LEGISTAR: 240312

September 24, 2024

TO: Village President and Board of Trustees

THROUGH: Carl Goldsmith, Director of Public Works

FROM: Mike Barbier, PE, PTOE, Civil Engineer II

SUBJECT: **Establish All-way stop-control at Central Avenue and Stewart Avenue**

Request

Staff recommends that the Village amend Section 10-9-3 and Section 10-9-4 of the Traffic Code to establish the intersection of Central Avenue and Stewart Avenue as an all-way stop-controlled intersection.

Background

In September 2024, Village staff conducted an engineering study at the intersection of Central Avenue at Stewart Avenue. The impetus for this investigation was requests from residents and Village staff.

This intersection is currently stop controlled on Central Avenue, with no stop sign for traffic on Stewart Avenue. This intersection was evaluated for an all-way stop in 2008, but narrowly missed meeting the criteria for an all-way stop.

Analysis

The Manual on Uniform Traffic Control Devices (MUTCD) governs the approach and application of traffic control devices (warning signs, yield/stop signs, traffic signals). While "Engineering Judgement" can be the primary justification for the installation of many signs, establishing an all-way stop or the installation of traffic signals require an "Engineering Study". The full engineering study can be found as Exhibit 1.

There is a set of formal criteria that must be met within the study to justify the establishment of an all-way stop. This intersection does meet the crash history criteria. This requires 5 or more crashes susceptible to correction with a stop sign in a one-year period.

The additional "optional criteria" met include:

- ✓ Proximity to location that generates high pedestrian volumes
- ✓ Locations where a road user cannot see conflicting cross traffic
- ✓ An intersection of two residential streets of similar design and operating characteristics where all-way stop control would improve intersection operations.

In addition to the established and optional criteria, there were other supporting factors noted in the report. The first aspect is that the higher speeds on Stewart Avenue was a compounding issues in both sight distance and the severity of crashes. The second aspect was the driver expectation. Based on the intersection control on Central Avenue, to the east of Stewart, it is reasonable to assume that this is a 4-way stop. It has been documented in the crash reports that drivers on Central Avenue assumed there was a stop sign on Stewart Avenue.

In order to amend the Village Traffic Code, there are two schedules that require amending:

1. Add the intersection of Central at Stewart to Schedule III (Stop Intersections), identifying it as an all-way stop. See Exhibit B.
2. Remove the intersection from Schedule IV (Stop Streets), this removes it from being a 2-way stop. See Exhibit C.

This recommendation was presented to the Public Safety and Transportation Committee at the October 2, 2024 meeting. The Committee supports the proposed amendment to the Lombard Traffic Code and requested that this matter be placed on the Village Board agenda for the October 17, 2024 for consideration.

Recommendation

Staff recommends amending the Village Traffic Code to establish Central Avenue at Stewart Avenue as an all-way stop-controlled intersection by amending Schedule III & IV of the Village's Traffic Code.

Ordinance No. _____

ORDINANCE AMENDING SCHEDULES III & IV OF THE LOMBARD TRAFFIC CODE TO ESTABLISH ALL-WAY STOP CONTROL AT THE INTERSECTION OF CENTRAL AVENUE AT STEWART AVENUE

WHEREAS, the President and Board of Trustees of the Village of Lombard have heretofore passed and approved Ordinance 1186, An Ordinance Regulating Traffic in the Village of Lombard (hereinafter the Lombard Traffic Code); and

WHEREAS, the President and Board of Trustees of the Village of Lombard find that the Lombard Traffic Code has been amended from time to time; and

WHEREAS, the Public Safety and Transportation Committee has reviewed the appropriate traffic studies and recommends certain changes to the Lombard Traffic Code; and

WHEREAS, the Corporate Authorities of the Village of Lombard concur in the recommendation of the Transportation and Safety Committee.

NOW, THEREFORE, BE IT ORDAINED BY THE PRESIDENT AND BOARD OF TRUSTEES OF THE VILLAGE OF LOMBARD, DU PAGE COUNTY, ILLINOIS, as follows:

Section 1: That Schedule III of the Lombard Traffic Code (Ordinance 1186) identifying stop intersections is amended as follows:

After the listing of, "Central Avenue and Elizabeth Street", add the intersection of "Central Avenue and Stewart Avenue"

Section 2: That Schedule IV of the Lombard Traffic Code (Ordinance 1186) identifying stop streets is amended as follows:

Remove the line of text, "Central Ave. shall stop at Stewart Ave."

Section 3: That this Ordinance shall be in full force and effect from and after its passage, approval, publication in pamphlet form and the posting of appropriate signs as provided by law.

Passed on first read this ____ day of _____, 2024.

First reading waived by action of the Board of Trustees this ___ day of _____, 2024.

Passed on second read this ___ day of _____, 2024.

Ayes: _____

Nays: _____

Absent: _____

Approved this ____ day of _____, 2024.

_____
Keith T. Giagnorio
Village President

Attest:

_____
Elizabeth Brezinski
Village Clerk

Published by me in pamphlet form this ____ day of _____, 2024.

_____
Elizabeth Brezinski, Village Clerk

Legistar: 240312
Exhibit A – Engineering Study

ALL-WAY STOP CONTROL WARRANT STUDY

Central Avenue at Stewart Avenue
Lombard, IL

September 20, 2024

Village of Lombard

Public Works Department

Prepared by:
Mike Barbier, P.E., PTOE
Civil Engineer II

This study will investigate the appropriateness of changing the existing 2-way stop control to 4-way stop control at the intersection of Central Avenue at Stewart Avenue in Lombard, IL.

Section 2B.07 of the Manual on Uniform Traffic Control Devices (MUTCD) outlines the criteria for a multi-way stop:

The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

A. *Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

B. *Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

C. *Minimum volumes:*
   1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
   2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*
   3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

D. *Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*

Option: Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;

B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;

C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and

D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

As this relates to the intersection in question and our engineering study, the following MUTCD criteria will be investigated:

Criteria A – Not applicable
Criteria B – Crash History will be investigated
Criteria C – Not applicable - Traffic volumes will not be met
Criteria D – Not applicable - Traffic volume portion will not be met

Additionally, the following Optional Criteria will be investigated:

Option Criteria A – Not applicable – relates more to unique intersection geometry
Option Criteria B – Pedestrian conflicts will be discussed (adjacent to Southland Park)
Option Criteria C – Sight distance will be investigated
Option Criteria D – Will be discussed and analyzed

Criteria B – Crash History

Below is a table of the crash history for the intersection of Central at Stewart from 2021 to July of 2024:

Raw Crash Data - Central Ave. at Stewart Ave.

Village of Lombard 2021 - 2024 (July)

Crash #	Crash ID	Date	Hour	Crash Severity					Collision Type
				K	A	B	C	PDO	
1	LOPC2102580	3/27/2021	13					1	Angle
2	LOPC2107318	9/1/2021	12					1	Angle
3	LOPC2109039	10/28/2021	13					1	Angle
4	LOPC2200067	1/3/2022	20					1	Turning
5	LOPC2202351	3/26/2022	13			1			Angle
6	LOPC2203951	5/21/2022	10					1	Parked Car
7	LOPC2208166	9/30/2022	17					1	Angle
8	LOPC2304523	6/12/2023	12					1	Angle
9	LOPC2307095	9/15/2023	15					1	Angle
10	LOPC2401584	3/22/2024	13				1		Angle
11	LOPC2401881	4/8/2024	17					1	Angle
12	LOPC2402633	5/13/2024	17					1	Rear End
13	LOPC2403812	7/3/2024	13					1	Turning

To meet this criterion *"five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation"*. In the next table, we will exclude crashes that are not susceptible to correction with a stop sign and analyze the crashes in a rolling 12-month period to determine if this criterion is met.

Crashes Susceptible to Correction with Stop Sign

Central Ave. at Stewart Ave.: 2021 - 2024 (July)

Crash #	Crash ID	Date	Collision Type	Rolling average of crashes in 12 months (Criteria is 5 or more crashes in 12-month period)			
1	LOPC2102580	3/27/2021	Angle	5 in 12 months			
2	LOPC2107318	9/1/2021	Angle		5 in 13 months		
3	LOPC2109039	10/28/2021	Angle				
4	LOPC2200067	1/3/2022	Turning				
5	LOPC2202351	3/26/2022	Angle				
7	LOPC2208166	9/30/2022	Angle				
8	LOPC2304523	6/12/2023	Angle			4 in 11 months	5 in 13 months
9	LOPC2307095	9/15/2023	Angle				
10	LOPC2401584	3/22/2024	Angle				
11	LOPC2401881	4/8/2024	Angle				
13	LOPC2403812	7/3/2024	Turning				

In the time period from March 27, 2021 to March 27, 2022, the crash history criteria is met.

It is also noted that there are 3 other periods in which this intersection is very close to having 5 crashes in a 12-month period.

Option Criteria B – The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes.

This location is adjacent to Southland Park, which is currently being enhanced. While this is a more subjective criteria, I believe that this optional criterion is met. Aerial picture of surrounding park:

Option Criteria C – Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop.

This criterion is based on departure sight triangles. Reduction in sight distance can be the result of obstructions or horizontal/vertical roadway geometry. The figure below shows a schematic of this:

INTERSECTION SIGHT DISTANCE MEASUREMENT

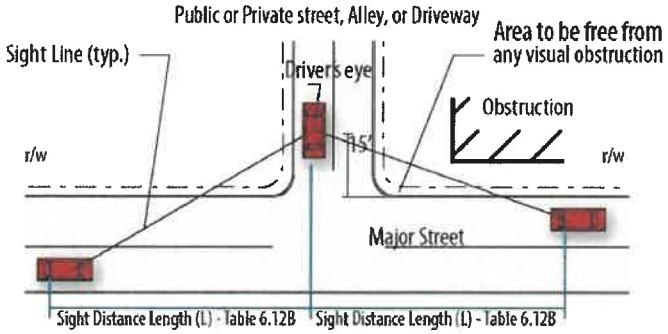


Figure 28-3E in the IDOT Bureau of Local Roads & Streets (BLRS) presents the sight distance requirements for a minor road, that is 2-way stop controlled:

US Customary	
Design Speed (V_{major}) (mph)	ISD (ft) (1)(2)
20	225
25	280
30	335
35	390
40	445
45	500
50	555
55	610
60	665

Appendix A shows the results of Staff's field measurements taken on July 18, 2024. Those results are as follows:

West Leg (EB vehicle) looking North = 250'
West Leg (EB vehicle) looking South = 425'
East Leg (WB vehicle) looking North = 385'
East Leg (WB vehicle) looking South = 425'

Stewart Avenue has a posted speed of 30 mph. Appendix B shows that the 85th Percentile Speed on Stewart Avenue is 35.66 MPH just south of Central Avenue and 33.24 MPH just to the north of Central Avenue. As this data source collects bi-directional data, we can assume that the vehicles on Stewart Avenue making a through movement are traveling faster than these speeds. This can also be seen in the crash data as it pertains to the severity of damage.

Even with a conservative design speed assumption, the sight distances are too low, and this criterion is met.

Option Criteria D – An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Central Avenue and Stewart Avenue share many similarities and operate much the same, ***but for*** the existing intersection control at the intersection of those roadways.

It is believed that the operational characteristics of this intersection will improve with the installation of a 4-way stop-controlled intersection based on the elimination of vehicles on Central Avenue having to wait for a safe gap to enter the intersection. The existing difficulty in negotiating a gap is directly related to the analysis performed for "Option Criteria C", especially as it pertains to this location.
The location of this intersection is adjacent to the Village of Lombard municipal campus, which houses the Public Works Department. The Public Works Department utilizes heavy trucks, flat beds to haul equipment, and other machinery. These vehicles accelerate slower and require more time to clear the intersection. During operational hours, this will reduce queuing on Central Avenue as Village vehicles no longer have wait for extended gaps in traffic.

Additional Contextual Aspect Investigated by Village – The driver's expectation of this intersection relative to the adjacent roadway network.

When the driver's expectations are not met, there is in an increased risk of crashes. If we look at the area surrounding the subject intersection, see Appendix C, the existing condition of this intersection makes it an outlier.

This aspect was also noted in some of the police reports. In 3 of the narratives involving a right-angle collision, the drivers on Central stated that they believed that Stewart Avenue also had a stop sign.

In analyzing the local network, we can see the following features that likely add to the confusion of drivers at this intersection:

On Central, from Hammerschmidt Avenue to Edgewood Avenue

a) ALL North-South Traffic has a stop sign at Central Avenue, *except Stewart Avenue*.
b) ALL of the intersections directly connected to Roosevelt Road have 4-way stop-controlled intersections, *except Stewart Avenue*.
c) Grace Street, which is a lower volume roadway, but adjacent to Southland Park, has a 4-way stop-controlled intersection. While Stewart Avenue which is also adjacent to the park and carries a higher volume of traffic does not.

Establishing a 4-way stop-controlled intersection at this location will better meet the drivers' expectations.

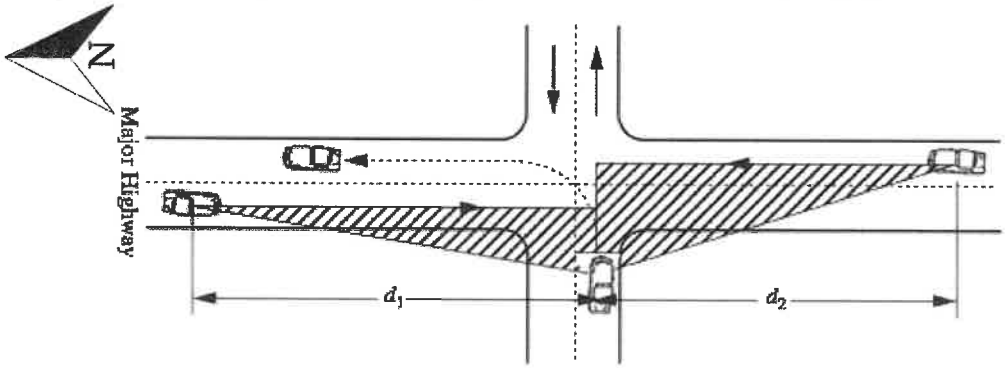
Conclusion

The intersection of Stewart Avenue at Central Avenue meets the criteria for the installation of a 4-way stop-controlled intersection. This intersection meets the following criteria set forth in the MUTCD – Criteria B, Optional Criteria B, C, & D.

Appendix

Appendix A – Sight Distances
Appendix B – Travel Speeds
Appendix C – Location Map

Sight Distance, Case B: Stop Control on Minor Rd.



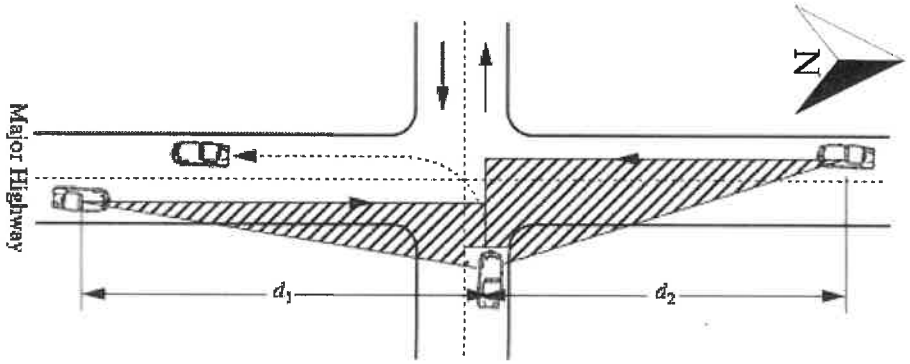
(a) Case B1—Stopped Vehicle Turning Left into Two-Lane Major Highway

Eastbound Central Avenue

d_1 = 250' (trees)

d_2 = 425'

Sight Distance, Case B: Stop Control on Minor Rd.



(a) Case B1—Stopped Vehicle Turning Left into Two-Lane Major Highway

Westbound Central Avenue

d_1 = 425'

d_2 = 385'

Measurements taken on July 18, 2024

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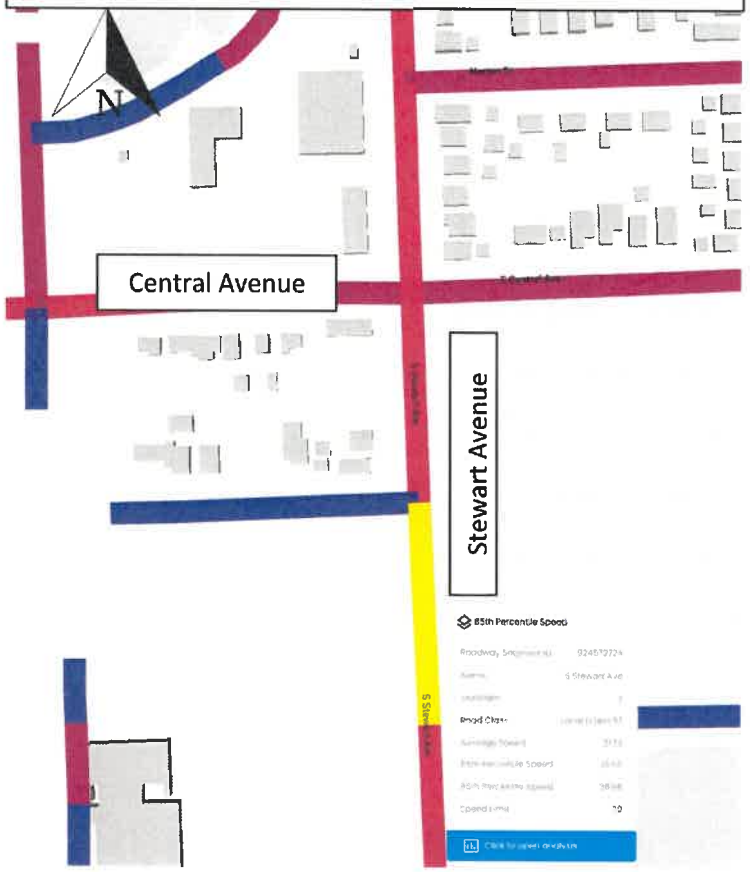
Exhibit A

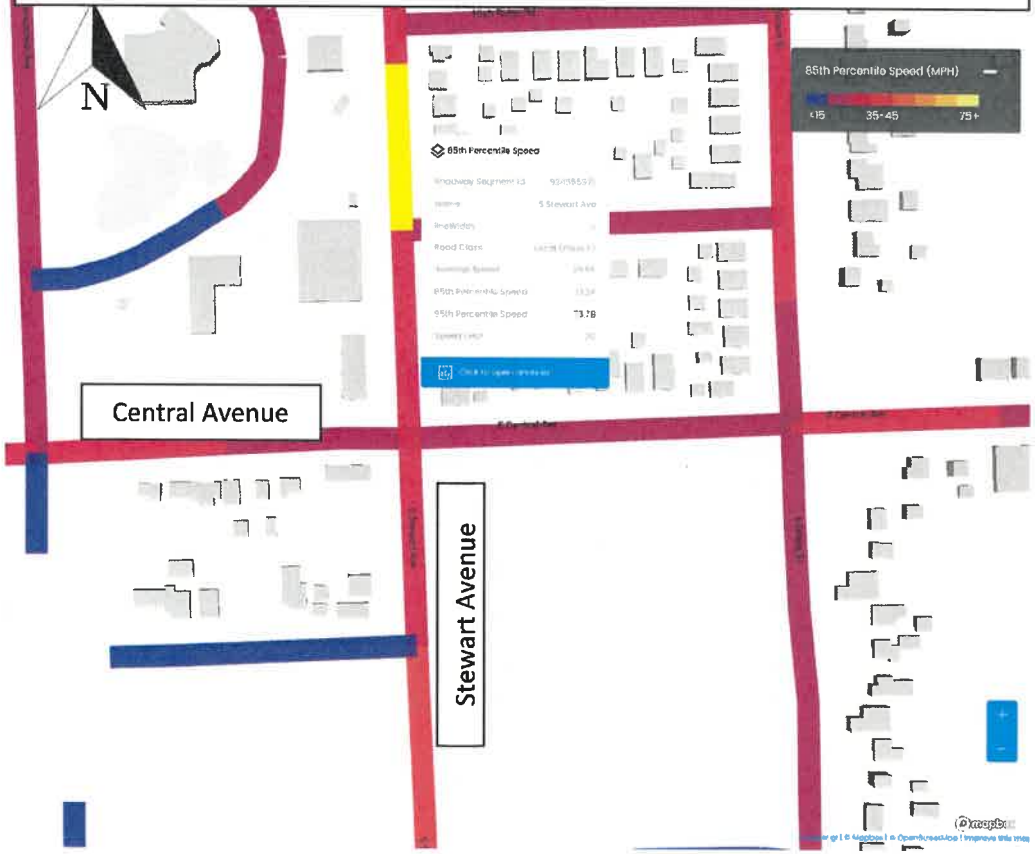
Appendix B – Vehicle Speeds

Stewart Avenue Segment South of Central



85th Percentile Speed = 35.66 MPH

Stewart Avenue Segment North of Central



85th Percentile Speed = 33.24 MPH

Data From UrbanSDK for the entire month of June 2024

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Exhibit A

Appendix C – Location Map

N

Legend

= All-way Stop

SCHEDULE III - STOP INTERSECTIONS

In accordance with Section 10-9-3 and when signs are erected giving notice thereof, drivers of vehicles shall stop before entering the intersections of the following streets.

Apple Lane/Norton and Fairview Avenue

Berkshire St. and Vista Ave.
Berkshire Avenue and Charlotte Street

Central Avenue and Edgewood Avenue
Central Avenue and Fairfield Avenue
Central Avenue and Grace Street
Central Avenue and Elizabeth Street
Central Avenue and Stewart Avenue

Charlotte Street and Grove Street
Charlotte Street and Praire Avenue
Charlotte Street and View Street

Collen Drive and Elizabeth Street

Craig Place and Morningside Avenue

Edgewood Avenue and Pleasant Lane

Edson Avenue and Hickory Street

Elizabeth Street and Greenfield Street
Elizabeth Street and Harrison Road
Elizabeth Street and Hickory Road Westbound
Elizabeth Street and Maple Street

Fairfield Ave. and Taylor Rd.

Fairview Ave. and Apple Lane.
Finley Rd. and Harrison Rd.
Finley Rd. and Wilson Ave.
Finley Rd. and Madison St.

Grace Street and Washington Blvd.
Grace Street and Madison Street
Grace Street and Wilson Avenue
Grace Street and Maple Street
Grace Street and Central Avenue

Harrelson Drive and Lloyd Avenue

Harrison Rd. and Hammerschmidt Ave.

SCHEDULE IV - STOP STREETS

In accordance with Section 10-9-4 and when signs are erected giving notice thereof, drivers of vehicles proceeding on the streets designated below shall stop at the following locations.

Name of Street	Shall Stop At	Name of Street
Adams St.	"	Addison St.
Addison Ave.	"	Jackson St.
Addison Ave. southbound	"	Madison St.
Addison Ave. southbound	"	Washington Blvd.
Addison Ave., eastbound	"	Wilson Avenue
Ahrens Ave.	"	Norton St.
Ahrens Ave.	"	Division St.
Brewster Ave., westbound	"	Edson Avenue
Brewster Ave.	"	Hickory Street
Broadview Ave.	"	Meadow Avenue
Butterfield Frontage Road	"	Fairfield Ave.
Butterfield Frontage Road	"	Fairfield Ave.
Westbound		
Cambria Lane, northbound	"	Addison Ave.
Cambria Lane, southbound	"	Addison Ave.
Central Ave.	"	Charlotte
Central Ave.	"	Edson Ave.
~~Central Ave.~~	"	~~Stewart Ave.~~
Charlotte St., northbound	"	Morningside
Charlotte Street	"	Taylor Road
Charlotte Street		Harrison Road
Chase Avenue	"	Division Street
Cherry Lane	"	Fairview Ave.
Church Ave. (northbound)	"	Morris Ave.
Church Ave. (southbound)	"	Morris Ave.
Cimarron Road	"	Meadow Avenue
Courtland Ave.	"	DuPage Avenue
Courtland Ave.	"	Main Street