

TRAFFIC IMPACT STUDY

For

The Caldwell Manor

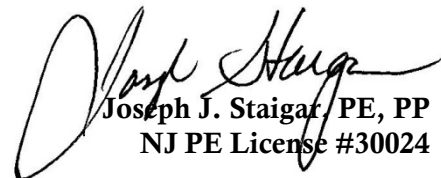
Property Located at:

**26 Lane Avenue
Block 41 – Lot 7
Borough of Caldwell, Essex County, NJ**

Prepared by:

JOSEPH STAIGAR ENGINEERING, LLC

**17 Tremont Drive
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Project #22020

INTRODUCTION

It is proposed to construct a 44 unit multi-family residential development on a parcel of land currently occupied by an existing single-family dwelling unit. The site is located on the east side of Lane Avenue south of its intersection with Bloomfield Avenue in the Borough of Caldwell, Essex County, New Jersey. The site is designated as Block 41 – Lot 7 on the Borough Tax Maps. A single full movement driveway along Lane Avenue will provide access to the proposed site. Parking will be provided via 99 parking spaces.

Joseph Staigar Engineering LLC has been retained to prepare this study to assess the traffic impact associated with the construction of The Project on the adjacent roadway network. This study documents the methodology, analyses, findings and conclusions of our study and includes:

- A detailed field inspection was conducted to obtain an inventory of existing roadway geometry, traffic control, and location and geometry of existing driveways and intersections.
- Existing traffic data was collected via manual turning movement (MTM) counts during the weekday morning and weekday evening peak periods at the site location along Lane Avenue, and compared to historic data collected to normalize the counts from current Covid-19 pandemic conditions.
- Projections of traffic to be generated by The Project were prepared utilizing trip generation data as published by the Institute of Transportation Engineers. Site traffic was then assigned to the adjacent street system based upon the anticipated directional distribution.
- Capacity analyses were conducted for the Build conditions at the site driveway.
- The proposed site driveway was inspected for adequacy of geometric design, spacing and/or alignment to streets and driveways on the opposite side of the street, relationship to other driveways adjacent to the development, and conformance with accepted design standards.
- The site plan as designed was reviewed for sufficiency in accommodating large wheel base vehicles such as refuse trucks.
- The parking layout and supply was assessed based on accepted design standards and demand experienced at similar developments.

EXISTING CONDITIONS

A review of the existing roadway conditions near the proposed site was conducted to provide the basis for assessing the traffic impact of the development. This included field investigations of the surrounding roadways and intersections, collection of traffic volume data, and extensive analyses.

Existing Roadway Conditions

The following are descriptions of the roadways in the study area:

Lane Avenue is an urban major collector roadway under the jurisdiction of Essex County as County Road 633. In the vicinity of the site the posted speed limit is 25 miles per hour and the roadway provides one travel lane in each direction. Curb is provided along both sides of the roadway while sidewalk is only provided along the west side of the roadway. Lane Avenue provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Lane Avenue in the vicinity of The Project are primarily residential.

Bloomfield Avenue is an urban principal arterial roadway under the jurisdiction of Essex County as County Road 506. In the vicinity of the site the posted speed limit is 35 miles per hour the roadway provides two travel lanes in each direction. Curb and sidewalk is provided along both sides of the roadway. Bloomfield Avenue provides a curved horizontal alignment and a vertical alignment that slopes from east to west at its intersection with Lane Avenue. The land uses along Bloomfield Avenue in the vicinity of The Project are a mix of residential and commercial.

Lane Avenue intersects Bloomfield Avenue 750 feet to the north to form a three-leg signalized intersection with a 120 second cycle length. The eastbound approach of Bloomfield Avenue provides a through lane and a shared through/right-turn lane. The westbound approach of Bloomfield Avenue provides a left-turn lane with a protected lead and two through lanes. The northbound approach of Lane Avenue provides a left turn lane and a right turn lane.

Westville Avenue is classified as an urban major collector under the jurisdiction of Essex County as County Road 632. At the proximity of the site location, it provides one (1) lane of travel in each direction and has a posted speed limit of 25 miles per hour. Curb and sidewalk are generally provided along both sides of the roadway. No shoulders are provided and on-street parking is prohibited.

Lane Avenue intersects Westville Avenue 2,300 feet to the south to form a signalized four (4) legged intersection with also Runnymede Road. The intersection is controlled by a two (2) phased traffic signal operating on a 90-second fixed background timing cycle. The eastbound and westbound approaches of Westville Avenue provide a single full-movement lane each. The southbound approach of Lane Avenue provides a single full-movement lane. The northbound approach of Runnymede Road provides a single full-movement lane.

Existing Traffic Volumes

Manual turning movement (MTM) counts of Lane Avenue were conducted in March 2021 and more recently in November 2022. These counts were conducted for purposes of observing the historic and current traffic conditions of traffic flow.

In some or most cases, post COVID-19 pandemic traffic volumes are considered to be “back to normal”. To ascertain that, traffic counts along Lane Avenue were recently conducted and compared

to historical data determined pre-pandemic on April 7, 2015 by Dynamic Traffic, LLC in order to provide an accurate representation of the volumes along the adjacent roadway network. This 2015 count data was then adjusted utilizing a documented annual growth rate of 0.5% for seven (7) years to Year-2022. The adjusted 2022 traffic volumes along Lane Avenue were determined to be somewhat higher than the recent November 2022) volumes and therefore conservatively utilized for further analysis purposes.

The above methodology is consistent with the Stonefield Engineering Traffic & Parking Assessment Report dated June 2, 2021 prepared for the 112-unit residential development to the north of the subject site. Based on the review of this volume data the weekday morning peak hour occurred from 7:45 a.m. to 8:45 a.m. and the weekday evening peak hour occurred from 4:30 p.m. to 5:30 p.m.

Two-way volumes of Lane Avenue across the site frontage are as provided in Table I:

Table I
2022 Traffic Volumes of Lane Avenue Along Site Frontage

AM PSH			PM PSH		
NB	SB	Total	NB	SB	Total
232	381	613	251	211	462

FUTURE CONDITIONS

Regardless of whether the subject site is developed or not, traffic volumes on the surrounding roadways are expected to increase as a result of developments throughout the region. The growth rate for the base volumes of Lane Avenue were further adjusted.

Future 2023 No Build traffic volumes were developed by applying the background growth rate of 1.0% for one (1) year to the 2022 traffic volumes and including the net trip generation of the single family and multi-family residential project of Block 41, Lots 2, 3, 3.01, and 4 and provided in Table II:

Table II
Future 2023 No-Build Traffic Volumes of Lane Avenue

AM PSH			PM PSH		
NB	SB	Total	NB	SB	Total
248	417	665	276	227	503

Traffic Generation

Projections of future traffic volumes were developed utilizing data as published in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition* for Land Use Code (LUC) 221 – Multi-Family Housing (Mid-Rise) – Not Close to rail Transit in a Suburban Setting. Table III summarizes the projected trips generated by the proposed development utilizing the ITE data.

Table III
Trip Generation 44 Units – Proposed Total Driveway Volumes

Land Use	AM PSH			PM PSH		
	In	Out	Total	In	Out	Total
44 Unit Multi-Family Housing	4	12	16	10	7	17

It is noted that the site is serviced by readily available and convenient bus-mass transit. There are a total of two (2) NJ Transit Bus Routes within less than ¼ mile walking distance of the site. These public transit services will diminish the trip and parking generation of the site to some degree, yet no adjustment was taken to decrease the trip generation that would be offset by available bus transit service.

Based on the orientation of existing traffic volumes and the setting of the site within the surrounding arterial network, the following trip distribution of Table IV is projected:

Table IV
Trip Distribution

AM PSH			PM PSH		
NB	SB	Total	NB	SB	Total
40%	60%	100%	55%	45%	100%

Based on the net increase in traffic of Table III and the projected distribution of Table IV, the intersection of Lane Avenue and Bloomfield Avenue will experience an increase of 9 trips during the morning peak hour and 10 trips during the evening peak hour. At the intersection of Lane Avenue with Westville Avenue and Runnymede Road there is a projected increase of 7 trips during the morning peak hour and evening peak hour.

Furthermore, it should be noted that the number of new trips falls below the industry accepted standard of a significant increase in traffic of 100 trips. Based on *Transportation Impact Analysis for Site Development*, published by the ITE “it is suggested that a transportation impact study be conducted whenever a proposed development will generate 100 or more added (new) trips during the adjacent roadways’ peak hour or the development’s peak hour.” Additionally, NJDOT has determined that the same 100 vehicle threshold is considered a “significant increase in traffic,” hence, it is not anticipated that the proposed mixed-use development will have any perceptible impact on the traffic operation of the adjacent roadway network. As presented above, the subject development will generate a maximum of only 10 % or less of this threshold.

Therefore, the intersections of Lane Avenue with Bloomfield Avenue to the north and the intersection of Lane Avenue with Westville Avenue/Runnymede Road to the south will not experience a significant increase in traffic and the proposed development will have no significant impact on those nearest intersections. Given the excellent dispersion capabilities beyond these aforementioned intersections, those beyond them will experience even lesser traffic volumes and lesser potential impacts.

This is further exemplified by the resultant capacity analyses of these two (2) studied intersections included in the aforementioned Stonefield traffic report which shows these intersections operating at Level of Service “B”, with more than sufficient reserve capacity to accommodate the addition of the very low volumes generated by the proposed 44-unit development.

Future Capacity Analysis

The methodology utilized in the capacity analyses of the unsignalized site driveway is described in Special Report 209, *Highway Capacity Manual 2010*, published by the Transportation Research Board. In general, the term Level of Service (LOS) is used to provide a “qualitative” evaluation of capacity based upon certain “quantitative” calculations related to empirical values, such as traffic volume and intersection control.

An unsignalized (STOP sign controlled) driveway or side street along a through route is seldom critical from an overall capacity standpoint, however, it may be of great significance to the capacity of the minor cross-route, and it may influence the quality of traffic flow on both. When analyzing an unsignalized intersection, it is assumed that both the major street through and right turn movements are unimpeded and have the right-of-way over all side street traffic and left turns from the major street. All other turning movements in the intersection cross, merge with, or are otherwise impeded by major street movements. Traffic delays at unsignalized intersections are determined by sequentially processing these impeded movements. Table V describes the level of service ranges for unsignalized (stop controlled) intersections.

**Table V
Level of Service Criteria
for Unsignalized Intersections**

Level of Service	Average Control Delay (seconds per vehicle)
a	0.0 to 10.0
b	10.1 to 15.0
c	15.1 to 25.0
d	25.1 to 35.0
e	35.1 to 50.0
f	greater than 50.0

It should be noted that the analyses within the 2010 Highway Capacity Manual assume a random arrival for all the movements, which may not be the case if an adjacent traffic signal is present that platoons vehicles. In this case, a traffic signal as located approximately 750 feet to the north and another signal less than 1/2-mile to the south of the site, which will have a beneficial effect on the operational conditions of the site access driveway.

All capacity analyses were performed utilizing Highway Capacity Software 2010.

Operational conditions at the study intersections were analyzed under the future 2023 Build conditions and are summarized in Table V below.

**Table V
Future Levels of Service**

Intersection	Direction/ Movement		AM PSH		PM PSH	
			No Build	Build	No Build	Build
Lane Avenue & Site Driveway	WB	LR	-	b (12)	-	b (11)
	SB	LT	-	a (8)	-	a (8)

a (#) - Unsignalized Intersection Level of Service (seconds of delay per vehicle)

With the addition of the site traffic the intersection movements will operate with very favorable levels of service “B” or better during the AM and PM peak hours.

SITE PLAN

Site Access and Circulation

The site plan was reviewed with respect to the site access and on-site circulation design. As noted previously, access to The Project will be provided via a single full movement driveway along Lane Avenue.

The proposed parking lot will be serviced by parking maneuvering aisles with a sufficient width of 24 feet, which will allow for ample two-way circulation and 90 degree parking.

Parking

The Borough of Caldwell Redevelopment Plan sets forth a minimum/maximum parking requirement of 88/132 parking spaces, respectively. The site as proposed provides 99 parking spaces and complies with these requirements

It is proposed to provide parking stalls with dimensions of 9 feet x 18 feet which meet the Redevelopment Plan and RSIS standards.

FINDINGS & CONCLUSIONS

Findings

Based upon the detailed analyses as documented herein, the following findings are noted:

- The proposed 44 multi-family residential units, will generate a net increase of 4 entering trips and 12 exiting trips during the morning peak hour and 10 entering trips and 7 exiting trips during the evening peak hour.
- Given the low magnitude of peak hour trips and the distribution to and from the site, there will be no significant increase of traffic volume to surrounding roadways and intersections that will produce a significant detrimental traffic impact.
- Access to the site will be provided via a single full-movement driveway along Lane Avenue.
- With the addition of the site generated traffic the intersection movements of Lane Avenue and the site driveway will operate with favorable levels of service “B” or better during the peak hours studied.
- As proposed, The Project’s site driveways and internal circulation have been designed to provide for safe and efficient movement of all vehicles that will utilize the site layout.
- The proposed parking supply and design is sufficient to support the projected demand and meets the Borough requirements.

Conclusions

Based upon our Traffic Impact Study as detailed in the body of this report, it is my professional opinion that the adjacent street system of the Borough of Caldwell will not experience any significant degradation in operating conditions with the construction of The Project. The site driveway is located to provide safe and efficient access to the adjacent roadway system. The site plan as proposed provides for good circulation throughout the site and provides adequate parking to accommodate The Project’s needs.

Technical Appendix

PROJECT

CALDWELL MANOR

SUBJECT

2023 FUTURE BUILD VOLUMES

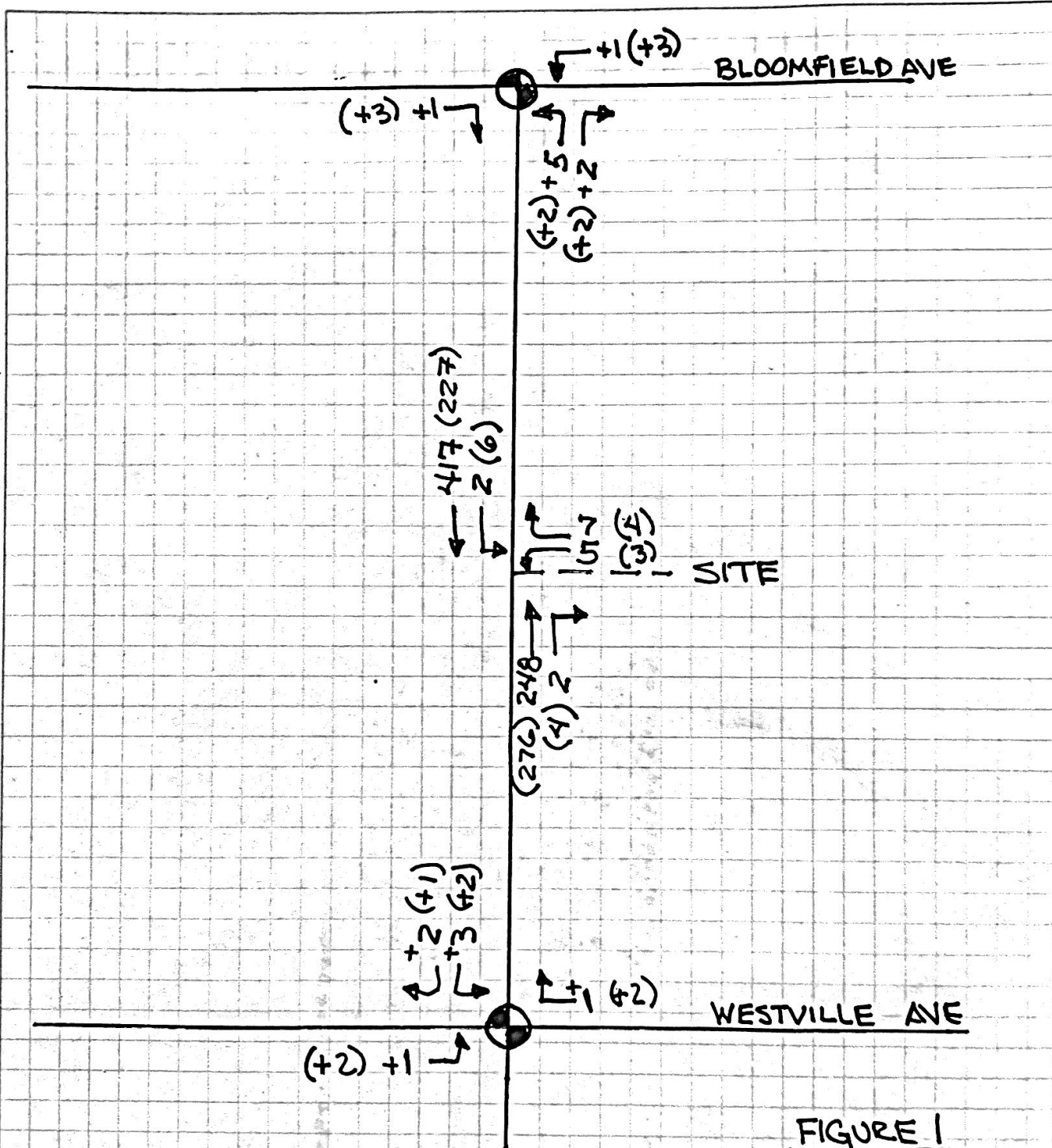


FIGURE 1

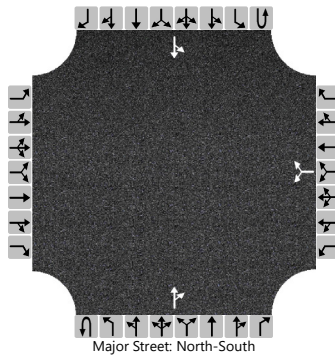
ABOVE ILLUSTRATION SHOWS PEAK HOUR DRIVEWAY VOLUMES AND INCREASE TO THE SIGNALIZED INTERSECTION

FUTURE 2023 BUILD AM (PM) VOLUMES

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	JJS			Intersection	Lane Ave & Site Driveway		
Agency/Co.				Jurisdiction			
Date Performed	11/27/2022			East/West Street	Site Driveway		
Analysis Year	2023			North/South Street	Lane Avenue		
Time Analyzed	AM PEAK HOUR			Peak Hour Factor	0.94		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Caldwell Manor						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		7			248	2		3	417	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1	
Critical Headway (sec)						6.43		6.23							4.13	
Base Follow-Up Headway (sec)						3.5		3.3							2.2	
Follow-Up Headway (sec)						3.53		3.33							2.23	

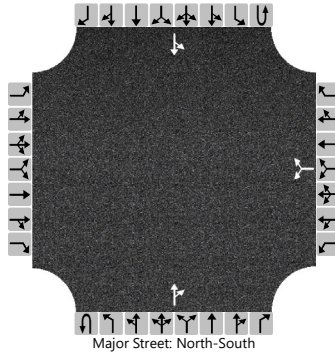
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						13								3		
Capacity, c (veh/h)						552								1292		
v/c Ratio						0.02								0.00		
95% Queue Length, Q ₉₅ (veh)						0.1								0.0		
Control Delay (s/veh)						11.7								7.8	0.0	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)						11.7								0.1		
Approach LOS						B								A		

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	JJS			Intersection	Lane Ave & Site Driveway		
Agency/Co.				Jurisdiction			
Date Performed	11/27/2022			East/West Street	Site Driveway		
Analysis Year	2023			North/South Street	Lane Avenue		
Time Analyzed	PM PEAK HOUR			Peak Hour Factor	0.94		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	Caldwell Manor						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						4		3			276	4		6	227	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1	
Critical Headway (sec)						6.43		6.23							4.13	
Base Follow-Up Headway (sec)						3.5		3.3							2.2	
Follow-Up Headway (sec)						3.53		3.33							2.23	

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						7									6	
Capacity, c (veh/h)						574									1258	
v/c Ratio						0.01									0.01	
95% Queue Length, Q ₉₅ (veh)						0.0									0.0	
Control Delay (s/veh)						11.3									7.9	0.0
Level of Service (LOS)						B									A	A
Approach Delay (s/veh)						11.3								0.2		
Approach LOS						B								A		