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VILLAGE OF LOMBARD, IL
The Lilac Village
1869

To: Stan Rickard, Public Works Director

From: John Johnson, Technical Services Supervisor

Date: November 15, 1999

Subject: Pedestrian Signals Finley Rd. and Pinebrook/16th St.

At the November 1, 1999, Transportation and Safety Committee meeting the committee requested staff to investigate if a pedestrian signal or a full-signalized intersection is warranted at Finley Rd. and Pinebrook/16th St.

A pedestrian gap study was conducted on November 5, 1999. The criteria for the study is if a pedestrian can transverse from the curb to the median in 12 seconds without interference from vehicles. Then from the median to the other side in 12 seconds without interference from vehicles. The median is large enough for pedestrians to wait until traffic clears. The following are the available gaps with sufficient times to accomplish this movement:

- Southbound, 19 available gaps in a 15-minute time survey. Average delay to the pedestrian 48 seconds.
- Northbound, 17 available gaps in a 15-minute time survey. Average delay to the pedestrian 53 seconds.

There were no available gaps to cross Finley Rd. in one movement.

The total delay for a pedestrian could be as high as 101 seconds to cross Finley Rd. To make pedestrians wait for this period time will lead to "taking chances" or making "incorrect decisions" resulting in endangerment to the pedestrian.

Warrants for Traffic Signal Installation

Traffic control signals should not be installed unless one or more of the signal warrants in this Manual are met. The satisfaction of a warrant or warrants is not in itself justification for a signal. Information should be obtained by means of engineering studies and compared with the requirements set forth in the warrants. The engineering study should indicate the installation of a traffic signal would improve the overall safety and/or operation of the intersection. If these requirements are not met, a traffic signal should neither be put into operation nor continued in operation (if already installed).

Warrant 1-Minimum vehicular volume.
Warrant 2-Interruption of continuous traffic.
Warrant 3-Minimum pedestrian volume.
Warrant 4-School crossings.

Warrant 5-Progressive movement.
Warrant 6-Accident experience.
Warrant 7-Systems.
Warrant 8-Combination of warrants.
Warrant 9-Four Hour Volumes.
Warrant 10-Peak Hour Delay.
Warrant 11-Peak Hour Volume.

Warrant 1, Minimum Vehicular Volume

The Minimum Vehicular Volume warrant is intended for application where the volume of intersecting traffic is the principal reason for consideration of signal installation. The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection. An "average" day is defined as a weekday representing traffic volumes normally and repeatedly found at the location.

MINIMUM VEHICULAR VOLUMES FOR WARRANT 1

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)	Vehicles per hour on higher-volume minor-street approach (one direction only)
Major Street	Minor Street		
1	1	500	150
2 or more	1	600	150
2 or more	2 or more	600	200
1	2 or more	500	200

These major-street and minor-street volumes are for the same 8 hours. During those 8 hours, the direction of higher volume on the minor street may be on one approach during some hours and on the opposite approach during other hours.

When the 85-percentile speed of major-street traffic exceeds 40 mph in either an urban or a rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Minimum Vehicular Volume warrant is 70 percent of the requirements above.

The 85–percentile for Finley exceeds 40 mph. The minimum vehicle volume was met for Finley Rd. The minimum vehicle volume for the side streets was not met, even after applying the 70% rule. This warrant was not met.

Warrant 2, Interruption of Continuous Traffic

The Interruption of Continuous Traffic warrant applies to operating conditions where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or hazard in entering or crossing the major street. The warrant is satisfied when, for each of any 8 hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection, and the signal installation will not seriously disrupt progressive traffic flow.

MINIMUM VEHICULAR VOLUMES FOR WARRANT 2

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)	Vehicles per hour on higher-volume minor-street approach (one direction only)
Major Street	Minor Street		
1	1	750	75
2 or more	1	900	75
2 or more	2 or more	900	100
1	2 or more	750	100

These major-street and minor-street volumes are for the same 8 hours. During those 8 hours, the direction of higher volume on the minor street may be on one approach during some hours and on the opposite approach during other hours.

When the 85-percentile speed of major-street traffic exceeds 40 mph in either an urban or a rural area, or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the Interruption of Continuous Traffic warrant is 70 percent of the requirements above.

The 85–percentile for Finley exceeds 40 mph. The minimum vehicle volume was met for Finley Rd. The minimum vehicle volume for the side streets was not met, even after applying the 70% rule. This warrant was not met.

Warrant 3, Minimum Pedestrian Volume

A traffic signal may be warranted where the pedestrian volume crossing the major street at an intersection or mid-block location during an average day is:

100 or more for each of any four hours; or
190 or more during any one hour.

The pedestrian volume crossing the major street may be reduced as much as 50 percent of the values given above when the predominant pedestrian crossing speed is below 3.5 feet per second.

In addition to a minimum pedestrian volume of that stated above, there shall be less than 60 gaps per hour in the traffic stream of adequate length for pedestrians to cross during the same period when the pedestrian volume criterion is satisfied. Where there is a divided street having a median of sufficient width for the pedestrian(s) to wait, the requirement applies separately to each direction of vehicular traffic.

Where coordinated traffic signals on each side of the study location provide for platooned traffic which result in fewer than 60 gaps per hour of adequate length for the pedestrians to cross the street, a traffic signal may not be warranted.

This warrant applies only to those locations where the nearest traffic signal along the major street is greater than 300 feet and where a new traffic signal at the study location would not unduly restrict platooned flow of traffic. Curbside parking at non-intersection locations should be prohibited for 100 feet in advance of and 20 feet beyond the crosswalk.

A signal installed under this warrant should be of the traffic-actuated type with push buttons for pedestrians crossing the main street. If such a signal is installed within a signal system, it should be coordinated if the signal system is coordinated.

Signals installed according to this warrant shall be equipped with pedestrian indications conforming to requirements set forth in other sections of this Manual.

Pedestrian volumes are undetermined and likely would not be met.

Warrant 4, School Crossing

A traffic control signal may be warranted at an established school crossing when a traffic engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at the school crossing shows that the number of adequate gaps in the traffic stream during the period when the children are using the crossing is less than the number of minutes in the same period (sec. 7A-3).

When traffic control signals are installed entirely under this warrant:

1. Pedestrian indications shall be provided at least for each crosswalk established as a school crossing.

2. At an intersection, the signal normally should be traffic-actuated. As a minimum, it should be semi-traffic-actuated, but full actuation with detectors on all approaches may be desirable. Intersection installations that can be fitted into progressive signal systems may have pretimed control.

3. At non-intersection crossings, the signal should be pedestrian actuated, parking and other obstructions to view should be prohibited for at least 100 feet in advance of and 20 feet beyond the crosswalk, and the installation should include suitable standard signs and pavement markings. Special police supervision and/or enforcement should be provided for a new non-intersection installation.

No school children cross Finley Rd. This warrant does not apply.

Warrant 5, Progressive Movement

Progressive movement control sometimes necessitates traffic signal installations at intersections where they would not otherwise be warranted, in order to maintain proper grouping of vehicles and effectively regulate group speed. The Progressive Movement warrant is satisfied when:

1. On a one-way street or a street which has predominantly unidirectional traffic, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning and speed control, or

2. On a two-way street, adjacent signals do not provide the necessary degree of platooning and speed control and the proposed and adjacent signals could constitute a progressive signal system.

The installation of a signal according to this warrant should be based on the 85-percentile speed unless an engineering study indicates that another speed is more desirable.

The installation of a signal according to this warrant should not be considered where the resultant signal spacing would be less than 1000 feet.

The intersection of Oak Creek and Finley is located 800 feet south of Pinebrook/16th St. This warrant has not been met.

Warrant 6, Accident Experience

The Accident Experience warrant is satisfied when:

1. Adequate trial of less restrictive remedies with satisfactory observance and enforcement has failed to reduce the accident frequency; and

2. Five or more reported accidents, of types susceptible to correction by traffic signal control, have occurred within a 12-month period, each accident involving personal injury or property damage apparently exceeding the applicable requirements for a reportable accident; and

3. There exists a volume of vehicular and pedestrian traffic not less than 80 percent of the requirements specified either in the Minimum Vehicular Volume warrant, the Interruption of Continuous Traffic warrant, or the Minimum Pedestrian Volume warrant; and

4. The signal installation will not seriously disrupt progressive traffic flow.

Any traffic signal installed solely on the Accident Experience warrant should be semi-traffic-actuated (with control devices which provide proper coordination if installed at an intersection within a coordinated system) and normally should be fully traffic-actuated if installed at an isolated intersection.

No accidents have occurred within the past 12 months. This warrant has not been met.

Warrant 7, Systems Warrant

A traffic signal installation at some intersections may be warranted to encourage concentration and organization of traffic flow networks. The Systems Warrant is applicable when the common intersection of two or more major routes: (1) has a total existing, or immediately projected, entering volume of at least 1000 vehicles during the peak hour of a typical weekday and has five year projected traffic volumes, based on an engineering study, which met one or more of Warrants 1, 2, 8, 9, and 11 during an average weekday; or (2) has a total existing or immediately projected entering volume of at least 1000 vehicles for each of any five hours of a Saturday and/or Sunday.

A major route as used in the above warrant has one or more of the following characteristics;

1. It is part of the street or highway system that serves as the principal network for through traffic flow;

2. It includes rural or suburban highways outside, entering or traversing a city;

3. It appears as a major route on an official plan such as a major street plan in an urban area traffic and transportation study.

The intersection of Finley and Pinebrook/16th St. is a combination of major route and a local street. This warrant has not been met.

Warrant 8, Combination of Warrants

In exceptional cases, signals occasionally may be justified where no single warrant is satisfied but where Warrants 1 and 2 are satisfied to the extent of 80 percent or more of the stated values.

Adequate trial of other remedial measures which cause less delay and inconvenience to traffic should precede installation of signals under this warrant.

Warrants 1 and 2 were not satisfied at 70% of the requirements. This warrant has not been met.

Warrant 9-Four Hour Volumes

The Four Hour Volume Warrant is satisfied when each of any four hours of an average day the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 4-7 for the existing combination of approach lanes.

When the 85th percentile speed of the major street traffic exceeds 40 miles per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the four hour volume requirement is satisfied when the plotted points referred to fall above the curve in figure 4-8 for the existing combination of approach lanes.

Two of the four hours fell above the line as per figure 4-8. This warrant has not been met.

Warrant 10, Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

This warrant was partially met. Number 1 and 2 were not satisfied. Number 3 met the requirements due to the high volume of traffic on Finley.

Warrant 11, Peak Hour Volume

The peak hour volume warrant is also intended for application when traffic conditions are such that for one hour of the day minor street traffic suffers undue traffic delay in entering or crossing the major street.

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicle per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in figure 4-5 for the existing combination of approach lanes.

When the 85th percentile speed of major street traffic exceeds 40 mph or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirements is satisfied when the plotted point referred to above falls above the curve in figure 4-6 for the existing combination of approach lanes.

All the points fell below the line as per figure 4-6

On the basis of the above information a pedestrian signal is warranted where as a full signalized intersection is not warranted. The pedestrian signal should be installed 100 feet south of the intersection of Finley Rd. and Pinebrook/16th St. The pedestrian signal should be interconnected with Oak Creek Dr. to avoid sudden stops for northbound traffic on Finley Rd.

I obtained a budget figure from Aldridge Electric to install a full-signalized intersection and for a used pedestrian signal for Pinebrook/16th St. and Finley Rd. The full signalized installation would cost $110,000.00 or with Auto Scope $145,000.00. The pedestrian signal would cost $35,000.00 to install and $4,500.00 to remove pedestrian signal on Main St. and 15th St.

cc: Richard Tross, Trustee - District 2
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Transportation and Safety Committee