



Memorandum

To: Charles Strome and Chief Sandra DiRuzza; Village of Mamaroneck
From: Elaine Du, PE and Steven Luglio, PE; AKRF
Date: October 29, 2024
Re: Exclusive Pedestrian Signal Phasing Study
cc: Matthew T. Carmody, PE, RSP1; AKRF and Gino Frabasile, PE; Village of Mamaroneck

EXECUTIVE SUMMARY

AKRF, Inc. ("AKRF") was retained by the Village of Mamaroneck to evaluate exclusive pedestrian phasing for the segment of Mamaroneck Avenue between Grand Street and Prospect Avenue (the "Mamaroneck Avenue corridor" or the "study corridor"). The Mamaroneck Avenue corridor experiences high pedestrian traffic due to its proximity to various pedestrian generators and destinations along the corridor including Mamaroneck Avenue School and French-American School of New York, the Mamaroneck Metro-North station, Bee-Line bus stops, Columbus Park, local businesses, and dense residential neighborhoods. Recent crashes involving pedestrians¹ along the Mamaroneck Avenue corridor highlight the need to consider additional safety improvements, such as exclusive pedestrian phasing for signalized intersections along the corridor. Under existing conditions, vehicles attempting to make turns to and from side streets at signalized intersections along the Mamaroneck Avenue corridor conflict with pedestrians attempting to cross the street. This study evaluates how exclusive pedestrian phasing would affect traffic operations along the Mamaroneck Avenue corridor and provides recommendations for implementation based on traffic operations, pedestrian volumes, safety, and other engineering considerations. This study was conducted using traffic data and field observations conducted in September 2024.

Exclusive pedestrian phasing is a traffic signal strategy where all vehicular traffic is stopped, allowing pedestrians to cross the intersection in any direction without having to contend with turning vehicles. This enhances pedestrian safety by eliminating conflicts between vehicles and pedestrians during the pedestrian phase. However, implementing exclusive pedestrian phasing can lead to increased traffic delays as it reduces the green time available for vehicles. This can impact overall signal coordination and may result in longer queues and congestion.

The analysis used Synchro 11 software to evaluate Existing and With Exclusive Pedestrian Phasing conditions. The analysis concluded that vehicle delays would increase throughout the corridor. Increases in vehicle delays overall would be slight, except for the intersections of Mamaroneck Avenue and Hoyt Avenue/Halstead Avenue/Mt Pleasant Avenue where delays would significantly increase.

¹ The double fatality pedestrian crash on Mamaroneck Avenue at New Street which occurred in June 2024 was not in the March 1, 2021 to February 29, 2024 data range available from the New York State Department of Transportation at the time of the crash history data request. Also, it is not within the study corridor evaluated in this report because it is north of Grand Street. Therefore, when fatal pedestrian crashes are discussed, the June 2024 crash is not presented in this report. However, that tragic event highlights the need for a systemic approach to safety along the entire Mamaroneck Avenue corridor from I-95 to US 1/Boston Post Road and the risk of another fatal pedestrian crash has been considered by AKRF as a qualitative criterion for installation of exclusive pedestrian phasing at other intersections.

After considering pedestrian demand, crash history, and traffic impacts, AKRF recommends that exclusive pedestrian phasing be implemented at the following intersections:

- Mamaroneck Avenue and Grand Street
- Mamaroneck Avenue and Prospect Avenue

Exclusive pedestrian phasing can be implemented at Grand Street, along with No Turn on Red signage, in the near-term. At Prospect Avenue, because the traffic signal is being upgraded by the Village, exclusive pedestrian phasing can be implemented with the traffic signal upgrade.

Although it was determined that an exclusive pedestrian phase may be viable at the Mamaroneck Avenue and Waverly Avenue / Van Ranst Place intersection, the intersection operations may change with the opening of the Waverly Avenue bridge. Therefore, it is recommended that observations be conducted following the opening of the Waverly Avenue bridge to determine whether exclusive pedestrian phasing would impact traffic at the intersection.

In addition, AKRF recommends all traffic signals to be upgraded to accommodate vehicle detection to increase operational efficiency. Finally, AKRF identified two signal controllers where signal displays are not functioning and would require replacement to implement signal timing changes. These intersections are Mamaroneck Avenue and Hoyt Avenue and Halstead Avenue / Mt Pleasant Avenue, and Mamaroneck Avenue and Prospect Avenue, the latter of which will be upgraded by the Village.

Details regarding traffic analysis, impacts, and recommendations are discussed in this document. AKRF has provided recommendations considering pedestrian safety benefits versus vehicular delay impacts. The Village of Mamaroneck should now consider the costs for implementation, which would include reprogramming the traffic signals in the short-term, and the pedestrian safety versus traffic delay effects and decide whether to implement the recommendations provided in this report.

The Village may also decide to go beyond AKRF's recommendations and include intersections such as Mamaroneck Avenue and Halstead Avenue / Mt Pleasant Avenue or Mamaroneck Avenue and Hoyt Avenue that may be more heavily impacted by traffic delays with the implementation of exclusive pedestrian phasing. The implementation of exclusive pedestrian phasing should be considered in the context of pedestrian safety and traffic delays. Should the Village decide that implementing exclusive pedestrian phasing at Hoyt Avenue or Halstead Avenue / Mt Pleasant Avenue is appropriate for the intersections to prioritize pedestrian safety over vehicular operations, the crash data shows a history of pedestrian crashes at these locations which could support the pedestrian safety improvements.

EXISTING CONDITIONS

STUDY AREA

To assess traffic operations associated with the proposed exclusive pedestrian phasing, five intersections were identified for detailed data collection and analysis:

1. Mamaroneck Avenue and Grand Street
2. Mamaroneck Avenue and Waverly Avenue / Van Ranst Place
3. Mamaroneck Avenue and Hoyt Avenue
4. Mamaroneck Avenue and Halstead Avenue / Mount Pleasant Avenue
5. Mamaroneck Avenue and Prospect Avenue

The Mamaroneck Avenue study corridor intersections, as shown in **Figure 1**, are located within a commercial neighborhood north of downtown Mamaroneck. The study corridor is approximately one-quarter mile from Mamaroneck Avenue School and just south of the New Street intersection which was changed to exclusive pedestrian phasing by Westchester County in late July 2024. Additionally, the two signalized intersections located directly adjacent to Mamaroneck Avenue School, Nostrand Avenue and Gertrude Avenue/Hillside Avenue, operate with exclusive pedestrian phasing. The Mamaroneck Metro-North train station is located between the intersections of Mamaroneck Avenue with Halstead / Mount Pleasant Avenue and Hoyt Avenue.

Avenue provides one travel lane in each direction, and a right-turn bay at the intersection with Mamaroneck Avenue. The road is approximately 40 feet wide at the intersection with Mamaroneck Avenue.

Intersection of Prospect Avenue and Mamaroneck Avenue

The intersection of Prospect Avenue and Mamaroneck Avenue is signalized. There are crosswalks along all approaches. Pedestrian signals are present along all crosswalks. The intersection is along the main downtown commercial corridor and experiences frequent pedestrian traffic.

Prospect Avenue traverses the study corridor in an east-west direction and is under the jurisdiction of the Village of Mamaroneck. NYSDOT classifies Prospect Avenue as an urban local street. Prospect Avenue provides one travel lane in each direction at the intersection with Mamaroneck Avenue. Prospect Avenue is approximately 30 feet wide at the intersection with Mamaroneck Avenue.

DATA COLLECTION

To establish the baseline condition of the study corridor, traffic counts and observations were conducted. Turning Movement Counts (TMC) were collected for the Weekday AM and PM peak periods in September 2024 during a typical weekday while school was in session. The traffic counts are included in **Appendix D**. Field observations of traffic and pedestrian operations were collected.

Based on the TMC data, the peak hours were determined as follows:

- Weekday AM Peak Hour: 7:45 AM to 8:45 AM
- Weekday PM Peak Hour: 4:45 PM to 5:45 PM

OBSERVATIONS

Field observations were conducted to establish the baseline condition and identify any specific operational and safety issues. Observations were conducted during the Weekday AM and PM peak periods during school arrival and dismissal.

Pedestrian activity along the Mamaroneck Avenue Study corridor was significant. Pedestrian traffic was primarily related to the Mamaroneck Avenue Elementary School and the Mamaroneck Metro-North station during the observed peak periods. Crossing guards were present at all intersections along the study corridor and effectively provided safe travel for pedestrians. All pedestrians utilized available sidewalks, but pedestrians were observed crossing outside of marked crosswalks, especially crossing the south leg of Mamaroneck Avenue at Hoyt Street and crossing Mamaroneck Avenue at Mount Pleasant Avenue.

Bicycle traffic was notably elevated during both observation periods. Bicyclists ranged all ages and included parents transporting children to school. Cyclists mostly utilized sidewalks throughout the study corridor, potentially due to the lack of on-street bicycle accommodations along Mamaroneck Avenue. The Village Code restricts riding a bicycle along sidewalks in the Downtown business district, which is defined as Mamaroneck Avenue between Grand Street and Boston Post Road and includes the study corridor in its entirety.

Mamaroneck Avenue was observed to be at capacity for traffic operations during both peak period observations. Due to the existing four-lane cross section of Mamaroneck Avenue, vehicles at unsignalized side streets were observed to experience long delays in waiting for a gap in traffic. This was noted in particular for vehicles making left turns to and from Mamaroneck Avenue.

CRASH HISTORY & ASSESSMENT

Crash data were obtained from the New York State Department of Transportation (NYSDOT) for the three-year time period between March 1, 2021 and February 29, 2024 to determine crash history and assess general crash trends. The data obtained quantify the total number of reportable crashes (involving fatality,

injury, or more than \$1,000 in property damage), fatalities, and injuries during the three-year period, and a yearly breakdown of vehicular crashes with pedestrians and bicycles at each intersection.

Table 1
Crash Summary: All Crash Types

Intersection		Study Period				
North-South Roadway	East-West Roadway	All Crashes by Year			Total Fatalities	Total Injuries
		2021-2022	2022-2023	2023-2024		
Mamaroneck Avenue	Grand Street	10	6	6	0	8
Mamaroneck Avenue	Waverly Avenue / Van Ranst Place	3	8	12	0	5
Mamaroneck Avenue	Hoyt Avenue	17	20	3	0	9
Mamaroneck Avenue	Halstead Avenue / Mt Pleasant Avenue	8	13	21	0	14
Mamaroneck Avenue	Prospect Avenue	2	7	6	0	8

Source: NYSDOT March 1, 2021 - February 29, 2024 crash data.

Table 2
Crash Summary: Pedestrians and Bikes

Intersection		Crashes by Year					
North-South Roadway	East-West Roadway	Pedestrian			Bicycle		
		2021-2022	2022-2023	2023-2024	2021-2022	2022-2023	2023-2024
Mamaroneck Avenue	Grand Street	0	0	0	0	0	0
Mamaroneck Avenue	Waverly Avenue / Van Ranst Place	1	0	0	0	0	0
Mamaroneck Avenue	Hoyt Avenue	3	1	1	0	0	0
Mamaroneck Avenue	Halstead Avenue / Mt Pleasant Avenue	0	1	1	0	0	1
Mamaroneck Avenue	Prospect Avenue	0	1	4	0	0	0

Source: NYSDOT March 1, 2021 - February 29, 2024 crash data.

As shown in **Table 1**, during the three-year period, there were 142 crashes at intersections along the Mamaroneck Avenue Study corridor. There were 44 injuries reported and no fatalities.

There was one pedestrian fatality recorded within the study corridor. This crash occurred mid-block, outside of the study intersections. This crash occurred in July 2021 overnight. The crash involved a driver striking a pedestrian crossing Mamaroneck Avenue north of the intersection of Waverly Avenue / Van Ranst Place and Mamaroneck Avenue. The driver fled the scene of the crash. At the time of this crash, there were no marked pedestrian crossings on Mamaroneck Avenue between New Street and Hoyt Avenue. Given these conditions, the victim crossed Mamaroneck Avenue outside of a crosswalk. Since this crash in 2021, there have been two new crosswalks installed, one at the intersection of Grand Street and Mamaroneck Avenue and another at the intersection of Waverly Avenue / Van Ranst Place and Mamaroneck Avenue.

At the Mamaroneck Avenue and Waverly Avenue / Van Ranst Place intersection, one pedestrian crash was reported. This crash involved a vehicle striking a pedestrian while the pedestrian was crossing against the traffic signal. It should be noted that this crash occurred in 2021 before the crosswalk crossing Mamaroneck Avenue was moved from the north side of the intersection to the south side of the intersection.

At the Mamaroneck Avenue and Hoyt Avenue intersection, five pedestrian crashes and one bicycle crash were reported, including two crashes involving trucks. Four of the five pedestrian crashes involved vehicles turning left from Hoyt Avenue onto Mamaroneck Avenue and striking a pedestrian in the crosswalk. One of the four pedestrian crashes involved a vehicle traveling southbound on Mamaroneck Avenue and striking a pedestrian in a wheelchair crossing at the crosswalk.

At the Mamaroneck Avenue and Halstead / Mt Pleasant Avenue intersection, there were two pedestrian crashes, and one bicycle crash reported. One pedestrian crash and the bicycle crash involved a vehicle making a left turn from Mamaroneck Avenue to Halstead Avenue, and the other pedestrian crash involved a driver not seeing a pedestrian in a marked crosswalk.

At the Mamaroneck Avenue and Prospect Avenue intersection, there were five reported crashes, four of which occurred within the last year of recorded data, all four involved vehicles making a left turn onto Mamaroneck Avenue in low light conditions. In addition to the crashes provided by NYSDOT through February 2024, another high-profile pedestrian crash occurred at this intersection in August 2024, which is not in the data range available from NYSDOT. This crash involved a vehicle making a left turn from Prospect Avenue onto Mamaroneck Avenue when the driver struck a pedestrian at the south crosswalk and fled the scene. This crash occurred during daylight hours.

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EXISTING CONDITIONS TRAFFIC ANALYSIS

Traffic operating conditions at the study intersections were analyzed using Synchro Version 11 to compute delays, volume-to-capacity (v/c) ratios, and Level of Service (LOS) as presented in **Table 3. Appendix A** presents the capacity analysis methodology which describes the LOS A (favorable) through LOS F (unfavorable) scale. **Appendix E** provides the Synchro capacity analysis reports.

As shown in **Table 3**, a majority of lane groups at the study intersections operate at an acceptable LOS D or better under Existing conditions during the analyzed peak hours. The following lane groups and intersections operate at LOS E or F:

- Intersection of Mamaroneck Avenue and Hoyt Avenue
 - Eastbound (Hoyt Avenue) approach left-through movement:
 - Weekday PM peak hour operates at LOS E
 - Southbound (Mamaroneck Avenue) approach left turn movement:
 - Weekday AM peak hour operates at LOS E
- Intersection of Mamaroneck Avenue and Mt Pleasant Avenue / Halstead Avenue
 - Westbound (Halstead Avenue) approach shared left-through-right movement:
 - Weekday AM peak hour operates at LOS E
 - Weekday PM peak hour operates at LOS E