

March 15, 2021

To: Patricia Davis, MSCE, PE, City Engineer
CC: Derek Klenke, PE, Assistant City Engineer
From: Mahmoud Alzioud, Traffic Engineering Associate
Subject: Speed Limit Study



Biltmore Ave, Helios & Sun light Near Way

City staff performed speed limit studies for the recently completed roadway projects for Biltmore Avenue, Sun Light Near Way and Helios Way, and is recommending the prima facie speed limit for Biltmore Avenue be set at 40 mph and the prima facie speed limit for Helios Way be set at 35 mph, while 40 is the recommended speed limit for Sun Light Near Way in accordance with Texas Department of Transportation (TxDOT) Manual - Procedures for Establishing Speed Zones, 2015 which can be referred to in the link:

http://onlinemanuals.txdot.gov/txdotmanuals/szn/manual_notice.htm

This study adopts the engineering approach based on the observed and recorded 85th percentile speed by road users. The 85th percentile is a process where a base speed limit is set according to the 85th percentile speed. Use of the 85th percentile speed concept is based on the theory that the large majority of drivers:

- are reasonable and prudent
- do not want to have a crash
- desire to reach their destination in the shortest possible time

The concept states that a speed at or below which 85 percent of people drive at any given location under good weather and visibility conditions may be considered as the maximum safe speed for that location.

Issue and Existing Conditions:

The main objective of this study is to evaluate the current speed limit on Biltmore, Helios, and Sun Light Near Way roadways. The locations are shown in Figure 1 (aerial photo from Bing Maps). In addition to the speed study and recordings, an assessment was performed to evaluate the efficiency of the locations of the existing speed limit signs, as can be seen in the figure 2 for the existing speed limit sign locations and posted speeds:



Figure 1: Area of Study

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- On Biltmore Ave, for traffic coming from E. Pecan Street, the speed limit sign is located nearly 230 ft from the intersection.
- On Biltmore Ave, for traffic coming from Helios Way, the speed limit sign is located nearly 430 ft from the intersection.
- On Sun Light Near Way, there is currently 1 speed limit sign located 430 ft from the intersection with Pecan Street for traffic coming from E Pecan Street to Sun Light Near Way.

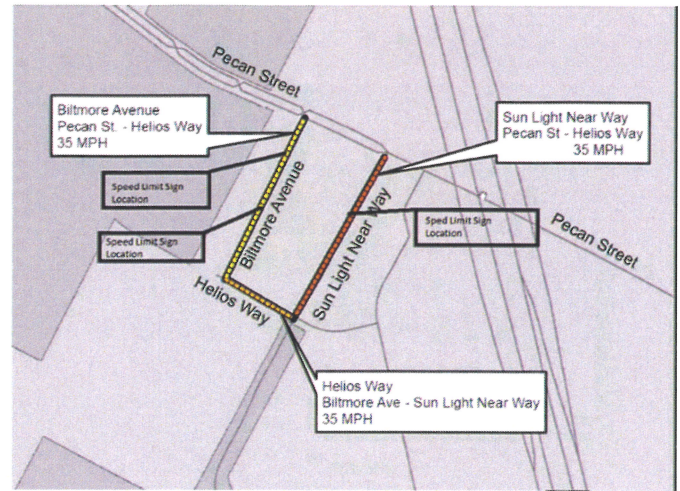


Figure 2: Existing conditions/ Speed limit signs location

The existing locations of the speed limit signs are consistent with the MUTCD regulations for placing speed signs, with the following comments on the area under study:

- On Helios Way, no speed limit signs were observed. This can be understood since the whole street length is 0.1 mile which does not allow for enough acceleration to exceed the speed limit.
- For traffic on the Sun Light Near Way going to E Pecan street, no speed limit signs were observed for northbound direction of travel.

Procedure: City staff gathered unimpeded flow travel speeds during Off-Peak hours and within a sufficient monitoring period to ensure the minimum sample size (observations) of 100 speeds in each direction, this resulted the following coverage durations for each roadway in table 1, in which 1 stands for the first direction (channel) and 2 for the 2nd direction.

Street	From	To	Observations #
Biltmore 1	10:00 AM	12:31 PM	102
Biltmore 2	10:00 AM	1:18 PM	102
Helios 1	11:00 AM	6:00 PM	108
Helios 2	11:00 AM	2:00 PM	105
Near Way Sun Light 1	10:00 AM	12:00 PM	102
Near Way Sun Light 2	10:00 AM	12:00 PM	105

Table 1: Roadway Speed Observation Periods

Speed data was collected during off peak periods to capture travel speeds that were more likely to be considered free-flow, or unimpeded by the influence of other vehicles, to assess what an isolated driver would consider to be a reasonable speed to traverse the roadway. The data collection method used guidelines contained in the TxDOT manual, Procedures for Establishing Speed Zones, noting that in the 3 sections under study, the speed recording was conducted in the mid-block of each route

to isolate the effect of acceleration and deceleration as shown in Figure 3 for the locations of recording.

Travel Speed Data

The raw speed data collection sheets are archived for future reference. The traffic data is summarized in Figures 4, 5 and 6 (both directions in each chart) with the height of the bars indicating the number of vehicles that were observed to travel, while the x axis indicates the speed ranges read to the right of the number, for example the speed ranges of 30 mph means the speeds from 30 to 34.9 mph. The 85th percentile speed is determined by sorting the number of vehicle observations in order and identifying that speed at which the car representing the 85th percent highest of the total vehicle speeds measured.

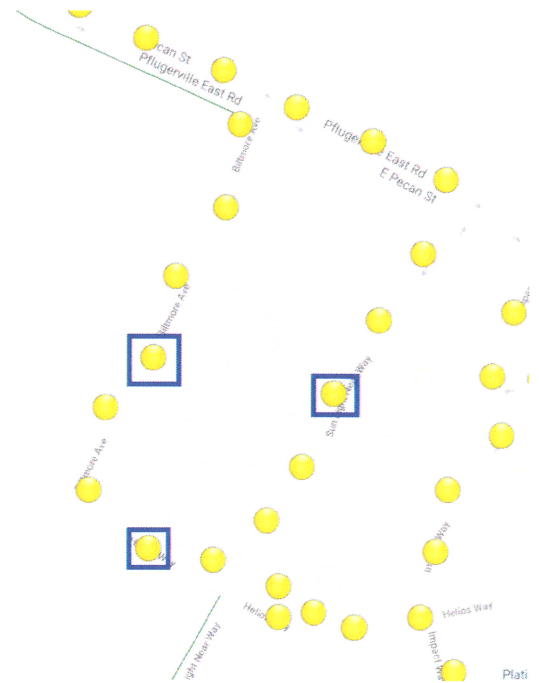


Figure 3: Speed Radar Location

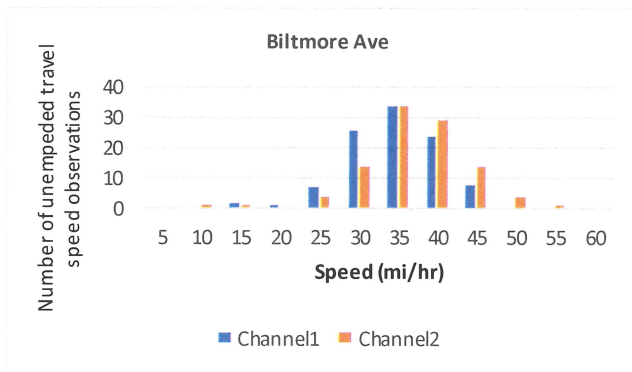


Figure 4: Biltmore Ave Speed distribution both directions

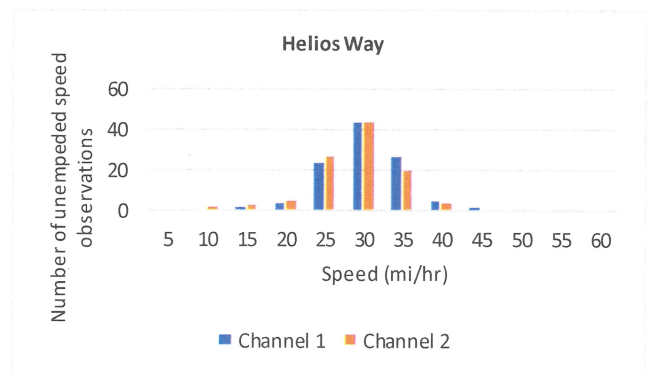


Figure 5: Helios Way Speed distribution both directions

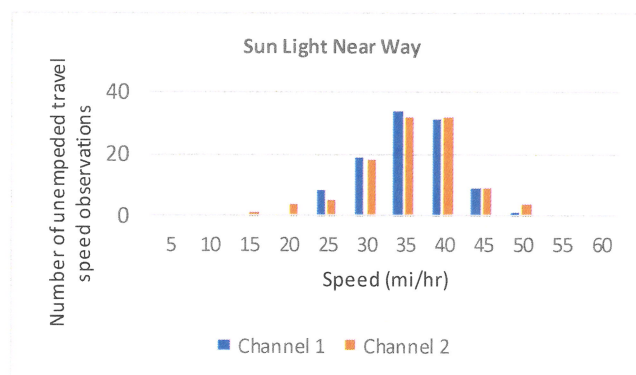


Figure 6: Sun Light Near Way Speed distribution both directions

Table 2 summarizes the most important percentiles to understand the traffic flow behavior in the area under study.

Channel 1	SB Biltmore Ave	EB Helios Way	NB Sun Light Near Way
85th Percentile	38.34	32.31	39.05
50th Percentile	32.93	27.65	33.55
15th Percentile	26.1	23.61	28.05
Channel 2	NB Biltmore Ave	WB Helios Way	SB Sun Light Near Way
85th Percentile	41.01	31.7	39.77
50th Percentile	34.8	26.72	34.18
15th Percentile	28.68	21.75	26.72

Table 2: Speed percentiles by roadway and direction

Evaluation of Speed Data & Recommendations

Channel 1 at SB Biltmore Ave –The measured speeds for southbound traffic on Biltmore Avenue are dispersed across a range, with most being between 25 and 45 MPH. The 85th percentile speed for this location is 38.34 MPH. The location is still within the influence range of the traffic having to turn from Pecan Street to enter Biltmore Ave. Considering these factors, the posted speed limit that would be most suitable to the southbound traffic at this location is 40 MPH.

Channel 2 at NB Biltmore Ave – The measured speeds for northbound traffic on Biltmore Avenue are very dispersed across a range, with most being between 25 and 40 MPH. The 85th percentile speed for this location is 41.01 MPH. Northbound traffic is using Biltmore Ave coming from Helios St. and the posted speed limit posted that would be most suitable to this traffic is 40 MPH.

Channel 1 at EB Helios Way –The measured speeds for eastbound traffic on Helios Way coming from Biltmore Ave are very dispersed across a range, with most being between 20 and 40 MPH. The 85th percentile speed for this location is 32.31 MPH. Considering these factors, the posted speed limit that would be most suitable to the eastbound traffic at this location is 35 MPH.

Channel 2 at WB Helios Way – The measured speeds for westbound traffic on Helios Way going to Biltmore Ave are very dispersed across a range, with most being between 20 and 40 MPH. The 85th percentile speed for that location is 31.7 MPH. The posted speed limit that would be most suitable to the westbound traffic at this location is 35 MPH.

Channel 1 at NB Sun Light Near Way –The measured speeds for northbound traffic on Sun Light Near Way going to E Pecan St. are very dispersed across a range, with most being between 20 and 45 MPH. The 85th percentile speed for that location is 39.05 MPH. Considering these factors, the posted speed limit that would be most suitable to the northbound traffic at this location is 40 MPH.

Channel 2 at SB Sun Light Near Way – The measured speeds for southbound traffic on Sun Light Near Way coming from E Pecan St. are very dispersed across a range, with most being between 20 and 45 MPH. The 85th percentile speed for that location is 39.77 MPH. The posted speed limit that would be most suitable to the southbound traffic at this location is 40 MPH.