VILLAGE OF GARDEN CITY

CATHEDRAL AVENUE ROAD DIET TRAFFIC STUDY

FINAL REPORT

September 10, 2021

Revised April 20, 2022

Prepared for:

INCORPORATED VILLAGE OF GARDEN CITY

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EXECUTIVE SUMMARY

The Cathedral Avenue corridor in the Village of Garden City has experienced speeding and a significant number of motor vehicle crashes in recent years. Community requests for traffic calming interventions prompted the opportunity to evaluate Cathedral Avenue for a road diet. Creighton Manning Engineering, LLP (CM), on behalf of the Village of Garden City, commenced a study in January 2021 to evaluate the feasibility of implementing a road diet along Cathedral Avenue from 7th Street to St. Pauls Place. A road diet reduces the number of travel lanes and the effective width of the roadway by re-striping the pavement surface. The reallocation of space can result in improved safety for pedestrians by reducing the potential vehicle conflicts; for cyclists by providing dedicated space on the roadway; and for vehicles by providing clear delineation, exclusive left-turn lanes at intersections, and fewer overall conflict points.

The goals of the study are to provide an assessment of the feasibility, benefits, and impacts of a road diet in the corridor by evaluating a three-lane roadway configuration consisting of one travel lane in each direction with a center two-way-left-turn lane and with signal coordination.

The analysis shows that the implementation of a road diet beginning south of 6th Street to St. Pauls Place with signal coordination is feasible, with the following tradeoffs:

Potential Advantages	Potential Disadvantages
Crash rate and crash severity reductions	Minor increase in corridor travel times
Improved pedestrian and bicyclist comfort	Greater delay for some vehicles during LIRR crossings
Reduced travel speeds	Increased traffic diversion
Opportunities for streetscapes or bike lanes	Increased road accessibility conflicts at unsignalized intersections
Exclusive left-turn lanes	
Community character and quality-of-life enhancements	

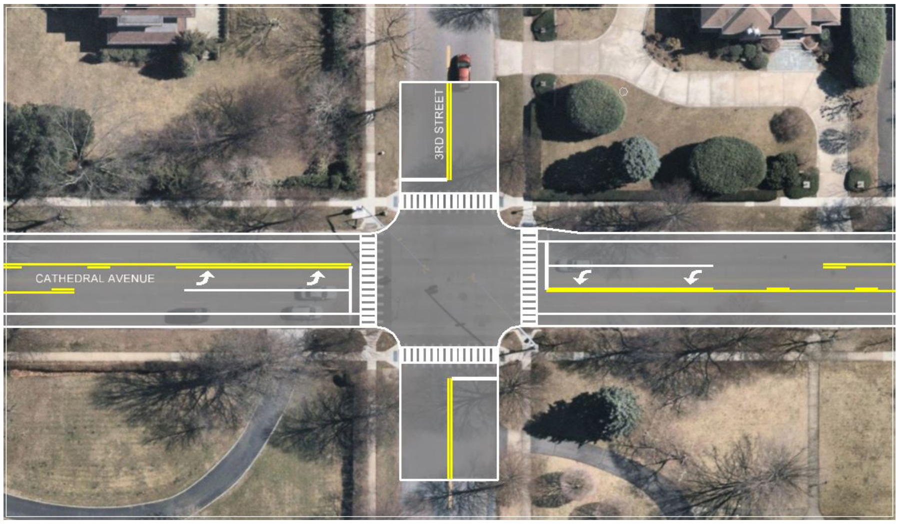
There are three general roadway layout options for a road diet on Cathedral Avenue:

- Concept 1: Single travel lane and center turn lane with paved shoulders.
- Concept 2: Exclusive travel lane for vehicles and an exclusive travel lane with bicycles.
- Concept 3: Single travel lane and center turn lane with extensions (a.k.a. bulb-outs) at intersections.

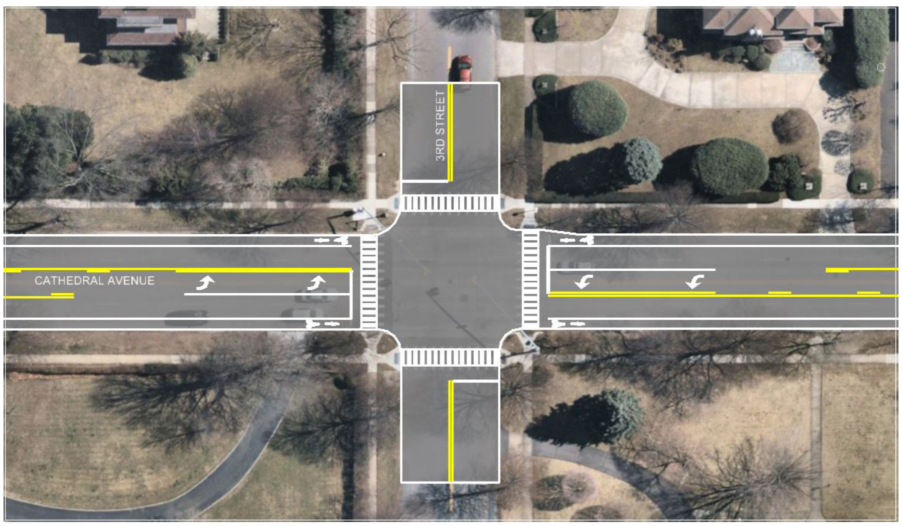
The following images illustrate how the three roadway layout options could look on Cathedral Avenue. Although all three of these options appear feasible, Concept 1 has been the most widely supported concept during meetings with the Village Board and its constituents.

A municipality's decision to support a road diet involves an understanding of the trade-offs. Garden City Police Commissioner, Kenneth Jackson, has been consulted by Creighton Manning to ensure that potential advantage and disadvantages have been vetted. The correspondence between Commissioner Jackson and Creighton Manning is included under Appendix A. The Nassau County Department of Public Works (NCDPW) reviewed the report dated September 10, 2021 and provided comments in a letter dated January 13, 2022. The report herein has been revised based on those comments. The NCDPW letter and a summary of responses can be found under Appendix B. Generally, road diets do not reduce corridor travel times since one of their goals is to reduce travel speeds. However, the reduction in travel speeds is not intended to result in congestion rather in a more balanced and comfortable environment for all road users, including drivers. Compared to other infrastructure projects, road diets are a cost-effective solution to traffic calming and often can be completed through a restriping of the existing pavement surface. However, they also allow for greater investment in Complete Streets initiatives in the form of streetscapes and bike lanes if desired.

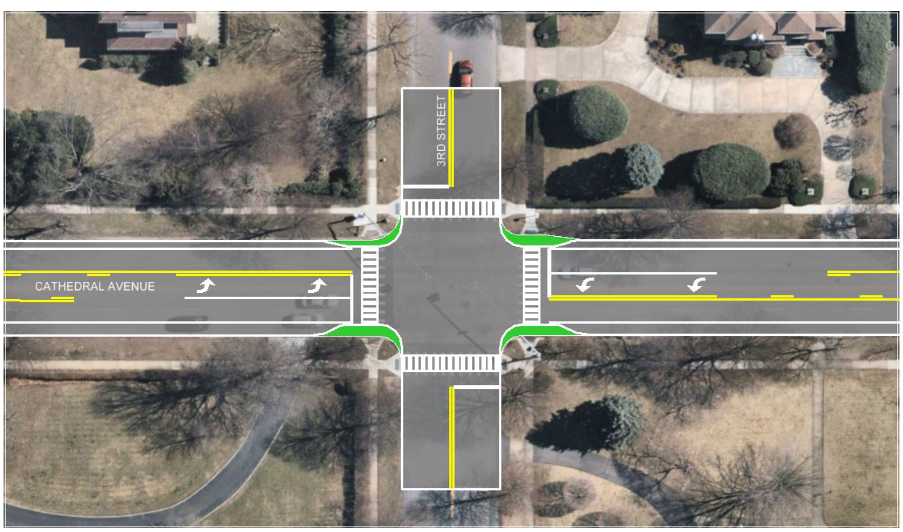
[1] American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities 2012, 4th Edition*, 2012.



Concept 1 – Paved Shoulders



Concept 2 – Bike Lanes



Concept 3 – Curb Extensions

CHAPTER 1. INTRODUCTION

In 2013, Nassau County adopted a Complete Streets policy, which ensures that all roadway users including pedestrians, bicyclists, and motorists be considered in the planning and design of new and improved roadways. On January 19, 2021, the Village of Garden City approved Creighton Manning Engineering, LLP (CM) to commence a study that would evaluate the feasibility of implementing a Complete Streets approach known as a road diet along Cathedral Avenue from Cherry Valley Avenue to St. Pauls Place. A road diet is a traffic calming method in which the number of travel lanes on a roadway is reduced by re-striping. The goal of this study is to assess the feasibility, benefits, and impacts of a road diet in the corridor by evaluating alternatives that consider a more balanced approach to transportation. The study area is illustrated below in Exhibit 1.1 and includes the following intersections (Listed from north to south):

Intersection	Control*
• Cathedral Ave/Stewart Ave/Cherry Valley Ave	S
• Cathedral Avenue/7th St	S
• Cathedral Avenue/6th St	S
• Cathedral Avenue/5th St	U
• Cathedral Avenue/4th St	U
• Cathedral Avenue/3rd St	S
• Cathedral Avenue/2nd St	S
• Cathedral Avenue/1st St/Atlantic Ave	S
• Cathedral Ave/St. Pauls Pl	U

*S/U= Signalized/Unsignalized

Exhibit 1.1 - Study Area Intersections

Cathedral Avenue is an Urban Minor Arterial roadway under the jurisdiction of the Nassau County Department of Public Works (NCDPW). The NCDPW confirmed the scope of the aforementioned study. While the Village sponsored the study, the NCDPW was an involved agency and was consulted throughout the study process. The NCDPW will need to review, approve, and oversee any changes to Cathedral Avenue stemming from this study.

The U.S Department of Transportation Federal Highway Administration (FHWA) states that the primary benefits of a road diet include "enhanced safety, mobility, and access for all road users and a 'complete streets' environment to accommodate a variety of transportation modes." The FHWA provides information about road diets, and notes that the typical road diets involve the reallocation of pavement from four travel lanes (two in each direction) to one travel lane in each direction with a center two-way left-turn lane (TWLTL), as shown in Exhibit 1.2 from the FHWA website.

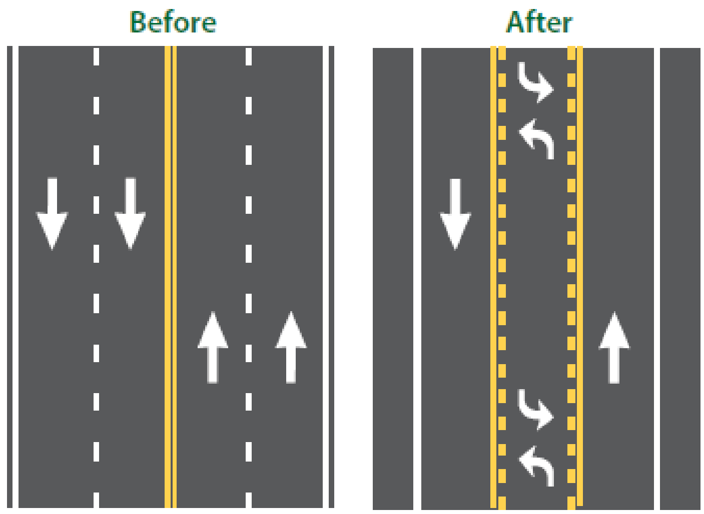


Exhibit 1.2 - Visualization of Road Diet Configuration

The reallocation of space can result in improved safety for pedestrians by reducing crossing distances and the potential vehicle conflicts; for cyclists by providing dedicated shoulder areas or striped bike lanes; and for vehicles by providing clear delineation, exclusive left-turn lanes at intersections, and fewer overall conflict points. Within the study corridor, there are a number of potential benefits associated with the potential implementation of a road diet. Below are several identified benefits detailed in works published by the American Association of State Highway and Transportation Officials (AASHTO) and the FHWA.[2, 3]

- With one travel lane in each direction, top-end travel speeds are moderated by those who are following posted speed limits, which may reduce potential crash severities for all users.
- It may be feasible to include a raised median or small refuge islands at some pedestrian crossing locations, making it easier for pedestrians to cross the street and reducing the likelihood of pedestrian crashes.
- Fewer lanes for pedestrians to cross.
- The reduction from two lanes to one in each direction virtually eliminates the likelihood of "multiple threat" crashes (where a driver in one lane stops to yield, but the driver in the adjacent lane continues at speed) for pedestrians and left-turning motorists and bicyclists.
- Left-turn lanes provide a place for motorists and bicyclists to wait to make a left turn, reducing the incidence of left-turn and rear-end crashes.
- Sideswipe crashes are reduced since motorists no longer need to change lanes to pass a vehicle waiting to turn left from the leftmost through lane.
- Less traffic noise (due to reduced speeds) and greater separation from traffic for pedestrians, residents, and businesses.

The AASHTO and FHWA guides do not list disadvantages, however there are several perceived or anecdotal concerns as listed below:

- Through traffic in a single lane will increase vehicle delays and travel time.
- Traffic shifted to a single lane results in more vehicles adjacent to on-road cyclists.
- Through traffic in a single lane results in difficulty for vehicles turning to and from side streets and driveways.
- Through traffic in a single lane means that any vehicles double parking will block the single travel lane.
- Reduction to a single lane will result in cut-through traffic.
- Traffic may be diverted to parallel roadways.
- Use by pedestrians of the TWLTL as a refuge, making them vulnerable to being struck by vehicles traveling in the TWLTL.
- In some cases, a reduction of lanes miles may result in less governmental funding.

The previous discussion shows that there are a number of trade-offs associated with the implementation of a road diet. For example, placing all vehicle traffic in a single lane may provide a traffic calming effect but could increase delays for traffic turning onto Cathedral Avenue due to fewer gaps in the single stream of traffic. All potential benefits and concerns should be weighed in assessing the feasibility and practicality of a road diet.

In addition to the above concerns, several criteria have been identified as success factors for feasibility of the road diet. These include:

- Maintaining the existing curb lines. To be cost effective, feasible alternatives should fit mostly within the existing roadway width and avoid significant roadway reconstruction cost. Implementation could occur largely through restriping with some limited curb work.
- Allowing sufficient opportunities for turning vehicles to enter and exit mainline traffic without unduly interrupting mainline flow. Generally speaking, this criterion dictates the necessity for queuing space for turning vehicles that will not interrupt mainline flow.
- Consideration of the Long Island Rail Road (LIRR) at-grade-crossing on Cathedral Avenue between 6th Street and 7th Street.
- Striving to provide standard lane widths.

CHAPTER 2. EXISTING CONDITIONS

A. Corridor Conditions

Cathedral Avenue is an Urban Minor Arterial roadway under the jurisdiction of the Nassau County Department of Public Works (NCDPW). The roadway runs north-south for approximately one and a half miles from Cherry Valley Avenue in the Village of Garden City to Front Street in the adjoining Village of Hempstead. The studied segment of roadway is from Cherry Valley Avenue to St. Pauls Place. This segment generally provides an approximately 44-foot-wide roadway consisting of two 11-foot-wide travel lanes in each direction. Turn lanes, shoulders, and curbs are not provided along the roadway. The posted speed limit is 30 miles per hour. There are five-foot-wide sidewalks with a variable-width buffer space provided along both sides of the roadway. It is important to note that in the Village of Hempstead, Cathedral Avenue provides one lane in each direction and curbside parking on either side; the transition from two lanes in each direction to one lane in each direction occurs in the vicinity of St. Pauls Place, which is why it is the southerly terminus for this study. Exhibit 2.1 shows the existing roadway configuration at an intersection within the Village of Garden City.

Exhibit 2.1 – Existing Roadway Configuration (Cathedral Ave/2nd St. Facing North)

The primary land use in the study area is single-family residential homes. The Cathedral of the Incarnation is located on the west side of Cathedral Avenue between 4th Street and 6th Street. The Garden City School District Office and Garden City Hotel are located adjacent to the Cathedral Avenue-7th Street intersection. There are no other commercial uses adjacent to the roadway.

1. Pedestrians

Pedestrians are accommodated by concrete sidewalks located on both sides of the road that are generally 5 feet or wider. Marked crosswalks are generally present at the study intersections, although some of the crosswalk markings are faded. Some of the intersections have pedestrian accommodations such as curb ramps, detectible warning surfaces, and pedestrian signals with countdown timers. Exhibit 2.2 shows the existing pedestrian accommodations at the signalized intersection of Cathedral Avenue and 3rd Street.

Exhibit 2.2 – Existing Pedestrian Accommodations (Cathedral Ave/3rd St. Facing Southwest)

2. Bicycles

There are no bicycle accommodations on Cathedral Avenue. The 11-foot-wide travel lanes in each direction do not allocate space for bicyclists and there are no delineated shoulders. Data collection indicated that bicycle traffic was relatively low. Additionally, a review of the existing conditions along the study corridor identified that accommodations for cyclists, such as like bicycle racks, are not present.

3. Transit

The Long Island Rail Road (LIRR) Garden City station on the Hempstead Line is located on the southeast corner of the Cathedral Avenue-7th Street intersection. There is an at-grade crossing on Cathedral Avenue between 7th Street and 6th Street. Field timings indicated that the boom barriers restrict crossings for approximately 2:25 (minutes:seconds) for westbound trains and 1:10 for eastbound trains. It should be noted that the analyses herein model the LIRR Hempstead Line according to a time table that was in effect from September 3, 2019 to November 10, 2019, thus representing a pre-pandemic operation.

B. Motor Vehicle Crash History

A motor vehicle crash analysis was performed for the study corridor based on data provided by the NYSDOT. The analysis included a review of 163 crashes over a three-year period from January 1, 2017 through December 31, 2019 between 7th Street and St. Pauls Place. A detailed crash sheet summary and crash history are included under Appendix C. The data shows the following:

- Most accidents occurred during clear dry conditions suggesting that weather conditions and pavement conditions are not the primary contributing factors of the crash history.
- 64% of crashes in the corridor are of types potentially correctible by a road diet (5% overtaking, 11% rear end, 47% right angle, and 1% sideswipe).
- There were zero fatal accidents reported in the three-year period.

Crashes involving property damage only accounted for 44% of total crashes while crashes resulting in at least one injury comprised the majority (56%). The percentage of crashes that resulted in at least one injury is well above the statewide average for crash severity, which is 23.20% for such a roadway.[1] Road diets have been identified by FHWA as Proven Safety Countermeasures for rear-end, sideswipe, right-angle, and pedestrian crash trends. The FHWA's Road Diet Informational Guide found that studies in suburban areas of large cities exhibited a 19 percent reduction in overall crashes when a Road Diet is installed on a previously four-lane undivided facility, as well as a decrease in crashes involving drivers under 35 years of age and over 65 years of age. The FHWA's 19-47% reduction range is meant to encompass a wide range of road diet applications. Given that the crash history and crash severity of Cathedral Avenue exceed statewide averages, even a near-20% reduction in crashes would be beneficial. When designed appropriately, a road diet provides a refuge area for a vehicle waiting on a gap to negotiate a left-turn. This refuge area allows the vehicle to no longer obstruct a through lane thus eliminating hazardous weaving maneuvers by drivers attempting to navigate around the turning vehicle. Exhibit 2.3, Exhibit 2.4, and Exhibit 2.5 illustrate how a road diet benefits driver's interactions with the roadway by reducing vehicle conflict points and operating speed, which in turn reduces the number and severity of crashes.[2]

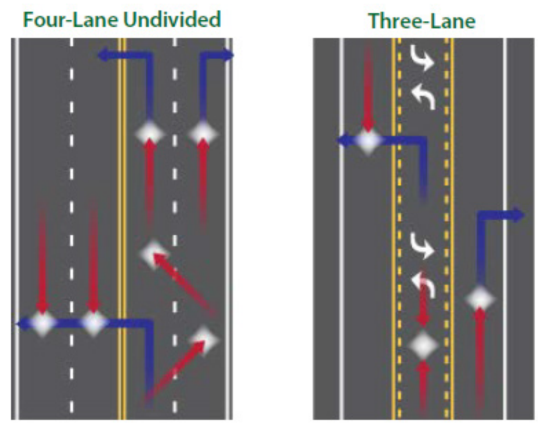


Exhibit 2.3 – Mid-Block Conflict Points for Four-Lane Undivided and Three-Lane Cross Section

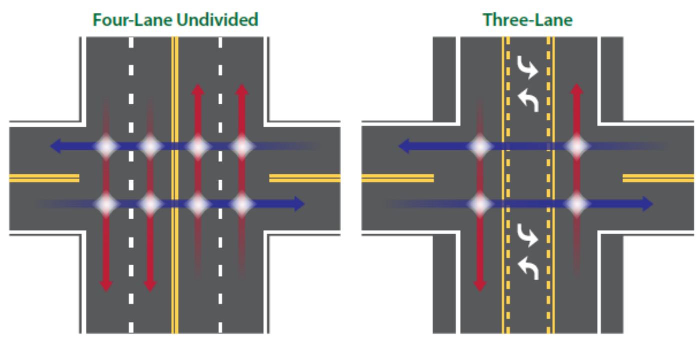


Exhibit 2.4 – Crossing/Through Traffic Conflict Points at Intersections for a Four-Lane Undivided Roadway and a Three-Lane Cross Section

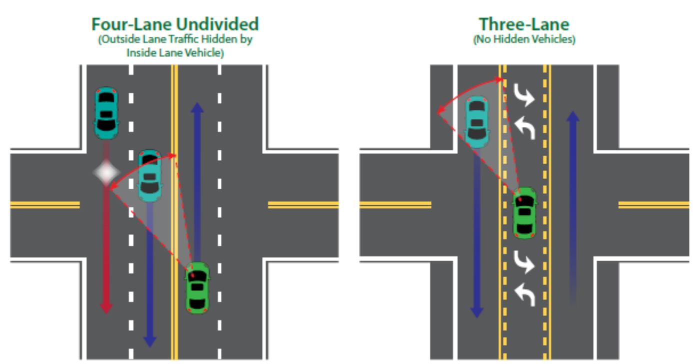


Exhibit 2.5 – Major-Street Left-Turn Sight Distance for Four-Lane Undivided Roadway and Three-Lane Cross Section

[3] NYSDOT-Safety Information Management System, https://www.dot.ny.gov/divisions/operating/osss/highway-repository/AccidentCost_SeverityDistribution2016.pdf
[4] US Department of Transportation Federal Highway Administration. "Road Diets." *Proven Safety Countermeasures*, October 18, 2017, https://safety.fhwa.dot.gov/provencountermeasures/road_diets/, Accessed June 9, 2021.

C. Traffic Volumes

Historic traffic volume data published by the New York State Department of Transportation (NYSDOT) shows that daily traffic volumes along Cathedral Avenue in 2019 totaled 11,689 vehicles per day (vpd) based on NYSDOT Automatic Traffic Recorder (ATR) Station ID 032030 located on Cathedral Avenue 170 feet north of 4th Street. The FHWA states in its Roadway Informational Guide, Section 3.3.5, "that roadways with ADT of 20,000 vpd or less may be good candidates for a Road Diet and should be evaluated for feasibility."

CM installed two ATRs along Cathedral Avenue to capture 24-hour volumes, vehicle classifications, and speed data by direction from Sunday, March 7, 2021, to Saturday, March 13, 2021. The ATRs were installed in the same locations as the NYSDOT ATR 032030 and NYSDOT ATR 038760. One ATR was placed within the study corridor; the other was placed outside the study corridor, in the Village of Hempstead, for comparison purposes. The existing traffic data is included under Appendix E and summarized in Table 2.1.

Table 2.1 – Summary of ATR Data

	Cathedral Avenue	
	Between 4th Street & 5th Street, Village of Garden City	Between Chelsea Place & Garden Place, Village of Hempstead
Volume[1]		
AWDT (vpd)	9,474	9,542
DHV (vph)	915	889
K	9.7%	9.3%
DDHV (vph)	527	569
Speed (mph)		
15th-Percentile NB	33	31
15th-Percentile SB	32	29
50th-Percentile NB	39	36
50th-Percentile SB	37	36
Average NB	39	36
Average SB	37	36
85th-Percentile NB	45	42
85th-Percentile SB	43	43
95th-Percentile NB	49	46
95th-Percentile SB	49	47

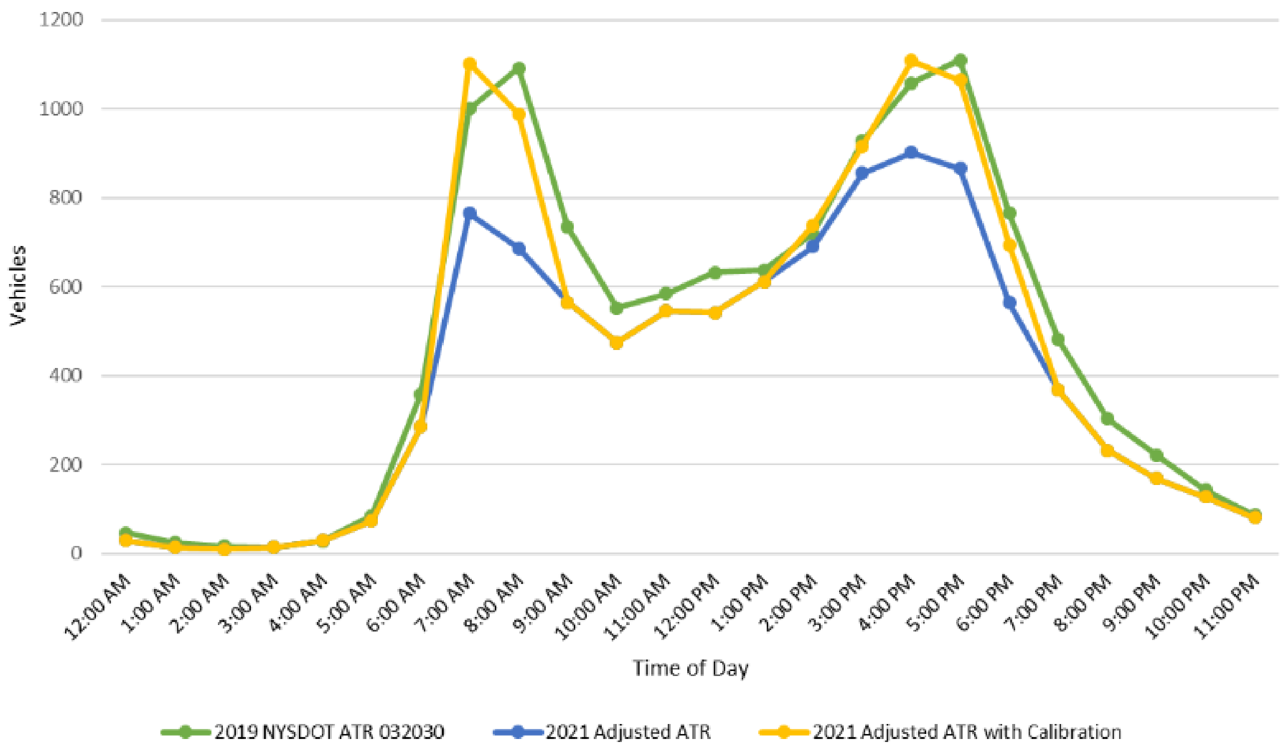
[1]Volume data was adjusted using NYSDOT Seasonal Adjustment Factor for a work week in March (1.009)
AWDT = Average Weekday Daily Traffic
DHV = Design Hour Volume
K = Peak hour traffic as a percent of daily traffic volumes
DDHV = Directional Design Hour Volume

The data shows that the average weekday daily traffic volume on Cathedral Avenue is approximately 9,500 vehicles per day. The 85th-percentile speeds are 42 to 45 mph. The 85th-percentile speed is the speed at or below which 85 percent of motorists travel. It is important to note that excessive speeding is considered by the FHWA as 20 percent above the posted speed limit, which on Cathedral Avenue is 30-mph; the observed 85th-percentile speeds are 40 to 50 percent above the posted speed limit. While the FHWA Road Diet Informational Guide states that road diets can reduce speed by 3 to 5 mph, it can be extrapolated from the data when comparing the speed data from the Garden City segment which is four lanes to the Hempstead segment which is two lanes that there could be a speed reduction of 1 to 3 mph. Given the fact that the 85th-percentile speed on Cathedral Avenue is almost 50 percent in excess of the posted speed limit, any degree of speed reduction would be beneficial.

Given the time during which this study was performed, the effect of the pandemic on roadway traffic volumes was closely considered. It was anticipated prior to the data collection effort that 2021 traffic volumes would be lower than 2019 traffic volumes. The hourly traffic volumes for 2019 are shown in green on Chart 2.1. Included on Chart 2.1 are the seasonally adjusted 2021 hourly traffic volumes in blue. The chart is indicative of the anticipated impacts of the pandemic as it shows that the hourly traffic volumes observed in 2021 were lower than hourly volumes observed in 2019. However, the 2021 volumes exhibit similar temporal variations in traffic during the average weekday. As the owner of the roadway and a key stakeholder in this project, the NCDPW was consulted on best practices for calibrating the 2021 traffic data so that an existing conditions model would appropriately reflect "pre-pandemic" traffic conditions. Calibration factors were applied accordingly to the study peak hours. These seasonally adjusted 2021 hourly traffic volumes with calibration are shown in yellow on Chart 2.1. Email correspondence detailing the calibration process and coordination with NCDPW is included under Appendix F.

Intersection turning movement counts were conducted on Thursday, March 9, 2021, from 7:00 AM to 9:00 AM and from 2:00 PM to 7:00PM. These periods capture the peak commuter periods in the morning and evening as well as the arrival and dismissal periods of the proximate Garden City Middle School. These counts were conducted at the nine study intersections

Chart 2.1 - Comparison of Hourly Traffic Volumes



listed in ***Chapter 1. Introduction***. Upon review of the count data, it was determined that the corridor peak hours were:

- Weekday Morning Peak Hour | 7:30 AM to 8:30 AM
- Weekday Midday Peak Hour | 3:00 PM to 4:00 PM
- Weekday Evening Peak Hour | 4:00 PM to 5:00 PM

The raw intersection turning movement counts were calibrated according to the methodology detailed in the email correspondence included under Appendix F. These calibrated volumes shown on Figure 1 reflect existing "pre-pandemic" volumes. The raw intersection turning movement counts are included under Appendix E.

D. Operations

Intersection capacity analysis was completed using Synchro 11 software to identify existing vehicle operations and levels of service through the study corridor. The analysis was also used to provide a base condition to compare the road diet alternative and null condition. Table 2.2 summarizes the existing levels of service during the AM, Midday and PM conditions.

Table 2.2 – Existing Overall Level of Service

Intersection		Control[1]	AM Peak Hour	Midday Peak Hour	PM Peak Hour
1	St. Pauls Pl	U	E (41.7)	C (17.3)	D (27.3)
2	1st St/ Atlantic Ave	S	B (15.1)	B (13.3)	B (14.0)
3	2nd St	S	A (8.3)	A (7.8)	A (8.5)
4	3rd St	S	A (7.0)	A (6.5)	A (6.8)
5	4th St	U	F (100+)	D (34.3)	F (85.8)
6	5th St	U	C (22.9)	C (16.9)	C (19.5)
7	6th St	S	A (9.7)	B (10.8)	B (10.6)
8	7th St	S	B (12.0)	A (8.9)	B (10.8)
9	Stewart Ave/Cherry Valley Ave	S	E (57.8)	C (25.2)	C (30.1)

X (Y.Y) = Level of Service (Average delay in seconds per vehicle)
[1]Control: S = Signalized | U = Unsignalized | LOS for signalized intersections reflects overall | LOS for unsignalized intersection reflects the highest side street stop-controlled delay.

The analysis shows that the majority of the signalized study intersections currently operate at favorable levels of service (LOS) as shown by the LOS A/B. The unsignalized intersections operate at an LOS E or better with the exception of 4th Street, which experiences LOS F conditions during the weekday morning and weekday evening peak hours.

Travel times were obtained from the Synchro 11 software simulations. Table 2.3 summarizes the simulated travel times for a vehicle traveling the entire length of the corridor within the study area during each study period according to direction of travel.

Table 2.3 – Existing Conditions Simulated Travel Times

Direction	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
	Sim	FIeld	Sim	Field	Sim	Field
Northbound	3:02	2:17	2:27	2:08	2:29	2:27
Southbound	2:26	2:36	2:17	2:12	2:24	2:13

Table 2.3 shows that the simulated travel times as well as the field measured travel times are higher in the AM and PM peak hours than the midday peak hour. This is indicative of the friction caused by the LIRR at-grade crossing servicing four trains during the AM peak hour and three in the PM peak hour as compared to two in the midday peak hour. The detailed level of service reports are included under Appendix G.

Queue lengths were also obtained from the Sychro 11 software simulations for the northbound and southbound Cathedral Avenue approaches at all signalized intersection. Table 2.4 summarizes the 95th-percentile queue length by lane of each approach.

Table 2.4 – Existing Condition Simulated 95th-Percentile Queue Lengths (Feet)

Intersection		Lane	AM Peak Hour	Midday Peak Hour	PM Peak Hour
2	1st St/ Atlantic Ave				
	Cathedral Avenue NB	LT/L	200	75	75
		TR	200	75	75
	Cathedral Avenue SB	LT/L	100	100	175
		TR	100	100	175
3	2nd St				
	Cathedral Avenue NB	LT/L	150	75	75
		TR	150	75	75
	Cathedral Avenue SB	LT/L	50	75	100
		TR	50	75	100
4	3rd St				
	Cathedral Avenue NB	LT/L	100	50	50
		TR	100	50	50
	Cathedral Avenue SB	LT/L	50	75	75
		TR	50	75	75
7	6th St				
	Cathedral Avenue NB	LT/L	125	75	75
		TR	125	75	75
	Cathedral Avenue SB	LT/L	50	75	100
		TR	75	75	125
8	7th St				
	Cathedral Avenue NB	TR	250	100	150
	Cathedral Avenue SB	LT/L	200	100	100
		T	125	150	225
9	Stewart Ave/ Cherry Valley Ave				
	Stewart Ave EB	L	1050	325	350
		TR	350	500	400
	Cathedral Avenue WB	T	500	875	250

*New lane configuration

Table 2.4 indicates that the longest queueing occurs on the eastbound Stewart Avenue approach during the weekday AM peak hour. The typical distance between the numbered streets on Cathedral Avenue is 580-ft with the distance between 5th and 6th Streets being the shortest at approximately 480-ft and the distance between 1st and 2nd being the longest at approximately 620-ft. Therefore, the simulated queue lengths indicate there is no queuing that encroaches on upstream intersections during the study peak hours.

CHAPTER 3. ANALYSIS & FINDINGS

A. Future Traffic Volumes

To evaluate the proposed road diet, traffic projections were prepared for ten years after the estimated time of completion (ETC+10) – 2032. The New York Metropolitan Transportation Council (NYMTC) published the New York Best Practice Model which states that a Functional Classification 16 Roadway (i.e., Urban Minor Arterial) in Nassau County, such as Cathedral Avenue, should expect a growth rate of +0.49% per year for the period from 2020 to 2045. Therefore, a 0.50% per year growth rate was applied to the 2021 existing traffic volumes and compounded annually for 11 years. The forecasted 2032 ETC+10 traffic volumes are shown on Figure 2.

B. Roadway Layout

As discussed earlier, a road diet is a traffic calming method where the number of travel lanes and effective width are reduced. This analysis considers implementing a road diet to the Cathedral Avenue corridor from just south of 6th Street to the St Pauls Place where Cathedral Avenue enters the Village of Hempstead and provides one travel lane in each direction and curbside parking. The road diet was originally considered from just south of 7th Street to St. Pauls Place, but it was determined through the course of the analysis that the additional lane capacity between 6th Street and 7th Street would promote better traffic flow resulting from LIRR crossing disruptions. A three-lane roadway cross-section consisting of one travel lane in each direction and a center two-way-left-turn lane (TWLTL) was analyzed. The TWLTL would transition to an exclusive left-turn lane at intersections along the study corridor. Exhibit 3.1 shows one potential concept depicting the road diet configuration at the Cathedral Avenue-3rd Street intersection. In addition to the road diet configuration, the analysis considers the following:

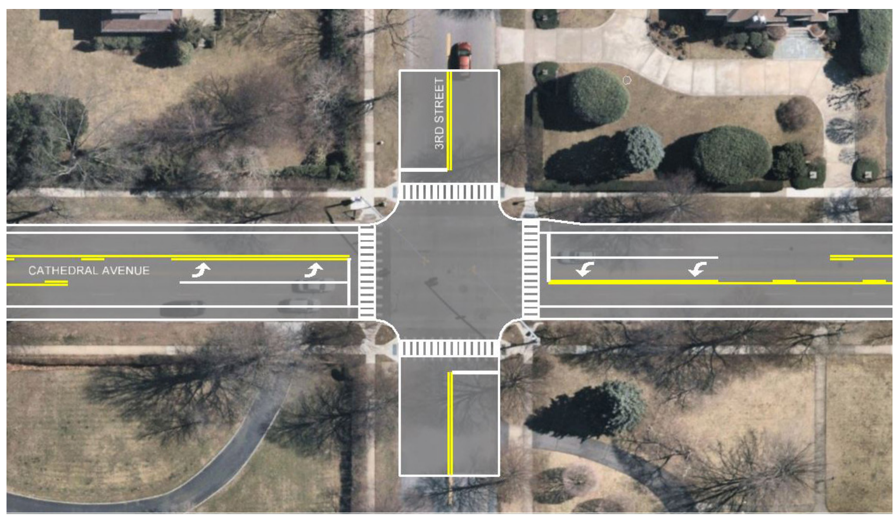


Exhibit 3.1 – Road Diet with Curb Extensions

1. Signalization of Cathedral Avenue-4th Street intersection by NCDPW (separate from this study)
2. Traffic signal coordination along Cathedral Avenue from 6th Street to 1st Street/Atlantic Avenue

C. Operations

Intersection capacity analysis was completed using Synchro 11 software to identify operating conditions including levels of service and travel times. The impacts of the road diet can be described by comparing the analysis of a Null 2032 condition, which considers the forecasted volumes shown on Figure 2 without the road diet and traffic signal coordination, to the analysis of a Build 2032 condition, which considers the forecasted volumes with the road diet and traffic signal coordination. Table 3.1 summarizes the results of the level of service calculations of these two analyses. The detailed level of service table and reports are included under Appendix G.

Table 3.1 – Level of Service Summary

Intersection		Control	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
			Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
1	St Pauls Pl	U	F (56.5)	E (45.7)	C (18.6)	C (16.8)	D (32.0)	C (23.4)
2	1st St/ Atlantic Ave	S	B (15.6)	C (22.1)	B (13.6)	B (17.3)	B (14.4)	C (21.1)
3	2nd St	S	A (8.5)	B (12.5)	A (7.9)	A (9.7)	A (8.6)	B (10.7)
4	3rd St	S	A (7.2)	A (8.7)	A (6.6)	A (5.6)	A (6.9)	A (5.8)
5	4th St	S	A (8.5)	A (6.7)	A (7.8)	A (6.6)	A (8.4)	A (6.7)
6	5th St	U	C (24.9))	E (35.9)	C (18.0)	C (23.1)	C (21.4)	D (34.0)
7	6th St	S	B (10.0)	B (10.3)	B (11.0)	B (13.6)	B (10.9)	B (13.8)
8	7th St	S	B (12.8)	B (13.0)	A (9.2)	A (9.3)	B (11.4)	B (11.3)
9	Stewart Ave/Cherry Valley Ave	S	E (67.2)	E (67.2)	C (27.0)	C (27.0)	C (34.2)	C (34.2)

X (Y.Y) = Level of Service (Average delay in seconds per vehicle)
Control: S = Signalized | U = Unsignalized | LOS for signalized intersections reflects overall | LOS for unsignalized intersection reflects the highest side street stop-controlled delay.

Table 3.1 shows that with the implementation of a road diet and traffic signal coordination along Cathedral Avenue, the overall levels of service will be comparable to the Null condition in 2032.

Travel times were obtained from the Synchro 11 software simulations. Table 3.2 summarizes the simulated travel times for a vehicle traveling the length of the corridor from St. Pauls Place to 7th Street during each study period peak period according to direction of travel in the Null 2032 and the Build 2032 conditions.

Table 3.2 – Null 2032 vs Build 2032 Simulated Travel Times

Direction	AM Peak Hour		Midday Peak Hour		Evening Peak Hour	
	Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
Northbound	3:02	4:07	2:32	2:37	2:28	2:38
Southbound	2:35	2:40	2:27	2:25	2:35	2:38

Table 3.2 shows that the simulated total travel times for northbound trips in the road diet configuration increase by 65 seconds in the morning peak hour, increase by 5 seconds in the midday peak hour, and increase by 10 seconds in the evening peak hour. In the southbound direction travel times are increased in the morning peak hour by 5 seconds, decrease by 2 seconds in the midday peak hour, and increase by 3 seconds in the evening peak hour.

Queue lengths were also obtained from the Sychro 11 software simulations for the northbound and southbound Cathedral Avenue approaches at all signalized intersection. Table 3.3 summarizes the 95th-percentile queue length by lane of each approach.

Table 3.3 – Null 2032 vs Build 2032 Simulated 95th-Percentile Queue Lengths

Intersection		Control	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
			Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
2	1st St/ Atlantic Ave							
	Cathedral Avenue NB	LT/L*	225	75	75	50	100	50
		TR	225	475	75	175	100	200
	Cathedral Avenue SB	LT/L*	100	25	125	25	200	25
		TR	100	200	125	275	175	475
3	2nd St							
	Cathedral Avenue NB	LT/L*	175	25	75	0	75	25
		TR	175	375	75	150	75	150
	Cathedral Avenue SB	LT/L*	50	25	100	25	125	25
		TR	50	100	75	200	125	250
4	3rd St							
	Cathedral Avenue NB	LT/L*	125	25	50	0	50	0
		TR	125	275	50	125	50	125
	Cathedral Avenue SB	LT/L*	50	25	75	25	100	25
		TR	50	25	75	25	100	25
5	4th St							
	Cathedral Avenue NB	LT/L*	125	0	50	0	75	0
		TR	125	50	50	25	75	25
	Cathedral Avenue SB	LT/L*	50	25	75	0	100	25
		TR	50	25	50	25	100	50
7	6th St							
	Cathedral Avenue NB	LT/L*	150	0	75	25	100	25
		TR	150	100	75	175	75	200
	Cathedral Avenue SB	LT/L*	50	25	75	50	125	50
		TR	75	125	100	175	125	250
8	7th St							
	Cathedral Avenue NB	TR	250	325	125	125	150	150
	Cathedral Avenue SB	LT/L*	200	175	125	125	100	100
		T	125	125	150	150	275	275
9	Stewart Ave/ Cherry Valley Ave							
	Stewart Ave EB	L	1175	1175	375	375	400	400
		TR	375	375	350	350	450	450
	Cathedral Avenue WB	T	525	525	200	200	250	250

*New lane configuration

Table 3.3 indicates that the longest queueing would occur on the eastbound Stewart Avenue approach during the weekday AM peak hour similar to the existing conditions. The typical distance between the numbered streets on Cathedral Avenue is 580-ft with the distance between 5th and 6th Streets being the shortest at approximately 480-ft and the distance between 1st and 2nd being the longest at approximately 620-ft. Therefore, the simulated queue lengths indicate there is no queuing that encroaches on upstream intersections during the study peak hours.

D. Sensitivity Analysis – Road Diet from St. Pauls Place to 5th Street

A sensitivity analysis was conducted that evaluated the feasibility of a road diet configuration of Cathedral Avenue from St. Pauls Place to 5th Street. In this configuration, the roadway would transition from a three-lane cross-section with one travel lane in each direction and one TWTL to a four-lane cross-section with two travel lanes in each direction between 5th and 6th Streets. This sensitivity analysis was completed in response to comments provided by the NCDPW in its January 13, 2022 letter included under Appendix B.

Intersection capacity analysis was completed using Synchro 11 software to identify operating conditions including levels of service and travel times. The results of the sensitivity analysis can be described by comparing the analysis of a Build 2032 condition, which considers the forecasted volumes with the road diet and traffic signal coordination from St. Pauls Place to 7th Street, to the analysis of the Build 2032 – Sensitivity Analysis (SA) condition, which considers the forecasted volumes with the road diet and traffic signal coordination from St. Pauls Place to 5th Street. Table 3.4 summarizes the results of the level of service calculations of these two analyses. The detailed level of service table and reports are included under Appendix G.

Table 3.4 – Level of Service Summary

Intersection		Control	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
			Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
1	St Pauls Pl	U	E (45.7)	E (45.7)	C (16.8)	C (16.8)	C (23.4)	C (23.4)
2	1st St/ Atlantic Ave	S	C (22.1)	C (22.1)	B (17.3)	B (17.3)	C (21.1)	C (21.1)
3	2nd St	S	B (12.5)	B (12.5)	A (9.7)	A (9.7)	B (10.7)	B (10.7)
4	3rd St	S	A (8.7)	A (8.7)	A (5.6)	A (5.6)	A (5.8)	A (5.8)
5	4th St	S	A (6.7)	A (7.5)	A (6.6)	A (8.2)	A (6.7)	A (9.4)
6	5th St	U	E (35.9)	E (35.9)	C (23.1)	C (23.1)	D (34.0)	D (34.0)
7	6th St	S	B (10.3)	B (10.7)	B (13.6)	B (12.3)	B (13.8)	B (11.9)
8	7th St	S	B (13.0)	B (13.0)	A (9.3)	A (9.3)	B (11.3)	B (11.3)
9	Stewart Ave/Cherry Valley Ave	S	E (67.2)	E (67.2)	C (27.0)	C (27.0)	C (34.2)	C (34.2)

X (Y.Y) = Level of Service (Average delay in seconds per vehicle)
Control: S = Signalized | U = Unsignalized | LOS for signalized intersections reflects overall | LOS for unsignalized intersection reflects the highest side street stop-controlled delay.

Table 3.4 shows that with the implementation of a road diet and traffic signal coordination along Cathedral Avenue from St. Pauls Place to 5th Street, the overall levels of service will be comparable to a road diet configuration from St. Pauls Place to 7th Street.

Travel times were obtained from the Synchro 11 software simulations. Table 3.5 summarizes the simulated travel times for a vehicle traveling the length of the corridor from St. Pauls Place to 7th Street during each study period peak period according to direction of travel in the Null 2032 and the Build 2032 conditions.

Table 3.5 – Build 2032 vs Build 2032 Sensitivity Analysis Travel Times

Direction	AM Peak Hour		Midday Peak Hour		Evening Peak Hour	
	Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
Northbound	4:07	4:31	2:37	2:37	2:38	2:36
Southbound	2:40	2:35	2:25	2:23	2:38	2:39

Table 3.5 shows that the simulated total travel times for northbound trips and southbound trips are commensurate in either road diet configuration.

Queue lengths were also obtained from the Sychro 11 software simulations for the northbound and southbound Cathedral Avenue approaches at all signalized intersection. Table 3.6 summarizes the 95th-percentile queue length by lane of each approach.

Table 3.6 – Build 2032 vs Build 2032 Sensitivity Analysis Simulated 95th-Percentile Queue Lengths

Intersection		Control	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
			Null 2032	Build 2032	Null 2032	Build 2032	Null 2032	Build 2032
2	1st St/ Atlantic Ave							
	Cathedral Avenue NB	LT/L*	75	75	50	50	50	50
		TR	475	475	175	175	200	200
	Cathedral Avenue SB	LT/L*	25	25	25	25	25	25
		TR	200	200	275	275	475	475
3	2nd St							
	Cathedral Avenue NB	LT/L*	25	25	0	0	25	25
		TR	375	375	150	150	150	150
	Cathedral Avenue SB	LT/L*	25	25	25	25	25	25
		TR	100	100	200	200	250	250
4	3rd St							
	Cathedral Avenue NB	LT/L*	25	25	0	0	0	0
		TR	275	275	125	125	125	125
	Cathedral Avenue SB	LT/L*	25	25	25	25	25	25
		TR	25	25	25	25	25	25
5	4th St							
	Cathedral Avenue NB	LT/L*	0	0	0	0	0	0
		TR	50	50	25	25	25	25
	Cathedral Avenue SB	LT/L*	25	25	0	25	25	25
		TR	25	75	25	125	50	250
7	6th St							
	Cathedral Avenue NB	LT/L*	0	150	25	75	25	100
		TR	100	150	175	75	200	100
	Cathedral Avenue SB	LT/L*	25	50	50	75	50	125
		TR	125	75	175	100	250	150
8	7th St							
	Cathedral Avenue NB	TR	325	325	125	125	150	150
	Cathedral Avenue SB	LT/L*	175	175	125	125	100	100
		T	125	125	150	150	275	275
9	Stewart Ave/ Cherry Valley Ave							
	Stewart Ave EB	L	1175	1175	375	375	400	400
		TR	375	375	350	350	450	450
	Cathedral Avenue WB	T	525	525	200	200	250	250

*Lane Configuration in Build 2032 Condition

Comparing the queue lengths at the 6th Street intersections it is evident that starting the road diet south of 6th Street will benefit southbound queueing. This is a result of there being more capacity for southbound vehicles. However, it is evident at the 4th Street intersection that queuing is worsened as capacity is at a closer point upstream. Overall, it is evident that beginning the transit to a road diet condition between 5th and 6th Streets would result in commensurate queue lengths as those to be experienced if the road diet began between 7th and 6th Streets.

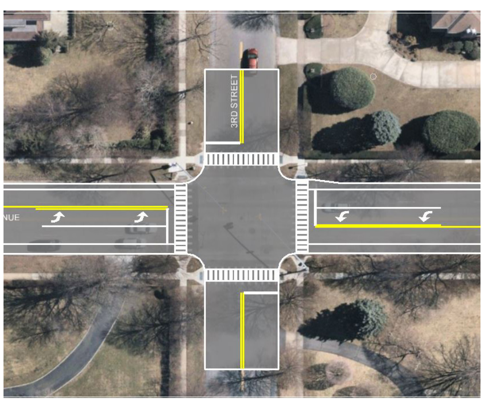
CHAPTER 4. CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the results of a road diet feasibility study on Cathedral Avenue from Cherry Valley Avenue to St. Pauls Place. A typical road diet involves the reallocation of four travel lanes (two in each direction) to three-lane configuration consisting of one travel lane in each direction with a center two-way left-turn lane to improve mobility for all users. The study evaluates the implementation of this road diet configuration from just south of the Cathedral Avenue-6th Street intersection to the Cathedral Avenue-St. Pauls Place intersection.

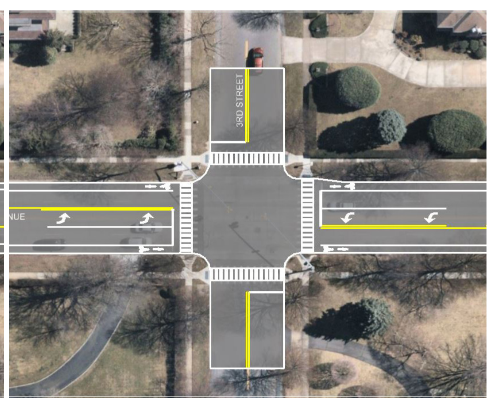
Based on the evaluation, a road diet is feasible and would not be detrimental to vehicular mobility through the corridor. Publications from the FHWA and AASHTO indicate several benefits of road diets that adhere to the Complete Streets Policy adopted by Nassau County including:

- Reductions in number and severity of crashes
- Reduction in speeds
- Fewer travel lanes for pedestrians to cross
- Potential for pavement to be reallocated for bike lanes

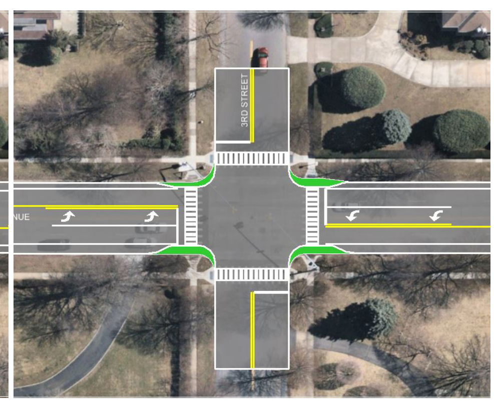
The extra space gained by reducing the number of lanes from 4 to 3, could be used for paved shoulders, bike lanes, and or bump-outs at intersections as shown on the images below, which will need to be confirmed during detailed design. Although all three of these options appear feasible, Concept 1 has been the most widely supported concept during meetings with the Village Board and its constituents.



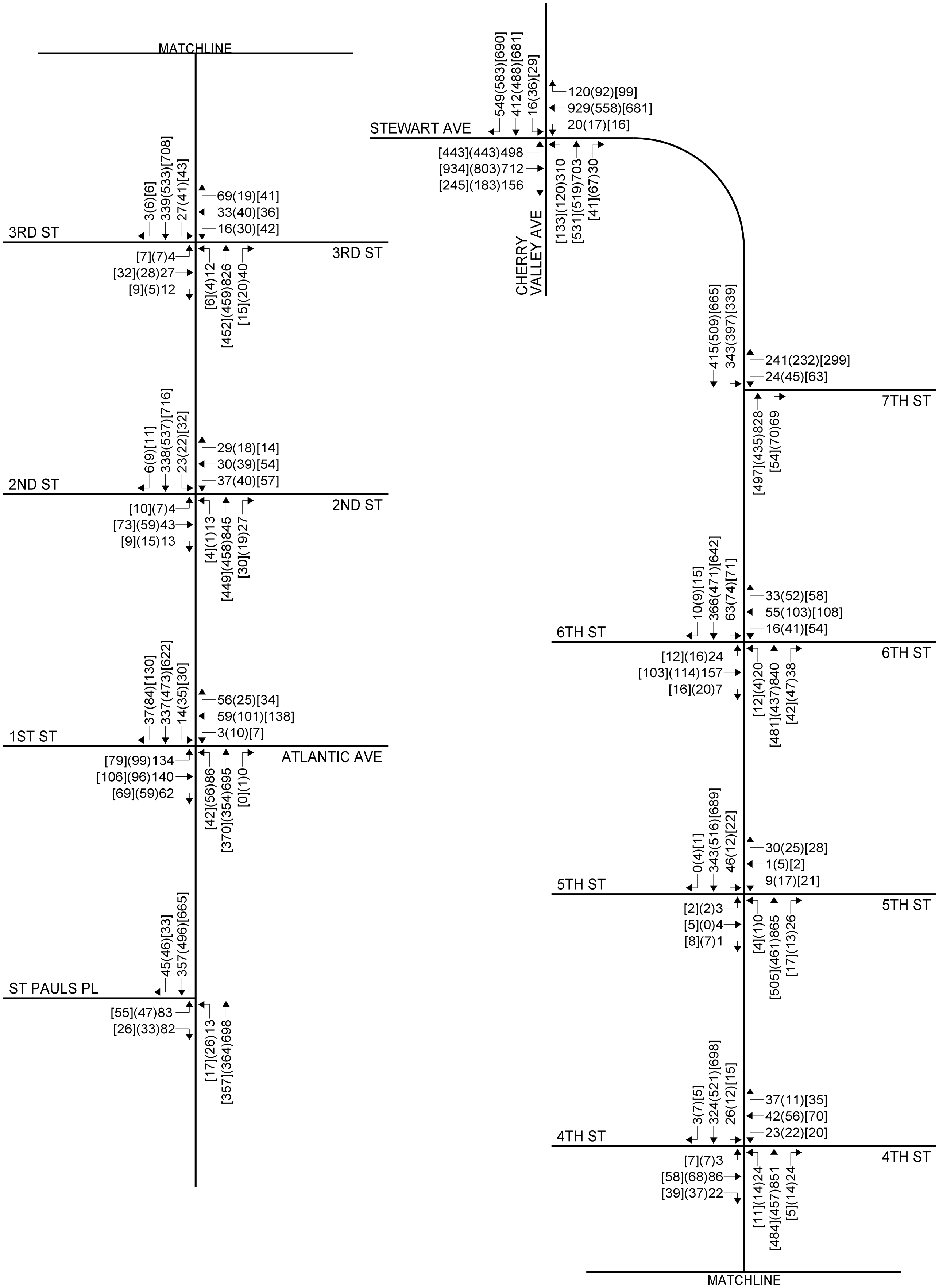
Concept 1 – Paved Shoulders



Concept 2 – Bike Lanes



Concept 3 – Curb Extensions



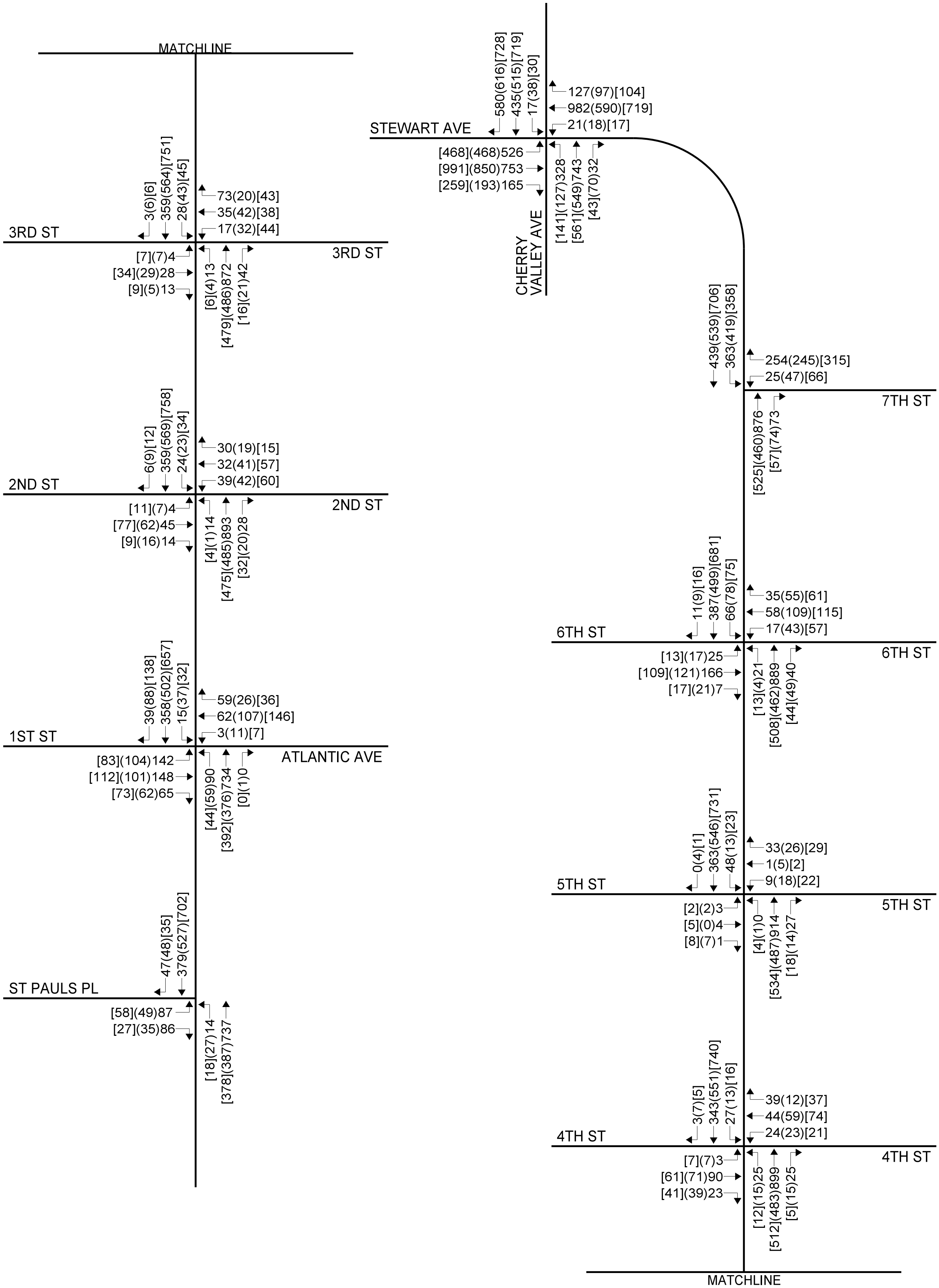
WEEKDAY AM PEAK HOUR (WEEKDAY MIDDAY PEAK HOUR) [PM PEAK HOUR]

2021 EXISTING
TRAFFIC VOLUMES

CATHEDRAL AVENUE ROAD DIET
VILLAGE OF GARDEN CITY
NASSAU COUNTY, NEW YORK

Creighton Manning

PROJECT: 120-343	DATE: 7/2021	FIGURE: 1



WEEKDAY AM PEAK HOUR (WEEKDAY MIDDAY PEAK HOUR) [PM PEAK HOUR]

2032 ETC + 10
TRAFFIC VOLUMES

CATHEDRAL AVENUEROAD DIET
VILLAGE OF GARDEN CITY
NASSAU COUNTY, NEW YORK

Creighton Manning

PROJECT: 120-343 | DATE: 7/2021 | FIGURE: 2