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VIA HAND DELIVERY

August 30, 2016

Mayor Lombardo and Council Members  
The Borough of Garwood  
403 South Avenue  
Garwood, NJ 07027

Re: **South Avenue Redevelopment Plan**  
**Garwood, New Jersey**

Dear Mayor Lombardo and Council Members:

I am writing to respond to certain recent statements concerning the financial impacts and other aspects of our proposed redevelopment of the properties commonly referred to as the Casale and Petro properties, which together comprise the majority of the Borough's South Avenue Redevelopment Area. We felt it was important that the Mayor and Council have the fiscal analysis completed by our economist, Richard Reading and Associates, when considering the adoption of the South Avenue Redevelopment Plan at its September 13, 2016 meeting. The approval and adoption of the Redevelopment Plan represents a critical step towards the successful redevelopment of the Casale/Petro properties, and I encourage you to approve the adoption of the Plan, which is in the best interests of the Borough and the Garwood community.

Our company has owned the Petro property since June 2014, and we are the contract purchaser of Casale properties, which together comprise the majority of the Redevelopment Area. We have invested approximately \$4 million in land acquisition, environmental testing, design/engineering work, real estate taxes, legal fees, and other costs since we began working on this project in January 2012, and we are committed to the successful redevelopment of this property.

I wanted to specifically respond to comments or written statements made by members of the Council or public since our April 18th and April 25th appearances before the Planning Board for the Governing Body's consideration, some of which included inaccurate statements about our proposed redevelopment. Comments and questions have been raised regarding the fiscal impacts of the project and the financial feasibility of our proposed development, including a 3-page memo recently published online by the Westfield Leader, which included the following conclusions:

- That the Borough should prepare a Financial Plan for the project;
- That the Borough should consider other alternates for the project besides redevelopment including "Reduce the Scope", "Do Nothing" or "Make a Park;"
- It makes several conclusions regarding the fiscal impacts of the project and the revenues that would need to be generated by the project in order for the community to "break even;"



While we respect the writer's intent to create awareness and discussion regarding potential impacts of the redevelopment project, and to ensure that the Governing Body is carefully considering the fiscal impacts of the project, the published analysis is incomplete and the financial calculations/conclusions made are not accurate. Although it is premature for us to formally present the financial model for the project until the Redevelopment Plan has been adopted, and the Borough will have an opportunity to thoroughly review the project's financial implications as part of its formal review of our PILOT application which will be submitted immediately following the Council's adoption of the Redevelopment Plan, we felt it was important to provide certain fundamental information regarding the project's potential fiscal impacts for the Governing Body's consideration prior to adoption of the Redevelopment Plan.

Our company retained Richard B. Reading, a Princeton based economist who has testified before and represented hundreds of governing bodies and land use boards in New Jersey during the past thirty years, to prepare a fiscal impact analysis for the proposed development. I am pleased to enclose for your consideration the 49-page fiscal report issued in April 2016 authored by Mr. Reading (Exhibit "A"). The report provides a careful and detailed analysis of Garwood's existing economic base (including its population, housing trends, school system, and ratable base), the fiscal impacts of our proposed redevelopment (affecting the municipality, school system, and county), and the projected revenues of the proposed redevelopment. The Reading Report then compares the projected fiscal impacts to the projected revenues and calculates the net fiscal benefit of the project.

It is important to note that Mr. Reading has modeled the fiscal impacts of the project on a very conservative basis, at our direction, so that both we and the Governing Body could be comfortable that the report's conclusions were supportable, readily achievable, and not overly optimistic. The main conclusions of the Reading report are as follows:

- The total PILOT revenues generated by the project would be \$880,518 per year, of which \$58,439 would be paid to the County and the remaining \$822,079 would be retained by the Borough (\$778,506) and School System (\$43,573). Currently, the property is generating approximately \$233,221 in annual taxes of which \$80,617 are retained by the municipality and \$105,909 are paid to the school system.
- The estimated cost of municipal services for the residential component of the project is \$345,790 (\$631 per capita on 548 estimated residents) and the estimated cost for the retail component is \$20,640, for a total municipal service cost of \$366,430. Please note that this estimate was calculated by applying the average cost per capita of all municipal service costs in the Borough not the marginal cost of the additional residents, which is a purposely conservative way of estimating the anticipated costs. In reality, the marginal cost of the additional residents will be significantly less than the average cost because infrastructure, personnel and additional capacity are already available to the Borough. It is also important to note that our project will privately provide many municipal services including garbage collection, snowplowing, etc. materially reducing any actual costs to the Borough.
- Mr. Reading's fiscal analysis calculated that the project would generate approximately 28 public school children (or ~ 9 children per 100 units) using statewide data published by The Center for Urban Policy Research at Rutgers University. Reliance upon the Rutgers data produces a very conservative estimate relative to the actual number of public school children that reside in other nearby apartment projects more relevant to the proposed transit oriented development in Garwood

specifically. Please see attached Exhibit “B” for a survey we completed of the actual number of school age children residing in similar, nearby projects in Garwood, Cranford and Westfield which was presented to the Garwood Planning Board during the April 18th and April 25th public hearings. The survey data indicates that the total number of public school age children will be less than 10. Please note that several existing apartment projects in Garwood and Cranford including Stephanie Gardens (36 units), Riverfront at Cranford Station (108 units) and Cranford Crossing (50 units) have zero children enrolled in the public school system as confirmed in writing by the Superintendents for each system. The lack of school age children at the Riverfront project in Cranford is particularly noteworthy given that project includes affordable housing and is similar to the proposed development, although approximately 80% of the units in that project are 2 bedroom units as opposed to our proposed development which proposes only 30% 2 bedroom units and mostly studio or 1 bedroom units. In fact, the project with the highest number of school age children (Woodmont Station at Cranford) had a total of 17 school age children (or 6.2 children per 100 bedrooms) which is less than the 6.6 children per 100 bedrooms that the Reading Report conservatively estimates for our redevelopment project. The data is clear that projects like our proposed development which have (i) structured parking; (ii) elevators; (iii) are transit oriented and located in a downtown location; and (iv) have a very heavy ratio of studio and one bedroom units and zero, market rate three bedroom units, are not attractive to families and generate very few public school age children.

- Mr. Reading calculated estimated school impacts by applying the actual, tax-supported Garwood School District cost of \$14,457 per student (for the 2015-2016 school year) to the 28 estimated school children for a total cost of \$404,800 per year. In addition to assuming 28 school age children, which is a conservative number given the data presented above, Mr. Reading used the average cost per student for his calculation instead of the marginal cost. As was the case in his calculation for municipal service costs, using average per capita costs instead of marginal costs produces a deliberately overstated cost assumption. The actual costs to the school system will be far less than the amount assumed for the Reading report especially considering that total enrollment at Garwood’s sole public school (Lincoln School) has declined from 580 students in the 2006-2007 school year to 512 students in the 2015-2016 school year, and the relatively small number of anticipated students will be using existing infrastructure and personnel already present in the Borough school system.
- Despite using very conservative assumptions in his report, Mr. Reading has concluded that the total municipal revenues of \$822,079 exceed the total municipal and school system costs of \$771,230 and that the project will result in a net fiscal benefit to the community. It is important to note that this analysis excludes all other revenue sources for the Borough such as construction permit fees which will be very significant.

In addition to recent comments regarding the fiscal impacts of the project, a number of public comments have been made regarding the size of our proposed development and the proposed density. Garwood’s planner provided detailed testimony to the Planning Board at five public hearings between November 2015 and April 2016 regarding the appropriateness of the proposed 315 unit, 4-story building from a planning, engineering, and architectural perspective, however we felt it was important to further address recent comments regarding the project size. It is important to note that nearly all mixed-use, transit oriented developments completed in similar communities to Garwood have had 4-story or higher buildings. Please see the table attached as Exhibit “C” which lists 9 nearby or transit oriented projects that provides the numbers of units, bedroom distribution, land area, and densities (on both a per unit and per bedroom basis)



for each project. It is important to note that the bedroom density proposed for our project (80.4 per acre) is comparable to or less than the other projects noted (several of which have bedroom densities of over 100 per acre). It is also important to note that all of the projects have at least 4 floors, and none have a 4th floor setback which our project contemplates along the full length of the property facing both South Avenue and Center Street. Our project also proposes more significant ground-level building setbacks than other comparable projects as suggested by the Borough's Planner, Victor Vinegra, and required by the proposed Redevelopment Plan.

I attended several of the Planning Board meetings held regarding the project including the two in April that were attended by many residents, and both I and other members of our company who attended carefully listened to and considered all of the comments, both positive and negative, regarding the Redevelopment Plan of our project. It seems that the primary concern from certain members of the Council and the community regarding the size of the project is the impact it might have on traffic conditions along South Avenue, North Avenue, and Center Street. We recognize that traffic conditions in Garwood's downtown particularly at the North Avenue/Center Street and South Avenue/Center intersections are poor during certain peak times, however the reality is that the vehicle trips generated by our project will only represent a few percent of the total vehicle trips that pass through the adjacent roadways and intersections on a daily basis, so the project as now proposed will not have any significant impact on the existing traffic conditions in these areas. I respectfully submit the Traffic Impact Report prepared by Stonefield Engineering dated April 2016 which includes key data regarding existing traffic conditions at the intersections noted, existing levels of service, a trip generation calculation for the proposed development, and other important data regarding the traffic conditions in this area (see Exhibit "D"). We understand the Garwood community's concern with traffic conditions in the downtown area, and we are prepared to present very detailed testimony regarding both existing conditions and the conditions after our proposed development is completed to the Planning Board during the formal site plan application process, so that we can work with the Board, its professionals, and Union County (as South Avenue is a county right of way) to assure that the redevelopment will not materially impact traffic conditions.

The redevelopment of this property has been discussed, planned, and debated for many years and the time has come for the Governing Body to take the actions necessary to realize the redevelopment of the largest and most important redevelopment site in its downtown. Our company remains committed to building a first-class project that the Governing Body and Garwood community can be proud of, and we look forward to submitting our formal Site Plan Application and appearing before the Garwood Planning Board over the coming months.

Very truly yours,  
Russo Development, LLC (on behalf of 490 South Avenue, LLC)

Edward Russo  
President and CEO

Cc: Mr. Robert Renaud, Esq., *Borough Attorney*  
Mr. Michael Pembroke, *EVP - Russo Development*  
Mr. Richard G. Berger, Esq., *EVP - General Counsel, Russo Development*  
Mr. Christopher Minks, Esq., *SVP - General Counsel, Russo Development*  
Mr. Douglas G. Bartels, P.E., *SVP - Development, Russo Development*

# Exhibit A

FISCAL IMPACT ANALYSIS

GARWOOD STATION  
MIXED-USE TRANSIT ORIENTED REDEVELOPMENT

BOROUGH OF GARWOOD  
UNION COUNTY, NEW JERSEY

**FISCAL IMPACT ANALYSIS**  
FOR  
**GARWOOD STATION**  
**MIXED-USE TRANSIT-ORIENTED REDEVELOPMENT**  
IN  
GARWOOD BOROUGH  
UNION COUNTY, NEW JERSEY

Richard B. Reading Associates  
Princeton, New Jersey

April 15, 2016

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## SUMMARY OF FINDINGS

### GARWOOD STATION MIXED-USE TRANSIT-ORIENTED REDEVELOPMENT

- The development that is the subject of this evaluation involves the proposal by 490 South Avenue, LLC for the construction and occupancy of a transit oriented mixed-use redevelopment located at the intersection of South Avenue and Center Street and adjacent to the railroad station in the central portion of the Borough of Garwood.
- The current development plans contemplate the construction of 16,452 square feet of non-residential (retail) space and a total of 315 multi-family rental housing units including 32 “affordable” housing units. The 283 “market” housing units are comprised of 14 studio apartments, 192 one-bedroom units and 77 two- bedroom units with monthly rents ranging from \$1,585 to \$2,724, and averaging \$2,201 per month. The 13 “affordable” housing units will be offered in the required mixture of one-, two-, and three-bedroom units and will have monthly rents calculated to be affordable to families with “very low”, “low” and “moderate” incomes in accordance with the current affordable housing regulations, with an average monthly rent of \$893. The non-residential (retail) space will be leased to multiple tenants with net annual rents ranging from \$25 to \$30 per square foot.
- The completed mixed-use redevelopment, with 40 employees and 548 anticipated residents, would have allocated municipal service costs of \$366,430 had it been completed and occupied during 2015. Based upon the mixture and type of housing units within the residential component of the mixed-use plan, and using Transit Oriented Development and Affordable Housing multipliers, the 283 “market” units would be estimated to generate 6 public school children while the 32 “affordable” housing units would generate 22 public school children, for a total of 28 public school children generated for the Garwood School District. The potential increase of 28 students would yield a total enrollment of 540 students, which is less than the 2006-07 enrollment of 580 students.
- The proposed development is within an area in need of redevelopment and the redeveloper is requesting long term (30-year) tax exemption pursuant to N.J.S.A. 40A:20-1 et seq. , (“Long Term Tax Exemption Law”). Under the terms of a proposed Financial Agreement, the mixed-use redevelopment would pay an Annual Service Charge equal to ten percent of the project’s Annual Gross Revenues. The total annual payments that the Borough would receive, which include Annual Service Charges and Land Tax payments, amount to \$778,506.
- The annual revenues generated for the Borough of Garwood with the proposed tax exemption (\$778,506) are 9.7 times the property tax revenues that the Borough currently receives from the properties to be redeveloped, are 1.23 times the annual property tax revenues of \$632,960 that the Borough would receive with ordinary taxes and are 2.12 times the allocated municipal service costs of \$366,430, resulting in an annual revenue surplus of \$412,076 for municipal operations.
- With Ordinary Applicable Taxes, the Borough of Garwood would retain 34.6 percent of the total revenues generated by the proposed redevelopment. The utilization of the provisions for tax-exemption would provide the Borough with 88.4 percent of the total annual revenues generated, and yield annual payments to the Borough totaling \$778,506.

## **INTRODUCTION**

The ensuing evaluation has been undertaken at the request of 490 South Avenue, LLC in order to provide an examination of the anticipated impact of a transit-oriented mixed-use redevelopment upon the economic base and the fiscal infrastructure that exists in the Borough of Garwood in Union County, New Jersey. The initial section of this evaluation presents a historical profile of the Borough's residential and non-residential growth trends and documents the manner in which the Borough generates and distributes municipal revenues and school district revenues. The findings of the fiscal profile are reviewed from a historical, as well as a present, perspective.

The second phase of the research undertaken involves a statistical analysis of the anticipated fiscal and economic effects that would be expected to result from the construction and occupancy of a mixed-use, transit oriented mixed-use redevelopment located at the corner of South Avenue and Center Street adjacent to the railroad station in the central portion of the Borough of Garwood. The data and evaluations contained on the following pages describe the nature and magnitude of the redevelopment plan, considers the available infrastructure of the community, and calculates the need for services resulting from the redevelopment.

The research and analysis undertaken herein is intended to provide information whereby changes in services and facilities necessitated by the proposed development can be accomplished smoothly, with foresight, and without interruption of existing operations. Of particular concern in the following evaluation is detailed information pertaining to:

- a) the economic and demographic composition of the Borough of Garwood, including historic and current levels of housing, population, employment, and school enrollments;
- b) the residential and non-residential ratable bases of Garwood, the changes occurring in each during recent years, and the effective tax rate of the Borough;
- c) the nature, scope, and magnitude of the proposed development; and
- d) the fiscal impact of the development upon municipal, school district, and County operations, to include changes in tax revenues and budgetary appropriations, as well as the impact upon the existing tax structure.

## **ECONOMIC BASE AND FISCAL PROFILE**

An examination of the current and historic characteristics of the Borough of Garwood and the manner by which the Borough derives its revenues and manages its appropriations is a precursor to a fiscal impact analysis of the proposed mixed-use redevelopment. This initial examination will furnish a useful insight into the nature of local fiscal operations and provide a benchmark by which changes may be measured and anticipated.

### **General Characteristics**

The Borough of Garwood is a well-established and substantially developed community located in the central portion of Union County. The Borough, as illustrated on Figure 1, is bounded by Scotch Plains Township and Westfield Town in Union County. Garwood Borough, itself, includes a land area of 0.66 square miles, or approximately 0.64 percent of Union County's total land area of 102.85 square miles.

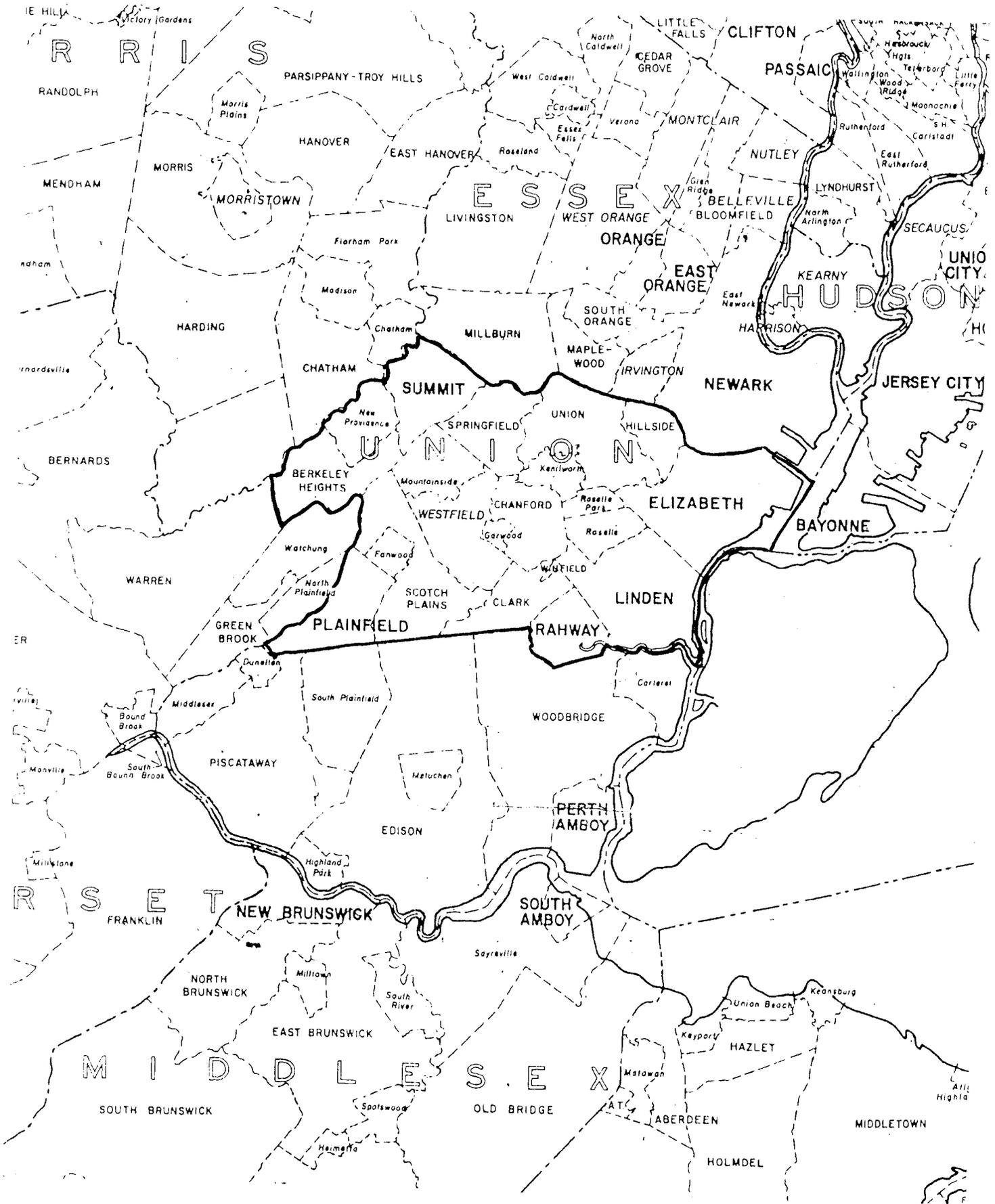
### **Population**

Garwood contained a total population of 5,260 persons at the time of the 1970 Census. During the 1970's, Garwood's population decreased by 508 persons (9.7 percent) and resulted in a population of 4,752 persons at the time of the 1980 Census. Another population decrease was recorded during the 1980's, with a loss of 525 persons (11.0 percent) to yield a total population of 4,227 persons as of the 1990 Census.

Between 1990 and 2000, the population of Garwood decreased, with a total population of 4,156 persons reported in 2000, indicating an decrease of 71 persons equal to a relative decrease of 1.7 percent. In 2000, the population of Garwood represented 0.80 percent of Union County's total population of 552,541 persons at that time. Between the 2000 and 2010 Census of Population, Garwood experienced a population increase of 70 persons, as indicated by the Borough's reported population of 4,226 persons at the time of the 2010 Census of Population. According to the most recent information available from the Bureau of the Census, the Borough's population base increased by 6.1 percent (257 persons) between the 2010 and the Census Bureau's mid-year 2014

FIGURE 1

LOCATION MAP



population estimates, when Garwood’s total population was reported to have increased to 4,483 persons. These population trends are summarized below:

<b>Population Trends Borough of Garwood</b>						
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2014</u>
Population	5,260	4,752	4,227	4,156	4,226	4,483
Change	-----	-508	-525	-71	70	257
Percent Change	-----	-9.7	-11.0	-1.7	1.7	6.1

Between 1970 and 2000, the Borough of Garwood accounted for a decreasing share of the County’s total population and, at the time of the 2000 Census, the Borough represented 0.80 percent of the total population of Union County. The Borough’s share of the County’s population continued to decrease, and accounted for 0.79 percent of the County’s 2010 population, as tabulated below. The 1990, 2000 and 2010 Census population base of the Borough of Garwood is profiled in Table 1, while the age characteristics of the Borough’s residents are further detailed in Table 2.

<b>Population Trends Garwood Borough as a Share of Union County</b>						
	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>2014</u>
Garwood	5,260	4,752	4,227	4,156	4,226	4,483
Union Co.	543,116	504,094	493,819	522,541	536,499	552,939
Borough / Co. - %	0.97	0.94	0.86	0.80	0.79	0.81

Since 1970, the Borough has experienced a maturing of its population base with increases in the median age of the Borough’s residents from 32.4 years in 1970, to 34.0 years in 1980, to 36.2 years in 1990, to 38.3 years in 2000 and to 41.4 years in 2010. The percentage of the Borough’s total population that is aged 0-19 years decreased from 33.9 percent in 1970 to 20.9 percent in 2010. Between 2000 and 2010, the number of residents under 19 years of age or younger decreased from 909 to 882 persons.

**TABLE 1**  
**GARWOOD BOROUGH, UNION COUNTY**  
**POPULATION CHARACTERISTICS**  
**1990, 2000 and 2010 Census of Population**

	<u>1990</u>	<u>2000</u>	<u>2010</u>
<b>TOTAL POPULATION</b>	4,227	4,156	4,226
Male	1,993	2,005	2,047
Female	2,234	2,151	2,179
 <b>AGE</b>			
Under 5 years	241	231	219
5 to 17 years	556	600	595
18 to 20 years	138	107	97
21 to 24 years	267	155	179
25 to 44 years	1,419	1,480	1,284
45 to 54 years	419	529	706
55 to 59 years	225	177	256
60 to 64 years	235	161	252
65 to 74 years	469	333	313
75 to 84 years	209	308	216
85 years and over	49	75	109
Median age	36.2	38.3	41.4
Under 18 years	797	831	814
Percent of total population	18.9	20.0	19.3
65 years and over	727	716	642
Percent of total population	17.2	17.2	15.2
 <b>HOUSEHOLDS BY TYPE</b>			
Total households	1,675	1,731	1,778
Family households (families)	1,173	1,125	1,118
Married-couple families	937	848	844
Percent of total households	55.9	49.0	47.5
Other family, male householder	59	68	84
Other family, female householder	177	209	190
Non family households	502	606	660
Percent of total households	30.0	35.0	37.1
Householder living alone	432	496	532
Householder 65 years and over	205	199	188
Persons living in households	4,227	4,151	4,226
Persons per household	2.52	2.40	2.38
Persons living in group quarters	0	2	0
Institutionalized persons	0	0	0
Other persons in group quarters	0	2	0

TABLE 2

GARWOOD BOROUGH, UNION COUNTY  
1970, 1980, 1990, 2000 and 2010

<u>Age Cohorts</u>	<u>1970 Census</u>		<u>1980 Census</u>		<u>1990 Census</u>		<u>2000 Census</u>		<u>2010 Census</u>	
	<u>No.</u>	<u>%</u>								
0 - 4	390	7.4	231	4.9	241	5.7	231	5.6	219	5.2
5 - 9	429	8.2	241	5.1	236	5.6	236	5.7	223	5.3
10 - 14	502	9.5	323	6.8	198	4.7	241	5.8	223	5.3
15 - 19	464	8.8	401	8.4	209	4.9	201	4.8	217	5.1
20 - 24	412	7.8	465	9.8	318	7.5	184	4.4	204	4.8
25 - 29	320	6.1	460	9.7	436	10.3	306	7.4	308	7.3
30 - 34	242	4.6	316	6.6	405	9.6	414	10.0	311	7.4
35 - 54	1,447	27.5	1,033	21.7	997	23.6	1,289	31.0	1,371	32.4
55 - 59	326	6.2	383	8.1	229	5.4	177	4.3	256	6.1
60 - 64	232	4.4	316	6.6	231	5.5	161	3.9	252	6.0
65 - 74	314	6.0	360	7.6	511	12.1	333	8.0	313	7.4
75+	180	3.4	223	4.7	216	5.1	383	9.2	329	7.8
<b>TOTALS</b>	<b>5,258</b>	<b>100.0</b>	<b>4,752</b>	<b>100.0</b>	<b>4,227</b>	<b>100.0</b>	<b>4,156</b>	<b>100.0</b>	<b>4,226</b>	<b>100.0</b>
Median Age	32.4		34.0		36.2		38.3		41.4	

## **Housing Trends**

Notwithstanding the population declines reported during the 1970's, 1980's and 1990's, Garwood has experienced an ongoing expansion of its housing inventory. During the 1960's, the Borough issued building permits authorizing the construction of 109 new housing units within the Borough. An additional 52 residential dwellings were authorized during the 1970's.

By 1980, Garwood contained a total of 1,759 year-round housing units, of which 1,736 units (98.7 percent) were reported to be occupied. The 1,759 year-round housing units included 992 units in one-unit structures and 767 units in structures of two or more dwelling units. In 1980, 1,117 of the 1,736 occupied housing units within Garwood, or 64.3 percent, were reported to be owner-occupied.

During the 1980's, housing construction in Garwood continued at a reduced rate compared to the 1970's (5 units per year). As indicated in Table 3, during the period from January 1980 through December 1989, the Borough of Garwood issued building permits authorizing the construction of 41 residential units, or an average of 4 units per year. During the 1990's, residential construction in Garwood decreased again, with the Borough authorizing the construction of just 11 new housing units between 1990 and 1999, or an average of 1.1 new homes annually. From 2000 through 2009, Garwood authorized the construction of 291 new housing units. During the past six years (2010 through 2015), the Borough authorized an additional 522 new housing units. The Borough's building permit trends are further detailed on Table 3.

The 1990 housing stock of Garwood was predominantly comprised of single-family detached and 2 to 4 family housing units. In 1990, single-family detached homes accounted for 916, or 52.0 percent of the Borough's 1,748 total housing units while there were 693 units in 2- 4 unit structures.. Owner-occupied homes accounted for 65.0 percent of the total occupied homes in 1990, while 587 housing units (35.0 percent) were renter-occupied.

Between the 1990 and 2000 Census, the total number of housing units in Garwood increased from 1,748 housing units to 1,782 housing units, for an increase of 34 housing units. The total number of occupied households increased by 56 households, from 1,675 households in 1990 to 1,731 households in 2000. Renter-occupied households in Garwood, which accounted for 35.0 percent of the Borough's occupied households in 1990, represented 36.7 percent of the 1,731 occupied households in 2000.

The published reports from the 2010 Census of Population indicate that the Borough's population increased by 70 persons between 2000 and 2010, with a total of 4,226 residents at the

TABLE 3

**GARWOOD BOROUGH, UNION COUNTY  
RESIDENTIAL CONSTRUCTION  
AUTHORIZED BY BUILDING PERMITS**

Year	Residential		Year	Residential		Year	Residential		Year	Residential	
	Units	Units		Units	Units		Units	Units		Units	Units
1960	17	9	1980	5	1	2000	2	2010	51		
1961	14	6	1981	0	1	2001	0	2011	55		
1962	17	8	1982	2	3	2002	3	2012	67		
1963	5	4	1983	12	2	2003	4	2013	88		
1964	6	0	1984	2	1	2004	6	2014	104		
1965	5	6	1985	3	1	2005	54	2015	157		
1966	13	11	1986	9	0	2006	72				
1967	20	3	1987	2	2	2007	61				
1968	6	4	1988	3	0	2008	53				
1969	<u>6</u>	<u>1</u>	1989	3	<u>0</u>	2009	<u>38</u>				
Sub- Total 1960-69	109	52	Sub- Total 1980-89	41	11	Sub- Total 2000-09	291	2010-15	522		

Source: New Jersey Department of Labor, Division of Planning and Research, Office of Demographic and Economic Analysis, Residential Building Permits, Annual Summaries 1960-2015.

time of the 2010 Census (April 1, 2010), while the total number of housing units increased from 1,782 units to 1,870 units, of which 1,778 housing units (95.1 percent) were reported to be occupied. The 1990, 2000 and 2010 Census housing base of Garwood Borough is detailed in Table 4.

### **School System**

The Borough of Garwood currently operates its own school district for students in grades K through 8 and has a sending relationship with Clark Township for students in grades 9-12. The number of students from Garwood Borough "on roll" in public schools declined during the 1970's and 1980's. Between 1977 and 1982, public school enrollment of Garwood students decreased from 734 students to 581 students, a decrease of 153 students or, 20.8 percent. Enrollment of Garwood students amounted to 582 students in the 1989-90 school year and 544 students in the 1999-2000 school year, and decreased thereafter with 525 students enrolled during the 2009-10 school year. Since 2009, enrollment in Garwood's schools has ranged from 496 students (2014-15) to 519 students (2010-11) with 512 students expected to be enrolled in the 2015-16 school year. Enrollment trends for the Garwood School District are detailed in Table 5.

### **Commercial Development**

According to reports of the New Jersey Department of Labor, there were 2,181 persons covered by New Jersey Unemployment Compensation (covered jobs) employed within Garwood during 1975. Between 1975 and 1985, the Borough's private sector employment base increased by 953 jobs, to a total of 3,134 jobs in 1985. The Borough experienced a decrease of 356 jobs in its employment base during the ensuing ten year interval, with 2,060 jobs reported in Garwood during 1995. Between 1995 and 2005, employment in Garwood is reported to have increased by 1 job, with 2,061 jobs reported during 2005. Private sector employment in Garwood declined to 1,777 jobs reported in 2011 but increased to 1,918 jobs in 2013.

According to the most recent published reports of the New Jersey Department of Labor, Garwood's private sector employment base had increased to 2,043 jobs in 2014. Notwithstanding these declines and recent employment gains, Garwood's share of Union County's total employment has consistently amounted to approximately 1.1 percent of the County's total employment. This information is further detailed in Table 6.

**TABLE 4**  
**GARWOOD BOROUGH, UNION COUNTY**  
**HOUSING PROFILE**  
**1990, 2000 AND 2010 CENSUS**

	<u>1990</u>	<u>2000</u>	<u>2010</u>
<b>TOTAL HOUSING UNITS</b>	1,748	1,782	1,870
Occupied housing units	1,675	1,731	1,778
Owner occupied	1,088	1,095	1,120
Percent owner occupied	65.0	63.3	63.0
Renter occupied	587	636	658
Vacant housing units	73	51	92
For seasonal, recreational, or occasional use	3	5	5
Homeowner vacancy rate (percent)	1.4	0.3	1.1
Rental vacancy rate (percent)	6.7	2.9	6.6
Persons per owner-occupied unit	2.70	2.59	2.56
Persons per renter-occupied unit	2.19	2.07	2.06
 <b>UNITS IN STRUCTURE</b>			
1-unit, detached	916	958	*
1-unit, attached	19	30	*
2 to 4 units	693	703	*
5 to 9 units	51	49	*
10 or more units	35	42	*
Mobile home, trailer, other	34	0	*
 <b>VALUE</b>			
Specified owner-occupied units	833	881	*
Less than \$50,000	6	0	*
\$50,000 to \$99,000	157	12	*
\$100,000 to \$149,000	452	133	*
\$150,000 to \$199,000	143	451	*
\$200,000 to \$299,000	8	280	*
\$300,000 or more	150	5	*
Median (dollars)	169,300	181,500	*
 <b>CONTRACT RENT</b>			
Specified renter-occupied units paying cash rent	564	638	*
Less than \$250	7	0	*
\$250 to \$499	121	12	*
\$500 to \$749	336	109	*
\$750 to \$999	918	270	*
\$1,000 or more	9	183	*
Median (dollars)	632	913	*

\* Detailed housing characteristics from the 2010 Census are not available.

**TABLE 5  
GARWOOD BOROUGH, UNION COUNTY  
PUBLIC SCHOOL ENROLLMENT K-12**

<u>Year</u>	K-8 Students <u>Enrolled</u>	Net School Cost/Student	Union County Regional School District		
			9-12 Students <u>Garwood</u>	<u>Total</u>	<u>Cost/ Student</u>
1975-76	490	1,586	NA	5,401	2,144
1976-77	468	1,659	NA	5,090	2,623
1977-78	444	2,101	290	4,828	2,987
1978-79	397	2,659	298	4,603	3,225
1979-80	385	2,614	277	4,381	3,586
1980-81	376	3,075	256	4,184	3,936
1981-82	343	3,304	265	3,967	3,936
1982-83	338	3,492	243	3,869	5,204
1983-84	348	3,662	242	3,610	5,846
1984-85	353	3,929	238	3,490	6,406
1985-86	357	4,196	234	3,371	6,965
1986-87	364	4,389	206	3,110	8,078
1987-88	407	4,132	183	2,872	9,525
1988-89	416	4,782	160	2,647	11,144
1989-90	401	5,297	141	2,545	12,914
1990-91	393	6,157	138	2,625	12,336
1991-92	386	6,540	135	2,096	15,127
1992-93	424	6,341	128	2,126	15,750
1993-94	409	6,593	134	2,128	16,154
1994-95	415	7,506	146	2,168	14,109
1995-96	426	7,640	149	2,092	12,648
1996-97	394	8,647	138	2,071	12,899
1997-98	518	9,873	Send to Kenilworth		
1998-99	526	10,074	Send to Kenilworth		
1999-00	544	10,022	Send to Clark		
2000-01	554	10,182	Send to Clark		
2001-02	539	10,786	Send to Clark		
2002-03	556	10,766	Send to Clark		
2003-04	553	11,057	Send to Clark		
2004-05	558	11,227	Send to Clark		
2005-06	557	11,647	Send to Clark		
2006-07	580	11,627	Send to Clark		
2007-08	575	12,663	Send to Clark		
2008-09	534	13,867	Send to Clark		
2009-10	525	13,181	Send to Clark		
2010-11	519	13,021	Send to Clark		
2011-12	512	14,039	Send to Clark		
2012-13	505	14,575	Send to Clark		
2013-14	517	14,609	Send to Clark		
2014-15	496	15,781	Send to Clark		
2015-16	512	15,566	Send to Clark		

Source: New Jersey Legislative District Data Book (1975-2011); NJ Dept of Education, 2012 -2014. The net cost per pupil is the general fund budget per pupil, as implemented under the Comprehensive Educational Improvement and Financing Act (CEIFA), and is equal to the sum of general fund tax levy, budgeted general fund balance, miscellaneous revenue, and most forms of state formula aid. The per pupil costs calculated for the 2012-13, 2013-14 and 2014-15 school years reflect total operating expenditures

**TABLE 6**  
**PRIVATE SECTOR EMPLOYMENT**  
**GARWOOD BOROUGH, UNION COUNTY**  
**(Covered by New Jersey Unemployment Compensation)**

<u>Year</u>	<u>Garwood Borough</u>	<u>Union County</u>	<u>Borough/ County (%)</u>
1975	2,181	210,032	1.0
1980	2,240	229,614	1.0
1981	2,858	231,222	1.2
1982	2,574	225,639	1.1
1983	2,686	229,641	1.2
1984	3,304	237,861	1.4
1985	3,134	237,250	1.3
1986	3,260	237,029	1.4
1987	2,846	237,954	1.2
1988	3,004	235,545	1.3
1989	2,831	232,149	1.2
1990	2,397	216,691	1.1
1991	2,143	206,091	1.0
1992	2,230	199,345	1.1
1993	2,169	198,925	1.1
1994	2,224	199,946	1.1
1995	2,060	199,925	1.0
1996	2,073	202,604	1.0
1997	2,128	203,820	1.1
1998	1,911	333,302	0.9
1999	1,852	205,481	0.9
2003	2,165	202,139	1.1
2004	2,141	198,641	1.1
2005	2,061	193,114	1.1
2006	1,997	174,044	1.1
2007	1,959	179,264	1.1
2008	1,843	175,929	1.0
2009	1,783	166,604	1.1
2010	1,813	178,798	1.0
2011	1,777	177,334	1.0
2012	1,771	178,633	1.0
2013	1,918	181,401	1.1
2014	2,043	181,558	1.1

Source: New Jersey Department of Labor, Division of Planning and Research, Office of Demographic and Economic Analysis, New Jersey Covered Employment Trends. Employment is as of September 30<sup>th</sup>.

## **RATABLE BASE AND TAX RATE**

The economic and demographic characteristics of Garwood Borough are reflected in the ratable base, and changes in the Borough's household base and commercial development over the past fifteen years may be examined in terms of the per parcel and total valuations (assessments) of the taxable properties in the Borough.

### **Ratable Base**

Garwood Borough has not undertaken a recent property revaluation that would result in assessments that approximate current market values. The ratio of assessed value to market value is expressed in the State equalization ratio, which amounted to 58.70 percent in 2000 and is reported to be 29.21 percent in 2015. During 2000, the total equalized property valuation in Garwood amounted to \$295.6 million. The total equalized assessments increased by 108.2 percent between 2000 and 2015 with an equalized assessed valuation of \$638.8 million reported for 2015. These assessment trends are further detailed in Table 7.

During the period from 2000 to 2015, when the Borough's equalized valuation increased by 116.1 percent, the cost of municipal operations reflected in the local use budget increased from \$4,999,744 to \$7,771,091--an increase of \$2,771,347, or 55.5 percent. Between 2000 and 2015, the growth of municipal costs (55.5 percent) was below the increase in the equalized taxable base (116.1 percent).

Between 2000 and 2015, Class 2 residential properties (which include all residential properties with the exception of Class 4c rental apartments) decreased as a share of the Borough's total ratables from 71.89 percent to 71.55 percent, a relative decrease of 0.5 percent. Non-residential (commercial/industrial) amounted to 26.23 percent of valuation in 2000 and 26.83 percent in 2015. These percentage levels indicate a stable ratable base with little change in the proportions of Garwood's total ratables represented by residential and non-residential properties over the past fifteen years.

Since 2000, the average equalized value of the Borough's residential parcels has increased substantially. The average equalized residential (Class 2) property assessment amounted to \$169,377 per parcel during 2000, and this average equalized value had increased to \$349,728 during 2015.

TABLE 7

GARWOOD BOROUGH, UNION COUNTY  
 RATABLE BASE COMPOSITION  
 LOCAL USE REVENUES AND TAXES

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<u>Year</u>	<u>Assessed</u>	<u>Valuation</u> Equalized	<u>Percent</u> Comm/Ind	<u>State</u> Eq. Ratio	<u>Local Use</u> Budget	<u>Average</u> Residential Tax
2000	\$173,560,900	\$295,674,446	26.23	58.70	\$4,999,744	\$3,691
2015	\$186,595,900	\$638,808,285	26.83	29.21	\$7,771,091	\$9,495

Source: New Jersey Department of Community Affairs, Division of Local Government Services, Annual Report, 2000; Union County Board of Taxation, 2015.

In 2000, the average residential (Class 2) tax bill in Garwood was \$4,973 and between 2000 and 2015, this average annual tax increased at an average annual rate of 4.40 percent, resulting in a 2015 average residential (Class 2) tax of \$9,495. This assessment and tax information is further detailed in Table 8.

**Effective Tax Rates**

The local (general) tax rates levied in the Borough of Garwood reflect the ratio of assessed to true (market) value of the assessments in the Borough. In 2000, the local (general) tax rate in Garwood was \$5.001 per \$100 of assessed value. By 2015, the general tax rate had increased to \$9.295 per \$100 of assessed value. On an “equalized valuation” basis, the tax rate relative to current values actually decreased from \$2.936 per \$100 in 2000 to 2.715 per \$100 in 2015.

**Borough of Garwood  
Local and Equalized Tax Rates**

<b><u>Year</u></b>	<b><u>Local Rate</u></b>	<b><u>Assessment Ratio</u></b>	<b><u>Equalized Rate</u></b>
2000	\$5.001	58.70	\$2.936
2014	\$9.295	29.21	\$2.715

**Overview**

The preceding review of the economic, demographic, fiscal and financial characteristics of Garwood has disclosed the Borough to be a well established community in the context of Union County. As noted previously, Garwood contains approximately 0.64 percent of the County’s land area, accounted for 0.79 percent of the County’s 2010 population, and 1.01 percent of the County’s 2010 employment base.

Between 2000 and 2015, the equalized valuation (assessments) in Garwood increased from \$295.6 million to \$638.8 million. In 2000, the average residential property in Garwood was assessed at \$99,424 and paid total taxes of \$4,973 per year. By 2015, the average residential (Class 2) assessment had increased by to \$102,156, while the taxes paid by the average residential property had increased to \$9,495 per year. From 2000 to 2015, the average residential tax paid in Garwood increased at an average annual rate of 4.40 percent.

TABLE 8

GARWOOD BOROUGH, UNION COUNTY  
 AVERAGE RESIDENTIAL ASSESSMENTS AND TAXES<sup>1</sup>

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<u>Year</u>	<u>Average Residential Assessment</u>	<u>Average Equalized Residential Assessment</u>	<u>PROPERTY TAXES<sup>2</sup></u>		
			<u>Total Tax</u>	<u>Local Use</u>	<u>Local School</u> <u>County</u>
2000	\$99,424	\$169,377	\$4,973	\$1,620	\$2,581 \$772
2015	\$102,156	\$349,728	\$9,495	\$3,282	\$4,312 \$1,901

Source: New Jersey Department of Community Affairs, Division of Local Government Services, Annual Report, 2000; Union County Board of Taxation, 2015.

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<sup>1</sup>Class 2 Residential Properties.

## **PROJECT DESCRIPTION AND FISCAL IMPACTS**

On the preceding pages, the economic base and fiscal infrastructure of the Borough of Garwood have been examined and quantified. With the information and insight gained in the foregoing examination, it is now possible to estimate the costs, revenues, and overall fiscal effects that would be expected to accompany the construction and occupancy of the proposed mixed-use redevelopment.

### **Project Description**

The development that is the subject of the ensuing fiscal assessment involves a proposal for the construction and occupancy of a transit-oriented mixed-use redevelopment, to be known as “Garwood Station” and located on a 5.2 ± acre tract of land (Block 4018, Lots 1, 2, 4 and 5) that is adjacent to the Garwood railroad station at the intersection of South Avenue and Center Street in the central portion of the Borough of Garwood. The current concept plans anticipate that the proposed mixed-use redevelopment will contain 16,452 square feet of retail space and a total of 315 multi-family rental housing units, including 32 “affordable” housing units. The retail space will be leased to multiple tenants with net annual rents ranging from \$25.00 to \$30.00, with an average anticipated rent of \$26.82 per square foot of leased area.

The 283 “market” housing units are comprised of 14 studio apartments, 192 one-bedroom units and 77 two-bedroom units with monthly rents ranging from \$1,585 to \$2,724 and averaging \$2,201 per month. The 32 “affordable” housing units will be offered in the required mixture of one-, two-, and three-bedroom units (6 one-bedroom units, 19 two-bedroom units and 7 three-bedroom units) and will have monthly rents calculated to be affordable to families with “very low”, “low” and “moderate” incomes in accordance with the current affordable housing regulations. The affordable housing units provide a range of monthly rents with an average monthly rent of \$893.

Based upon the unit distributions in the developer’s plans and the current pricing schedule, the new mixed-use redevelopment would be expected to represent an aggregate (completed) value of \$67,442,079. At Garwood’s current assessment ratio of 29.21 percent, the completed mixed-use redevelopment would yield an aggregate assessed valuation of \$19,699,800. This information is further detailed in the following tabulation:

**Garwood Station  
Proposed Transit Oriented Mixed-Use Redevelopment**

<b><u>Non-Residential</u></b>	Area <u>Sq Ft</u>	Rent <u>Sq Ft</u>	Annual <u>Net Rent</u>	Aggregate <u>Value</u>
Retail 1, 8	5,997	\$30.00	\$179,910	\$ 1,999,000
Retail 2-7	<u>10,455</u>	<u>\$25.00</u>	<u>\$261,375</u>	<u>\$ 2,904,167</u>
Subtotal	16,452	\$26.82	\$441,285	\$ 4,903,167

<b><u>Market</u></b>	No of <u>Units</u>	Size <u>Sq. Ft</u>	Average <u>Mo. Rent</u>	Estimated <u>Value</u>	Aggregate <u>Value</u>
Studio	14	500	\$1,585	\$152,160	\$ 2,130,240
Apartment - 1BR	192	780	\$2,036	\$195,456	\$37,527,552
Apartment - 2BR	<u>77</u>	<u>1,200</u>	<u>\$2,724</u>	<u>\$261,504</u>	<u>\$20,135,808</u>
Subtotal (Avg)	283	837	\$2,201	\$211,285	\$59,793,600
<b><u>Affordable</u></b>					
Apartment - 1BR	6	----	\$ 742	\$ 71,232	\$ 427,392
Apartment - 2 BR	19	----	\$ 895	\$ 85,920	\$ 1,632,480
Apartment - 3BR	<u>7</u>	<u>----</u>	<u>\$1,020</u>	<u>\$ 97,920</u>	<u>\$ 685,440</u>
Total (Avg)	32	---	\$ 893	\$ 85,791	\$ 2,745,312
<b><u>Total</u></b>	<u>315</u>				\$67,442,079

**Population Determinants**

There are a number of techniques and methods available in demographic analysis which may be utilized to estimate the anticipated population levels that would be generated by a proposed development. No single technique or methodology is universally applicable, accepted, or reliable. Rather, all methods available for the pro forma calculation of anticipated population are subject to certain limitations.

Among the various techniques available for developing estimates of population, the “comparable” approach, or “case study” method, appears to offer the benefits of actual experiences, timely data, geographic proximities, and known similarities in market sectors and product design. In the “case study” method, population determinants are generated on the basis of the actual occupancy experiences of comparable housing units in similar, recently constructed housing complexes. The reliability of the “case study” model is a function of the comparability of the case study housing units to the units proposed for construction.

Information is also available from the U.S. Department of Commerce, Bureau of the Census, which provides population and housing characteristics that can be examined to estimate municipal population and school children multiplier ratios on a per household basis. In this regard, at the time of the 2010 Census of Population (April 1, 2010), Garwood Borough contained a total population of 4,226 persons, of which 4,226 persons occupied 1,778 of the Borough's 1,870 total housing units. At this time (2009-2010 school year), there were 525 children from Garwood Borough enrolled in public schools. These statistics indicate that the average household in the Borough of Garwood contained 2.378 persons, including 0.295 public school children.

The proposed mixed-use redevelopment differs significantly from the Borough's housing base to the extent that all (100.0 percent) of the proposed homes are "new" and "renter-occupied", as opposed to only 4.7 percent "new" and 37.0 percent "renter-occupied" in the Borough's 2010 housing inventory. With an average of 1.35 bedrooms per unit, the new housing units are smaller units than the average housing unit in the Borough. Additionally, the proposed mixed-use redevelopment contains a ten percent affordable housing component with different occupancy characteristics than the Borough's existing housing units. In view of the differences in the type of housing units proposed vis-a-vis the Borough's existing housing base, the use of municipal demographic cohorts as a "comparable" would not be appropriate.

### **Multi-Family Demographics**

Given the unique location, character, and transit-oriented convenience of the proposed new housing units, demographic information for recently occupied attached housing units in New Jersey would provide a more realistic basis for estimating the population, school age, and public school children likely to be generated by the proposed multi-family rental housing units, with an average of 1.35 bedrooms per unit, and the location that affords retail convenience and a transit oriented opportunity for its residents.

**Standard Demographic Multipliers** - A study of the occupancy characteristics of newly occupied housing units was prepared (November 2006) for the New Jersey Department of Community Affairs, Office of Smart Growth by the Center for Urban Policy Research (CUPR), Edward J. Bloustein School of Planning & Public Policy at Rutgers, The State University. The findings of this

study, which are summarized in the enclosed Appendices 1 and 2, provide demographic multipliers for single-family detached homes, single-family attached homes and multi-family (5+ units/building), including condominiums and apartments. The “CUPR” multipliers furnish Statewide information, adjusted for pricing (below median or above median), for certain bedroom configurations (0-1, 2, 3, and 4-5 bedrooms). The CUPR multipliers also provide consolidated (owner/renter) information for three “Regions” of the State (northern, central and southern) but the regional data does not separate owner and renter occupied units or provide the disaggregated data for the specific bedroom configurations that is available in the Statewide data..

The published CUPR data that is most similar to the 283 “market” housing units is contained within the New Jersey multipliers for “above median price” one-bedroom and two-bedroom rental housing units in buildings containing five or more housing units. These tables (Appendices 1 and 2) indicate an expectation for occupancies of 1.644 to 2.107 persons per unit, including 0.051 to 0.115 public school children per unit. If these Statewide multipliers were applied to the 283 “market” housing units with a mix of 206 studio and one-bedroom units and 77 two-bedroom units, a total resident population with a weighted average amounting to 1.770 persons per unit, including 0.071 school children per unit would be anticipated:

**Estimated Population - Market Units  
CUPR Standard (Statewide) and Affordable Demographic Multipliers**

	<u>Population Per Unit</u>			<u>Estimated Population</u>	
	<u>No. Units</u>	<u>Total Pop.</u>	<u>Public School</u>	<u>Total Pop.</u>	<u>Public School</u>
<u>Market</u>					
0-1 BR	206	1.644	0.051	339	11
2 BR	<u>77</u>	<u>2.107</u>	<u>0.115</u>	<u>162</u>	<u>9</u>
Total	283	1.770	0.071	501	20

**Transit-Oriented Developments** - In addition to the demographic information for standard housing types, the November 2006 study prepared by the Center for Urban Policy Research also provides demographic multipliers specialized forms of housing, including housing units within transit-oriented mixed-use redevelopments. As detailed in Appendix 3, this survey of transit-oriented developments included a total of 2,183 rental housing units located within ten (10) rental projects in

New Jersey. These 2,183 “rental” housing units were found to contain a total of 47 public school children, or 0.021 public school children per housing unit. In view of the design and the proximity of the proposed mixed-use redevelopment to transit opportunities, the TOD multipliers furnish an indication of the reduced population and public school children that could be anticipated. Applying the TOD school children multiplier (0.021 school children / unit) to the 283 “market” housing units would yield 6 public school children, as opposed to the 20 public school children derived with the standard CUPR (Statewide) multipliers.

**Estimated Population - Market Units  
CUPR Transit Oriented Development Demographic Multipliers**

<u>Market</u>	<u>Population Per Unit</u>			<u>Estimated Population</u>	
	<u>No. Units</u>	<u>Total Pop.</u>	<u>Public School</u>	<u>Total Pop.</u>	<u>Public School</u>
0-1 BR	206	1.529	0.015	315	3
2 BR	<u>77</u>	<u>1.870</u>	<u>0.034</u>	<u>144</u>	<u>3</u>
Total	283	1.622	0.021	459	6

**Affordable Housing Demographics** - In addition to the “market” priced housing units, the development proposal also contains 32 “affordable” (Mt. Laurel) housing units to be reserved and priced to be affordable for lower-income households in accordance with affordable housing regulations. To the extent that the 32 “affordable” (Mt. Laurel) housing units have specific occupancy, income, and pricing restrictions, the “CUPR” survey provides separate demographic multipliers for low and moderate income households in New Jersey. The demographic multipliers for the 32 one-, two- and three-bedroom, renter-occupied, “affordable” housing units (Appendix 4) anticipate 1.61 to 3.82 persons per unit including 0.14 to 1.27 public school children per “affordable” housing unit. Utilizing the CUPR demographic multipliers specific to “affordable” (Mt Laurel) housing units profiled in Appendix 4, the number residents and public school children generated by the 32 affordable housing units within the mixed-use redevelopment proposed in the Borough of Garwood have also been estimated. The “affordable” housing units, which have specific income and occupancy requirements, have not been adjusted for the transit location:

**Garwood Station - Affordable Units  
CUPR Affordable Demographic Multipliers**

	<u>Population Per Unit</u>			<u>Estimated Population</u>	
	No. Units	Total Pop.	Public School	Total Pop.	Public School
<u>Affordable</u>					
1 BR	6	1.610	0.140	10	1
2 BR	19	2.760	0.620	52	12
3 BR	<u>7</u>	<u>3.820</u>	<u>1.270</u>	<u>27</u>	<u>9</u>
Subtotal	32	2.781	0.688	89	22

**Added Population**

Utilizing the TOD demographic multipliers for the 283 “market” housing units and the unadjusted affordable demographic multipliers for the 32 “affordable” housing units, yields a total estimated population of 548 persons including 28 public school children:

**Garwood Station - Estimated Population  
Transit Oriented Development and Affordable Demographic Multipliers  
Proposed Mixed-Use Redevelopment in Garwood Borough**

	<u>Population Per Unit</u>			<u>Estimated Population</u>	
	No. Units	Total Pop.	Public School	Total Pop.	Public School
<u>Market</u>					
0-1 BR	206	1.529	0.015	315	3
2 BR	<u>77</u>	<u>1.870</u>	<u>0.034</u>	<u>144</u>	<u>3</u>
Subtotal	283	1.622	0.021	459	6
<u>Affordable</u>					
1 BR	6	1.610	0.140	10	1
2 BR	19	2.760	0.620	52	12
3 BR	<u>7</u>	<u>3.820</u>	<u>1.270</u>	<u>27</u>	<u>9</u>
Subtotal	32	2.781	0.688	89	22
Total	315	1.740	0.089	548	28

**Estimated Employment**

In addition to the proposed housing units, the redevelopment plan also includes 16,452 square feet of commercial (retail) space. The number of employees could be expected to be generated by new

non-residential development may be based upon space (facilities) planning of the actual tenants. Alternatively, and prior to the actual leasing of the commercial space, the employment ratios (employees per 1,000 square feet of commercial space) that are published by the International Building Code (IBC) and the Uniform Construction Code (UCC) may be utilized. These publications provide ratios for retail uses that range from 1.7 per for each 1,000 square feet of retail space and 3.2 employees for each 1,000 square feet of restaurant space. Applied to the 16,452 square feet of proposed non-residential space, the average use group ratio (2.45/1,000 sf) would yield an estimate of 40 full-time equivalent (FTE) jobs:

**Estimated Employment  
Garwood Station Mixed-Use Redevelopment**

<b><u>Non-Residential</u></b>	<b><u>Use Group</u></b>	<b><u>Building Area-Sq. Ft.</u></b>	<b><u>Jobs Per 1,000 Sq. Ft.</u></b>	<b><u>Estimated Employment</u></b>
Retail	M	<u>16,452</u>	<u>2.45</u>	40
Total		16,452	2.45	40

**Municipal Services**

The development and addition of new residences, new businesses, or a combination thereof to a community will generate direct and indirect needs for new or added services from the community and other governmental jurisdictions. The services to be provided to a new development generally include education (public school), police and fire protection, public works, administration, etc. The type and extent of services furnished by a municipality often reflect community size and developmental densities. In examining the services which will be provided by the Borough and, hence affected by the proposed development, it is apparent that the overwhelming proportion of the municipal services furnished, the facilities utilized, and the personnel required, are involved in serving the needs of the community’s resident population. Accordingly, and in recognition of the fact that the resident population is ultimately the predominant user and beneficiary of municipal and school services, the determination of the population anticipated to be generated by the proposed mixed-use redevelopment is an important element and determinant in the impact analysis.

## **IMPACT ANALYSIS**

### **Fiscal Impact**

The fiscal impact resulting from the construction and occupancy of the proposed mixed-use redevelopment containing 16,452 square feet of commercial (retail) space with 40 employees and 315 housing units with 548 residents, including 28 public school children, may now be examined in terms of the services provided to the Borough's residents and employees. The determination of the fiscal impact of the proposed redevelopment involves the use of an econometric model which is a composite of two techniques generally referred to as the "per capita multiplier method" and the "proportional valuation method". The "proportional valuation method" is utilized first to assign a portion of total municipal expenditures to the residential (as opposed to non-residential) valuation in the Borough. Municipal expenditure levels proportionately allocated to residential valuation are then expressed in terms of per employee and per capita expenditures for the existing employment and population base. School appropriations are expressed on a per pupil basis. Once these per employee, per capita and per pupil expense ratios are determined, the "per capita multiplier method" anticipates added costs from the proposed development by applying increased employment, population and student enrollment to the current expense ratios.

### **Assumptions, Conditions and Qualifications**

The preparation of a cost/revenue analysis, which measures the overall and specific impacts resulting from the development and occupancy of the proposed development, necessarily requires that certain empirical assumptions be made:

- 1) All dollars are 2015 dollars--the fiscal impact shown reflects the forecasted impact as if the development were completed in 2015;
- 2) Other growth or changes (demographic/economic) occurring in Garwood Borough during the development phases of the project may well have their own impact on fiscal matters, but are not included within the scope of this study in order to empirically assess the direct impact of the planned development;

- 3) The “proportional valuation method” assumes that, over the long run, current average operating costs furnish a reasonable estimate of future operating costs occasioned by growth, and that current levels of service, relative to current population, are reasonably accurate indicators of future service levels continued at the same relative scale, and;
- 4) The current distribution of expenditures among the various sectors of municipal service will remain constant in the short term and will serve as the primary indicator of the way in which additional expenditures will be subsequently allocated.

Utilizing the aforescribed methodology and assumptions, the ultimate impact of the completion and occupancy of the proposed mixed-use redevelopment can be determined through a cost/revenue analysis of the major sources of the services and taxing bodies affected by the new development. The primary sources of the services and taxes to be affected are: a) the municipality; b) the school district, and ; c) the County.

## **MUNICIPAL IMPACT**

The fiscal effects anticipated to result from the proposed transit-oriented mixed-use redevelopment containing 16,452 square feet of commercial space with 40 employees and 315 new housing units, including the addition of 548 new residents, shall be analyzed in this section in terms of the added costs expected to be incurred by the municipality in providing the various services required by the development.

### **Municipal Costs**

Insofar as the costs of the services now being provided by the community serve as the statistical foundation for the costs to be generated by the proposed development, an analysis of existing service/cost relationships has been undertaken. A summary of Garwood Borough's current (2015) revenues and expenditures, as presented in Table 10, provides a useful profile for the determination of the fiscal impact attributable to the proposed development.

Before the data and relationships indicated in Table 10 may be utilized, certain adjustments must be made to separate its residential and non-residential components. As may be seen in Table 10, non-residential properties in the Borough of Garwood, which include Class 4a Commercial and Class 4b Industrial properties, represent 9.33 percent of all properties and 26.83 percent of the Borough's total assessed valuation. Given these distributions, 18.08 percent of the total current municipal expenditures would be assigned, in terms of cost/benefit (or cost generation), to the non-residential properties in Garwood Borough. Of the Borough's current tax-supported appropriations of \$5,998,427, 18.08 percent, or \$1,084,516, would be assigned to the Borough's 1405 non-residential (commercial/industrial) properties.

The Borough's residential properties, which are represented by 1,307 Class 2 Residential and 8 Class 4c apartment properties, represent 87.61 percent of the Borough's total properties and 72.68 percent of the Borough's total assessed valuation, and would be assigned 80.15 percent of the Borough's total tax-supported costs. In this regard, \$4,807,739 of the Borough's total, tax-supported local use appropriations of \$5,998,427 would be attributed to residential properties located within the Borough of Garwood.

**TABLE 9  
MUNICIPAL DATA - 2015  
GARWOOD BOROUGH, UNION COUNTY**

**A. Current Assessments:**

<u>Property Class</u>	<u>Assessment</u>	<u>Percent</u>	<u>Parcels</u>
1 Vacant Land	\$ 915,800	0.49	46
2 Residential	\$133,517,300	71.56	1,307
3a Farm-Regular	\$ 0	0.00	0
3b Farm-Qualified	\$ 0	0.00	0
4a Commercial	\$ 43,514,000	23.32	119
4b Industrial	\$ 6,556,800	3.51	21
4c Apartments	\$ 2,092,000	1.12	8
<u>Summary</u>			
Residential (Class 2,3a and 4c)	\$135,609,300	72.68	1,315
Commercial/Industrial	\$ 50,070,800	26.83	140
Vacant Land, Farm-Q	\$ 915,800	0.49	46
Total	\$186,595,900	100.00	1,501

**B. Current Tax Structure:**

<u>Rate Per \$100 (2015-16)</u>	<u>Percent</u>	<u>Tax Rate</u>
Municipal Purpose	34.57	\$3.213
Local School	45.41	\$4.221
County	20.02	\$1.861
Total	100.00	\$9.295

**C. Local Use Appropriations:**

	<u>Percent</u>	<u>Amount</u>
Municipal Purposes Within CAPS	74.76	\$5,395,728
Statutory Expenditures		\$ 630,137
Other Operations	3.10	\$ 954,771
Capital Improvements	1.04	\$ 15,000
Debt Service	13.61	\$ 315,289
Deferred Charges	0.18	\$ 60,166
Reserve for Uncollected Taxes	4.83	\$ 400,000
Total	100.00	\$7,771,091

**D. General Revenues - Local Use:**

	<u>Percent</u>	<u>Amount</u>
Revenue from Property Taxes (*)	77.19	\$5,998,427
Miscellaneous Revenues	12.21	\$ 949,163
Surplus Revenues	7.70	\$ 598,500
Receipt of Delinquent Taxes	2.89	\$ 225,000
Total General Revenues	100.00	\$7,771,091

Note: Assessment Ratio is 29.21 percent.

(\*) Includes Library tax of \$0.115 / \$100

**Non-Residential Costs** - The 140 existing non-residential (commercial and industrial) parcels in Garwood have a total estimated (2015) employment base of 2,100 jobs and were previously calculated to generate \$1,084,516 in allocated, tax-supported, local use costs, or \$516 per employee. Applying this non-residential cost factor of \$516 per employee to the 40 new jobs estimated to be generated by the new commercial space yields an allocated a local use cost of \$20,640 (40 x \$516= \$20,640).

**Residential Costs** - When the resident-based, tax-supported municipal appropriations of \$4,807,739 are allocated among the Borough's estimated year-end 2015 residential population of 4,575 residents, an average per capita, tax-supported cost appropriation of \$1,051 is derived. Concentrated, higher-density residential developments, and particularly investor-owned and professionally managed income producing Class 4c (apartment) properties, where many services (streets and road maintenance, snow removal, garbage collection, etc) are provided by the property owner, will typically have "marginal" costs that are approximately 60 percent of the "average" per capita costs, or approximately \$631 per capita. Applying this marginal per capita cost allocation of \$631 to the 548 residents estimated to reside within the proposed mixed-use redevelopment, yields an allocated local use appropriation of \$345,790 (548 x \$631 = \$345,790). Combined with the calculated non-residential costs of \$20,640, the residential costs of \$345,790 yield a total, tax-supported, allocated local use cost of \$366,430.

**Cost Allocations** - The actual experience and distribution of the municipality's expenditures among its various budgetary components provides a basis for the allocation of costs estimated for the proposed new development. The allocated costs would reflect an annual allotment of estimated appropriations predicated upon Garwood's existing levels of service and appropriations. The estimated tax-supported costs of \$366,430 amount to 6.11 percent of the tax-supported municipal appropriations that would be allocated to maintain the same level and quality of municipal services to the Borough's existing residential and non-residential properties. The forecasted allocation takes into account factors associated with the lower costs attributable to the compact and self-contained nature of the proposed mixed-use redevelopment and the economies of scale and efficiencies inherent in the addition of 40 employees to an existing employment base of 2,100 employees and 548 persons to an estimated existing population base of approximately 4,575 persons.

## **SCHOOL SYSTEM IMPACT**

The number of public school students expected to be generated by the proposed mixed-use redevelopment furnishes the statistical basis for this element of the anticipated fiscal impact. As previously discussed, the 283 “market” housing units would be estimated to generate 6 public school children while the 32 “affordable” housing units are estimated to generate 22 public school children, for a total of 28 school children. Educational services for these students would be provided by the Garwood Borough School District, which furnishes educational services for students in grades K-8 and has a “sending” relationship with the Clark Township School District for students in grades 9-12.

### **Garwood School District Costs**

The fiscal impact resulting from the addition of the 28 new students to the Garwood Borough School District has been statistically structured under the assumption that all new students were enrolled during 2014. The costs anticipated for the added enrollment of 28 students in the school district have been estimated on the basis of the actual reported per pupil appropriations for the 2015-16 school year.

During the 2015-16 school year, the Garwood Borough School District anticipates a total operating budget of \$8,007,185, of which \$7,402,118 (92.44 percent), is funded by property taxes. Relative to the school district’s anticipated enrollment, the current (2015-16) school district budget equates to \$15.639 per student, of which \$14,457 per student, is funded by tax revenues. Applying the average tax-supported school district cost of \$14,457 to the 28 new students estimated to be enrolled, yields added tax-supported school district costs amounting to \$404,800 (28 x \$14,457 = \$404,800).

## **COUNTY SERVICES IMPACT**

A broad range of services are furnished by the County government, its agencies, offices, and departments. These services, which are provided and available to all County residents without respect to municipality of residence, include the services of County Courts; Sheriff's office; various health, safety, and welfare programs; maintenance of County roads; County education services; County parks; recreational facilities; etc. The nature of the services provided by the County are such that its services, facilities and operations are generally of countywide use and benefit, and the costs thereof are not allotted and cannot be segregated on a municipality-by-municipality basis. Therefore, it is difficult to specifically separate and determine the actual measure of benefit, and the costs attendant thereto, received by Garwood Borough residents from Union County operations.

The absence of a direct cost/benefit relationship in the services supplied by the County does not preclude its analysis, but rather, focuses the correlations upon the actual manner in which County services are furnished and financed. Although County services are provided to the general public, these services are not financed by the population, but through the assessment of a County Tax upon property valuations. A calculation of the estimated County costs and estimated County revenues resulting from the proposed mixed-use redevelopment in Garwood Borough may also be derived from this bifurcated relationship between costs and revenues.

### **County Costs**

County services are provided primarily, and in some instances exclusively, for the benefit of County residents with only a limited amount of services rendered to non-residential properties and non-resident employees. Because the vast majority of Union County's services and associated costs are furnished to and for the benefit of County residents, only a nominal and indirect relationship exists relative to non-residential properties and the employees thereof. Of the total County appropriations, only those activities involved with general government, public safety, public works, and judiciary could reasonably be perceived as providing a service/benefit to non-residential properties and their employees. These types of County services, which are provided for the joint benefit of residents and non-residents, account for approximately 43 percent of the total County expenditures while the

remaining 57 percent of Union County's expenditures are furnished exclusively for the County's residential population.

**Non-Residential Costs** - Although the majority of the County's tax-supported costs are provided for the benefit of the County's residents, some portion of the total tax-supported appropriations are attributable to non-residential properties. During 2015, approximately \$32.2 million of the County's total tax-supported appropriations of \$335.3 million would be allocated to the County's commercial and industrial properties with 182,250 estimated employees, yielding a non-residential (commercial/industrial) cost factor of \$177 per commercial/industrial employee. Applying this non-residential cost factor of \$177 per employee to the 40 new employees generated by the commercial space within the mixed-use redevelopment yields an allocated a local use cost of \$7,080 (40 x \$177 = \$7,080).

**Residential Costs** - During 2015, \$285.3 million of Union County's total tax-supported expenditures of \$335.3 million would be allocated to the County's residential properties. With an estimated year-end 2015 population of 558,740 persons, the tax-supported residential expenditures would amount to \$511 for each of the County's residents. Concentrated residential developments that do not require an extension of County infrastructure would be expected to have a "marginal" added cost that is approximately 60 percent of the "average" cost, or \$307 per capita. Applying the "marginal" per capita County cost appropriation of \$307 to the 548 new residents estimated to reside within the proposed mixed-use redevelopment indicates an allocated County service cost appropriation of \$168,240 (548 x \$307 = \$168,240). Given the magnitude of Union County operations, the absence of a direct cost/revenue basis for the provision of County services, and the fact that the added development would represent a nominal (0.10 percent) increase in the County's total population, it is unlikely that County costs would increase proportionately. To the contrary, it is probable that the added development could substantially be accommodated and serviced by existing County facilities, equipment, and personnel.

**ANNUAL REVENUES**

The proposed mixed-use redevelopment is located on a property that is within an area in the Borough of Garwood that has been designated as an area in need of redevelopment. Pursuant to the terms of a proposed Financial Agreement between the redeveloper and the Borough, the redeveloper will form an urban renewal entity that is qualified to do business under the provisions of the Long Term Tax Exemption Law, as set forth in *N.J.S.A. 40A:20-1 et seq.* In accordance with provisions of the Long Term Tax Exemption Law, the redeveloper will prepare a proposed Financial Agreement that would provide the Borough with an increased share of the total annual revenues generated by the proposed redevelopment.

**Current Revenues**

The property that is the subject of this fiscal assessment involves a proposal for the redevelopment of a 5.2 ± acre tract of land located at South Avenue and Center Street that is designated as Block 401, Lots 1, 2, 4 and 5 on the Official Tax Map of the Borough of Garwood.

**Assessed Valuation** - The redevelopment site consists of a four (4) tax lots that have combined assessed valuation of \$2,509,100:

**Proposed Redevelopment Property  
Current Assessments - Existing Use**

<u>Block</u>	<u>Lot</u>	<u>Assessed Value</u>		
		<u>Land</u>	<u>Improvements</u>	<u>Total</u>
401	1	\$ 500,500	\$ 645,900	\$1,146,400
401	2	\$ 392,000	\$ 452,400	\$ 844,400
401	4	\$ 105,500	\$ 311,800	\$ 417,300
401	5	\$ 34,300	\$ 66,700	\$ 101,000
Total		\$1,032,300	\$1,476,800	\$2,509,100

**Current Property Tax Revenues** - The property to be redeveloped, as indicated in the preceding tabulation, has a total current assessment of \$2,509,100. At the Borough’s current general tax rates, the existing use of the subject property would generate annual property tax revenues for the

Borough of Garwood amounting to \$80,618, along with property tax revenues of \$105,909 for the Garwood School District and property tax revenues of \$46,694 for Union County. The total property tax revenues generated by the existing property amount to \$233,221 and are attributable to the property taxes of \$95,952 on the land assessment and taxes of \$137,269 on the improvements. The annual property tax revenues applicable to a current assessed valuation of \$2,509,100 are summarized below:

**Garwood Redevelopment Property  
Existing Property Tax Revenues**

		<u>Land</u>	<u>Improvements</u>	<u>Total</u>
<u>Existing Assessment</u>		\$1,032,300	\$1,476,800	\$2,509,100
<u>Property Taxes/\$100</u>				
Municipal <sup>3</sup>	\$ 3.213	\$ 33,168	\$ 47,450	\$ 80,618
School District	\$ 4.221	\$ 43,573	\$ 62,336	\$105,909
County <sup>4</sup>	<u>\$ 1.861</u>	<u>\$ 19,211</u>	<u>\$ 27,483</u>	<u>\$ 46,694</u>
Total	\$ 9.295	\$ 95,952	\$ 137,269	\$233,221

**Financial Agreement With In-Lieu Payments**

The proposed residential redevelopment on a property in the Borough of Garwood that is within an area in need of redevelopment. Pursuant to the terms of a proposed Financial Agreement between the redeveloper and the Borough, the redeveloper will form an urban renewal entity (“Entity”) that is qualified to do business under the provisions of the New Jersey laws providing for Payments In Lieu (PILOT Payments), as set forth in *N.J.S.A. 40A:20-1 et seq.*, for the commercial space and residential housing units to be redeveloped on the subject property.

The annual revenues that could be expected to be generated from the residential redevelopment proposed for the subject property have been calculated to illustrate the Annual Service Charges and other payments to be paid to the Borough under the anticipated terms of a Financial Agreement between the urban renewal entity and the Borough of Garwood. Pursuant to the provisions of *N.J.S.A. 40A:20-1 et seq.*, the annual payments may be calculated using the Annual Gross Revenue method or (at the option of the municipality, or when the annual gross revenue cannot be reasonably ascertained) using the Project Cost method. To the extent that annual gross revenues the commercial space and rental apartments in the redevelopment plan can be readily calculated, the Annual Gross Revenue method has been utilized.

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<sup>3</sup> Includes Library Tax of \$0.115/\$100

<sup>4</sup> Includes Open Space Tax of \$0.052/\$100

**Annual Gross Revenue Method**

The proposed redevelopment plan, consisting of 16,452 square feet of commercial space and 315 multi-family, rental housing units, would be expected to generate Annual Gross Revenues amounting to \$8,805,180 when completed and occupied. The total (combined) Annual Gross Revenues amount to \$8,805,180 and, pursuant to the terms of the redevelopment agreement, with an Annual Service Charge amounting to ten (10.0) percent, would generate Annual Service Charges amounting to \$880,518 during the first year of full occupancy:

**Estimated Annual Gross Revenues  
Garwood Station Mixed-Use Redevelopment**

	Size	Annual Gross Revenue		Annual	
<u>Non-Residential</u>	<u>(Sq Ft)</u>	<u>Per Sq Ft</u>	<u>Aggregate</u>	<u>Svc Chg</u>	
Retail	16,452	\$26.82	\$ 441,285	10.0%	
Subtotal	16,452	\$26.82	\$ 441,285	\$ 44,128	
<u>Residential</u>	<u>Units</u>	<u>Monthly Rent</u>	<u>Annual Rent<sup>5</sup></u>	<u>Total AGR</u>	<u>ASC (0.10)</u>
Market	283	\$2,201	\$25,620	\$7,250,460	\$725,046
Affordable	32	\$ 837	\$ 9,743	\$ 311,776	\$ 31,178
Other Income	----	\$ 212	\$ 2,545	\$ 801,659	\$ 80,166
Subtotal	315			\$8,363,895	\$836,390
Total				\$8,805,180	\$880,518

**Land Tax Credit** - The completed redevelopment would be estimated to generate an Annual Service Charge of \$880,518 that, net of land taxes of \$95,952, would yield a net Annual Service Charge of \$784,566 on the improvements represented proposed redevelopment. After the land tax credit, the net Annual Service Charge amounts to \$784,566, of which 95.0 percent, or \$745,338 would be retained by the Borough of Garwood. Union County would be entitled to an annual payment that amounts to the remainder (5.0 percent) of the net Annual Service Charge, or \$39,228.

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<sup>5</sup> Annual Rent is Gross Potential Rent less three percent vacancy.

**Annual In-Lieu Payments** - The completed mixed-use redevelopment, pursuant to the provisions of a Financial Agreement, could be expected to make “net” annual in-lieu payments to the Borough of Garwood and Union County amounting to \$784,566. These payments would be distributed between the Borough of Garwood (\$745,338) and the County (\$39,228) as detailed in the following tabulation:

**Garwood Station Mixed-Use Redevelopment  
Annual Service Charges and Administrative Fees**

<u>Annual Service Charge</u>		
<u>Total</u>	<u>Garwood</u>	<u>County</u>
\$784,556	\$745,338	\$39,228

**Total Annual Payments** - With the inclusion of the land tax payments, which currently amount to \$95,952, the proposed residential redevelopment would be expected to generate total annual payments (PILOT revenues and land taxes) amounting to \$880,518:

**Proposed Mixed-Use Redevelopment  
Annual Revenues**

<u>Source</u>	<u>Municipal</u>	<u>School</u>	<u>County</u>	<u>Total</u>
Annual Service Charge	\$745,338	\$ 0	\$39,228	\$784,566
Land Taxes	\$ 33,168	\$43,573	\$19,211	\$ 95,952
Total	\$778,506	\$43,573	\$58,439	\$880,518

**Annual Revenue Comparisons**

The payments that the Borough of Garwood would retain with the proposed tax abatement (\$778,506) are 9.7 times the property tax revenues (\$80,618) that the Borough currently receives from the existing property and are 1.23 times the property tax revenues of \$632,960<sup>6</sup> that the Borough would receive with Ordinary Applicable Taxes:

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<sup>6</sup>The proposed redevelopment, with a completed project value of \$67,442,049 and an estimated assessment of \$19,699,80, would generate municipal property tax revenues of \$632,960 at the current municipal property tax rate of \$3.213 per \$100 of assessed valuation

**Garwood Station Mixed-Use Redevelopment  
Annual Revenue Summary and Comparison**

	Borough of Garwood
<u>Existing Use</u>	\$ 80,618
<u>Proposed Redevelopment</u>	
Ordinary Taxes	\$632,960
PILOT payments	\$778,506
Allocated Costs	\$366,430

As summarized in the preceding tabulation, the annual revenues that would be received by the Borough of Garwood with a Financial Agreement providing for in-lieu payments are 9.7 times the current municipal tax revenues of \$80,618 and are 2.12 times the allocated municipal service costs of \$366,430. Significantly, the annual revenues generated for the Borough of Garwood (\$778,506) and the local school district (\$43,573) with the proposed tax-exemption amount to \$822,079 and exceed the combined municipal and school district costs of \$771,230<sup>7</sup> allocated to the proposed mixed-use redevelopment, notwithstanding the inclusion of 32 “affordable” housing units.

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<sup>7</sup> Municipal service costs of \$366,430 plus school district costs of \$404,800 = \$771,230.

## **FISCAL IMPACT OVERVIEW**

In the preceding sections, the nature and magnitude of the proposed mixed-use redevelopment in the Borough of Garwood relative to the existing community have been defined and quantified, and the prospective impact thereof upon the various services furnished by the municipality, school system and County have been determined. The need for a variety of services, and the costs thereof, as a result of the proposed redevelopment, were subsequently refined to illustrate the ultimate impact through cost/revenue analysis.

The results of these analyses, as previously discussed, indicate that the completed redevelopment would, with the proposed tax exemption, generate Annual Service Charges and land taxes for the Borough of Garwood that amount to \$778,506. The annual revenues generated for the municipality with the proposed tax abatement are 9.7 times the current municipal tax revenues of \$80,618 and are 2.12 times the allocated municipal service costs of \$366,430. Significantly, the annual revenues generated for the Borough of Garwood and the local school district with the proposed tax-abatement (\$822,079) also exceed the combined municipal and school district costs of \$771,230 allocated to the mixed-use redevelopment, to yield an annual revenue surplus for municipal and school operations.

Under Ordinary Applicable Taxes, the Borough of Garwood would receive only 34.6 percent of the property tax revenues generated by the proposed redevelopment. The utilization of the provisions for tax-exemption would provide the Borough with 88.4 percent of the total annual revenues generated (annual service charges and land taxes), and yield annual payments to the Borough of Garwood amounting to \$778,506.

### **Impact Summary**

The foregoing analysis has demonstrated that, if the proposed redevelopment had been in existence during 2015, the annual municipal revenues expected to be generated would have amounted to \$778,506 and would fully offset the allocated tax-supported municipal costs \$366,430 and resulted in a municipal revenue surplus of \$412,076. The existing costs allocations for municipal operations provide one possible distribution of the estimated overall costs; but it is the overall cost estimate, and

not the specific distribution of this cost, that is the most reliable product of this analysis. The actual and final determination of specific services, equipment, and manpower needs most appropriately rests with the various municipal and school authorities responsible for the provision of these services. Similarly, the allocation and/or reallocation of newly realized revenue sources should necessarily be reserved for those charged with the responsibility of managing these fiscal resources.

## **INDEX TO APPENDICES**

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APPENDIX 3	CUPR Transit Oriented Development Demographics
APPENDIX 4	CUPR Affordable Housing Demographic Multipliers

## APPENDIX 1

### Demographic Multipliers - Total Population

STATEWIDE NEW JERSEY TOTAL PERSONS AND PERSONS BY AGE (continued)									
STRUCTURE TYPE/ BEDROOMS/ VALUE/TENURE	TOTAL PERSONS	AGE							
		0-4	5-17	18-34	35-44	45-54	55-64	65-74	75+
<b>5+ Units (Own), 0-1 BR</b>									
All Values	1.694	0.094	0.125	0.530	0.304	0.145	0.124	0.159	0.214
Below Median \$185,361	1.702	0.137	0.167	0.474	0.364	0.140	0.097	0.151	0.171
Above Median \$185,361	1.682	0.036	0.069	0.605	0.223	0.150	0.159	0.171	0.270
<b>5+ Units (Own), 2 BR</b>									
All Values	1.797	0.071	0.122	0.485	0.320	0.294	0.191	0.153	0.161
Below Median \$226,552	1.771	0.074	0.131	0.520	0.324	0.290	0.164	0.121	0.147
Above Median \$226,552	1.844	0.064	0.105	0.419	0.312	0.301	0.243	0.215	0.186
<b>5+ Units (Own), 3 BR</b>									
All Values	2.469	0.213	0.471	0.537	0.481	0.332	0.243	0.129	0.063
Below Median \$226,552	2.828	0.301	0.655	0.588	0.524	0.412	0.204	0.103	0.041
Above Median \$226,552	2.104	0.124	0.283	0.486	0.438	0.250	0.282	0.155	0.086
<b>5+ Units (Rent), 0-1 BR</b>									
All Values	1.507	0.069	0.070	0.569	0.190	0.098	0.077	0.149	0.284
Below Median \$125,716	1.370	0.053	0.083	0.285	0.143	0.100	0.093	0.262	0.351
Above Median \$125,716	1.644	0.085	0.057	0.855	0.237	0.097	0.061	0.035	0.216
<b>5+ Units (Rent), 2 BR</b>									
All Values	2.303	0.207	0.323	0.967	0.353	0.180	0.113	0.069	0.090
Below Median \$177,123	2.493	0.265	0.478	0.951	0.364	0.195	0.115	0.065	0.060
Above Median \$177,123	2.107	0.147	0.165	0.984	0.342	0.164	0.112	0.073	0.121
<b>5+ Units (Rent), 3 BR</b>									
All Values	3.545	0.431	0.973	1.137	0.577	0.199	0.109	0.075	0.044
Below Median \$173,004	3.666	0.392	1.242	1.064	0.587	0.246	0.114	0.022	0.000
Above Median \$173,004	3.422	0.470	0.702	1.212	0.568	0.151	0.104	0.128	0.088
<b>2-4 Units, 0-1 BR</b>									
All Values	2.043	0.179	0.288	0.747	0.278	0.221	0.112	0.087	0.133
Below Median \$123,574	1.868	0.151	0.259	0.650	0.282	0.141	0.111	0.117	0.158
Above Median \$123,574	2.225	0.207	0.318	0.847	0.274	0.304	0.113	0.057	0.106
<b>2-4 Units, 2 BR</b>									
All Values	2.651	0.250	0.453	0.940	0.477	0.217	0.157	0.094	0.063
Below Median \$149,607	2.857	0.341	0.603	0.939	0.497	0.200	0.144	0.082	0.052
Above Median \$149,607	2.440	0.158	0.300	0.940	0.456	0.235	0.169	0.106	0.075
<b>2-4 Units, 3 BR</b>									
All Values	3.529	0.293	0.805	1.062	0.654	0.363	0.209	0.107	0.036
Below Median \$226,552	3.665	0.355	1.070	1.085	0.718	0.269	0.099	0.047	0.021
Above Median \$226,552	3.388	0.228	0.530	1.038	0.588	0.460	0.322	0.170	0.052
<b>2-4 Units, 4-5 BR</b>									
All Values	3.995	0.384	0.749	1.141	0.623	0.527	0.216	0.194	0.162
Below Median \$370,722	4.231	0.474	0.965	1.212	0.744	0.557	0.073	0.129	0.078
Above Median \$370,722	3.699	0.270	0.477	1.052	0.471	0.490	0.396	0.276	0.268

## APPENDIX 2

### Demographic Multipliers - Public School Children

#### STATEWIDE NEW JERSEY PUBLIC SCHOOL CHILDREN (PSC) (continued)

STRUCTURE TYPE/ BEDROOMS/ VALUE /TENURE	TOTAL PSC	PUBLIC SCHOOL GRADE		
		Elementary (K-6)	Junior High School (7-9)	High School (10-12)
<b>5+ Units (Own), 0-1 BR</b>				
All Values	0.117	0.100	0.009	0.008
Below Median \$129,835	0.167	0.137	0.015	0.015
Above Median \$129,835	0.051	0.051	0.000	0.000
<b>5+ Units (Own), 2 BR</b>				
All Values	0.098	0.067	0.013	0.018
Below Median \$226,552	0.101	0.065	0.013	0.024
Above Median \$226,552	0.092	0.072	0.013	0.007
<b>5+ Units (Own), 3 BR</b>				
All Values	0.442	0.321	0.068	0.054
Below Median \$226,552	0.598	0.406	0.134	0.058
Above Median \$226,552	0.283	0.234	0.000	0.049
<b>5+ Units (Rent), 0-1 BR</b>				
All Values	0.060	0.040	0.012	0.008
Below Median \$125,716	0.069	0.043	0.015	0.011
Above Median \$125,716	0.051	0.037	0.009	0.006
<b>5+ Units (Rent), 2 BR</b>				
All Values	0.275	0.183	0.051	0.041
Below Median \$177,123	0.432	0.286	0.081	0.065
Above Median \$177,123	0.115	0.078	0.019	0.017
<b>5+ Units (Rent), 3 BR</b>				
All Values	0.832	0.493	0.229	0.109
Below Median \$173,004	1.103	0.761	0.251	0.091
Above Median \$173,004	0.560	0.225	0.208	0.127
<b>2-4 Units, 0-1 BR</b>				
All Values	0.250	0.139	0.052	0.059
Below Median \$123,574	0.237	0.126	0.044	0.067
Above Median \$123,574	0.264	0.153	0.060	0.051
<b>2-4 Units, 2 BR</b>				
All Values	0.382	0.252	0.074	0.057
Below Median \$149,607	0.514	0.360	0.084	0.071
Above Median \$149,607	0.248	0.141	0.064	0.042
<b>2-4 Units, 3 BR</b>				
All Values	0.684	0.306	0.171	0.128
Below Median \$226,552	0.946	0.523	0.244	0.180
Above Median \$226,552	0.412	0.244	0.094	0.074
<b>2-4 Units, 4-5 BR</b>				
All Values	0.556	0.247	0.143	0.167
Below Median \$370,722	0.742	0.321	0.256	0.165
Above Median \$370,722	0.322	0.154	0.000	0.168

## APPENDIX 3

### Transit Oriented Development Public School Children Multipliers

**Public School Children Generation from Selected Transit-Oriented Developments (TODs)  
in New Jersey**

<b>PROJECT PROFILE</b>			<b>SIZE</b>	<b>PUPIL GENERATION</b>	<b>PUPIL MULTIPLIERS</b>
<i>Project Name</i>	<i>Location</i>	<i>Tenure</i>	<i>Number of Units</i>	<i>Public School Children</i>	<i>Public School Children Multiplier<sup>a</sup></i>
1. Jacobs Ferry	West New York	Rental	254	0	0.00
2. Riverwatch	New Brunswick	Rental	200	1	0.01
3. Chancery Square	Morristown	Rental	131	1	0.01
4. Franklin Square	Metuchen	Rental	105	10	0.10
5. Gaslight Commons	South Orange	Rental	200	6	0.03
6. Riverbend I	West New York	Rental	302	5	0.02
7. Riverbend II	West New York	Rental	212	4	0.02
6. Riverside West	West New York	Rental	344	5	0.01
9. Harbor Place	West New York	Rental	20	9	0.45
10. Highlands at Plaza Square	New Brunswick	Rental	415	6	0.01
<b>TOTAL</b>			<b>2,183</b>	<b>47</b>	<b>0.02</b>

*Note:* a. Equals public school children divided by the number of housing units.

*Source:* Project profile and size information was derived from the developers of the indicated TODs. Public school children data from each TOD was obtained by contacting the public school district(s) serving the respective TODs.

## APPENDIX 4

### Demographic Multipliers - Affordable Housing

#### Household Size, School-Age Children, and Public School Children for Low- and Moderate-Income Households (LMI) in New Jersey (2000)

	<i>Total Persons</i>	<i>School-Age Children</i>	<i>Public School Children</i>
All Housing Types and Bedrooms	2.35	0.50	0.45
Single-Family, Detached			
2 BR	1.95	0.24	0.21
3 BR	2.49	0.51	0.46
4 BR	3.07	0.83	0.73
Single-Family, Attached			
2 BR	2.09	0.35	0.32
3 BR	3.05	0.86	0.78
5+ Units, Own			
1 BR	1.37	0.07	0.06
2 BR	1.76	0.21	0.18
3 BR	2.51	0.60	0.54
5+ Units, Rent			
1 BR	1.61	0.16	0.14
2 BR	2.76	0.68	0.62
3 BR	3.82	1.37	1.27

*Note:* The New Jersey Council on Affordable Housing (COAH) Uniform Housing Affordability Controls (UHAC) indicate the following occupancy standards: "A studio shall be affordable to a one-person household; a one-bedroom unit shall be affordable to a one and one-half person household; a two-bedroom unit shall be affordable to a three-person household; a three-bedroom unit shall be affordable to a four and one-half person household; and a four-bedroom unit shall be affordable to a six-person household." UHAC further indicates that "to the extent feasible...the administrative agent shall strive to: Provide an occupant for each unit bedroom; provide children of different sex with separate bedrooms; and prevent more than two persons from occupying a single bedroom." While these standards bear on the relationship between housing-unit size (bedrooms) and household size, we do not have empirical evidence on the number of persons found in different-size COAH units. For instance, a "smaller" household (e.g., a 3-person household in a 3-bedroom unit) may be able to afford such a home with a larger down payment.

*Source:* U.S. Census of Population and Housing, Public Use Microdata Sample, 2000.

More complete knowledge must await future survey of the occupants of such housing units. En route to that goal, the current investigation has begun to investigate empirically the public school children impact of *Mount Laurel* dwellings. Ideally, this will be the start of follow-up future investigations.

The research protocol proceeded in the following manner. From the New Jersey Council on Affordable Housing (COAH) and from other affordable housing groups in New Jersey, Rutgers obtained a list of *Mount Laurel* housing developments, both stand-alone, entirely affordable projects (termed "exclusively affordable") and *Mount Laurel* units intermixed with market-rate housing (termed "inclusionary.") Rutgers then contacted the school districts responsible for the *Mount Laurel* and market housing to ascertain the number of public school children (PSC) generated from these units. In many instances, the school districts could not or would not provide the requested information. However, Rutgers was able to obtain

## Exhibit B

<b>School Age Children Survey</b>																			
<b>Garwood Station</b>																			
<b>Garwood, NJ</b>																			
<b>Date:</b>										<b>4/18/2016</b>									
Description										Public School Children ("SAC") Year 2015-2016			Bedroom Distribution (Source: Costar)						
Development	Address	Town	Within 1000 FT of Transit	Elevator Served	Type	Year Built	Total Units	COAH Units	SAC 2015-2016	Data Source	SAC Per Unit	Stud.	1BR	2BR	3BR	Total BRs	BR Per Unit	SAC Per BR	
<b>0 Subject Property</b>	Park Ridge Transit	Garwood	Yes		Low-Rise	Proposed	315	31.5	28	Proposed Development	0.089	14	198	96	7	425	1.35	0.066	
<b>Nearby Properties</b>																			
1	Garwood Lofts	710 North Avenue	Garwood	Yes	Yes	Low-Rise	2009	50	0	2	4-6-16 email from Teresa Quigley-Garwood schools K-8 (2 students). 4-12-16 response for ALJ High School (0 students)	0.040	0	50	0	0	50	1.00	0.040
2	Stephanie Gardens	54 Third Avenue	Garwood	No	No	Low-Rise	1973	36	0	0	4-6-16 email from Teresa Quigley-Garwood schools K-8 (0 students). 4-12-16 response for ALJ High School (0 students)	0.000	4	32	4	0	44	1.22	0.000
3	Cranford Crossing	2 South Avenue West	Cranford	Yes	Yes	Low-Rise	2007	50	0	0	3-3-16 email from Karen Durana, BOE Secretary	0.000	0	6	44	0	94	1.88	0.000
4	Riverfront at Cranford Station	105 Chestnut St.	Cranford	Yes	Yes	Low-Rise	2014	108	19	0	3-9-16 e-mail from Karen Durana, BOE Secretary	0.000	0	27	81	0	189	1.75	0.000
							<b>Total Nearby Units</b>	<b>244</b>			<b>Avg. SAC Per Unit for Nearby Properties</b>	<b>0.008</b>	<b>Avg. SAC Per BR for Nearby Properties</b>					<b>0.005</b>	
<b>TOD Properties</b>																			
5	Avalon at Rutherford Station	201 Railroad Ave	East Rutherford	Yes	Yes	Low-Rise	2006	108	0	4	2-29-16 fax from Superintendent's office at East Rutherford BOE	0.037	0	47	61	0	169	1.56	0.024
6	Highlands at Morristown Station	10 Lafayette Ave.	Morristown	Yes	Yes	Low-Rise	2009	217	4	5	3-21-16 e-mail from Pat Giacomaro, Admin Asst BOE	0.023	0	137	80	0	297	1.37	0.017
7	Fair Lawn Promenade	Route 208	Fair Lawn	Yes	Yes	Low-Rise	2015	150	0	4	3-11-16 email from Sandy Logan, Secretary to Superintendent	0.027	0	25	121	4	279	1.86	0.014
							<b>Total TOD Units</b>	<b>475</b>			<b>Avg. SAC Per Unit for TOD Properties</b>	<b>0.027</b>	<b>Avg. SAC Per BR for TOD Properties</b>					<b>0.017</b>	
<b>Non-TOD Nearby Properties</b>																			
8	Lamberts Mill Village	333 Spruce Mill Lane	Westfield	No	No	Garden	1992	332	0	0	03-31-16 email from Lisa Bertone, BOE secretary	0.000	0	145	116	71	590	1.78	0.000
9	Woodmont Station at Cranford	555 South Avenue East	Cranford	No	Yes	Low-Rise	2015	163	24	17	3-9-16 e-mail from Karen Durana, BOE Secretary	0.104	0	72	70	21	275	1.69	0.062
							<b>Total Non-TOD Units</b>	<b>495</b>			<b>Avg. SAC Per Unit for Non-TOD Properties</b>	<b>0.034</b>	<b>Avg. SAC Per BR for Non-TOD Prop.</b>					<b>0.020</b>	

## Exhibit C



## Exhibit D



# TRAFFIC IMPACT STUDY

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PROPOSED MIXED-USE DEVELOPMENT  
400 South Avenue  
Borough of Garwood  
Union County, New Jersey

Prepared For:  
Russo Development

Stonefield Engineering & Design, LLC  
April 15, 2016  
S-15054

A handwritten signature in black ink, reading "Charles D. Olivo". The signature is written in a cursive, flowing style.

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Charles D. Olivo, PE, PTOE  
PRINCIPAL  
NJ P.E. License #46719

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Figure 2 – 2015 Existing Traffic Volumes

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### **HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS**

2015 Existing Traffic Conditions

2018 No-Build Traffic Conditions

2018 Build Traffic Conditions

## INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed mixed-use development on the adjacent roadway network. The subject property is comprised of multiple lots located along South Avenue in the Borough of Garwood, Union County, New Jersey. The subject site is located at the northwest quadrant of the intersection of South Avenue and Center Street. The site location is shown on appended **Figure I**.

The project is located on Block 401, Lots 1, 2, 4, and 5 as depicted on the Borough of Garwood Tax Map. The subject property has approximately 780 feet of frontage along South Avenue and currently contains industrial uses. Existing access is provided via two (2) driveways along South Avenue. Under the proposed development program, a 16,858 square-foot retail building and a three (3)-story residential building with 315 dwelling units would be constructed on the subject site. Access to the subject site is proposed via one (1) full-movement driveway and one (1) egress-only driveway along South Avenue.

## METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the *2010 Highway Capacity Manual* (HCM) and the Synchro 9 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on field recordings and timing directives provided by the New Jersey Department of Transportation (NJDOT).

## **2015 EXISTING CONDITION**

### EXISTING ROADWAY CONDITIONS

The proposed mixed-use development is located along South Avenue in the Borough of Garwood, Union County, New Jersey. The subject site is located at the northwest quadrant of the signalized intersection of South Avenue with Center Street. The subject property is designated as Block 401, Lots 1, 2, 4, and 5 as depicted on the Borough of Garwood Tax Map. The subject site has approximately 780 feet of frontage along South Avenue. Land uses in the area are predominantly residential with commercial uses located along North Avenue and South Avenue.

South Avenue (Union County Route 610) is classified as an Urban Minor Arterial with a general east-west orientation and is under the jurisdiction of Union County. Along the site frontage, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 35 mph. Sidewalk and curb are provided along both sides of the roadway, shoulders are not provided, and on-street parking is not permitted along the site frontage. The pavement surface and roadway striping appear to be in good condition. South Avenue provides mobility within Garwood and surrounding municipalities for primarily commercial uses along its length.

Center Street is a local roadway with a general north-south orientation and is under the jurisdiction of the Borough of Garwood. North of North Avenue, the roadway is designated as Walnut Street. The roadway generally provides one (1) lane of travel in each direction; however, two (2) lanes in each direction are provided between North Avenue (NJSH Route 28) and South Avenue. Center Street has a posted speed limit of 25 mph. The pavement surface and roadway striping appear to be in good condition. Center Street provides an underpass traversing the New Jersey Transit Raritan Valley Line and provides the only connection between North Avenue and South Avenue within the Borough of Garwood.

South Avenue intersects Center Street to form a signalized four (4)-leg intersection controlled by a four (4)-phase traffic signal. Each approach to the intersection provides one (1) exclusive left-turn lane and one (1) shared through/right-turn lane. Crosswalks and pedestrian signal heads are provided at all approaches of the intersection.

### EXISTING TRAFFIC VOLUMES

Manual turning movement counts were collected during the typical weekday morning, weekday evening, and Saturday midday time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the signalized intersection of South Avenue and Center Street. Specifically, manual turning movement counts were conducted on the following dates:

- ◆ Wednesday, March 18, 2015, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.
- ◆ Saturday, March 21, 2015, from 11:00 a.m. to 2:00 p.m.

The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. The study time periods have been chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed mixed-use development. Based on the review of the count data the weekday morning peak hour occurred from 8:00 a.m. to 9:00 a.m., the weekday evening peak hour occurred from 5:00 p.m. to 6:00 p.m., and the Saturday midday peak hour occurred from 11:30 a.m. to 12:30 p.m. The 2015 Existing weekday morning, weekday evening, and Saturday midday peak hour volumes are summarized on appended **Figure 2**.

### EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2015 Existing Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection and is summarized on appended **Table A.1**. Under the existing condition, the signalized intersection of South Avenue and Center Street is calculated to operate at overall Level of Service D or better during the study peak hours. All movements are calculated to operate at Level of Service D or better, with the exception of the Center Street northbound through/right-turn and southbound left-turn movements at South Avenue which operate under capacity constraints during the weekday evening peak hour.

### **2018 NO-BUILD CONDITION**

#### BACKGROUND GROWTH

The 2015 traffic volume data was grown to a future horizon year of 2018, which is a conservative estimate for when the proposed mixed-use development is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.5% annually for three (3) years. The 1.5% background growth rate was obtained from the NJDOT Annual Background Growth Rate Table.

#### OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other planned development projects that could further influence the traffic volume at the study intersections. Other planned development projects include those that are in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on consultations with the Borough of Garwood's Administrator/Municipal Clerk, a mixed-use development located at 325-331 South Avenue is under construction and would comprise twelve (12) residential dwelling units above existing

storefronts. Based on the trip generation characteristics of this development, the application of the NJDOT annual growth rate would be adequate to account for the site-specific growth associated with this project.

### 2018 NO-BUILD TRAFFIC VOLUMES

The background growth rate was applied to the 2015 Existing Condition Traffic Volumes to calculate the 2018 No-Build Condition Traffic Volumes for the weekday morning, weekday evening, and Saturday midday peak hours. These volumes are summarized on appended **Figure 3**.

### 2018 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2018 No-Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection and is summarized on appended **Table A.1**. All movements in the study network are calculated to operate generally consistent with the findings of the 2015 Existing Condition.

### **2018 BUILD CONDITION**

The site-generated traffic volume of the proposed mixed-use development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within three (3) years of the preparation of this study.

### TRIP GENERATION

Trip generation projections for the proposed mixed-use development were prepared utilizing the following land uses published by the Institute of Transportation Engineers (ITE) in Trip Generation Manual, 9<sup>th</sup> Edition: Land Use 820: “Shopping Center” for the 16,858 square feet of retail space and Land Use Code 220: “Apartment” for the 315 proposed dwelling units. **Table I** summarizes the weekday morning, weekday evening, and Saturday midday trip generation volumes associated with the proposed development.

**TABLE I – PROPOSED TRIP GENERATION**

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
315 Dwelling Units <i>Land Use 220</i>	32	129	161	127	68	195	82	82	164
16,858 SF Retail <i>Land Use 820</i>	33	20	53	87	95	182	143	132	275
<b>Total</b>	<b>65</b>	<b>149</b>	<b>214</b>	<b>214</b>	<b>163</b>	<b>377</b>	<b>225</b>	<b>214</b>	<b>439</b>

Based on data published by the US Census Bureau, approximately 21% of residents in Garwood and the neighboring communities of Cranford and Westfield proximate to their respective NJ Transit Rail Stations use public transportation or modes other than passenger vehicles to commute to work. The location of the proposed development is particularly suited to provide transit options for its occupants and patrons as two (2) NJ Transit Bus Routes operate in the nearby vicinity and the NJ Transit Raritan Valley Line Garwood Station is located proximate to the site. These routes provide connection to multiple areas in New Jersey including Hunterdon County, Somerset County, Dunellen, Plainfield, Scotch Plains, Westfield, Cranford, Union, Elizabeth, Newark, as well as New York City. Additionally, as stated within *Effects of Transportation Demand Management (TDM) and Transit on Trip Generation* published by ITE, mixed-use developments located within a quarter mile of a transit center or light rail station would be expected to have a 15% vehicle trip reduction due to transit use. Accordingly, a 15% vehicle trip reduction due to transit has been incorporated and is summarized in **Table 2**.

Chapter 6 of ITE's *Trip Generation Handbook, 3rd Edition*, states that internally captured trips can be a component in the travel patterns at multi-use developments, such as the one proposed. When combined within a single development, individual land uses tend to interact and thus, attract a portion of each other's trip generation, such as a resident visiting the retail shopping areas. Utilizing the published data, internal trips were calculated between the retail and residential uses during the weekday morning, evening, and Saturday midday peak hours. It is noted that the *Trip Generation Handbook* does not have published data for the weekday morning and Saturday midday peak hours. However, it is logical that an interaction equal or greater than experienced during the weekday evening peak period would occur during the Saturday midday peak period. As such, the weekday evening rates have been utilized for the Saturday midday peak hour. The internal capture portion of the site-generated traffic is shown in **Table 2**.

As stated within Chapter 10 of ITE's *Trip Generation Handbook*, there are instances when the total number of external trips generated by a site is different from the amount of new traffic added to the street system by the generator. Shopping centers are specifically located on or adjacent to busy streets to attract motorists already on the roadway. Therefore, the proposed site would be expected to attract a portion of its retail trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as pass-by trips. Based upon the published ITE data for Land Use 820: "Shopping Centers," approximately 34% of the external site-generated retail traffic during the weekday evening peak hour and approximately 26% during the Saturday midday peak hour is expected to be comprised of pass-by traffic. Per the ITE methodology, the net external trips (ITE trip generation less transit trips and internal trips) were used to calculate the pass-by trips.

The following table summarizes the total trip generation for the proposed development in terms of newly generated external site-generated trips (New), pass-by external site-generated trips (Pass-by), site-generated trips accomplished via transit, and internally captured site-generated traffic.

**TABLE 2 – PROPOSED TRIP GENERATION – NEW, PASS-BY, TRANSIT, & INTERNAL TRIPS**

Code	Land Use	Amount	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
220	Apartment	315 DU	32	129	161	127	68	195	82	82	164
820	Shopping Center	16,858 SF	33	20	53	87	95	182	143	132	275
<b>ITE Trip Generation Total</b>			<b>65</b>	<b>149</b>	<b>214</b>	<b>214</b>	<b>163</b>	<b>377</b>	<b>225</b>	<b>214</b>	<b>439</b>
Internal Capture Trip Reduction			-2	-2	-4	-33	-33	-66	-48	-48	-96
15.0% Transit Trip Reduction			-10	-22	-32	-28	-19	-47	-26	-24	-50
Pass-By Trip Reduction			--	--	--	-29	-29	-58	-34	-34	-68
<b>Total New Vehicular Trips</b>			<b>53</b>	<b>125</b>	<b>178</b>	<b>124</b>	<b>82</b>	<b>206</b>	<b>117</b>	<b>108</b>	<b>225</b>

At the site driveways, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the through travel stream into and out of the site access point. The internal trips are internal to the site and therefore not shown on the adjacent roadway network.

It should be noted that approximately 183,100 square feet of industrial uses existed on the subject property for many years. Therefore, it is important to consider the net change in site trip generation. The trip generation rates associated with Land Use 110: “General Light Industrial” was cited for the existing uses. **Table 3** shows a comparison of the ITE Trip Generation for the existing uses and the proposed development. Please note: the following analysis conservatively does not incorporate an existing trip credit.

**TABLE 3 – ANTICIPATED TRIP GENERATION DIFFERENCE**

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Existing 183,100 SF Industrial <i>Land Use 110</i>	148	20	168	21	157	178	12	14	26
Proposed Development	53	125	178	124	82	206	117	108	225
<b>Difference</b>	<b>-95</b>	<b>105</b>	<b>10</b>	<b>103</b>	<b>-75</b>	<b>28</b>	<b>105</b>	<b>94</b>	<b>199</b>

**TRIP ASSIGNMENT/DISTRIBUTION**

The trips generated by the proposed development have been assigned to the adjacent roadway system based on the existing travel patterns along the adjacent roadway network, the location of major arterial roadways, and the access management plan of the site. The “New” Residential Traffic Volumes are illustrated

on **Figure 4**, the “New” Retail Traffic Volumes are illustrated on **Figure 5**, the “Pass-by” Retail Traffic Volumes are illustrated on **Figure 6**, and the Total Site-Generated Traffic Volumes expected to access the site have been summarized on **Figure 7**.

### 2018 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2018 No-Build Volumes to calculate the 2018 Build Volumes and are shown on appended **Figure 8**.

### 2018 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2018 Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection and site driveways. The appended **Table A.1** compares the Existing, No Build, and Build Conditions Level of Service and delay values. With the addition of site-generated traffic, all movements within the study network are calculated to operate generally consistent with the findings of the No-Build Condition.

The southbound approach of the proposed full-movement driveway along South Avenue is calculated to operate at Level of Service D or better during all peak hours studied. All other site driveway movements are calculated to operate at Level of Service C or better during the peak hours studied.

### **SITE CIRCULATION/PARKING SUPPLY**

A review was conducted of the proposed mixed-use development using the Site Plan (Sheet A1.1), dated March 23, 2016 prepared by Russo Development. In completing this review, particular attention was focused on the site access, circulation, and parking supply. Under the proposed development program, a four (4) story multi-use building containing 16,858 square feet of retail and 315 dwelling units would be constructed at the subject property. Access is proposed via one (1) full-movement driveway and one (1) egress-only driveway along South Avenue.

The subject site will be served by a 457-stall parking garage and adjacent ground floor parking containing 64 stalls for a total of 521 parking stalls. Both parking areas are accessed via a common driveway off South Avenue. There are 99 stalls (64 stalls within the ground floor lot adjacent to the parking garage and 35 stalls on the ground floor of the parking garage) that would be reserved for on-site retail and visitor use. Also, 370 stalls within the parking garage would be reserved for resident use only, which complies with the proposed redevelopment plan’s requirement. The final 52 parking spaces in the garage would be made available to commuter parking.

Regarding the parking requirements for the development, the Borough of Garwood's proposed redevelopment plan requires 1 parking per studio and 1-bedroom dwelling, 1.25 spaces per 2-bedroom unit, 2 spaces per 3-bedroom unit and three (3) parking stalls per 1,000 square feet of retail space. For the proposed development consisting of 315 total dwelling units and 16,858 square feet of retail space, this equates to 419 required parking stalls. As such, the proposed parking supply of 521 stalls would be sufficient to accommodate the Borough of Garwood's parking requirement. The parking stalls would be 8.5 feet wide and 18 feet deep and in accordance with industry standards.

## **CONCLUSIONS**

This report was prepared to examine the potential traffic impact of the proposed mixed-use development. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property and the parking supply would be sufficient to support this project.

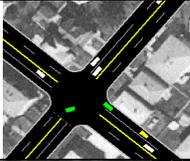
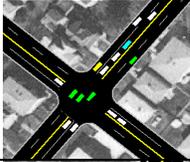
## **TECHNICAL APPENDIX**

**LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA**

## LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual 2010 (HCM 2010), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

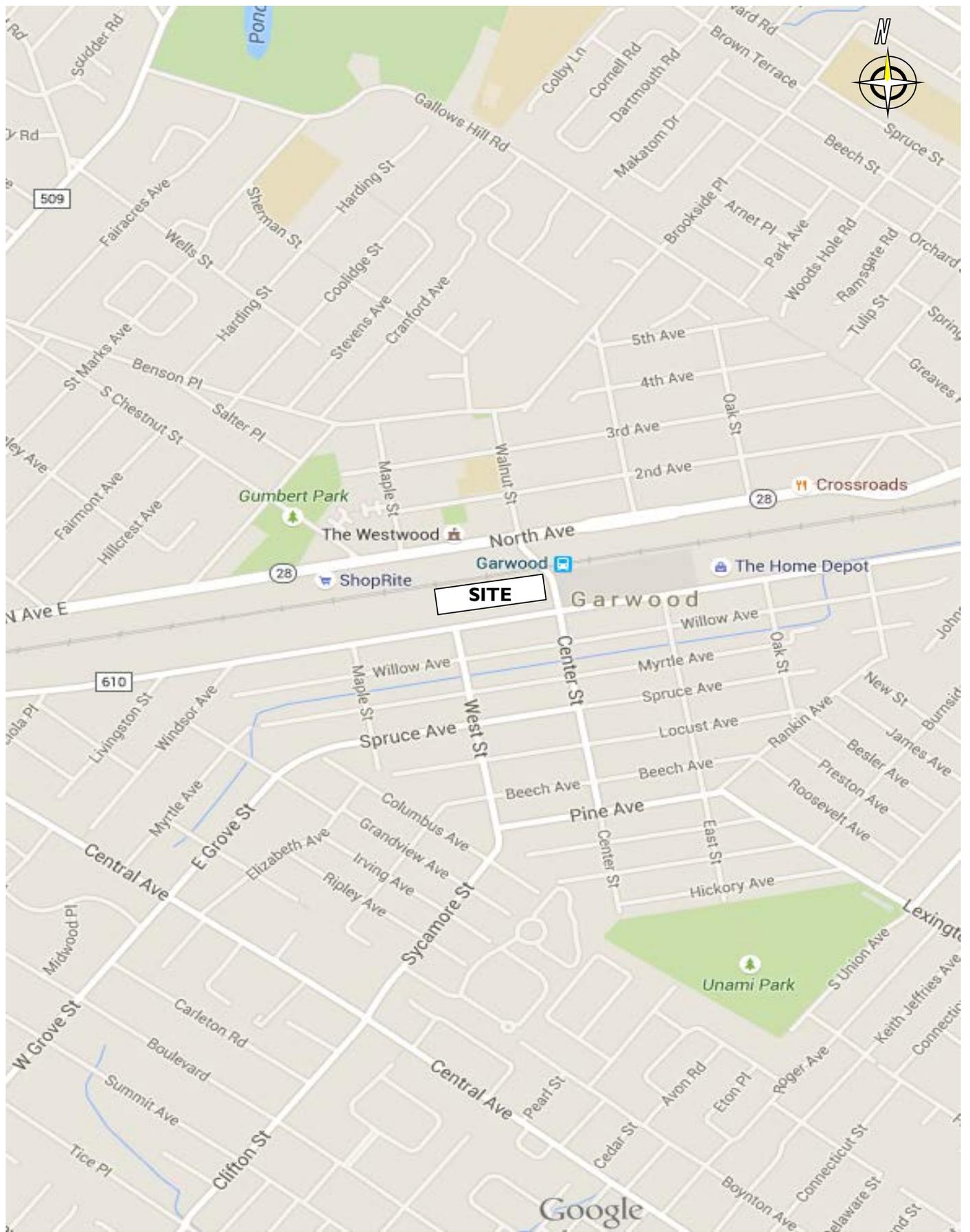
Source: Highway Capacity Manual 2010

**Table A.1:**  
**Comparative Level of Service (Delay) Table**  
**X (n) = Level of Service (seconds of delay)**

Intersection	Lane Group	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
		2015 Existing LOS (Delay)	2017 No-Build LOS (Delay)	2017 Build LOS (Delay)	2015 Existing LOS (Delay)	2017 No-Build LOS (Delay)	2017 Build LOS (Delay)	2015 Existing LOS (Delay)	2017 No-Build LOS (Delay)	2017 Build LOS (Delay)
South Avenue (EMV) & Center Street (N/S)	EB Left	C (21.6)	B (18.0)	B (19.7)	B (19.3)	C (21.0)	C (25.4)	C (26.1)	B (17.5)	C (25.1)
	EB Through/Right	C (27.6)	B (17.2)	B (18.8)	C (20.9)	B (14.5)	B (15.2)	C (27.9)	B (13.5)	B (17.2)
	WB Left	C (20.2)	C (25.7)	C (28.2)	B (13.8)	C (21.8)	C (23.6)	B (19.1)	C (20.4)	C (27.0)
	WB Through/Right	C (31.6)	C (26.4)	C (27.7)	C (27.6)	C (29.3)	C (32.4)	D (35.4)	C (24.3)	C (30.7)
	NB Left	D (41.6)	D (48.2)	D (50.1)	D (53.5)	D (52.3)	E (61.8)	D (43.2)	E (56.8)	E (56.6)
	NB Through/Right	D (51.3)	E (67.5)	E (67.0)	F (111.6)	F (125.4)	F (125.4)	D (43.1)	D (53.4)	D (47.2)
	SB Left	C (31.5)	D (38.2)	D (37.9)	F (147.6)	F (164.5)	F (159.8)	C (32.0)	D (52.3)	D (40.4)
	SB Through/Right	C (33.3)	D (37.5)	D (38.1)	D (41.7)	D (40.7)	D (42.6)	C (34.6)	D (44.7)	D (41.3)
	<b>Overall</b>	<b>C (32.9)</b>	<b>C (32.8)</b>	<b>C (33.2)</b>	<b>D (50.1)</b>	<b>D (52.8)</b>	<b>D (53.1)</b>	<b>C (32.8)</b>	<b>C (30.6)</b>	<b>C (31.8)</b>
	South Avenue (EMV) & Main Entrance (N/S)	EB Left		A (1.7)			A (4.8)			A (5.4)
	SB Left/Right		C (15.9)			D (29.4)			C (24.8)	
South Avenue (EMV) & Egress-Only Driveway (N/S)	SB Left/Right		B (12.5)			C (16.3)			B (13.9)	

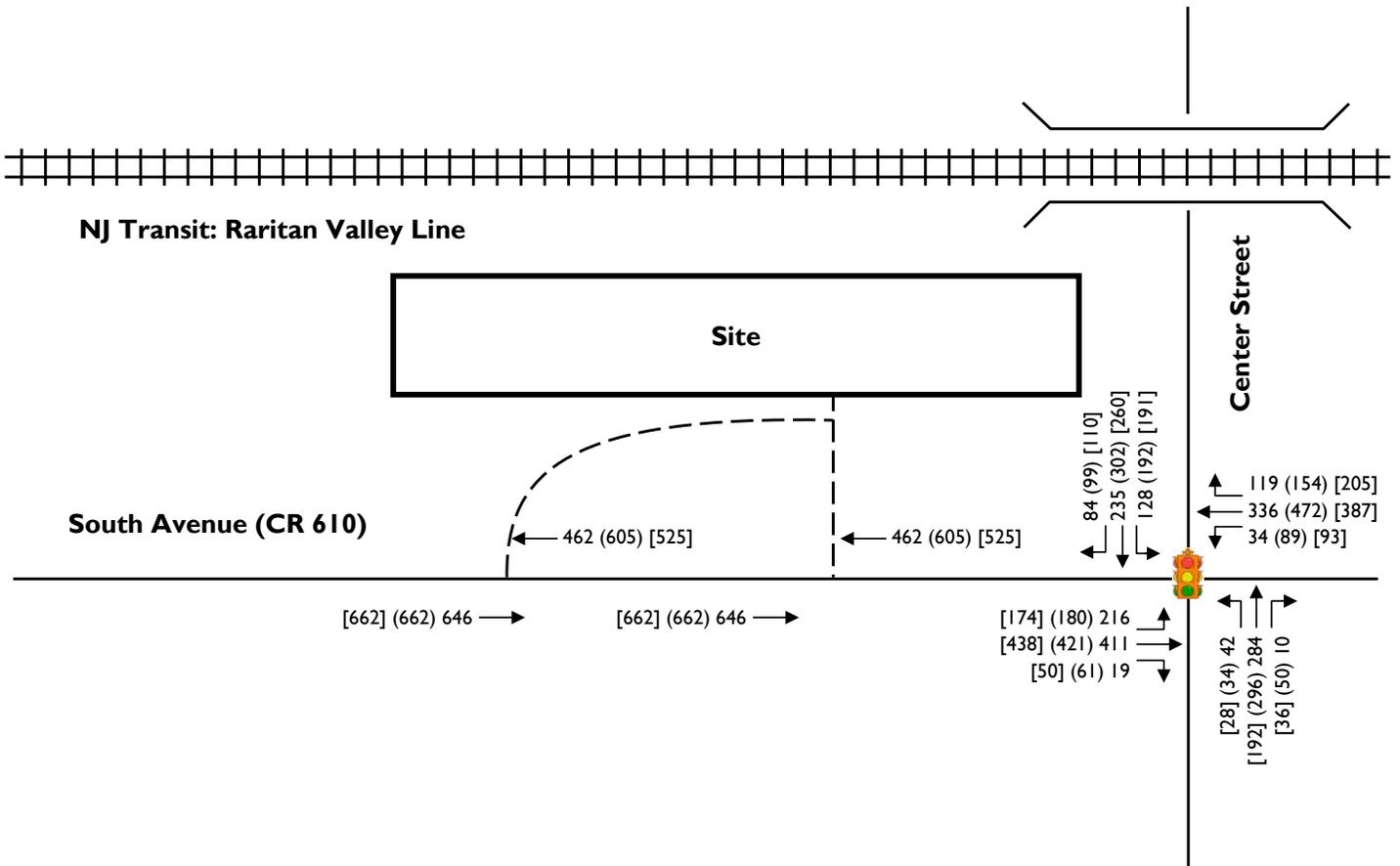
Note: Sim Traffic analysis was utilized for proposed site driveways to better represent operations given proximity to signalized intersections

## **FIGURES**



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE I**  
**Site Location Map**



**LEGEND**

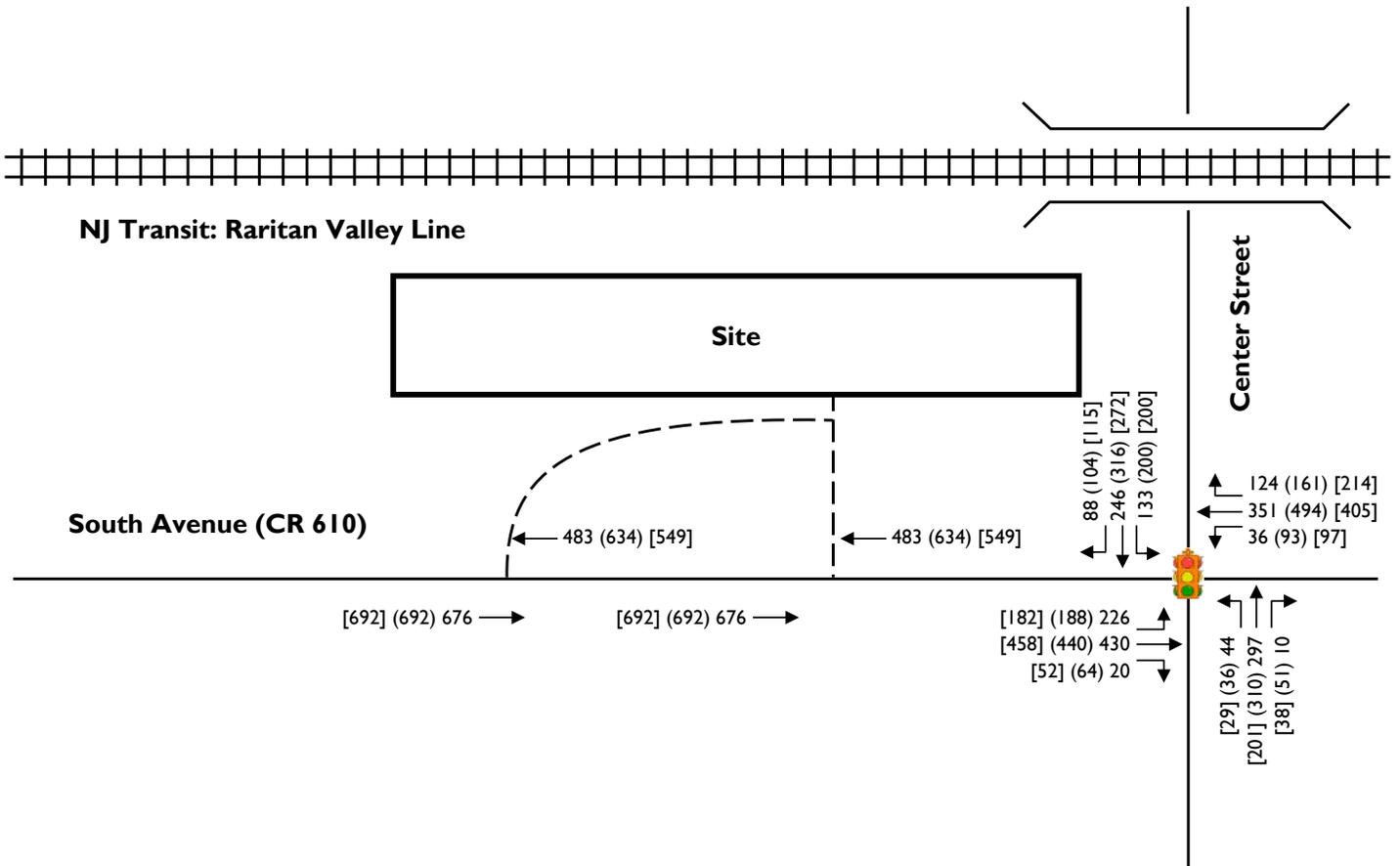
- Existing Roadway
- - - Proposed Driveway
- ← AM (PM) [SAT] Peak Hour Volumes
-  Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 2**  
**2015 Existing Traffic**  
**Volumes**



**LEGEND**

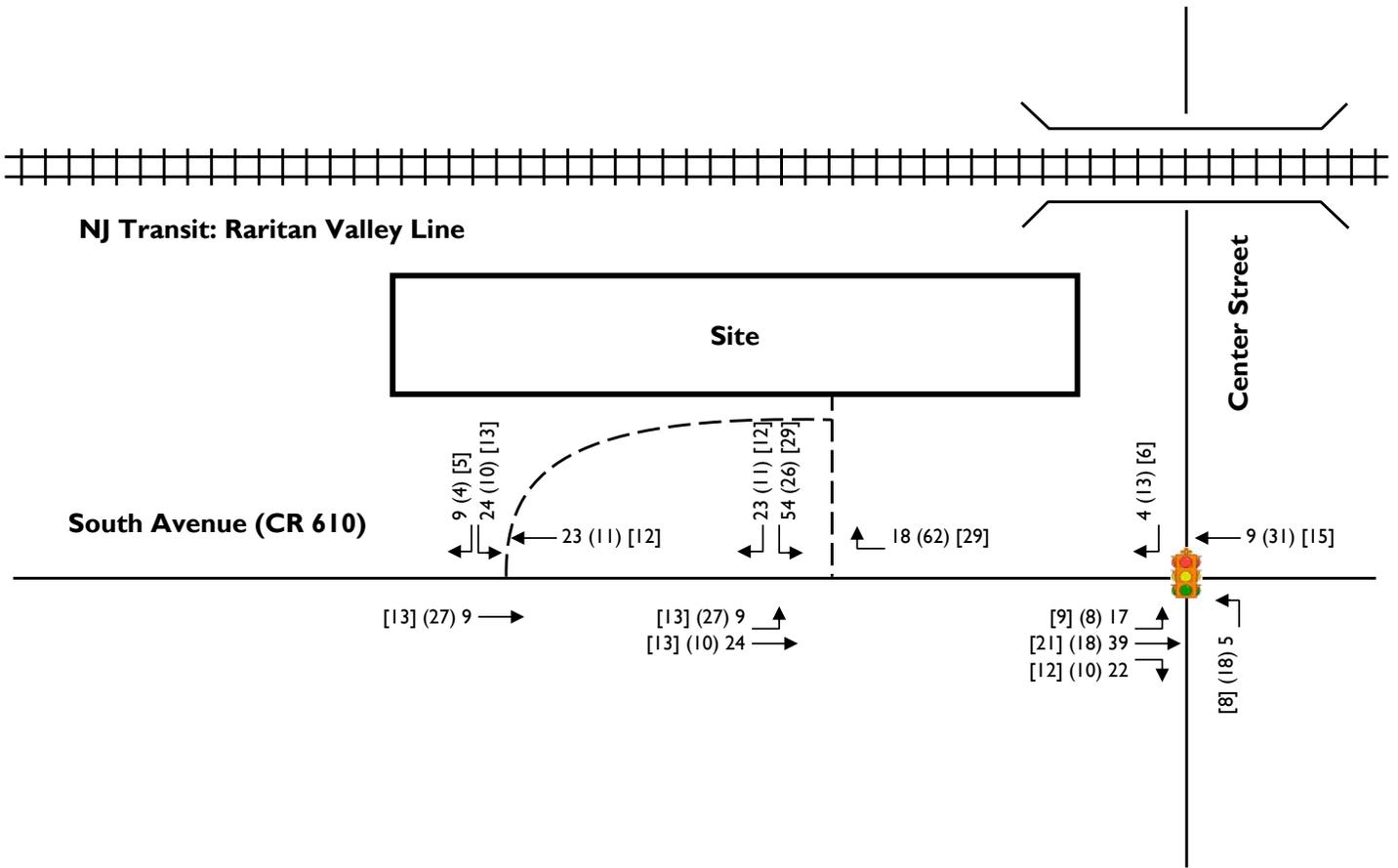
- Existing Roadway
- - - Proposed Driveway
- ← AM (PM) [SAT] Peak Hour Volumes
- Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 3**  
**2018 No-Build Traffic**  
**Volumes**



**LEGEND**

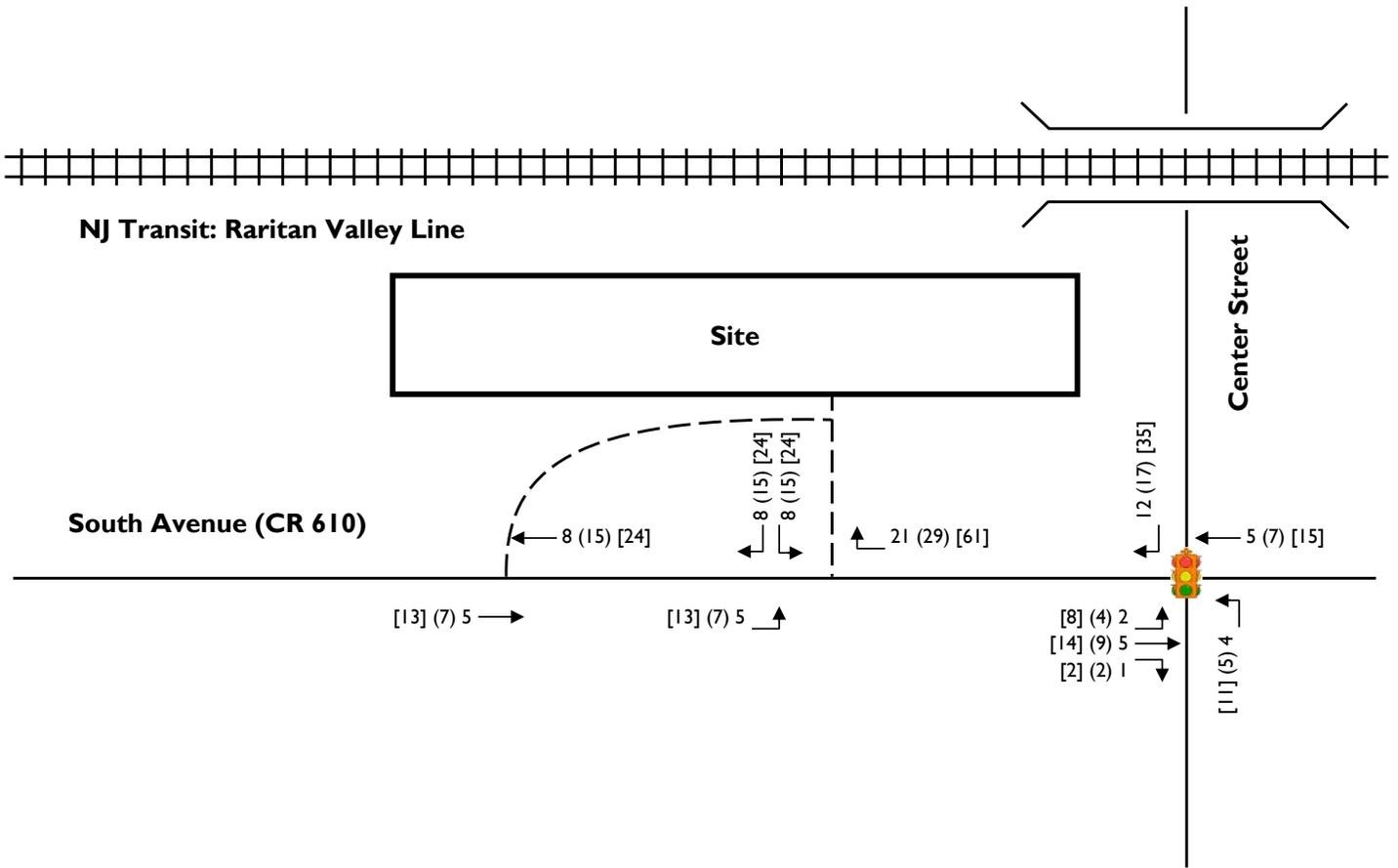
- Existing Roadway
- - - Proposed Driveway
- ← AM (PM) [SAT] Peak Hour Volumes
- Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 4**  
**"New" Residential Traffic**  
**Volumes**



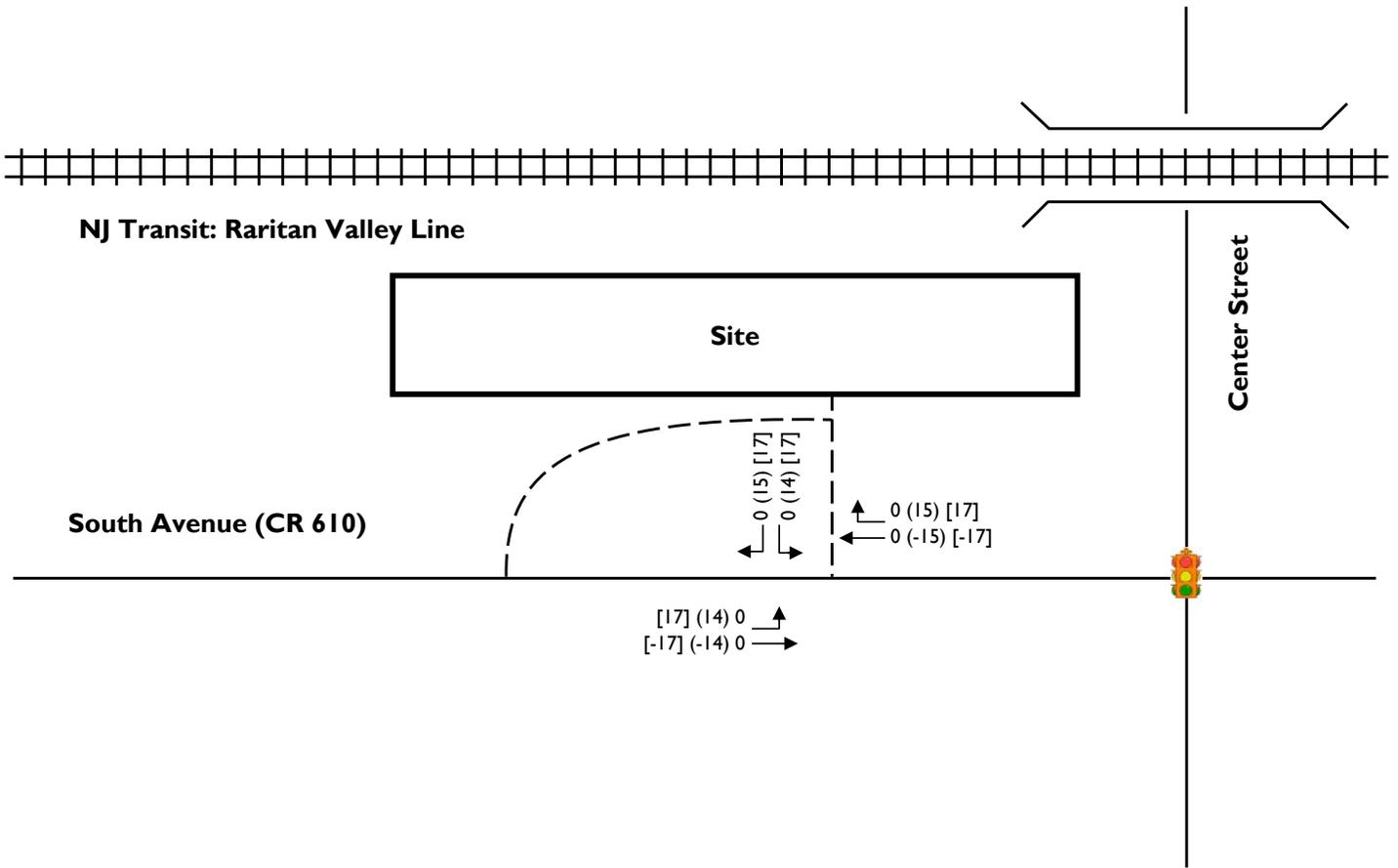
- LEGEND**
- Existing Roadway
  - - - Proposed Driveway
  - ← AM (PM) [SAT] Peak Hour Volumes
  -  Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 5**  
**"New" Retail Traffic**  
**Volumes**



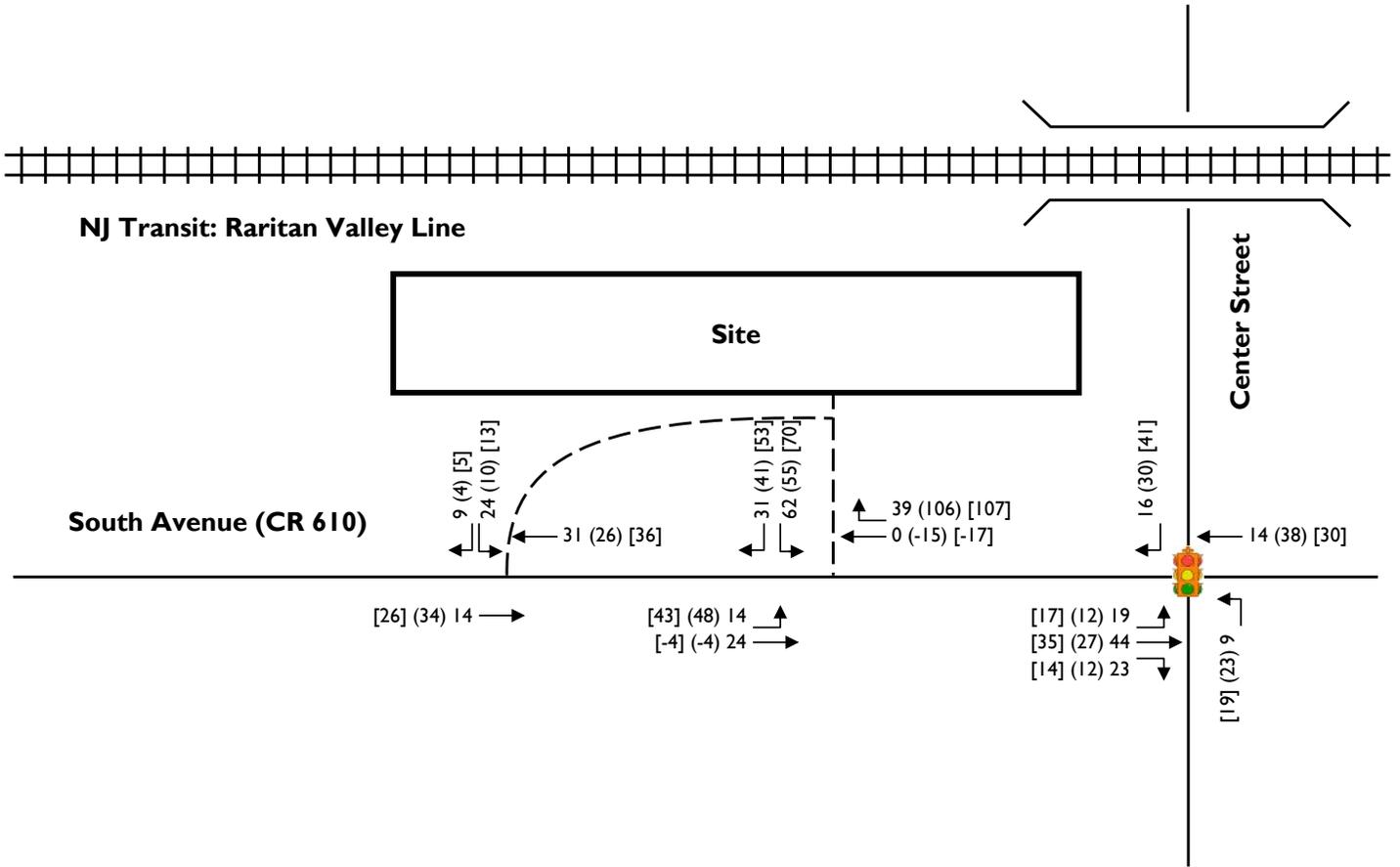
- LEGEND**
- Existing Roadway
  - - - Proposed Driveway
  - ← AM (PM) [SAT] Peak Hour Volumes
  - Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 6**  
**"Pass-By" Retail Traffic**  
**Volumes**



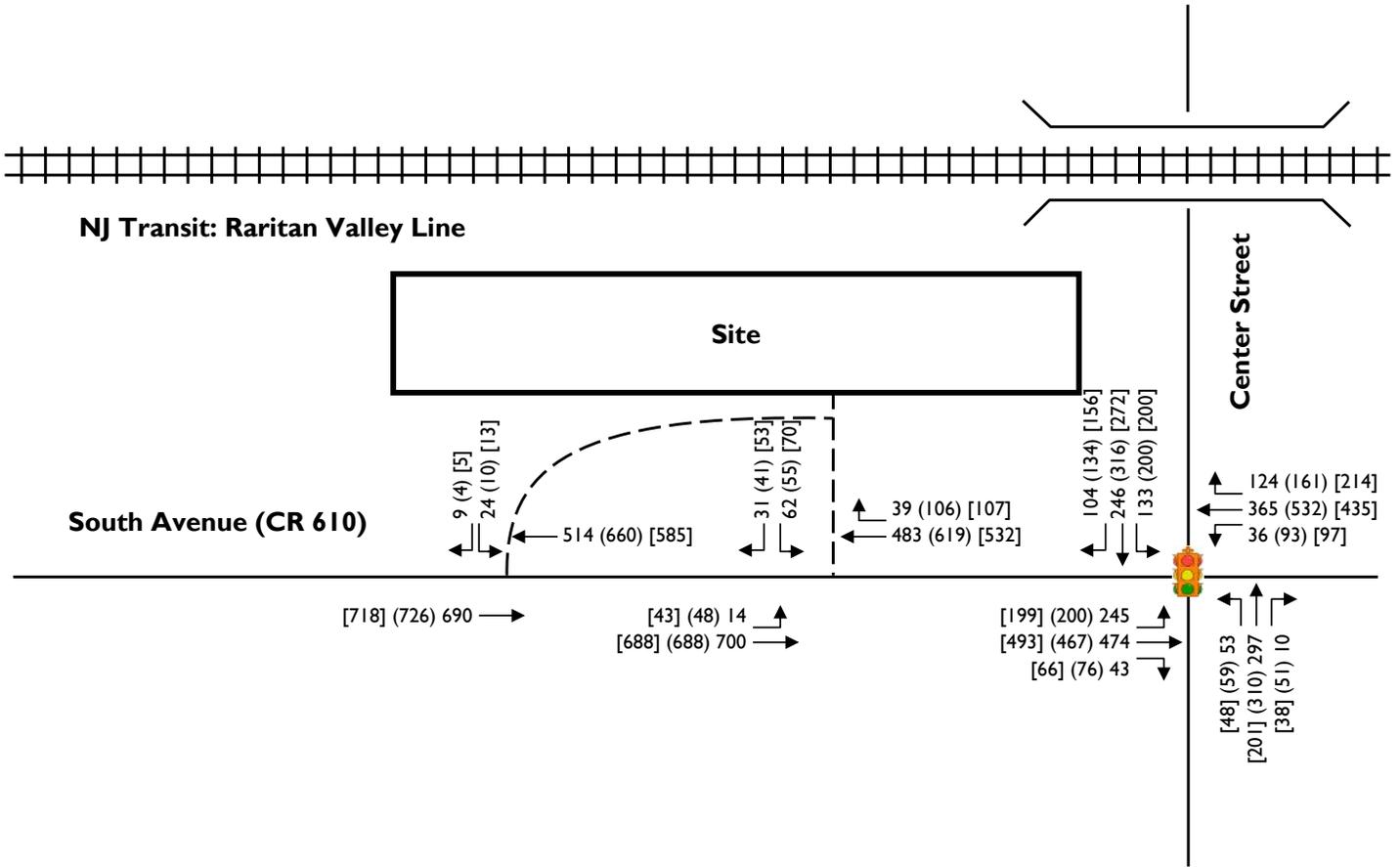
- LEGEND**
- Existing Roadway
  - - - Proposed Driveway
  - ← AM (PM) [SAT] Peak Hour Volumes
  - Signalized Intersection

not to scale



**Proposed Mixed-Use Development  
400 South Avenue  
Borough of Garwood, Union County, New Jersey  
Traffic Impact Study**

**FIGURE 7  
Total Site-Generated  
Traffic Volumes**



**LEGEND**

- Existing Roadway
- - - Proposed Driveway
- ← AM (PM) [SAT] Peak Hour Volumes
- Signalized Intersection

not to scale



**Proposed Mixed-Use Development**  
**400 South Avenue**  
**Borough of Garwood, Union County, New Jersey**  
**Traffic Impact Study**

**FIGURE 8**  
**2018 Build Traffic Volumes**

**CAPACITY ANALYSIS DETAIL SHEETS**

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2015 Existing  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	216	411	19	34	336	119	42	284	10	128	235	84
Future Volume (veh/h)	216	411	19	34	336	119	42	284	10	128	235	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	10	0	0	0	0	0	8	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	232	442	20	37	361	128	45	305	11	138	253	90
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	852	36	377	570	202	279	496	15	295	492	175
Arrive On Green	0.09	0.48	0.48	0.04	0.43	0.43	0.27	0.27	0.27	0.07	0.36	0.36
Sat Flow, veh/h	1774	1769	80	1774	1314	466	1033	1858	67	1774	1366	486
Grp Volume(v), veh/h	232	0	462	37	0	489	45	0	316	138	0	343
Grp Sat Flow(s),veh/h/ln	1774	0	1849	1774	0	1780	1033	0	1925	1774	0	1852
Q Serve(g_s), s	8.7	0.0	21.7	1.4	0.0	26.8	4.5	0.0	18.0	6.8	0.0	18.2
Cycle Q Clear(g_c), s	8.7	0.0	21.7	1.4	0.0	26.8	10.9	0.0	18.0	6.8	0.0	18.2
Prop In Lane	1.00		0.04	1.00		0.26	1.00		0.03	1.00		0.26
Lane Grp Cap(c), veh/h	409	0	887	377	0	772	279	0	512	295	0	667
V/C Ratio(X)	0.57	0.00	0.52	0.10	0.00	0.63	0.16	0.00	0.62	0.47	0.00	0.51
Avail Cap(c_a), veh/h	426	0	886	483	0	772	279	0	511	328	0	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.67	0.00	0.67
Uniform Delay (d), s/veh	19.9	0.0	23.5	20.1	0.0	27.7	40.3	0.0	41.2	30.7	0.0	31.4
Incr Delay (d2), s/veh	1.6	0.0	2.2	0.1	0.0	3.9	1.2	0.0	5.5	0.8	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	13.9	0.7	0.0	14.0	1.4	0.0	12.3	3.4	0.0	9.6
LnGrp Delay(d),s/veh	21.6	0.0	27.6	20.2	0.0	31.6	41.6	0.0	51.3	31.5	0.0	33.3
LnGrp LOS	C		C	C		C	D		D	C		C
Approach Vol, veh/h		694			526			361			481	
Approach Delay, s/veh		25.6			30.8			50.1			32.8	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	11.8	39.2	8.1	65.9		51.0	13.8	60.2				
Change Period (Y+Rc), s	3.0	6.0	3.0	6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	32.0	10.0	53.0		45.0	12.0	53.0				
Max Q Clear Time (g_c+I1), s	8.8	20.0	3.4	23.7		20.2	10.7	28.8				
Green Ext Time (p_c), s	0.0	3.6	0.0	6.8		4.8	0.1	6.5				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			32.9									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2015 Existing  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	421	61	89	472	154	34	296	50	192	302	99
Future Volume (veh/h)	180	421	61	89	472	154	34	296	50	192	302	99
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	189	443	64	94	497	162	36	312	53	202	318	104
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	351	822	119	458	679	221	148	295	50	171	414	135
Arrive On Green	0.07	0.52	0.52	0.06	0.50	0.50	0.18	0.18	0.18	0.06	0.30	0.30
Sat Flow, veh/h	1774	1592	230	1774	1346	439	961	1615	274	1774	1399	458
Grp Volume(v), veh/h	189	0	507	94	0	659	36	0	365	202	0	422
Grp Sat Flow(s),veh/h/ln	1774	0	1822	1774	0	1785	961	0	1889	1774	0	1857
Q Serve(g_s), s	5.8	0.0	21.5	2.8	0.0	33.4	4.1	0.0	21.0	7.0	0.0	23.8
Cycle Q Clear(g_c), s	5.8	0.0	21.5	2.8	0.0	33.4	14.9	0.0	21.0	7.0	0.0	23.8
Prop In Lane	1.00		0.13	1.00		0.25	1.00		0.15	1.00		0.25
Lane Grp Cap(c), veh/h	351	0	940	458	0	900	148	0	345	171	0	549
V/C Ratio(X)	0.54	0.00	0.54	0.21	0.00	0.73	0.24	0.00	1.06	1.18	0.00	0.77
Avail Cap(c_a), veh/h	429	0	940	556	0	900	148	0	345	171	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.46	0.00	0.46
Uniform Delay (d), s/veh	18.1	0.0	18.7	13.6	0.0	22.4	49.6	0.0	47.0	40.7	0.0	36.9
Incr Delay (d2), s/veh	1.3	0.0	2.2	0.2	0.0	5.2	3.9	0.0	64.6	106.9	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	11.3	1.4	0.0	17.6	1.2	0.0	17.1	9.3	0.0	12.9
LnGrp Delay(d),s/veh	19.3	0.0	20.9	13.8	0.0	27.6	53.5	0.0	111.6	147.6	0.0	41.7
LnGrp LOS	B		C	B		C	D		F	F		D
Approach Vol, veh/h		696			753			401			624	
Approach Delay, s/veh		20.5			25.9			106.4			76.0	
Approach LOS		C			C			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	27.0	9.7	65.3		40.0	11.0	64.0				
Change Period (Y+Rc), s	6.0	6.0	3.0	6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	7.0	21.0	13.0	53.0		34.0	13.0	53.0				
Max Q Clear Time (g_c+I1), s	9.0	23.0	4.8	23.5		25.8	7.8	35.4				
Green Ext Time (p_c), s	0.0	0.0	0.1	9.2		3.4	0.2	7.4				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			50.1									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2015 Existing  
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	438	50	93	387	205	28	192	36	191	260	110
Future Volume (veh/h)	174	438	50	93	387	205	28	192	36	191	260	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	179	452	52	96	399	211	29	198	37	197	268	113
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	304	765	88	386	524	277	252	413	77	373	469	198
Arrive On Green	0.06	0.47	0.47	0.05	0.46	0.46	0.26	0.26	0.26	0.08	0.36	0.36
Sat Flow, veh/h	1774	1641	189	1774	1148	607	998	1588	297	1774	1295	546
Grp Volume(v), veh/h	179	0	504	96	0	610	29	0	235	197	0	381
Grp Sat Flow(s),veh/h/ln	1774	0	1829	1774	0	1756	998	0	1885	1774	0	1841
Q Serve(g_s), s	6.8	0.0	25.8	3.6	0.0	36.7	3.1	0.0	13.4	10.0	0.0	21.1
Cycle Q Clear(g_c), s	6.8	0.0	25.8	3.6	0.0	36.7	11.2	0.0	13.4	10.0	0.0	21.1
Prop In Lane	1.00		0.10	1.00		0.35	1.00		0.16	1.00		0.30
Lane Grp Cap(c), veh/h	304	0	853	386	0	802	252	0	490	373	0	667
V/C Ratio(X)	0.59	0.00	0.59	0.25	0.00	0.76	0.12	0.00	0.48	0.53	0.00	0.57
Avail Cap(c_a), veh/h	304	0	853	403	0	802	252	0	490	373	0	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.57	0.00	0.57
Uniform Delay (d), s/veh	23.1	0.0	25.0	18.8	0.0	28.7	42.3	0.0	39.7	31.2	0.0	32.6
Incr Delay (d2), s/veh	3.0	0.0	3.0	0.3	0.0	6.7	0.9	0.0	3.3	0.8	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	13.7	1.7	0.0	19.3	0.9	0.0	7.4	1.2	0.0	11.1
LnGrp Delay(d),s/veh	26.1	0.0	27.9	19.1	0.0	35.4	43.2	0.0	43.1	32.0	0.0	34.6
LnGrp LOS	C		C	B		D	D		D	C		C
Approach Vol, veh/h		683			706			264			578	
Approach Delay, s/veh		27.5			33.2			43.1			33.7	
Approach LOS		C			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	39.0	9.8	65.2		52.0	11.0	64.0				
Change Period (Y+Rc), s	3.0	6.0	3.0	6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	33.0	8.0	58.0		46.0	8.0	58.0				
Max Q Clear Time (g_c+I1), s	12.0	15.4	5.6	27.8		23.1	8.8	38.7				
Green Ext Time (p_c), s	0.0	4.0	0.0	9.3		4.4	0.0	7.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			32.8									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 No-Build  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	226	430	20	36	351	124	44	297	10	133	246	88
Future Volume (veh/h)	226	430	20	36	351	124	44	297	10	133	246	88
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	10	0	0	0	0	0	8	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	243	462	22	39	377	133	47	319	11	143	265	95
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	1047	47	414	636	224	208	399	11	232	427	153
Arrive On Green	0.08	0.60	0.60	0.49	0.49	0.49	0.21	0.21	0.21	0.08	0.31	0.31
Sat Flow, veh/h	1774	1764	84	908	1316	464	1017	1862	64	1774	1363	488
Grp Volume(v), veh/h	243	0	484	39	0	510	47	0	330	143	0	360
Grp Sat Flow(s),veh/h/ln	1774	0	1848	908	0	1781	1017	0	1926	1774	0	1851
Q Serve(g_s), s	8.2	0.0	17.9	3.1	0.0	25.6	5.2	0.0	20.5	7.7	0.0	20.9
Cycle Q Clear(g_c), s	8.2	0.0	17.9	7.7	0.0	25.6	13.5	0.0	20.5	7.7	0.0	20.9
Prop In Lane	1.00		0.05	1.00		0.26	1.00		0.03	1.00		0.26
Lane Grp Cap(c), veh/h	450	0	1097	414	0	861	208	0	416	232	0	580
V/C Ratio(X)	0.54	0.00	0.44	0.09	0.00	0.59	0.23	0.00	0.79	0.62	0.00	0.62
Avail Cap(c_a), veh/h	481	0	1103	469	0	873	251	0	493	244	0	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.62	0.00	0.62
Uniform Delay (d), s/veh	16.9	0.0	14.8	25.2	0.0	23.4	47.6	0.0	47.3	35.5	0.0	36.6
Incr Delay (d2), s/veh	1.0	0.0	1.3	0.5	0.0	3.0	0.5	0.0	7.4	2.7	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	12.8	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	11.8	0.9	0.0	13.5	1.5	0.0	14.4	3.9	0.0	10.7
LnGrp Delay(d),s/veh	18.0	0.0	17.2	25.7	0.0	26.4	48.2	0.0	67.5	38.2	0.0	37.5
LnGrp LOS	B		B	C		C	D		E	D		D
Approach Vol, veh/h		727			549			377			503	
Approach Delay, s/veh		17.5			26.4			65.1			37.7	
Approach LOS		B			C			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	12.6	31.8		80.6		44.4	13.3	67.3				
Change Period (Y+Rc), s	3.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	32.0		68.0		45.0	12.0	53.0				
Max Q Clear Time (g_c+I1), s	9.7	22.5		19.9		22.9	10.2	27.6				
Green Ext Time (p_c), s	0.0	3.3		8.2		4.9	0.1	7.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			32.8									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 No-Build  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	440	64	93	494	161	36	310	51	200	316	104
Future Volume (veh/h)	188	440	64	93	494	161	36	310	51	200	316	104
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	198	463	67	98	520	169	38	326	54	211	333	109
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	955	138	442	678	220	134	296	49	171	414	135
Arrive On Green	0.07	0.60	0.60	0.50	0.50	0.50	0.18	0.18	0.18	0.06	0.30	0.30
Sat Flow, veh/h	1774	1592	230	870	1348	438	944	1621	269	1774	1399	458
Grp Volume(v), veh/h	198	0	530	98	0	689	38	0	380	211	0	442
Grp Sat Flow(s),veh/h/ln	1774	0	1822	870	0	1785	944	0	1890	1774	0	1856
Q Serve(g_s), s	5.9	0.0	18.9	8.2	0.0	35.9	4.5	0.0	21.0	7.0	0.0	25.3
Cycle Q Clear(g_c), s	5.9	0.0	18.9	16.0	0.0	35.9	16.8	0.0	21.0	7.0	0.0	25.3
Prop In Lane	1.00		0.13	1.00		0.25	1.00		0.14	1.00		0.25
Lane Grp Cap(c), veh/h	331	0	1093	442	0	899	134	0	345	171	0	549
V/C Ratio(X)	0.60	0.00	0.48	0.22	0.00	0.77	0.28	0.00	1.10	1.24	0.00	0.81
Avail Cap(c_a), veh/h	407	0	1093	442	0	899	134	0	345	171	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.36	0.00	0.36
Uniform Delay (d), s/veh	19.3	0.0	13.0	20.6	0.0	23.1	51.2	0.0	47.0	40.7	0.0	37.4
Incr Delay (d2), s/veh	1.7	0.0	1.5	1.2	0.0	6.2	1.1	0.0	78.4	123.7	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	9.9	2.1	0.0	19.2	1.2	0.0	18.4	10.1	0.0	13.4
LnGrp Delay(d),s/veh	21.0	0.0	14.5	21.8	0.0	29.3	52.3	0.0	125.4	164.5	0.0	40.7
LnGrp LOS	C		B	C		C	D		F	F		D
Approach Vol, veh/h		728			787			418			653	
Approach Delay, s/veh		16.3			28.4			118.8			80.7	
Approach LOS		B			C			F			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	27.0		75.0		40.0	11.1	63.9				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	7.0	21.0		69.0		34.0	13.0	53.0				
Max Q Clear Time (g_c+I1), s	9.0	23.0		20.9		27.3	7.9	37.9				
Green Ext Time (p_c), s	0.0	0.0		12.1		3.1	0.2	7.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				52.8								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 No-Build  
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	458	52	97	405	214	29	201	38	200	272	115
Future Volume (veh/h)	182	458	52	97	405	214	29	201	38	200	272	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	188	472	54	100	418	221	30	207	39	206	280	119
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	388	1033	118	476	626	331	131	275	52	252	357	152
Arrive On Green	0.06	0.63	0.63	0.55	0.55	0.55	0.17	0.17	0.17	0.08	0.28	0.28
Sat Flow, veh/h	1774	1642	188	873	1148	607	982	1586	299	1774	1292	549
Grp Volume(v), veh/h	188	0	526	100	0	639	30	0	246	206	0	399
Grp Sat Flow(s),veh/h/ln	1774	0	1830	873	0	1756	982	0	1885	1774	0	1840
Q Serve(g_s), s	5.7	0.0	19.0	8.5	0.0	33.1	3.7	0.0	15.8	10.0	0.0	25.5
Cycle Q Clear(g_c), s	5.7	0.0	19.0	16.8	0.0	33.1	16.2	0.0	15.8	10.0	0.0	25.5
Prop In Lane	1.00		0.10	1.00		0.35	1.00		0.16	1.00		0.30
Lane Grp Cap(c), veh/h	388	0	1152	476	0	957	131	0	327	252	0	508
V/C Ratio(X)	0.48	0.00	0.46	0.21	0.00	0.67	0.23	0.00	0.75	0.82	0.00	0.79
Avail Cap(c_a), veh/h	392	0	1152	476	0	957	216	0	490	252	0	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.46	0.00	0.46
Uniform Delay (d), s/veh	16.5	0.0	12.2	19.4	0.0	20.7	56.0	0.0	49.9	42.9	0.0	42.5
Incr Delay (d2), s/veh	0.9	0.0	1.3	1.0	0.0	3.7	0.9	0.0	3.5	9.4	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	9.9	2.2	0.0	17.0	1.0	0.0	8.5	3.0	0.0	13.3
LnGrp Delay(d),s/veh	17.5	0.0	13.5	20.4	0.0	24.3	56.8	0.0	53.4	52.3	0.0	44.7
LnGrp LOS	B		B	C		C	E		D	D		D
Approach Vol, veh/h		714			739			276			605	
Approach Delay, s/veh		14.6			23.8			53.8			47.3	
Approach LOS		B			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	28.1		85.9		41.1	10.7	75.2				
Change Period (Y+Rc), s	3.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	33.0		69.0		46.0	8.0	58.0				
Max Q Clear Time (g_c+I1), s	12.0	18.2		21.0		27.5	7.7	35.1				
Green Ext Time (p_c), s	0.0	3.9		12.1		4.3	0.0	9.6				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			30.6									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 Build  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	474	43	36	365	124	53	297	10	133	246	104
Future Volume (veh/h)	245	474	43	36	365	124	53	297	10	133	246	104
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	10	0	0	0	0	0	8	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	263	510	46	39	392	133	57	319	11	143	265	112
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	441	1002	85	365	634	215	196	401	11	232	407	172
Arrive On Green	0.09	0.60	0.60	0.48	0.48	0.48	0.21	0.21	0.21	0.08	0.31	0.31
Sat Flow, veh/h	1774	1684	152	849	1331	452	1002	1862	64	1774	1294	547
Grp Volume(v), veh/h	263	0	556	39	0	525	57	0	330	143	0	377
Grp Sat Flow(s),veh/h/ln	1774	0	1836	849	0	1783	1002	0	1926	1774	0	1841
Q Serve(g_s), s	9.0	0.0	21.9	3.5	0.0	26.9	6.6	0.0	20.5	7.7	0.0	22.3
Cycle Q Clear(g_c), s	9.0	0.0	21.9	11.4	0.0	26.9	16.2	0.0	20.5	7.7	0.0	22.3
Prop In Lane	1.00		0.08	1.00		0.25	1.00		0.03	1.00		0.30
Lane Grp Cap(c), veh/h	441	0	1088	365	0	849	196	0	418	232	0	579
V/C Ratio(X)	0.60	0.00	0.51	0.11	0.00	0.62	0.29	0.00	0.79	0.62	0.00	0.65
Avail Cap(c_a), veh/h	462	0	1094	415	0	862	237	0	493	245	0	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.60	0.00	0.60
Uniform Delay (d), s/veh	17.8	0.0	15.8	27.7	0.0	24.3	49.3	0.0	47.2	35.4	0.0	37.0
Incr Delay (d2), s/veh	1.9	0.0	1.7	0.6	0.0	3.4	0.8	0.0	7.2	2.5	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	12.6	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	14.1	0.9	0.0	14.2	1.8	0.0	14.4	3.8	0.0	11.4
LnGrp Delay(d),s/veh	19.7	0.0	18.8	28.2	0.0	27.7	50.1	0.0	67.0	37.9	0.0	38.1
LnGrp LOS	B		B	C		C	D		E	D		D
Approach Vol, veh/h		819			564			387			520	
Approach Delay, s/veh		19.1			27.7			64.5			38.0	
Approach LOS		B			C			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	12.6	31.9		80.5		44.5	14.1	66.4				
Change Period (Y+Rc), s	3.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	32.0		68.0		45.0	12.0	53.0				
Max Q Clear Time (g_c+I1), s	9.7	22.5		23.9		24.3	11.0	28.9				
Green Ext Time (p_c), s	0.0	3.4		9.2		5.0	0.1	8.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			33.2									
HCM 2010 LOS			C									

**5: South Avenue & Main Entrance Performance by lane**

Lane	EB	EB	WB	SB	All
Movements Served	L	T	TR	LR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	1.7	0.7	2.6	15.9	2.6

**6: South Avenue & Egress-Only Driveway Performance by lane**

Lane	EB	WB	SB	All
Movements Served	T	T	LR	
Denied Del/Veh (s)				0.0
Total Del/Veh (s)	0.9	0.5	12.5	1.0

**Total Zone Performance**

Denied Del/Veh (s)			0.1
Total Del/Veh (s)			458.2

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 Build  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	467	76	93	532	161	59	310	51	200	316	134
Future Volume (veh/h)	200	467	76	93	532	161	59	310	51	200	316	134
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	211	492	80	98	560	169	62	326	54	211	333	141
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	307	938	153	411	686	207	110	296	49	171	382	162
Arrive On Green	0.07	0.60	0.60	0.50	0.50	0.50	0.18	0.18	0.18	0.06	0.30	0.30
Sat Flow, veh/h	1774	1564	254	837	1375	415	916	1621	269	1774	1293	548
Grp Volume(v), veh/h	211	0	572	98	0	729	62	0	380	211	0	474
Grp Sat Flow(s),veh/h/ln	1774	0	1818	837	0	1790	916	0	1890	1774	0	1841
Q Serve(g_s), s	6.3	0.0	21.1	8.9	0.0	39.6	5.9	0.0	21.0	7.0	0.0	28.1
Cycle Q Clear(g_c), s	6.3	0.0	21.1	18.5	0.0	39.6	21.0	0.0	21.0	7.0	0.0	28.1
Prop In Lane	1.00		0.14	1.00		0.23	1.00		0.14	1.00		0.30
Lane Grp Cap(c), veh/h	307	0	1091	411	0	894	110	0	345	171	0	544
V/C Ratio(X)	0.69	0.00	0.52	0.24	0.00	0.82	0.57	0.00	1.10	1.24	0.00	0.87
Avail Cap(c_a), veh/h	375	0	1091	411	0	894	110	0	345	171	0	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.25	0.00	0.25
Uniform Delay (d), s/veh	21.5	0.0	13.4	22.2	0.0	24.3	55.3	0.0	47.0	40.7	0.0	38.4
Incr Delay (d2), s/veh	3.9	0.0	1.8	1.4	0.0	8.1	6.6	0.0	78.4	119.1	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	11.0	2.2	0.0	21.5	2.2	0.0	18.4	9.9	0.0	14.9
LnGrp Delay(d),s/veh	25.4	0.0	15.2	23.6	0.0	32.4	61.8	0.0	125.4	159.8	0.0	42.6
LnGrp LOS	C		B	C		C	E		F	F		D
Approach Vol, veh/h		783			827			442			685	
Approach Delay, s/veh		18.0			31.4			116.5			78.7	
Approach LOS		B			C			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	27.0		75.0		40.0	11.6	63.4				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	7.0	21.0		69.0		34.0	13.0	53.0				
Max Q Clear Time (g_c+I1), s	9.0	23.0		23.1		30.1	8.3	41.6				
Green Ext Time (p_c), s	0.0	0.0		13.4		2.1	0.2	6.8				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			53.1									
HCM 2010 LOS			D									

**5: South Avenue & Main Entrance Performance by lane**

Lane	EB	EB	WB	SB	All
Movements Served	L	T	TR	LR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	4.8	0.9	3.7	29.4	4.1

**6: South Avenue & Egress-Only Driveway Performance by lane**

Lane	EB	WB	SB	All
Movements Served	T	T	LR	
Denied Del/Veh (s)				0.0
Total Del/Veh (s)	1.1	0.8	16.3	1.1

**Total Zone Performance**

Denied Del/Veh (s)			1.0
Total Del/Veh (s)		558.5	

HCM 2010 Signalized Intersection Summary  
2: Center Street & South Avenue

2018 Build  
SAT Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	493	66	97	435	214	48	201	38	200	272	156
Future Volume (veh/h)	199	493	66	97	435	214	48	201	38	200	272	156
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1937	1900	1863	1937	1976
Adj Flow Rate, veh/h	205	508	68	100	448	221	49	207	39	206	280	161
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	955	128	395	597	295	144	333	63	299	361	207
Arrive On Green	0.06	0.59	0.59	0.51	0.51	0.51	0.21	0.21	0.21	0.08	0.31	0.31
Sat Flow, veh/h	1774	1609	215	834	1179	581	944	1586	299	1774	1156	664
Grp Volume(v), veh/h	205	0	576	100	0	669	49	0	246	206	0	441
Grp Sat Flow(s),veh/h/ln	1774	0	1825	834	0	1760	944	0	1885	1774	0	1820
Q Serve(g_s), s	6.9	0.0	23.8	10.3	0.0	38.4	6.3	0.0	15.1	10.0	0.0	27.9
Cycle Q Clear(g_c), s	6.9	0.0	23.8	23.1	0.0	38.4	21.2	0.0	15.1	10.0	0.0	27.9
Prop In Lane	1.00		0.12	1.00		0.33	1.00		0.16	1.00		0.37
Lane Grp Cap(c), veh/h	325	0	1083	395	0	892	144	0	396	299	0	568
V/C Ratio(X)	0.63	0.00	0.53	0.25	0.00	0.75	0.34	0.00	0.62	0.69	0.00	0.78
Avail Cap(c_a), veh/h	325	0	1083	395	0	892	191	0	490	299	0	659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.32	0.00	0.32
Uniform Delay (d), s/veh	21.1	0.0	15.4	25.5	0.0	24.9	55.2	0.0	45.6	38.2	0.0	39.6
Incr Delay (d2), s/veh	3.9	0.0	1.9	1.5	0.0	5.8	1.4	0.0	1.6	2.1	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	12.6	2.5	0.0	20.0	1.7	0.0	8.0	2.2	0.0	14.4
LnGrp Delay(d),s/veh	25.1	0.0	17.2	27.0	0.0	30.7	56.6	0.0	47.2	40.4	0.0	41.3
LnGrp LOS	C		B	C		C	E		D	D		D
Approach Vol, veh/h		781			769			295			647	
Approach Delay, s/veh		19.3			30.2			48.8			41.0	
Approach LOS		B			C			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6	7	8				
Phs Duration (G+Y+Rc), s	13.0	32.7		81.3		45.7	11.0	70.3				
Change Period (Y+Rc), s	3.0	6.0		6.0		6.0	3.0	6.0				
Max Green Setting (Gmax), s	10.0	33.0		69.0		46.0	8.0	58.0				
Max Q Clear Time (g_c+I1), s	12.0	23.2		25.8		29.9	8.9	40.4				
Green Ext Time (p_c), s	0.0	3.4		13.2		4.5	0.0	9.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				31.8								
HCM 2010 LOS				C								

**5: South Avenue & Main Entrance Performance by lane**

Lane	EB	EB	WB	SB	All
Movements Served	L	T	TR	LR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.4	0.7	2.9	24.8	3.7

**6: South Avenue & Egress-Only Driveway Performance by lane**

Lane	EB	WB	SB	All
Movements Served	T	T	LR	
Denied Del/Veh (s)				0.0
Total Del/Veh (s)	0.9	0.7	13.9	1.0

**Total Zone Performance**

Denied Del/Veh (s)			0.9
Total Del/Veh (s)			201.0

