# **TRAFFIC IMPACT STUDY**



# CAPODAGLI PROPERTY COMPANY, LLC/ MERIDIA, LLC

Meridia Village Commons Proposed Mixed Use Building 4<sup>th</sup> Street & Valley Street Block 2303, Lots 7-11 Township of South Orange Village Essex County, New Jersey



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# INTRODUCTION

It is proposed to construct a 5 story building with a 5,152 square feet of ground floor retail space, a 5,093 square foot restaurant and one hundred six (106) residential units (The Project). The site is located in the southwest quadrant of the intersection of Valley Street (CR 638) with Fourth Street, in the Township of South Orange Village, Essex County, New Jersey as shown on Figure 1 contained in Appendix A. The site is designated as Block 2303 – Lots 7-11 on the Township Tax Maps. Parking will be provided via one hundred twenty four (124) parking stalls on the lower level of the building, six (6) parallel parking spaces on Valley Street and eleven (11) parallel parking spaces on Fourth Street. Access to the proposed site will be provided via one (1) full movement driveway along Fourth Street. The property is currently occupied by four dwellings and an automotive service center, with access provided via two (2) full movement driveways along Fourth Street and six (6) full movement driveways along Valley Street.

Dynamic Traffic, 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, pedestrian crossings, sidewalk widths and location and geometry of existing driveways and intersections.
- Existing traffic and pedestrian data was collected via manual turning movement (MTM) counts during the weekday AM and weekday PM peak periods at four intersections in the vicinity of the site.
- Projections of traffic to be generated by the proposed development 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 Existing, No Build and Build conditions for the study intersection and the site driveways.
- 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.



# **EXISTING CONDITIONS**

A review of the existing roadway conditions near the subject 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:

<u>Valley Street (CR 638)</u> is an urban minor arterial roadway under the jurisdiction of Essex County. In the vicinity of the site the posted speed limit is 30 miles per hour and the roadway provides one travel lane in each direction with a general north/south orientation. On-street parking is permitted along both sides of the roadway with curb and sidewalk provided along both sides of the roadway. Valley Street provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Valley Street in the vicinity of The Project are a mix of commercial and residential.

<u>Academy Street</u> is an urban major collector roadway under the jurisdiction of the Township of South Orange Village. 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 with a general north/south orientation. On-street parking is permitted along the west side of the roadway with curb and sidewalk provided along both sides of the roadway. Academy Street provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Academy Street in the vicinity of The Project are primarily residential.

<u>Fourth Street</u> is a local roadway under the jurisdiction of the Township of South Orange Village. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane for each direction of travel with a general east/west orientation. Fourth Street to the east of Academy Street provides one travel lane for one-way travel in the westbound direction. On-street parking is permitted along the south side of the roadway with curb and sidewalk provided along both sides of the roadway. Fourth Street provides a straight horizontal alignment and an uphill vertical alignment from west to east. The roadway is approximately ¼ of a mile long traversing from Prospect Street to its terminus just west of the site at the New Jersey Transit Rail Lines. At this western terminus there is access to the PSE&G utilities substation which will remain as existing. On school days during the hours of 7:30 AM to 5:00 PM Fourth Street is closed from Academy Street to Prospect Street in front of Our Lady of Sorrows School/Church. The land uses along Fourth Street in the vicinity of The Project are primarily commercial to the west of Valley Street and primarily residential to the east of Valley Street.

<u>Third Street</u> is a local roadway under the jurisdiction of the Township of South Orange Village. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane for each direction of travel with a general east/west orientation. On-street parking is permitted along the north side of the roadway with curb and sidewalk provided along both sides of the roadway. Third Street provides a straight horizontal alignment and an uphill vertical alignment from west to east. The roadway is approximately ½ of a mile long traversing from Prospect Street to South Ridgewood Road. The land uses along Third Street in the vicinity of The Project are a mix of commercial and residential.



<u>Massel Terrace</u> is a local roadway under the jurisdiction of the Township of South Orange Village. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane for each direction of travel with a general east/west orientation. On-street parking is permitted along both sides of the roadway with curb and sidewalk provided along both sides of the roadway. Massel Terrace provides a straight horizontal alignment and an uphill vertical alignment from west to east. The roadway is approximately 440 feet long traversing from Prospect Street to Academy Street. The land uses along Massel Terrace in the vicinity of The Project are primarily residential.

# **Existing Traffic Volumes**

Manual turning movement (MTM) counts were conducted on Wednesday, June 7, 2017 between 7:00 AM and 9:00 AM and between 4:30 PM and 6:30 PM at the intersections of Valley Street with Fourth Street, Valley Street with Third Street, Valley Street with Massel Terrace and Academy Street with Fourth Street. Review of the collected traffic data reveals that the weekday morning peak street hour (PSH) occurs between 7:30–8:30 AM and the Evening PSH occurs between 5:15–6:15 PM. Figure 2 in Appendix A shows the existing peak hour traffic volumes at the study intersection.

#### **Existing Pedestrian Movements**

Pedestrian counts were also conducted on Wednesday, June 7, 2017 between 7:00 AM and 9:00 AM and between 4:30 PM and 6:30 PM at the intersections of Valley Street with Fourth Street, Valley Street with Third Street, Valley Street with Massel Terrace and Academy Street with Fourth Street. The following Table I summarizes the results of the pedestrian counts during the peak hours of the roadway. The pedestrian movements were utilized in the capacity analysis that are included in Appendix C.

Pedestrian Volumes							
Interestion	Annuash	Pedestrians per Hour					
Intersection	Approacn	AM PSH	PM PSH				
	Eastbound	19	17				
Valley Street and Third Street	Westbound	33	18				
	Northbound	19	20				
	Southbound	85	15				
Valley Street and Fourth Street	Eastbound	35	21				
	Westbound	34	12				
	Northbound	1	1				
	Southbound	13	3				
Valley Street and Massel Terrace	Westbound	32	18				
	Northbound	0	0				
	Southbound	0	0				
Fourth Street and Academy Street	Eastbound	24	9				
	Westbound	44	5				
	Northbound	3	3				
	Southbound	24	1				

Table I Pedestrian Volumes



# **Existing Capacity Analysis**

The methodology utilized in the capacity analyses is described in the, *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.

At the signalized intersections, factors that affect the various approach capacities include width of approach, number of lanes, signal "green time", turning percentages, truck volumes, etc. However, delays cannot be related to capacity in a simple one-to-one fashion. For example, it is possible to have delays in the Level of Service "F" range without exceeding roadway capacity. Substantial delays can exist without exceeding capacity if one or more of the following conditions exist: long signal cycle lengths; a particular traffic movement experiences a long red time; or progressive movement for a particular lane group is poor. Table II describes the level of service ranges for signalized intersections.

for Signalized Intersections					
Level of	Average Control Delay				
Service	(seconds per vehicle)				
А	0.0 to 10.0				
В	10.1 to 20.0				
С	20.1 to 35.0				
D	35.1 to 55.0				
E	55.1 to 80.0				
F	greater than 80.0				

Table II
Level of Service Criteria
for Signalized Intersections

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 III describes the level of service ranges for unsignalized (stop controlled) intersections.

# Table III Level of Service Criteria for Unsignalized Intersections

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



All capacity analyses were performed utilizing the SYNCHRO software package. Table IV summarizes the existing levels of service (LOS) and delay in seconds per vehicle. All Capacity analysis calculation worksheets are contained in Appendix C.

Existing Levels of Service						
Intersection	Direction/ Movement		Direction/ Movement		AM PSH	PM PSH
	EB	LTR	C (22)	C (22)		
	WB	LTR	C (24)	C (22)		
Valley Street and Third Street	NB	LTR	C (22)	C (24)		
	SB	LTR	C (21)	B (20)		
	Overall		C (22)	C (22)		
	EB	LTR	b (14)	d (29)		
Valley Street and Fourth Street	WB	LTR	c (17)	c (19)		
	NB	LTR	a (9)	a (0)		
	SB	LTR	a (9)	a (9)		
Valley Street and Massel	WB	LR	b (14)	c (20)		
Terrace	SB	LT	a (8)	a (9)		
	EB	LR	b (12)	b (10)		
Fourth Street and Academy	WD	L	b (12)	b (10)		
Street	VV D	TR	b (11)	a (10)		
	NB	LT	a (8)	a (7)		

Table IV				
Existing Levels of Service				

A (#) - Signalized Intersection Level of Service (seconds of delay per vehicle)

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

The following are discussions pertaining to each of the existing intersections analyzed. It should be noted that the existing percentage of trucks and peak hour factors were used in the existing analysis.

# Valley Street and Third Street

Third Street intersects Valley Street to form a four-leg signalized intersection. All four approaches provide a shared left turn/through/right turn lane. The intersection has crosswalks on all four legs of the intersections with only the southwest corner having an ADA compliant detectable warning surface. Pedestrian-oriented traffic signals are provided although "Man/Hand" pedestrian signal heads are not. The sidewalks in the vicinity of this intersection range from 5' to 8' wide.

A review of the existing analysis reveals that the intersection operates at overall acceptable level of service "C" during the AM and PM analyzed peak periods. See Table IV for the individual movement levels of service and delays.

# Valley Street and Fourth Street

Fourth Street intersects Valley Street to form a four-leg unsignalized intersection with Fourth Street under stop control. All four approaches provide a shared left turn/through/right turn lane. The intersection has crosswalks on all four legs of the intersections with no ADA compliant detectable warning surfaces present. The sidewalks in the vicinity of this intersection range from 3' to 4' wide.



A review of the existing analysis reveals that the individual intersection movements operate at acceptable level of service "C" or better during the AM and PM analyzed peak periods. See Table IV for the individual movement levels of service and delays.

#### Valley Street and Massel Terrace

Massel Terrace intersects Valley Street to form an unsignalized T-intersection with Massel Terrace under stop control. The westbound approach of Massel Terrace provides a shared left turn/right turn lane. The northbound and southbound approaches of Valley Street provide a shared through/right turn lane and a shared left turn/through lane respectively. The intersection has a crosswalk to cross the Massel Terrace leg of the intersection with no ADA compliant curb ramps present. The sidewalks in the vicinity of this intersection range from 5' to 8' wide.

A review of the existing analysis reveals that the individual intersection movements operate at acceptable level of service "C" or better during the AM and PM analyzed peak periods. See Table IV for the individual movement levels of service and delays.

#### Fourth Street and Academy Street

Fourth Street intersects Academy Street to form a four-leg unsignalized intersection with Fourth Street under stop control. The eastbound approach of Fourth Street provides a shared left turn/through lane. The westbound approach of Fourth Street provides a left turn lane and a shared through/right turn lane. The northbound and southbound approaches of Academy Street provide a shared left turn/through lane and a shared through/right turn lane respectively. The intersection has crosswalks on all four legs of the intersection with only the northeast and southeast corners having ADA compliant detectable warning surfaces. The sidewalks in the vicinity of this intersection range from 4' to 8' wide.

A review of the existing analysis reveals that the individual intersection movements operate at favorable level of service "B" or better during the AM and PM analyzed peak periods. See Table IV for the individual movement levels of service and delays.



# **FUTURE CONDITIONS**

Traffic volumes and operational analyses were developed for both the Future No Build and Build conditions. The no build conditions provide a baseline for assessing the impact of site development traffic on the roadway system. The process of developing the No Build and Build traffic volumes and the subsequent analyses is outlined below.

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. A growth rate for roadways within the study area was obtained from the NJDOT Annual Background Growth Rate Table, which indicates a growth rate of 2.0% per year.

Future No Build traffic volumes were developed by applying the background growth rate of 2.0% per year for two (2) years to the study area roadways existing traffic volumes. Figure 3, in Appendix A of this report, shows the Future No Build traffic volumes.

### Traffic Generation

Projections of future traffic volumes were developed utilizing data as published in the Institute of Transportation Engineers (ITE) publication *Trip Generation*, 9<sup>th</sup> Edition for Land Use Code (LUC) 223 – Mid-Rise Apartments, LUC 932 – High-Turnover (Sit-Down) Restaurant and LUC 820 – Shopping Center. Table V summarizes the projected trips generated by the proposed development utilizing the ITE data.

Land Use	AM PSH			PM PSH		
	In	Out	Total	In	Out	Total
106 Residential Units	9	21	30	23	17	40
5,152 Square Foot Shopping Center	3	2	5	9	10	19
5,093 Square Foot Restaurant	30	25	55	30	20	50
Total	42	48	90	62	47	109

Table V

The ITE publication *Trip Generation Handbook*,  $9^{th}$  *Edition*, recognizes that when land uses are proximate to each other, individual land uses tend to interact, reducing the overall trip generation for the site. In order to perform a more conservative analysis no credit was taken for the "internally captured" trips associated with the individual uses. It should also be noted that, conservatively, no credit was taken for passby trips associated with the shopping center portion of the site.

One of the attractive features for prospective tenants is that within a half mile of the site there is access to New Jersey Transit bus lines 92, 107 and the Morris & Essex Rail Line. However, no adjustments are made to the ITE trip rate data to account for the likely high utilization of mass transit for daily commutation purposes for the future tenants of the proposed building. Furthermore no credit was



taken for the existing use of the site which currently generates traffic. All trip generation was considered an increase over vacant land. This allows for a conservative projection of a "worst case" scenario.

Once the magnitude of traffic to be generated by the site is known, it is necessary to assign that traffic to the adjacent street system. The distribution of site traffic to the surrounding roadways is based on the location of primary arterial roadways, major signalized intersections, and existing traffic patterns. Located in Appendix A, Figure 4 illustrates the site generated traffic volumes. The site generated volumes were added to the Future No Build traffic volumes to generate the Future Build traffic volumes, which are shown in Figure 5.

### **Future Capacity Analysis**

Operational conditions at the study intersections were analyzed under the No Build and Build conditions and are summarized in Table VI below.

Future Levels of Service						
	Direction/ Movement		AM PSH		PM PSH	
Intersection			No Build	Build	No Build	Build
	EB	LTR	C (23)	C (23)	C (22)	C (23)
	WB	LTR	C (25)	C (25)	C (22)	C (22)
Valley Street and Third Street	NB	LTR	C (23)	C (26)	C (27)	C (30)
	SB	LTR	C (21)	C (22)	C (21)	C (22)
	Overall		C (23)	C (24)	C (23)	C (25)
	EB	LTR	b (14)	e (36)	d (31)	e (48)
Valley Street and Fourth Street	WB	LTR	c (18)	c (20)	c (20)	d (26)
	NB	LTR	a (9)	a (9)	a (0)	a (9)
	SB	LTR	a (9)	a (10)	a (9)	a (9)
Valley Street and Massel Terrace	WB	LR	b (15)	b (15)	c (21)	c (22)
	SB	LT	a (8)	a (9)	a (9)	a (9)
	EB	LR	b (12)	b (12)	b (11)	b (11)
Fourth Street and Academy	WD	L	b (13)	b (13)	b (10)	b (10)
Street	W D	TR	b (11)	b (11)	a (10)	b (10)
	NB	LT	a (8)	a (8)	a (8)	a (8)
Site Driveway and Fourth	WB	LT	-	a (7)	-	a (7)
Street	NB	R	-	a (9)	-	a (9)

Table VI Future Levels of Service

A (#) - Signalized Intersection Level of Service (seconds of delay per vehicle)

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



# Valley Street and Third Street

With the addition of the site traffic the intersection will continue to operate at overall acceptable level of service "C" or better during the AM and PM peak hours, maintaining the no build levels of service. See Table VI for the individual movement levels of service and delays.

#### Valley Street and Fourth Street

With the addition of the site traffic the individual intersection movements will operate at level of service "E" or better during the AM and PM peak hours. See Table VI for the individual movement levels of service and delays. It should also be noted that the sidewalks along the property frontage will be improved and widened and that ADA compliant curb ramps will be installed in the southwest corner of the intersection.

#### Valley Street and Massel Terrace

With the addition of the site traffic the individual intersection movements will continue to operate at acceptable level of service "C" or better during the AM and PM peak hours, maintaining the no build levels of service. See Table VI for the individual movement levels of service and delays.

#### Academy Street and Fourth Street

With the addition of the site traffic the individual intersection movements will continue to operate at favorable level of service "B" or better during the AM and PM peak hours, maintaining the no build levels of service. See Table VI for the individual movement levels of service and delays.

#### Fourth Street and the Site Driveway

The site driveway is proposed to intersect Fourth Street to form a three-leg unsignalized intersection with the site driveway under stop control. The eastbound and westbound approaches of Fourth Street will provide a shared through/right turn lane and a shared left turn/through lane respectively. The northbound approach of the site driveway will provide one lane for left and right turns.

With the addition of the site traffic the individual intersection movements will operate at favorable level of service "A" during the AM and PM analyzed peak periods. See Table VI for the individual movement levels of service and delays. Access to the PSE& G substation exists to the west of the site driveway and will remain. It is expected that this minimally utilized access point will continue to function adequately in its existing location.



# SITE PLAN

#### Site Access

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 one (1) full movement driveway along Fourth Street. The proposed access layout is an improvement over the existing layout which currently provides two (2) full movement driveways along Valley Street and six (6) full movement driveways along Fourth Street. A loading zone will be provided along Fourth Street and loading/unloading will be conducted during off peak hours of the surrounding roadways.



# FINDINGS & CONCLUSIONS

# Findings

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

- The proposed 5,152 square feet of retail space, 5,093 square foot restaurant and 106 residential units will generate 42 entering trips and 48 exiting trips during the morning peak hour and 62 entering trips and 47 exiting trips during the evening peak hour. This is based on a conservative assessment of trip generation with no credit for mass transit usage, internal trips or passby trips.
- Access to the site will be provided via one (1) full movement driveway along Fourth Street. Sidewalks and pedestrian amenities will be upgraded along the subject property frontages.
- With the addition of the site generated traffic, the intersection of Valley Street with Third Street will continue to operate at overall acceptable level of service "C" or better during the AM and PM peak hours, maintaining the no build levels of service.
- With the addition of the site generated traffic, the individual intersection movements of Valley Street with Fourth Street will operate at level of service "E" or better during the AM and PM peak hours.
- With the addition of the site generated traffic, the individual intersection movements of Valley Street with Massel Terrace will continue to operate at acceptable level of service "C" or better during the AM and PM peak hours, maintaining the no build level of service.
- With the addition of the site generated traffic, the individual intersection movements of Academy Street with Fourth Street will continue to operate at acceptable level of service "B" or better during the AM and PM peak hours, maintaining the no build level of service.
- With the addition of the site generated traffic, the individual intersection movements of Fourth Street and the site driveway will operate at favorable level of service "A" during the AM and PM peak hours.
- The on-site parking is compatible with roadway traffic as required by the redevelopment plan.
- As proposed, The Project's site driveways have been designed to provide for safe and efficient movement of vehicles on-site.

# Conclusions

Based upon our Traffic Impact Study as detailed in the body of this report, it is the professional opinion of Dynamic Traffic LLC that the adjacent street system of the Township of South Orange Village and County of Essex 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.

Appendix A Volume Figures Appendix B Traffic Counts Appendix C Capacity Analysis