

Criterion	Criterion Determinant	Weighting	Automatic or Manual Input
Functional Classification	Is this location along a roadway classified as a local street?	Include in prioritization if local street, exclude if not local street	Automatic
Equity	Is this location within a Community Development Block Grant (CDBG) area?	Medium	Automatic
Transit (bus stops)	Is this location within 500 feet of a transit stop?	Medium	Automatic
School Zone	Is the location within 1,000 feet of an entrance to an elementary school or high school?	High	Automatic
Community Center/ Services	Is this location within 1,000 feet of a park or within 1,000 feet of an entrance to a community center, library, or other government service?	Medium	Automatic
Senior Center/ Housing	Is this location within 1,000 feet of an entrance to a senior center or senior housing?	Medium/High	Automatic
Commercial/Retail	Is this location within 1,000 feet of a commercial or retail property?	Low/Medium	Automatic
Bike Network	Is this location along the bike network?	Medium	Automatic
Sidewalk Presence	Does this location have a sidewalk on both sides of the street?	High	Automatic
City Plans	Is this location identified in a City plan such as Pedestrian Management Plan, Bikeway Master Plan, Safe Routes To School, or Local Road Safety Plan?	include in prioritization if not in funded plan, exclude if in funded plan	Manual
Community Requests	Is there another community request(s) within 250 feet of this location?	High	Automatic
Lighting Presence	Does this location have street lighting?	High	Manual
Proximity to Existing Traffic Safety Countermeasure	Is this location on a block that already has a traffic safety countermeasure (e.g., speed humps)?	High	Manual
Crash History	In the past five years, has a crash of any type been reported within 250 feet of this location?	High	Manual



Step 2: Evaluation Process

Once requests have been prioritized, City engineering staff will perform detailed analyses of the highest priority requests on a case-by-case basis.

For each request, a set of potential countermeasures will be selected using the issue type information associated with the request.

Depending upon potential countermeasures available, a detailed engineering analysis will be conducted to determine the most appropriate countermeasure. This may include collection of on-site information, such as speed and volume from surveys. For example, the following speed and volume thresholds will be used to determine the severity of the need for speeding requests on residential streets:

- Low Need: vehicle 85th percentile speed less than 20 mph and vehicle average daily traffic (ADT) volume less than 2,000
- Medium Need: vehicle 85th percentile speed between 20 mph and 30 mph and ADT volume between 2,000 and 3,000
- High Need: vehicle 85th percentile speed greater than 30 mph and ADT traffic volume greater than 3,000

In cases where speeds fall into one need category and volumes fall into another need category, need is determined by the more severe category. For example, a hypothetical location with an 85th percentile speed of 27 mph and ADT of 5,000 would be categorized as High Need.

The details of speed and volume thresholds are included on the Countermeasure information sheets provided in Appendix B of this Guide.

Process Summary

Ultimately, the prioritization and evaluation analyses will serve as a method for the City to determine which countermeasures should be recommended for funding, design, and implementation.

Implementation and Reporting

The prioritization and evaluation process will be run every 6 months, when recently received requests will be prioritized and evaluated. Street safety improvements will be selected for inclusion in the City's Capital Improvement Program (CIP), depending on available funding.

The General Services Department (GSD) will provide an annual informational report on performance and selected improvements.

Previous Community Requests

Previous requests made by residents for safety improvements have been incorporated into the MMTSP and have been ranked and prioritized using the process outlined above.

Prioritized requests that are over five years old will be confirmed with the original reporting party if possible.





3 Submitting and Tracking Requests



Submitting Requests

Members of the community can submit a request for a street safety improvement in multiple ways, as follows:

- Online, at the following webpage: http://citrusheights.net/945 (links to the request portal will be provided on multiple webpages on the City website)
- By phone, by calling General Services at 916-727-4770.
- In person, at City Hall 6360 Fountain Square Drive, Citrus Heights 95621

Online submittals are encouraged, as street safety requests received in this way are logged immediately and could potentially be assessed quicker than if the request was received on the phone or in person.

The following information is collected when a request is submitted:

- Contact information
- Location of issue
- Nature of issue(s), e.g. speeding traffic, failure to yield, etc.
- Any other comments, description or supporting information

The resident request form allows residents to select up to three primary issues from drop down menus that they want to address, such as speeding, stop/yield sign violations, crossing safety, or lack of sidewalks or street lighting. They will also have the ability to choose "Other", which will prompt them to fill out some additional information in the comments box.

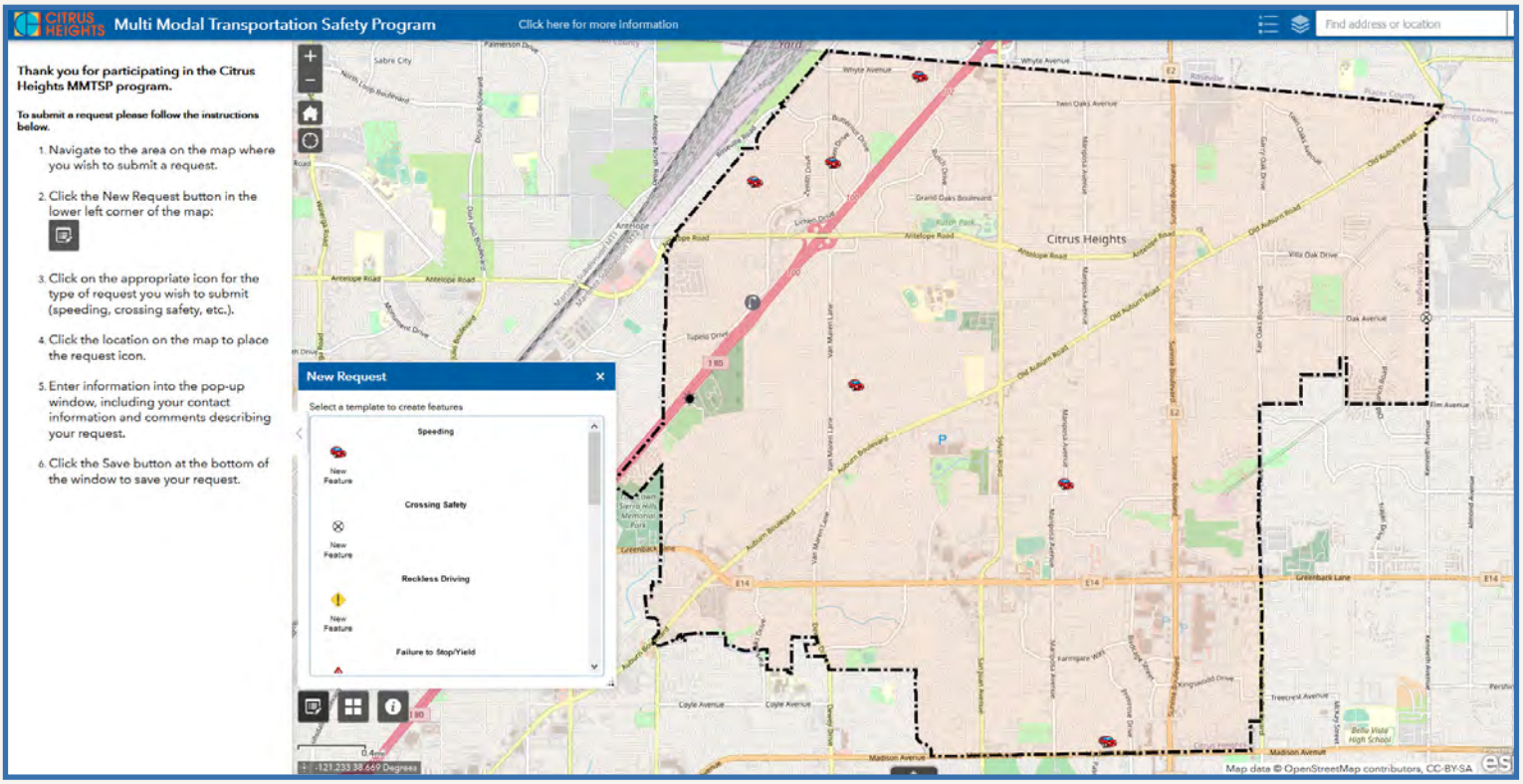


Figure 3.1 Example of MMTSP Request Submission Platform

Tracking Requests

An interactive online map, showing locations of all requests that have come in from the community will be available on the City's website:

http://citrusheights.net/945

The online MMTSP request tracking map shows the primary issue type and the date of the request. Information on the prioritization ranking and funding status of requests will also be available once requests have been prioritized and evaluated.



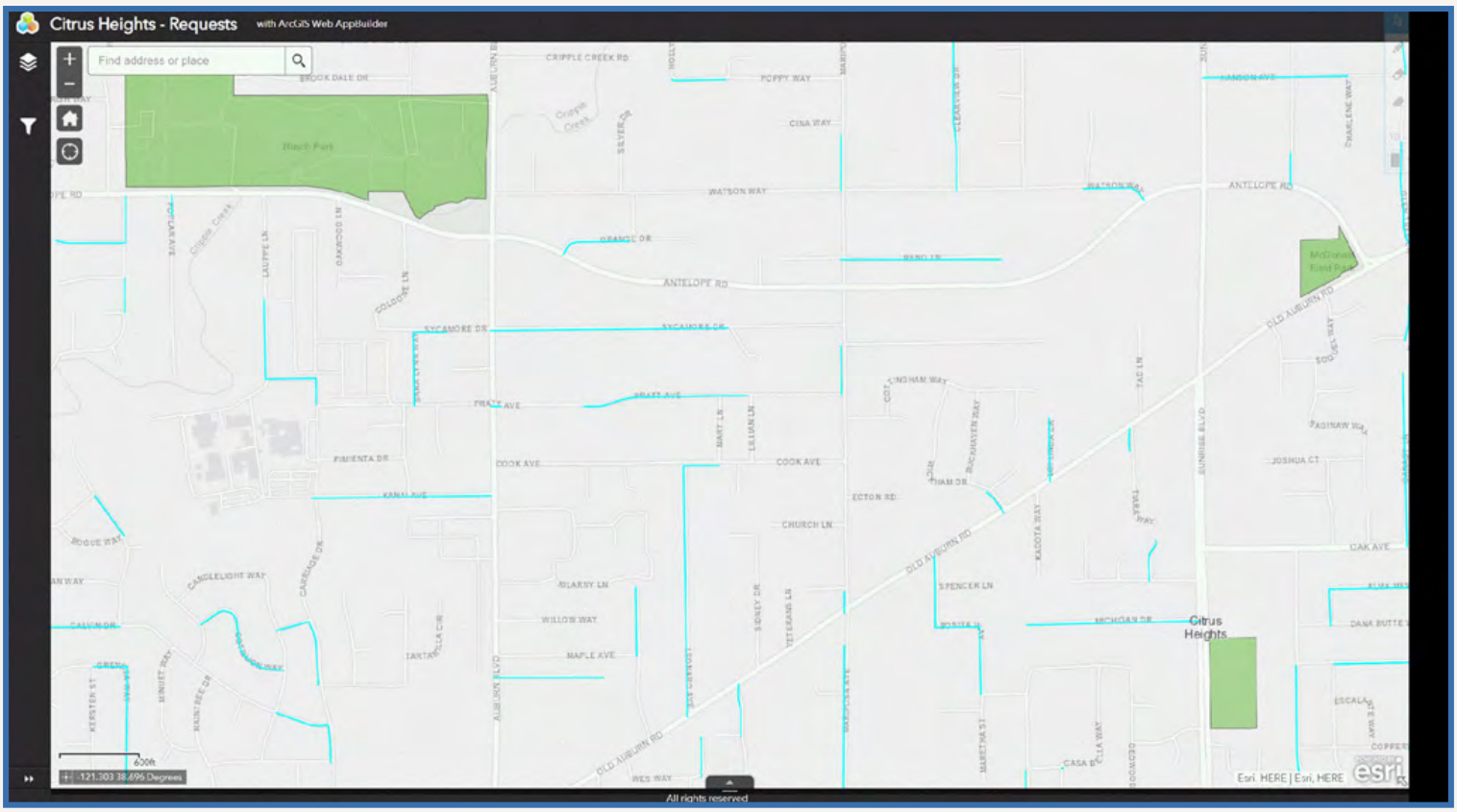


Figure 3.2 MMTSP Interactive Tracking Map (Map provided for demonstration puposes only)



4 Toolbox



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Introduction to the Toolbox

One of the key elements of the MMTSP is the Toolbox. The Toolbox includes resources for residents, staff and the community at large to improve street safety on every level.

A) Recognizing the power that residents and the community have to make street safety synonymous with Citrus Heights, the MMTSP includes a section for Resident Resources. This section includes information about how to champion safety in your neighborhood, and links to an appendix with templates to create lawn signs, stickers, magnets and car clings to support a unified messaging throughout the City.

B) Enforcement is another critical component identified in the Toolbox. Here, the Toolbox provides links to Citrus Heights Police Department (CHPD) traffic hotline, non-emergency number as well as the CHPD online reporting tool which can be used to ensure that traffic violations are captured in the CHPD database, which helps determine where targeted enforcement is deployed.

C) The third section of the Toolbox showcases a detailed series of traffic calming countermeasures for use on local residential and collector streets. Countermeasures are physical treatments as well as non-physical strategies that address street safety concerns. Non-physical strategies include neighborhood engagement, encouragement and ownership, as noted in Section A above. Enforcement is also considered a non-physical strategy and is covered in Section B above. Physical countermeasures include an wide range of treatments intended to be implemented in a progressive manner, with the least expensive to install and maintain recommended for implementation first.

Each Countermeasure included in the Toolbox includes a brief description, advantages and disadvantages, an effectiveness "scorecard", and a relative cost score as compared to other measures. Best practices for implementation for each Countermeasure are also included, and will be utilized as part of the engineering staff evaluation process as well as being available for community review and education. It is important to understand the cost-benefit considerations, both on an initial cost investment and the long term maintenance costs. This information will factor into what Countermeasures are ultimately selected for implementation and in what order of phasing.

A) Encouragement

Residents and the community at large have an incredible ability to promote and support street safety for all modes as part of the culture of the Citrus Heights community. In addition to traditional enforcement and engineering strategies, the MMTSP includes a community resource section of education and outreach materials that residents indicated would be useful during community meetings and the online survey.

These templates are included in Appendix A and have been developed to allow residents, neighborhood associations and community groups to use the templates directly for production. Thus, the MMTSP branding will be consistent throughout City neighborhoods, but sponsors can customize the materials with their own organization logos and slogans. The initial package of templates includes:

- lawn signs
- stickers
- car clings
- magnets

There will be a limited number of these items available at City Hall as funding permits. Production and distribution of the materials are eligible expenses under the City's Neighborhood Improvement Funding program, subject to available funding. Residents are encouraged to partner with their neighborhood associations, neighborhood watch groups, and community non-profits to expand the



influence of the various outreach and education materials. Such efforts will also increase the impact of enforcement and engineering efforts to support improved street safety for all modes of travel.

Community Champions - Resident Resources

The City recognizes that community engagement is critical to the MMTSP success. Thus, a key feature of the MMTSP development was to engage street safety Champions throughout every step of the process. However, involvement of Champions is necessary for the ongoing success as well. Thus, a series of "champion" characters were created as part of the MMTSP brand, and are available to be incorporated into education and outreach materials, for community and City use alike.

Everyone truly can be a street safety champion. It is important to recognize that there are many levels of championship and that a person or family might move between levels of engagement depending on their capacity for involvement.

At a minimum, the MMTSP encourages everyone to "find their inner Champion" and model safe street behavior in every travel mode, whether walking, biking, rolling, scooting or driving. MMTSP also encourages travel in all modes, which supports community health and safety of local streets in general. When people walk, bike and roll in the neighborhoods, the sense of neighborhood is heightened and drivers feel more connected, tending to drive more carefully.

As residents and community members become more interested in street safety advocacy, there are a number of options for involvement that are above and beyond a personal and family commitment level. Neighborhood Watch groups, which are generally structured by street blocks, are one avenue of organized investment in neighborhood safety. Another venue is your local neighborhood association. The Neighborhood Associations, which are generally made up of a few thousand households, have regular monthly meetings and are another opportunity for neighbors to collaborate on strategies to improve street safety for all modes of travel. Neighborhood Watch and Neighborhood Associations have regular interface with City departments, including CHPD and Engineering.

The MMTSP includes a number of resources that can be utilized by Community Champions, Neighborhood Watch and Neighborhood Associations, as well as other community-based groups. Templates for lawn signs, stickers, magnets and car clings are provided in the appendix. These templates are print ready and most include space for sponsor information.

Residents interested in finding out more about becoming or supporting Community Champions are encouraged to explore the MMTSP webpages at: www.citrusheights.net/945 and/or to contact MMTSP staff at mmtsp@citrusheights.net or 916-727-4770.



Figure 4.1 MMTSP Yard Sign

B) Enforcement

Enforcement includes the use of police presence to improve safety at a particular location. Police officers can monitor speeds and issue citations for violations relating to speeding, running stop signs and reckless driving. Enforcement can be very effective while there is a continued police presence at a location.

The CHPD regularly monitors key locations and has a program that deploys speed feedback signage throughout the city.



C) Countermeasure Toolbox

Introduction to Countermeasures

A countermeasure toolbox has been developed for the MMTSP that includes a variety of countermeasures that the City can implement to address specific safety issues at target locations.

Non-physical countermeasures, such as community ecouragement and enforcement are discussed on pages 15 and 16.

The physical countermeasures have been divided into two groups, as follows:

Striping, Signage & Marking

Striping, signage and markings are strategies that provide a less invasive form of calming traffic that is relatively inexpensive and easy to implement. Additionally, these measures are generally relatively inexpensive to maintain.

Roadway & Constructed Treatments

Roadway and constructed treatments are physical changes to the roadway design that are more complex and more expensive to implement than the improvements described above.

These measures are generally more expensive to install and maintain than countermeasures like striping, signage and markings shown above.

Performance Measures

For each countermeasure in the toolbox, six performance measures were assessed. Each of the following performance measures were rated on a four point scale, or as not applicable:

- Speed reduction
- Crash reduction
- Pedestrian safety increase
- Bicycle safety increase
- Emergency access reduction
- Cut-through traffic increase

The likely capital cost was determined for each countermeasure and translated to a four point scale.

The ultimate cost of any improvement may vary substantially based on the number of devices implemented, the length of the improvement, and/or the extent of necessary reconstruction. It is not the intent of this Guide to determine detailed costs but rather to provide generalized costs to facilitate comparison between comutermeasures.

Data Sources

The set of countermeasures has been collated with reference to the following data sources:

- Neighborhood Traffic Safety Program (NTMP) of 2001
- Institute of Transportation Engineers (ITE) Traffic Calming State of the Practice
- Crash Reduction Factors and Quality data from the Federal Highway Administration (FHWA) Crash Modification Factor Clearinghouse
- Cost data from FHWA Safety website, Guidance to Improve Pedestrian & Bicyclist Safety at Intersections, Caltrans Cost Database
- Federal funding eligibility pulled from Caltrans Local Roadway Safety Manual
- Similar traffic calming programs and policies from cities across the nation.



Appendix A
Community Resource Templates




Roads for All Modes


Be a Street Safety Superhero
CITRUS HEIGHTS


Look Out for Each Other


Street Safety Superheroes
CITRUS HEIGHTS
Solid roots. New growth.


Be a Street Safety Superhero


CHoose Safe
CITRUS HEIGHTS
Solid roots. New growth.


Look Out for Each Other

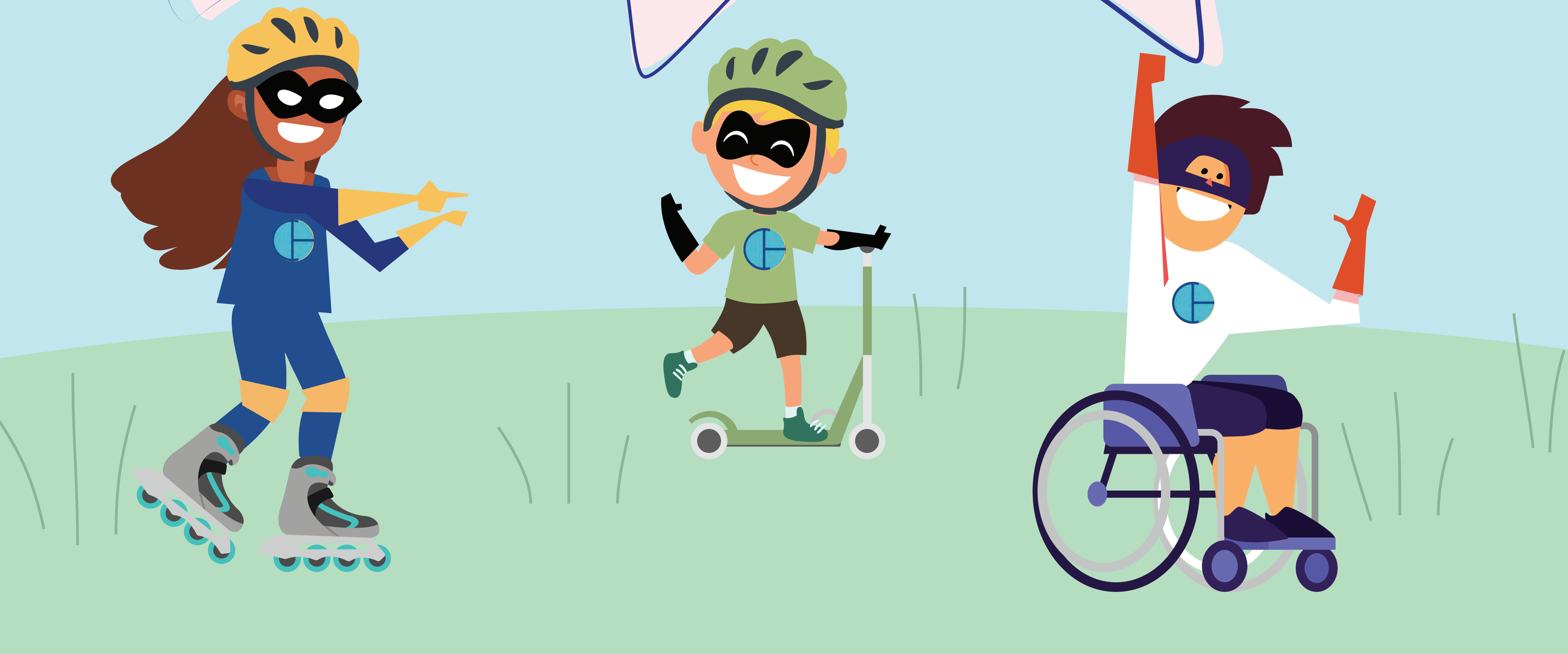

Street Safety Superhero



Look Out for Each Other

CITRUS HEIGHTS
Solid roots. New growth.

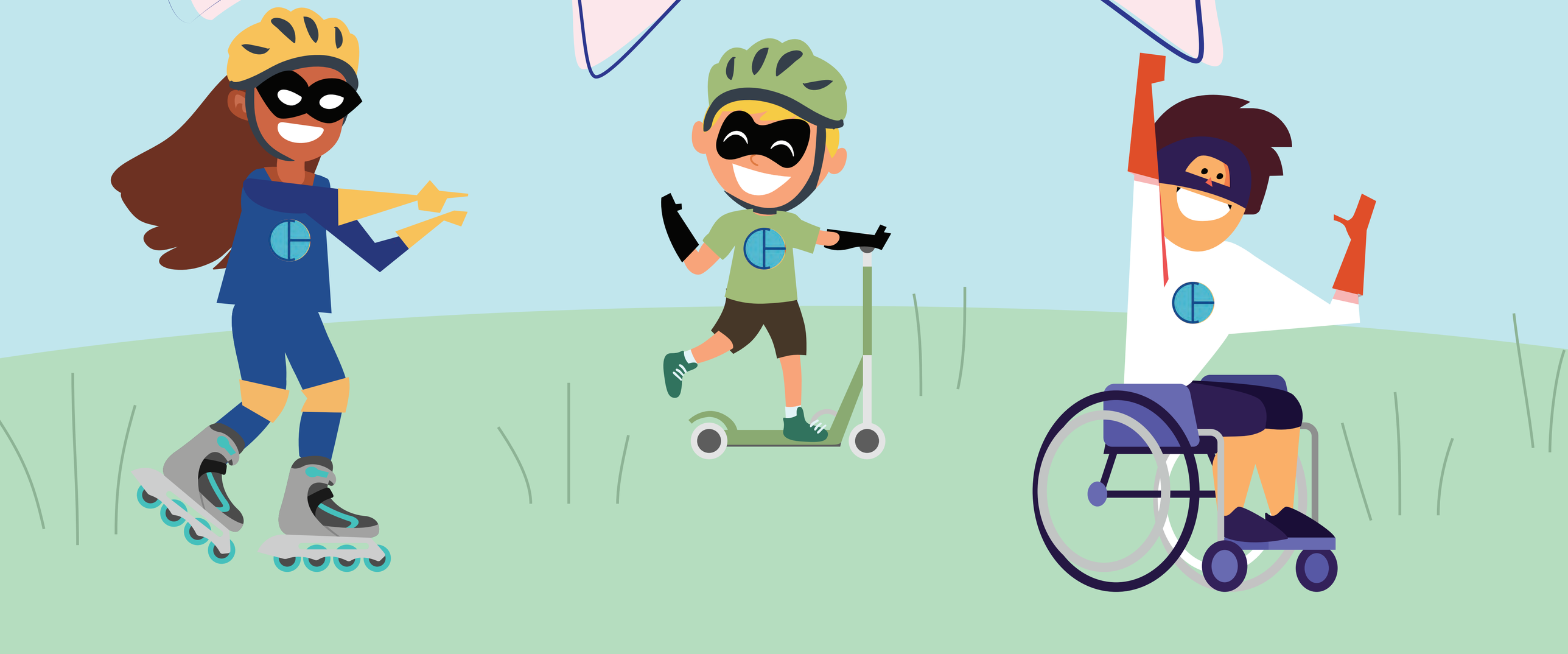
Look Out for Each Other



CHoose Safe

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Be a Street Safety Superhero!



Look Out for Each Other

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Appendix B1
Countermeasure Toolbox
Striping, Signage & Marking



Speed Limit Signage

Signs, which can be upgraded to high-visibility reflective materials, posted along streets that notify and remind drivers of the legal speed limit.

Advantages

May reduce vehicle speeds

Relatively inexpensive treatment

No impact on emergency vehicle response

Disadvantages

Overuse can lead to loss of effectiveness

Potential for drivers to increase speeds if speed limit is set too low

Compliance can be low without enforcement





Effectiveness Score Card

- Speed Reduction
- Crash Reduction
- Pedestrian Safety Increase
- Bicycle Safety Increase
- Cost
- Emergency Response Impact
- Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Stop Control Signage

Stop signs posted at previously uncontrolled intersections, which can be accompanied by a flashing red light.

Advantages

Assigns and clarifies right-of-way at intersections

Improves bicycle and pedestrian safety

Disadvantages

Potentially slows emergency vehicle response

Potential for drivers to increase speeds between stop signs





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	High
Pedestrian Safety Increase	Low
Bicycle Safety Increase	Low
Cost	$
Emergency Response Impact	Low
Cut-Through Traffic Increase	Low

Very High · High · Fair · Low · Not Effective

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Signed Turn Restrictions

Signs posted at intersections to prevent left and right turns to reduce turning conflicts and cut-through traffic.

Advantages

Reduces conflicts of turning and through traffic

Relatively inexpensive treatment

No impact on emergency vehicle response

Disadvantages

Compliance can be low without enforcement

May increase trip length for some drivers





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Not Effective
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Fair
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Speed Feedback Signage

Electronic display signage that uses radar to remind drivers of their speeds and encourages them to obey speed limits.

Advantages

Reduces vehicle speeds

No impact on emergency vehicle response

Disadvantages

Overuse can lead to loss of effectiveness

Potential for drivers to try to register high speeds

Requires electrical connection and ongoing operating cost



Effectiveness Score Card

Speed Reduction	Cost
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Traffic Signal Control

Traffic signals installed at intersections that assign right-of-way to drivers.

Advantages

- Assigns and clarifies right-of-way
- Improves pedestrian safety
- Improves bicyclist safety

Disadvantages

- Expensive ongoing maintenance and operating cost
- Potentially slows emergency vehicle response
- Relatively expensive to implement





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	High
Pedestrian Safety Increase	High
Bicycle Safety Increase	High
Cost	$$$$
Emergency Response Impact	Low
Cut-Through Traffic Increase	Low

Very High · High · Fair · Low · Not Effective

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Traffic Signal Hardware Modification

Alterations to lenses, lights, back-plates, locations, the number and size of traffic signals to increase their visibility.

Advantages

Improves intersection and crossing visibility

Improves compliance at traffic signals

Disadvantages

Requires regular maintenance

Potentially expensive treatment





Effectiveness Score Card

- Speed Reduction
- Crash Reduction
- Pedestrian Safety Increase
- Bicycle Safety Increase
- Cost
- Emergency Response Impact
- Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Pedestrian Countdown Signals

Traffic signals at crossings and intersections that display how much time remains in the walk phase.

Advantages

Improves pedestrian safety and visibility

Improves pedestrian crossing compliance

Disadvantages

None





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	High
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Advance Stop & Yield Flashing Beacons

Flashing lights installed ahead of unapparent roadway conditions, such as traffic signals or roadway curvatures, to increase awareness of approaching crossings and signals.

Advantages

May reduce vehicle speeds

Improves compliance at traffic signals

Reduces crashes at roadway curvatures

Disadvantages

Expensive treatment

Requires ongoing maintenance and ongoing operating costs





Effectiveness Score Card

Speed Reduction	Cost $ $ $
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Centerline, Edge, and Lane Line Striping

Painted stripes along the center, edges, or lanes of the roadway to limit or define lane widths.

Advantages

Reduces vehicle speeds

Can be used to delineate bike lanes or on-street parking

Relatively inexpensive treatment

Disadvantages

Sustains wear and tear

Requires good pavement condition





Effectiveness Score Card

- Speed Reduction
- Crash Reduction
- Pedestrian Safety Increase
- Bicycle Safety Increase
- Cost
- Emergency Response Impact
- Cut-Through Traffic Increase

Very High | High | Fair | Low | Not Effective

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Advance Stop & Yield Lines

Lines painted 20 to 50 feet before a crossing where vehicles should stop or yield, discouraging drivers from stopping too close or obstructing crosswalk visibility.

Advantages

Improves pedestrian safety and visibility

Improves bicyclist safety and visibility

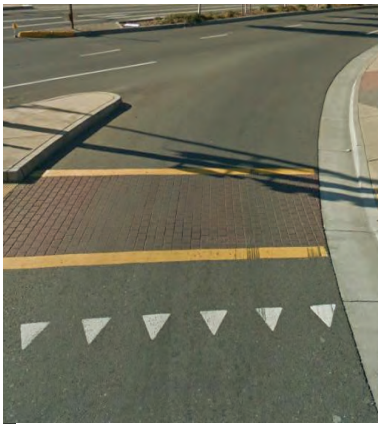
Effectiveness can be improved with signs and beacons

Disadvantages

Requires regular re-painting

Requires good pavement condition





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	Very High
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Speed Reduction Markings

Painted series of markings that progressively get closer together to create a sense of faster speeds and encourage drivers to slow down.

Advantages

May reduce vehicle speeds

Relatively inexpensive treatment

No impact on emergency vehicle response

Disadvantages

Requires regular re-painting

Requires good pavement condition

Must be applied with signage and lane striping





Effectiveness Score Card

Speed Reduction	Cost
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

CITRUS HEIGHTS
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Speed Limit Pavement Markings

Text and numbers painted on the roadway to notify and remind drivers of the legal speed limit.

Advantages

May reduce vehicle speeds

Relatively inexpensive treatment

No impact on emergency vehicle response

Disadvantages

Requires regular re-painting

Requires good pavement condition

Compliance can be low without enforcement





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	High
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Low
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Not Effective

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Bike Lane Extensions and Green Pavement Markings at Intersections

Bike lanes that extend through intersections and conflict points, which can be painted green and accompanied by signage, to improve awareness of bicyclists.

Advantages

Improves bicyclist safety and visibility

Inexpensive treatment

No impact on emergency vehicle response

Disadvantages

Requires high-level of maintenance due to area covered

Requires good pavement condition





Effectiveness Score Card

Speed Reduction	Cost
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Raised Pavement Markers

Slightly raised, round or trapezoidal markers to supplement or replace centerline striping that visually and/or physically alert drivers if they cross lane lines.

Advantages

May reduce vehicle speeds

Relatively inexpensive treatment

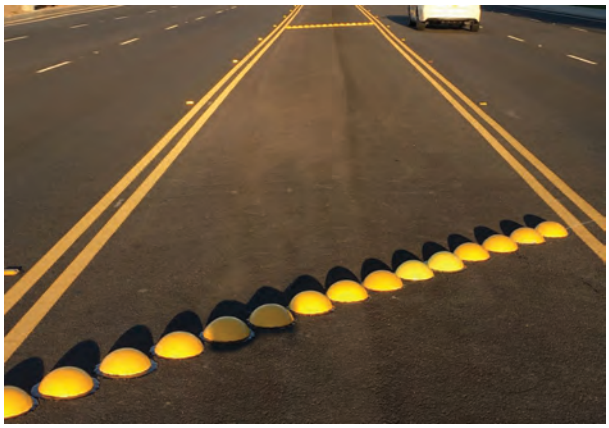
No impact on emergency vehicle response

Can extend through intersections to discourage reckless driving (e.g. donuts)

Disadvantages

Requires frequent maintenance

May create noise as vehicles drive over





Effectiveness Score Card

Speed Reduction	Cost
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

May High | High | Fair | Low | Not Effective

CITRUS HEIGHTS
Solid roots. New growth.

High Visibility Crossings

Striping, signage, pavement markings, pavement treatments, flashing beacons, and/or lights that signal pedestrian and bicycle crossings.

Advantages

Improves pedestrian safety and visibility

Improves bicyclist safety and visibility

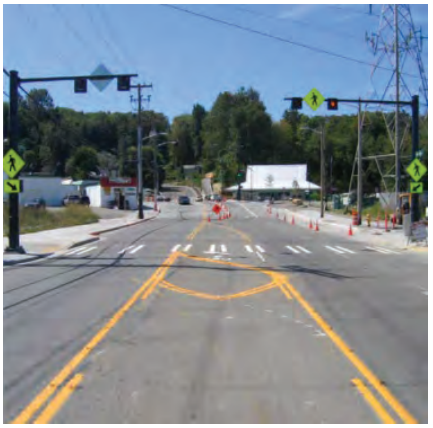
Attracts pedestrians and bicyclists to cross at central location

Disadvantages

Pedestrians may overestimate sense of safety

Ongoing operations costs and potentially needs an electric connection





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	High
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Low

Very High · High · Fair · Low · Not Effective

CITRUS HEIGHTS
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Appendix B2
Countermeasure Toolbox
Roadway & Constructed Treatments



Curb Extensions

Curb extensions are areas where the sidewalk extends farther into the road, shortening the distance for pedestrians to cross.

Advantages

- Lower travel speeds near intersections
- Increase visibility of pedestrians
- Improve pedestrian line-of-sight
- Reduce crossing distance for pedestrians

Disadvantages

- May reduce on-street parking
- May make it harder to accommodate full bike lanes
- May alter stormwater drainage





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Fair
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	Fair
Cost	$ $ $
Emergency Response Impact	Fair
Cut-Through Traffic Increase	Fair

Very High · High · Fair · Low · Not Effective

CITRUS HEIGHTS
Solid roots. New growth.

Lateral Shifts

Realignment of the roadway using curb extensions and a center island to lead drivers to slow down and jog over on an otherwise straight street.

Advantages

- May reduce vehicle speeds
- Limited to no impact on emergency vehicle response
- Can be landscaped for enhanced aesthetic

Disadvantages

- May reduce passing space for bicyclists
- May require removal of on-street parking
- May impact drainage
- May divert cut-through traffic to adjacent streets





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Not Effective
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Low
Cost	$ $ $
Emergency Response Impact	Low
Cut-Through Traffic Increase	Fair

Very High · High · Fair · Low · Not Effective

CITRUS HEIGHTS
Solid roots. New growth.

Neckdowns and Bulbouts

Neckdowns are curb extensions that narrow the roadway before intersections while bulbouts are extensions at the corners of intersections that shorten pedestrian crossing distances.

Advantages

- Reduces vehicle speeds
- Reduces pedestrian crossing distance
- Enhances pedestrian visibility
- Can reduce reckless driving (e.g. donuts) at intersections

Disadvantages

- Reduces space available for bike lanes
- May require removal of on-street parking





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	High
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Low
Cost	$ $ $
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Low

CITRUS HEIGHTS
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Two Lane Chokers

Midblock curb extensions that narrow the roadway but still allow for two lanes of travel.

Advantages

- Reduces vehicle speeds
- Discourages cut-through traffic on applied street
- Can be landscaped for enhanced aesthetic

Disadvantages

- Reduces passing space for bicyclists
- May divert cut-through traffic to adjacent streets
- May impact drainage
- May divert cut-through traffic to adjacent streets





Effectiveness Score Card

- Speed Reduction
- Crash Reduction
- Pedestrian Safety Increase
- Bicycle Safety Increase
- Cost: $ $ $
- Emergency Response Impact
- Cut-Through Traffic Increase

Very High | High | Fair | Low | Not Effective

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Full & Partial Medians

Raised curbs placed at the center of roadways that separate two travel lanes.

Advantages

Effective at lowering speeds

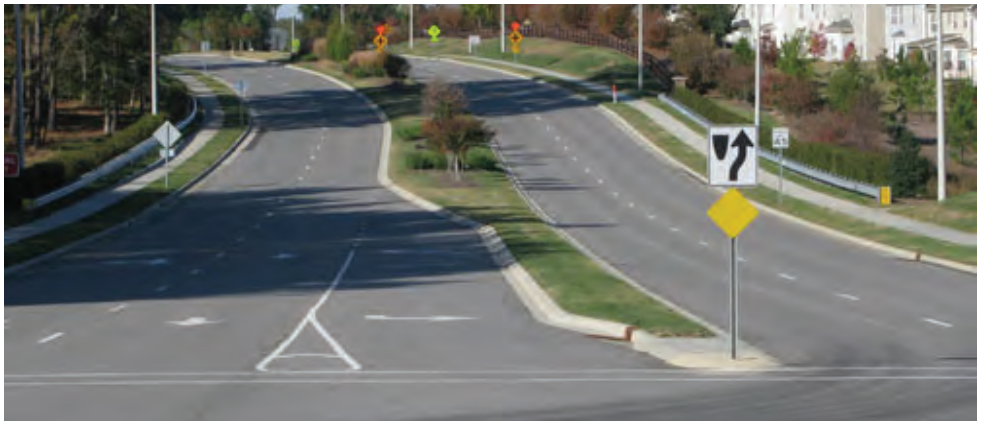
Can be landscaped for enhanced aesthetic

Disadvantages

May impact emergency vehicle access and response

May encourage pedestrians to cross the street outside of controlled crossings

May impact drainage



Effectiveness Score Card

Speed Reduction	Cost $ $ $
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Median Islands & Pedestrian Refuges

Raised island located at the center of travel lanes with space and path for pedestrian crossing.

Advantages

- Reduces vehicle speeds
- Reduces pedestrian & bicyclist crossing distance
- Enhances pedestrian & bicyclist visibility

Disadvantages

- Requires vehicle lane removal or narrowing
- Relatively expensive





Effectiveness Score Card

Speed Reduction	Cost $ $
Crash Reduction	
Pedestrian Safety Increase	Emergency Response Impact
Bicycle Safety Increase	Cut-Through Traffic Increase

Very High · High · Fair · Low · Not Effective

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Roadside & Median Landscaping

Adding plants, trees, or other landscaping to roadsides and/or medians to narrow the appearance of the roadway.

Advantages

- May reduce vehicle speeds
- Enhances neighborhood aesthetic
- Inexpensive treatment if curbs or medians are landscape-ready

Disadvantages

- Ongoing regular landscaping maintenance
- May increase water usage
- Tree roots may result in sidewalk buckling



Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Not Effective
Pedestrian Safety Increase	Low
Bicycle Safety Increase	Low
Cost	$
Emergency Response Impact	Not Effective
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Road Narrowing

Removing or reducing the width of travel lanes to accommodate bike lanes, wider sidewalks, or on-street parking. Bike lanes can be buffered with striping for added safety or protected with bollards for even greater safety.

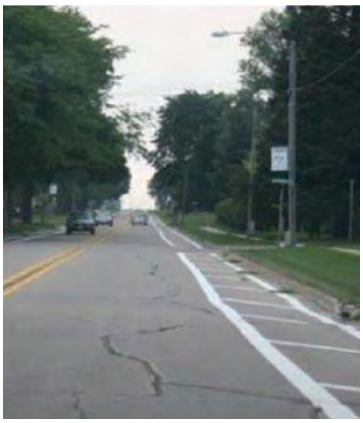
Advantages

- Improves pedestrian safety
- Improves bicyclist safety
- May reduce speeds
- Allows space for bike lanes, parking, or sidewalks

Disadvantages

- Requires good pavement condition
- Requires extensive study of multi modal capacity
- Very expensive treatment if bike lanes or wider sidewalks added





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	High
Cost	$ $ $
Emergency Response Impact	Low
Cut-Through Traffic Increase	Low

Very High · High · Fair · Low · Not Effective

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Separated Sidewalks & Bike Lanes

Sidewalks and/or bike lanes that are physically separated and protected from the roadway by medians or barriers. Separated bike lanes greatly enhance safety compared to painted bike lane lines.

Advantages

- Greatly improves pedestrian safety
- Greatly improves bicyclist safety
- May reduce speeds
- Barriers can be landscaped for enhanced aesthetic

Disadvantages

- May require additional right-of-way
- May require removal of on-street parking
- Very expensive treatment



Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Very High
Bicycle Safety Increase	Very High
Cost	$$$$
Emergency Response Impact	Low
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Traffic Circles & Single-Lane Roundabouts

Raised islands located at the center of intersections around which traffic circulates in a counter-clockwise fashion.

Advantages

- Very effective at reducing crashes
- Reduces vehicle speeds
- Can reduce reckless driving (e.g. "donuts") at intersections
- Can be landscaped for enhanced aesthetic

Disadvantages

- Potentially slows emergency vehicle response
- May require repositioning of pedestrian crossings
- May require additional right-of-way
- Relatively expensive





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	High
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Fair
Cost	$$$
Emergency Response Impact	Fair
Cut-Through Traffic Increase	Low

Very High · High · Fair · Low · Not Effective

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Raised Intersections

Plateau-like intersections that are raised to curb height with ramps for all approaching vehicles and modes.

Advantages

- Enhances pedestrian visibility
- Reduces vehicle speeds
- Can reduce reckless driving (e.g. donuts) at intersections
- Can calm two intersecting streets at once

Disadvantages

- Potentially slows emergency vehicle response
- May impact drainage
- Very expensive treatment





Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	High
Bicycle Safety Increase	High
Cost	$$$$
Emergency Response Impact	Fair
Cut-Through Traffic Increase	Not Effective

Very High · High · Fair · Low · Not Effective

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Speed Humps and Lumps

Long, raised surfaces on the roadway that stretch across the width of the roadway. Speed lumps include gaps spaced wide enough to allow vehicles with large wheel bases (e.g., emergency vehicles, garbage trucks, and buses) to travel unimpeded.

Advantages

Reduces vehicle speeds

Discourages cut-through traffic on applied street

Relatively easy for bicyclists to ride over

Disadvantages

Potentially slows emergency vehicle response

May divert cut-through traffic to adjacent streets

May impact drainage



Effectiveness Score Card

Speed Reduction	Very High
Crash Reduction	Very High
Pedestrian Safety Increase	Fair
Bicycle Safety Increase	Fair
Cost	$ $
Emergency Response Impact	Very High
Cut-Through Traffic Increase	High

Very High · High · Fair · Low · Not Effective

CITRUS HEIGHTS
Solid roots. New growth.

Speed Tables & Raised Crosswalks

Long, raised speed humps with a flat section that can allow for a pedestrian crossing.

Advantages

Reduces vehicles speeds

Discourages cut-through traffic on applied street

Improves pedestrian safety

Disadvantages

Potentially slows emergency vehicle response

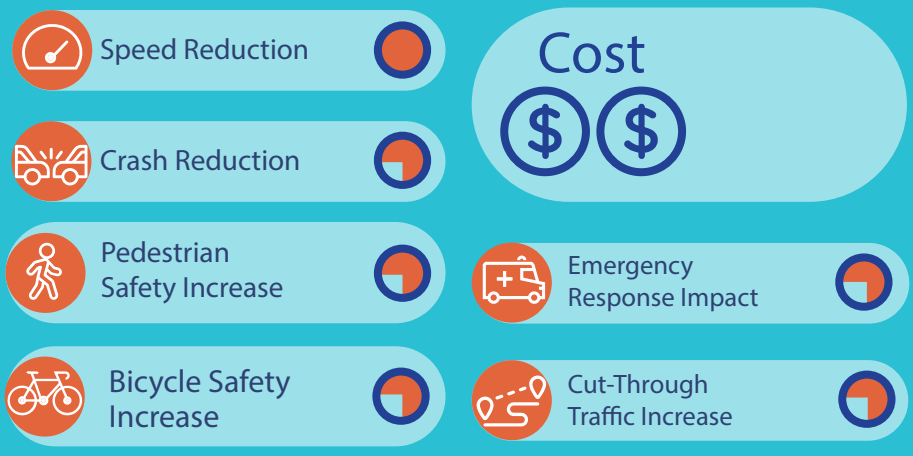
May divert cut-through traffic to adjacent streets

May impact drainage





Effectiveness Score Card



Very High · High · Fair · Low · Not Effective

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Prepared by
Steer
800 Wilshire Blvd, Suite 1320,
Los Angeles, CA 90017
+1 (213) 425 0990
www.steergroup.com

Prepared for
City of Citrus Heights
6360 Fountain Square Drive
Citrus Heights, CA 95621
+1 (916) 725 2448
www.citrusheights.net

