

Elementary school students cross the street on a crosswalk with a curb extension at the intersection of Linn Street and Chestnut Street in Cincinnati, Ohio. Source: The City of Cincinnati.



Cincinnati Uses Quick-Build Project to Address an Urgent Safety Need

Around the country, cities and communities are experimenting with pop-up and quick-build projects. Some projects serve as pilot initiatives, demonstrating the functionality of bike lanes or the effectiveness of curb extensions in reducing crossing distances and traffic speeds. Using low-cost materials like paint, concrete wheel stops, and flexible posts, these projects offer community members and decision makers a chance to try temporary infrastructure improvements that can provide immediate safety improvements,

give feedback, and identify what will work best for the community. In some instances, these projects are installed for a day or a month. In other instances, projects are considered permanent.

The City of Cincinnati has used quick-build approaches in resourceful, innovative ways. At the intersection of Linn and Chestnut Streets, the Cincinnati Department of Transportation & Engineering applied tools and techniques to address an urgent safety problem threatening child pedestrians that will stay in place until implementation of a full street redesign.

Traffic calming on Linn Street in Cincinnati's West End has been a neighborhood priority for years. In 2022, the City approved the street for a \$10 million rightsizing project. Recognizing that it would take years for this project to come to fruition, the City took action to apply quick-build interventions.

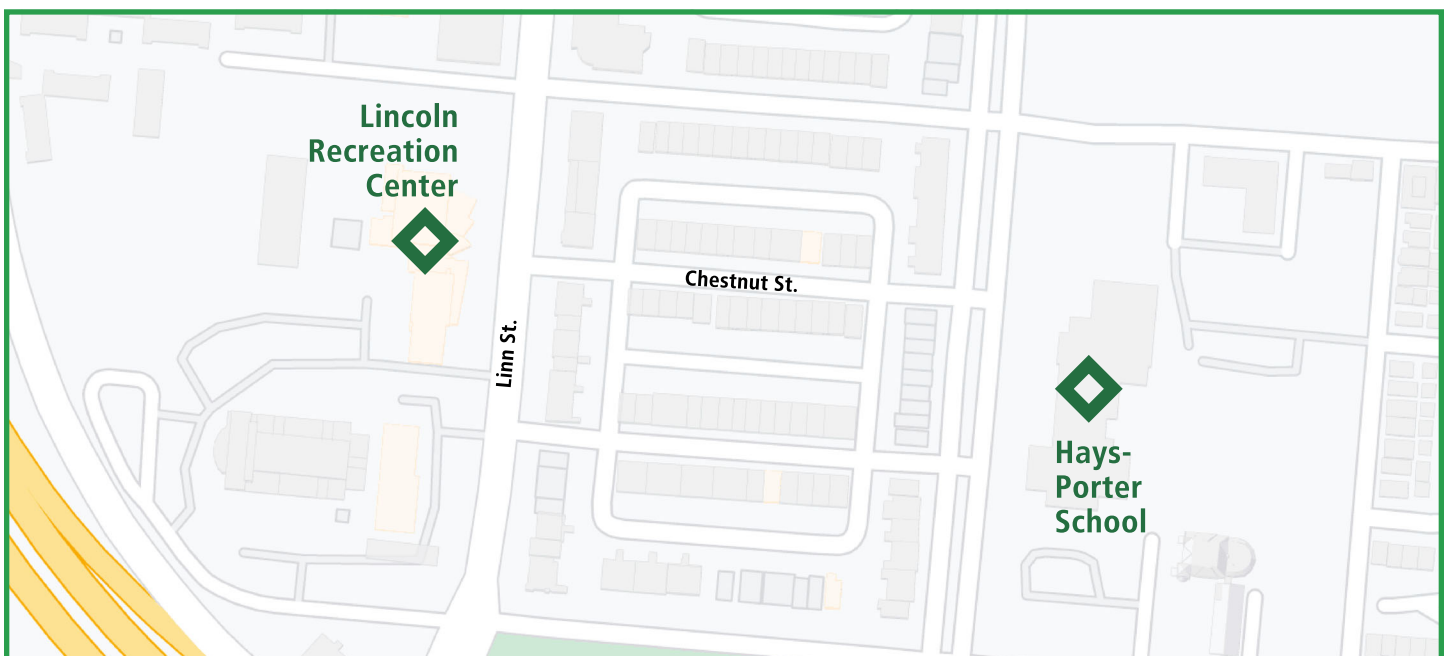
With funding from General Motors, the National Center for Safe Routes to School awarded a grant to Cincinnati to support a quick-build project to improve road safety in the Linn Street Corridor. The City installed a preformed thermoplastic curb extension and removed a parking space to reduce crossing distances and increase visibility to improve safety for pedestrians at a crossing on Linn Street that connects elementary school students to a community center. The City viewed this quick-build project as a cost-effective way to improve safety and calm traffic on a street within its high-injury network, while awaiting the implementation of a rightsizing project. The project offers several insights that can inform other cities interested in implementing quick-build projects.

Addressing an Urgent Safety Need Quickly

Linn Street serves a vital neighborhood function, connecting West End residents to essential daily destinations. Its wide roadway has four travel lanes, a center turn lane, and parking on both sides of the street. Several factors contribute to the heavy pedestrian travel at the intersection of Linn Street

and Chestnut Street. 1) Over 50 percent of West End households do not have access to a personal vehicle. 2) Hays-Porter Elementary School is just one block away from the intersection. Hays-Porter is a Title I school, with a large percentage of children coming from low-income families, primarily serving students of color. This school was also identified as one of the city's highest priority schools for attention in the 2021 Safe Routes to School (SRTS) Vision Zero Action plan. 3) Approximately 74 percent of students at Hays-Porter walk to school daily. 4) The Linn-Chestnut intersection is the primary crossing for young pedestrians traveling between the school and the Lincoln Recreation Center. The Lincoln Recreation Center serves about 30,000 residents a year, many of whom arrive on foot.

The Linn-Chestnut intersection improvement was not the City's first experience with quick-build curb extensions. At other locations in the City, Cincinnati had installed "painted" curb extensions. These painted curb extensions used plastic paddles instead of concrete to outline the area being bumped out, and the interior of the curb extensions were painted with exterior house paint to further define the area. However, the City found that the house paint faded quickly, and was completely worn off within approximately 12 to 18 months. As a result, the City became interested in testing the durability of preformed thermoplastic as an alternative to paint in non-concrete curb extensions.



Map showing relevant areas in Cincinnati, Ohio. Source: Google Maps/PBIC illustration.

Thermoplastic is a synthetic material that becomes pliable at extremely high temperatures, then cools quickly, hardens, and retains its shape. It is extremely resilient to freeze/thaw cycles and includes retroreflective components to enhance roadway visibility at night. Most crosswalks and lane lines are composed of thermoplastic that has been heated to a liquid state and then installed using specialized truck mounted striping equipment or smaller walk behind machines that use propane and require a long setup and take down process. In contrast, preformed thermoplastic comes in sheets or rolls, and is applied with a small hand torch. Since it does not require other special equipment, preformed thermoplastic uses fewer staff resources and can be installed in large spaces significantly faster than regular thermoplastic. Using preformed thermoplastic also significantly reduces maintenance requirements compared to paint.

The City received a grant from the National Center for Safe Routes to School to support a preformed thermoplastic curb extension project as part of a [quick-build projects pilot program to improve road safety for youth](#). Funded by General Motors, this program offers grants of up to \$10,000 to communities to fund low-cost, quick-build infrastructure improvements to provide immediate safety benefits in underserved areas where children walk and bike.

The pilot project consisted of removing a parking space and installing curb extensions on both sides of Linn Street just north of Chestnut Street. The City painted the curb extension purple, as it is a bright, vibrant color that is not associated with other traffic control devices. The cost was \$25.50/sq ft for material and installation. The City also installed Pexco Tubular Markers (plastic bollards) to vertically delineate the edge of the curb extension. The Pexco Tubular Markers cost \$305 a piece for material and installation. The City also removed a parking space on the west side of the street to provide more visibility for the crosswalk. Construction of this project was completed in two days and cost a total of \$15,000.



A drone image of a curb extension at the intersection of Linn Street and Chestnut Street in Cincinnati. Source: Christian Hauser.

Cheaper and Quicker than Concrete

"It functions the same as the concrete curb extension," Cincinnati Department of Transportation & Engineering Senior City Planner Melissa McVay said of the piloted preformed thermoplastic curb extension. "It extends the sidewalk into the street, into the crosswalk to shorten that crossing distance. A typical concrete curb extension could cost up to \$100,000 because of both the cost of concrete and the need to redo the stormwater management, but the quick-build, quick curb with the plastic paddles can be built in about two days for maybe \$15,000."

The City captured speed data at the crossing before and after the installation of the curb extension. The post-installation data collection process occurred at a time of the year that had approximately five fewer hours of daylight compared to the pre-installation data collection period. The average temperature during pre-installation data collection ranged from 72-80 degrees. The average temperature during post-installation data collection ranged from 52-57 degrees. No precipitation was recorded during collection times.

Both the 85th percentile speed and the average speed decreased slightly following the curb extension installation, and the percentage of vehicles speeding southbound and northbound also decreased significantly going from 52-54% down to 28% in the southbound direction, and 43-46% down to 32-33% in the northbound direction.

McVay said the pilot project allowed the City to install a curb extension and calm traffic more quickly and cost-effectively than traditional concrete curb extensions, which may allow the City to "build more curb extensions, faster."

Table 1. Pre-installation traffic volumes and speeds

	Wednesday, Jun 29, 2023		Thursday, Jun 30, 2023	
	Southbound	Northbound	Southbound	Northbound
85th percentile speed	36	34	36	34
Average speed	29	29	30	29
Total vehicles	5541	5241	5335	5052
Vehicles speeding (over 30mph)	2900 (52%)	2260 (43%)	2895 (54%)	2333 (46%)
Vehicles exceeding 40mph	309 (5%)	116 (2%)	300 (5%)	117 (2%)

Table 2. Post-installation traffic volumes and speeds

	Wednesday, Nov 8, 2023		Thursday, Nov 9, 2023	
	Southbound	Northbound	Southbound	Northbound
85th percentile speed	33	33	32	33
Average speed	27	28	26	28
Total Vehicles	4240	4433	4619	4592
Vehicles speeding (over 30mph)	1203 (28%)	1456 (33%)	1273 (28%)	1475 (32%)
Vehicles exceeding 40mph	58 (1%)	70 (2%)	45 (1%)	79 (2%)

Summary

In 2022, Cincinnati implemented a quick-build solution by installing a preformed thermoplastic curb extension on a street within its high-injury network. This temporary measure was aimed at addressing an immediate safety concern until a street rightsizing project could be implemented.

The City saw decreases in the 85th percentile speed and the average speed as a result of the project. This project offers a useful model for communities wanting to use quick-build projects to calm traffic quickly and cost-effectively in areas with urgent safety needs. This approach is effective when there is a need for large scale design improvements that cannot be immediately implemented.

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