

Meeting Date: 2/25/2014

Report Type: Consent

Report ID: 2014-00136

Title: Amend Speed Lump Program to Include Moderate-Volume Residential Collector Streets

Location: Citywide

Recommendation: Pass a Motion amending the Speed Lump Program Guidelines to include Moderate-Volume Residential Collector Streets category to the Program and define travel lane criteria for speed lumps.

Contact: Debb Newton, Program Analyst, (916) 808-6739; Hector Barron, City Traffic Engineer, (916) 808-2669, Department of Public Works

Presenter: None

Department: Public Works Department

Division: Transportation Division

Dept ID:

Attachments:

1-Description/Analysis

2-Background

3-Exhibit A-2014 Speed Lump Program Guidelines

City Attorney Review

Approved as to Form

Gerald Hicks

2/13/2014 3:28:42 PM

Approvals/Acknowledgements

Department Director or Designee: Jerry Way - 2/6/2014 7:15:39 AM

Description/Analysis

Issue: The current Speed Lump Program addresses speeding on local residential and minor collector streets. There is a need to amend the program to address high speeds on moderate-volume residential collector streets, which are streets with traffic volumes of 4,500 to 8,000 vehicles per day. This will require amending the existing program guidelines to include this new category of streets. Further, it is recommended that raised devices under the Speed Lump Program be limited to roadways with a single travel lane in each direction.

Policy Considerations: The Speed Lump Program is consistent with the 2030 General Plan Policy M 4.3.1

M 4.3.1 Neighborhood Traffic Management. The City shall continue wherever possible to design streets and approve development applications in such a manner as to reduce high traffic flows and parking problems within residential neighborhoods. *(RDR/MPSP)*

Economic Impacts: None.

Environmental Considerations:

California Environmental Quality Act (CEQA): The current proposal involves adding the category of moderate-volume residential collector streets to the Speed Lump Program. The proposal is not a “project” in accordance with Section 15378 of the CEQA Guidelines. The implementation of adding this category to the Speed Lump Program does not have a potential for resulting in either direct or indirect physical changes in the environment. Therefore, as determined by the City’s Environmental Services Planning Manager, no environmental review is necessary.

Sustainability: This project is consistent with the City’s Sustainability Master Plan. It is aimed at addressing the goals and targets set forth in the Transportation Infrastructure and Air Quality Focus Areas by improving and optimizing transportation infrastructure with streets that encourage pedestrians and bicycles.

Commission/Committee Action: None.

Rationale for Recommendation: Each year, the City of Sacramento receives requests for speed reduction on moderate-volume residential collector streets with volumes above 4,500 vehicles per day. The Transportation Division has

considered alternative treatments, such as raised islands, to address these streets, however, costs are prohibitive and a number of the collectors have geometric constraints which preclude these treatments. Speed lumps and tables are the most effective, economical and adaptable treatment for speed reduction.

By including moderate-volume residential collector streets within the local Residential, Parks and Schools categories, the City can address speeding concerns on streets with volumes ranging between 4,500 and 8,000 vehicles per day and with speeds posted between 25 mph and 35 mph. Staff recommends the moderate-volume residential collectors adhere to the existing criteria for local streets, including length, speed, travel lane, and frontage requirements, as well as Regional Transit and Fire Department approval.

The residential balloting process for moderate-volume residential collector streets will follow the guidelines established for local streets, but will be tracked on a separate qualifying list and limited to two qualifying street segments per year. Many of the moderate-volume residential collectors have longer segments, with greater widths than local streets, and require a greater portion of the annual budget for speed lump/table installation. Limiting the installation of raised devices to two moderate-volume collector segments per annual project will allow speed lump treatments on a greater number of local streets.

Representative of the current practice, it is recommended that the program guidelines reflect installation of raised devices in all categories to be limited to roadways with only one travel lane in each direction. The roadway may include two-way-left-turn lanes, bike lanes and parking lanes.

Financial Considerations: The Traffic Calming Program (S15120700) has a total budget of \$315,000 consisting of local transportation funds. As of February 3, 2014, the Traffic Calming Program (S15120700) has an unobligated balance of \$106,712, which is sufficient for the addition of moderate volume residential collector streets to the program.

Local Business Enterprise (LBE): No goods or services are being procured, therefore the ESBD program is held in abeyance.

Background

The City of Sacramento has had a program to reduce speeding on residential streets through the use of raised devices since 1980. Since that time, several revisions have been made to the program, including a change from the installation of undulations to speed humps, followed by speed lumps, and the addition of speed tables. Changes in street length criteria, the addition of a minimum speed requirement, and a change in volume thresholds have also been made.

The current Speed Lump Program qualifies local and minor collector streets for speed reduction under three categories, which include Residential, Parks and Schools, and Bypass streets. Streets with prima facie or posted speeds of 30 mph or under and volumes less than 4,500 vehicles per day are treated with speed lumps. Speed tables are limited to Parks and Schools streets with posted speeds of 35 mph and volumes up to 7,500 vehicles per day.

City of Sacramento Speed Lump Program Guidelines

Introduction

The City of Sacramento has had a speed hump program since 1980. Over the years, several revisions have been made to the program including street length criteria, a change from undulations to speed humps, a program name change, the addition of a minimum speed requirement, ~~and the initial installation of speed lumps on emergency response and bus routes, and the current practice of installing speed lumps, rather than speed humps on qualifying streets with posted or prima facie speeds of 30 mph or under.~~

~~The Program once more changing names to the Speed Lump Program to reflect current practice. Speed lumps provide comparable speed reduction to speed humps, while providing a smoother transit for buses and emergency vehicles, significantly reducing response time for the latter. Speed lump markings also offer increased visibility for drivers when compared to speed hump markings~~ now includes moderate volume residential collector streets with volumes ranging between 4,500 to 8,000 vehicles per day, posted speeds at or below 35 mph, and with only one travel lane in each direction. Collector streets, posted 35 mph, could be treated with speed lumps or speed tables pending Fire Department approval.

Definitions

Speed Lump – Asphalt mounds, parabolic in shape, covering 12 feet of street with a height between 3 ¼ and 3 ¾ inches. The center mound or lump, has a width of 5 ½ feet to accommodate the wheelbase of fire trucks and buses. The lumps adjacent to the center lump vary in width to accommodate the street width. Depending on the street width, a 5 ½ foot lump may be placed in each travel lane. First testing of speed lumps in Sacramento was done in February 2000. Speed lumps have been approved by the Fire Department for use on emergency response routes and by Sacramento Regional Transit for use on bus routes.

Speed Table – An elongated speed hump, incorporating a 10-foot flat surface in the middle and covering a total of 22 feet of street, with a height between 3 ¼ and 3 ¾ inches. Speed tables have been installed on streets in Sacramento as part of the Neighborhood Traffic Management Program (NTMP). With the 2008 Transportation Programming Guide, they were added to the Speed Hump Program for use on minor collector roadways with park or school frontage and posted speeds of 35 mph. Speed tables have been approved by the Fire Department for use on emergency response routes and by Sacramento Regional Transit for use on bus routes on a case by case basis. ~~With the addition of moderate volume collectors to the Program, speed tables will be considered for use on those streets with posted speeds of 35 mph and volumes between 4,500 to 8,000 vehicles per day, regardless of whether streets have residential or park/school frontage.~~

~~**Speed Bump**—Single asphalt bump covering approximately one foot and approximately 5 inches in height. Found in shopping centers and parking lots. Not installed on public streets.~~

Speed Hump – Single asphalt hump, parabolic in shape, covering 12 feet of street with a height between 3¼ and 3¾ inches. Not installed on emergency response or bus routes. Installed on streets in Sacramento between 1996 and 2006. Speed humps are no longer installed in the City.

Undulations – A pair of adjacent speed humps placed on the street. Undulations were installed on Sacramento streets prior to 1995. Undulations are no longer installed in the City.

For simplicity of these guidelines, the term “raised devices” will refer to the collective use of speed humps, speed lumps and speed tables. Designs for speed lumps and speed tables are included in these guidelines.

Speed Survey – A 24 hour survey of traffic speeds and volume conducted by the use of a magnetic sensor(s) or air pressure hose(s) to determine the percentage of traffic exceeding the speed limit.

85th Percentile Speed – Otherwise known as the critical speed, is the speed at or below which 85% of the traffic is moving. The 85th percentile speed is used as one of the criteria to determine if a street qualifies for speed lumps.

Program Categories

The City of Sacramento has ~~three~~ four types of speed lump categories: Residential, Parks and Schools, ~~and~~ Bypass, ~~and~~ Moderate Volume Residential Collectors. The objectives, qualifying criteria, and priority ranking system for each of these categories are presented in subsequent sections of this report. Also in this report are construction specifications and guidelines related to location selection, signs and markings, relocation and removal requirements, other funding, Regional Transit, Fire Department emergency response routes, and public notification. Between 1980 and 1995, the city installed undulations (2 humps) for traffic calming. Between 1996 and 2006, the city installed speed humps (one hump) because it was determined that one hump was just as effective at slowing traffic as two humps, less costly and easier to find spacing for installation on streets. Speed lumps have been used in the Neighborhood Traffic Management Program since 2001 and in the Speed Hump Program since 2007. Speed tables were introduced into the Program in 2008, ~~for use on Parks and Schools Streets with posted speeds of 35 mph and are now considered for use on residential collector streets with posted speeds of 35 mph.~~

Program Objectives

Speed lumps serve to reduce vehicular speeds as well as to reduce cut-through traffic on local residential streets. Both of these effects are realized when speed lumps are installed on a street, regardless of the type of program for which a street qualifies. ~~Speed lumps on moderate volume residential collector streets are used to reduce speed without incurring bypass traffic on adjacent streets.~~ The principle purpose of each of the ~~three programs~~ four categories is as follows: The Residential Speed Lump list and the Parks and Schools list serve to reduce vehicular speeds on streets with residential frontage or park and/or school frontage; ~~the Moderate Volume Residential Collector Streets list serves the same purpose on higher volume streets;~~ the Bypass Speed Lumps list serves primarily to reduce considerable bypass traffic volumes on certain streets.

A street with speeding complaints may be studied further to determine whether or not it qualifies for speed lumps. The application of speed lumps is limited to streets where geometric configuration or design fails to passively deter many drivers from exceeding the speed limit or from using streets as bypass routes. The proper application of speed lumps enhances public safety. Other, less costly, forms of traffic calming (e.g., Police Traffic Enforcement, radar board, education) should also be considered to discourage speeding

Qualifying Criteria

In order for a residential street to be studied for speed lumps, a petition from ten residents from the affected street must first be submitted.

A street segment qualifies for the installation of speed lumps when the results of an investigation demonstrate that the criteria presented on page three of this document are met for the respective types of programs. Once a street has qualified, it will be assigned points and ranked with other qualifying streets based on the ranking system shown on page four of this document.

Qualifying Criteria by Category

Residential – Local & Moderate Volume Collectors

The segment must be a minimum of 750 feet in length between traffic controls, four way intersections, and/or curves with less than a 250-foot radius,
 Or,
 The street is comprised of contiguous segments with no stop controls between the segments and all side streets entering at four-way intersections are stop controlled. The total length of the contiguous segments must be at least 750' in length.

The street has only one travel lane in each direction (Two-Way Left-Turn Lanes are acceptable).

The length is measured from the nearest flow line from the ends of the segment or continuous segments.

Posted speed limit must be 30 mph or less on local streets and posted 25 – 35 mph on moderate volume collectors.

Street frontage of subject street segment must be at least 75% developed residential.

Street must be approved by Regional Transit and by the Fire Department.

A speed survey shall indicate that the 85th percentile speed is at least five or more miles per hour over the speed limit.

The Average Daily Traffic volume must not exceed 4,500 vehicles on local streets and must be between 4,500 and 8,000 for moderate volume collectors.

A minimum of 25% of ballots mailed shall be returned and a two-thirds majority of residents that vote are in favor of the installation of speed lumps. **

Parks & Schools

The segment must be 500 feet in length between traffic controls, four-way intersections, and/or curves with less than a 250-foot radius. The length is measured from the nearest flow line from the ends of the segment.

The street has only one travel lane in each direction (Two-Way Left-Turn Lanes are acceptable).

Posted speed limit must be 30 mph or less for placement of speed lumps or 35 mph when considering the placement of speed tables.

Street segment must be adjacent to a school * or park.

Street must be approved by Regional Transit and by the Fire Department.

A speed survey shall indicate that the 85th percentile speed is at least five or more miles per hour over the speed limit.

The Average Daily Traffic volume must not exceed 4,500 vehicles for speed lumps or 7,500 for speed tables.

A minimum of 25% of ballots mailed shall be returned and a two-thirds majority of residents that vote are in favor of the installation of speed lumps. **+

Bypass

The segment must be 500 feet in length between traffic controls, four way intersections, and/or curves with less than a 250-foot radius. The length is measured from the nearest flow line from the ends of the segment.

The street has only one travel lane in each direction (Two-Way Left-Turn Lanes are acceptable).

Posted speed limit must be 30 mph or less.

Street frontage of subject street segment must be at least 75% developed residential.

Street must be approved by Regional Transit and by the Fire Department.

Minimum Average Daily Traffic must be 500 vehicles per day.

The street(s) must serve to bypass *** major streets with a four-way stop, a signalized intersection, or another street with raised devices.

The Average Daily Traffic volume must not exceed 4,500 vehicles for speed lumps or 7,500 for speed tables.

A minimum of 25% of ballots mailed shall be returned and a two-thirds majority of residents that vote are in favor of the installation of speed lumps. **

- * Preschool, Day care school, elementary, middle, or high school.
- ** One vote per household is allowed; voter(s) must reside at the household (whether they are owners or tenants), as they are the primary users of the street being considered for speed lumps.
- + If the survey of residents on a parks and schools street does not demonstrate a two-third majority favoring the installation of speed lumps, the City Council member representing the district in which the street is located may override the survey.
- *** To be considered a “bypass” location, the ADT must be at least 50% higher than the volume that would be expected using the following trip generation rates: Frontage units and Non-Frontage units which could reasonably be expected to use the bypass street(s) - 10-trips/day/single family residential (SFR) unit, 6-trips/day/multi family residential (MFR) unit. The volume greater than 50% more than the volume expected is considered “bypass traffic”.

When Voting Requirement Not Met

If a street fails to receive the necessary two-thirds majority approval, the street may not be considered again for speed lumps for three (3) years.

Priority Ranking System

The following point allocation method will be used in order to rank streets qualifying for the speed lump categories:

Residential – Local & Moderate Volume Collectors

One point for every 50 vehicles traveling the street in a 24-hour study period.

One point for each residential unit fronting the street, plus one point for each 25 feet of apartment frontage.

Five points for every 85th percentile speed of traffic exceeding the speed limit.

Parks & Schools & Moderate Volume Collectors

One point for every 50 vehicles traveling the street in a 24-hour study period.

One point for each residential unit fronting the street, plus one point for each 25 feet of school, park, playground, or apartment frontage.

Five points for every 85th percentile speed of traffic exceeding the speed limit.

Bypass

One point for every 50 vehicles traveling the street in a 24-hour study period.

One point for each residential unit fronting the street, plus one point for each 25 feet of apartment frontage.

One point for every 10 vehicles that are considered “bypass traffic.”

Construction Specifications (Speed Lumps)

Upon installation of speed lumps, the asphalt concrete speed lumps will have a width of 12 feet, a minimum height of three and one-quarter inches and a maximum height of three and three-quarters inches (3 ¼" to 3 ¾"), and a vertical curvature as shown in the Detail drawings. The center lump (or lumps if the design requires one lump in each travel lane) will be five and one-half (5 ½') feet across. There will be a gap between lumps of one foot – three inches (1' - 3") to accommodate the wheelbase of fire trucks and buses. The outside speed lumps will extend from the center lump to the lip of gutter. There will be a two-foot (2') horizontal taper originating at the crest of the speed lump and converging at the lip of curb, with the exception of Speed Lump Detail A (Refer to Page 10). Asphalt concrete shall be mixed and placed in accordance with Section 22 of the City of Sacramento Standard Specifications. (Refer to Pages 10 - 13 for drawings of the speed lump cross sections for typical residential streets).

Construction Specifications (Speed Tables)

Upon installation of speed tables, the asphalt concrete speed tables will have a width of 22 feet, made up of a 6' long vertical curvature reaching a minimum height of three and one-quarter inches and a maximum height of three and three-quarters inches (3 ¼" to 3 ¾") on each end of a 10' long flat surface. There will be a two-foot (2') horizontal taper originating at the crest of the speed table and converging at the lip of curb. Asphalt concrete shall be mixed and placed in accordance with Section 22 of the City of Sacramento Standard Specifications. (Refer to Page 14 for the proposed speed table cross section).

Location Selection Guidelines

In selecting precise locations for the speed lump installation, the following guidelines shall be adhered to:

- Speed lumps shall not be located over manholes, water valves, or street monumentation, or whenever possible, within ten (10) feet of fire hydrants, as they may prevent/impede access to these facilities.
- Speed lumps should be located five to ten feet away from driveways, whenever possible, to minimize their effect on driveway access.
- Speed lumps should be located on or near property lines, whenever possible, to minimize the impact on (access to) individual properties.
- Speed lumps should be located near streetlights, whenever possible, in order to enhance their visibility at night.
- Speed lumps should be located a minimum distance of 200 feet from the end of the segment, whenever possible, and should never be located within a corner radius.

- No speed lumps shall be located on any horizontal curve(s) with less than a 650' radius.
- Speed lumps shall be spaced at a minimum interval of 250 feet and a maximum interval of 600 feet.
- Where possible, at least two speed lumps will be placed on a residential or parks and schools street, as two lumps are the minimum for effective speed control. The maximum number of speed lumps is dictated by street length and spacing requirements.
- To deter drivers from driving around speed lumps where no vertical curb exists, a two-inch (2") pipe shall be set in the sidewalk, centered on the speed lump in each approach direction. The pipes shall be placed at a maximum of six inches (6") from the back of curb and shall allow a minimum of 48" of clear sidewalk width to allow for wheelchair access. (Refer to Pages 10 - 14).

Signs and markings

There are two types of advanced warning devices used to alert motorists of upcoming speed lumps: street signs and pavement markings. The signing includes a 30-inch sign stating "SPEED LUMP" in four-inch (4") letters and a second line with an advisory speed of 15 MPH. Above this text is a pictorial of a speed lump. (Refer to Pages 10 - 14). Signage for a speed table includes a 30-inch sign stating "SPEED TABLE" in four-inch (4") letters and a second line with an advisory speed of 20 MPH. Above this text is a pictorial of a speed table.

Pavement markings for speed lumps shall include diamond striping on the center lump(s) and chevron markings on the side lumps. A reflective pavement marker will indicate the middle of the center lump(s) to assist RT and fire truck drivers to center their vehicle over the lump. (Refer to Pages 10 -13). Pavement markings for speed tables shall include twelve-inch (12") wide stripes, forming a chevron, extending six feet (6') from the approach edge of the speed table to the apex of the table and centered in each travel lane. Speed tables shall be striped with seventy feet (70') of centerline, extending thirty-five feet (35') from the apex of the speed table in both directions.

Additional Speed Lumps

Adding additional speed lumps on a street may be considered when all of the criteria listed below are met:

1. For Residential and Parks and Schools Locations: Where existing raised devices are ineffective in reducing speeds of vehicles based on speed survey conducted for a 24-hour period; the 85th percentile speed must be 5 mph or greater than the posted or prima facie speed on the street segment.

For Bypass Locations: Where existing raised devices are ineffective in reducing the volume of vehicles, based on an average daily traffic (ADT) count. Traffic volumes must be reduced by less than 10% from the street's ADT count prior to the installation of speed lumps in order to be considered ineffective.

2. The distance between existing raised devices or between a device and the end of the street segment must be at least five hundred feet (500') apart.
3. There is a petition with ten signatures requesting additional lumps. One resident signature per household having driveway access onto the street in question is allowed; a resident may be either an owner or tenant.
4. If all criteria are met, the segment will be ranked on the speed lump list. The segment will be balloted prior to installation. A minimum of 25% of ballots mailed shall be returned and a two-thirds majority of residents that vote are in favor of the installation of additional speed lumps. **

Relocation of Raised Devices

Changing the location of existing raised devices on a street may be considered when all of the criteria listed below are met.

1. The raised devices were placed in a location conflicting with the adopted guidelines, and another location exists which does not conflict with the adopted guidelines.
2. There is a petition with a two-thirds majority of the street's residents in favor of the relocation. One resident signature per household having driveway access onto the street in question is allowed; a resident may be either an owner or tenant.
3. A community meeting should be held, with the concurrence of the district's City Council member, to discuss the advantages of raised devices and receive feedback. Relocation of raised devices must be approved by City Council. Relocation of speed lumps which may have been installed for less than two years will only be considered if the City is compensated by those requesting speed lump relocation for the full cost of relocating the speed lumps, including removal, design, construction, inspection, and administration.

Removal of Raised Devices

Removing existing raised devices from a street may be considered when all of the criteria listed below are met:

1. For Residential and Parks and Schools Locations: The devices are ineffective in reducing speeds of vehicles based on speed survey conducted for a 24-hour

period. The 85th percentile and average speeds must each be less than 2 mph lower than those speeds demonstrated prior to the installation of the devices in order to be considered effective.

For Bypass Locations: Existing raised devices are ineffective in reducing the volume of vehicles, based on an average daily traffic (ADT) count. Traffic volumes must be reduced by less than 10% from the street's ADT count prior to the installation of the devices in order to be considered ineffective.

2. Raised devices were placed in a location conflicting with the adopted guidelines, and no other location exists which does not conflict with the adopted guidelines.
3. There is a petition with a two-thirds majority of street's residents' signatures in favor of removal of the raised device. One resident signature per household having driveway access onto the street in question is allowed; a resident may be either an owner or tenant.
4. A community meeting should be held, with the concurrence of the district's City Council Member, to discuss the advantages of raised devices and receive feedback. Removal of raised devices must be approved by City Council. Removal of speed lumps which have been installed for less than two years will only be considered if the City is compensated by those requesting speed lump removal for the full cost of the original installation, including design, construction, inspection, and administration and roadway repair.

Other Funding

A street segment which qualifies for any one of the speed lump categories may be funded by an individual or a group of individuals. The individual or group of individuals must enter into a memorandum of understanding (MOU) with the City of Sacramento, wherein they agree to pay for all costs associated with the installation of speed lumps on their street (construction, inspection, administration, etc). Once a MOU is executed, the location to receive speed lumps shall be included in the next City CIP speed lump project. Private payment for speed lumps does not relieve a location from the requirement of a two-thirds majority of residents favoring the installation of speed lumps, or from any other criterion set forth in these guidelines.

Regional Transit

Regional Transit (RT) adopted a policy on bus routing with regard to undulations in 1982. This policy authorizes RT staff to modify bus routes so they do not utilize streets with existing undulations or speed humps, and to coordinate future placement of speed lumps/tables. The Department of Transportation policy is to provide RT with the locations of future speed lumps for approval. RT has approved speed lumps and speed tables for placement on bus routes.

Fire Department Emergency Response Routes

The Department of Transportation's policy is to provide the Fire Department with the locations of proposed speed lumps for approval. The Fire Department has approved speed lumps and speed tables for emergency response routes on a case-by-case basis.

Since 2004, the Department of Transportation has not placed any raised devices in the area bound by the American River on the north, Alhambra Boulevard on the east, Broadway on the south and the Sacramento River on the west. The decision was made due to the large number of calls for emergency services due to the high density in the downtown/midtown area, the general classification of the grid pattern streets as primary emergency response routes and the delay in response time of raised devices already in place.

The Department of Transportation will consider including the conversion of existing speed humps to speed lumps in the annual Speed Lump Project installation, where warranted. Residents will be notified prior to the conversion.

Public Notification

Public notifications, which are used for balloting and to inform residents of proposed speed lumps and to have them vote, may be distributed by the following method:

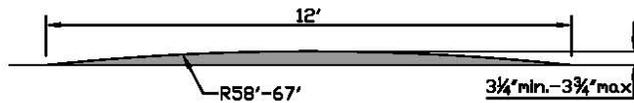
1. Ballots may be mailed out to residents of affected streets.

Note: Ballots with a response requested should be sent far enough in advance to reach the public two and one half (2 ½) weeks prior to the response deadlines.

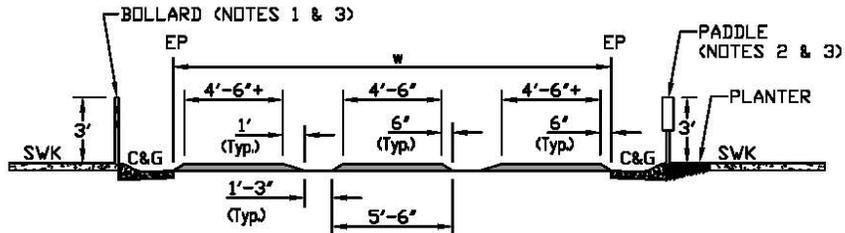
Street Participation in the Neighborhood Traffic Management Program (NTMP)

The NTMP reviews all streets within a neighborhood for possible traffic calming measures. In doing so, streets are evaluated for speed lumps. If the traffic calming plan approved by balloted residents and City Council does not include speed lumps on a street, that street is ineligible to be considered for further traffic calming measures such as speed lumps for a minimum of one-year after the NTMP project has been closed.

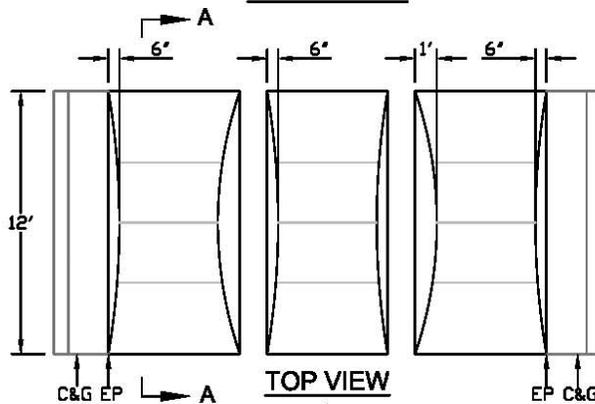
Revised April 25, 2013



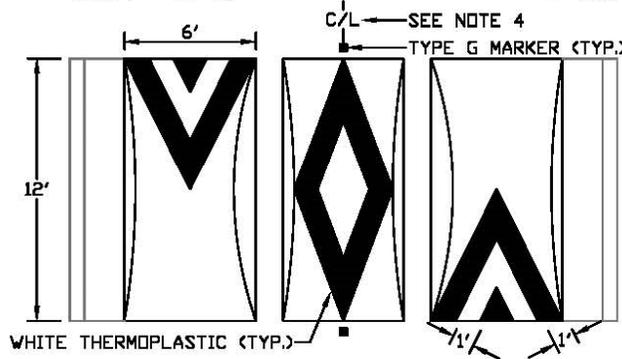
SPEED LUMP CROSS SECTION A-A



FRONT VIEW



TOP VIEW



STRIPING DETAIL

LEGEND:

C&G - CURB AND GUTTER
 EP - EDGE OF PAVEMENT
 SWK - SIDEWALK

NOTES:

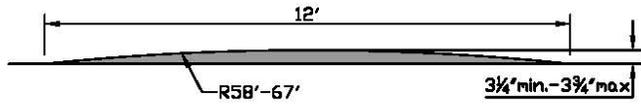
1. BOLLARD TO BE INSTALLED ON SIDEWALKS WITH ROLLED CURBS. SEE CITY STANDARD DWG. NO. T-230.
2. PADDLES TO BE INSTALLED ON PLANTER/DIRT WITH ROLLED CURBS OR UNIMPROVED STREETS. SEE CITY STANDARD DWG. NO. T-210.
3. NO BOLLARD OR PADDLE IS NEEDED WHERE TYPE 2 CURB & GUTTER IS PRESENT.
4. CENTER LUMP ON ROADWAY UNLESS OTHERWISE NOTED BY THE ENGINEER.

REV.	DATE	DESCRIPTION
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△		
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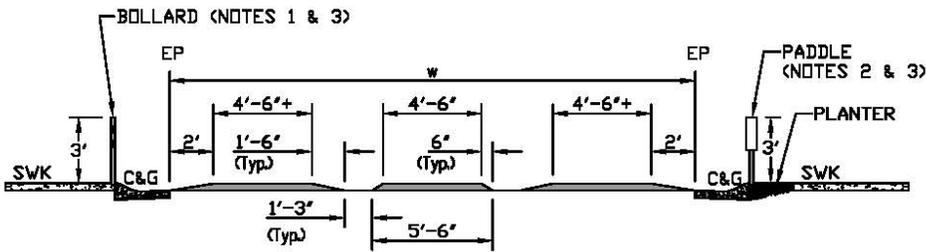
CITY OF SACRAMENTO DEPARTMENT OF TRANSPORTATION	SPEED LUMP DETAIL (A) (w) < 24'	APPROVED BY: <i>Heather Brown</i> SCALE: None
		DATE: 08/31/09 DWG. NO. T-222

R:\UHS\tds\Transportation\Stallings\T-222.dwg

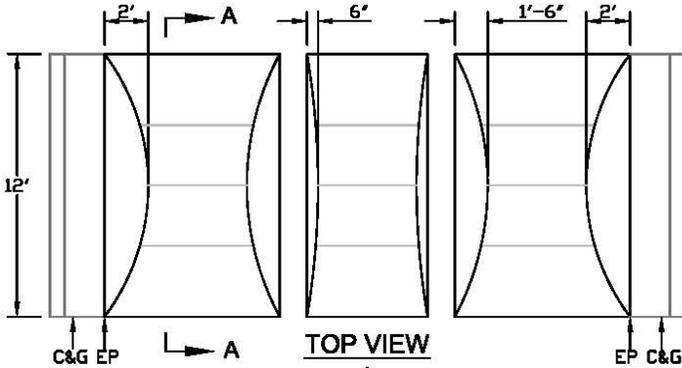
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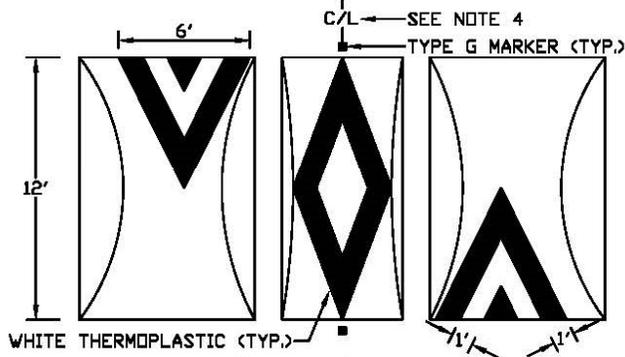
SPEED LUMP CROSS SECTION A-A



FRONT VIEW



TOP VIEW



STRIPING DETAIL

LEGEND:

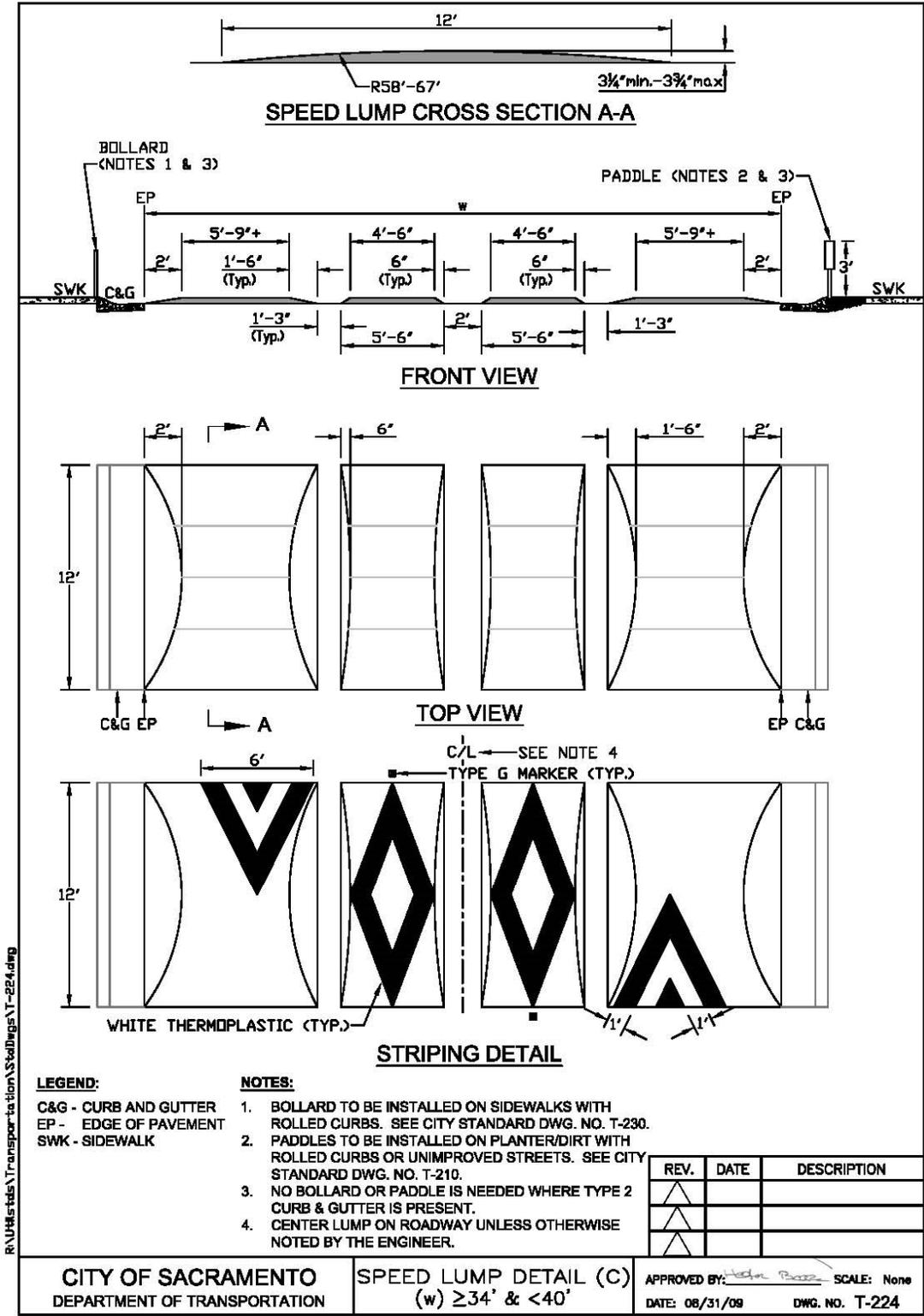
- C&G - CURB AND GUTTER
- EP - EDGE OF PAVEMENT
- SWK - SIDEWALK

NOTES:

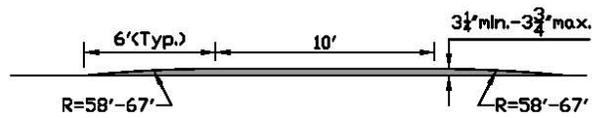
1. BOLLARD TO BE INSTALLED ON SIDEWALKS WITH ROLLED CURBS. SEE CITY STANDARD DWG. NO. T-230.
2. PADDLES TO BE INSTALLED ON PLANTER/DIRT WITH ROLLED CURBS OR UNIMPROVED STREETS. SEE CITY STANDARD DWG. NO. T-210.
3. NO BOLLARD OR PADDLE IS NEEDED WHERE TYPE 2 CURB & GUTTER IS PRESENT.
4. CENTER LUMP ON ROADWAY UNLESS OTHERWISE NOTED BY THE ENGINEER.

REV.	DATE	DESCRIPTION

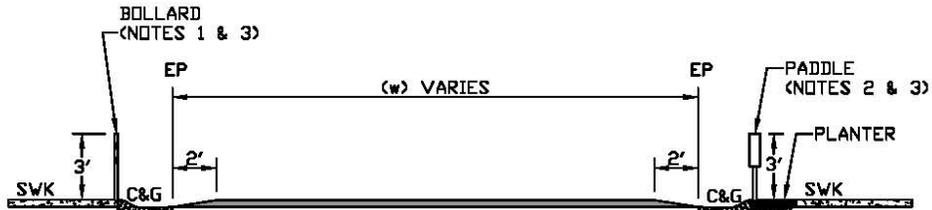
CITY OF SACRAMENTO DEPARTMENT OF TRANSPORTATION	SPEED LUMP DETAIL (B) (w) ≥24' & <34'	APPROVED BY: <i>Helen Bass</i> SCALE: None DATE: 08/31/09 DWG. NO. T-223
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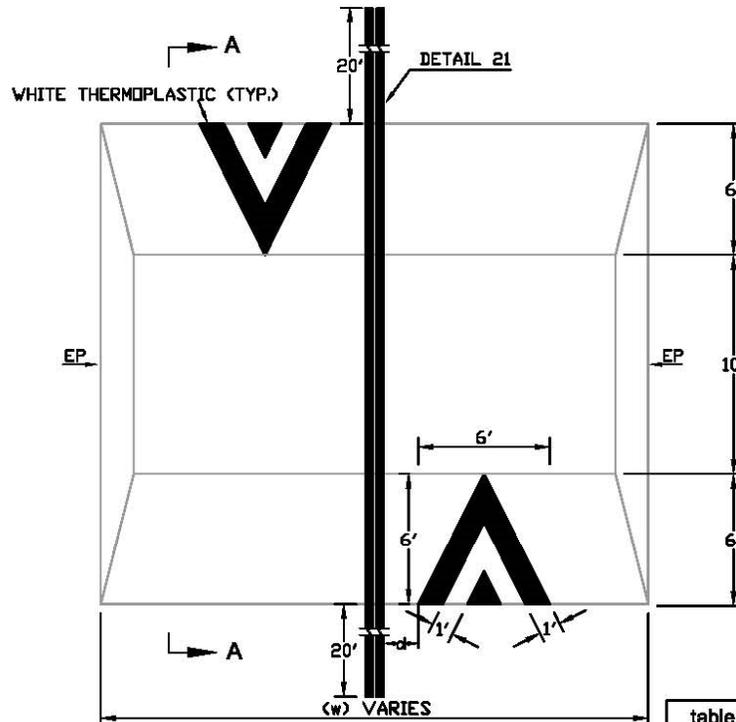
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SPEED TABLE CROSS SECTION A-A



FRONT VIEW



PLAN VIEW & STRIPING PLAN

table width (w)	(d)
20' - 32'	2'-0"
32' +	3'-0"

LEGEND:

C&G - CURB AND GUTTER
 EP - EDGE OF PAVEMENT
 SWK - SIDEWALK

NOTES:

1. BOLLARD TO BE INSTALLED ON SIDEWALKS WITH ROLLED CURBS. SEE CITY STANDARD DWG. NO. T-230.
2. PADDLES TO BE INSTALLED ON PLANTER/DIRT WITH ROLLED CURBS OR UNIMPROVED STREETS. SEE CITY STANDARD DWG. NO. T-210.
3. NO BOLLARD OR PADDLE IS NEEDED WHERE TYPE 2 CURB & GUTTER IS PRESENT.

REV.	DATE	DESCRIPTION
△		
△		
△		

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CITY OF SACRAMENTO
 DEPARTMENT OF TRANSPORTATION

SPEED TABLE DETAIL

APPROVED BY: *Helen Basso* SCALE: None
 DATE: 08/31/09 DWG. NO. T-226

