

Setting Speed Limits, a Case Study of USLIMITS2 in Charlotte, NC, USA

Charlotte, NC, USA is one city that has been extensively using USLIMITS2, an expert systems approach to setting speed limits, for the last 10 years. The city of Charlotte, which was experiencing a significant percentage of fatalities attributed to speeding, adopted USLIMITS2 as their standard method for determining speed limits on city-maintained roads.

Upon requests from citizens and other groups to lower the speed limit for a given road, city staff will undertake an engineering speed limit study. Speeds on the selected road section are collected by either tube counts for at least a 24-hour period or LIDAR taken over approximately one hour to collect enough reading depending on traffic volume to determine the 85th percentile. The analysts will also submit additional required data required, including 85th and 50th percentile, annual average daily traffic (AADT), adverse alignment, statutory speed, transition zone, roadside rating, divided/undivided, number of through lanes, and pedestrian/bicyclist presence.



Having accurate and comprehensive crash data to input in USLIMITS2 is one of the most critical data points cities can have to obtain a recommended speed limit. The crash module portion of USLIMITS2 asks for data on crash history duration, AADT, total number of crashes, and total number of injury and fatal crashes. Charlotte has its own comprehensive crash database, from which the necessary crash data can be extracted. If a city cannot provide crash data, [Highway Safety Information System](#) (HSIS) data will be used.

Where there are pedestrian/bicyclist present and/or where there is either pedestrian/bicycle infrastructure, such as a sidewalk or bicycle lane, the analyst will select high volume. The

View of Old Plank Rd showing current speed limit at 35 mph which will be lowered to 30 MPH based on the out from USLIMITS2. Photo: City of Charlotte, NC.

city will select the speed limit recommendation from the program, but for streets in urban areas, the city will compare the USLIMITS2 results with those from the [A Model for Setting Credible Speed Limits in Urban Areas](#) point system based table published by Dr. Lynda Bellalite. The engineer will then use engineering judgment to determine the safest speed limit given the expert and safe systems approaches.

According to Angela Berry, the city's traffic safety engineer responsible for conducting speed studies, the city feels the USLIMITS2 program is a good approach for determining the appropriate speed limit. The expert system takes many factors into consideration. Also, following the guidelines of the program, a 50th percentile can be selected if the crash rate is higher than normal for study section and/or if there is a high volume of pedestrians and/or bicyclist. An example of this guidance

USLIMITS2 Speed Zoning Report	
Project Name: 8500 Old Plank Rd, Charlotte, NC US	
Analyst: Jon Shaben	Date: 06-17-2019
Basic Project Information	Crash Data Information
Project Number: 8500	Crash Data Years: 5.00
Route Name: Old Plank Rd	Crash AADT: 3300 veh/day
From: Setter Trace	Total Number of Crashes: 5
To: Chapman	Total Number of Injury Crashes: 1
State: North Carolina	Section Crash Rate: 519 per 100 MVM
County: Mecklenburg County	Section Injury Crash Rate: 104 per 100 MVM
City: Charlotte city	Crash Rate Average for Similar Roads: 148
Route Type: Road Section in Undeveloped Area	Injury Rate Average for Similar Roads: 48
Route Status: Existing	
	Traffic Information
Roadway Information	85th Percentile Speed: 36 mph
Section Length: .16 mile(s)	50th Percentile Speed: 31 mph
Statutory Speed Limit: 35 mph	AADT: 3300 veh/day
Existing Speed Limit: 35 mph	
Adverse Alignment: No	
Divided/Undivided: Undivided	
Number of Lanes: 2	
Roadside Hazard Rating: 7	
Transition Zone: No	
Recommended Speed Limit: 30	
Note: The section crash rate of 519 per 100 MVM is above the critical rate (404). The injury crash rate for the section of 104 per 100 MVM is more than 30 percent above the average for similar roads (48) but below the critical rate (215). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions.	

Exported Speed Zoning Report done by City of Charlotte staff in USLIMITS2 for Old Plank Road. Source: FHWA Courtesy: City of Charlotte, NC.

can be seen in the [USLIMITS2 Speed Zoning Report for Old Plank Road in Charlotte](#). For this project, the USLIMITS2 program recommended reducing the speed limit from 35 mph to 30 mph. The city implemented this recommendation because the section crash rate was above the critical rate, and injury crash rate was above the average for similar roads. The use of this speed limit procedure has been accepted by city officials and citizens. USLIMITS 2 will also make note of high crash rates, and suggestion further crash study to identify geometry changes in addition to reduced speed limits.

As part of their [Vision Zero program](#), Charlotte plans to evaluate how speed limit reductions have changed their rate of fatalities and severe injuries. Evaluating such changes and how data influences speed limit setting can help more cities plan for speed management programs, ultimately improving the safety of our roads and communities for all users. In addition to using USLIMITS2 as the primary way the city of Charlotte sets speed limits, the city also has a comprehensive [traffic calming program](#) as part of their speed management work.

Additional Information

[USLIMITS2](#) is a free web-based program developed and maintained by Federal Highway Administration (FHWA) that uses decision rules developed by transportation professionals to recommend a speed limit. USLIMITS2 is an expert systems approach to speed limit setting. USLIMITS2 was made available by the Federal Highway Administration in 2003 with subsequent updates in 2007 and 2012. While easily accessible, USLIMITS2 has not been adopted widely by states and local agencies as a method of setting speed limits. FHWA offers [Roadway Safety Professional Capacity Building technical assistance](#) to jurisdictions that want to learn more about using USLIMITS2 to inform speed limits. Transportation

professionals can learn more about USLIMITS2 on the [FHWA fact sheet](#).