

Memo

Date: 5/3/2021

To: Mr. Bradley S. Kosco, P.E., P.S.
City of Hudson

Copy: Mr. Thomas J. Sheridan, P.E., P.S.
City of Hudson

From: Michael W. Schweickart, P.E., PTOE
TMS Engineers, Inc.

Subject: No Right Turn on Red Recommendations
For SR 303 & Library Street

This memo is in response to your request for our recommendations on installing “No Turn On Red” signs at the intersection of W. Streetsboro Road (SR 303) and Library Street. The following recommendation is submitted for your consideration.

The Ohio Revised Code in section 4511.13 indicates that unless a sign prohibiting such action is in place, vehicular traffic, after stopping, may cautiously make a right turn on a steady red signal. It also authorizes local officials, *by ordinance*, to “prohibit a right turn against a steady red signal at any intersection, which shall be effective when signs giving notice thereof are posted at the intersection.” If a sign is to be erected at the intersection, there must be a City ordinance in place in order for the restriction to be enforceable.

The following factors must be considered in making the determination for prohibiting or restricting turns against a steady red signal since the prohibition would result in an impact to the environment with respect to motor vehicle delay that can produce increased idling, gas consumption and pollution production:

1. Sight distance from the stop position to approaching traffic is less than adequate for the right-turning driver to observe safe gaps.
2. Geometrics of the intersection are such that the path of the right-turning vehicle crosses rather than merges with the path of the vehicle which has the green indication.

3. Right-turning vehicles conflict with other traffic which has been given a green arrow indication.
4. Right-turning vehicles create a storage or capacity problem on the street onto which they are turning.
5. Right-turns are permitted from two or more lanes on an approach. (Consideration can be given to permitting turns against a steady red signal from the curb lane only.)
6. An intersection has five or more approaches.
7. An intersection is used by a substantial number of school children, elderly persons or other pedestrians where right-turning vehicles would be a hazard to the pedestrians and less restrictive measures have failed. (Measures such as the installation of "Turning Vehicles Yield to Pedestrian" R10-15, signs should be considered)
8. An intersection is near a highway-rail at-grade only crossing.
9. Other hazards or conflicts.

Of the nine (9) criteria listed above, items 1, 3, 4, 7 and 9 may apply to the Library Street intersection therefore, additional analysis was performed. Items 2, 5, 6 and 8 do not apply to this location.

Sight distances were measured at the intersection. Sight distance on SR 303 were found to exceed the recommended value of 305 feet. The sight distances on Library Street were found to be as that shown on the following table.

LIBRARY AND PLAZA DRIVEWAY SIGHT DISTANCE (NORTH & SOUTH)					
Approach	Measured Sight Distance	ISD ¹		SSD ²	
		Min	Desired	Min	Desired
Library Street	115'	240'	290'	155'	200'
Plaza Driveway	215'	240'	290'	155'	200'

1 = Intersection Sight Distance

2 = Stopping Sight Distance

The south approach was found to have adequate stopping sight distance, however the intersection sight distance is less than the recommended minimum. The sight distance restriction was found to be caused by the location of a retaining wall near the railroad overpass.

The north approach was found to have less than the minimum acceptable stopping and

intersection sight distance. The sight distance is being constrained by the location of a ground mounted monument sign and landscaping for the gas station on the northeast corner. It is recommended that the sight distance restrictions be removed in order to improve the situation. As a temporary measure, "No Turn On Red" signs could be installed for the north and south approaches (Library Street and plaza driveway only) to the intersection.

Traffic count data taken October 5, 2017 was reviewed to determine the magnitude of the pedestrian activity. This sample is the newest data available at this location. It is recommended that new counts be taken to determine if there have been any changes since the last count. Pedestrian activity was not broken down on the count by crosswalk, however it did show the time period when there was pedestrian activity. There was less than 4 pedestrian present per hour in the AM period from 7-10 AM. There was a total of 18 pedestrian who crossed at the intersection at the noon hour. There was a total of 26 pedestrians who crossed at the 5:00 PM peak hour which was the maximum counted for this day. There were no crosswalks which had 20 persons crossing per hour at the intersection. The magnitude of the pedestrian activity from the available traffic data does not indicate the need for the restrictions of right turns on red at this location based upon the available data. A new count should be taken to determine if the pedestrian volume has increased.

A field investigation was performed to determine if there any conflicts involving left turning vehicles making their turns during a green arrow display on SR 303 with vehicles making right turns on red from the opposite direction. The presence of a significant number of these conflicts would suggest that restricting no turns on red on the SR 303 approach would be beneficial. There were no conflicts observed during the field investigation at the intersection.

A field investigation was performed to determine if there were any hazards or conflicts which may impact the safety of pedestrian movement at the intersection. There were no discernable hazards found at this location. A review by the Hudson Police Department is recommended to confirm these findings.

A capacity analysis was prepared to determine the impact of restricting right turns on red at the intersection on all four legs. The results of the analysis shows that there will be no degradation in the levels of service and that average delay will remain the same if the turns are restricted on any or all of the legs of the intersection.

The capacity analysis indicates that right-turning vehicles do not create a storage or capacity problem on the street (SR 303, Library Street or plaza driveway) onto which they are turning.

The analysis of conditions at the intersection of W. Streetsboro Road & Library Street indicates that the north and south approaches to the intersection should have right turns on red restricted due to the lack of adequate sight distance until such time as the physical

constraints can be removed. An ordinance should be passed in order to allow the legal enforcement of the restriction. The east and west approaches are not recommended for restriction since the existing sight distance exceeds the design standards for the intersection.

The mast arm supports were analyzed to determine if the “NTOR” signs could be placed on the mast arm to the right of the right most signal head. This is the recommended location for NTOR signs. A structural analysis was performed utilizing the procedures in section 440.3 of the ODOT **Traffic Engineering Manual**. The analysis shows that the signal support on the northeast corner of the intersection which support the signal heads for northbound traffic is currently loaded beyond the design limits and therefore no additional signage would be recommended to be added to the arm. The analysis also shows that the signal support on the southwest corner of the intersection which support the signal heads for southbound traffic is not overloaded but would be impacted by the addition of any additional signage mounted on the arm. We cannot recommend no turn on red signs be mounted on the mast arms at this intersection. The signs would need to be mounted on the pole upright. The location is not ideal but is allowable by the **Ohio Manual of Uniform Traffic Control Devices**.

Conclusions:

1. Sight distance is restricted for the Library Street approach to the intersection by a ground mounted monument sign and landscaping on the northeast corner. Both intersection and stopping sight distances are constrained. It is recommended that the restriction be removed. If the restriction cannot be immediately removed, then it is recommended that a no turn on red restriction for this approach be installed until such time that the sight distance can be improved.
2. Intersection sight distance for the plaza driveway is restricted by the presence of a retaining wall adjacent to the rail overpass. There is currently sufficient stopping sight distance for this approach, however, it is recommended that no turns on red be prohibited until such time as the retaining wall be modified to improve the intersection sight distance.
3. Stopping sight distance on W. Streetsboro Road (SR 303) was found to exceed the recommended value of 305 feet, therefore it is not recommended that turns on red be restricted on the east and west approaches to the intersection.
4. A capacity analysis of the intersection with and without right turns on red prohibited was made and it was found that there is no impact to the level of service or average delay if a no turn on red restriction is installed on any or all four approaches to the intersection. The restriction of turns on red on the Library Street and plaza driveway can be made without affecting the efficiency of the intersection.

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5. An ordinance should be passed in order to allow the legal enforcement of the no turn on red restriction.
6. No Turn on Red signs erected for the purpose of restricting turns at the Library Street and plaza driveway cannot be installed on the existing mast arms of the signal supports due to the lack of design capacity to accommodate the additional loading. Such signs, if installed, would be required to be placed on the pole upright. This is not an ideal location but is allowable by the **Ohio Manual of Uniform Traffic Control Devices**.
7. There were no conflicts observed during a field investigation involving left turning vehicles making their turns during a green arrow display on SR 303 with vehicles making right turns on red from the opposite direction.
8. There were no discernable hazards or conflicts found at the intersection of W. Streetsboro Road (SR 303) & Library Street based upon a recent field investigation. A review by the Hudson Police Department is recommended to confirm these findings.
9. A new turning movement traffic count should be taken at the intersection of W. Streetsboro Road (SR 303) & Library Street to determine if there has been any change in motor vehicle traffic patterns or pedestrian activity since the last count taken in 2017. New data and its analysis may change one or more of the recommendations stated above.