

City of Portland Policy Adoption
of Offset Speed Tables
for
Reduced Emergency Response Delay

(Making Fire-Truck-Friendly
Speed bumps an accepted
Tool for Traffic Calming)

Portland Traffic and Transportation Class – Fall 2009
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December 3, 2009

Speed Table History on Cornell Road

- 1994: NW Cornell Road Test Project
 - City demonstration project (2nd street in Portland to receive speed tables)
 - Intent: Traffic Calming:
 - Reduce traffic volume
 - Reduce vehicle speeds
 - Improve pedestrian safety
 - 22-foot speed tables (commonly known as speed bumps) installed:
 - (3) tables installed at 300' intervals near the junction with Lovejoy Street
 - (1) table installed near Forest Park. (Location modified in 1995)
 - (1) Pedestrian Refuge Island installed at the Overton street crosswalk for safety of school children
 - Number and placement was highly restricted because of City's unfamiliarity with these as traffic calming devices



Existing 22' Speed Tables



Existing Pedestrian Refuge Island

Offset Speed Tables for Reduced Emergency Response Delay Study & Abstract Report by Scott Batson, PBOT March 2004

Offset Speed Tables for Reduced Emergency Response Delay ITE Technical Conference, March 2004, Irvine, California Scott Batson, PE

ABSTRACT

With the advent of speed bumps (i.e., modern speed bumps) to reduce vehicle speeding on residential streets has come the unwanted cost of delay for Emergency Service Providers. This equipment, due to its size and weight, is particularly affected by speed bumps. Past studies in Portland found delays per bump of up to 9.4 seconds for the 14-foot design and 9.2 seconds for 22-foot speed tables. Testing of the offset speed table with median islands made advances in reducing delay for emergency vehicles into the 2-second range, but was limited to one or wider streets due to the turning needs of larger fire equipment. This report provides a summary of the testing of the offset speed table with median islands as well as a recent alternative and makes a comparison to speed cushions, a tool often used where emergency response delay is of concern. This investigation was undertaken to evaluate a design that would permit the use of the offset speed bump on designated Emergency Response Routes regardless of the street width.

PORTLAND AND SPEED BUMPS

A Brief History

In 1991 the City of Portland's Office of Transportation (PBOT) undertook a study of speed bumps in response to public demand for relief from the skewed and unwanted mix rates of traffic speeds. As the result of two years of testing, speed bumps and speed tables became standard tools for addressing the problem of speeding on Portland's residential streets. In Phase II of the original 1992 speed bump tests, the Fire Bureau indicated a maximum cost for table speed of 28 mph for the 14-foot speed bump and 25 mph for the 22-foot speed table.

The 14-foot speed bump was adopted for "Local Streets" streets that serve as either a transit street or a primary fire response route. The 22-foot speed bump, or table, was designed for Neighborhood Collector streets that serve higher volumes of traffic, to maximize clearance potential, and on streets that are designated transit or primary fire response routes. Speed tables have reduced effect on transit buses and are easier for fire and emergency vehicles to negotiate than the 14-foot speed bump. The 22-foot speed table has proved effective in slowing average 85th percentile speeds along a street to 19 mph. Seventy percent of residents on traffic calmed streets have perceived a change to speed and over 80% perceived a change in traffic volume.¹ The Traffic Calming Program has been installing speed bumps since 1992, and to date has installed over 600 speed bumps and 180 speed tables. Demand for traffic calming in Portland continues with the current street project backlog exceeding 700 projects. It can be stated with certainty that speed bumps will for the foreseeable future be a common tool to slow speeding traffic in Portland.

EMERGENCY RESPONSE ISSUES

Benefits Have Costs

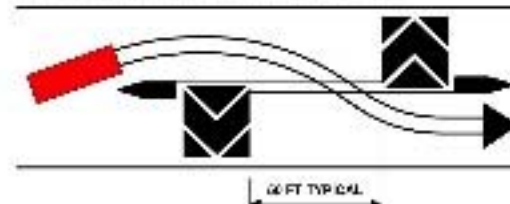
With the continued success of speed bumps the demand for them was increased greatly. And though the Portland Fire Bureau recognized the community's need for reduced speeding, there began to be significant concern that embedded installation would pose create a cumulative slowing effect that might compromise emergency response time goals.² Problems developed

The UK study also found that 45% of drivers aimed for the gaps when traversing speed cushions and noted concern when gaps coincided with street corners.^{3,4} Finally, the use of speed cushions and the need for larger vehicles to straddle the device meant that conflicts with parked vehicles were possible, eliminating the original benefit to using speed cushions.⁵

Offset Speed Tables with Median Islands

In 1997 PBOT began testing an alternative to the speed cushion concept. PBOT's design used a standard speed table that was constructed across only half of a street. The second half of the speed table was constructed downstream of the first and in the opposing lane. An emergency vehicle is able to use any portion of the roadway to accomplish a response, the space between the speed table halves permitted emergency vehicles to cross the street centerline and utilize around them in a response pathway (Figure 1). Constructed with the offset speed tables were median islands on the outside approaches to deter on-lane drivers from crossing the centerline. In addition, a double yellow centerline was added approaching each island and quadruple yellow centerlines with raised pavement markings were added between the speed table halves. The device pavement markings between the speed table halves gave an illusion that a median continued the entire distance. The addition of the islands and striping was done to deter drivers from utilizing the pathway emergency vehicles could take.

Figure 1. Offset Speed Tables with Islands and Emergency Response Path.



Tests of the offset speed table with islands were conducted on two public streets, SE Market and SE 17th, in 1998. The testing of the offset speed bump with islands successfully demonstrated the track across speeds of 20-30 miles per hour through the pair of speed tables. Response delay was reduced from a maximum of 9.4 seconds for standard speed tables⁶ into the 2-second range.⁷ Views of the test site on SE Market showed no indication of confusion on the part of the drivers, nor any indications of drivers trying to avoid the device at any time.⁸ The testing also revealed that the offset speed table with median islands has limited applications. Street width must be at least 46 feet, curb to curb, to provide for the response path of Emergency Equipment and parking removed is either necessary opposite of each speed table half (see Figure 1). Additionally, where the street is less than 40 feet, transit drivers and other wide vehicle operators

March 2008 Report

Offset Speed Table Concept



Example of Offset Speed Table

City of Beaverton
SW 87th between Canyon Rd.
and Beaverton-Hillsdale Hwy.



Looking back the other way



Close-up view of 22' table

City of Beaverton
SW 87th between Canyon Rd.
and Beaverton-Hillsdale Hwy.



Raised pavement markers to
deter crossing of centerline






- Alternate traffic calming device:
- Speed cushions with channels
 - Preferred in Beaverton as a fire-truck friendly device

City of Beaverton
SW 91st between Canyon Rd.
and Beaverton-Hillsdale Hwy.




Vehicles aim for channel

Safer Routes to Schools - 2008

Safer Routes To Schools Continuing Services Plan

Chapman Elementary School



Be Safe. Have Fun. Grow Healthy. Get There.

Prepared September 2008 By:
The Safer Routes to Schools Program
The City of Portland Office of Transportation
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Safer Routes to School Report
September 2008

Safer Routes to School - ENGINEERING at Chapman Elementary

The SR25 Program provides engineering improvements around the school to address school-related transportation safety concerns. The engineering projects listed below were identified by the Chapman Elementary SR25 Team, following a walkabout with a Portland Office of Transportation traffic engineer. The SR25 Engineer produced an Engineering Strategy Report, and the SR25 Team ranked the identified issues. SR25 staff then presented them to the school's local Neighborhood Association for review.

Blue text: - Completed improvement items (as of September 2008)
Red text: - Items awaiting implementation as funding becomes available
Pink text: - Federal/Oregon Department of Transportation funded engineering items with expected completion in 2010

Priority Rank by School Team	Project Location	Project Description
Short-term Identified Projects (Approved and Prioritized by the SR25 School Team)		
1	Pettygrove at 26 th	Rebuild SW Corner
2	Pettygrove at 26 th	Rebuild SE Corner
3	Pettygrove E/26 th	Relocate BLIMP sign
4	26 th S/Pettygrove	add STOP sign
5	Pettygrove at 26 th	Parking Restrictions
6	Raleigh at 26 th	Rebuild NW Corner
7	Raleigh at 26 th	Rebuild NE Corner
8	Raleigh at 26 th	Crosswalk Adjust
9	Various	Island Vegetation Clearing
Future Short-Term Projects - Prioritized by the SR25 Team		
1	Pettygrove at 28th	Resurface Road/Crosswalk
2	Waughn at 15th	Countdown Ped. Signals (L)
3	Waughn at 17th	Countdown Ped. Signals (R)
4	12 th at Lowmyer	Countdown Ped. Signals (R)
5	11 th at Lowmyer	Countdown Ped. Signals (R)
6	Waughn at 15 th	Leading Pedestrian Interval
7	Waughn at 17 th	Leading Pedestrian Interval
8	Pettygrove at 26 th	Curb Extension
9	Cornell Rd.	Offset Speed Tables
10	Various	Corner Rebuilds (EAO)
11	Pettygrove at 15th	Raised Crosswalk/Corner
12	Raleigh E/27 th	Raised Path
13	Pettygrove and Raleigh	Divide pick-up by grade
Future Short-Term Projects - Prioritized by the SR25 Team		
1	21 st at Raleigh	Curb Extension (2) - Federal Funding Approved 1/08 - Work scheduled 2010

Future Short Term Project – (Unfunded)
Item #9: Cornell Rd. – Offset Speed Tables
Estimated Cost: \$18,000

Safer Routes to Schools

Location, E.24 th	4/20/08	-	-	20	3501	2024	0.471
Cornell, McNeish	482	31	35	35	4170	4020	6.189
2015 Cornell	42902	27	27	25	3607	4097	7.594
Cornell, E.24 th	42902	38	38	38	3090	4676	6.586
Waverly, N.24 th	303101	24	25	25	2558	3099	5.637
Waverly N.24 th	303101	38	38	35	3038	2782	5.726
Waverly, S. McNeish	128008	22	28	25	0644	945	2.049
Glenn at 21 st	111008	-	-	25	759	4989	5.688
Glenn E.17 th	41184	-	-	25	-	11503	11.781
Flinders at 21 st	111008	-	-	25	853	684	1.217

Miles per hour - 87th percent speed, 15% of drivers exceed this. *School Zone 1:00 to 1:00, 2:00 to 2:00.

SOLUTIONS FOR SAFETY CONCERNS

SOLUTIONS FOR SPEEDING

NW 25th Avenue

The speed of traffic on NW 25th was identified as a concern. A speed camera takes south of NW Quincey Road 85th percentile speeds of 22 mph to 24 mph in the 25-mph zone. Previous traffic calming projects appear to continue to be effective on vehicle speeds. NW 25th is a Local Service street but it would react like a collector (8,800 vehicles per day) due to the lack of roads for the north hills area and NW 25th Avenue's convenience as a connection to the freeway system via NW Vaughn. PDOT has worked with the neighborhood to correct unsafe driver behavior and the current traffic use of NW 25th is likely the best compromise available.

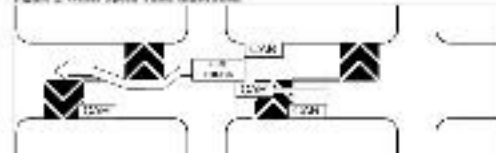
One possible improvement is a raised crosswalk at the school crossing at Perrygrove. Placing a raised crosswalk on 21st at Perrygrove would require moving the crossing away from the intersection. This change also involves reconstructing the corners and modifying the pedestrian refuge island at Perrygrove.

Cornell Road

Cornell Road had a speed table project and pedestrian refuge island constructed in 1994. Cornell Road was one of the first Neighborhood Collector streets to receive traffic calming and stands has been honored since the original project. If constructed today it is likely that several more speed tables would be recommended than currently exist, though additional areas have also arisen. PDOT has had internal discussions regarding NW Cornell Road as a test street for a new five-foot-wide speed table (22-foot speed bump). Offset speed tables have the same dimensions as standard speed tables but are split down the centerline of the street with the left half placed further down the street in the opposing lane. Offset speed tables permit emergency response vehicles to reduce delay at the speed tables by placing one at both sides of the emergency vehicle into the opposing traffic lane (Figure 2). This action can significantly reduce the delay to emergency response vehicles when compared with driving both sides of the emergency vehicle over a speed table (2 seconds delay versus up to 18 seconds for standard speed table).

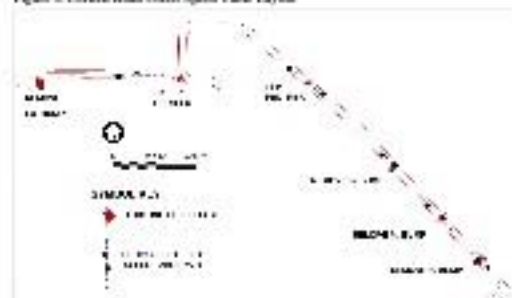
Proposed Cornell Road project description

Figure 2. Offset Speed Table Illustration



Because Cornell Road is a Neighborhood Collector street, with a wider area of influence, the process to approve speed tables requires more involvement. Not only do residents along the street need to approve a traffic calming project, but any neighborhood associations that the street crosses must also approve the project. A general layout of offset speed tables that increases the effectiveness of vehicle slowing and poses less delay to emergency vehicles has been created. It is recommended that 3 offset speed table pairs be constructed along Cornell Road (Figure 3).

Figure 3. Cornell Road Offset Speed Table Layout



The cost of the project would be approximately \$30,000. PDOT does not currently provide a subsidy for traffic calming on Neighborhood Collector streets, however the unusual nature of this proposal may present full City funding. The Chapman Elementary SR25 Tunnels could consider a partial funding of this traffic calming project to encourage its construction.

NW 21st Avenue

NW 21st Avenue near Quincey has a measured 87th percentile speed of 27 to 28 mph in a 28-mph zone. NW 21st Avenue is a Neighborhood Collector, indicating higher expected use by users, and

Proposed project diagrams

Status of Offset Speed Tables

- Since study was presented in March 2004
 - A draft policy adopting the Offset Speed Tables by the City as a traffic calming device has been prepared by Scott Batson
 - **The adoption of the policy has never occurred.** This is due to a number of factors:
 - Insufficient staffing resources within both bureaus allocated to complete the task
 - No funding due to current fiscal constraints in both bureaus
 - No champion to push project to completion – either within the City or from the public
 - No marching orders from higher management within the City to get this task done
 - Longevity of the process (begun in 1998) – this is a task that is fading from staff's attention
 - Changing of City staff along the way – the knowledge and cooperation of those involved is being lost
 - Since 2005 – periodic checking in with Scott Batson via email or phone to learn status
 - Each time the response is "No change".
 - Without adoption of policy allowing their use – **NO OFFSET TABLES CAN BE INSTALLED ANYWHERE WITHIN THE CITY, NO MATTER WHAT THE STREET CLASSIFICATION.** They are not approved as a tool within the City's traffic calming tool box kit available to neighborhoods
- **What next?**

Offset Speed Tables – Where do we go from here?

- **Step #1: Get the policy adopted by both PBOT & Portland Fire & Rescue (PF&R)**
 - With participation in Portland Traffic and Transportation Class:
 - Selected as my class project
 - Calls to Scott Batson, PBOT & Erin Janseens, PBOT
 - Last spoke with Erin Janseens yesterday, December 2nd.
 - Agreed to have her schedule a meeting with herself, Scott Batson & myself to discuss status of adoption
- **Step #2: Work with City to identify test project**
 - Location ?
 - Argument for Cornell Road as a test project – Primary Emergency Response Route
 - Identified in Safer Routes to Schools Service Plan for Chapman Elementary School – September 2008
 - Funding Source
- **Step #3: Develop strategy to implement test project**
- **Step #4: Construct project. Assess results and modify if required for safety**



Where will make project this fail?

- Can't get City of Portland staff at PBOT or PF&R to return phone calls or email. I loose interest in trying to push project forward. No champion
- Inability to arrange meeting between PBOT & PF&R
- PF&R backs-off from prior willingness to compromise on finding an engineered solution that will calm traffic on the street but not significantly impact fire truck response time
- City's willingness to accept offset speed tables – but not allow their use on Primary Emergency Response Routes
- No funding or staff availability to get through policy adoption phase
- Neighborhood preferring status quo and not willing to try a pilot test project on Cornell
- No funding source ever identified or found for installation
- Offset tables installed – and who knew – they turn out to be a higher hazard than the existing 22' full-width speed tables. This prompts the City to remove them altogether, leaving no traffic calming tables on Cornell.