City of Cleveland

2022 Speed Table Pilot Program

Evaluation and Key Recommendations

CITY OF CLEVELAND
Mayor Justin M. Bibb

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Contents

Speed Table Pilot Overview

In Summer, 2022, the City of Cleveland launched a residential speed table pilot to inform a future citywide traffic calming policy. Using removable, modular rubber speed tables at nine locations and formed asphalt speed tables at one location, data were collected to better understand the impact of speed tables on vehicle speeds, resident perception, and service delivery of Public Safety, Public Works, and Greater Cleveland Regional Transit Authority.

Terminology

The following terminology is used frequently throughout the document.

- **85th Percentile Speed**—This is the speed in miles per hour at which 85% of analyzed vehicles travelled below
- **Average Speed**—Average/mean speed of vehicles travelling in both directions
- **Delineators** – Upright posts mounted to the roadway surface
- **Speed Tables**—Vertical elevations in the roadway that cause drivers to slow down to drive over them. Speed tables are flat on the top and are not as abrupt as speed bumps, which are narrower and rounded.
- **Traffic Calming**—Street design solutions that slow vehicle speeds, making streets safer for all road users.

Figure 1 Speed Table Installation on W. 56th Street

Goals of the Pilot Program

- Increase quality of life for residents by creating safer, calmer streets.
- Reduce the chance of serious injury or death if a crash does happen.
- Expand local experience with street design interventions that reinforce lower speeds in residential areas.
- Inform citywide traffic calming programs and guidance in alignment with the Vision Zero Cleveland initiative.

Cleveland's Vision Zero Action Plan

The Vision Zero Action Plan was adopted by the City Planning Commission on September 2, 2022. The Vision Zero Action Plan includes strategies to eliminate serious injuries and fatalities on our roadways through a clear workplan with prioritized actions that will create a "new normal" for transportation in Cleveland – one that shares responsibility for the elimination of deaths and serious injury on city streets, making it safe for everyone to move through the city whether they are walking, rolling, or in a vehicle.

The speed table pilot program is an effort in alignment with the City's Vision Zero Action Plan as one piece of a greater safety improvement effort to eliminate serious injuries and fatalities on our roadways.

Location of Speed Tables

Ten locations were identified as pilot areas for speed table implementation. Selected locations were local, primarily residential streets with medium traffic volumes and documented speeding issues or a history of fatal crashes. Baseline eligibility was determined by:

- Average daily traffic of 1,000 to 4,000 vehicles
- Average speeds at or above the posted speed limit (>25 mph)
- 85th percentile speeds at 6 mph or more than the posted speed limit (31 mph)

Locations Identified for Pilot Program

- Edgewater Drive between W. 117th and W. 115th
- West 101st Street between Madison Avenue and N Marginal Drive
- West 56th Street between Denison Avenue and Eichorn Avenue
- West 50th Street between Kouba Avenue and Clark Avenue*
- Bohn Road between East 40th Street and Kennard Road **
- Dickens Avenue between Larry Doby Way and East 116th Street
- Corlett Avenue between East 120th Street and East 127th Street
- East 147th Street between Bartlett Avenue and Glendale Avenue
- Judson Drive between East 151st Street and East 160th Street
- East 174th Street between Ozark Avenue and Nottingham Road

*Location of fatal crash

Speed Table Variations

As part of the pilot program, speed table variations were incorporated to better inform future implementation, including:

- Number of speed tables per location
- Speed table width
- Speed table material (modular rubber and formed asphalt)
- Distance between tables
- Presence of delineators between speed tables and curbs

Figure 2 Speed Table with Delineators

The following table details the variations of each pilot location.

Speed Table Location	Number of Tables	Table Width	Table Type	Distance Between Tables	Delineators Installed	Street Width	Transit Service
Edgewater Drive	1	10.5 ft	Modular	N/A	No	30 ft	No
West 101st Street	2	10.5 ft	Modular	1050 ft	No	27 ft	No
West 56th Street	2	10.5 ft	Modular	470 ft	No	27 ft	No

West 50th Street	1	10.5 ft	Modular	N/A	No	27 ft	No
Bohn Road	1	10.5 ft	Modular	N/A	Yes	40 ft	No
Dickens Avenue	3	Formed Asphalt	Asphalt	235 ft (west of center) and 625 ft (east of center)	No	27 ft	No
Corlett Avenue	2	14 ft	Modular	1000 ft	Yes	45 ft	Yes
East 147th Street	2	14 ft	Modular	485 ft	No	27 ft	No
Judson Drive	2	10.5 ft	Modular	1155 ft	No	40 ft	No
East 174th Street	1	10.5 ft	Modular	N/A	Yes	27 ft	No

Pilot Evaluation

At the initiation of the pilot, the City of Cleveland established project objectives along with metrics to evaluate success. Data from a variety of sources quantify the pilot program's effectiveness and inform a city-wide approach to traffic calming.

Project Objective	**Evaluation Metric**	**Measure of Success**
1) Document effectiveness of speed tables	Pre- and post-speed and volumes on pilot streets	Achieve 85th percentile speeds at or below the posted speed limit
	Pre- and post-speed and volumes on adjacent parallel streets	No significant impact on speeds or volumes of adjacent streets
	Pre- and post-crash data review on pilot streets	No significant increase in crash severity on pilot streets
2) Address service delivery challenges, if any	Qualitative interviews with Public Safety, Public Works, and GCRTA personnel	Insignificant or acceptable levels of service impact due to presence of speed tables
3) Use resident feedback to refine approach	Feelings of safety, program approval, and qualitative feedback gathered via survey	Documented resident approval based on increased feelings of roadway safety
4) Investigate potential for City-installed asphalt speed tables	Installation time, cost, and durability	Cost-effective and maintainable, with no significant difference in effectiveness compared to modular installations

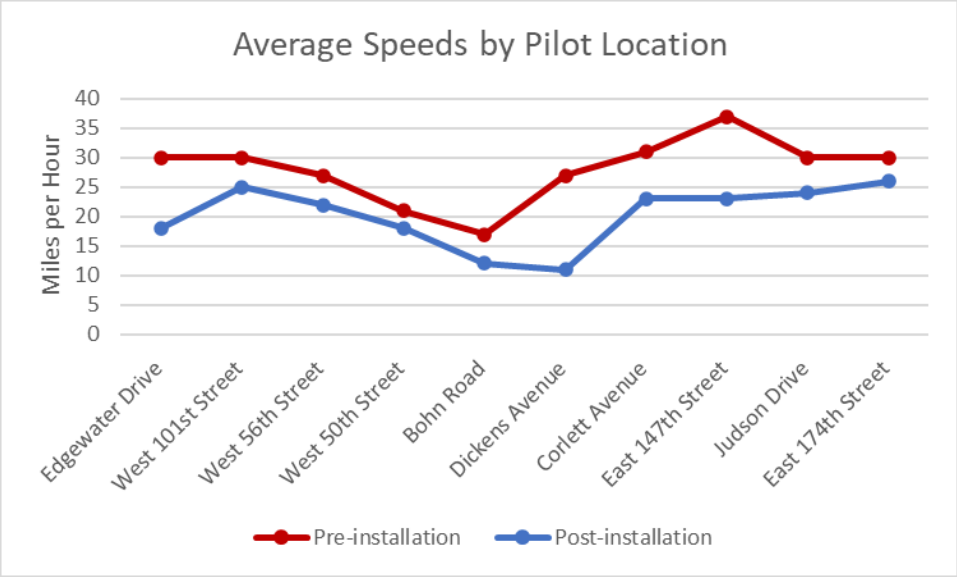
1) Documenting the Effectiveness of Speed Tables

The City of Cleveland collected data at key locations to evaluate the following metrics: speed and volume on the pilot streets, speed and volume on adjacent parallel streets, and crash data on the pilot streets.

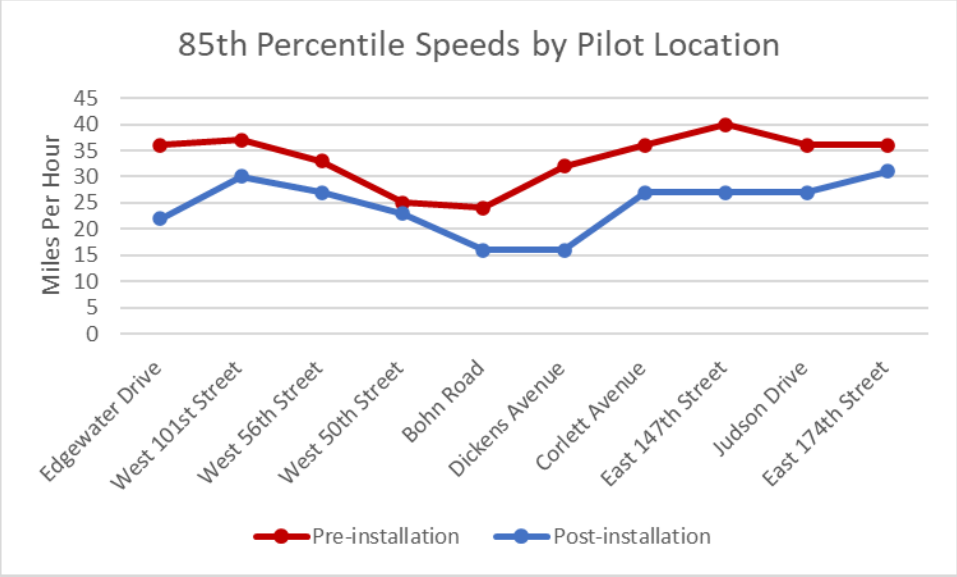
Key Findings: Pilot Location Speeds

After speed table installation, all locations experienced a speed reduction according to pre- and post-installation traffic counts. Pilot program locations saw a reduction average of 7.8 mph for the mean vehicle speed and an average reduction of 8.9 mph for 85th percentile vehicle speeds. Four locations achieved 85th percentile speeds at or below 25 mph, with another four locations showing 85th percentile speeds of 27 mph.

Speed Table Average Speed Change (Prior and Post Installation)				
Speed Table Location	**Posted Speed Limit**	**Average Speed BEFORE Speed Table Installation**	**Speed Change**	**Average Speed AFTER Speed Table Installation**
Edgewater Drive	25 Mph	30 Mph	Decrease: 12 Mph	18 Mph
West 101st Street	25 Mph	30 Mph	Decrease: 5 Mph	25 Mph
West 56th Street	25 Mph	27 Mph	Decrease: 5 Mph	22 Mph
West 50th Street	25 Mph	21 Mph	Decrease: 3 Mph	18 Mph
Bohn Road	25 Mph	17 Mph	Decrease: 5 Mph	12 Mph
Dickens Avenue	25 Mph	27 Mph	Decrease: 16 Mph	11 Mph
Corlett Avenue	25 Mph	31 Mph	Decrease: 8 Mph	23 Mph
East 147th Street	25 Mph	37 Mph	Decrease: 14 Mph	23 Mph
Judson Drive	25 Mph	30 Mph	Decrease: 6 Mph	24 Mph
East 174th Street	25 Mph	30 Mph	Decrease: 4 Mph	26 Mph
Average Speed Reduction		**Decrease: 7.8 Mph**		



Speed Table 85th Percentile Speed Change (Prior and Post Installation)				
Speed Table Location	**Posted Speed Limit**	**85th Percentile Speed BEFORE Table Installation**	**Speed Change**	**85th Percentile Speed AFTER Table Installation**
Edgewater Drive	25 Mph	36 Mph	Decrease: 14 Mph	22 Mph
West 101st Street	25 Mph	37 Mph	Decrease: 7 Mph	30 Mph
West 56th Street	25 Mph	33 Mph	Decrease: 6 Mph	27 Mph
West 50th Street	25 Mph	25 Mph	Decrease: 2 Mph	23 Mph
Bohn Road	25 Mph	24 Mph	Decrease: 8 Mph	16 Mph
Dickens Avenue	25 Mph	32 Mph	Decrease: 16 Mph	16 Mph
Corlett Avenue	25 Mph	36 Mph	Decrease: 9 Mph	27 Mph
East 147th Street	25 Mph	40 Mph	Decrease: 13 Mph	27 Mph
Judson Drive	25 Mph	36 Mph	Decrease: 9 Mph	27 Mph
East 174th Street	25 Mph	36 Mph	Decrease: 5 Mph	31 Mph
Average Speed Reduction		**Decrease: 8.9 Mph**		



Key Findings: Adjacent Streets

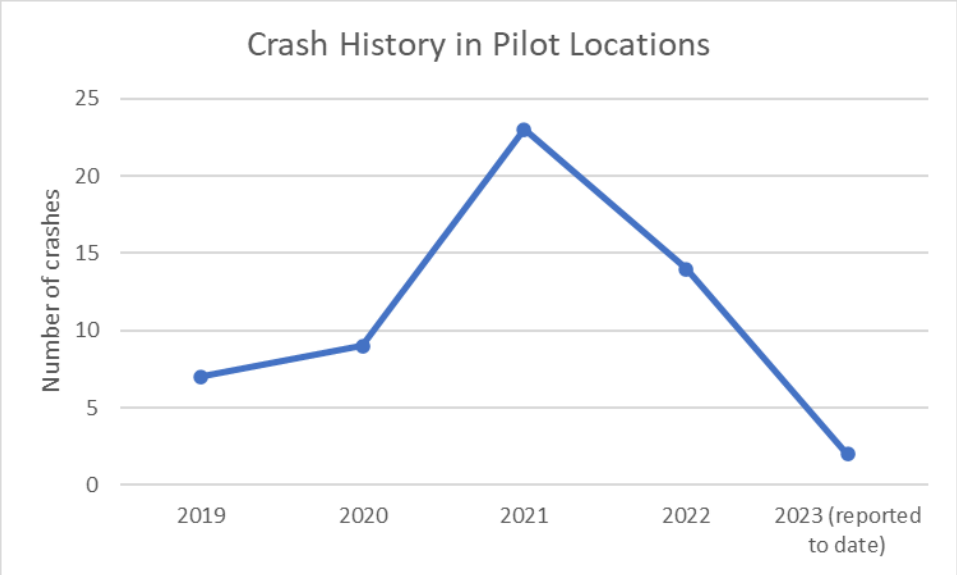
The City continues to monitor impacts to residential, 25 mph streets that are parallel to speed table treatment locations, to observe any traffic volume or speeding issues. In general, adjacent streets have relatively low traffic volumes, with all observed streets displaying less than 1,000 ADT post-installation. Some parallel streets experienced average observed speed increases of one to two miles per hour. Streets with speeding issues are candidates for future speed table or other traffic calming installations.

Info		Pre-Installation Data			Post-Installation Data		
Location	**Nearest Speed Table**	**ADT**	**Average**	**85th**	**ADT**	**Average**	**85th**
W. 100th St between Madison and Western	W 101st	586	24	30	983	26	31
W. 58th between Storer and Denison	W 56th	N/A	N/A	N/A	627	25	31
Gay Ave between E. 120 and E. 124th	Corlett	1034	22	26	803	25	30
Angelus Ave between E. 120th and E. 124th	Corlett	597	23	26	508	21	26
E. 149th between Bartlett and Glendale	E 147th	719	23	29	568	25	31
E. 144th between Bartlett and Glendale	E 147th	N/A	N/A	N/A	347	25	31

Key Findings: Pilot Location Crash Data

Available crash data for pilot locations from 2019 to date were obtained via the Ohio Department of Transportation's Geographic Crash Analysis Tool (GCAT). Crash records reviewed for this evaluation include incidents within the treated roadway segments, but do not include intersection crashes at block limits. In general, pilot locations are residential streets that tend to have low overall crash volumes. However, due to the residential nature of the streets and the possibility of pedestrian-vehicle conflicts, especially child-vehicle conflicts, crashes can be deadly if they happen.

Four crash reports are available on GCAT from the time of speed table installation (Fall, 2022) to present day (May, 2023). None directly involve the speed tables: two involve hit-skip crashes with parked cars, one is an intersection crash in the speed table treatment area, and one is a driveway pull-out crash.



Because speed tables were installed relatively recently and there is a standard lag time for crash reports to be uploaded to GCAT, the City will continue to monitor crash data near speed table locations.

2) Service Delivery Challenges

City staff reached out to public service providers that regularly use streets, including Public Safety, Public Works, Greater Cleveland Regional Transit Authority, and Cleveland Metropolitan School District. Minimal service impacts were reported. However, given the potential impact on emergency response times, the City is developing designated emergency response routes to inform the selection and design of future traffic calming installations.

3) Resident Feedback

In February, 2023, the City released a resident survey to understand opinions of and experiences with pilot speed table installations. The survey was promoted via yard signs posted at each speed table location, door-to-door flyer distribution, and social media posts.

Key Findings

- **73.91%** of respondents interacted with a speed table at least once a week
- **98.09%** of respondents interacted with a speed table using a car
- **75.31%** of respondents said speeding was a moderate to major issue in their community
- **59.88%** of respondents said they believed speeds decreased since a speed table was installed
- **85.80%** of respondents said they did not think traffic noise had increased, or were not sure of any changes, since installation
- **93.79%** of respondents said they did not think traffic volumes on nearby streets changed, or were not sure of any changes, since installation
- **77.78%** of respondents said they would like to see the City of Cleveland expand the speed table pilot program

Appendix I includes summary tables of survey questions and responses received.

4) Speed Table Materiality

Of the ten speed table pilot locations, nine were installed as modular rubber tables. In one location, Dickens Avenue, formed asphalt tables were tested. Compared to the modular rubber installations, the formed asphalt speed tables were faster to install and more cost effective. No significant differences in effectiveness or durability based on speed table materiality were observed during the pilot period.

City staff also conducted outreach to similar cities that have installed speed tables, including Columbus, Pittsburgh, Dayton, Cincinnati, and Akron. In general, these cities prefer using formed asphalt speed tables due to the benefits cited above, as well as ease of ongoing maintenance.

Key Recommendations

Based on findings from the pilot program, the following actions will improve the effectiveness of future speed table installations.

- Move forward with additional speed table installations across the city using formed asphalt tables, rather than modular rubber tables.
- Install multiple speed tables in target locations, aiming for spacing of no more than 500 to 700 feet between tables after accounting for signed or signalized intersections.

- Install vertical delineators between curb lines and speed tables to increase visibility and discourage drive-around behavior.
- Increase speed table visibility and driver awareness by reviewing roadway striping and signage installed at speed table locations.
- When possible, install speed tables in locations that are well-lit by streetlights at night.
- Designate routes commonly used by emergency responders, including Emergency Medical Services and Fire, to inform future traffic calming installations.

What's Next?

Based on the lessons learned from the 2022 speed table pilot program, the City plans to incorporate the recommendations outlined here for future speed table installations on residential streets with documented speeding issues. In April, 2023, Mayor Bibb requested that $3 million of American Rescue Plan Act (ARPA) resources be allocated as part of the 'Back to Basics' fund to support additional speed table installations and other multimodal and safety improvements across the city. The proposal is currently moving through City Council for final approval.

The City will continue to collect traffic speed and volume data based on resident requests to inform traffic calming installations throughout Cleveland. Interactive maps of resident comments and traffic data collected to date are available in a Neighborhood Traffic Calming StoryMap linked on the project webpage (www.clevelandohio.gov/TrafficCalming). Residents are encouraged to continue sharing traffic safety-related concerns with the City via an online form on the website or by calling 216-664-7182.

Appendix I.

Survey Questions and Results

Which speed table location are you responding to? (Select one or more answers)		**161 Responses**
Option	Responses	Frequency %
Edgewater Dr.	57	36.08%
West 101st St.	34	21.52%
West 56th St.	20	12.66%
West 50th St.	7	4.43%
Bohn Rd.	1	0.63%
Dickens Ave.	4	2.53%
Corlett Ave.	4	2.53%
East 147th St.	12	7.59%
Judson Dr.	12	7.59%
East 174th St.	21	13.29%
General Comment	21	13.29%
Total	190*	120.25%*
*Percentage and responses greater due to multiple selections per participant		

Which best describes you?		**161 Participants**
Option	Responses	Frequency %
I live on a street where a speed table was installed	90	55.90%
I live within a few blocks of where a speed table was installed	29	18.01%
I pass through a street where a speed table was installed	38	23.60%
Other	4	2.48%
Total	161	100.00%

How often do you travel over the speed table?		162 Participants
Option	Responses	Frequency %
Daily	88	54.32%
Weekly	46	28.40%
Monthly	20	12.35%
Rarely/Never	8	4.94%
Total	162	100.00%

I have ____ over a speed table (select one or more answers)		160 Participants
Option	Responses	Frequency %
Driven a Car	154	98.09%
Biked	35	22.29%
Ridden the Bus	4	2.55%
E-Scootered	5	3.18%
Driven a Motorcycle	2	1.27%
Walked/Ran	3	1.91%
Skateboarded	2	1.27%
Used a Wheelchair/Mobility Aid	0	0.00%
Total	205*	130.57%*
*Percentage and responses greater due to multiple selections per participant		

On a scale from 1 (not an issue) - 5 (major issue), how big of an issue do you feel speeding was at the pilot location(s) BEFORE the speed table pilot?		162 Participants
Option	Responses	Frequency %
1 (not an issue)	21	12.96%
2	8	4.94%
3	13	8.02%
4	20	12.35%
5 (major issue)	89	54.94%
I'm not sure	11	6.79%
Total	162	100.00%

Do you feel there has been a change in traffic SPEEDS at the pilot location(s) since the speed table was installed?		162 Participants
Option	Responses	Frequency %
Increased	6	3.70%
Not noticed	38	23.46%
Decreased	97	59.88%
I'm not sure	21	12.96%
Total	162	100.00%

Do you feel there has been a change in traffic NOISE since the speed table was installed?		162 Participants
Option	Responses	Frequency %
Increased	23	14.20%
Not noticed	45	27.78%
Decreased	45	27.78%
I'm not sure	49	30.25%
Total	162	100.00%

Do you feel the AMOUNT of traffic ON the street where a speed table was installed has changed?		162 Participants
Option	Responses	Frequency %
Increased	7	4.32%
Not noticed	93	57.41%
Decreased	28	17.28%
I'm not sure	34	20.99%
Total	162	100.00%

Do you feel the AMOUNT of traffic on NEARBY streets has changed?		161 Participants
Option	Responses	Frequency %
Increased	10	6.21%
Not noticed	79	49.07%
Decreased	6	3.73%
I'm not sure	66	40.99%
Total	161	100.00%

In your opinion, should the City expand this speed table pilot to other locations across Cleveland?		162 Participants
Option	Responses	Frequency %
Yes	126	77.78%
No	29	17.90%
No Opinion	6	3.70%
Other	1	0.62%
Total	162	100.00%