

Office of the City Engineer

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MEMO

To: John C. Rooney, P.E.

Re: Traffic Study - Intersection Analysis of 12th St. and Racine Street (STH 32)

From: Ara P. Molitor, P.E.

Purpose: Determine if there is a warranted change required for the control of the intersection.

Method: Field observation, traffic count and an accident analysis.

ANALYSIS:

Existing Conditions

- 12th Street (either direction of Racine) is 32-foot face to face asphalt over concrete 2-lane street through a mostly residential neighborhood, although 1 block to the west it changes to commercial (Washington Ave.).
 - To the west of the intersection there is no parking allowed on the north side of the street and No Parking allowed from 6am to 6pm on the south side of the street with the exception of weekends and holidays.
 - To the east of the intersection, there is no parking allowed to the south side of the street and no posted restrictions to the north side.
 - Currently both direction of 12th Street are “Stop” controlled at Racine Street.
 - By ordinance the speed limit is 25 MPH on 12th Street.
- Racine Street (STH 32) is a 38-foot face to face concrete 4-lane street through a mix of residential, multi-family and commercial neighborhood. One block to the south the zoning changes to industrial, and 1 block to the north it is fully commercial (Washington Ave.).
 - Racine Street (STH 32) is a designated truck route with a posted Speed limit of 30 MPH.
 - There is a Bus Stop on the NE and SW corners of the intersection on Racine Street.
 - Parking restrictions right at the intersection are very strict “Tow-Away” restrictions, further away from the intersection the restriction is limited to 3:30-6PM.
- 12th Street has other factors that generate larger volumes of traffic at specific times of day:
 - St. Catherine’s High School 6 blocks to the east – 12th St. is a primary ingress and egress route.
 - Walden III (MS & HS) is 3 blocks to the NE and also is a favorite route to and from school.
 - Washing Park High School is 6 blocks to the west, although traffic from here seems to be dissipated by the time it gets to this intersection.

Traffic Analysis

- An intersection count was conducted on 10/11/2017 to create a clear picture of traffic movement through the intersection in addition to converting the data into Average Daily Traffic (ADT) using the highest 8 hourly counts of the 12-hour period.

- 12th Street – ADT 2550
- Racine Street (STH 32) – ADT 6740
- See attached intersection count with ADT calculation notes.
- Accident Study 2012-2017 Findings
 - 48 total accidents reported: 42 Injuries 0 Deaths
 - Of the accidents reported:
 - None are correctable by 2-way Stop Standards.
 - 9/48 the condition of the offender is unknown (19%)
 - 7/48 were weather related (15%)
 - However: 34/48 accidents are WB traffic (71%).
 - 17/34 of the WB accidents failed to stop for the Stop sign. (50%)
 - Only 2 were weather related.
 - It is impossible to determine by the Police reports if these were caused by not being able to see the sign – only 1 accident reported “not seeing the sign”. Since the occurrence of this accident additional signage and tree trimming has occurred.
 - 13/34 of WB accidents were stopped and then continued without noticing conflicting traffic (38%).
 - Only 2 were weather related.
 - It is impossible to determine by the Police reports if these were caused by not being able to see oncoming traffic – only 1 accident reported “thought road was clear” – and that particular one was a truck driver who would have been higher than all noticeable obstructions.
 - Another 10/48 accidents are EB traffic (21%).
 - 6/10 of the EB accidents failed to stop for the Stop sign (60%).
 - 2 were weather related.
 - As a comparison, there is no issue of “not seeing the sign” or seeing the traffic signals at the next intersection for this direction of traffic.
 - 2/10 of EB accidents were stopped and then continued without noticing conflicting traffic.
 - 1 was weather related. This one also stated “...thought intersection was a 4-way Stop”
 - In comparison; 4 accidents found NB or SB traffic at fault.
 - See attached Accident Tally spread sheet.

Field Observations

- EB – West Approach:
 - When legally stopped prior to crossing the cross walk you can see to the curve in Racine St. where it meets Washington Ave. for view to the north. (>SSSD)
 - In the same location looking south you can see 160’+/- south of the intersection (=SSSD), however at times this can be restricted further by the Bus Stop.
- WB – East Approach:
 - When legally stopped prior to crossing the cross walk you can see to the curve in Racine St. where it meets Washington Ave. for view to the north (>SSSD), however at times this can be restricted by the Bus Stop.
 - The view to the north can also be partially obstructed by small bushes an unmaintained weed within a cyclone fence immediately north of the intersection.
 - In the same location looking south you can see 120’+/- south of the intersection (<SSSD).
 - If you move up into the cross walk and before entering the intersection you can see past 13th Street to the south (>SSSD).
 - The view to the south is also partially obstructed by unmaintained small bushes, a small tree and weeds within a cyclone fence between the 1st and 2nd houses south of the intersection.

Intersection Control Warrants

- **Two way Stop Sign Control** – warranted if any of the following conditions are met:
 - Safe approach speed (SSSD) < 10mph.
 - Met – 12th Street controlled by Stop Sign.
 - Accident experience of 3 or more right angle accidents per year.
 - Met – we are averaging 7.5 right angle accidents a year.
 - A total average daily traffic (ADT): 2000<ADT<8000 (intersection ADT)
 - Met – the total (intersection) ADT is 9,290.
- **Four Way Stop Sign** – warranted if any of the following conditions are met:
 - At the intersection of two major arterial streets.
 - Not Met – 12th Street still within “Collector” range
 - An accident problem, as indicated by five or more reported accidents of the type susceptible of correction by a four-way stop installation; a less restrictive device should be used first.
 - Not Met – 12th Street and Racine Street intersection is averaging 7.5 right angle accidents a year. However, the implementation of a 4-way Stop at this intersection would increase the number of right angle intersections.
 - The ADT of Racine Street is 2.5 times greater than that of 12th Street, a four way stop introduction into the intersection increases the intersection delay in all directions, which only increases the potential for more accidents.
 - Racine street is a major arterial street (STH 32) which stops at a traffic light 2 blocks to the south (14th Street) and again at Washington Ave. (STH 20) 1 block to the north. This would potentially have a state highway stopping 3 times in less than a 1000 feet of roadway.
 - Where the traffic volume warrants are met: the total volume must average at least 500 vehicles per hour for any 8 hours of an average day, and the combined vehicular and pedestrian volume from the minor street must average at least 200 units per hour for the same 8 hours, or with an average delay to minor street vehicular traffic of at least 20 seconds per vehicle during the maximum hour.
 - Not Met – we did find 8 hours during the day we counted, with hourly volumes totaling over 500 vph. However, in those same 8 hours 12th Street averaged 181.5 vph (< required side road volumes). We also did not notice during field observations any side road delays approaching 20 seconds per vehicle.
 - At the intersection with low volume urban intersections that have highly restricted visibility. It should only be used if less restrictive devices have proved unsuccessful in reducing accidents.
 - Not applicable – this intersection really doesn’t have low volumes, but it does display some visibility concerns from 12th Street.

RECOMMENDATIONS:

- Have City Forrester monitor the tree growth along the north side of the east approach and trim trees as needed to maintain visibility of the Stop sign from this direction.
- Have Building Department contact second property south of the intersection and east side of Racine Street to remove the remaining section of cyclone fence and trim or remove bushes and tree to maintain vision triangle for the intersection
- It is my opinion to leave the intersection “As-Is”.
 - Add 2 – W4-4P “Cross Traffic Does Not Stop” sign beneath each Stop sign on 12th Street.
- Continue with additional speed enforcement and monitoring of intersection.