CONGESTED CORRIDORS PROJECT:

AMBOY ROAD

BOROUGH OF STATEN ISLAND

DRAFT FINAL REPORT

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City of New York
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Department of Transportation
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A Member of the New York
Metropolitan Transportation Council

Amboy Road Congested Corridor Project

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EXECUTUIVE SUMMARY

The Amboy Road Congested Corridors Project has been undertaken by the New York City Department of Transportation (NYCDOT) with the goals of improving safety, mobility, and the quality of life for all street users (pedestrians, cyclists, transit users and motorists). This report presents recommended improvement measures based on analysis of existing and projected future conditions, as well as community input and feedback.

The Amboy Road study area extends from Arden Avenue on the west to Guyon Avenue on the east.. It lies entirely within the boundaries of Staten Island Community Board 3.

The initiation of this study coincided with rapid development and increased congestion in the area. In response to congestion-related concerns expressed by the Community Board and local elected officials, NYCDOT is performing this study to address these issues. Problems were identified based on data collection and analyses, field observations and consultation with stakeholders such as residents, local businesses, transportation providers, Community Board members, elected officials, local government agencies and various interest groups. Several bottlenecks and causes of congestion on the corridor were identified.

In order to address these identified issues, improvement measures were designed and analyzed using Synchro software, where applicable. Improvements that have already been implemented are:

- Signal timing and offset adjustments.
- Lane arrangement modifications on Richmond Avenue between Sylvia Street and Amboy Road.
- Striping, parking, lane arrangement, bus stop relocation and turn prohibitions on Richmond Avenue and Amboy Road.
- Left turn bays at:
    - Northbound Richmond Avenue at Oakdale Street.
    - Southbound Richmond Avenue at Oakdale Street.
    - Westbound Amboy Road at Lindenwood Road.
    - Eastbound Amboy Road at Nolan Road.
    - Eastbound Amboy Road at Waimer Place.
- Raised concrete right turn channelization island for westbound Amboy Road at Giffords Lane.
- Re-routing of S54 bus along Nelson Avenue and Giffords Lane.

There are also two long term improvements, each of which has been initiated as a capital project:

- Eltingville Town Center. The proposed changes include road widening, provision of dedicated turning lanes, and installation of new medians and sidewalks on Amboy Road from Armstrong Avenue to Richmond Avenue.
- Amundsen Circle. Complete redesign of Amboy Road from Clarke Avenue to Guyon Avenue, making use of Savoy Street and Riedel Avenue near Amundsen Circle for Westbound Amboy Road traffic.

CHAPTER 1 INTRODUCTION

1.1 Background

The Citywide Congested Corridors Project (CCCP) is a study undertaken by the New York City Department of Transportation (NYCDOT) of selected roadways across the five boroughs which experience congestion, with the goals of improving mobility and safety for all street users, air quality and the quality of life. Amboy Road in Staten island was selected as one of the congested corridors. The study is consistent with the City's goal of building "Complete Streets" that accommodate all street users including pedestrians, cyclists, transit users and motorists.

This report documents the data collection effort, presents analysis of existing conditions and future conditions without improvements, summarizes recommended improvements, and evaluates future conditions with improvements for the Amboy Road Congested Corridor. The identification of current issues along the corridor was based on analyses of traffic, roadway geometry, parking, safety, goods movement, transit, pedestrian and bicycle data collected as part of a comprehensive data collection effort.

The public outreach effort to obtain community input was a critical component throughout the study process. The participants consisted of various stakeholders including residents, local businesses, transportation providers, Community Board members, elected officials, city and state agencies, and various interest groups. Input from the outreach effort helped identify issues and were incorporated into the development of various potential improvements and the selection of the recommended improvements.

1.2 Study Area

The study area is a corridor that is located in the southeastern quadrant of Staten Island. Amboy Road extends from Richmond Road in the northeast to Wards Point Avenue in the southwest. The portion of the corridor that is the focus for this study extends from Arden Avenue to Guyon Avenue. For the remainder of this report, Amboy Road will be considered as running east-west, and its cross streets as north-south. Amboy Road parallels Hylan Boulevard, these two arterials being the major east-west corridors running along the southern side of Staten Island. The corridor runs through the Annadale, Eltingville, Great Kills, and Bay Terrace neighborhoods. The study examines the entire corridor, but focuses on six major intersections along the corridor. Figure 1.2.1 presents the study area.

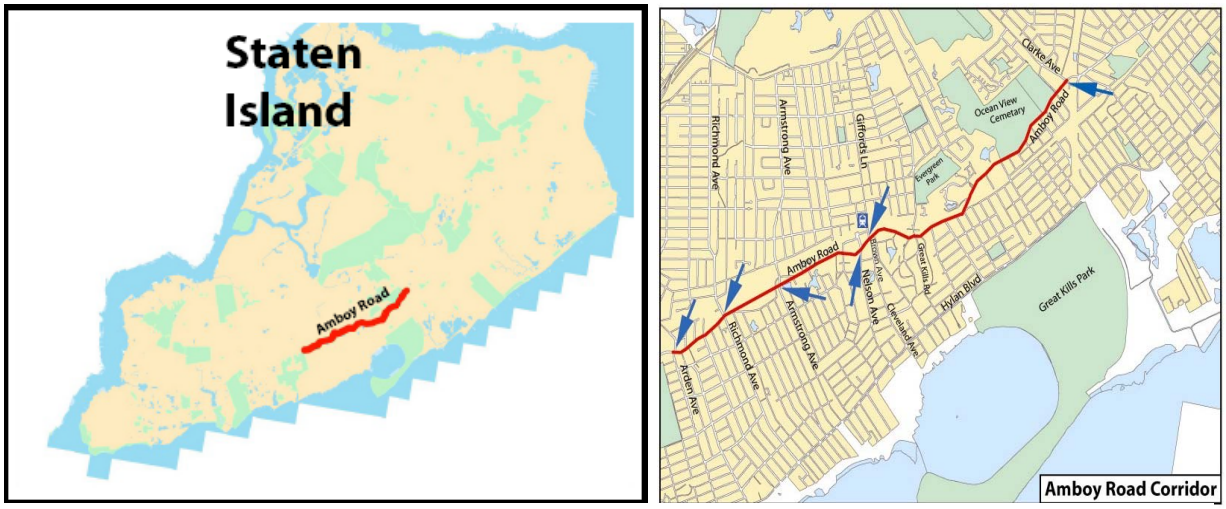


Figure 1.2.1: Study Area

The study area's land use is primarily residential with pockets of small commercial businesses and local retail establishments. Other land use includes auto repair shops, institutional facilities, public parks, schools, churches, banks, restaurants and parking lots. The demand generated by this land uses causes traffic congestion at several locations throughout the study area. The corridor also serves as a local truck route. The study area lies within Community Board 3.

CHAPTER 2 DEMOGRAPHICS

The demographic/socioeconomic analysis of the study area examines population trends such as growth/decline, age distribution and sex, along with socioeconomic characteristics such as household size, employment, income and car ownership rate, to identify trends and help determine future needs.

The demographic analysis relies on data from New York City Department of City Planning (NYCDCP) and computer files issued by the United States Department of Commerce – Bureau of the Census. Data were collected for the years 1980 through 2010. To better assess the population dynamics of the study area, comparisons were made with the Borough of Staten Island and New York City, where applicable.

The study area along the Amboy Road corridor is captured entirely in Community Board 3 and demographic data was collected from the following Census Tracts: 132.03, 132.04, 146.03, 146.04, 146.05, 146.06, 156.01, 156.02, 170.05 and 170.06[1]. In the analysis of these tracts, it is assumed that the population and other related variables are evenly distributed geographically. Exhibit 2-1 shows the community district boundaries and the census tracts with the 2000 population for the study.

2.1. Population Trends

The population analysis covers the four decennial years 1980, 1990, 2000 and 2010 as shown in Table 2.1 below. The study area had a population of 51,394, 53,415, 59,253 and 60,090 in 1980, 1990, 2000 and 2010, respectively. This shows a population increase of 16.2% over the 30 year period. The population grew by only 3.9% between 1980 and 1990, while between 1990 and 2000 it grew by nearly 11%, and 1.4% between 200 and 2010. Comparing the population changes of the study area with the borough of Staten Island and New York City, analysis shows that both areas recorded growth in population over the two decades. New York City grew by 15% and Staten Island grew by 30.3% over the 20 year period.

Table 2.1.1

Population by Area

Census Year	New York City	% Change	Staten Island	% Change	Study Area	% Change
1980	7,071,639	--	352,121	--	51,394	--
1990	7,322,564	3.5	378,977	7.6	53,415	3.9
2000	8,008,278	9.4	443,728	17.1	59,253	10.9
2010	8,175,133	2.1	468,730	5.6	60,090	1.4

[1] The 1980 and 1990 census tracts that corresponded with the 2000 tracts were 132.02, 146.01, 146.02, 156.01, 156.02 and 170.02

The travel needs and characteristics of the school-attending population are different from the working population and the retired population. To capture the difference the population analysis was applied to seven age groups: ages 0-4, 5-9, 10-14, 15-17, 18-24, 25-64, 65+. This is intended to reflect school age, including elementary, middle and high school; employable; and retired population, respectively. The age of 17 was chosen as the cut-off for school age population because even though the legal working age 16 years old, DCP statistics show that less than 40% of the 0-17 years population are employed. Also the census shows that a significant number of the school population is between 18-25 years old. The age for the retired of 65+ was supported by the fact that less than 20% of this population is employed according to DCP statistics. The 0-17 age group is made up predominately of school attending population. Their trips tend to be made slightly outside of the work trip peak hours. The work trips are more directly related to the 18-64 age groups. The majority of the over 65 age group trips tend to be made outside of both the work trip and school trip peak hours. Table 2.1.2 compares the age distribution for the Study Area with Manhattan and New York City.

Table 2.1.2

Population by Area and Age Group

Census Year & Age Group	New York City	% Share	Staten Island	% Share	Study Area	% Share
1980	7,071,639	100.0	352,121	100.0	51,394	100.0
0 - 4	470,694	6.7	24,403	6.9	3,405	6.6
5 - 9	447,327	6.3	26,685	7.6	4,292	8.4
10 - 14	506,283	7.2	31,567	9.0	5,613	10.9
15 - 17	341,163	4.8	19,869	5.6	3,452	6.7
18 - 24	826,222	11.7	40,099	11.4	5,634	11.0
25 - 64	3,528,218	49.9	174,373	49.5	25,787	50.2
65+	951,732	13.5	35,125	10.0	3,211	6.2
1990	7,322,564	100.0	378,977	100.0	53,415	100.0
0 - 4	509,740	7.2	28,227	7.4	3,673	6.9
5 - 9	457,477	6.5	25,231	6.7	3,287	6.2
10 - 14	450,072	6.4	25,090	6.6	3,376	6.3
15 - 17	269,429	3.8	15,514	4.1	2,238	4.2
18 - 24	777,938	11.0	40,262	10.6	6,327	11.8
25 - 64	3,904,591	55.2	202,340	53.4	29,830	55.8
65+	953,317	13.5	42,313	11.2	4,684	8.8
2000	8,008,278	100.0	443,728	100.0	59,253	100.0
0 - 4	540,878	7.6	29,783	6.7	3,830	6.5
5 - 9	561,115	7.9	32,967	7.4	4,168	7.0
10 - 14	530,816	7.5	32,203	7.3	3,926	6.6
15 - 17	307,460	4.3	18,305	4.1	2,243	3.8
18 - 24	803,012	11.4	37,932	8.5	4,478	7.6
25 - 64	4,327,140	61.2	241,105	54.3	33,383	56.3
65+	937,857	13.3	51,433	11.6	7,225	12.2
2010	8,175,133	100.0	468,730	100.0	60,090	100.0
0-4	517,724	6.3	28,339	6.0	3,183	5.3
5-9	473,159	5.8	30,015	6.4	3,547	5.9
10-14	468,154	5.7	30,797	6.6	3,805	6.3
15-17	309,074	3.8	20,050	4.3	2,364	3.9
18-24	869,344	10.6	44,337	9.5	4,932	8.2
25-64	4,544,520	55.6	255,848	54.6	32,646	54.3
65+	993,158	12.1	59,344	12.7	9,613	16.0

2.2 Labor Force

According to the U.S. Census Bureau, the labor force includes all persons in the civilian labor force plus members of the Armed Forces (persons 16 years and over on active duty with the U.S. Army, Navy, Air Force, Marine Corps, or Coast Guard). The "civilian labor force" consists of persons classified as employed or unemployed. Those not in the labor force are mainly students, housewives, retired workers, seasonal workers, inmates of institutions, disabled persons and persons doing only incidental unpaid family work.

As expected the labor force fluctuated with changes in total population. Table 2.2.1 shows the labor force distribution for 1980, 1990 and 2000. Table 2.2.1 indicates that between 1980 and 1990 the percentage of people in the labor force in New York City increased by 3.4% even though the population of those over 16 years of age decreased by 11.2%. Staten Island's labor force and population over 16 years increased by 9.6% and 12.5%, respectively during the same period. In the study area, labor force increased by 3.9%, however the population over 16 years increased by 15% during this period. From 1980 to 1990 in New York City, civilians employed decreased by 7% while civilians unemployed increased by 16.5%. Staten Island experienced a large increase of 21.8% in civilian employed and only a 0.5% increased in civilians unemployed. Similarly, the study area experienced 19.4% and 0.2% increases in civilians employed and unemployed for the same period.

Between 1990 and 2000 the percentage of people in the labor force in New York City decreased by 39.9% even though the population over 16 years of age increased by 7.4%. Staten Island's labor force decreased by 5.8% while during the same period, the population over 16 years of age increased by 16.2%. The study area labor force decreased by 9% during this period, while the population over 16 years of age increased by 9.2%. Civilians employed and unemployed from 1990 to 2000 increased by 0.6% and 7.6%, respectively, for New York City. In Staten Island, civilian employment increased by 10% while civilians unemployed rose slightly, by 2.3%. In the study area, both the civilians employed remained constant at 0.7% while the percentage of unemployed civilians dropped significantly by 24.1%.

Table 2.2.1
Labor Force Distribution

Census Year	New York City	% Change	Staten Island	% Change	Study Area	% Change
1980 (Total Pop)	7,071,639		352,121		51,394	
Population over 16 years	6,467,814	--	262,491	--	36,952	--
% of total population 16 years & over in labor force	58.2%	--	58.5%	--	64.4%	--
Employed	3,487,013	--	145,488	--	22,592	--
Unemployed	269,009	--	8,132	--	1,221	--
1990 (Total Pop)	7,322,564	3.6	378,977	7.6	53,415	3.9
Population over 16 years	5,817,015	-11.2	295,186	12.5	42,505	15.0
% of total population 16 years & over in labor force	61.6%	3.4%	64.1%	5.6%	66.9%	2.5%
Employed	3,257,637	-7.0	177,265	21.8	26,975	19.4
Unemployed	322,125	16.5	11,923	46.6	1,481	21.3
2000 (Total Pop)	8,008,278	9.4	443,728	17.1	59,253	10.9
Population over 16 years	6,279,431	7.4	343,053	16.2	46,435	9.2
% of total population 16 years & over in labor force	57.7%	-3.9%	60.4%	-3.7%	60.9%	-6.0%
Employed	3,277,825	0.6	195,074	10.0	27,154	0.7
Unemployed	346,741	7.6	12,203	2.3	1,124	-24.1
2010 (Total Pop)	8,175,133	2.1	468,730	5.6	60,090	1.4
Population over 16 years	6,510,606	3.4	367,837	7.2	49,245	6.0
% of total population 16 years & over in labor force	63.1%	5.4%	60.4%	0%	61.1%	0.2%
Employed	3,745,106	14.3	207,886	6.6	28,501	5.0
Unemployed	359,222	3.6	13,631	11.7	1,619	44.0

2.3 Household Characteristics

The number of households in the study area increased during the first decade (1980-1990) from 15,372 to 17,634, a 3.9% increase. Between 1990 and 2000 the number of households in the study increased by 20% while the total population rose by 10.9%. The number of households in Staten Island also increased during both decades, by 14% from 1980-1990 and by 19.8% from 1990-2000. However, in New York City the number of households decreased by 19.5% from 3,502,233 to 2,819,401 between 1980 and 1990, although it increased by 7.2%, to 3,021,588 over the next decade.

The average household size (person/household) in the study area showed a decrease in both decades between 1980 and 2000. There was a 9.3% decline, from 3.34 persons per household from 3.03, from 1980 to 1990, and a decline of 7.9%, or 2.79, between 1990 and 2000. Staten Island also exhibited declines of 5.3% and 2.5% during both decades. From 1980 to 1990, the average household size decreased from 3.0 to 2.85, and from 1990 to 2000 household size further decreased to 2.78. On the other hand, the average household size for New York City increased during both decades from 2.02 to 2.60 from 1980 to 1990 and from 2.60 to 2.65 between 1990 and 2000. Table 2.3.1 shows the household characteristics for New York City, Staten Island and the study area.

Table 2.3.1
Household Characteristics

Census Year	New York City	% Change	Staten Island	% Change	Study Area	% Change
1980 Population	7,071,639	--	352,121	--	51,394	--
# Households	3,502,233	--	114,485	--	15,372	--
Person/HH	2.02	--	3.01	--	3.34	--
1990 Population	7,322,564	3.6	378,977	7.6	53,415	3.9
# Households	2,819,401	-19.5	130,519	14.0	17,634	14.7
Persons/HH	2.60	28.6	2.85	-5.3	3.0	-9.3
2000 Population	8,008,278	9.4	443,728	17.1	59,253	10.9
# Households	3,021,588	7.2	156,341	19.8	21,167	20.0
Persons/HH	2.59	2.1	2.78	-2.5	2.8	-6.7
2010 Population	8,175,133	2.1	468,730	5.6	60,090	1.4
# Households	3,109,784	0.9	165,516	4.7	22,062	4.8
Persons/HH	2.57	-0.8	2.78	0.0	2.7	-3.6

2.4 Median Household Income

The household income for the study area is best represented in comparison with New York City and Staten Island. Table 2.4.1 shows median income for the study area, Staten Island and New York City for the period between 1980 and 2010.

Table 2.4.1

Median Household Income by Area

Census Year	New York City	% Change	Staten Island	% Change	Study Area	% Change
1980	$28,952	--	$48,769	--	$58,093	--
1990	$39,292	35.7	$58,774	20.5	$68,550	18.0
2000	$38,293	-2.5	$55,039	-6.4	$62,972	-8.1
2010	$48,743	27.3	$70,560	28.2	$87,723	39.3

Although the study area has the higher median household income, it has grown at a slower rate than the city and the borough over the 30 year period from 1980 to 2010. Not taking inflation into account, the income of New York City residents from 1980 to 1990 increased by 132.9%, from $13,854 to $32,262. In the next ten years, median income in New York City grew by 45.8% to $47,030. While the growth rate in the borough of Staten Island and the study area were slower, the median incomes were higher. In Staten Island, income grew 20.5%, from $48,769 to $58,774, between 1980 and 1990. During the same period, income in the study area grew by 18%, from $58,093 to $68,550. From 1990 to 2000, the median household in both Staten Island and the study decreased by 6.4% and 8.1%, respectively, yet was still higher than New York City.

2.5 Vehicle Ownership

Census data regarding vehicle ownership for the period of 1980 – 1990 was not available. This section will discuss the trends observed in vehicle ownership during the period from 1990 – 2010 for New York City, Staten Island and the study area.

Between 1990 and 2000, vehicle ownership in New York City remained relatively constant as is shown in Table 2.5.1. In 1990, approximately 44% of New York City households owned vehicles. This percentage rises to approximately 82% and 91% for Staten Island and the study area, respectively. The demographic analysis shows that in New York City the number of households increased by 7.2% from 1990 to 2000, while the number with vehicles increased by 7.6% over the same period. The number of households with no vehicles increased by 6.8%. The number of households increased 0.9% from 2000 to 2010, with those with vehicles increasing by 2.4% and those without vehicles increasing by 0.2%

Between 1990 and 2000 the number of households in Staten Island increased by 19.8% while households with vehicles increased by 22.1%. The study area's data show that from 1990 to 2000 the number of households with and without vehicles increased by about 20.0%. From 2000 to 2010, households with vehicles increased by 6.9%, while households without vehicles decreased by 17.3%

Table 2.5.1
Vehicle Ownership per Household (1990, 2000, 2010)

		Vehicles per Household					
		Zero	One	Two	Three or More	HH with Vehicles	# of Households
NYC	**1990**	1,575,217	887,309	282,593	74,282	1,244,184	2,819,401
	% Change	--	--	--	--	--	--
	2000	1,682,946	955,165	305,267	78,210	1,338,642	3,021,588
	% Change	6.8	7.6	8.0	5.3	7.6	7.2
	2010	1,679,025	955,187	325,755	90,011	1,370,953	3,049,978
	% Change	0.2	-	6.7	15.1	2.4	0.9
Staten Island	**1990**	23,714	48,995	42,752	15,058	106,805	130,519
	% Change	--	--	--	--	--	--
	2000	28,961	59,783	52,199	15,668	127,650	156,341
	% Change	22.1	22.0	22.1	4.1	19.5	19.8
	2010	26,078	60,845	56,058	20,766	137,669	163,747
	% Change	(10.0)	1.8	7.4	32.5	7.8	4.7
Study Area	**1990**	1,528	5,967	7,169	2,956	16,092	17,634
	% Change	--	--	--	--	--	--
	2000	1,849	8,001	8,848	2,461	19,310	21,167
	% Change	21.0	34.1	23.2	-16.7	20.0	20.0
	2010	1,530	7,311	9,484	3,848	20,643	22,173
	% Change	-17.3	-8.6	7.2	56.4	6.9	4.8

2.6 Travel Behavior

2.6.1 Journey to Work by Mode

Journey to work by mode was analyzed for 1980, 1990, 2000 and 2010 census years. Tables 2.6.1.1, 2.6.1.2, 2.6.1.3 and 2.6.1.4 show a summary of the journey to work by mode share.

The 1980 journey to work data for public transportation and other modes were not available at the same level of detail as for 1990 and 2000 census years. However, the data shows clearly the most commonly used modes for journey to work in the study area, Staten Island and New York City. The 1980 journey to work data reveal that for New York City, the predominant mode used for journey to work was public transportation, representing 56.2% of the total trips while public transportation accounted for only 29.6% and 34.5% of trips in Staten Island and the study area, respectively.

In Staten Island and the study area, driving to work was the most commonly used mode of transportation, representing approximately 61% of the total trips to work. In New York City, journey to work by automobiles represented 31% of trips, the second most commonly used mode.

Walking represented about 12% of journey to work trips in New York City. In Staten Island and the study area, walking accounted for only 3.7% and 2.2% of total trips, respectively. The use of other means for journey to work represents less than 2% of the trips in New York City, 6.1% in Staten Island and 2.6% in the study area.

The 1990 journey to work data show an increasing reliance on automobiles for New York City, Staten Island and the study area. In 1990, New York City public transportation accounted for 54.5% of all work trips, while Staten Island and the study area accounted for only 30.9% and 30%, respectively. Travel by bus was the most commonly used form of public transportation in the study area, accounting for 14.3% of all work trips. This trend is also observed in Staten Island and with the bus share being 16.5%. In New York City, the subway was the most commonly used mode of public transportation at 38%.

Automobile represents the second most commonly used mode of transportation to work with the New York City and the most commonly used mode in Staten Island and the study area accounting for 33.4%, 65.1% and 67.1% of trips, respectively. These shares comprise drove alone and carpooled trips which accounted for approximately one quarter of all automobile trips in New York City, Staten Island, and the study area.

The 2000 journey to work data reveal a similar trend to 1990 with public transportation being the predominant mode in New York City, and the second most common mode in Staten Island and the study area having 54.2%, 28.8% and 27% public transit share respectively. The study area has 17.7% of the trips made by bus. Taxicabs represent less than 1% of the work trips in the study area and Richmond County, in New York City the percentage share is 1.7%. Automobile accounted for 71.2% of the total trips in the study area, 67.5% in Staten Island and only 33.9% for New York City. Among the other modes, walking represents less than 2% in the study area, 3% in Staten Island and 10.7% in New York City.

Table 2.6.1.1

1980 Journey to Work by Mode

1980 Census Year	New York City	Mode Share %	Staten Island	Mode Share %	Study Area	Mode Share %
Car, Truck or Van						
Drove Alone	567,774	20.7	59,070	42.0	8,982	40.9
Carpooled	278,273	10.2	26,151	18.6	4,368	19.9
Total	**846,047**	**30.9**	**85,221**	**60.6**	**13,350**	**60.8**
Public Transportation	**1,542,027**	**56.2**	**41,649**	**29.6**	**7,566**	**34.5**
Walked Only	320,308	11.7	5,168	3.7	474	2.2
Other Modes	33,166	1.2	8,530	6.1	563	2.6
Total Trips	**2,741,548**	**100**	**140,568**	**100**	**21,953**	**100**

Table 2.6.1.2

1990 Journey to Work by Mode

1990 Census Year	New York City	Mode Share %	Staten Island	Mode Share %	Study Area	Mode Share %
Car, Truck or Van						
Drove Alone	765,151	24.6	84,862	49.4	13,465	51.4
Carpooled	271,503	8.7	26,796	15.6	4,123	15.7
Total	**1,036,654**	**33.4**	**111,658**	**65.1**	**17,588**	**67.1**
Public Transportation						
Bus	403,477	13.0	28,261	16.5	3,760	14.3
Subway	1,168,346	37.6	5,767	3.4	1,229	4.7
Railroad	54,716	1.8	2,608	1.5	1,038	4.0
Ferry	16,619	0.5	15,622	9.1	1,732	6.6
Taxicab	50,096	1.6	719	0.4	97	0.4
Total	**1,693,254**	**54.5**	**52,977**	**19.8**	**7,856**	**19.0**
Other Modes						
Motorcycle	1,711	0.1	134	0.1	10	0.0
Bicycle	9,643	0.3	294	0.2	24	0.1
Walked	340,077	10.9	5,726	3.3	600	2.3
Other Means	24,930	0.8	845	0.5	135	0.5
Total	**376,361**	**12.1**	**6,999**	4.1	**769**	2.9
Total Trips	**3,106,269**	**100**	**171,634**	**89**	**26,213**	**89**

Table 2.6.1.3

2000 Journey to Work by Mode

2000 Census Year	New York City	Mode Share %	Staten Island	Mode Share %	Study Area	Mode Share %
Car, Truck or Van						
Drove Alone	794,422	25.6	103,856	55.3	15,604	59.3
Carpooled	254,974	8.2	23,084	12.3	3,149	12.0
Total	**1,049,396**	**33.9**	**126,940**	**67.5**	**18,753**	**71.2**
Public Transportation						
Bus	364,408	11.8	36,678	19.5	4,655	17.7
Subway	1,199,226	38.7	4,894	2.6	841	3.2
Railroad	51,141	1.6	1,705	0.9	642	2.4
Ferry	11,193	0.4	10,109	5.4	949	3.6
Taxicab	53,781	1.7	715	0.4	20	0.1
Total	**1,679,749**	**54.2**	**54,101**	**28.8**	**7,107**	**27.0**
Other Modes						
Motorcycle	1,488	0.0	114	0.1	16	0.1
Bicycle	15,024	0.5	364	0.2	28	0.1
Walked	332,264	10.7	5,545	3.0	335	1.3
Other Means	21,998	0.7	875	0.5	82	0.3
Total	**370,774**	**12.0**	**6,898**	**3.7**	**461**	**1.8**
Total Trips	**3,099,919**	**100**	**187,939**	**100**	**26,321**	**100**

Table 2.6.1.4
2010 Journey to Work by Mode

2010 Census Year	New York City	Mode Share %	Staten Island	Mode Share %	Study Area	Mode Share %
Car, Truck or Van						
Drove Alone	1,026,191	27.8	129,722	60.0	20,650	67.1
Carpooled	190,379	5.2	17,885	8.3	3,142	10.2
Total	**1,216,570**	**32.9**	**147,607**	**68.3**	**23,792**	**77.3**
Public Transportation						
Bus	443,513	12.0	46,652	21.6	4,539	14.8
Subway	1,496,193	40.5	5,719	2.6	839	2.7
Railroad	66,186	1.8	1,809	08	513	1.7
Ferry	8,352	0.2	7,069	3.3	618	2.0
Taxicab	40,864	1.1	378	0.2	137	0.4
Total	**2,055,108**	**55.6**	**61,627**	**28.5**	**6,646**	**21.6**
Other Modes						
Motorcycle	2,393	0.7	134	0.1	--	0.0
Bicycle	26,196	0.5	301	0.1	25	0.1
Walked	375,991	10.2	5,366	2.5	250	0.8
Other Means	19,868	0.5	1,226	0.6	47	0.2
Total	**424,448**	**11.5**	**7,027**	**3.2**	**322**	**1.0**
Total Trips	**3,696,126**	**100**	**216,261**	**100**	**30,760**	**100**

2.6.2 Auto Travel Characteristics

Table 2.6.2.1 shows a summary of auto travel by years observed in New York City, Staten Island and in the study area. The data indicate that between 1980 and 1990 drive alone increased substantially. Between 1980 and 1990, the number of people who drove alone increased by 34.8%, 43.7% and 49.9% in New York City, Staten Island and the study area, respectively. During this period, carpooling decreased slightly in both New York City and the study area, while it increased slightly in Staten Island.

Comparing 1990 with 2000, drive alone increased at a slower rate that the previous decade. New York City drive alone increased by only 3.8%, in Staten Island it increased by 22.4% and in the study area it increased by 15.9%. Carpooling decreased in New York City, Staten Island and the study area by 6.1%, 13.9% and 23.6%, respectively. Other means of journey to work remained relatively constant during this time in New York City and Staten Island, but decreased by 12.3% in the study area.

Table 2.6.2.1
Auto Travel Characteristics

Census Year & Driving Characteristics	New York City	% Change	Staten Island	% Change	Study Area	% Change
1980						
Drove Alone	567,774		59,070		8,982	
Carpooled	278,273		26,151		4,368	
Other Means	1,895,501		55,347		8,603	
1990						
Drove Alone	765,151	34.8	84,862	43.7	13,465	49.9
Carpooled	271,503	-2.4	26,796	2.5	4,123	-5.6
Other Means	2,069,615	9.2	59,976	8.4	8,625	0.3
2000						
Drove Alone	794,422	3.8	103,856	22.4	15,604	15.9
Carpooled	254,974	-6.1	23,084	-13.9	3,149	-23.6
Other Means	2,050,523	-0.9	60,999	1.7	7,568	-12.3
2010						
Drove Alone	1,026,191	29.2	129,722	24.9	20,650	32.3
Carpooled	190,379	-25.3	17,885	-22.5	3,142	-.0.2
Other Means	2,479,556	20.9	68,654	12.5	6,968	-7.9

2.6.3 Origin and Destination

Of the people who work in the study area, 80% also live in Staten Island. Of workers who commute to the study area 7% are from New Jersey, 5% from Brooklyn and 4% from Queens (See Figure 2.6.3.1).

Of the people who live in the study area, 45% of them work on Staten Island. Of those who commute off of the Island, 34% work in Manhattan, 18% work in Brooklyn and 3% work in Queens (See Figure 2.6.3.2).

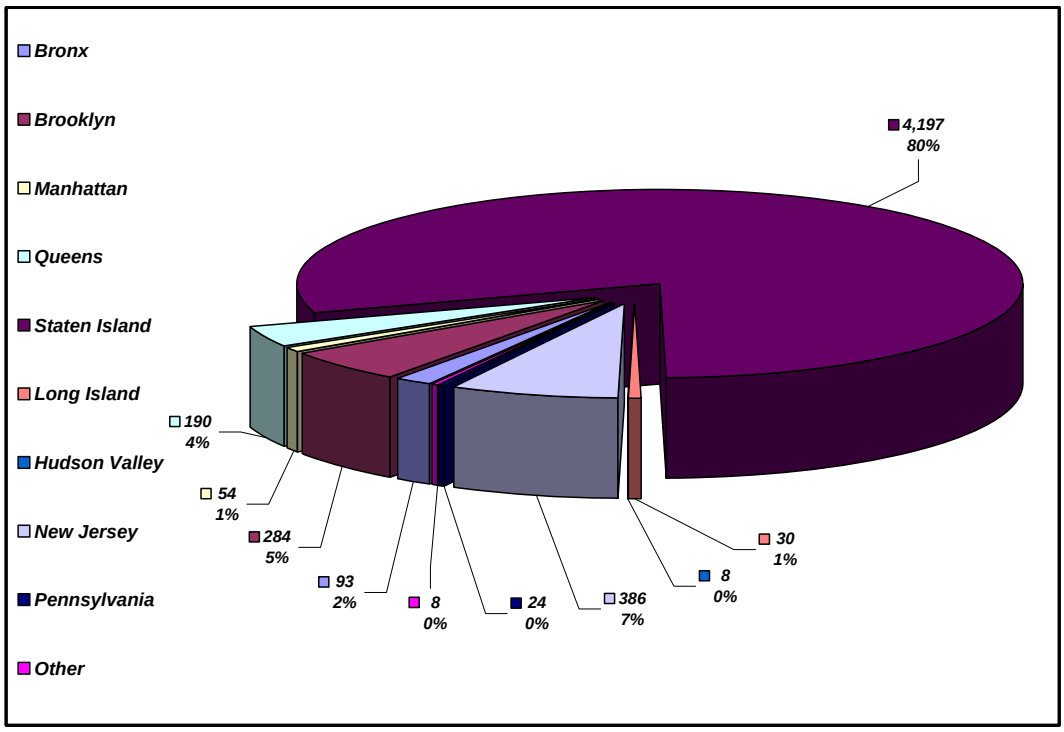


Figure 2.6.3.1: Amboy Road Inbound Work Trip Origins

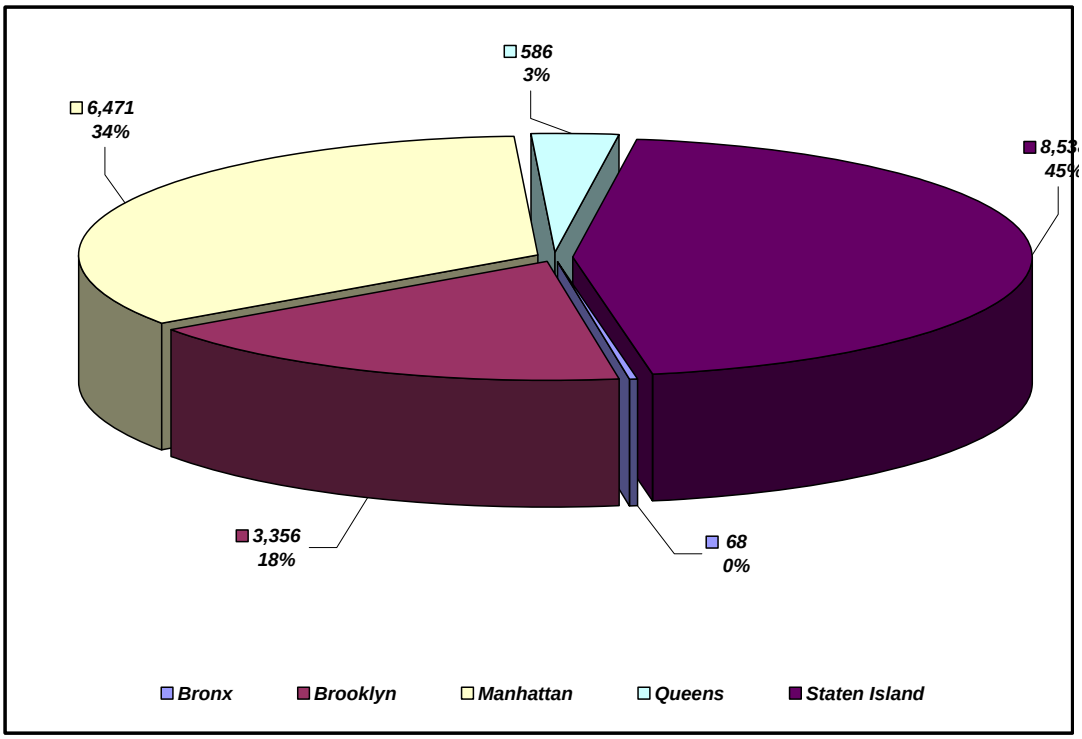


Figure 2.6.3.2: Amboy Road Outbound Work Trip Destinations

CHAPTER 3 ZONING AND LAND USE

The city is divided into three basic zoning districts: residential (R), commercial (C), and manufacturing (M). The three basic categories are further subdivided into lower, medium, and higher density residential, commercial and manufacturing districts. Development within these districts is regulated by use, building size, and parking regulations.

Here is a brief description of the three basic zoning districts according to the Zoning Handbook:

Residential District (R)

In New York City, there are ten standard residential districts, R1 through R10. The numbers refer to the permitted density (R1 having the lowest density and R10 the highest) and other controls such as required parking. A second letter or number signifies additional controls are required in certain districts. R1 and R2 districts allow only detached single-family residences and certain community facilities. The R3-2 through R10 districts accept all types of dwelling units and community facilities and are distinguished by differing bulk and density, height and setback, parking, and lot coverage or open space requirements.

Commercial District (C)

The commercial districts reflect the full range of commercial activity in the city from local retail and service establishments to high density, shopping, entertainment and office uses. There are eight basic commercial districts where two (C1 and C2 districts) are designed to serve local needs, one district (C4) is for shopping centers outside the central business district, two (C5 and C6 districts) are for the central business districts which embrace the office, retail, and commercial functions that serve the city and region, and three (C3, C7, and C8 districts) are designed for special purposes (waterfront activity, large commercial amusement parks and heavy repair services).

Variations in bulk, parking and loading requirements also exist in these commercial districts.

Manufacturing District (M)

Manufacturing activities are grouped into three districts: M1, M2, and M3. These districts include performance standards which establish limits on the amount and type of industrial nuisances which may be created. The more noxious uses are restricted to M3 districts but they may be permitted in districts M1 and M2 if they comply with performance standards of those districts. Retail and commercial uses are permitted in manufacturing districts with some exceptions while residential and community facility uses are excluded from most manufacturing districts.

3.1 Resident Zoning Districts

The Amboy Road study area is a predominantly residential corridor with commercial overlays in several subsections. The lots along the study artery have zoning designations that include R2, R3-1, R3-2, R3A and R3X districts.

The R3-1 and R3-2 zoning districts comprise a large portion of the study area. They consist of single- and two-family homes. R3-1 districts permit attached and semi-attached single- and two-family homes. R3-2 districts are the lowest density zones in which multiple dwellings are allowed. Garden apartments and row houses are common in this district.

Zoning District	Maximum Residential FAR	Maximum Commercial FAR	Maximum Commercial Overlay FAR
R2	0.5	0.5	1.0
R3-1	0.5 plus 0.1 attic allowance	1.0	1.0
R3-2	0.5 plus 0.1 attic allowance	1.0	1.0
R3A	0.5 plus 0.1 attic allowance	1.0	1.0
R3X	0.5 plus 0.1 attic allowance	1.0	1.0

3.2 Commercial Zoning Districts

The Amboy Road study area has two districts primarily zoned for commercial use and two that are commercial overlays. The main cluster of stores is in a C4-1 and C8-1 commercial district, designations usually assigned on major avenues. Larger stores with more goods and services are found in C4 districts. C8 districts ordinarily have heavy repair shops and automotive uses.

Commercial overlays allow retail uses in residential neighborhoods. Residential bulk in these commercial districts is governed by the regulations of the surrounding residential district within which the overlay is mapped.

Zoning District	Maximum Residential FAR	Maximum Commercial FAR	Maximum Community Facility FAR
C8-1	—	1.0	2.4
C4-1	1.25	1.0	2.0
C1-1 overlay district	0.5 plus 0.1 attic allowance	1.0	1.0
C1-2 overlay district	0.5 plus 0.1 attic allowance	1.0	1.0

3.3 Residential Land Use

The predominant land use along the Amboy Road study area is residential. Housing characteristics of this area mostly consist of single- and two-family homes with some multiple dwellings.

3.4 Commercial Land Use

The commercial uses along the Amboy Road corridor are mostly in clusters scattered throughout the area. The concentration can be found between:

- Ridgecrest Avenue and Armstrong Avenue
- Colon Avenue and Midland Road
- Keegans Lane and Bay Terrace
- Justin Avenue and Buffalo St.

3.5 Garages, Public Facilities and Open Space

Five lots that are part of the Amboy Road congested corridor study are used as a garage or gas station. They are interspersed throughout the area near:

- Richmond Road
- Ridge Street
- St. Albans Street
- Lindenwood Avenue
- Hillside Terrace

An additional five lots are used as public facilities or institutions. Most of these uses can be found near the southern end of the study area. The streets that approach these lots include:

- Arden Avenue
- Lyndale Avenue
- Ridge Street
- Cloverdale Avenue
- Seeley Lane

The northern end of Amboy Road has cemetery uses. Ocean View Cemetery and St. Agnes Cemetery are adjacent to the study area. They make up the only open space along the corridor, bound by Great Kills Avenue and Bay Street.

3.6 Vacant Land

There are approximately 35 vacant properties of various sizes adjacent to Amboy Road. The majority of these lots can be found on the northern side of the study area near the cemetery.

CHAPTER 4 TRAFFIC

4.1 Traffic Network

Amboy Road begins at the Richmond Road intersection and continues to the western end of Staten Island. The study corridor is along Amboy Road between Guyon Avenue to the east and Arden Avenue to the west in the borough of Staten Island. The study corridor is located in the heart of Staten Island. See Figure 4.1.1.

The study corridor provides adequate vehicular access in Staten Island. Although there is no direct connection to any major highway, the study corridor is within a half mile of other major corridors which leads to Brooklyn to the east or New Jersey to the west. To the east, vehicles can travel southbound on Guyon Avenue and connect to Hylan Boulevard which leads to the Verrazano-Narrows Bridge to Brooklyn. To the west, vehicles can travel westbound on Amboy Road to northbound Huguenot Avenue which connects to the Korean War Veterans Parkway toward the Outerbridge Crossing to New Jersey.

Amboy Road is the main east/west corridor in this study. A typical cross-section of Amboy Road is approximately 32 feet wide and is comprised of one moving lane in each direction. As noted earlier, this corridor is characterized by mixed land uses, some of which include residential, commercial and retail uses.

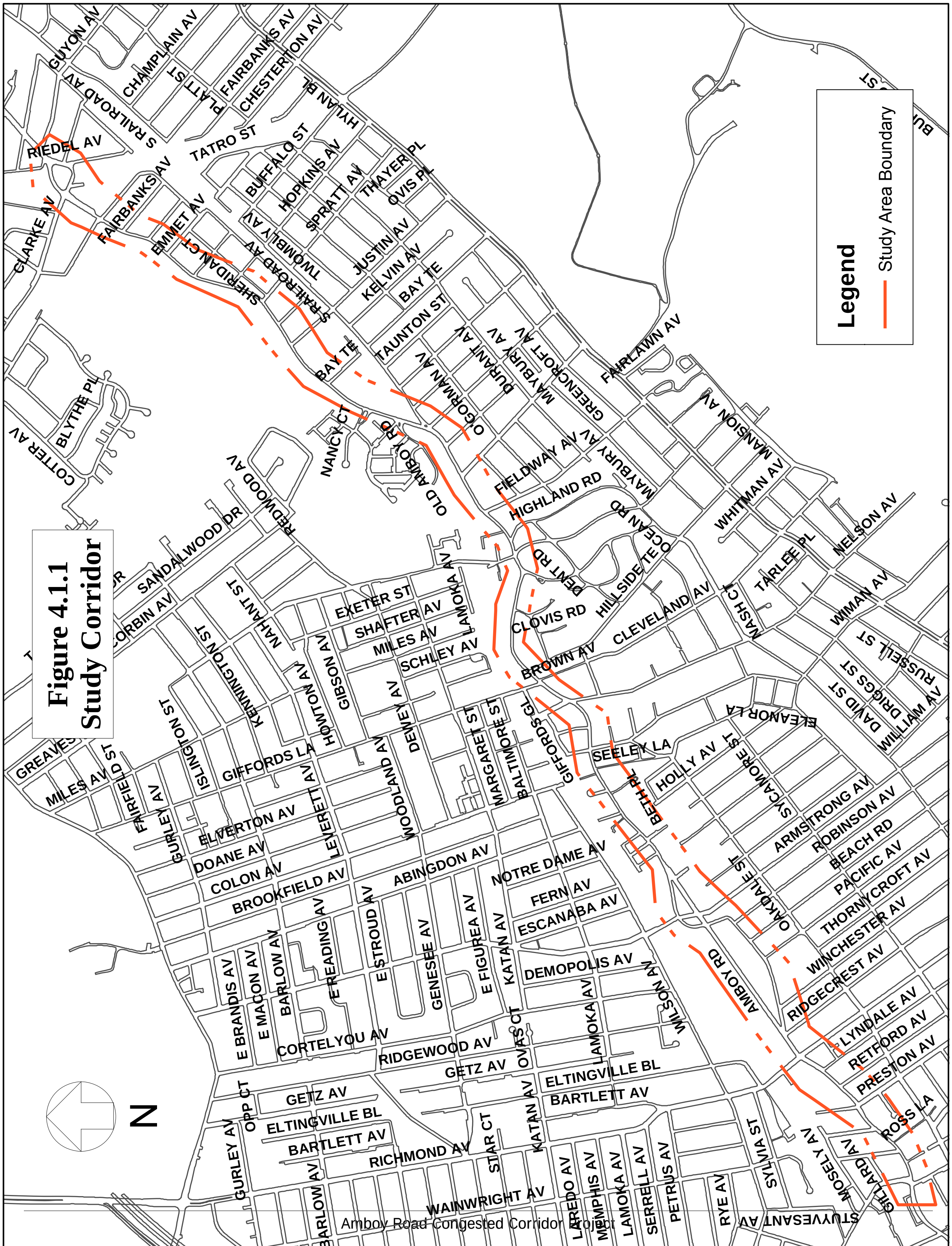


Figure 4.1.1
Study Corridor

4.2 Activity Centers

A high percentage of the peak hour vehicle trips in the study area are through trips for work and shopping oriented travel. The trips leaving the area in the AM are home based trips (origins) while those coming into the area constitute a high share of non-home based trips (destinations). The reverse pattern is somewhat evident in the PM peak. The area's economic activity, local retail/offices and entertainment centers make this area a destination point. The surrounding commercial retail creates major Activity Centers in the study corridor, see Figure 4.2.1.

Activity Center # 1 is located on Amboy Road between Arden Avenue and Armstrong Avenue. This segment of the corridor is predominantly commercial in nature with major retail activities; food shopping centers, a bank, a church and various retail stores, including the Waldbaum's Supermarket and Eltingville Shopping Center located between Armstrong Avenue and Richmond Avenue that has the largest occupancy and is the major attraction along this section of the corridor.

Activity Center # 2 is located on Amboy Road between Lindenwood Road and Giffords Lane/Cleveland Avenue. This segment of the corridor is a mix of residential and commercial land uses including a pharmacy and some retail activity. On the segment between Nelson Avenue and Giffords Lane/Cleveland Avenue, the entire block is occupied by retail stores on both sides of the corridor.

Activity Center # 3 is located on Amboy Road between Montreal Avenue and Riedel Avenue. This segment of the corridor is predominantly commercial in nature with retail activities. The south-west corner of the Amboy Road and Clarke Avenue intersection contains multiple retail stores and a large parking lot.

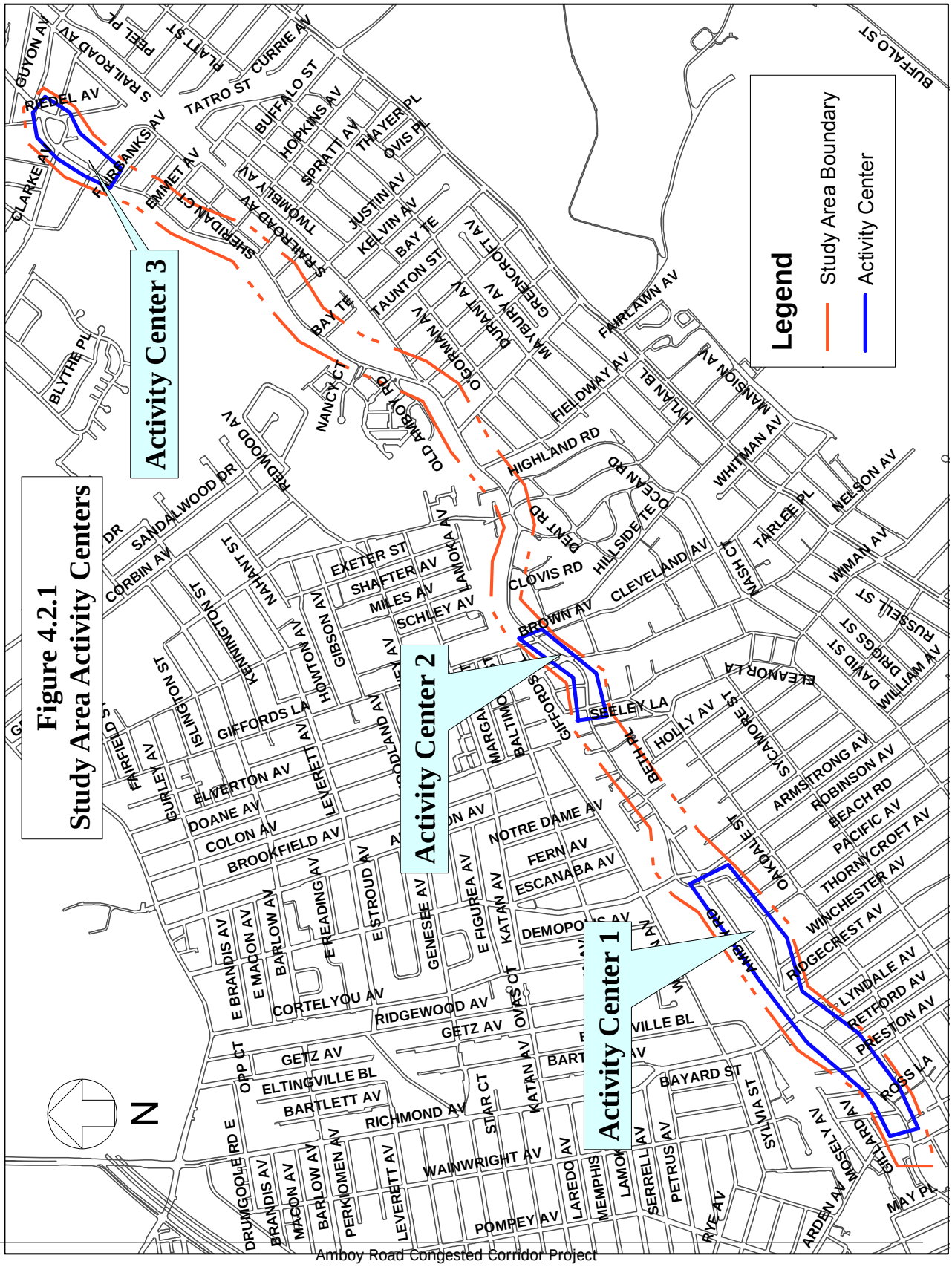


Figure 4.2.1
Study Area Activity Centers
Activity Center 1
Activity Center 2
Activity Center 3
Legend
Study Area Boundary
Activity Center
N

4.3 Data Collection

Existing traffic conditions were defined through field surveys conducted for twelve days in April/May 2007. Automatic Traffic Recorders (ATRs) provided traffic count data from Monday April 23, 2007 to Friday May 4, 2007.

Traffic volume counts included vehicle classification and turning movements for three midweek days (Tuesday, Wednesday and Thursday) during the AM, midday, and PM peak hours and for the Saturday midday peak hour. The ATR machines were place at twenty-one locations for the duration of twelve days and data were collected in 15-minute intervals for a consecutive 24-hour periods. Speed and delay runs were also conducted for the various peak hours along the corridor.

Automatic Traffic Recorders were placed at the following twenty-one locations:

- Amboy Road west of Clarke Avenue (Eastbound);
- Amboy Road east of Clarke Avenue (Westbound);
- Amboy Road west of Bay Terrace (Eastbound);
- Amboy Road west of Giffords Lane (Eastbound);
- Amboy Road east of Giffords Lane (Westbound);
- Amboy Road west of Armstrong Avenue (Eastbound);
- Amboy Road east of Armstrong Avenue (Westbound);
- Amboy Road west of Richmond Avenue (Eastbound);
- Amboy Road east of Richmond Avenue (Westbound);
- Amboy Road west of Arden Avenue (Eastbound);
- Amboy Road east of Arden Avenue (Westbound);
- Clarke Avenue north of Amboy Road (Southbound);
- Clarke Avenue south of Amboy Road (Northbound);
- Brown Avenue south of Amboy Road (Southbound);
- Giffords Lane north of Amboy Road (Southbound);
- Armstrong Avenue north of Amboy Road (Southbound);
- Armstrong Avenue south of Amboy Road (Northbound);
- Richmond Avenue north of Amboy Road (Southbound);
- Richmond Avenue south of Amboy Road (Northbound);
- Arden Avenue north of Amboy Road (Southbound); and
- Arden Avenue south of Amboy Road (Northbound).

Manual turning movement with vehicle classification counts were conducted concurrently with the ATR counts for the various peak periods on one typical midweek day (Tuesday, Wednesday

or Thursday) during the AM (7:00AM. to 9:00AM), midday (12:00 noon to 2:00PM), PM (4:00PM to 6:00PM) and one weekend midday (10:00AM to 2:00PM) at the following intersections:

- Amboy Road & Guyon Avenue (sample counts);
- Amboy Road & Riedel Avenue;
- Amboy Road & Clarke Avenue;
- Amboy Road & Montreal Avenue (sample counts);
- Amboy Road & Buffalo Street;
- Amboy Road & Justin Avenue;
- Amboy Road & Timber Ridge Drive;
- Amboy Road & Evergreen Shopping Plaza;
- Amboy Road & Great Kill Road;
- Amboy Road & Giffords Lane/Cleveland Avenue;
- Amboy Road & Nelson Avenue;
- Amboy Road & Lindenwood Road (sample counts);
- Amboy Road & Armstrong Avenue;
- Old Amboy Road & Armstrong Avenue;
- Amboy Road & Albans Place (sample counts);
- Amboy Road between Armstrong Avenue and Albans Place (sample counts);
- Amboy Road & Richmond Avenue; and
- Amboy Road & Arden Avenue.

In order to measure peak hour travel time and vehicular speeds along the study corridor and to identify locations where traffic delay exists, multiple speed runs and travel time data were collected during weekdays in April 2007.

The travel time runs were conducted on Amboy Road for each peak period for three consecutive weekdays concurrently with the traffic volume data collection. Four or more runs were performed for each direction during each peak travel period.

The “floating car” method (a technique whereby a field vehicle travels at speeds under prevailing traffic conditions) was used to measure travel time and speed on the following paths:

Amboy Road between Arden Avenue and Clarke Avenue (Eastbound)

- Amboy Road between Clarke Avenue and Arden Avenue (Westbound)

Pedestrian traffic plays a significant role in the study area due to the presence of the commercial retail, recreational facilities, schools and churches. Five intersections were identified for pedestrian counts for the weekday (AM, midday and PM) and Saturday peak hours.

- Amboy Road & Clarke Avenue;
- Amboy Road & Giffords Lane/Brown Avenue;
- Amboy Road & Nelson Avenue;
- Amboy Road & Armstrong Avenue; and
- Amboy Road & Richmond Avenue.

The traffic count locations are summarized in Figure 4.3.1.

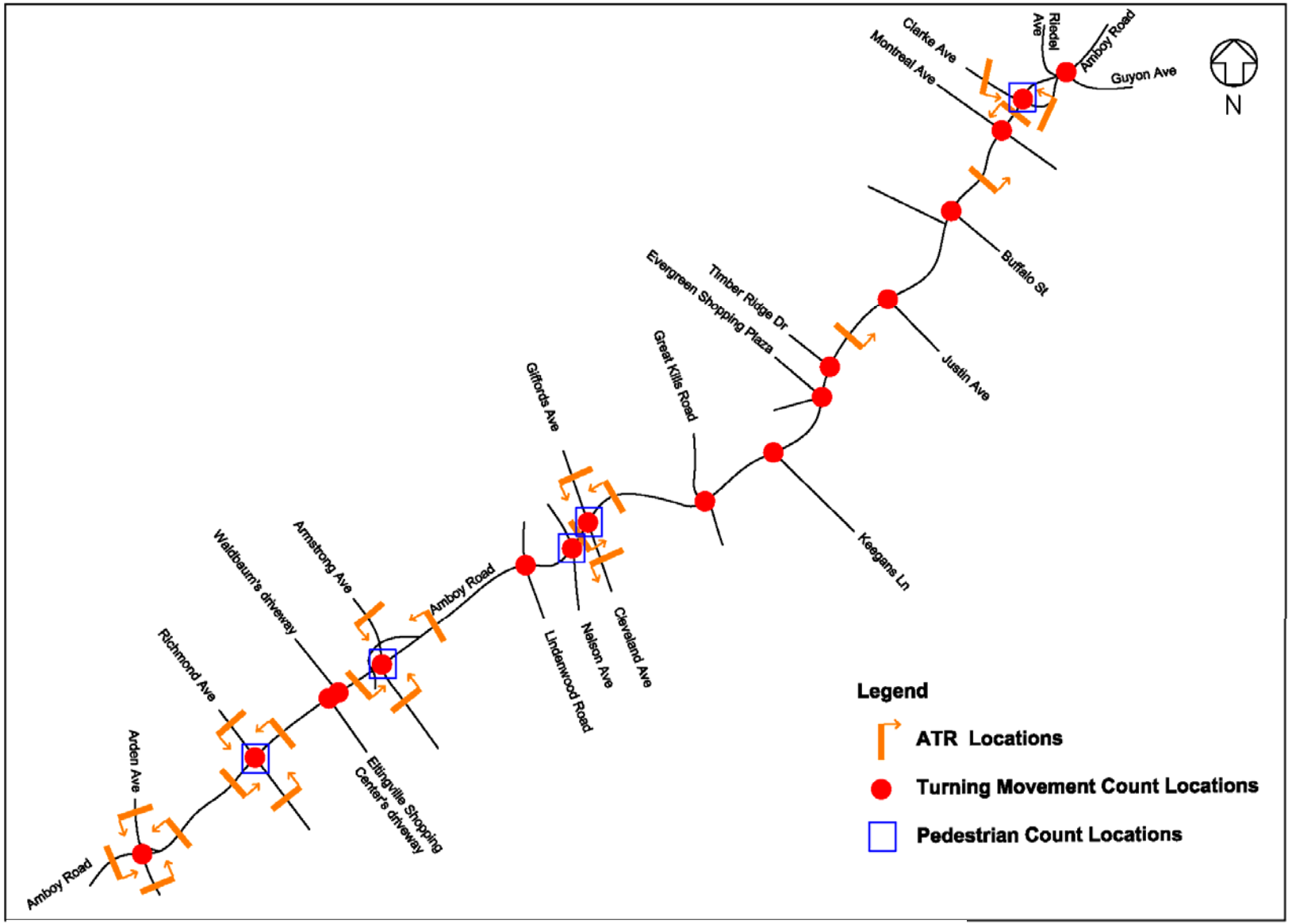


Figure 4.3.1: Traffic Count Locations

4.4 Existing Traffic Volumes

Balanced traffic network volumes for the various peak periods were prepared using the ATRs and the manual turning movement counts. This information was plotted on traffic flow maps for each of the representative peak hours; AM (7:45AM - 8:45AM), midday (12:00 noon - 1:00PM), PM (5:00PM - 6:00PM), and Saturday midday (12:30PM - 1:30PM). Table 4.4.1 shows volumes for the AM, midday, PM and Saturday midday peak hours,at all ATR count locations. Figures 4.4.1 to 4.4.4 present the 2007 existing peak hour traffic volumes.

The data showed that two locations along the Amboy Road corridor processed the highest number of vehicles for all four peak periods.

1. Amboy Road Eastbound west of Clarke Avenue processed approximately 961, 646, 773, and 740 vehicles per hour (vph) in the AM, midday, PM and Saturday midday peak hours, respectively; and

2. Amboy Road Westbound east of Clarke Avenue processed approximately 912, 888, 1497, and 1295 vph in the AM, midday, PM, and Saturday midday peak hours.

Table 4.4.1
Peak Hour ATR Volumes

Location ID	Location	Peak Hour Volumes			
		AM	MD	PM	SAT MD
1	Amboy Road west of Clarke Avenue (Eastbound)	961	646	773	740
2	Amboy Road east of Clarke Avenue (Westbound)	912	888	1497	1295
3	Amboy Road west of Bay Terrace (Eastbound)	715	521	568	685
4	Amboy Road west of Giffords Lane (Eastbound)	591	488	591	616
5	Amboy Road east of Giffords Lane (Westbound)	468	614	718	758
6	Amboy Road west of Armstrong Avenue (Eastbound)	607	648	738	854
7	Amboy Road east of Armstrong Avenue (Westbound)	297	278	434	310
8	Amboy Road west of Richmond Avenue (Eastbound)	532	523	582	658
9	Amboy Road east of Richmond Avenue (Westbound)	477	666	790	828
10	Amboy Road west of Arden Avenue (Eastbound)	504	380	442	460
11	Amboy Road east of Arden Avenue (Westbound)	390	457	588	585
12	Clarke Avenue north of Amboy Road (Southbound)	735	433	603	616
13	Clarke Avenue south of Amboy Road (Northbound)	59	58	145	96
14	Brown Avenue south of Amboy Road (Southbound)	91	50	75	74
15	Giffords Lane north of Amboy Road (Southbound)	244	203	254	293
16	Armstrong Avenue north of Amboy Road (Southbound)	379	279	372	414
17	Armstrong Avenue south of Amboy Road (Northbound)	239	213	301	296
18	Richmond Avenue north of Amboy Road (Southbound)	633	656	788	759
19	Richmond Avenue south of Amboy Road (Northbound)	424	520	555	560
20	Arden Avenue north of Amboy Road (Southbound)	596	443	604	607
21	Arden Avenue south of Amboy Road (Northbound)	399	324	495	440

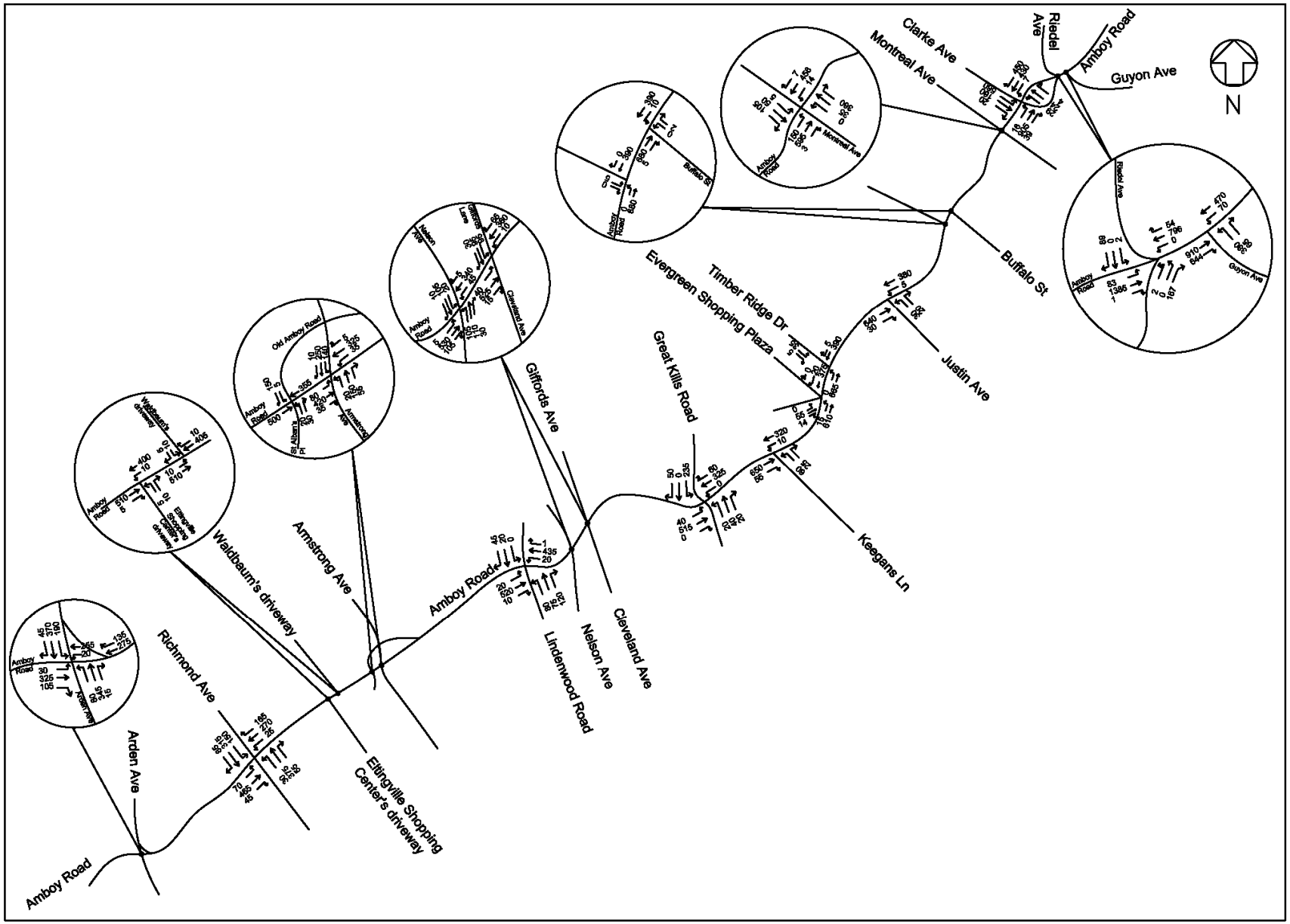


Figure 4.4.1: Existing Traffic Volume – Weekday AM Peak (7:45-8:45)

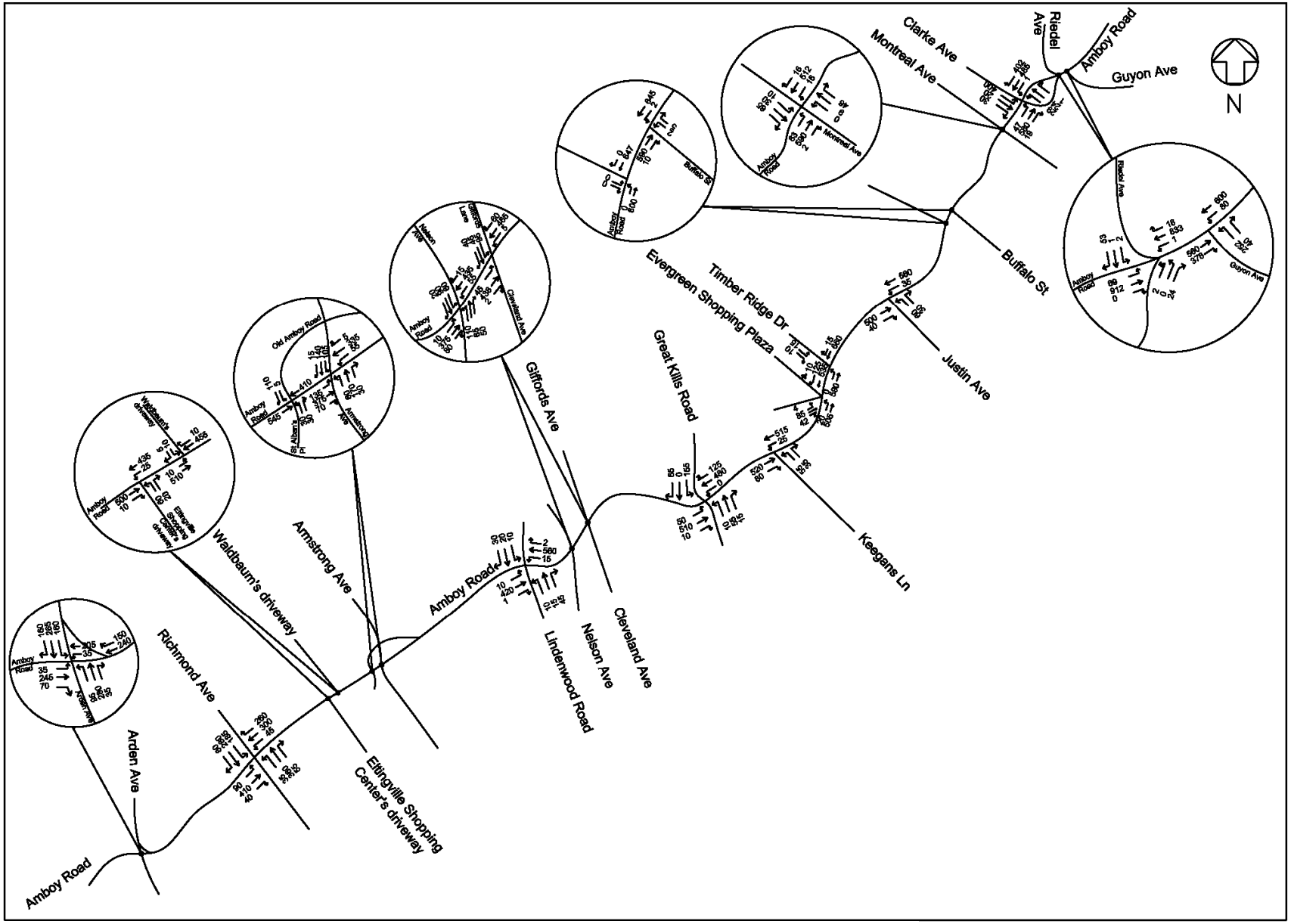


Figure 4.4.2: Existing Traffic Volume – Weekday Midday Peak (12:00-1:00 PM)

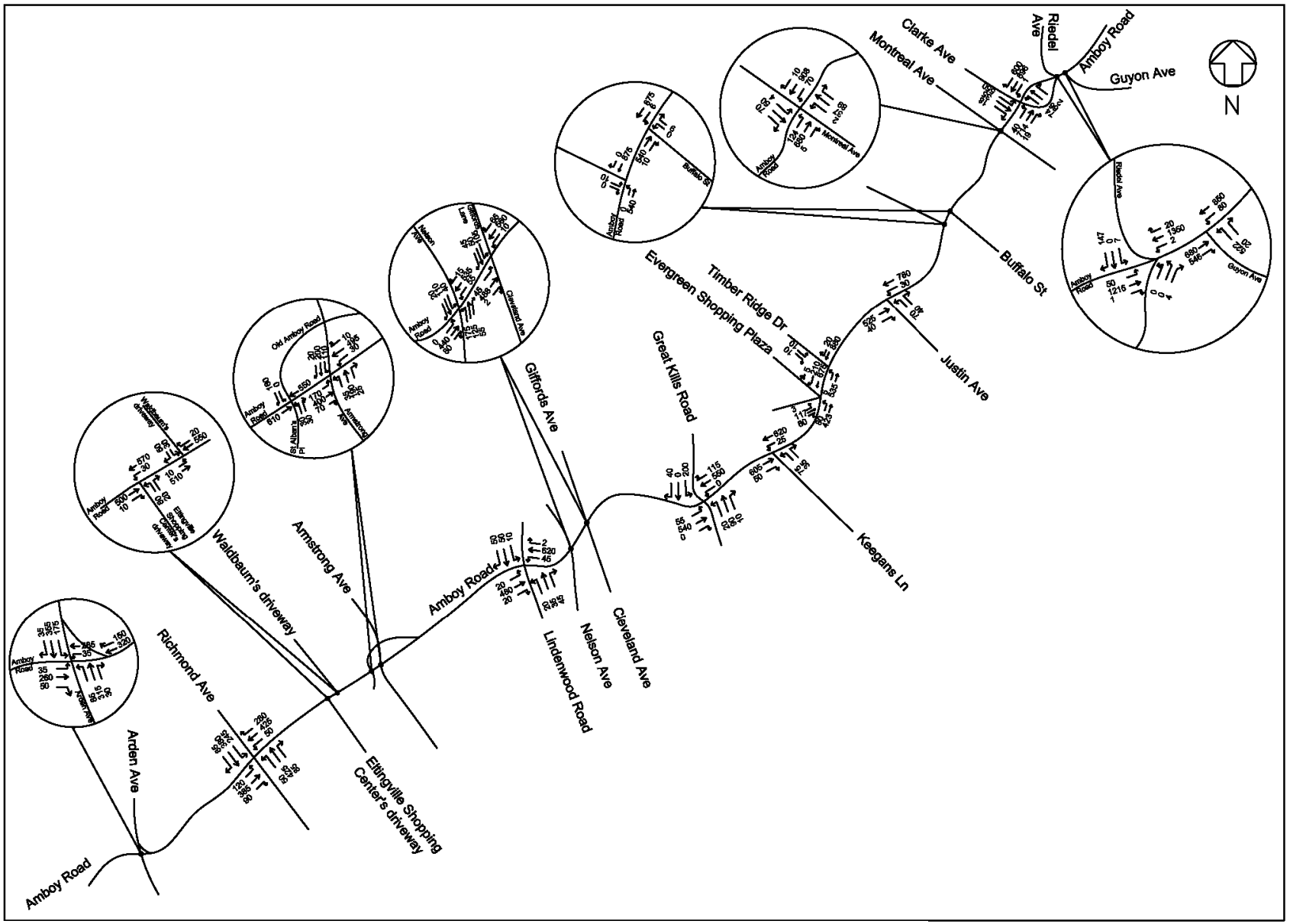


Figure 4.4.3: Existing Traffic Volume – Weekday PM Peak (5:00-6:00)

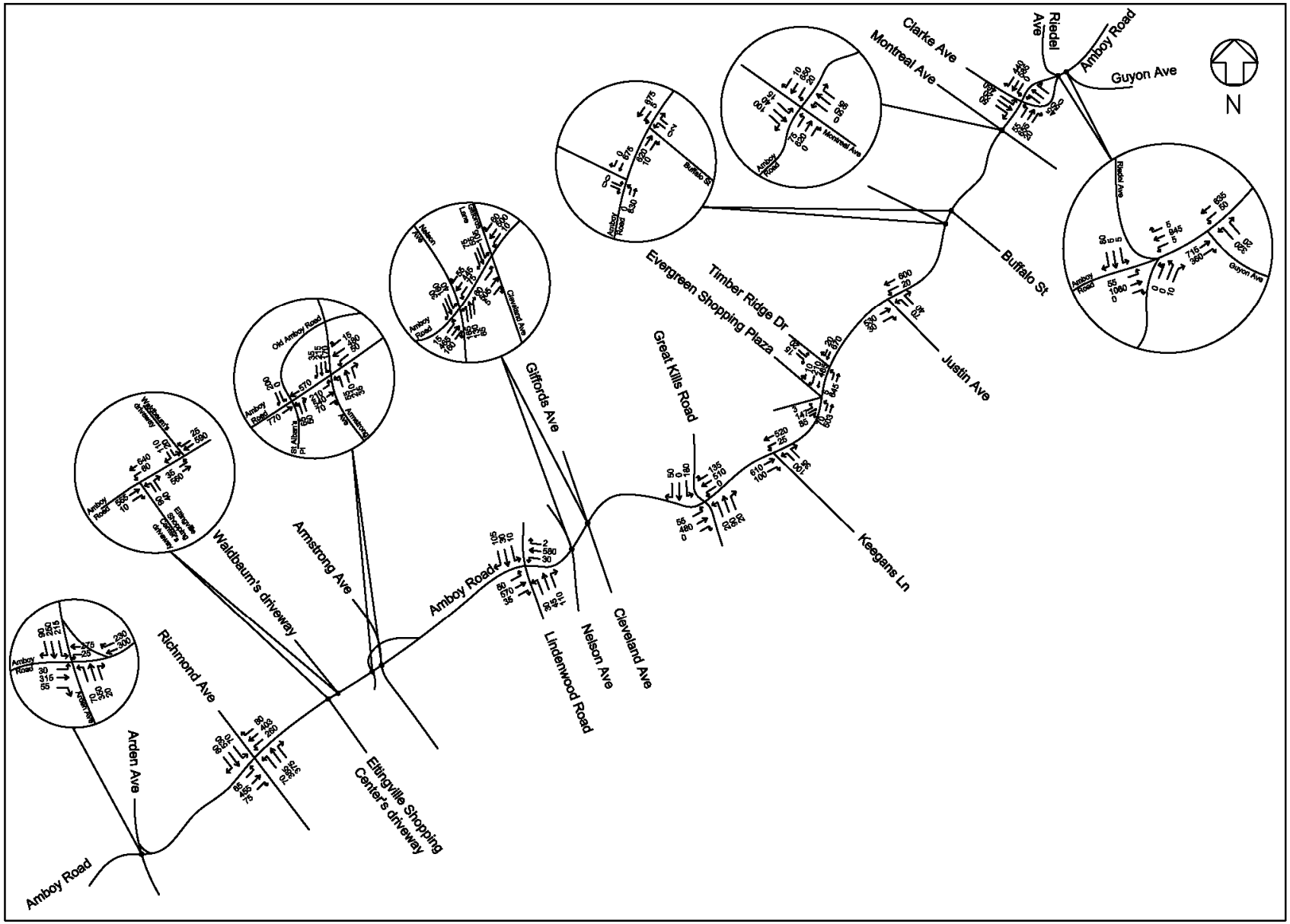


Figure 4.4.3: Existing Traffic Volume – Saturday Peak (12:30-1:30 PM)

4.5 Street Capacity & Level of Service (LOS) Methodology

The capacity of the roadway is the maximum rate of flow which may pass through a section of roadway under prevailing traffic, roadway and signalization conditions. The capacity of a roadway is determined by several factors including turning movements, signal timing, geometric design of the intersection, pedestrian movements, type of vehicle, illegal and/or double parking, grade, roadway conditions and weather. In determining street capacity within the study corridor, the 2000 Highway Capacity Manual methodology was used. The methodology requires the use of official signal timing, street geometry, and other relevant information for performing capacity and LOS analyses. Field inventories were conducted in order to gather the prevailing conditions of the intersection.

The traffic flow characteristics are measured in terms of the volume-to-capacity (v/c) ratios and delays. The quality of the flow is expressed in terms of Level of Service (LOS), which is based on an average delay experienced by a vehicle. When the v/c ratio exceeds 1.0, a facility or intersection operates at or above capacity. In this situation, severe congestion occurs in traffic with stop-and-start conditions and extensive vehicle queuing and delays. Volume-to-capacity ratios of less than 0.85, and average delays per vehicle of 45 seconds or less are considered to be reflective of acceptable traffic conditions. The following are level of service criteria as specified in the 2000 HCM Methodology.

Signalized Intersection LOS Criteria

Level of Service	Control Delay Per Vehicle	Description of Traffic Condition
A	≤10.0	LOS A describes operations with low control delay, up to 10 s/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	>10 to 20	LOS B describes operations with control delay greater than 10 and up to 20 s/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	> 20 to 35	LOS C describes operations with control delay greater than 20 and up to 35 s/veh. These higher delays may result from only fair progression, longer cycle lengths or both. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	> 35 to 55	LOS D describes operations with control delay greater than 35 and up to 55 s/veh. The influence of congestion becomes more noticeable at this level. Longer delays may result from a combination of unfavorable progression, long cycle lengths, and/or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 to 80	LOS E describes operations with control delay greater than 55 and up to 80 s/veh. These higher delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	LOS F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Sources: Highway Capacity Manual, Transportation Research Board;
National Research Council, Washington D.C., 2000;
New York City Department of Transportation;
New York State Department of Transportation.

Note: Control delay is measured in terms of seconds per vehicle.

4.6 Existing Traffic LOS

Intersections with significant activity and volumes were identified and analyzed for roadway capacity using Synchro which follows the 2000 Highway Capacity Manual (HCM) methodology. Balanced traffic network for the weekday AM, midday, PM and Saturday midday peak hour were developed and volume-to-capacity (v/c) ratios, vehicular delay, and level-of-service (LOS) were determined. Table 4.6.1 shows the 2004 Existing Conditions, v/c ratios, delays, and level of service (LOS) for AM, midday, PM, and Saturday midday peak hours for the twelve intersections analyzed along the study corridor.

The analysis shows that most intersections operated at an acceptable level of service (LOS) C or better during the AM, midday, PM and Saturday midday peak hours. However, some intersections experienced LOS D, E, and F for some or all lane groups during some peak hours. Figures 4.6.1 to 4.6.4 show the overall LOS for all analyzed intersections in the study area.

The intersections with approaches or lane groups with mid LOS D (equal to 45 sec/veh) or worse are listed below and shown in Figures 4.6.5 to 4.6.8.

- Amboy Road & Guyon Avenue (AM, MD, PM, and Saturday);
- Amboy Road & Clarke Avenue (AM, MD, PM, and Saturday);
- Amboy Road & Montreal Avenue (AM and PM);
- Amboy Road & Justin Avenue (MD and PM);
- Amboy Road & Timber Ridge Drive (AM, MD, PM, and Saturday);
- Amboy Road & Evergreen Shopping Plaza (AM, MD, PM, and Saturday);
- Amboy Road & Nelson Avenue (MD, PM, and Saturday);
- Amboy Road & Lindenwood Road (AM and MD);
- Old Amboy Road & Armstrong Avenue (AM);
- Amboy Road & Waldbaum's Driveway (PM and Saturday);
- Amboy Road & Eckerd Driveway (MD, PM, and Saturday);
- Amboy Road & Richmond Avenue (AM, MD, PM, and Saturday); and
- Amboy Road & Arden Avenue (AM, MD, and Saturday).

Table 4.6.1
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2007 Existing Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Guyon Avenue														
Amboy Road	EB	T	0.91	115.5	F	0.52	12.0	B	0.62	17.2	B	0.63	17.0	B
		R	0.61	3.0	A	0.40	2.1	A	0.54	1.2	A	0.37	2.1	A
	WB	L	1.09	161.3	F	0.32	12.7	B	0.52	24.4	C	0.45	23.2	C
		T	0.42	12.9	B	0.51	12.3	B	0.75	22.5	C	0.58	15.7	B
Guyon Avenue	NB	LR	0.77	38.6	D	0.59	31.2	C	0.80	39.5	D	0.53	26.3	C
	Overall			56.9	E		13.4	B		20.3	C		15.8	B
Amboy Road @ Clarke Avenue														
Amboy Road	EB	L	0.07	10.4	B	0.30	5.3	A	0.65	15.4	B	0.26	6.5	A
		T	1.03	133.2	F	0.66	6.6	A	0.76	11.2	B	0.69	10.2	B
		R	0.09	10.2	B	0.03	3.4	A	0.03	3.8	A	0.04	5.2	A
	WB	LT	1.03	67.6	E	0.56	12.3	B	1.05	112.9	F	0.61	13.4	B
		R	0.64	17.9	B	0.52	11.7	B	0.94	48.5	D	0.51	11.7	B
Savoy Street	NB	LTR	0.07	19.5	B	0.08	19.6	B	0.17	20.6	C	0.10	19.9	B
Clarke Avenue	SB	L	1.15	207	F	0.98	69.1	E	1.32	184.5	F	1.05	87.7	F
		TR	0.54	27.2	C	0.15	20.6	C	0.18	21.3	C	0.15	20.7	C
	Overall			101.7	F		20.8	C		84.7	F		26.2	C
Amboy Road @ Montreal Avenue														
Amboy Road	EB	LTR	1.05	206.2	F	0.80	10.1	B	1.05	64.3	E	0.92	20.7	C
	WB	LTR	0.50	16.8	B	0.54	14.0	B	1.05	78.1	E	0.68	18.6	B
Motreal Avenue	NB	LTR	1.04	90.0	F	0.15	28.6	C	0.35	31.5	C	0.42	32.9	C
	SB	LTR	0.69	47.7	D	0.38	32.1	C	0.35	31.5	C	0.46	34.2	C
	Overall			116.7	F		14.6	B		66.1	E		22.3	C

Table 4.6.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2007 Existing Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Riveria Plaza														
Amboy Road	EB	LT	0.71	8.6	A	0.76	11.1	B	0.73	15.5	B	0.65	7.3	A
	WB	TR	0.41	21.6	C	0.64	27.6	C	0.87	33.8	C	0.69	26.8	C
Riveria Plaza	SB	LR	0.01	18.8	B				0.02	19.0	B			
	Overall			13.4	B		18.7	B		25.4	C		17.3	B
Amboy Road @ Justin Avenue														
Amboy Road	EB	TR	0.69	34.1	C	0.57	4.5	A	0.57	26.9	C	0.62	4.4	A
	WB	LT	0.45	31.9	C	0.59	36.8	D	0.75	37.3	D	0.56	28.7	C
Justin Avenue	NB	LR	0.09	19.9	B	0.17	21.0	C	0.21	21.4	C	0.23	21.6	C
	Overall			32.6	C		21.8	C		32.1	C		17.1	B
Amboy Road @ Timber Ridge Drive														
Amboy Road	EB	LT	0.82	33.2	C	0.62	12.4	B	1.02	60.4	E	0.68	14.2	B
	WB	TR	0.42	7.6	A	0.63	27.7	C	0.86	13.5	B	0.64	28.6	C
Timber Ridge Drive	SB	LR	0.11	20.2	C	0.07	19.8	B	0.04	19.4	B	0.09	19.9	B
	Overall			23.9	C		20.5	C		34.1	C		21.5	C
Amboy Road @ Evergreen Shopping Plaza														
Amboy Road	EB	L	0.05	4.6	A	0.05	1.8	A	0.23	14.6	B	0.16	2.6	A
		T	0.44	13.4	B	0.44	2.3	A	0.52	17.9	B	0.42	3.0	A
	WB	T	0.32	1.3	A	0.46	6.6	A	0.60	2.0	A	0.40	8.1	A
		TR	0.04	0.6	A	0.17	5.1	A	0.22	1.0	A	0.33	7.9	A
Evergreen Shopping Plaza	SB	LTR	0.43	44.2	D	0.66	45.2	D	0.68	44.2	D	0.75	43.7	D
	Overall			10.3	B		9.4	A		12.7	B		12.5	B

Table 4.6.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2007 Existing Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Keegans Lane														
Amboy Road	EB	TR	0.68	15.0	B	0.56	10.0	B	0.66	10.6	B	0.71	14.7	B
	WB	L	0.11	3.6	A	0.14	16.8	B	0.14	4.7	A	0.20	19.1	B
		T	0.41	3.7	A	0.52	21.9	C	0.61	6.2	A	0.54	20.8	C
Keegans Lane	NB	LR	0.16	20.6	C	0.18	21.0	C	0.20	21.1	C	0.27	22.1	C
	Overall			11.6	B		16.1	B		9.6	A		17.9	B
Amboy Road @ Great Kills Road														
Amboy Road	EB	LTR	0.62	7.1	A	0.89	23.9	C	0.85	19.1	B	0.78	15.1	B
	WB	LTR	0.46	23.1	C	0.75	29.2	C	0.66	26.4	C	0.68	24.9	C
Great Kills Road	NB	LTR	0.21	21.5	C	0.15	20.6	C	0.21	21.3	C	0.24	21.7	C
	SB	LTR	0.67	32.3	C	0.48	26.5	C	0.56	29.0	C	0.56	29.0	C
	Overall			18.8	B		26.4	C		23.5	C		22.0	C
Amboy Road @ Giffords Lane/Brown/Cleveland Avenues														
Amboy Road	EB	LTR	0.67	7.8	A	0.60	13.9	B	0.59	8.8	A	0.61	9.0	A
	WB	LTR	0.50	19.4	B	0.55	19.9	B	0.68	25.0	C	0.66	23.3	C
Giffords Lane	SB	LTR	0.55	27.5	C	0.38	23.8	C	0.38	24.0	C	0.52	26.5	C
	Overall			16.0	B		17.9	B		18.7	B		18.7	B
Amboy Road @ Nelson Avenue														
Amboy Road	EB	LTR	0.66	10.8	B	0.52	7.8	A	0.57	7.1	A	0.66	11.3	B
	WB	LTR	0.52	5.8	A	0.61	5.5	A	0.73	8.6	A	0.75	9.7	A
Nelson Avenue	NB	LTR	0.72	35.1	D	0.66	32.0	C	0.88	495.0	F	0.98	68.9	E
	SB	LTR	0.37	23.6	C	0.40	24.4	C	0.38	23.8	C	0.50	26.0	C
	Overall			16.2	B		14.0	B		19.0	B		24.7	C

Table 4.6.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2007 Existing Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Lindenwood Road														
Amboy Road	EB	LTR	0.54	14.4	B	0.44	13.3	B	0.51	10.8	B	0.66	13.5	B
	WB	LTR	0.50	16.3	B	0.66	20.6	C	0.65	20.4	C	0.58	17.4	B
Lindenwood Road	NB	LTR	0.70	33.0	C	0.14	20.4	C	0.18	20.9	C	0.47	25.5	C
	SB	LTR	0.13	20.3	C	0.14	20.6	C	0.19	21.0	C	0.29	22.4	C
	Overall			19.8	B		18.0	B		17.0	B		17.7	B
Amboy Road @ Armstrong Avenue														
Amboy Road	EB	L	0.20	5.1	A	0.42	7.2	A	0.53	9.2	A	1.06	86.9	F
		TR	0.46	4.9	A	0.46	5.0	A	0.50	4.4	A	0.56	4.6	A
	WB	L	0.14	8.4	A	0.21	4.9	A	0.11	4.5	A	0.31	13.9	B
		TR	0.32	9.3	A	0.39	4.9	A	0.46	5.8	A	0.62	15.7	B
Armstrong Avenue	NB	LTR	0.32	22.2	C	0.37	24.0	C	0.31	22.7	C	0.44	25.6	C
	SB	LTR	0.59	27.4	C	0.38	24.5	C	0.46	27.2	C	0.62	46.6	D
	Overall			15.0	B		12.1	B		12.5	B		26.4	C
Amboy Road @ Old Amboy Road														
Amboy Road	EB	T	0.46	8.9	A	0.51	7.9	A	0.56	12.6	B	0.72	11.7	B
	WB	T	0.33	6.5	A	0.39	9.3	A	0.51	7.1	A	0.49	8.1	A
Old Amboy Road	NB	LTR	0.10	20.1	C	0.13	20.4	C	0.11	20.1	C	0.22	21.6	C
	SB	L	0.01	19.0	B	0.02	19.0	B						
		R	0.39	24.3	C	0.25	22.1	C	0.40	21.9	C	0.44	25.0	C
	Overall			11.2	B		10.7	B		11.9	B		12.8	B
Amboy Road @ Waldbaum's Driveway														
Amboy Road	EB	L	0.02	1.7	A	0.02	2.3	A	0.03	2.8	A	0.08	3.6	A
		T	0.48	2.9	A	0.48	2.3	A	0.43	2.4	A	0.44	3.2	A
	WB	TR	0.28	4.8	A	0.35	4.9	A	0.39	4.6	A	0.43	5.5	A
Waldbaum's Driveway	SB	LR	0.08	31.6	C	0.05	31.2	C	0.32	37.6	D	0.42	44.5	D
	Overall			4.4	A		3.9	A		6.4	A		8.4	A

Table 4.6.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2007 Existing Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Eltingville Shopping Center's Driveway														
Amboy Road	EB	TR	0.40	2.6	A	0.40	3.0	A	0.36	2.7	A	0.37	5.1	A
	WB	L	0.03	2.2	A	0.06	2.5	A	0.07	4.0	A	0.15	5.2	A
		T	0.33	1.8	A	0.40	1.8	A	0.47	3.8	A	0.53	5.8	A
Eltingville Shopping Center's Driveway	NB	LR	0.07	31.9	C	0.27	34.6	C	0.43	38.4	D	0.43	40.4	D
	Overall			3.0	A		4.7	A		6.9	A		9.0	A
Amboy Road @ Richmond Avenue														
Amboy Road	EB	L	0.55	36.5	D	0.60	46.3	D	0.82	60.8	E	0.56	47.4	D
		T	0.90	49.5	D	0.84	48.0	D	0.68	33.4	C	0.84	47.8	D
		R	0.13	24.8	C	0.15	27.0	C	0.22	24.3	C	0.21	29.0	C
	WB	L	0.34	46.8	D	0.70	69.8	E	0.39	36.6	D	1.29	193.2	F
		T	0.52	40.0	D	0.65	39.8	D	0.68	38.1	D	0.83	51.0	D
		R	0.26	16.4	B	0.42	19.3	B	0.43	13.9	B	0.15	16.5	B
Richmond Avenue	NB	L	0.10	18.0	B	0.11	16.2	B	0.21	21.8	C	0.26	19.2	B
		TR	0.73	30.3	C	0.64	24.8	C	0.87	43.6	D	1.05	74.7	E
	SB	L	0.48	14.8	B	0.53	13.9	B	0.80	33.5	C	0.33	11.5	B
		TR	0.51	14.7	B	0.38	11.0	B	0.50	15.4	B	0.53	13.1	B
	Overall			30.7	C		29.5	C		31.4	C		58.0	E
Amboy Road @ Arden Avenue														
Amboy Road	EB	L	0.17	16.2	B	0.12	15.3	B	0.14	15.7	B	0.11	15.1	B
		TR	0.67	23.9	C	0.41	18.2	B	0.40	18.0	B	0.45	18.7	B
	WB	LT	0.42	23.8	C	0.34	25.1	C	0.42	25.3	C	0.41	24.7	C
Arden Avenue	NB	L	0.53	27.4	C	0.80	52.0	D	0.36	21.1	C	0.44	25.4	C
		TR	0.52	20.4	C	0.49	19.8	B	0.45	19.0	B	0.48	19.5	B
	SB	L	0.71	35.3	D	0.67	32.4	C	0.56	25.5	C	0.88	52.9	D
		TR	0.63	23.6	C	0.83	33.9	C	0.59	21.9	C	0.77	29.5	C
	Overall			24.3	C		27.9	C		21.3	C		27.4	C

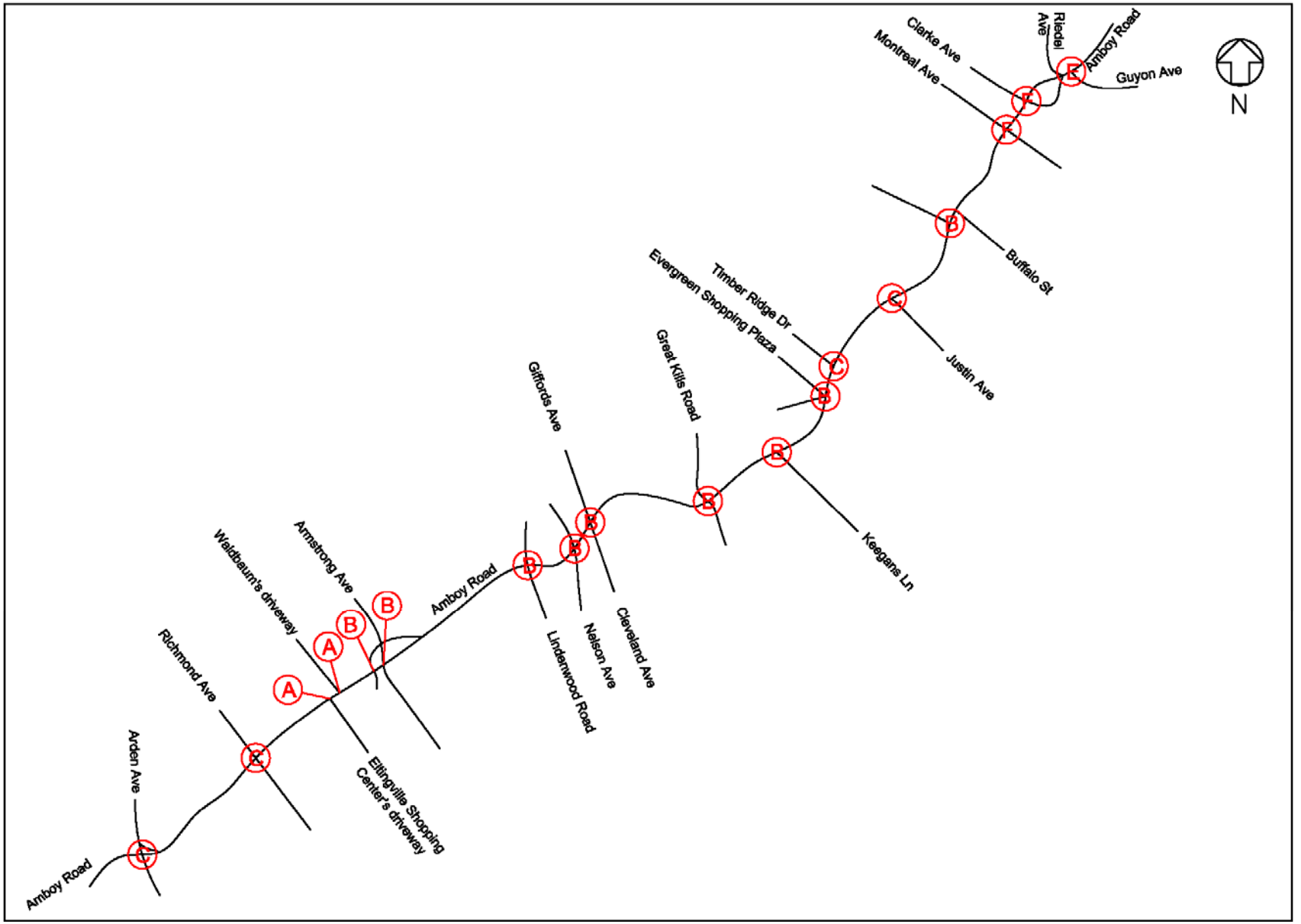


Figure 4.6.1: Existing Intersection LOS – Weekday AM Peak (7:45-8:45)

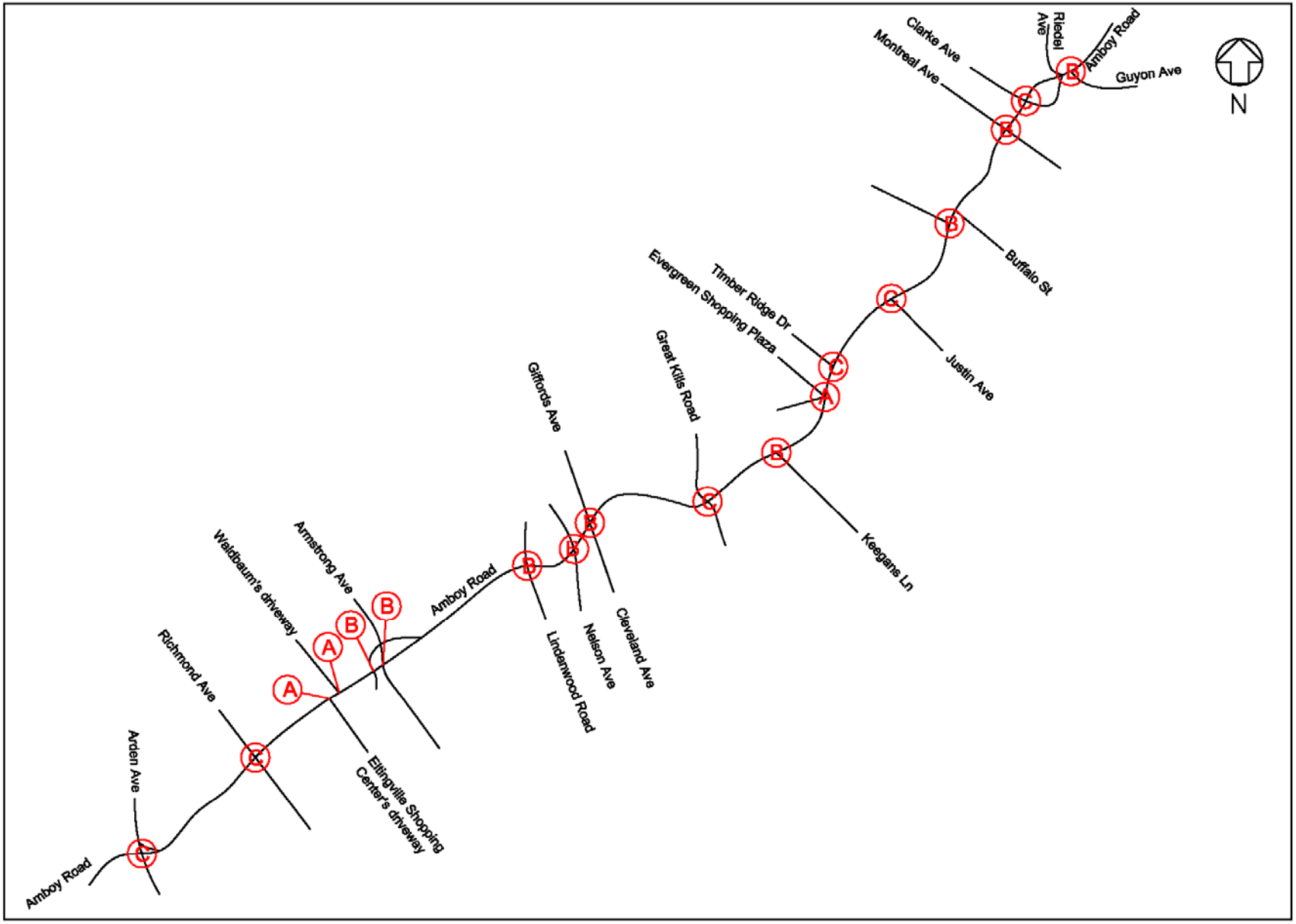


Figure 4.6.1: Existing Intersection LOS – Weekday Midday Peak (12:00-1:00 PM)

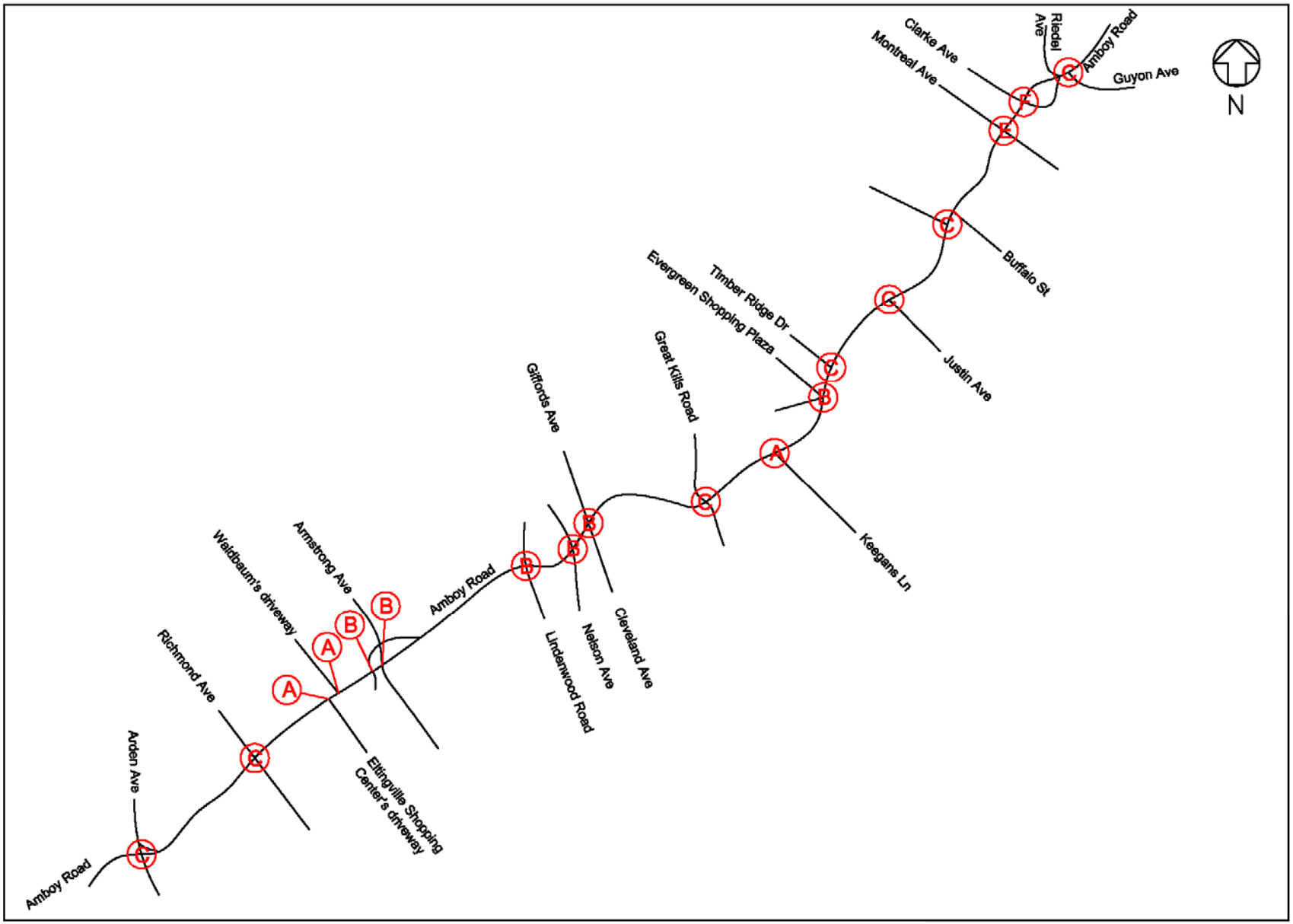


Figure 4.6.3: Existing Intersection LOS – Weekday PM Peak (5:00-6:00)

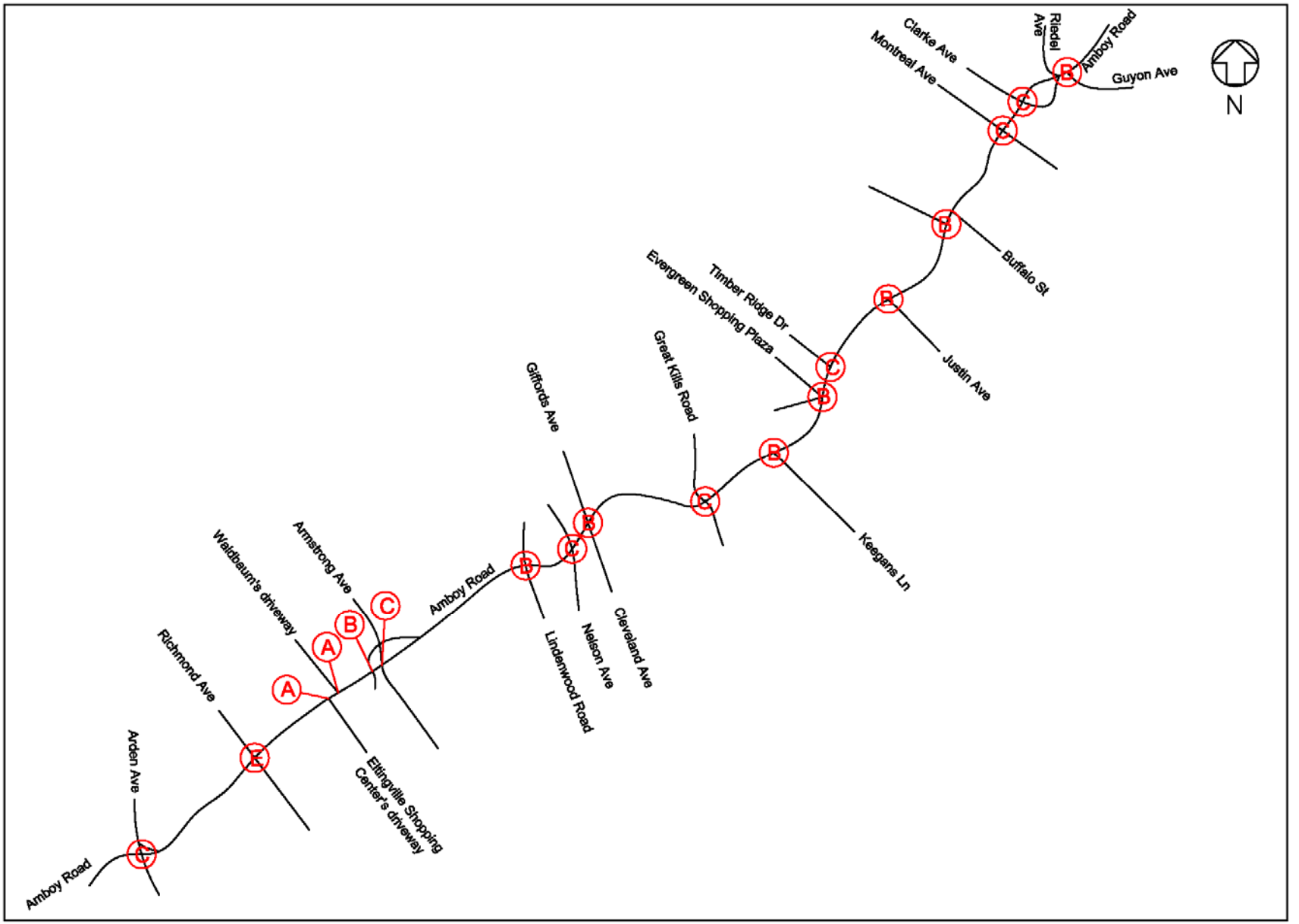


Figure 4.6.4: Existing Intersection LOS – Saturday Peak (12:30-1:30 PM)

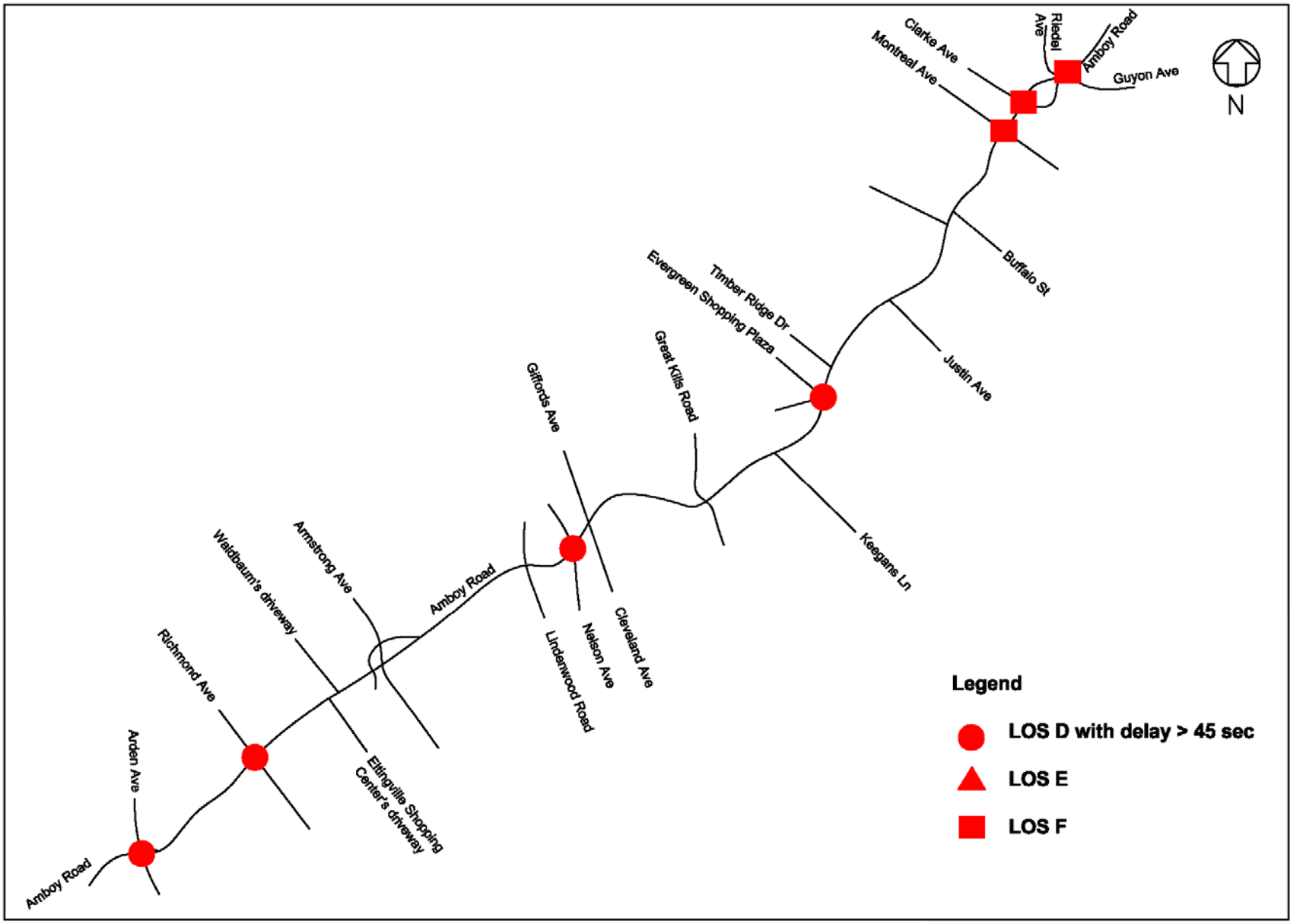


Figure 4.6.5: Existing Intersections with Mid LOS D or Worse – Weekday AM Peak (7:45-8:45)

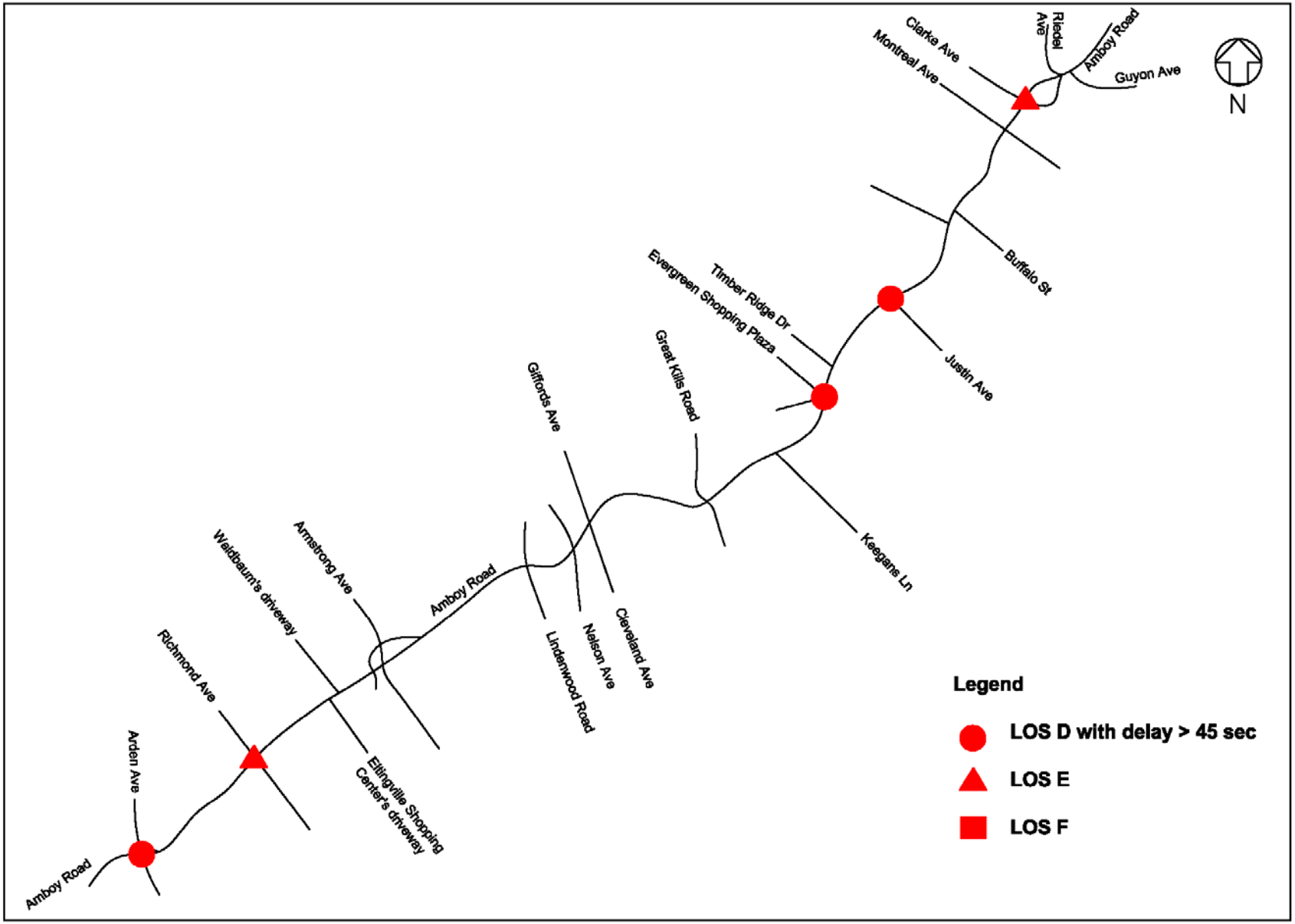


Figure 4.6.6: Existing Intersections with Mid LOS D or Worse – Weekday Midday Peak (12:00-1:00 PM)

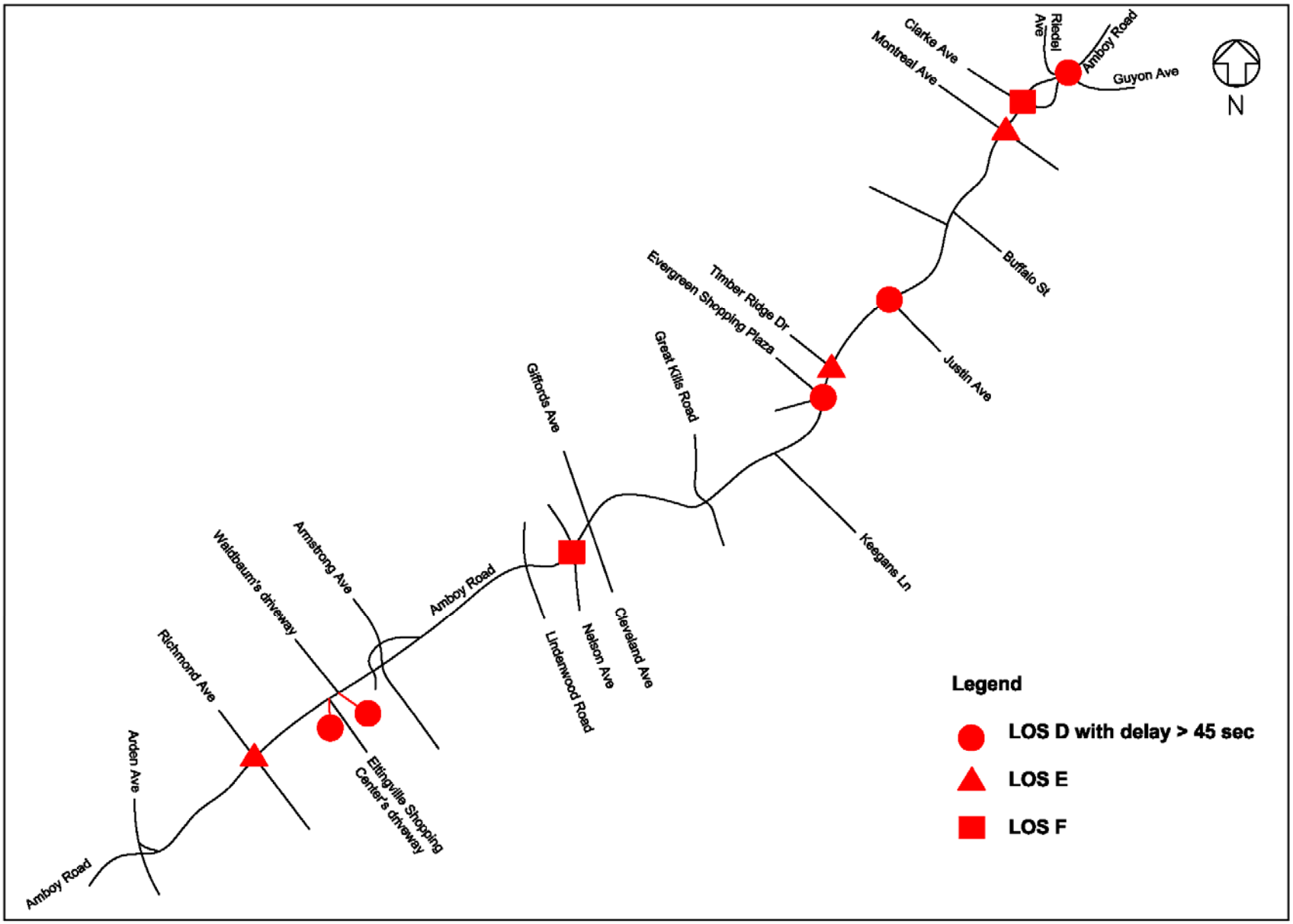


Figure 4.6.7: Existing Intersections with Mid LOS D or Worse – Weekday PM Peak (5:00-6:00)

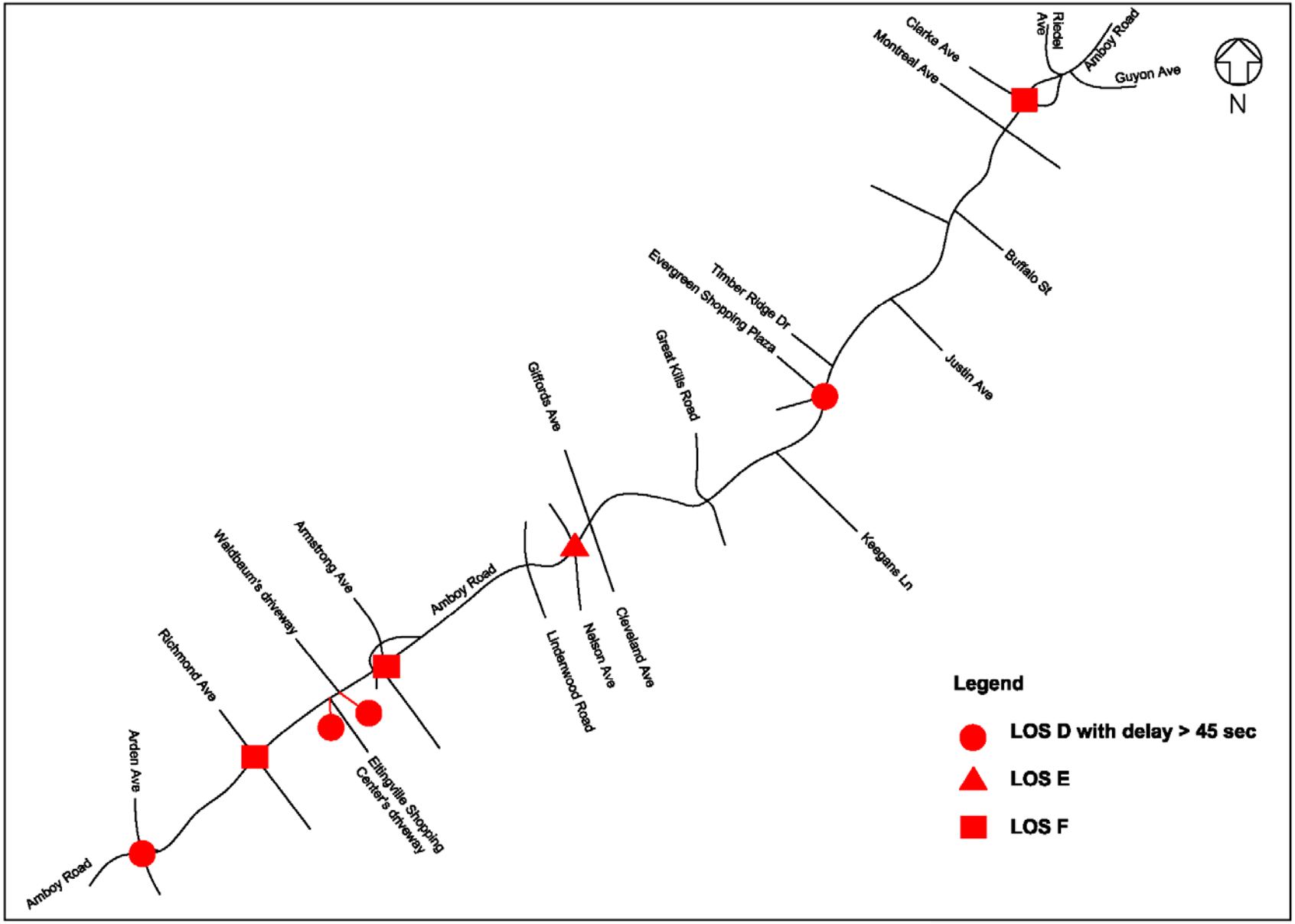


Figure 4.6.8: Existing Intersections with Mid LOS D or Worse – Saturday Peak (12:30-1:30 PM)

4.7 Existing Vehicle Speeds

Table 4.7.1 presents a summary of the travel speeds for the Amboy Road Corridor between Arden Avenue and Clarke Avenue for both eastbound and westbound direction for four peak hours. Eastbound travel speeds range from 13.1 to 14.4 mph, with the slowest conditions during the weekday AM and Saturday midday peak hours. Westbound travel speeds are generally faster the eastbound, ranging from 14.5 to 16.0 mph. The slowest conditions for westbound are during the weekday PM peak hour.

Table 4.7.1
Average Travel Speed Summary - Existing Conditions

	EASTBOUND (mph)	WESTBOUND (mph)
WEEKDAY AM	13.1	16.0
WEEKDAY MIDDAY	14.4	15.3
WEEKDAY PM	13.9	14.5
SAT MIDDAY	13.1	15.6

Table 4.7.2 presents details of the travel times and travel speeds broken down by segment for the corridor.

Table 4.7.2
Travel Times and Travel Speeds by Segment - Existing Conditions

DIRECTION: Eastbound

SEGMENT	SEGMENT DISTANCE (mile)	TRAVEL TIMES (min)				TRAVEL SPEEDS (mph)			
		WEEKDAY 7-10 AM	WEEKDAY 12-2 MIDDAY	WEEKDAY 4-7 PM	SATURDAY 11-2 MIDDAY	WEEKDAY 7-10 AM	WEEKDAY 12-2 MIDDAY	WEEKDAY 4-7 PM	SATURDAY 11-2 MIDDAY
Arden Ave to Richmond Ave	0.34	1.55	1.53	1.38	2.02	13.2	13.4	14.9	10.2
Richmond Ave to Waldbaum's Driveway	0.23	0.59	0.56	0.55	0.61	23.6	25.0	25.1	22.8
Waldbaum's Driveway to Armstrong Ave	0.12	0.51	0.35	0.59	0.77	13.7	20.1	11.9	9.1
Arden Ave to Armstrong Ave	**0.69**	**2.65**	**2.43**	**2.52**	**3.40**	**15.6**	**17.0**	**16.5**	**12.2**
Armstrong Ave to Lindenwood Rd	0.40	1.22	3.16	1.42	2.59	19.5	7.5	16.7	9.2
Lindenwood Rd to Giffords Ln / Brown Ave	0.17	0.74	0.71	1.43	1.14	13.5	14.2	7.0	8.8
Armstrong Ave to Giffords Ln	**0.56**	**1.96**	**3.87**	**2.85**	**3.73**	**17.2**	**8.7**	**11.9**	**9.1**
Giffords Ln / Brown Ave to Greaves Ave / Great Kills Rd	0.30	1.26	0.78	1.27	0.88	14.1	22.7	14.0	20.1
Greaves Ave / Great Kills Rd to Keegans Ln	0.19	1.14	0.63	0.96	0.68	10.1	18.4	12.0	17.2
Keegans Ln to Timber Ridge Dr	0.24	1.31	0.80	0.88	0.83	11.2	18.2	16.5	17.7
Timber Ridge Dr to Justin Ave	0.20	1.00	0.71	0.80	0.83	12.1	16.9	15.1	14.7
Justin Ave to Burger King Driveway	0.23	0.88	0.93	1.42	0.96	15.6	14.6	9.6	14.3
Burger King Driveway to Clarke Ave / Savoy St	0.33	2.36	1.25	1.14	1.24	8.4	15.9	17.3	15.9
Giffords Ln to Clarke Ave	**1.49**	**7.95**	**5.11**	**6.48**	**5.41**	**11.3**	**17.5**	**13.8**	**16.5**
Overall	**2.74**	**12.56**	**11.41**	**11.85**	**12.54**	**13.1**	**14.4**	**13.9**	**13.1**

DIRECTION: Westbound

SEGMENT	SEGMENT DISTANCE (mile)	TRAVEL TIMES (min)				TRAVEL SPEEDS (mph)			
		WEEKDAY 7-10 AM	WEEKDAY 12-2 MIDDAY	WEEKDAY 4-7 PM	SATURDAY 11-2 MIDDAY	WEEKDAY 7-10 AM	WEEKDAY 12-2 MIDDAY	WEEKDAY 4-7 PM	SATURDAY 11-2 MIDDAY
Clarke Ave / Savoy St to Burger King Driveway	0.33	0.91	1.24	2.19	1.27	21.6	15.9	9.0	15.6
Burger King Driveway to Justin Ave	0.23	1.08	0.67	1.10	0.71	12.7	20.6	12.4	19.3
Justin Ave to Timber Ridge Dr	0.20	0.75	0.71	0.66	0.63	16.2	17.0	18.3	19.2
Timber Ridge Dr to Keegans Ln	0.24	1.08	0.68	0.68	0.72	13.6	21.5	21.5	20.3
Keegans Ln to Greaves Ave / Great Kills Rd	0.19	0.68	0.95	0.89	0.86	17.1	12.2	13.0	13.5
Greaves Ave / Great Kills Rd to Giffords Ln / Brown Ave	0.30	0.98	0.83	1.21	1.31	18.2	21.3	14.7	13.6
Clarke Ave to Giffords Ln	**1.49**	**5.47**	**5.08**	**6.73**	**5.49**	**16.4**	**17.6**	**13.3**	**16.3**
Giffords Ln / Brown Ave to Lindenwood Rd	0.17	0.96	1.57	0.94	1.24	10.5	6.4	10.7	8.1
Lindenwood Rd to Armstrong Ave	0.40	0.95	1.50	0.91	0.88	25.0	15.8	26.1	27.0
Giffords Ln to Armstrong Ave	**0.56**	**1.90**	**3.07**	**1.85**	**2.12**	**17.7**	**11.0**	**18.3**	**15.9**
Armstrong Ave to Waldbaum's Driveway	0.12	0.58	0.43	0.48	0.39	12.0	16.3	14.5	18.1
Waldbaum's Driveway to Richmond Ave	0.23	1.14	0.95	1.19	0.96	12.2	14.7	11.7	14.4
Richmond Ave to Arden Ave	0.34	1.21	1.26	1.15	1.60	17.0	16.3	17.8	12.8
Armstrong Ave to Arden Ave	**0.69**	**2.93**	**2.64**	**2.82**	**2.95**	**14.1**	**15.7**	**14.7**	**14.0**
Overall	**2.74**	**10.31**	**10.78**	**11.40**	**10.56**	**16.0**	**15.3**	**14.5**	**15.6**

4.8 2017 Future No Build Traffic Volumes

The future 2017 no build conditions analyzed the same eighteen intersections as analyzed under the existing conditions in the study area during the AM (7:45 - 8:45), midday (11:45am - 12:45pm), PM (5:15 - 6:15), and Saturday midday (12:00 - 1:00) peak hours.

In order to estimate the potential traffic impacts of the future conditions, the existing 2007 traffic volumes were projected to 2017 no build analysis year with a background traffic growth rate of two percent per year. Figures 4.8.1 to 4.8.4 present the 2017 projected peak hour traffic volumes for the four peak hours, respectively.

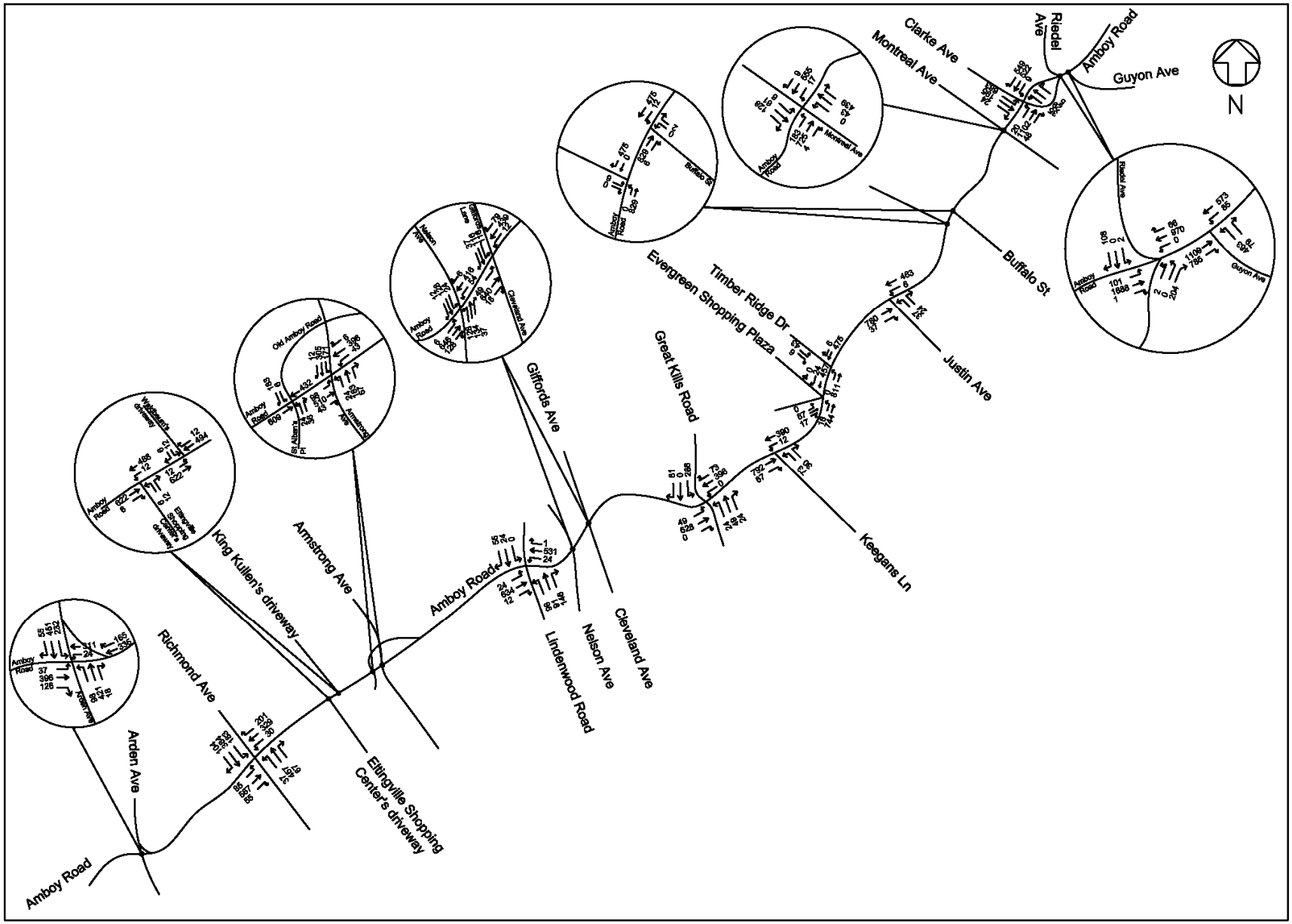


Figure 4.8.1: 2017 Future No Build Traffic Volume – Weekday AM Peak (7:45-8:45)

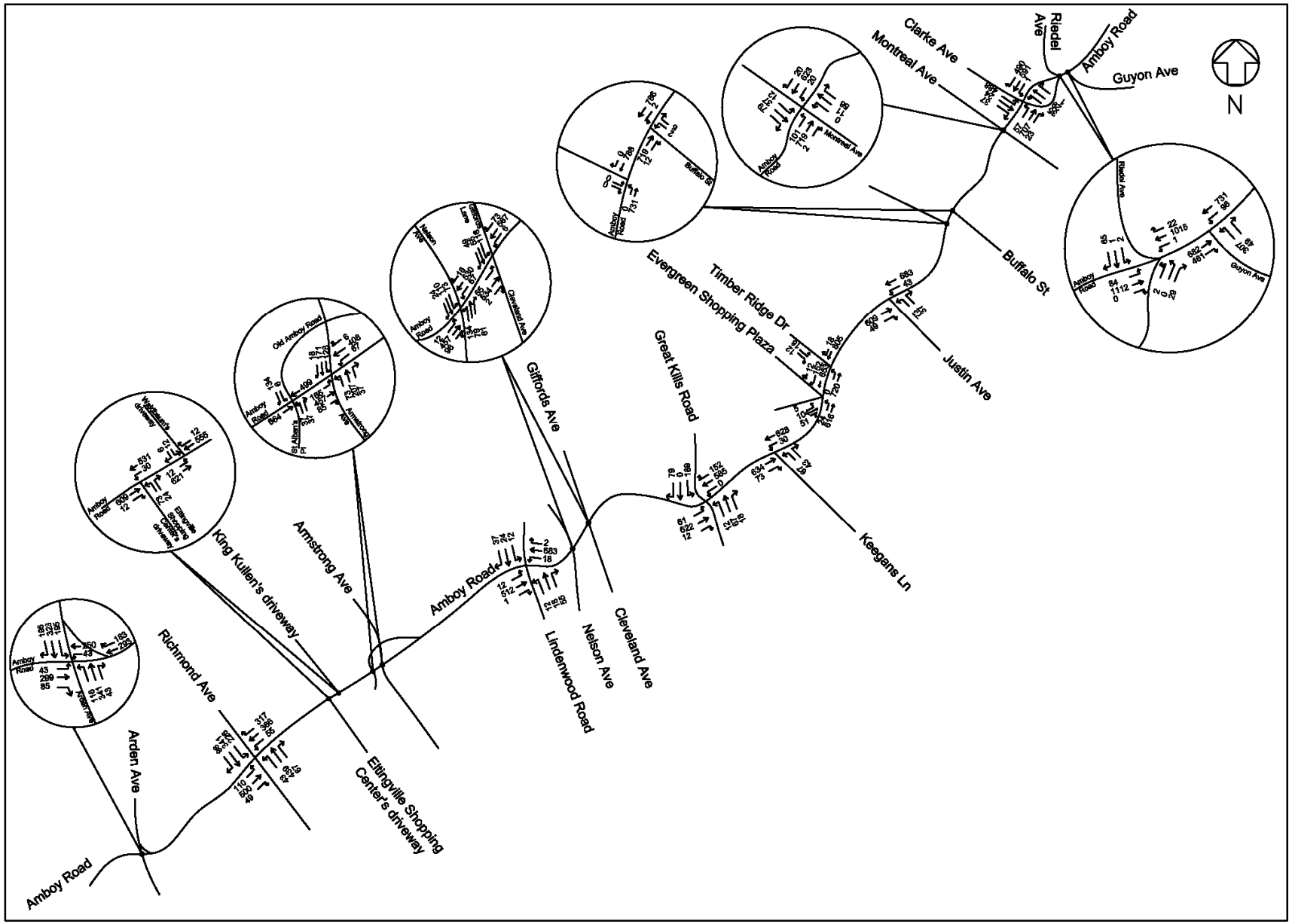


Figure 4.8.2: 2017 Future No Build Traffic Volume – Weekday Midday Peak (12:00-1:00 PM)

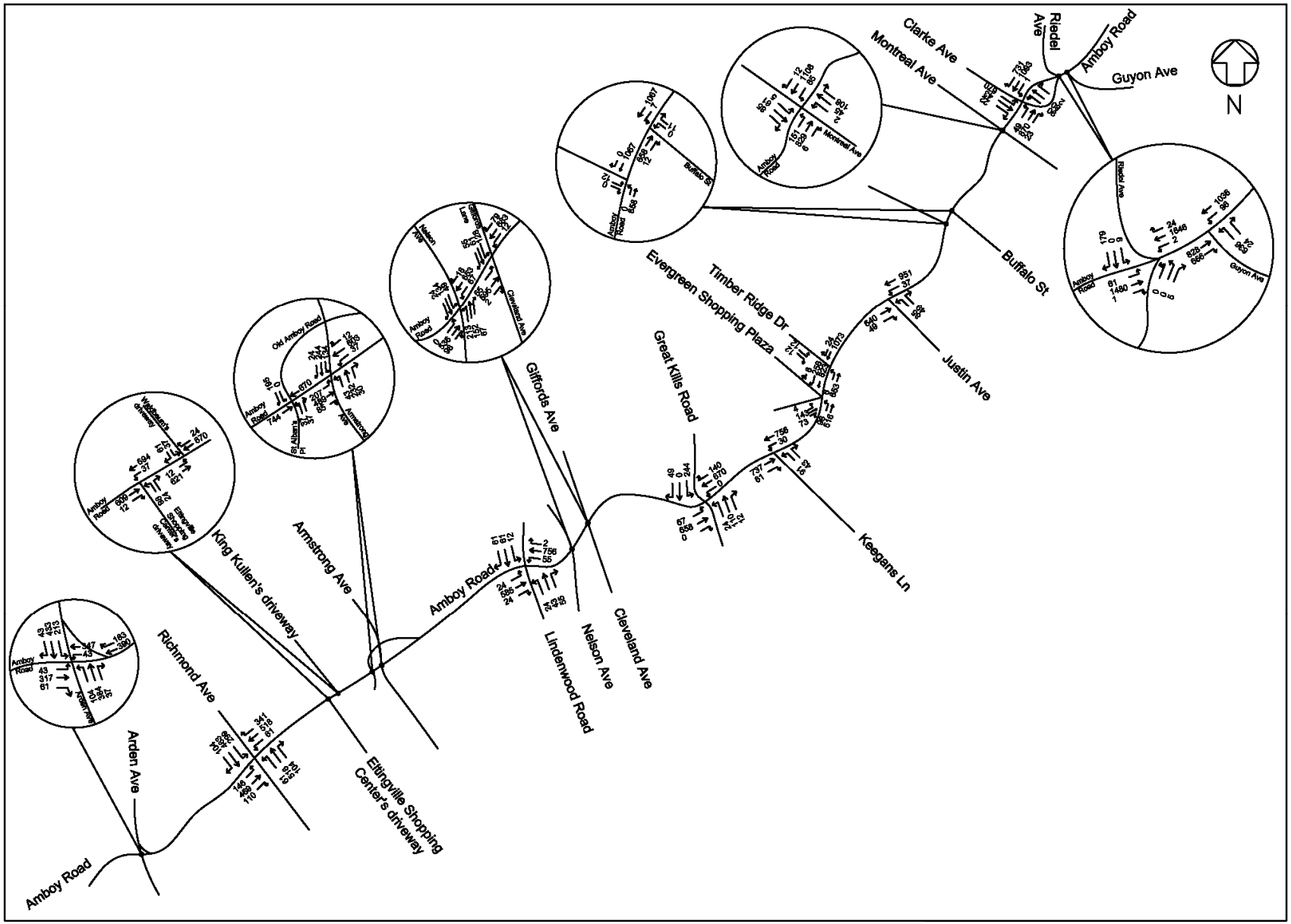


Figure 4.8.3: 2017 Future No Build Traffic Volume – Weekday PM Peak (5:00-6:00)

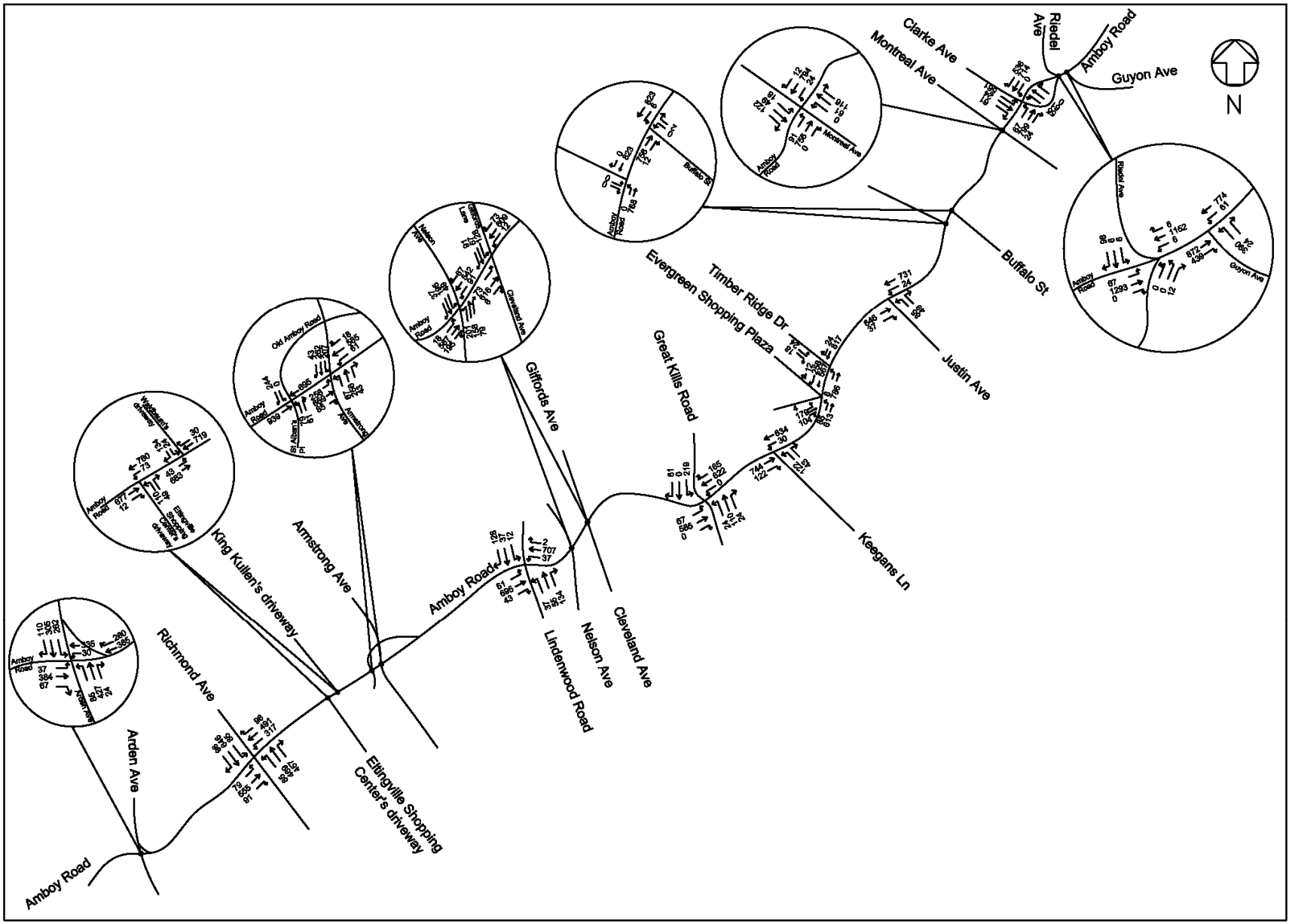


Figure 4.8.4: 2017 Future No Build Traffic Volume – Saturday Peak (12:30-1:30 PM)

4.9 2017 Future No Build Traffic LOS

All of the analyzed intersections under the 2017 no build condition operate with the same signal timings and physical configurations as under the existing conditions except two intersections approach which would allow right turn on red in the future. They are the westbound Amboy Road at southbound Buffalo Street, and westbound Amboy Road at Clarke Avenue. 2017 no build traffic were analyzed for roadway capacity using Synchro/SimTraffic with the 2000 Highway Capacity Manual (HCM) methodology. Weekday AM, Midday, PM, peak hours and Saturday Midday peak hour analysis were done; and volume-to-capacity (v/c) ratios, vehicular delay, and level-of-service (LOS) for the respective peak hours were determined. Table 4.9.1 shows the 2017 no build conditions, v/c ratios, delays, and level of service (LOS) for AM, Midday, PM, and Saturday midday peak hours for the eighteen signalized intersections analyzed in the study area.

The analysis shows that most intersections operated at level of service (LOS) D, E, and F for some or all lane groups during certain peak hours. Figures 4.9.1 to 4.9.4 show the overall LOS for all of the intersections in the study area.

The intersections with approaches or lane groups with mid LOS D (equal to 45 sec/veh) or worse are listed below and shown in Figures 4.9.5 to 4.9.8.

- Amboy Road & Guyon Avenue (AM, Midday, PM, and Saturday);
- Amboy Road & Clarke Avenue (AM, Midday, PM, and Saturday);
- Amboy Road & Montreal Avenue (AM, Midday, PM, and Saturday);
- Amboy Road & Riveria Plaza (PM);
- Amboy Road & Justin Avenue (AM, Midday, PM, and Saturday);
- Amboy Road & Timber Ridge Drive (AM and PM);
- Amboy Road & Evergreen Shopping Plaza (AM, Midday, PM, and Saturday);
- Amboy Road & Keegans Lane (Saturday);
- Amboy Road & Great Kills Road (AM, Midday, PM, and Saturday);
- Amboy Road & Nelson Avenue (AM, Midday, PM, and Saturday);
- Amboy Road & Lindenwood Road (AM);
- Amboy Road & Armstrong Avenue (Saturday);
- Amboy Road & Old Amboy Road (Saturday);
- Amboy Road & King Kullen's Driveway (PM and Saturday);
- Amboy Road & Eltingville Shopping Center Driveway (Midday, PM, and Saturday);
- Amboy Road & Richmond Avenue (AM, Midday, PM, and Saturday); and
- Amboy Road & Arden Avenue (AM, Midday, PM, and Saturday).

Table 4.9.1
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2017 No Build Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Guyon Avenue														
Amboy Road	EB	T	1.11	184.4	F	0.63	13.6	B	0.75	38.7	D	0.77	23.7	C
		R	0.75	7.2	A	0.48	2.0	A	0.63	1.0	A	0.44	1.9	A
	WB	L	1.34	244.7	F	0.55	23.3	C	1.27	206.8	F	1.25	214.4	F
		T	0.51	14.3	B	0.62	14.4	B	0.91	120.0	F	0.71	19.0	B
Guyon Avenue	NB	LR	0.94	55.1	E	0.72	35.7	D	0.98	146.8	F	0.65	29.3	C
	Overall			88.8	F		15.7	B		83.7	F		25.6	C
Amboy Road @ Clarke Avenue														
Amboy Road	EB	L	0.11	10.4	B	0.50	7.3	A	0.80	23.1	C	0.48	7.0	A
		T	1.26	269.8	F	0.81	11.3	B	0.92	50.2	D	0.84	37.6	D
		R	0.11	10.2	B	0.04	3.3	A	0.03	3.8	A	0.05	5.0	A
	WB	LT	1.41	219.5	F	0.69	15.0	B	1.44	286.9	F	0.74	18.2	B
		R	0.78	23.6	C	0.63	14.0	B	1.15	130.0	F	0.62	14.9	B
Savoy Street	NB	LTR	0.09	19.8	B	0.10	19.8	B	0.22	21.5	C	0.13	20.1	C
Clarke Avenue	SB	L	1.40	360.3	F	1.21	143.7	F	1.61	336.3	F	1.28	172.1	F
		TR	0.66	30.6	C	0.18	21.0	C	0.22	696.3	F	0.18	21.1	C
	Overall			201.6	F		36.3	D		210.8	F		51.1	D
Amboy Road @ Montreal Avenue														
Amboy Road	EB	LTR	1.42	497.8	F	1.04	53.3	D	1.28	152.3	F	1.24	155.3	F
	WB	LTR	0.61	20.3	C	0.67	16.7	B	1.28	209.3	F	0.84	24.4	C
Motreal Avenue	NB	LTR	1.27	169.6	F	0.18	29.0	C	0.42	32.8	C	0.51	35.0	D
	SB	LTR	1.08	124.0	F	0.46	33.8	C	0.43	32.9	C	0.57	37.2	D
	Overall			267.1	F		37.1	D		162.2	F		83.7	F

Table 4.9.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2017 No Build Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Riveria Plaza														
Amboy Road	EB	LT	0.87	13.8	B	0.92	23.4	C	0.89	23.7	C	0.79	11.2	B
	WB	TR	0.50	23.3	C	0.79	32.7	C	1.06	65.5	E	0.84	33.2	C
Riveria Plaza	SB	LR	0.01	19.0	B				0.02	19.1	B			
	Overall			17.3	B		27.7	C		46.3	D		22.5	C
Amboy Road @ Justin Avenue														
Amboy Road	EB	TR	0.85	36.6	D	0.69	6.1	A	0.70	28.6	C	0.75	6.5	A
	WB	LT	0.58	35.2	D	0.85	44.8	D	1.08	75.5	E	0.76	38.4	D
Justin Avenue	NB	LR	0.11	20.1	C	0.21	21.5	C	0.25	22.0	C	0.28	22.3	C
	Overall			35.3	D		26.4	C		53.8	D		22.6	C
Amboy Road @ Timber Ridge Drive														
Amboy Road	EB	LT	0.99	53.3	D	0.76	16.0	B	1.60	299.5	F	0.87	22.1	C
	WB	TR	0.51	7.0	A	0.77	31.2	C	1.02	42.9	D	0.78	32.2	C
Timber Ridge Drive	SB	LR	0.14	20.5	C	0.09	20.0	C	0.05	19.5	B	0.10	20.1	C
	Overall			36.0	D		24.0	C		154.8	F		27.0	C
Amboy Road @ Evergreen Shopping Plaza														
Amboy Road	EB	L	0.07	4.6	A	0.08	2.2	A	0.48	25.6	C	0.24	3.5	A
		T	0.55	16.3	B	0.55	3.6	A	0.66	22.6	C	0.54	4.3	A
	WB	T	0.40	1.9	A	0.58	6.1	A	0.76	5.1	A	0.51	7.6	A
		TR	0.05	1.1	A	0.22	4.4	A	0.28	1.9	A	0.42	7.4	A
Evergreen Shopping Plaza	SB	LTR	0.48	44.4	D	0.70	44.7	D	0.72	46.0	D	0.80	43.6	D
	Overall			12.0	B		9.5	A		16.3	B		12.8	B

Table 4.9.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2017 No Build Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Keegans Lane														
Amboy Road	EB	TR	0.83	18.2	B	0.68	10.5	B	0.80	11.8	B	0.86	16.1	B
	WB	L	0.29	11.2	B	0.25	19.7	B	0.36	12.1	B	0.54	48.1	D
		T	0.51	4.7	A	0.64	24.2	C	0.74	8.3	A	0.66	24.3	C
Keegans Lane	NB	LR	0.19	21.0	C	0.23	21.5	C	0.24	21.7	C	0.33	23.0	C
	Overall			13.9	B		17.5	B		11.2	B		20.6	C
Amboy Road @ Great Kills Road														
Amboy Road	EB	LTR	0.86	15.3	B	1.92	437.9	F	1.53	262.1	F	1.54	266.1	F
	WB	LTR	0.57	24.9	C	0.91	41.5	D	0.81	31.7	C	0.83	32.4	C
Great Kills Road	NB	LTR	0.26	22.2	C	0.18	21.0	C	0.26	22.0	C	0.30	22.6	C
	SB	LTR	0.85	45.0	D	0.61	30.1	C	0.72	36.6	D	0.72	36.5	D
	Overall			25.4	C		183.9	F		122.8	F		110.5	F
Amboy Road @ Giffords Lane/Brown/Cleveland Avenues														
Amboy Road	EB	LTR	0.82	12.9	B	0.74	17.5	B	0.75	12.0	B	0.82	15.8	B
	WB	LTR	0.62	21.9	C	0.68	21.5	C	0.83	30.3	C	0.80	27.9	C
Giffords Lane	SB	LTR	0.68	31.4	C	0.46	25.4	C	0.47	27.7	C	0.63	29.9	C
	Overall			20.0	C		20.4	C		23.0	C		23.8	C
Amboy Road @ Nelson Avenue														
Amboy Road	EB	LTR	0.81	15.1	B	0.63	9.2	A	0.70	9.2	A	0.81	16.2	B
	WB	LTR	0.67	8.0	A	0.78	10.6	B	1.19	110.3	F	1.01	40.3	D
Nelson Avenue	NB	LTR	0.97	66.0	E	0.84	44.2	D	1.15	118.6	F	1.30	182.6	F
	SB	LTR	0.46	25.2	C	0.50	26.7	C	0.47	25.7	C	0.62	29.1	C
	Overall			24.9	C		18.9	B		69.0	E		59.2	E

Table 4.9.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2017 No Build Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Lindenwood Road														
Amboy Road	EB	LTR	0.67	16.4	B	0.53	11.0	B	0.63	11.9	B	0.83	18.8	B
	WB	LTR	0.62	18.3	B	0.81	25.3	C	0.80	20.8	C	0.72	18.2	B
Lindenwood Road	NB	LTR	0.86	44.7	D	0.17	20.8	C	0.21	21.4	C	0.58	28.0	C
	SB	LTR	0.15	20.6	C	0.17	20.9	C	0.23	21.6	C	0.36	23.4	C
	Overall			24.0	C		19.8	B		17.6	B		20.5	C
Amboy Road @ Armstrong Avenue														
Amboy Road	EB	L	0.28	6.1	A	0.61	12.4	B	0.85	34.5	C	2.69	790.5	F
		TR	0.56	5.7	A	0.56	6.0	A	0.61	5.7	A	0.68	8.1	A
	WB	L	0.22	9.4	A	0.33	6.5	A	0.18	5.2	A	0.59	30.2	C
		TR	0.39	9.3	A	0.47	5.2	A	0.55	6.1	A	0.75	19.3	B
Armstrong Avenue	NB	LTR	0.40	23.3	C	0.50	28.7	C	0.39	24.5	C	0.59	44.9	D
	SB	LTR	0.75	34.0	C	0.49	29.2	C	0.59	46.0	D	0.90	189.3	F
	Overall			17.2	B		14.7	B		19.1	B		118.2	F
Amboy Road @ Old Amboy Road														
Amboy Road	EB	T	0.56	10.2	B	0.63	9.2	A	0.68	15.0	B	0.88	65.7	E
	WB	T	0.40	6.1	A	0.48	9.2	A	0.62	7.4	A	0.60	11.7	B
Old Amboy Road	NB	LTR	0.12	20.3	C	0.16	20.8	C	0.13	20.4	C	0.26	23.8	C
	SB	L	0.02	19.0	B	0.03	18.8	B						
		R	0.48	26.1	C	0.30	22.9	C	0.48	22.7	C	0.53	27.3	C
	Overall			12.0	B		11.4	B		13.1	B		40.2	D
Amboy Road @ King Kullen's Driveway														
Amboy Road	EB	L	0.02	1.8	A	0.03	2.3	A	0.04	3.2	A	0.13	3.9	A
		T	0.59	3.5	A	0.59	2.7	A	0.52	2.8	A	0.54	3.7	A
	WB	TR	0.35	5.3	A	0.43	5.3	A	0.47	5.0	A	0.52	6.2	A
King Kullen's Driveway	SB	LR	0.09	31.8	C	0.06	31.3	C	0.39	40.9	D	0.52	64.4	E
	Overall			4.9	A		4.3	A		7.1	A		10.9	B

Table 4.9.1 (Cont'd)
Signalized Intersections Level of Service (LOS) Summary

Intersection	Approach	Movement	2017 No Build Conditions											
			AM Peak (7:45-8:45 am)			MD Peak (12:00-1:00 pm)			PM Peak (5:00-6:00 pm)			Saturday Peak (12:30-1:30 pm)		
			v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS	v/c Ratio	Avg Delay	LOS
Amboy Road @ Eltingville Shopping Center's Driveway														
Amboy Road	EB	TR	0.49	2.6	A	0.48	2.8	A	0.43	2.2	A	0.45	5.2	A
	WB	L	0.04	2.3	A	0.09	2.9	A	0.10	4.2	A	0.22	5.8	A
		T	0.40	1.9	A	0.48	2.1	A	0.57	4.4	A	0.65	7.2	A
Eltingville Shopping Center's Driveway	NB	LR	0.07	31.9	C	0.32	35.8	D	0.53	50.4	D	0.53	47.0	D
	Overall			2.8	A		4.8	A		8.2	A		10.4	B
Amboy Road @ Richmond Avenue														
Amboy Road	EB	L	0.82	55.9	E	1.02	115.5	F	1.47	272.6	F	1.14	153.9	F
		T	1.10	93.2	F	1.02	76.8	E	0.83	41.0	D	1.02	71.4	E
		R	0.16	24.7	C	0.18	26.7	C	0.27	24.9	C	0.26	28.7	C
	WB	L	0.49	59.8	E	1.14	183.1	F	0.80	81.3	F	1.58	305.5	F
		T	0.64	43.3	D	0.79	46.5	D	0.83	45.0	D	1.01	76.6	E
		R	0.32	16.8	B	0.51	21.6	C	0.53	15.7	B	0.18	18.0	B
Richmond Avenue	NB	L	0.16	19.1	B	0.14	16.8	B	0.33	25.3	C	0.45	26.7	C
		TR	0.89	42.4	D	0.78	30.7	C	1.06	830.3	F	1.28	163.6	F
	SB	L	0.74	30.3	C	0.79	28.7	C	1.14	120.9	F	0.40	14.2	B
		TR	0.62	17.1	B	0.46	12.1	B	0.61	17.6	B	0.65	15.5	B
	Overall			46.1	D		45.0	D		61.9	E		102.2	F
Amboy Road @ Arden Avenue														
Amboy Road	EB	L	0.23	17.6	B	0.16	16.0	B	0.20	16.7	B	0.15	15.9	B
		TR	0.82	30.6	C	0.50	19.7	B	0.49	19.5	B	0.55	20.5	C
	WB	LT	0.68	31.2	C	0.45	26.3	C	0.55	26.3	C	0.60	27.8	C
Arden Avenue	NB	L	0.88	67.0	E	1.66	353.0	F	0.61	35.0	D	0.96	103.1	F
		TR	0.64	23.3	C	0.60	22.2	C	0.55	21.0	C	0.59	21.7	C
	SB	L	1.11	117.5	F	1.03	92.5	F	0.83	47.5	D	1.35	207.9	F
		TR	0.77	29.3	C	1.01	62.5	E	0.71	25.9	C	0.95	47.5	D
	Overall			39.3	D		67.2	E		26.1	C		57.0	E

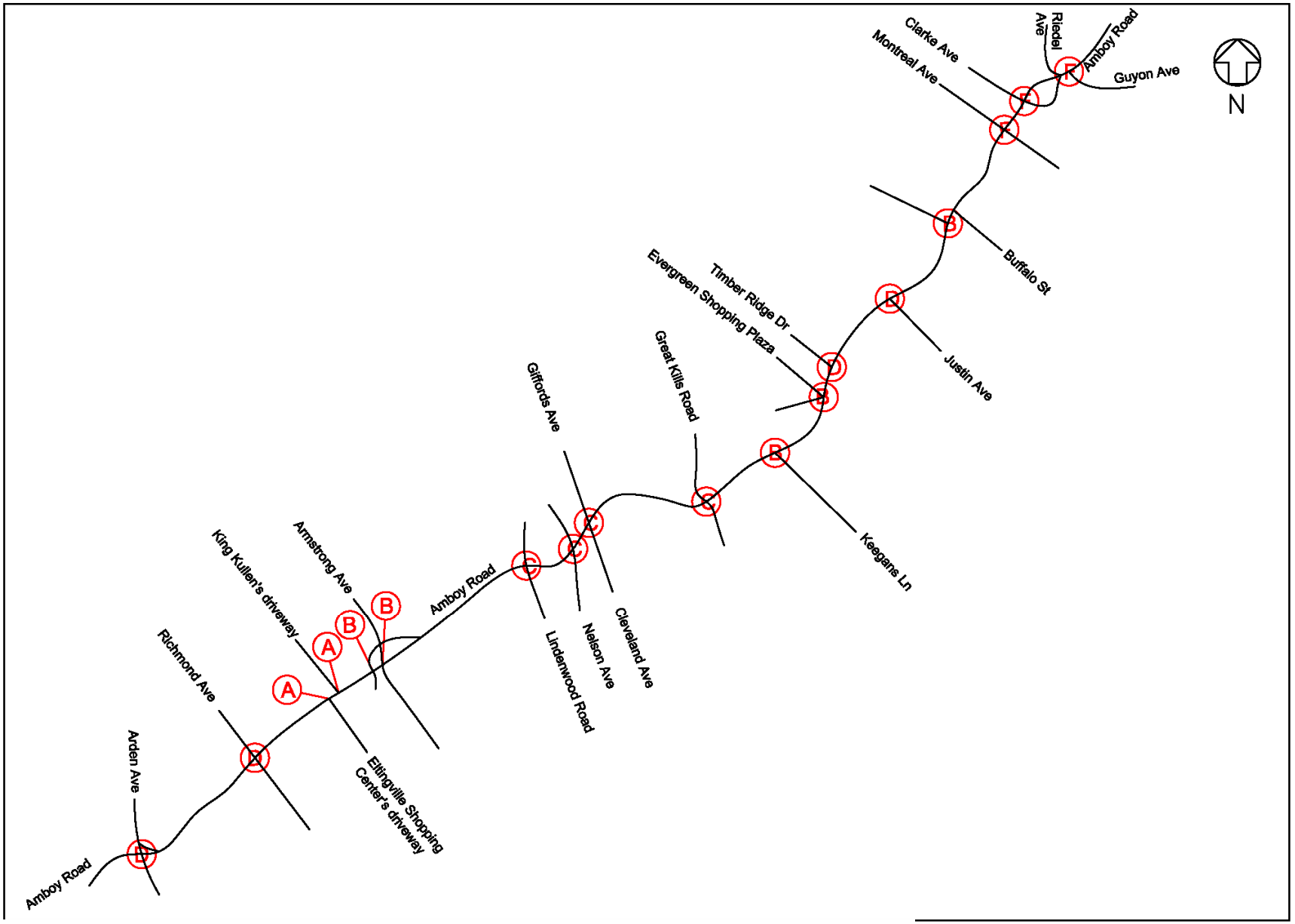


Figure 4.9.1: 2017 No Build Intersection LOS – Weekday AM Peak (7:45-8:45)

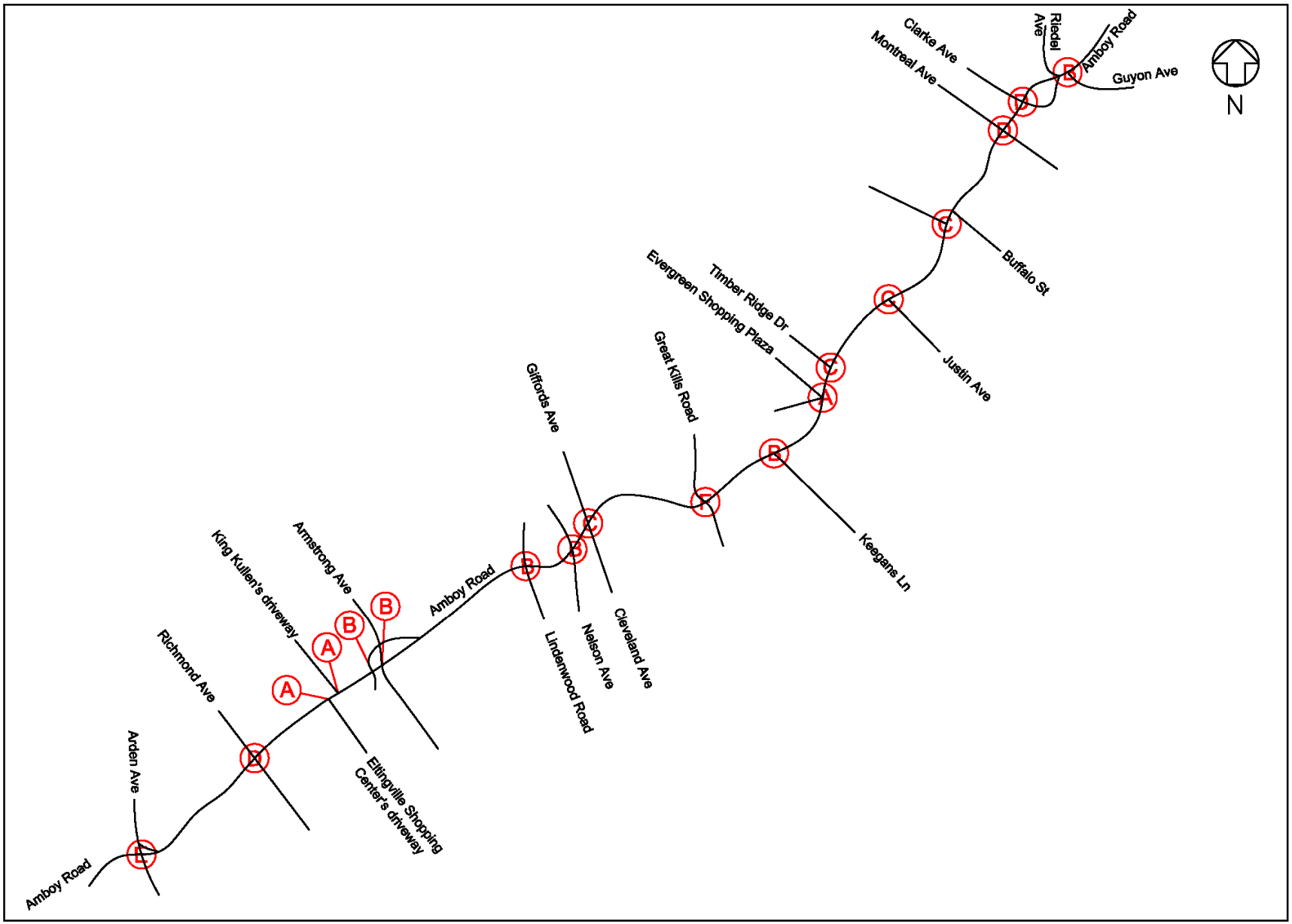


Figure 4.9.2: 2017 No Build Intersection LOS – Weekday Midday Peak (12:00-1:00 PM)

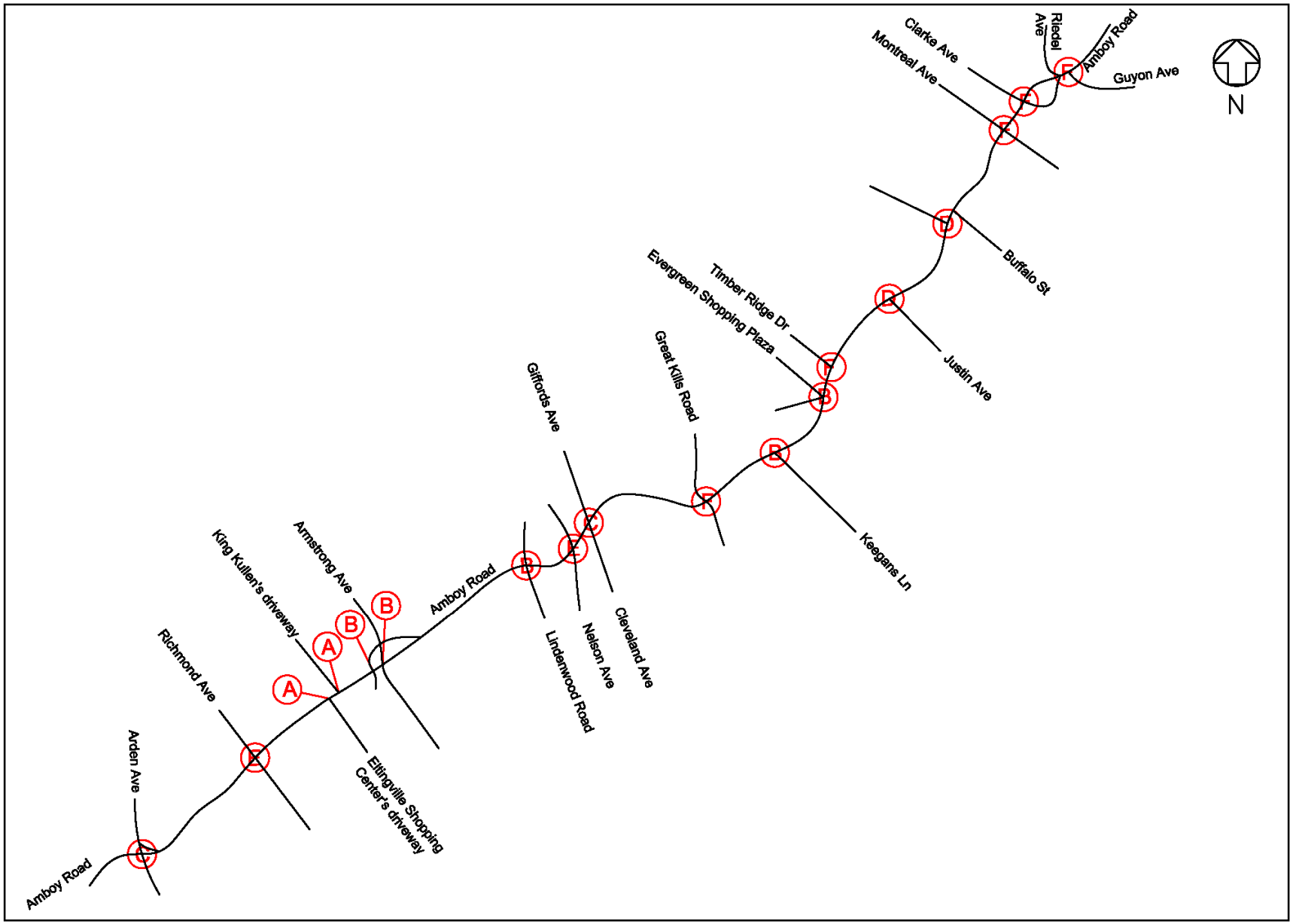


Figure 4.9.3: 2017 No Build Intersection LOS – Weekday PM Peak (5:00-6:00)

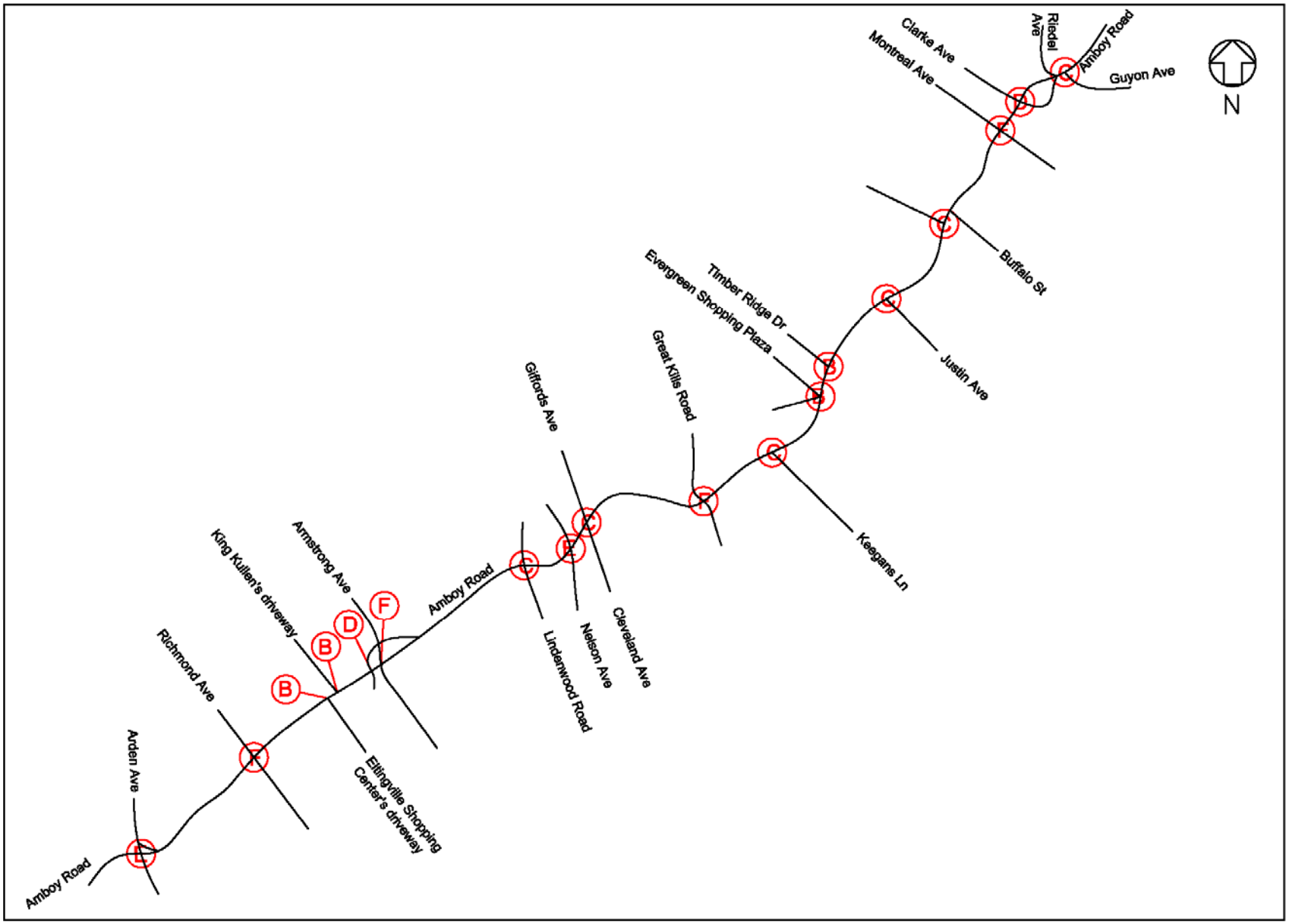


Figure 4.9.4: 2017 No Build Intersection LOS – Saturday Peak (12:30-1:30 PM)

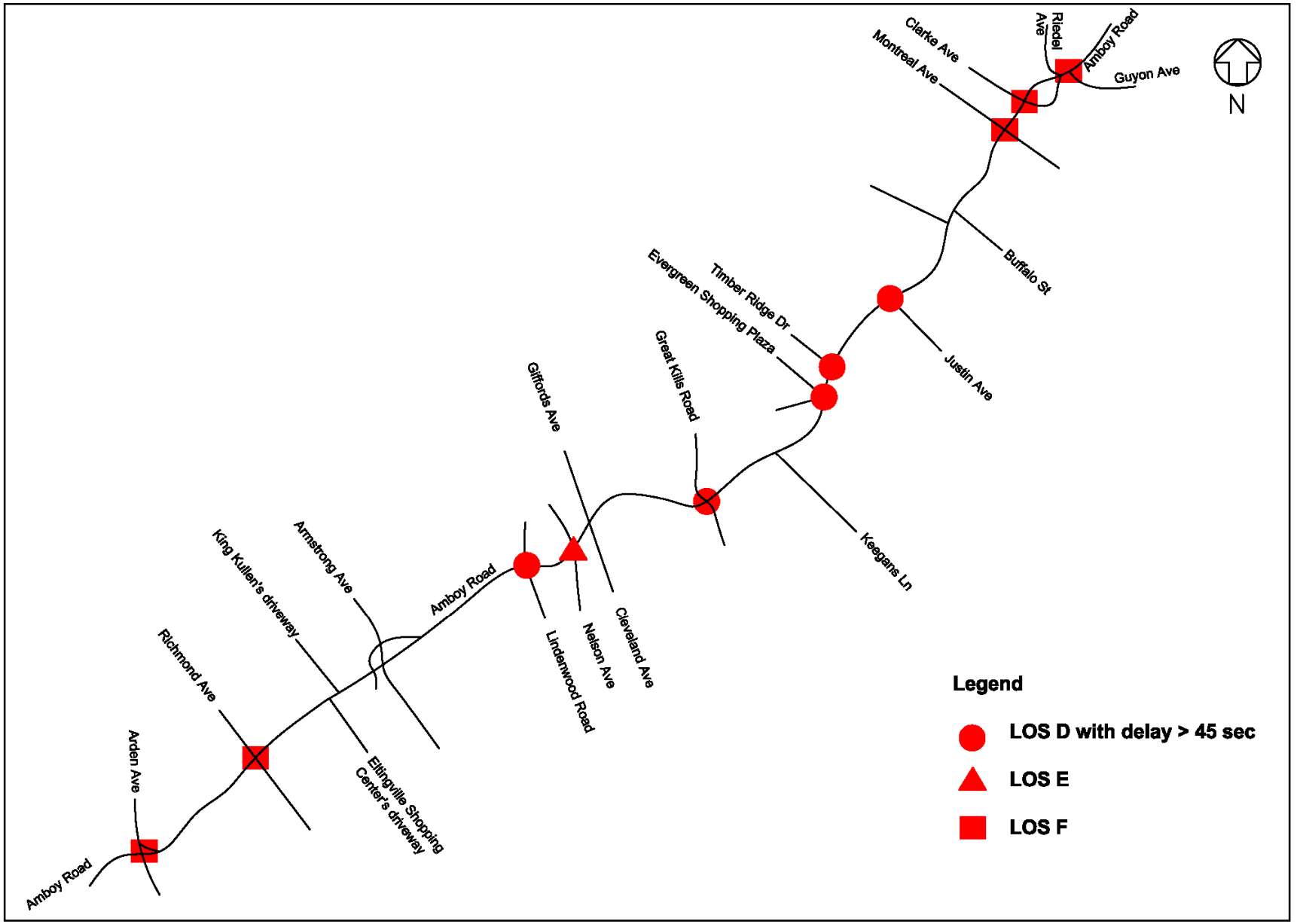


Figure 4.9.5: 2017 No Build Intersections with Mid LOS D or Worse – Weekday AM Peak (7:45-8:45)

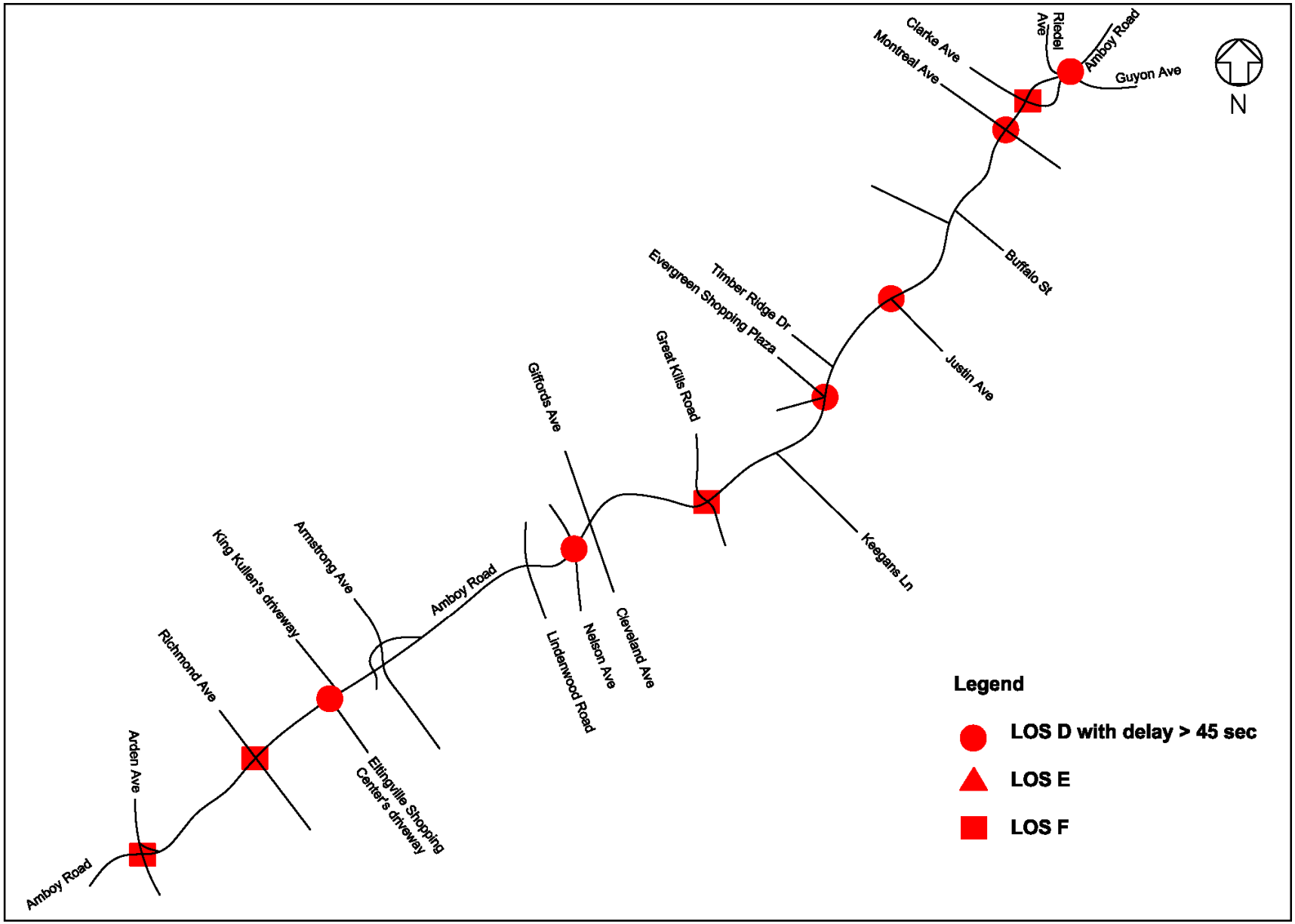


Figure 4.9.6: 2017 No Build Intersections with Mid LOS D or Worse – Weekday Midday Peak (12:00-1:00 PM)

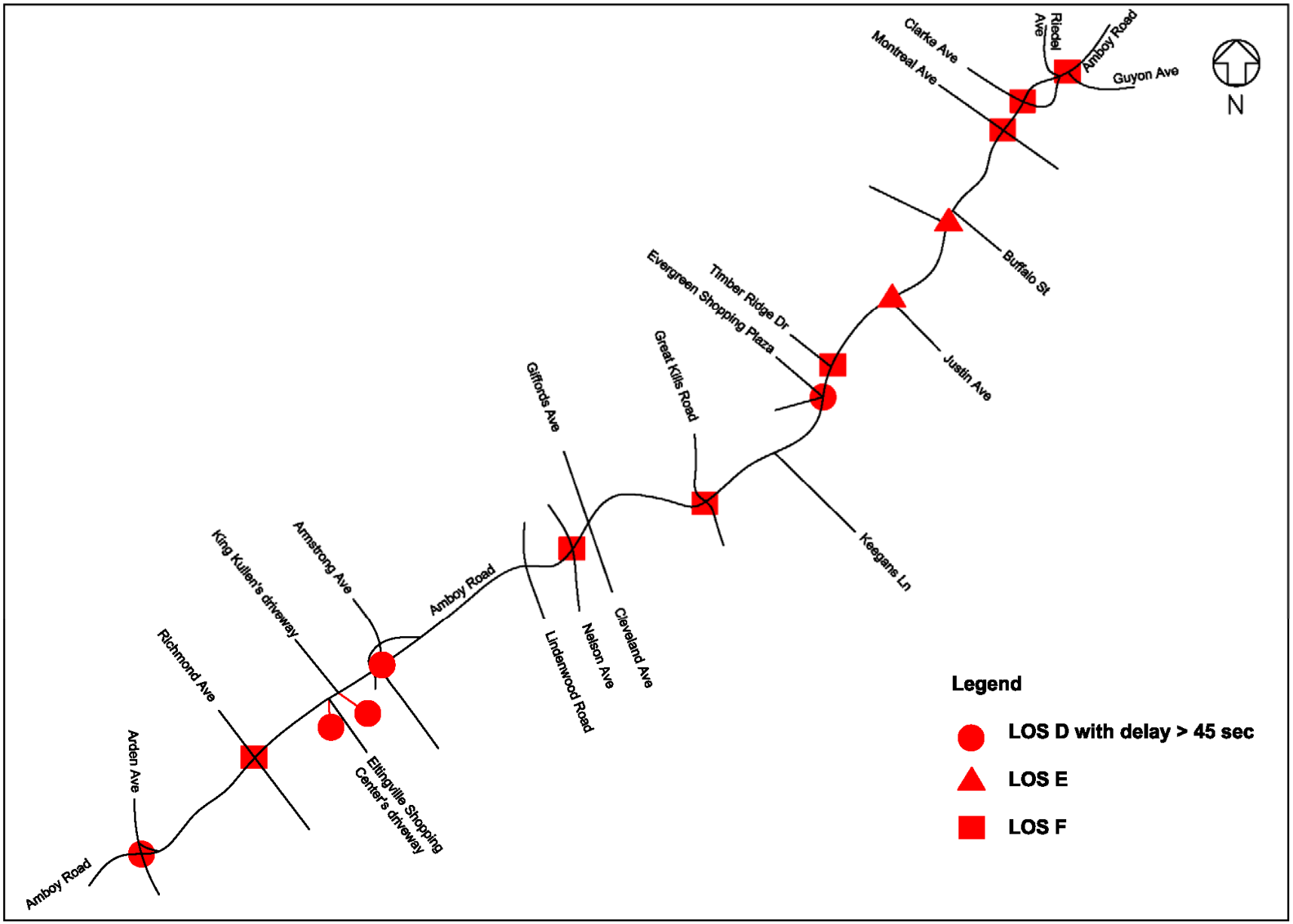


Figure 4.9.7: 2017 No Build Intersections with Mid LOS D or Worse – Weekday PM Peak (5:00-6:00)

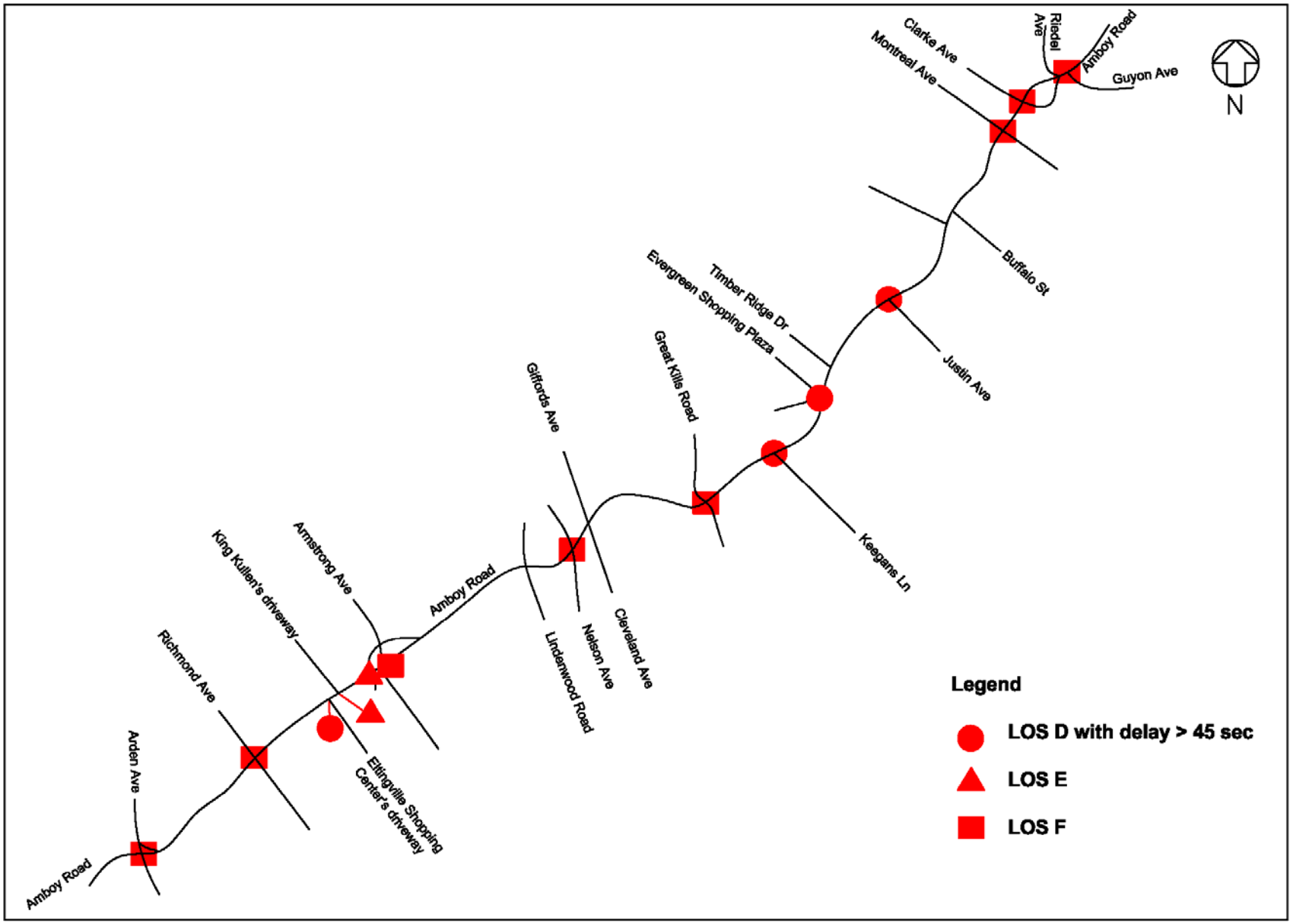


Figure 4.9.8: 2017 No Build Intersections with Mid LOS D or Worse – Saturday Peak (12:30-1:30 PM)

CAHPTER 5 PARKING

5.1 Off-Street Public Parking

Parking data was collected in detail for the following facilities:

- Off street parking garages;
- Off street parking lots;
- On-street metered parking; and
- On-street non-meter parking.

There are two publicly-operated, off street public parking facilities along the corridor study area. Both are located near the Great Kills Staten Island Railway station.

One public parking facility is operated by the New York City Department of Transportation. The other is a free Park and Ride lot adjacent to the Railway station and is operated by MTA/Staten Island Railway. They are both unattended lots.

The NYCDOT's Great Kills Municipal Parking Field is located at the southeast corner of Amboy Road and Hillside Terrace. It is located three blocks from the MTA/Staten Island Railway Great Kills station and two blocks from the S54 local and southbound express X7 and X8 bus stops on Nelson Avenue. It is open from 9AM – 10PM Monday to Saturday and has a total of 63 parking spaces – 20, 5-hour spaces; 32, 12-hour spaces, and 11 monthly permits. The 5-hour spaces and 12-hour spaces both charge $0.25 per 30 minutes. Permits are sold quarterly for $60.00. According to the NYCDOT's website, the facility is described as both a Park and Ride and local shopping lot.

In 2007, the Metropolitan Transportation Authority's Staten Island Railroad opened a free, 25-space Park and Ride one block west of the SIR Great Kills Station. It is unlikely that the opening of the new Park and Ride greatly affected the number of *railroad commuters* (12-hour maximum space users) previously utilizing the paid NYCDOT municipal lot (with a 9AM opening time), but the opening of a free, all day lot with equal proximity to the local activity center between Nelson Avenue and Giffords Lane provides no incentive for increased use.

The Metropolitan Transportation Authority operates a free 'Park and Ride' lot directly adjacent to the Staten Island Railway Great Kills station at the intersection of Nelson Avenue and Brower Court, located one block north of Amboy Road. As of the time of this report's release, the MTA has not undertaken any official occupancy survey of this new space. Unofficial surveys taken between the hours of 11AM and 2PM in the Spring and Summer of 2008 showed the lot to be consistently 80% and 100% full.

5.2 Off-Street Accessory Parking

There are 50 garages and/or private parking lots that are classified as accessory parking locations within the corridor boundaries combining for a total of approximately 2,500 parking spaces. Among these garages/lots only 12 are primarily used for residential parking; two are used for church parking, and 36 are for commercial establishments. The seven residential lots combined have approximately 449 parking spaces, the churches have approximately 63 spaces, and the commercial parking contains approximately 1,968 spaces. Table 5.2.1 presents the name, locations and estimated number of spaces for each facility.

Table 5.2.1
Off-Street Accessory Parking Garages and Lots

	Name	Address or Location	Estimated # Spaces
Residential			
1	Apartments	3180 Amboy Rd.	16
2	Apartments	3264-3272 Amboy Rd.	17
3	Woodlands Apartments	3461 Amboy Rd.	91
4	Woodlands Apartments	4365 Amboy Rd.	18
5	Kensington Garden Apartments	Southeast corner Amboy/Bay Terrace	43
6	Saccheri Court Apartments	North side Amboy at Saccheri Ct.	21
7	Apartments	3528-3532 Amboy Rd.	9
8	Amboy Co-Op Apartments	3745-3747 Amboy Rd.	37
9	Apartments	3364-3380 Amboy Rd.	34
10	Apartments	3430-3442 Amboy Rd.	17
11	Apartments	3849 Amboy Rd.	26
12	Avon at Great Kills Apt's.	4185-4219 Amboy Rd.	120
		SUB TOTAL	**449**
Commercial (public use)			
13	Oakwood Center Plaza	Northwest corner Clarke/Amboy	251
14	Sovereign Bank	3150 Amboy Rd.	13
15	Master Realtors	3130 Amboy Rd.	12
16	Riviera Plaza	3295 Amboy Rd.	99
17	Angelos Superrette & Salumeria	3304 Amboy Rd.	7
18	Reliable Locksmith	3316 Amboy Rd.	13
19	Evergreen Shopping Plaza	Amboy Rd./Timber Ridge Rd.	333
20	Richmond County Savings Bank	3879 Amboy Rd.	47
21	Shopping Plaza	3911 Amboy Rd.	20
22	Premier Credit	3902-3906 Amboy Rd.	6
23	Candela Espanola Restaurant	3921 Amboy Rd.	16
24	Groom Room	3917 Amboy Rd.	8
25	Village Realty	3912 Amboy Rd.	17
26	Shopping Plaza	North side Amboy at Hillside Terrace	29

27	Staten Island Bank and Trust	Northwest corner Amboy/Nelson	18
28	Amboy stores (south side)	Between Giffords Lane & Nelson Ave.	52
29	Top Tomato	4045 Amboy Rd.	19
30	Top Tomato	4045 Amboy Rd.	6
31	Top Tomato/CVS	4045 & 4065 Amboy Rd.	25
32	CVS	4065 Amboy Rd.	40
33	Makeovers Salon	4225 Amboy Rd.	12
34	Chiropractor	s/w corner Amboy & Acadia Ave.	10
35	Francis Driving School	4240 Amboy Rd.	28
36	King Kullen shopping plaza	n/side betw. Old Amboy & St. Albans	278
37	Eltingville shopping plaza	s/side betw. Old Amboy & St. Albans	246
38	Commerce Bank	4401 Amboy Rd.	27
39	US Post Office – Eltingville Sta.	4455 Amboy Rd.	44
40	Crib Outlet	4459 Amboy Rd.	24
41	Empire Physical Therapy	4434 Amboy Rd.	29
42	United Federation of Teachers	4456 Amboy Rd.	27
43	Blockbuster Video	4501 Amboy Rd.	18
44	Burger King	3901 Richmond Ave.	28
45	Richmond Ave. businesses	Southwest corner Amboy/Richmond	17
46	Richmond Co. Savings Bank	Northwest corner Amboy/Richmond	93
47	Regal Plaza	North Side Amboy at Lyndale Ave.	36
48	Shopping Plaza	North Side Amboy at Retford Ave.	20
		SUBTOTAL	**1968**
Governmental/Institutional			
49	Coptic Church	Northwest corner Amboy/Lindenwood	27
50	Bethel Evangelical Church		36
		SUBTOTAL	**63**
	TOTAL		**2480**

5.3 On-Street Parking

This section summarizes the existing on-street parking conditions in the study area. The analysis includes an inventory of on-street parking spaces and their regulations; it provides both a quantitative and qualitative analysis of the parking in the study area. On street parking is permitted on only two blocks of the corridor study area's forty one blocks. The rest of the corridor is a combination of No Parking, No Standing, and No Stopping Anytime regulations.

The curb use regulations on Amboy Road, a mixed, residential and commercial corridor, provide for almost no parking for the commercial and residential uses along this street. The narrow width of Amboy Road does not permit sufficient space for both moving and parking lanes in either direction. Furthermore, all residential units and all but a small number of commercial establishments provide accessory, off-street parking. Approximately half of the corridor's curbside regulations prohibit on street parking with a mix of 'No Parking Anytime', 'No Standing Anytime', and 'No Stopping Anytime' regulations. However, there is so little demand and perceived capacity for on street parking along the corridor that approximately half of the corridor's blocks do not have any parking regulations at all. Presumably, parking regulations are not necessary.

The following summarizes the curb regulations along Amboy Road:

- From Arden Road to Nelson Avenue, curbside parking is prohibited with a combination of 'No Parking Anytime', 'No Standing Anytime', and 'No Stopping Anytime' regulations. There is a mix of residential and commercial-only land uses along this stretch with a narrow roadway and ample availability of residential and commercial off-street accessory parking.
- From Nelson Avenue to Giffords Lane, there are twelve, two-hour metered parking spaces from 8AM to 5PM except Sunday, with unrestricted curbside parking at other times. This block is located in the older, more pedestrian-oriented commercial core of the Amboy Road corridor (Activity Center #2).
- From Giffords Lane to Montreal Avenue, curbside parking is prohibited with a combination of 'No Parking Anytime', 'No Standing Anytime', and 'No Stopping Anytime' regulations. There is a mix of residential and commercial-only land uses along this stretch with a narrow roadway and ample availability of residential and commercial off-street accessory parking.
- From Montreal Avenue to Clarke Avenue, parking is prohibited on the north (westbound) side of the street for the same reasons as mentioned above. On the south (eastbound) side of the street, the there is sufficient width for travel and parking lanes. Between Montreal and Clarke avenues, there are approximately seven on street parking spaces ("Parallel Parking Only"), with no other stated restrictions.

The following summarizes the curb regulations along major intersecting side streets:

- On Arden Avenue – On the east side of Arden Avenue north of Amboy Road, there are no parking regulations. The west side of Arden Avenue north of the intersection contains a mix of 'No Standing' and 'No Parking' Anytime. 'No Standing Anytime' regulations

exist on the east side south of Amboy and 'No Parking Anytime' regulations are on the west side south of Amboy.

- On Richmond Avenue – On the east side of the street north of Amboy Road, there is an MTA bus stop just north of the intersection, No Parking regulations, and several '1 Hour Parking 8AM-7PM Except Sunday' spaces. On the west side of the avenue north of Amboy Road, there are a mix of '1 Hour Parking 8AM-7PM Except Sunday' spaces and metered spaces. No regulations could be identified for the east side of Richmond Avenue south of Amboy Road, but heavy volumes in the existing 'Through/Right' curb side lane do not permit parking. '2 Hour Parking 8AM-7PM Except Sunday' spaces are prevalent on the west side of Richmond south of Amboy Road.
- On Armstrong Avenue – 'No Standing Anytime' regulations exist on both the east and west sides of Armstrong Avenue north of the Amboy Road intersection. South of Amboy, 'No Parking Anytime' regulations exist on the east side of the avenue and 'No Standing Anytime' regulations are on the west.
- On Lindenwood Road – 'No Standing Anytime' regulations exist on the east side of Lindenwood north of Amboy Road and 'No Parking Anytime' signs and regulations exist on the west. South of Amboy Road, there is a mix of 'No Standing Anytime' and '2 Hour Parking 8AM-7PM Except Sunday' regulations. 'No Parking Anytime' regulations are on the west.
- On Nelson Avenue – North of Amboy on the east side of the avenue, there are six metered parking spaces. On the west, there is a mix of free, two-hour parking spaces (8AM-5PM Except Sunday) and three metered parking spaces. South of Amboy on both the east and west sides of Nelson Avenue, there is a mix of 'No Parking Anytime' and 'No Standing Anytime' regulations.
- On Giffords Lane – There is approximately 70' of 'No Standing Anytime' regulations on the east side of Giffords Lane north of the Amboy Road intersection to accommodate wide westbound to-northbound bus movement clearance requirements. North of the NSA regulations, there are three metered parking spaces south of the intersection with Brower Court. 'No Standing Anytime' regulations exist on the west side of Giffords. South of Amboy Road, Giffords Lane becomes Brown Avenue – a narrow, one way southbound street with 'No Parking Anytime' regulations on both the east and west sides of the street.
- On Clarke Avenue – On the east side of Clarke Avenue north of Amboy Road, no parking regulations exist. 'No Standing Anytime' regulations on the west side of the avenue. South of Amboy, on both the east and west sides of the street, curb regulations are limited to: "No Standing" and "No Parking Anytime".

5.4 On Street Utilization/Demand

Peak hour Mid Day observation of on-street parking utilization along the south side of Amboy Road between Montreal Avenue and Clarke Avenue and between Brown Avenue and Nelson Avenue indicates that average occupancy during observation times was between 50% and 80%. Of the twelve metered parking spaces between Brown and Nelson avenues, there were consistently at least two vacant. Of the eight metered spaces on Nelson Avenue north of Amboy Road, utilization was very light. No more than three of those spaces were taken.

Given the existence of accessory, off street parking at every commercial establishment to the east and west of the Nelson Avenue to-Giffords Lane block, there is little reported or recorded incidence of double parking.

CHAPTER 6 PEDESTRIANS AND BICYCLES

Pedestrian activity is an important element in the capacity analysis of urban streets and in the design and operation of transportation systems. The concentration of pedestrian activity occurs at major transit stops or terminals and in high density areas. Hence we tend to see pedestrian concentration near transit terminals, high-rise building, stores, and other major traffic generators. The concentration of pedestrians at corners and crosswalks at intersection affect pedestrian themselves but can also impede turning vehicles and reduce the capacity of the intersection.

6.1 Existing Pedestrian Volumes

A pedestrian analysis along the study corridor was conducted for existing and future conditions. The pedestrian analysis focused on the identification of high pedestrian volume generators along the corridor and adjacent land uses. It also provided an overview of general pedestrian concentration and flows at selected locations within the study area and assessed vehicle, pedestrian conflicts and capacity problems under current conditions.

Data was collected at the intersections of Amboy Road and Armstrong Avenue, Nelson Avenue, Giffords Lane, Clarke Avenue and Richmond Avenue. Of these locations, Armstrong Avenue, Nelson Avenue and Richmond Avenue had the highest level of pedestrian activity during the Saturday midday period. Giffords Lane and Clarke Avenue had the highest level of pedestrian activity during the weekday PM peak period. Figures 6.1.2 to 6.2.5 show the existing weekday and weekend hourly pedestrian volumes during the AM, Midday, PM, and Saturday midday peak hours.

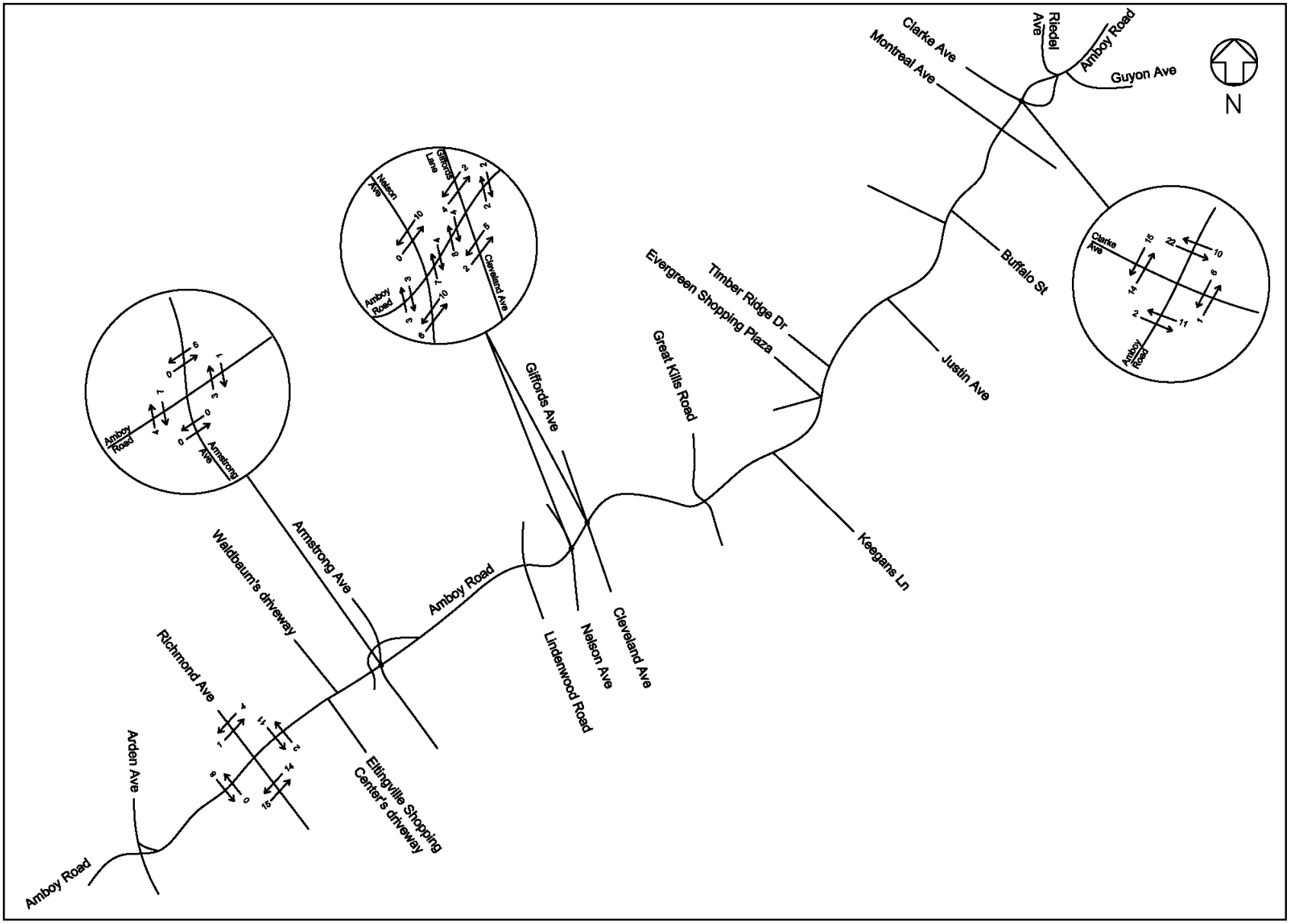


Figure 6.1.1: Existing Pedestrian Volume – Weekday AM Peak (7:45-8:45)

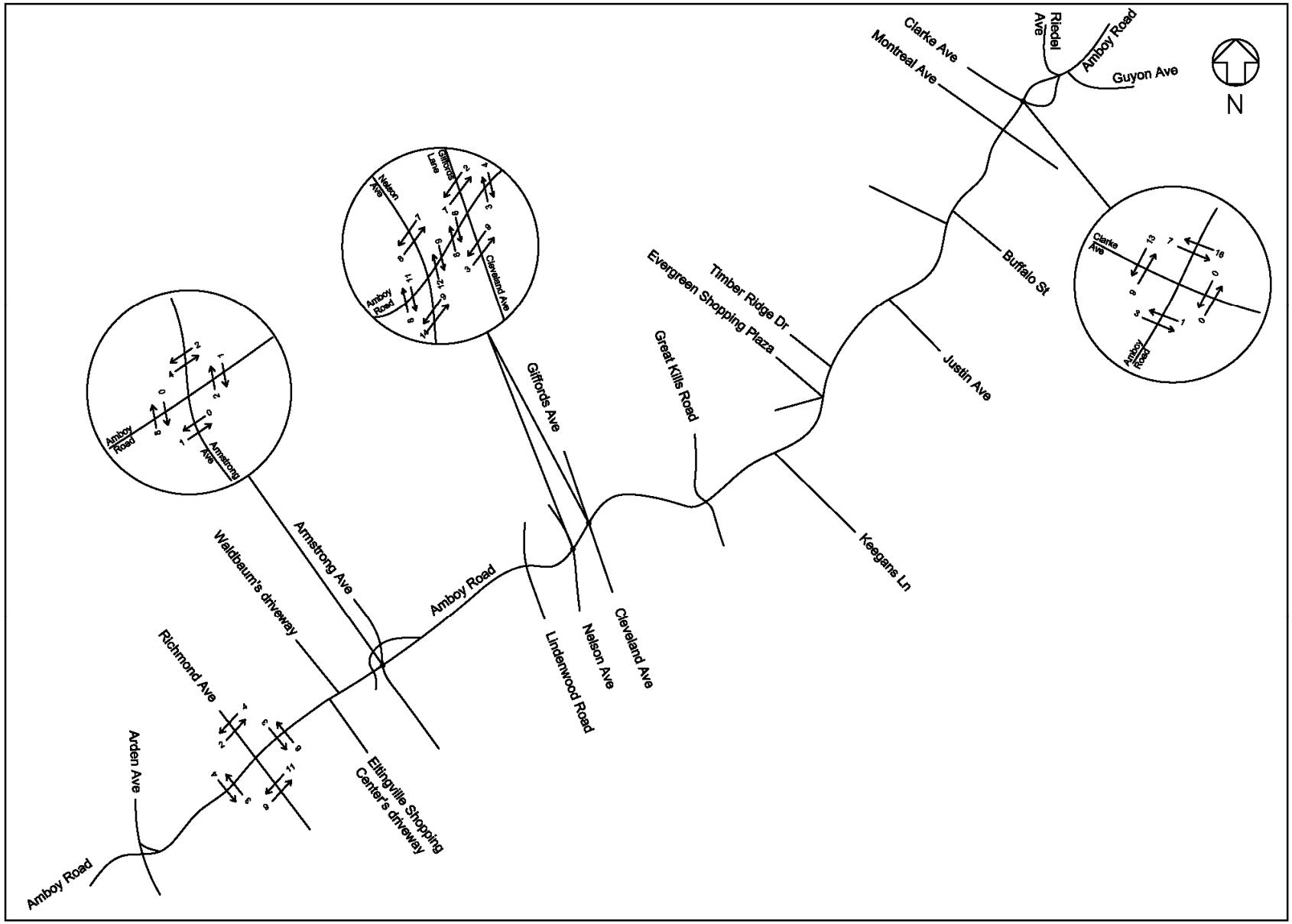


Figure 6.1.2: Existing Pedestrian Volume – Weekday Midday Peak (12:00-1:00 PM)

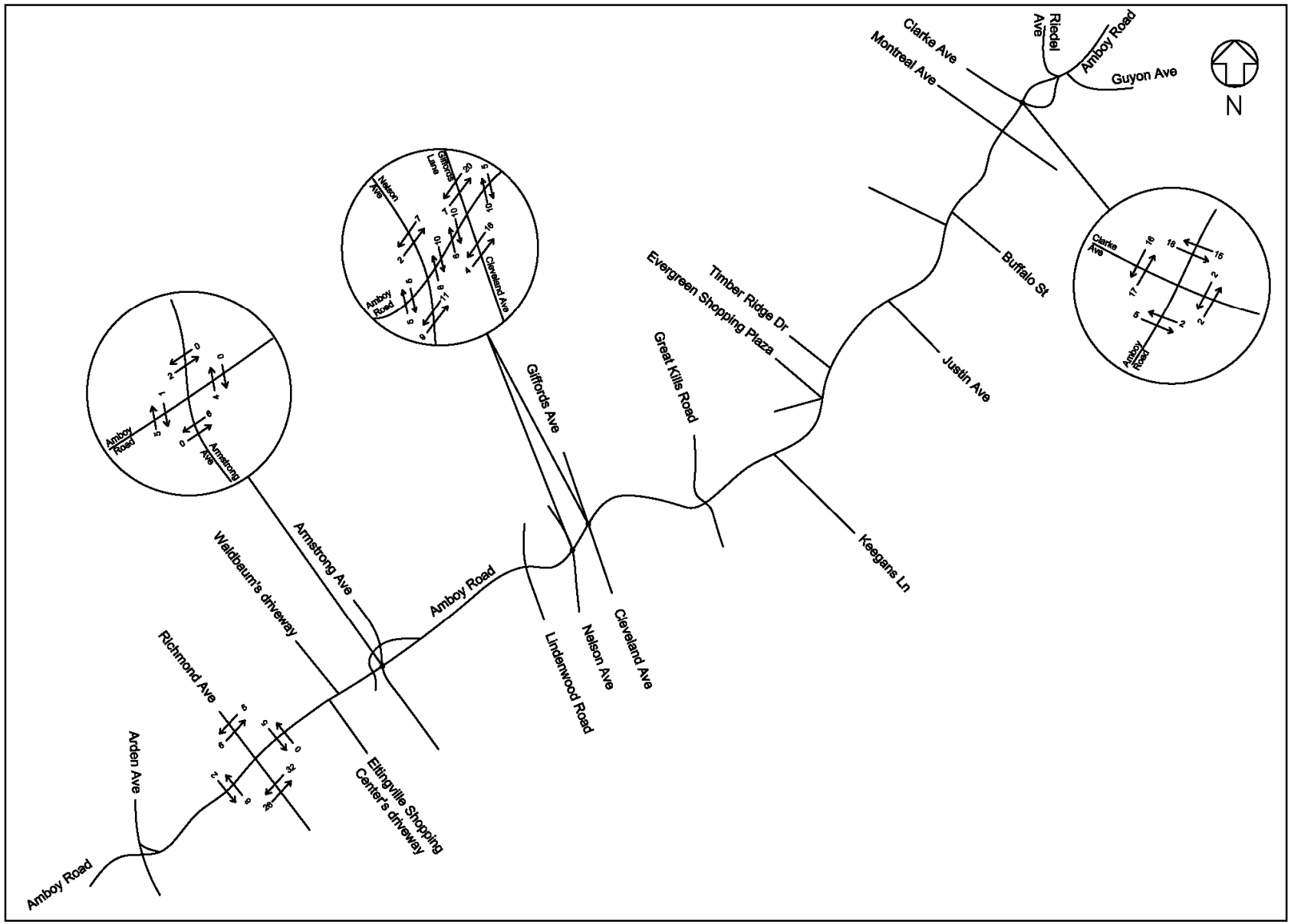


Figure 6.1.3: Existing Pedestrian Volume – Weekday PM Peak (5:00-6:00)

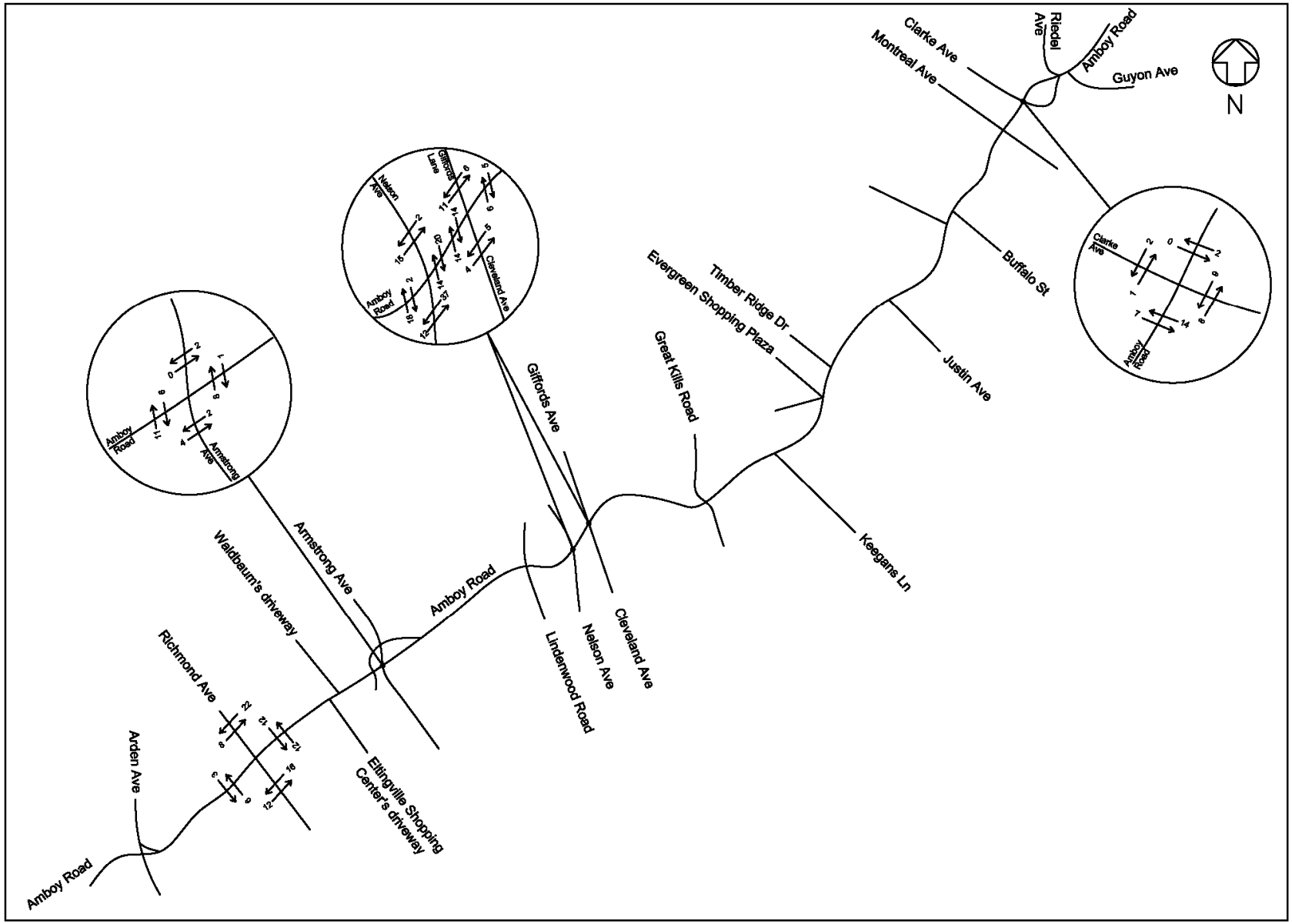


Figure 6.1.4: Existing Pedestrian Volume – Saturday Peak (12:30-1:30 PM)

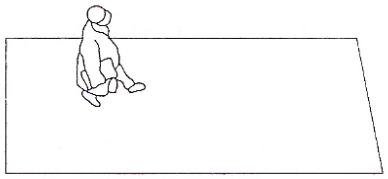
6.2 Pedestrian LOS Analysis and Methodology

Pedestrian volumes for the LOS analysis were collected in 15-minute increments during the peak hours of the day. The Highway Capacity Manual methodology was used to determine pedestrian level of service at the crosswalks and corners for the five selected intersections. The analysis examined the level of service (LOS) for the AM, Midday, PM, and Saturday midday peak hours of crosswalk and corners for the 2007 existing condition. The pedestrian LOS is measured in terms of square feet of space per pedestrian (Sq Ft/Ped), as indicated in Figure 6.2.1 which also shows the criteria for analyzing pedestrian level of service as define by the highway capacity manual.

Figure 6.2.1
Pedestrian LOS Criteria

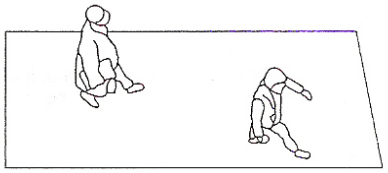
LOS A

Pedestrian Space > 60 ft^2/p *Flow Rate* ≤ 5 p/min/ft
At a walkway LOS A, pedestrians move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.



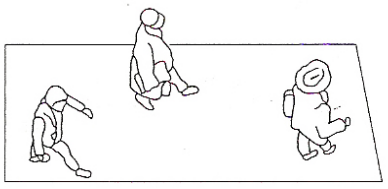
LOS B

Pedestrian Space > 40-60 ft^2/p *Flow Rate* > 5-7 p/min/ft
At LOS B, there is sufficient area for pedestrians to select walking speeds freely, to bypass other pedestrians, and to avoid crossing conflicts. At this level, pedestrians begin to be aware of other pedestrians, and to respond to their presence when selecting a walking path.



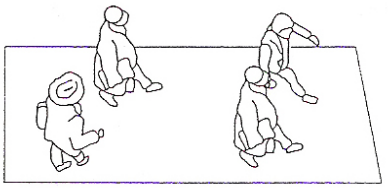
LOS C

Pedestrian Space > 24-40 ft^2/p *Flow Rate* > 7-10 p/min/ft
At LOS C, space is sufficient for normal walking speeds, and for bypassing other pedestrians in primarily unidirectional streams. Reverse-direction or crossing movements can cause minor conflicts, and speeds and flow rate are somewhat lower.



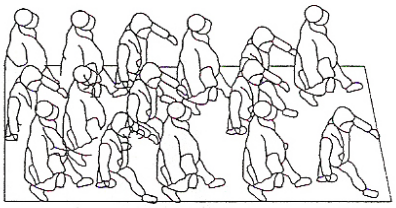
LOS D

Pedestrian Space > 15-24 ft^2/p *Flow Rate* > 10-15 p/min/ft
At LOS D, freedom to select individual walking speed and to bypass other pedestrians is restricted. Crossing or reverse-flow movements face a high probability of conflict, requiring frequent changes in speed and position. The LOS provides reasonably fluid flow, but friction and interaction between pedestrians is likely.



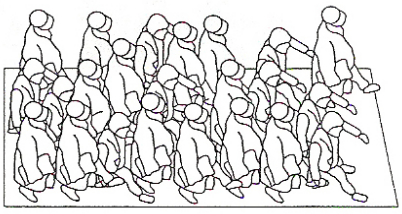
LOS E

Pedestrian Space > 8-15 ft^2/p *Flow Rate* > 15-23 p/min/ft
At LOS E, virtually all pedestrians restrict their normal walking speed, frequently adjusting their gait. At the lower range, forward movement is possible only by shuffling. Space is not sufficient for passing slower pedestrians. Cross0 or reverse-flow movements are possible only with extreme difficulties. Design volumes approach the limit of walkway capacity, with stoppages and interruptions to flow.



LOS F

Pedestrian Space ≤ 8 ft^2/p *Flow Rate* varies p/min/ft
At LOS F, all walking speeds are severely restricted, and forward progress is made only by shuffling. There is frequent, unavoidable contact with other pedestrians. Cross- and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrians than of moving pedestrian streams.



6.3 Existing Pedestrian LOS

The analysis shows that all the analyzed intersections have pedestrian LOS of A during all peak periods under the crosswalk analysis. However, there is one location with pedestrian LOS E and F during all peak periods under the corner analysis. It is the southeast corner of Amboy Road at Nelson Avenue. The narrowed sidewalk width is the major factor that caused the failure in LOS at this corner. Tables 6.3.1 and Table 6.3.2 show the results of crosswalk and corner analysis, rspectively.

Table 6.3.1
Existing Conditions: Crosswalk Analysis

Intersection	Crosswalk	Crosswalk		With Conflicting Vehicles							
		Length (ft)	Width (ft)	AM		Midday		PM		Saturday midday	
				sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS
Amboy Road & Clarke Avenue	North	49.5	15.8	1312.9	A	928.6	A	489.9	A	1594.6	A
	South	65.5	17.5	4329.8	A	-	-	-	-	1644.0	A
	East	39.0	13.5	1275.7	A	2979.8	A	1617.6	A	17939.6	A
	West	43.5	13.0	4329.4	A	17213.7	A	8662.2	A	1540.9	A
Amboy Road & Giffords Lane	North	30.0	10.0	368.3	A	1764.0	A	387.5	A	2348.2	A
	South	36.0	12.0	3071.3	A	4670.7	A	1326.5	A	614.9	A
	East	17.8	11.0	11972.0	A	2983.4	A	1704.8	A	1982.6	A
	West	31.0	11.5	7188.2	A	2845.9	A	4725.7	A	1257.8	A
Amboy Road & Nelson Avenue	North	35.0	11.0	4254.5	A	930.2	A	1404.8	A	497.8	A
	South	30.0	12.0	718.5	A	1173.5	A	1370.9	A	380.2	A
	East	30.0	12.0	-	-	3664.3	A	4878.4	A	4847.0	A
	West	50.0	11.0	3715.9	A	1643.8	A	4941.8	A	-	-
Amboy Road & Armstrong Avenue	North	45.5	13.0	5114.0	A	3406.2	A	10183.4	A	-	-
	South	45.0	12.5	-	-	9272.3	A	-	-	3090.8	A
	East	45.0	13.0	4258.0	A	-	-	17335.2	A	-	-
	West	42.5	13.0	3468.3	A	8659.1	A	5753.1	A	2445.5	A
Amboy Road & Richmond Avenue	North	44.5	14.0	-	-	-	-	15275.0	A	2424.0	A
	South	49.5	13.0	883.9	A	1418.9	A	490.6	A	829.4	A
	East	51.0	14.0	3361.5	A	5154.9	A	5955.7	A	3161.9	A
	West	54.5	14.5	5306.3	A	4627.5	A	2891.9	A	2315.5	A

Table 6.3.2
Existing Conditions: Corner Analysis

Intersection	Corner	AM		Midday		PM		Saturday midday	
		sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS
Amboy Road & Clarke Avenue	Northeast	128.6	A	137.5	A	95.4	A	270.2	A
	Southeast	1821.8	A	4431.9	A	2815.4	A	3442.0	A
	Southwest	3343.5	A	8928.0	A	6693.8	A	1270.3	A
	Northwest	2537.3	A	2304.0	A	1693.7	A	1580.1	A
Amboy Road & Giffords Lane	Northeast	281.9	A	359.8	A	200.8	A	651.6	A
	Southeast	247.8	A	245.5	A	116.4	A	74.3	A
	Southwest	1933.7	A	1211.1	A	970.7	A	367.4	A
	Northwest	1338.0	A	3076.7	A	1279.4	A	2194.9	A
Amboy Road & Nelson Avenue	Northeast	2170.8	A	449.7	A	632.0	A	357.2	A
	Southeast	4.5	F	6.8	F	14.0	E	-3.7	F
	Southwest	283.4	A	359.6	A	496.1	A	416.6	A
	Northwest	3197.8	A	1416.8	A	2847.8	A	1157.1	A
Amboy Road & Armstrong Avenue	Northeast	540.6	A	948.4	A	951.2	A	3834.0	A
	Southeast	8489.3	A	33984.0	A	11328.0	A	11328.0	A
	Southwest	4684.5	A	9365.3	A	5623.2	A	1648.2	A
	Northwest	3396.6	A	5660.6	A	6795.0	A	4853.6	A
Amboy Road & Richmond Avenue	Northeast	6029.7	A	12065.2	A	6037.4	A	2780.8	A
	Southeast	1246.2	A	2181.3	A	1534.1	A	1867.0	A
	Southwest	850.4	A	985.7	A	487.8	A	669.2	A
	Northwest	17808.8	A	17817.7	A	5092.6	A	2970.2	A

6.4 2017 Future No Build Pedestrian Volumes

The future pedestrian volumes were generated by applying a two percent per year growth factor to the existing pedestrian volumes. The same five intersections analyzed under the existing conditions are analyzed in the future no build conditions. Figures 6.4.1 through 6.4.4 show the pedestrian crosswalk volumes during the AM, Midday, PM, and Saturday midday peak hours, respectively.

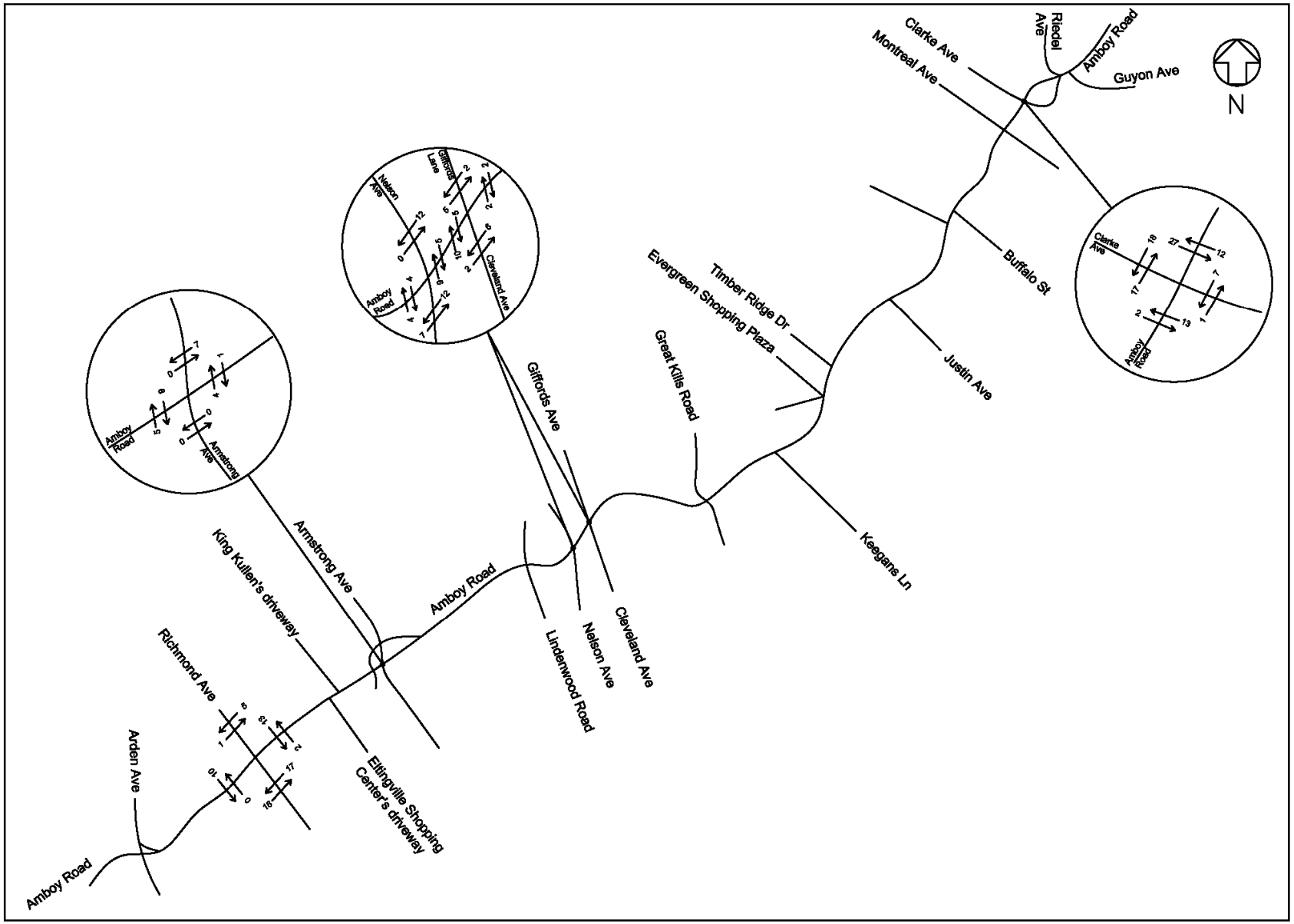


Figure 6.4.1: 2017 Future No Build Pedestrian Volume – Weekday AM Peak (7:45-8:45)

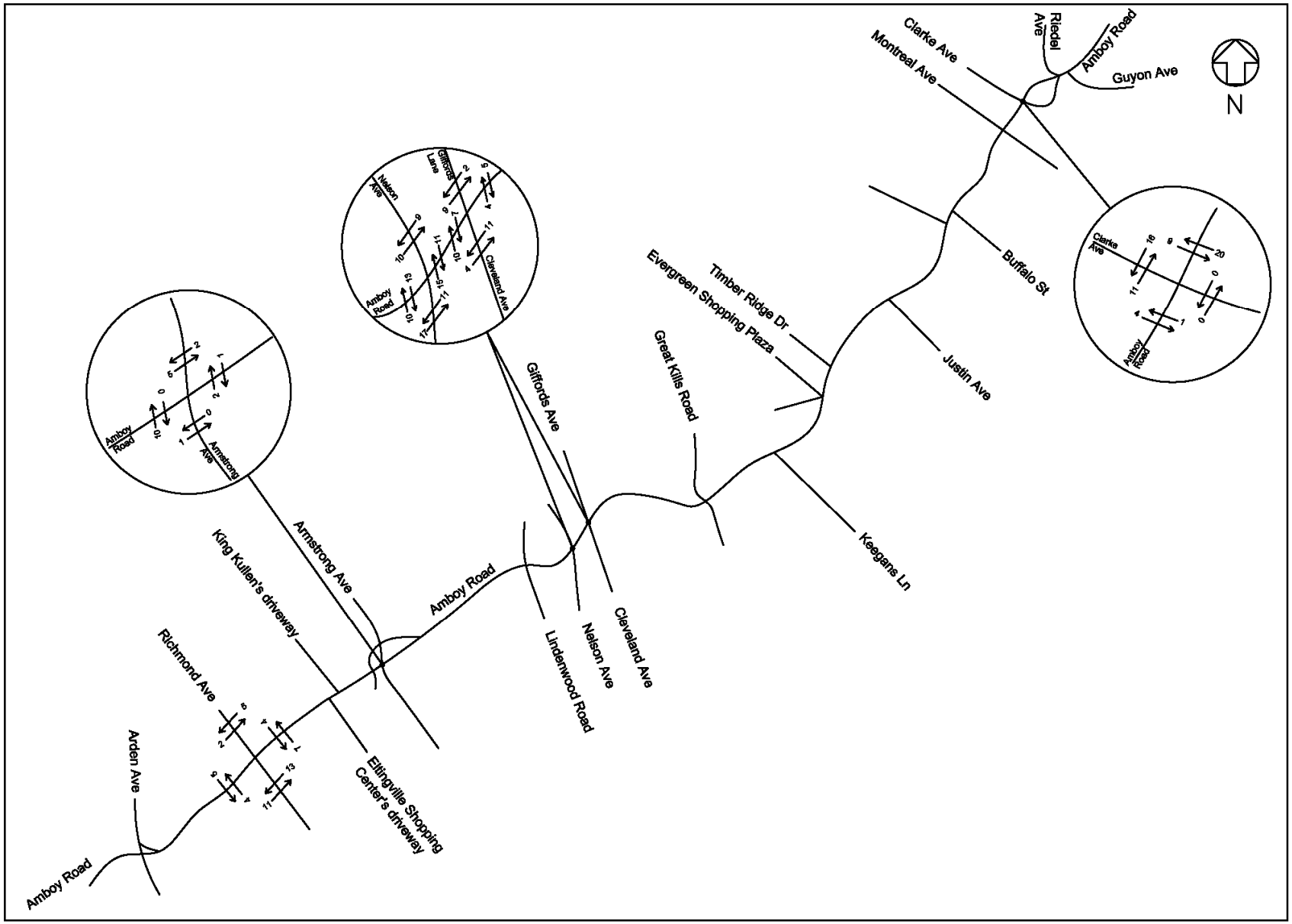


Figure 6.4.2: 2017 Future No Build Pedestrian Volume – Weekday Midday Peak (12:00-1:00 PM)

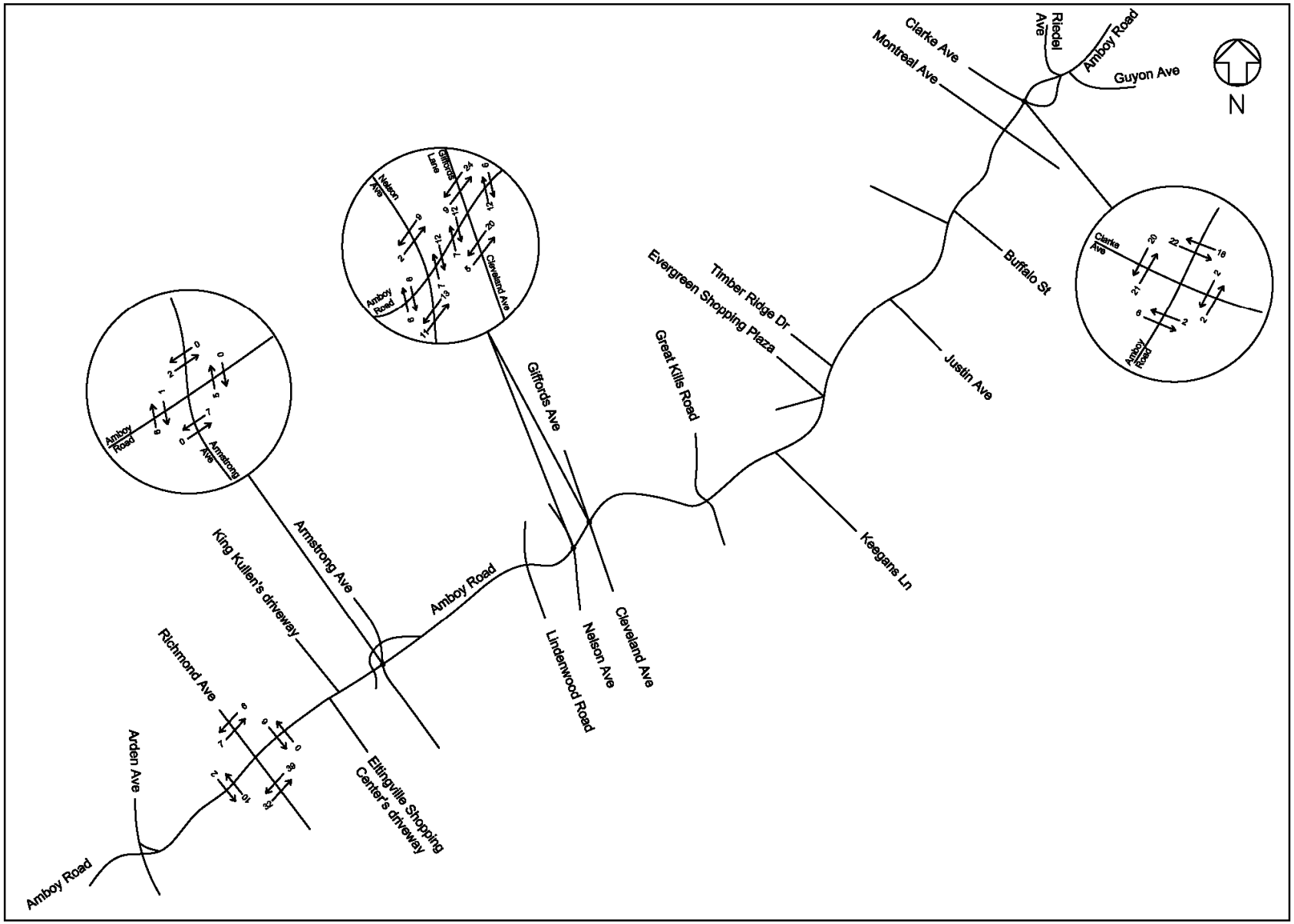


Figure 6.4.3: 2017 Future No Build Pedestrian Volume – Weekday PM Peak (5:00-6:00)

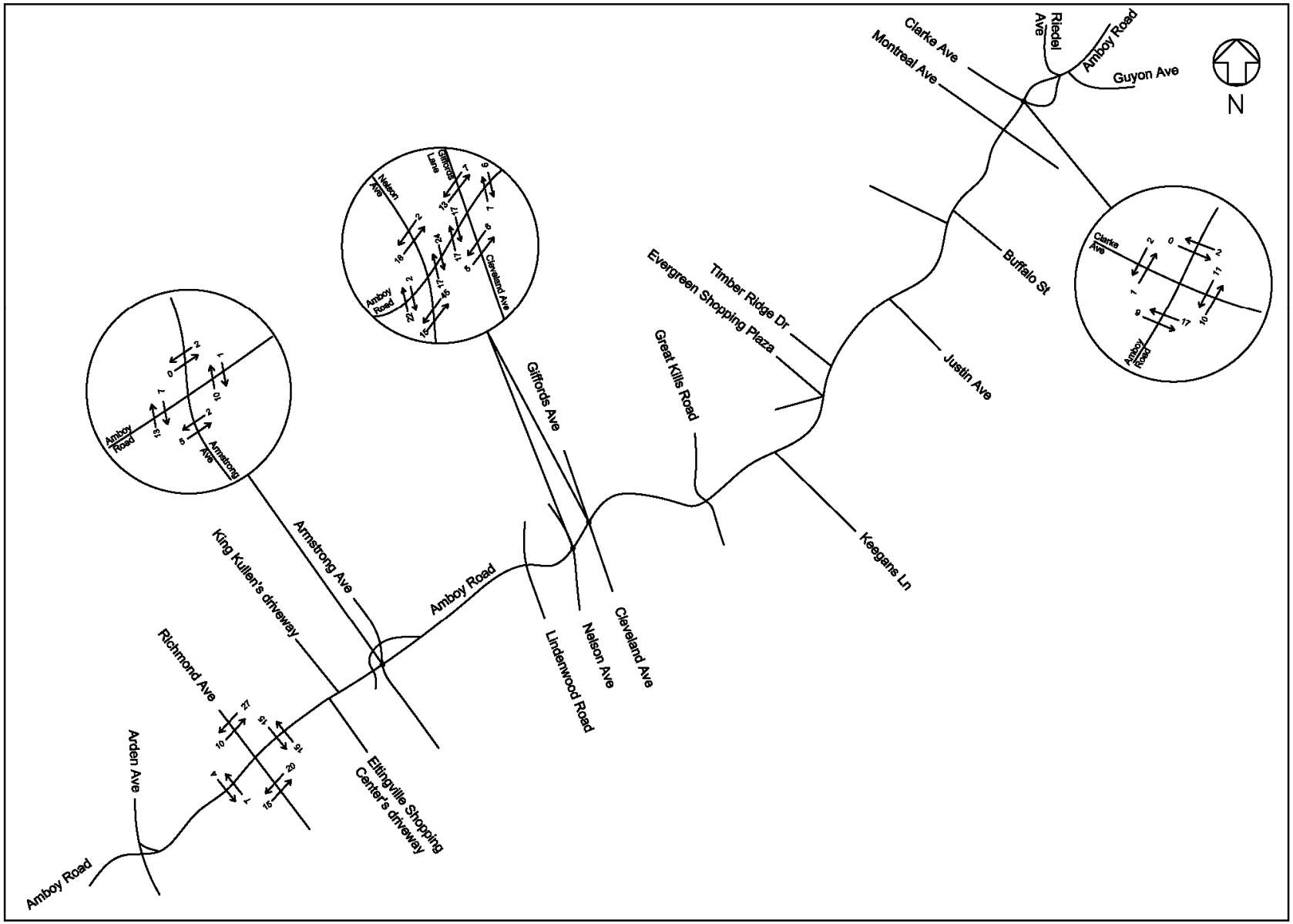


Figure 6.4.4: 2017 Future No Build Pedestrian Volume – Saturday Peak (12:30-1:30 PM)

6.5 2017 Future No Build Pedestrian LOS

Pedestrian LOS analysis was conducted for the 2017 Future No Buils scenario. The analysis show a similar result as under the existing condition with all the locations have level of service A except the southeast corner of Amboy Road and Nelson Avenue; which operates at LOS E and F during all peak periods under the corner analysis. Tables 6.5.1 and Table 6.5.2 show the results of the 2017 No Build crosswalk and corner analysis, respectively.

Table 6.5.1
2017 No Build Conditions: Crosswalk Analysis

Intersection	Crosswalk	Crosswalk		With Conflicting Vehicles							
		Length (ft)	Width (ft)	AM		Midday		PM		Saturday midday	
				sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS
Amboy Road & Clarke Avenue	North	49.5	15.8	858.8	A	678.4	A	315.0	A	1166.2	A
	South	65.5	17.5	3225.6	A	-	-	-	-	1311.0	A
	East	39.0	13.5	1049.3	A	2552.3	A	1366.8	A	17939.6	A
	West	43.5	13.0	3456.1	A	17149.1	A	8643.8	A	1201.8	A
Amboy Road & Giffords Lane	North	30.0	10.0	285.7	A	1733.8	A	310.6	A	1728.1	A
	South	36.0	12.0	3061.4	A	4670.7	A	1029.2	A	510.6	A
	East	17.8	11.0	11972.0	A	2983.4	A	1491.7	A	1696.6	A
	West	31.0	11.5	7151.4	A	2353.6	A	3514.7	A	1050.4	A
Amboy Road & Nelson Avenue	North	35.0	11.0	4249.9	A	757.6	A	1200.1	A	412.3	A
	South	30.0	12.0	544.8	A	1000.4	A	1144.8	A	296.2	A
	East	30.0	12.0	-	-	2903.9	A	4834.2	A	4795.4	A
	West	50.0	11.0	2967.8	A	1341.4	A	4932.5	A	-	-
Amboy Road & Armstrong Avenue	North	45.5	13.0	5109.6	A	3403.2	A	10165.6	A	-	-
	South	45.0	12.5	-	-	9142.5	A	-	-	2285.6	A
	East	45.0	13.0	3382.6	A	-	-	17290.2	A	-	-
	West	42.5	13.0	2887.1	A	8645.0	A	5740.6	A	2130.4	A
Amboy Road & Richmond Avenue	North	44.5	14.0	-	-	-	-	14679.3	A	2135.1	A
	South	49.5	13.0	712.4	A	1153.3	A	384.9	A	646.8	A
	East	51.0	14.0	2783.7	A	3839.9	A	5900.2	A	2385.7	A
	West	54.5	14.5	5224.6	A	4550.0	A	2280.7	A	1821.4	A

Table 6.5.2
2017 No Build Conditions: Corner Analysis

Intersection	Corner	AM		Midday		PM		Saturday midday	
		sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS	sq.ft/ped	LOS
Amboy Road & Clarke Avenue	Northeast	101.3	A	112.7	A	78.0	A	225.2	A
	Southeast	1473.4	A	3876.8	A	2380.8	A	2814.3	A
	Southwest	2673.9	A	8928.0	A	6693.8	A	1024.9	A
	Northwest	1950.2	A	1948.0	A	1411.4	A	1262.1	A
Amboy Road & Giffords Lane	Northeast	226.7	A	323.8	A	166.4	A	543.0	A
	Southeast	220.3	A	245.5	A	95.9	A	59.8	B
	Southwest	1933.7	A	1076.5	A	746.7	A	307.2	A
	Northwest	1098.3	A	2796.1	A	1022.6	A	1805.8	A
Amboy Road & Nelson Avenue	Northeast	1809.0	A	371.5	A	536.2	A	305.6	A
	Southeast	1.3	F	3.9	F	10.6	E	-5.3	F
	Southwest	226.2	A	303.9	A	417.8	A	343.3	A
	Northwest	2841.5	A	1157.8	A	2563.0	A	977.5	A
Amboy Road & Armstrong Avenue	Northeast	473.1	A	948.4	A	951.2	A	3834.0	A
	Southeast	6789.6	A	33984.0	A	11328.0	A	8496.0	A
	Southwest	4014.0	A	9365.3	A	5623.2	A	1332.9	A
	Northwest	2830.5	A	5660.6	A	6795.0	A	4246.9	A
Amboy Road & Richmond Avenue	Northeast	5166.8	A	9045.7	A	6037.4	A	2408.6	A
	Southeast	1026.0	A	1744.5	A	1270.7	A	1492.7	A
	Southwest	706.8	A	853.2	A	394.5	A	527.6	A
	Northwest	17808.8	A	17817.7	A	4456.0	A	2545.9	A

6.6 Bicycles

A network of bicycle lanes and greenway paths does not exist within the study area. According to the 2000 census data, the use of bicycle as an alternative mode of transportation in the study area was less than 1% of the total mode share. Very few people were observed using bicycles in the study area.

There is no proposed bicycle lanes or paths develop by the year 2017, and bicycle activity will generally remain the same under the future no build conditions in the study area.

CHAPTER 7 CRASHES AND SAFETY ANALYSIS

A detailed crash analysis was conducted for the entire study corridor for a four year period from 2003 to 2006. Only 48 intersections out of 53 along the entire corridor had at least one accident during this time and only ten of those intersections had ten or more accidents during the four year period. There was a total of 281 traffic crashes between 2003 and 2006. Pedestrian accidents represented 5.3% of all traffic accidents and occurred at only nine intersections along the corridor. Only two bicycle crashes and one traffic fatality took place during this period.

The ten intersections that had at least ten accidents from 2003 through 2006 were:

- Amboy Road and Old Amboy Road – 11 crashes
- Amboy Road and Ainsworth Avenue – 12 crashes
- Amboy Road and Montreal Avenue – 12 crashes
- Amboy Road and Arden Avenue – 14 crashes
- Amboy Road and Lindenwood Avenue – 16 crashes
- Amboy Road and Guyon Avenue – 18 crashes
- Amboy Road and Armstrong Avenue – 22crashes
- Amboy Road and Nelson Avenue – 23 crashes
- Amboy Road and Clarke Avenue – 26 crashes
- Amboy Road and Richmond Avenue – 38 crashes

CHAPTER 8 GOODS MOVEMENT

New York City, more so than nearly any major city in the world, is heavily dependant on trucks to supply the city with the resources needed to make it run. Thousands of local and through truck trips traverse the city daily, providing the city with all the goods and services required for its residential communities, commercial enterprises and daily businesses.

Given the reliance upon trucks for goods movement in New York City, the need to analyze truck traffic as part of traffic and transportation studies is amplified. Although trucks provide a vital service, their movement within the city arterial system can create significant problems on the street network affecting flows, their presence affects congestion, accessibility and obstructing traffic while loading and unloading. There are also numerous quality of life issues which must be explored, including noise and air pollution. Truck traffic can also compromise pedestrian and other road users' safety due to the size of trucks and the type of materials being transported. Within New York City, one must also take into account the age of the transportation infrastructure, and the changing sizes of these types of vehicles.

The basic rules and regulations governing truck traffic in New York City can be found in the New York City Traffic Rules and Regulations (Chapter 4 of Title 34 of the Rules of the City of New York). As a whole, this document stipulates all the rules and regulations governing the movement of motorized vehicles in New York City, including curb-side and parking regulations. The sections that directly pertain to trucks can be found in Section 4-13 and section 4-15, wherein the rules governing trucks and commercial vehicles are defined and the routes stipulated, as well as dimensional restrictions for these vehicles.

According to section 4-13 of the New York City Traffic Rules and Regulations, a truck generally is defined as any vehicle or combination of vehicle designed for the transportation of property which has two axels- six tires or three or more axles.

8.1 Truck Routes

In New York City, trucks as defined above should confine themselves to the local and through truck route system in order to access their destinations, and utilize the local street network only to directly access those facilities, usually at the intersection closest to their destination. By definition, local routes should be used by an operator of a truck, with an origin or destination for the purpose of delivery, loading or servicing within the borough, shall only operate such vehicle on a designated local street, except that in order to arrive at their destination, in which they should take the most direct route and utilize the intersection closest to their destination.

Through truck routes are to be utilized for vehicles with neither and origin nor destination within the borough that it is crossing. There are no through truck routes in the study area. Figure 8.2.1 shows the truck routes (local and through) for the borough of Staten Island.

The movement of goods and trucks along the study corridor is influenced by DOT designated truck routes and the concentration of commercial activities along, adjacent, and parallel to the corridor. The entire length of Amboy Road, from Wards Point Avenue in Staten Island's southwest to Richmond Road near its center, is a Local Truck Route. All of the other truck

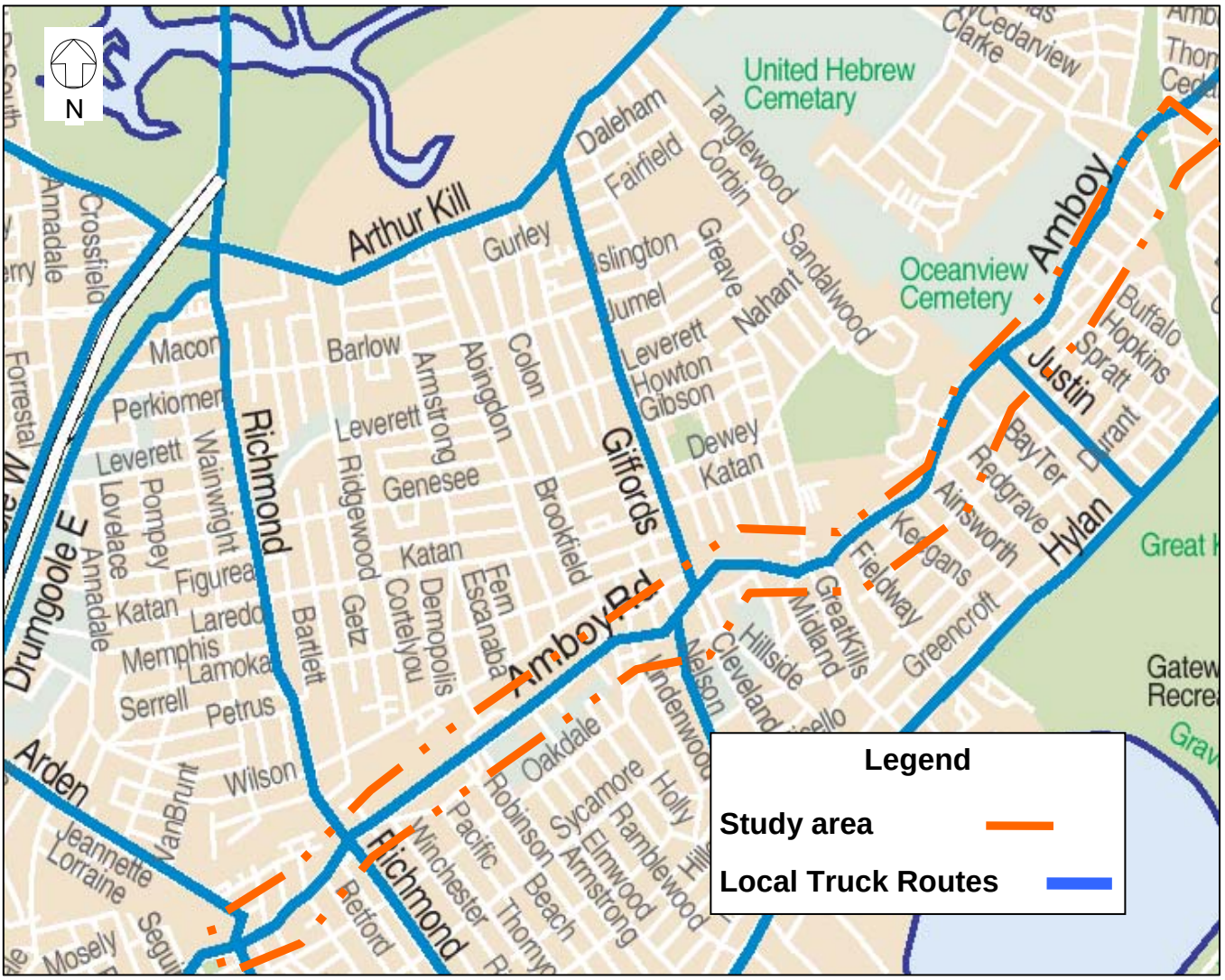


Figure 8.1.1: Truck Routes in the Study Area

routes near the Amboy corridor are also Local Truck routes – routes for use by trucks with local origins and/or destinations.

East/West Local Truck routes parallel to Amboy Road:

- Hylan Boulevard from Saterlee Street to Edgewater Road
- Drumgoole Avenue East from Pembrook Road to Richmond Avenue
- Drumgoole Avenue West from Veterans Highway service road to Arthur Kill Avenue
- Arthur Kill /Richmond Avenue from Huguenot Road to Victory Boulevard

North/South Local Truck routes intersecting the Amboy Road corridor:

- Arden Avenue from Hylan Boulevard to Arthur Kill Road
- Richmond Avenue from Hylan Boulevard to Victory Boulevard
- Nelson Avenue from Hylan Boulevard to Amboy Road
- Giffords Lane from Amboy Road to Arthur Kill Road
- Justin Avenue from Hylan Boulevard to Amboy Road

Of the above truck routes above, Amboy Road is the busiest. Because of the commercial retail, it experiences a significant amount of truck traffic, and due to its location providing access to New Jersey and Brooklyn as well as its close proximity to the surrounding industrial area.

8.2 Truck Movement in the Study Area

The Amboy Road local truck route that serves the corridor study area sees relatively little truck traffic. As described earlier, the corridor's land use is largely residential with three separate and distinct centers of commercial activity. Each of these areas are themselves located near intersecting local truck routes with access to Hylan Boulevard. Amboy Road's proximity to Hylan Boulevard, primary residential land use, relatively sparse commercial activity, restricting geometry, and its relative congestion are all factors in the small percentage and total number of commercial vehicles which use the corridor.

Based on the information gathered from the Manual Turning Counts, field observations, and the distribution of commercial establishments, the volume of commercial vehicles using the Amboy Road truck route and through intersecting streets is relatively light. None of the intersecting Truck Route corridors (Arden Avenue, Richmond Avenue, Nelson Avenue, Giffords Lane, Justin Avenue) recorded more than 4.5% of total volumes comprising truck through or turning movements at the Amboy Road intersection at any single peak hour. The mid-day peak hour period showed the highest numbers and percentages of truck movements.

The heaviest volumes and percentage of trucks passing through Amboy corridor intersections were in the mid-day peak period (12pm to 2pm). During the mid-day peak period, the percentage of truck through and-turning movements at intersecting truck routes ranged from a maximum 4.3% of all vehicles at Justin Avenue/Amboy Road to only 3.1% of all vehicles at Nelson Avenue/Amboy Road.

AM peak hour times varied more between the 7-8AM and 8-9AM hours, with approximately twice as much truck volume between 8-9AM as between 7-8AM. PM peak hours showed a sharp drop in the percentage of trucks passing through the corridor. Only Giffords Lane (2.3%) and Arden Avenue (2.1%) intersections recorded more than 2% of their total through and-turning volume to be from commercial vehicles in any PM peak hour. Since the drop in commercial vehicle's PM peak share of overall volume was also accompanied by a similarly relative drop in the actual number of corridor trucks (roughly half of mid-day peak), the percentage drop cannot be attributed to an overall increase in PM peak volumes relative to consistent truck numbers.

8.3 Curbside and Double Parking

Double parking is almost nonexistent. With the exception of the block between Giffords Lane, every commercial and residential-use property along the corridor has ample accessory parking access for customers, residents, and local deliveries. Between Giffords Lane and Nelson Avenue, twelve metered parking spaces exist on the south side of Amboy Road. Several small businesses were observed to receive curbside UPS and small to-medium truck deliveries in the mid-day peak period from double parked trucks. At no point during any of these observations did more than two of the total functioning fifteen storefront businesses receive deliveries. However, because of the narrow width of this portion of the corridor (35'), any double parked vehicle (or vehicle parked along the north side of the street where there is no on street parking permitted) further narrows the block to only one lane for both east and westbound traffic and has significant impact on congestion and local level of service. The westbound LOS grade for the Nelson Avenue intersection approach for the AM, PM, and Saturday afternoon peak hours was an 'A'. For weekday mid-day peak hour, it was a 'D'.

CHAPTER 9 TRANSIT

9.1 Rail Service

The Metropolitan Transportation Authority - New York City Transit (MTA-NYCT) operates within ½ mile from the study area corridor one subway line – the Staten Island Railway – along one route. The study area is served by four nearby stations. Table 9.1.1 lists the stations. All but Oakwood Heights is within ¼ mile (5-8 minute walk) of the study corridor. Figure 9.1.1 shows the proximity of the railroad to the Amboy Road study corridor.

Table 9.1.1
Staten Island Railway Stations in the Study Area

LINE	CORRIDOR STATIONS	ACCESS ROAD
SIR	• Oakwood Heights • Bay Terrace • Great Kills • Eltingville	• Guyon Avenue • Bay Terrace • Nelson Avenue • Richmond Avenue

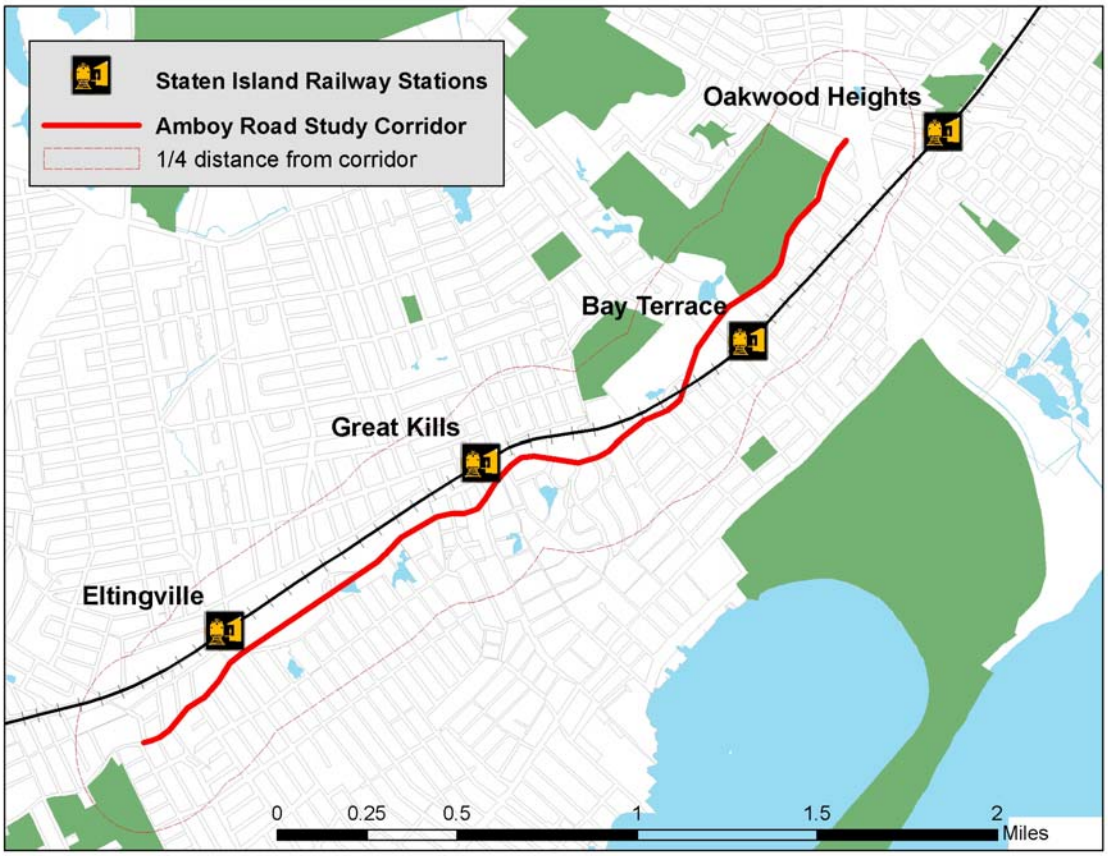


Figure 9.1.1: Staten Island Railway in the Study Area

The Staten Island Railway follows a southwest/northeast route and makes all local stops at 22 stations (23 during Staten Island Yankee games) from the Tottenville Station in the southwest corner of Staten Island to St. George at the Staten Island Ferry terminus in the north. The line operates at all times, but with more frequent northbound AM and southbound PM service.

The Staten Island Railway carries approximately 11,000 passengers per weekday. Unlike most other MTA subway facilities, SIR stations do not have turnstiles or register passenger trips with MTA Metro Cards. Only the St. George Station terminus has turnstiles where Metrocards are used to exit and enter the Railroad. Rides between all other stations are free and station arrival and departure volumes were recorded by individual survey. Passenger boarding and alighting volumes for service to Tottenville (southwest-bound) and to St. George (northeast-bound) are shown in Tables 9.1.2 and 9.1.3, respectively.

Given the light volume of passengers utilizing the railroad stations, the relatively few pedestrians on the Amboy Road corridor, and the fact that none of the stations are actually located on Amboy Road, it was determined that the presence of the stations has a negligible effect on local pedestrian conditions. Furthermore, passenger volumes at each of the corridor area stations were light enough to not warrant further conditions analysis. Consequently, no pedestrian Level of Service (LOS) analysis was conducted at the SIR stations.

Table 9.1.2
SIR Weekday Boardings and Alightings - To Tottenville

	St. George			Tompkinsville			Stapleton			Clifton			Grasmere			Old Town		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	0	115	9	0	14	9	1	4	9	4	14	9	7	7	9	4	1	9
6-10	0	362	11	31	371	11	23	113	11	51	162	11	52	197	11	34	96	11
10-15	0	571	10	12	279	10	23	79	10	52	101	10	57	89	10	66	70	10
15-19	0	4,130	21	22	242	10	28	69	10	125	140	13	163	158	13	162	77	13
19-24	0	1,351	12	32	92	12	13	23	12	78	41	12	126	36	12	71	39	12
TOTAL	0	6,529	63	97	998	52	88	288	52	310	458	55	405	487	55	337	283	55

	Dongan Hills			Jefferson Ave.			Grant City			New Dorp			Oakwood Heights			Bay Terrace		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	8	3	9	6	5	9	4	4	9	7	13	9	13	0	9	20	1	9
6-10	61	75	11	27	76	11	45	76	11	195	84	11	155	41	11	42	45	11
10-15	89	58	10	50	42	10	52	52	10	141	198	10	91	155	10	91	30	10
15-19	230	71	12	164	40	12	147	49	12	329	154	12	333	121	12	331	24	12
19-24	111	21	13	86	17	13	87	21	13	150	40	13	146	20	13	139	9	13
TOTAL	499	228	55	333	180	55	335	202	55	822	489	55	738	337	55	623	109	55

	Great Kills			Eltingville			Annadale			Huguenot			Prince's Bay			Pleasant Plains		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	17	4	9	16	2	9	11	3	9	10	2	8	23	0	9	11	1	9
6-10	124	55	11	182	85	11	100	26	10	278	9	11	119	10	11	75	5	11
10-15	225	57	10	148	43	9	107	13	10	107	36	10	75	14	10	80	11	10
15-19	821	171	19	594	56	14	569	32	14	634	121	14	251	21	14	288	13	13
19-24	225	23	14	176	30	14	157	12	14	173	4	14	72	1	13	66	10	14
TOTAL	1,412	310	63	1,116	216	57	944	86	57	1,202	172	57	540	46	57	520	40	57

	Richmond Valley			Nassau			Atlantic			Tottenville		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	6	1	9	7	0	9	2	0	9	12	0	9
6-10	85	3	11	66	1	11	34	0	11	62	0	11
10-15	89	1	10	37	4	10	47	0	10	61	0	10
15-19	88	7	13	137	12	13	100	1	13	158	0	13
19-24	41	1	14	27	4	14	48	0	14	65	0	14
TOTAL	309	13	57	274	21	57	231	1	57	358	0	57

TOTAL	
Offs	Ons
189	194
1,841	1,892
1,700	1,903
5,674	5,709
2,089	1,795
11,493	11,493

Table 9.1.3
SIR Weekday Boardings and Alightings - To St. George

	Tottenville			Atlantic			Nassau			Richmond Valley			Pleasant Plains			Prince's Bay		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	0	30	10	1	15	10	0	18	10	0	21	10	0	24	10	0	24	10
6-10	0	181	13	1	127	11	6	113	11	3	91	11	11	183	11	9	268	11
10-15	0	81	11	1	44	10	3	35	10	3	36	10	10	81	10	8	103	10
15-19	0	58	14	2	70	15	6	70	15	8	106	14	26	85	14	11	98	14
19-24	0	25	11	0	22	11	3	22	11	2	48	12	8	40	12	4	30	12
TOTAL	0	375	59	5	278	57	18	258	57	16	302	57	55	413	57	32	523	57

	Huguenot			Annadale			Eltingville			Great Kills			Bay Terrace			Oakwood Heights		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	0	86	10	1	65	9	10	49	9	3	79	9	4	35	9	3	51	9
6-10	124	484	12	13	467	13	45	457	13	71	758	19	33	427	19	211	355	19
10-15	16	156	10	25	88	10	77	125	10	46	135	10	29	84	10	35	143	10
15-19	13	376	14	47	115	13	185	175	13	74	160	13	40	45	13	70	108	13
19-24	5	60	12	5	54	13	38	98	13	35	94	13	17	31	13	15	42	13
TOTAL	158	1,162	58	91	789	58	355	904	58	229	1,226	64	123	622	64	334	699	64

	New Dorp			Grant City			Jefferson Ave.			Dongan Hills			Old Town			Grasmere		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	8	41	9	2	41	10	5	34	10	10	31	10	1	19	10	23	15	9
6-10	216	359	18	22	203	12	19	171	12	76	241	12	74	175	12	61	192	13
10-15	82	143	10	38	61	10	25	56	10	58	91	10	62	63	10	89	51	10
15-19	94	224	14	77	84	14	64	42	14	105	83	14	133	56	14	197	66	14
19-24	68	92	13	31	30	12	29	16	12	30	37	12	32	18	12	89	30	12
TOTAL	468	859	64	170	419	58	142	319	58	279	483	58	302	331	58	459	354	58

	Clifton			Stapleton			Tompkinsville			St. George		
Time Period	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count	Off	On	Trip Count
0-6	7	20	9	6	5	9	24	12	9	421	0	9
6-10	148	170	13	50	29	10	204	6	10	4,166	0	19
10-15	59	49	10	82	24	10	237	16	10	610	0	10
15-19	118	62	13	144	24	13	337	17	13	464	0	13
19-24	70	24	13	70	7	13	124	12	13	215	0	13
TOTAL	402	325	58	352	89	55	926	63	55	5,876	0	64

TOTAL	
Offs	Ons
529	715
5,563	5,457
1,595	1,665
2,215	2,123
890	832
10,792	10,792

9.2 Bus Service

There are no MTA buses which operate direction on study portion of the Amboy Road corridor. However, there are several intersecting local and express bus lines that cross Amboy Road for service on Hylan Boulevard. Seven of these are peak hour express buses to Manhattan, three service local trips in Staten Island, and one (S89) serves peak hour commuters to and from Bayonne, New Jersey. Furthermore, the Metropolitan Transportation Authority - New York City Transit (MTA-NYCT) operates the Staten Island Railway, which runs parallel to the study corridor with four stations located between between Guyon Road and Arden Avenue. At the eastern end of the study area, between Guyon Avenue and Ainsworth Avenue, the railway runs parallel to Amboy Road approximately ¼ mile to the south. Amboy Road crosses underneath the railway just west of Ainsworth Avenue and for the remainder of the corridor, the railway runs parallel to its north; varying in distance from ¼ to ½ mile. Figure 9.2.1 presents the bus routes in the vicinity of the study area.

Figure 9.2.1: Bus Routes in the Study Area

The corridor is not directly served by a bus route, but is near several SIRR stations. The only bus movements onto or off of Amboy are between Giffords Lane and Nelson Avenue, where the X7 and X8 express buses and S54 local bus use Amboy for one block to continue along their north/south routes from Hylan Boulevard (SIRR tracks prohibit access on Nelson north of Amboy Road and south of Amboy, Giffords Lane becomes Brown Avenue, a narrow and local one way northbound street).

All of the corridor-intersecting bus routes run either down Arden Avenue, Richmond Avenue, or Giffords Lane/Nelson Avenue to and from service on Hylan Boulevard.

Tables 9.2.1 and 9.2.2 present the frequency of northbound and southbound bus routes, respectively. Of the eleven bus lines that intersect the study corridor, seven are Manhattan-bound commuter buses only running during peak hours (X1, X4, X5, X6, X7, X8, X24), one is a Bayonne, NJ-bound commuter bus that only runs during peak hours (S89), and three provide 6AM-midnight local service (S54, S59, S79)

Of the local-service bus routes, the S79 (crossing at Richmond Avenue) provides the most frequent service – averaging one northbound and southbound bus every 9-15 minutes during weekdays, every 11-15 minutes on Saturdays, and every 11-24 minutes on Sundays.

Table 9.2.1
Frequency of Northbound Bus Routes in Study Area

	Weekday					Saturday					Sunday				
Route	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
S54*	14	24	20	24	ns	30	30	30	30	ns	30	30	30	30	ns
S59	15	20	14	17	ns	20	20	17	20	ns	24	30	20	24	ns
S79	10	14	9	10	ns	15	12	10	11	ns	24	11	12	12	ns
S89	17	ns	24	ns	ns	No Weekend Service									
X1	ns	40	6	5	17	60	24	18	17	40	ns	30	24	20	ns
X4	ns	ns	18	20	ns	No Weekend Service									
X5	ns	ns	7	10	ns	No Weekend Service									
X6	ns	ns	180	12	ns	No Weekend Service									
X7	ns	ns	20	20	ns	No Weekend Service									
X8	ns	ns	11	24	ns	No Weekend Service									
X24**	14	ns	ns	ns	ns	No Weekend Service									

Notes: Time Periods: AM= 7-9 AM, Noon= 11 AM-1 PM, PM= 4-7 PM, Eve= 7-9 PM and Night= Midnight – 4 AM
ns = no service during time period. *extra AM service on school days **private line

Source: NYCT Bus Schedule

Table 9.2.2
Frequency of Southbound Bus Routes in Study Area

	Weekday					Saturday					Sunday				
Route	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night	AM	Noon	PM	Eve	Night
S54*	17	20	30	30	ns	30	30	30	30	ns	60	30	30	30	ns
S59	14	20	14	24	50	15	20	14	20	50	24	30	30	30	ns
S79	9	14	9	17	ns	11	12	7	14	ns	15	10	8	15	ns
S89	40	ns	12	30	ns	No Weekend Service									
X1	6	15	24	40	ns	17	20	18	30	ns	30	30	ns	ns	ns
X4	17	ns	ns	ns	ns	No Weekend Service									
X5	11	ns	ns	ns	ns	No Weekend Service									
X6	12	ns	ns	ns	ns	No Weekend Service									
X7	15	ns	ns	ns	ns	No Weekend Service									
X8	8	ns	ns	ns	ns	No Weekend Service									
X24**	ns	ns	13	14	ns	No Weekend Service									

Notes: Time Periods: AM= 7-9 AM, Noon= 11 AM-1 PM, PM= 4-7 PM, Eve= 7-9 PM and Night= Midnight - 4 AM
ns = no service during time period. *extra AM service on school days **private line

CHAPTER 10 SHORT TERM IMPROVEMENTS

NYCDOT developed short-term and long-term improvement measures for the corridor. The short term measures included signal timing and phasing changes, installation of left turn bays, channelization, lane realignment, turn prohibition, and bus route changes. These improvements were mostly implemented during July and August 2009. At a community meeting in October 2009, feedback was generally positive, with a few concerns at one location (Amboy Road and Richmond Avenue).

10.1 Signal Timing Adjustments

Figure 10.1.1 shows the locations where signal timing was adjusted along the Amboy Road corridor. Table 10.1.1 summarizes the implemented signal timings changes, adjusted to minimize delays and improve progression throughout the AM, Midday, PM and Saturday Midday peak hours.

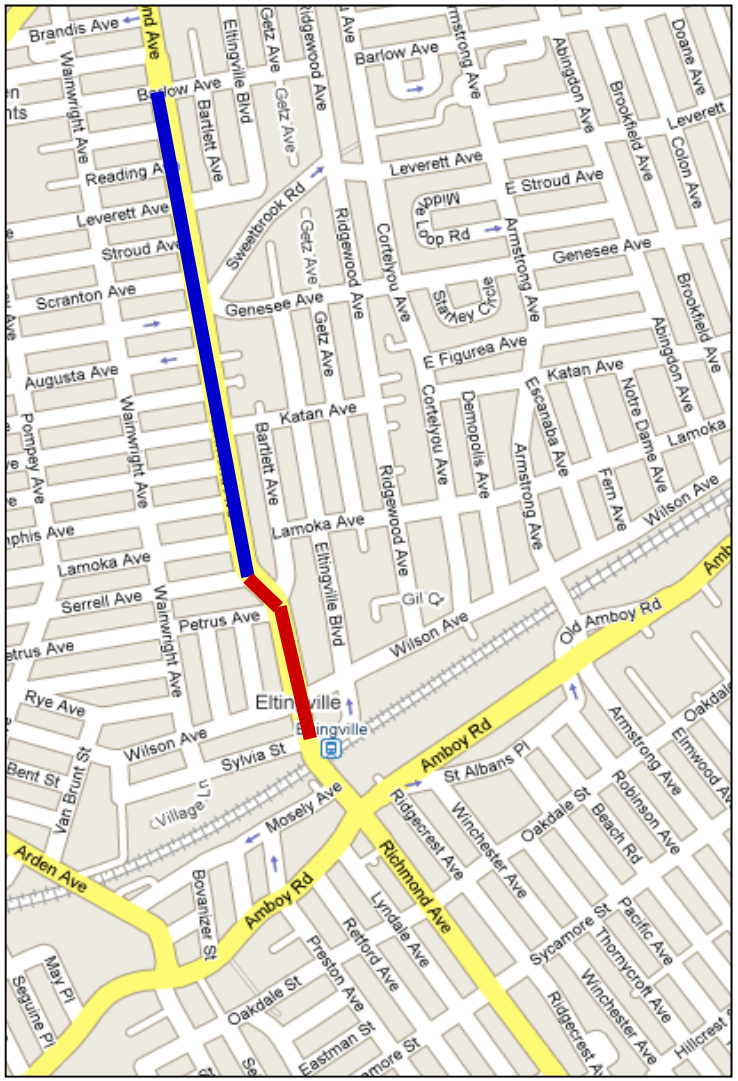
Table 10.1.1
Signal Timing and Offset Improvements

Intersection	AM	MD	PM	SAT MD
Amboy Road @ Guyon Avenue	Shift 4 seconds of green time from NB phase to EB/WB phase		Shift 4 seconds of green time from EB/WB phase to NB phase	
Amboy Road @ Clarke Avenue				Shift 6 seconds of green time from EB/WB phase to NB/SB phase
Amboy Road @ Montreal Avenue	Shift 3 seconds of green time from SE phase to EB/WB phase		Shift 5 seconds of green time from NB/SB phase to EB/WB phase	Shift 4 seconds of green time from NB/SB phase to EB/WB phase
			Shift 3 seconds of green time from SE phase to EB/WB phase	
Amboy Road @ Riveria Plaza	Shift 6 seconds of green time from NB phase to EB/WB phase	Shift 6 seconds of green time from SB phase to EB/WB phase	Shift 6 seconds of green time from SB phase to EB/WB phase	Shift 10 seconds of green time from SB phase to EB/WB phase
Amboy Road @ Justin Avenue	Shift 6 seconds of green time from NB phase to EB/WB phase	Shift 6 seconds of green time from NB phase to EB/WB phase	Shift 6 seconds of green time from NB phase to EB/WB phase	Shift 6 seconds of green time from NB phase to EB/WB phase
Amboy Road @ Timber Ridge Drive	Shift 10 seconds of green time from SB phase to EB/WB phase	Shift 10 seconds of green time from SB phase to EB/WB phase	Shift 6 seconds of green time from SB phase to EB/WB phase	Shift 10 seconds of green time from SB phase to EB/WB phase
Amboy Road @ Evergreen Shopping Plaza	Shift 6 seconds of green time from SB phase to EB/WB phase			
Amboy Road @ Keegans Lane	Shift 5 seconds of green time from NB phase to EB/WB phase			Shift 4 seconds of green time from NB phase to EB/WB phase
Amboy Road @ Great Kills Road		Shift 4 seconds of green time from NB/SB phase to EB/WB phase	Shift 3 seconds of green time from NB/SB phase to EB/WB phase	Shift 3 seconds of green time from NB/SB phase to EB/WB phase
Amboy Road @ Giffords Lane/Brown/Cleveland Avenues	Shift 4 seconds of green time from EB/WB phase to SB phase		Shift 4 seconds of green time from SB phase to EB/WB phase	
Amboy Road @ Nelson Avenue	Shift 5 seconds of green time from EB/WB phase to NB/SB phase	Shift 4 seconds of green time from EB/WB phase to NB/SB phase	Shift 4 seconds of green time from EB/WB phase to NB/SB phase	Shift 4 seconds of green time from EB/WB phase to NB/SB phase
Amboy Road @ Lindenwood Road		Shift 4 seconds of green time from NB/SB phase to EB/WB phase	Shift 4 seconds of green time from NB/SB phase to EB/WB phase	Shift 3 seconds of green time from NB/SB phase to EB/WB phase
Amboy Road @ Richmond Avenue	Shift 5 seconds of green time from EB/WB phase to NB phase	Shift 5 seconds of green time from NB/SB phase to EB/WB phase	Shift 1 seconds of green time from SB phase to EB/WB phase	Shift 4 seconds of green time from SB phase to EB/WB phase
		Shift 2 seconds of green time from SB phase to EB/WB phase		
Amboy Road @ Arden Avenue	Change from 90 seconds cycle to 120 seconds cycle with 60-60 split			

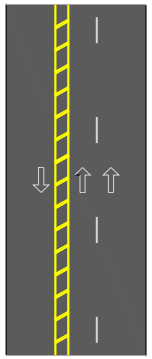
10.2 Richmond Avenue from Sylvia Street to Amboy Road

Prior to project implementation in June 2009, the northern section of Richmond Avenue between Barlow and Serrell Avenue operated with two northbound travel lanes and one southbound lane, while the southern section between Serrell Avenue and Sylvia Street operated with only one northbound lane and two southbound lanes. In order to increase the usage of a second travel lane and eliminate unnecessary merging, this proposal reversed the southern lane section to match the northern section with two north bound lanes and one southbound lane. The layout is presented in Figure 10.2.1.

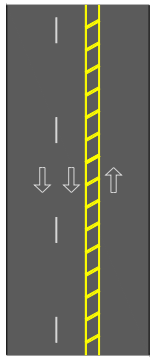
This purpose of this action is to provide increased capacity for Richmond Avenue in the northbound direction. At the intersection of Richmond Avenue and Amboy Road, the southbound approach gets more green time than the northbound approach because of the southbound left-turn phase. This is described in more detail in the following section.



Richmond Ave from Barlow Ave to Serrell Ave:



PREVIOUS: Richmond Ave from Serrell Ave to Sylvia St:



REVERSED LANE ARRANGEMENT: Richmond Ave from Serrell Ave to Sylvia St:

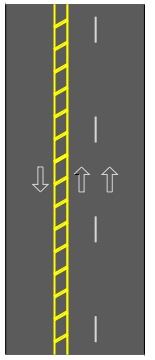


Figure 10.2.1: Improvements on Richmond Avenue from Sylvia Street to Amboy Road.

10.3 Richmond Avenue and Amboy Road

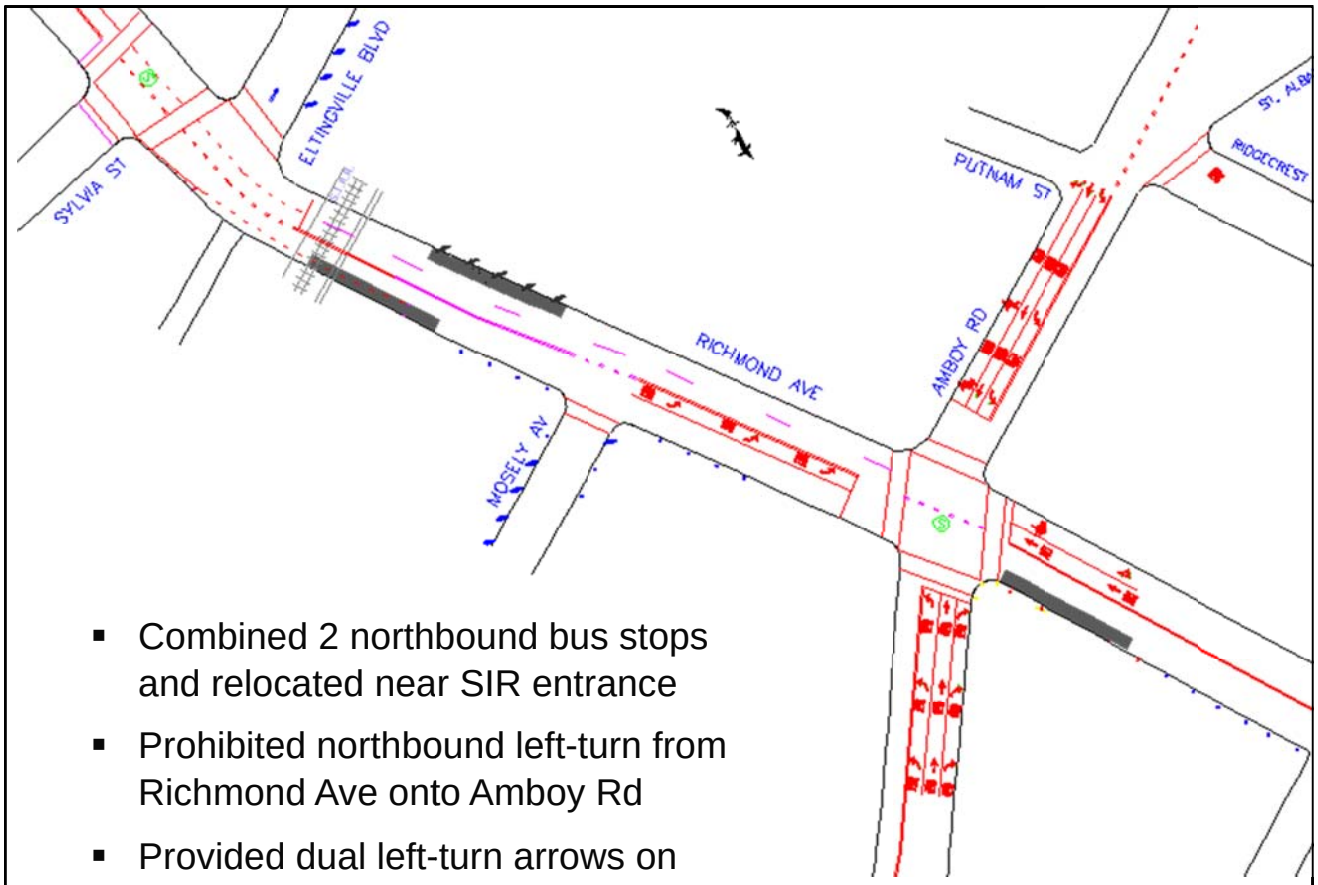
The intersection of Richmond Avenue and Amboy Road was previously experienced chronic congested, especially during weekday AM and PM peak periods. Several improvements were implemented in June 2009 to address this.

Traffic on Richmond Avenue in the southbound direction currently receives the benefit of a protected turn phase, where northbound traffic is held with a red signal to allow the protected southbound left turn. That is the reason for providing two northbound lanes described in the previous section.

In order to accomplish this, bus stops on Richmond Avenue had to be relocated to make room for the two northbound lanes. Prior to project implementation, there were two northbound bus stops between Amboy Road and the downstream intersection of Eltingville Boulevard. One was located on the far side Amboy Road. This served the S59 and S79 bus routes. The other was on the near side of Eltingville Avenue. This served the S59, S79 and S89 bus routes as well as a drop-off bus stop for several express busses. The frequency of the bus arrivals in combination with the proximity of the two bus stops significantly added to the traffic delay. In addition, the southbound side of Richmond Avenue needs to flare to two lanes approaching Amboy Road (one exclusive left and one shared through-right). In order to accommodate this proposal and minimize delays due to bus maneuvers, the two bus stops were combined into one and relocated near the Staten Island Railrway entrance. This bus-stop relocation required basic signage removal and relocation, as well as the removal of five metered parking spaces on the east side of Richmond Avenue and three on the north side of Eltingville Boulevard. However, six additional metered parking were provided on the north side of Moseley Avenue, three on the south side of Moseley Avenue, fifteen on the south side of Eltingville Boulevard and three on the north side Wilson Avenue.

In addition, to further reduce delays, the project banned northbound left turns from Richmond Avenue onto Amboy Road. There were 30, 35, 50, 70 northbound left-turning vehicles for the existing AM, MD, PM and SAT peak periods, respectively. This proposal required the installation of new signs and the remarking of the lane movements. Because of this ban, northbound vehicles who desire to turn left onto Amboy Road are instead re-routed to make the left at Oakdale Street, one block south of Amboy Road. This is discussed in the following section.

For a schematic drawing of this improvement, see Figure 10.3.1.



- Combined 2 northbound bus stops and relocated near SIR entrance
- Prohibited northbound left-turn from Richmond Ave onto Amboy Rd
- Provided dual left-turn arrows on Amboy Rd at Richmond Ave
- Created 19 additional metered parking spaces
  - Removed 5 on east side of Richmond Ave
  - Added 6 on north side of Mosely Ave
  - Added 3 on south side of Mosely Ave
  - Added 15 on south side of Eltingville Blvd
  - Removed 3 on north side of Eltingville Blvd
  - Added 3 on north side of Wilson Ave

The project also changed the phasing of the east-west direction of Amboy Road. Figure 10.3.2 presents the previous and improved signal timing. A leading dual protected left-turn phase was implemented. This give left turns the opportunity to turn without having to yield to oncoming traffic with a green left arrow, shown in Phase 1 of the improved timing.

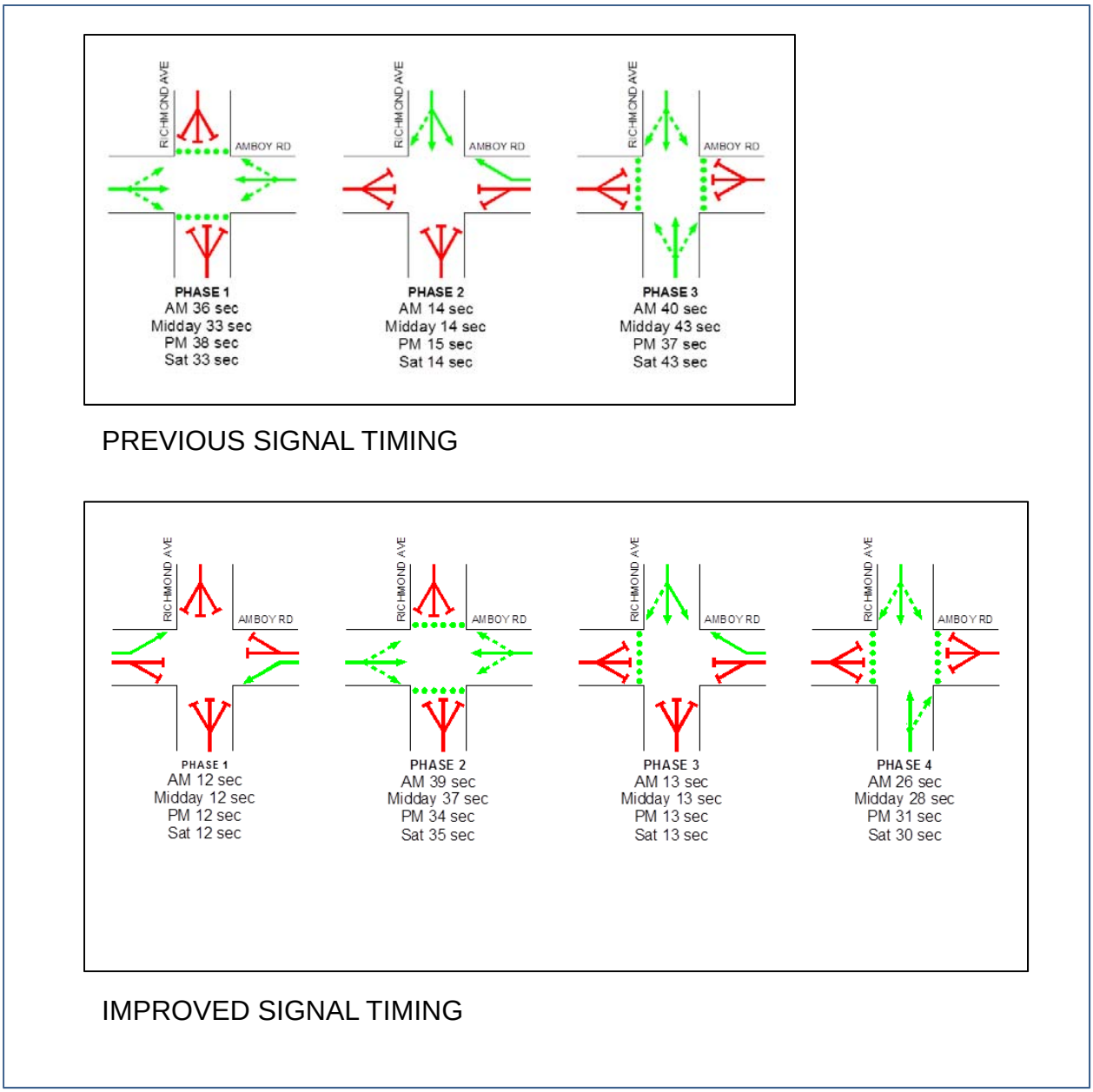


Figure 10.3.2: Signal Timing at Richmond Avenue and Amboy Road.

10.4 Richmond Avenue and Oakdale Street

Because of the northbound left-turn ban at Richmond Avenue and Amboy Road, vehicles desiring to head west onto Amboy Road would be required to instead make the left turn onto Oakdale Street, then a right onto Arden Avenue and another left onto Amboy Road. The diverted route is presented in Figure 10.4.1.

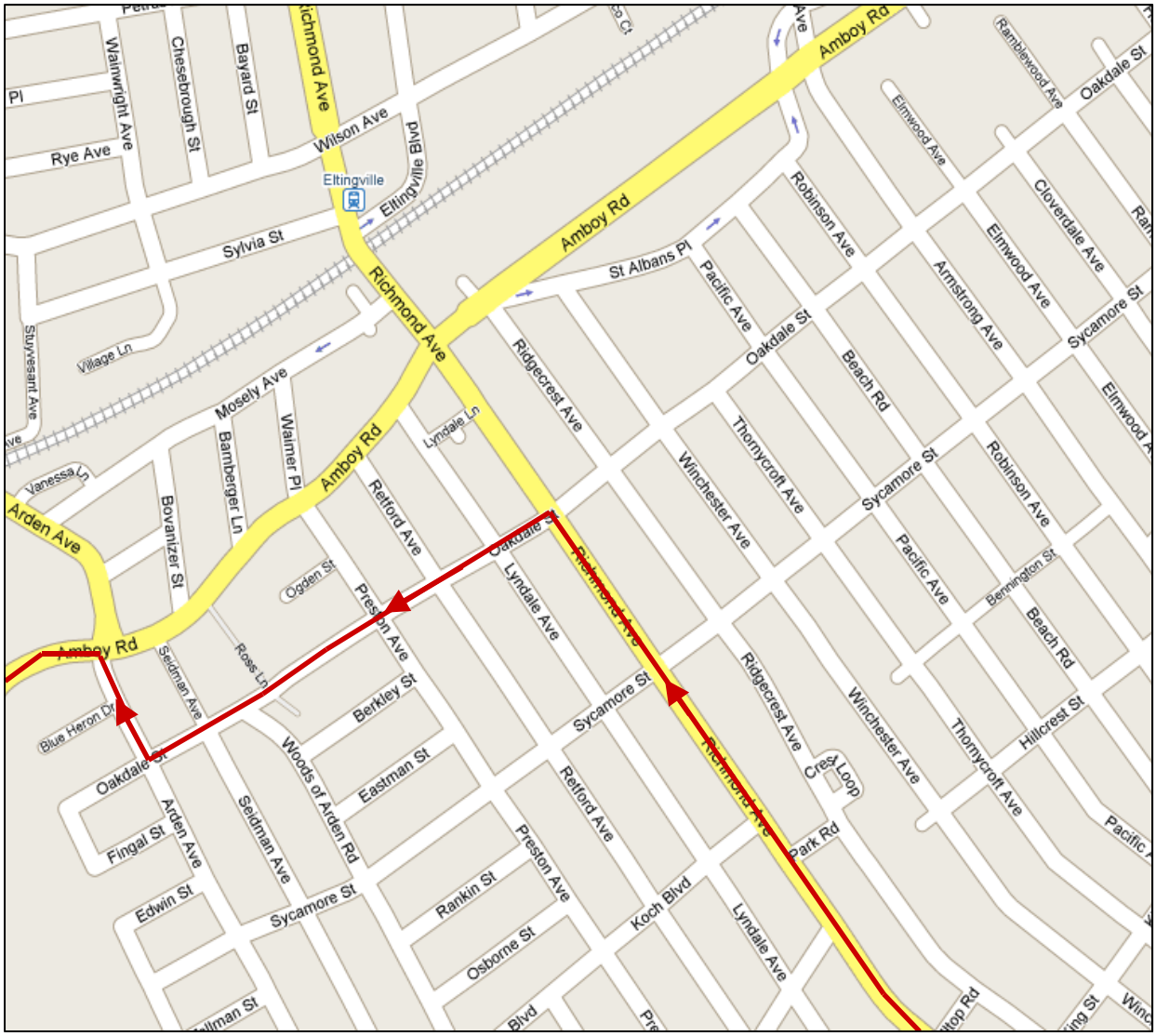
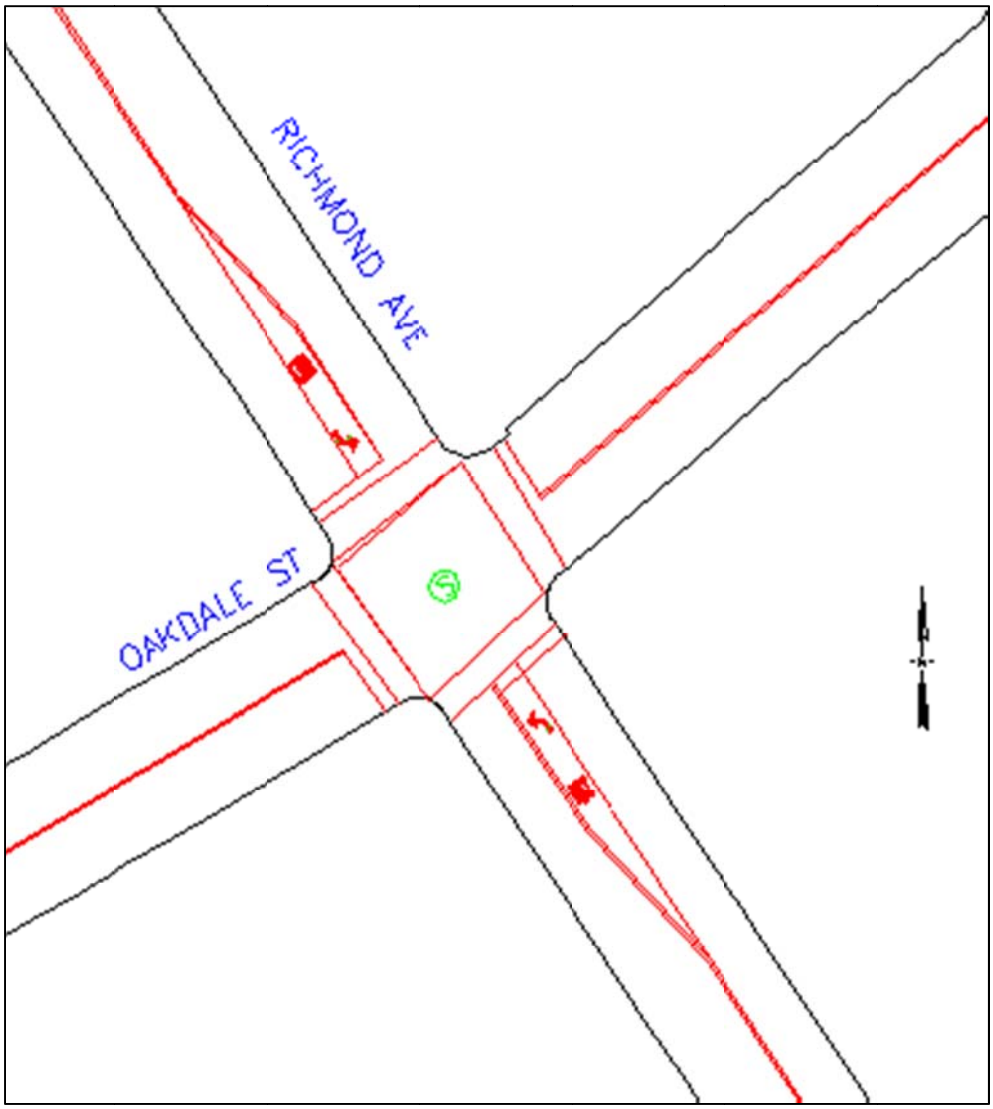


Figure 10.4.1: Diverted Route Due to Northbound Left-turn Ban at Richmond Avenue and Amboy Road.

In order to accommodate the increased northbound left turning volume from Amboy Road to Oakdale Street, left-turn bays were added to the northbound and southbound approaches. This required new pavement markings and the removal of four metered parking and two free parking spaces on Richmond Avenue. The new layout is presented in Figure 10.4.2.

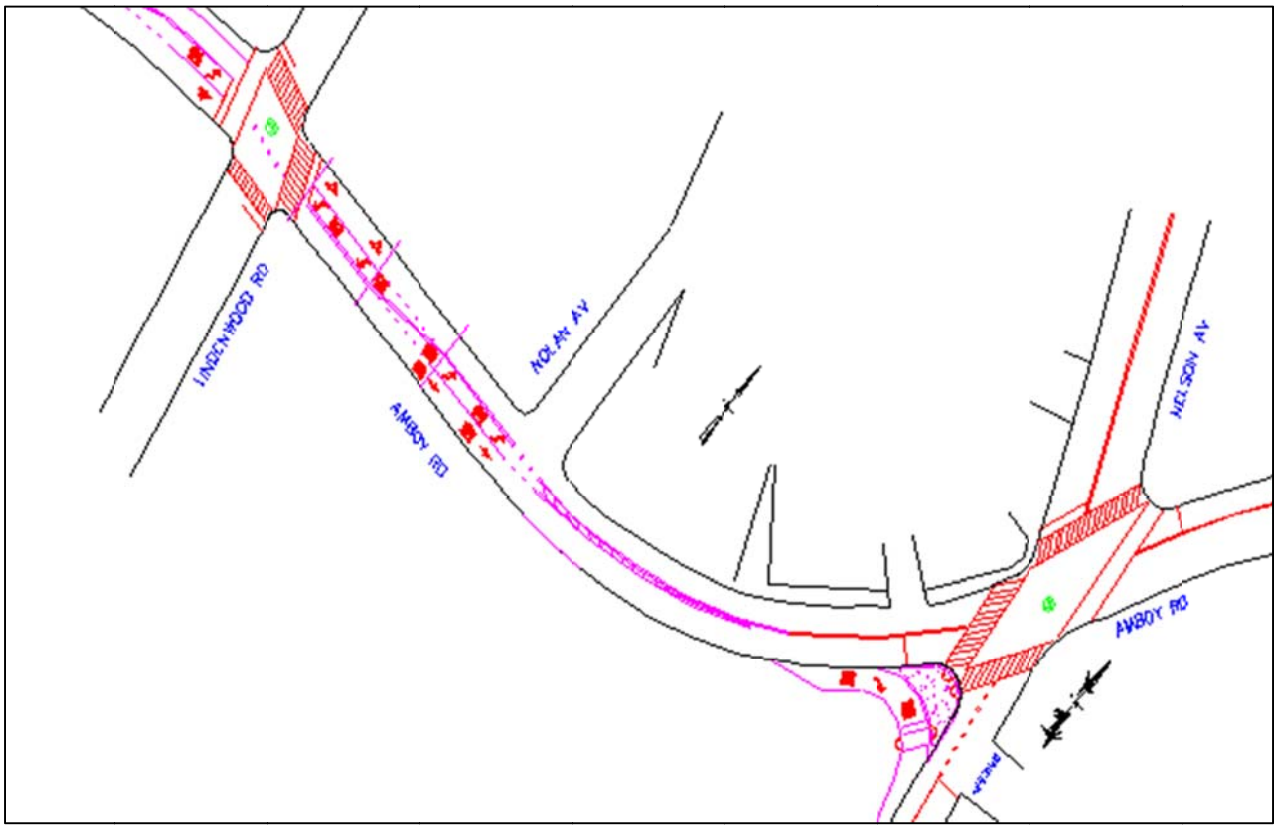


10.5 Amboy Road from Lindenwood Road to Nelson Avenue

In order to ease congestion along Amboy Road, eastbound and westbound left turn bays were implemented to the approach of Lindenwood Road, as well as an eastbound left turn bay at Nolan Avenue. Adding exclusive left turn bays to a previously shared right-through-left lane separates the left turning vehicles from blocking through traffic while they are waiting for a gap to turn. Remarking the pavement was the only work necessary for this improvement.

In addition, a right-turn channelization was implemented for the eastbound right turn at Nelson Avenue with a raised concrete channelization island. This element further reduces delays because it separates out the right-turning vehicles and allows them to proceed, even against the signal. The work required the construction of a new paved street, sidewalk and island along with the appropriate pavement markings and signage.

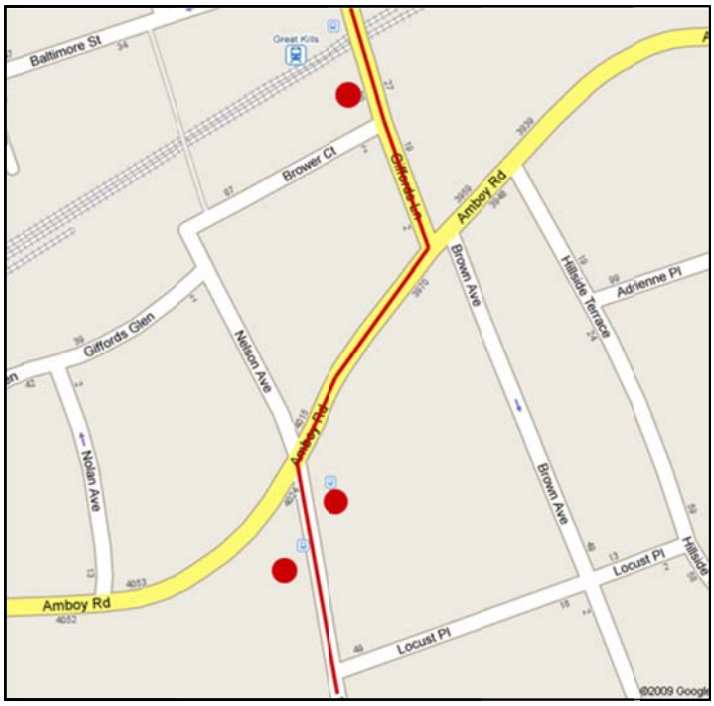
These improvements are presented in Figure 10.5.1



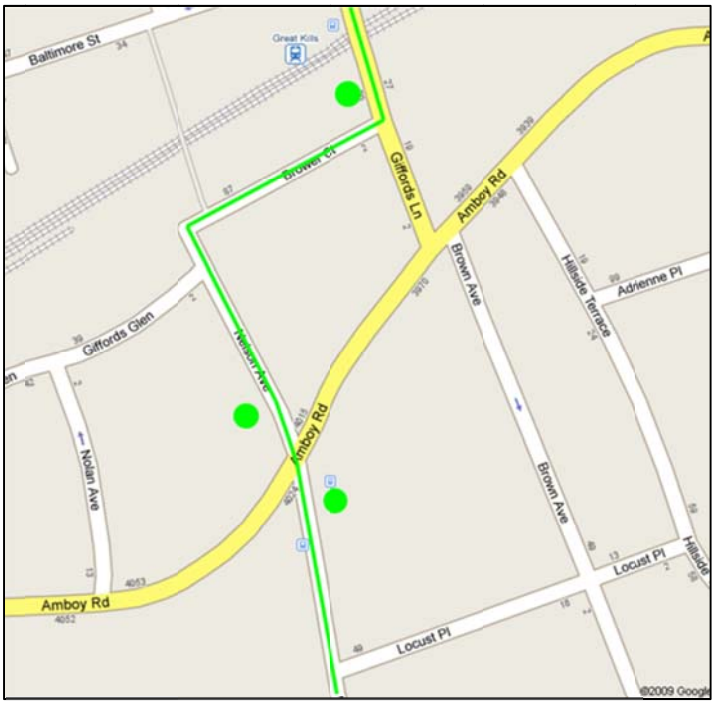
on

10.6 Amboy Road from Nelson Avenue to Giffords Lane

This section of Amboy Road is the commercial center of the Great Kills neighborhood. As such, with one lane in each direction, Amboy Road experiences congestion in this area. Nelson Avenue has one moving lane in each direction with no parking lanes and intersects Amboy Road at a skewed angle. The bus stop at Amboy Road and Nelson Avenue serves the S54, X7 and X8 busses, for a maximum of about 22 busses stopping in the AM and PM peak hours. Prior to implementation, the northbound S54 bus made a northbound right turn onto Amboy Avenue and then a left onto Giffords Lane and the sounthbound bus turned right from Giffords Lane onto Amboy Road. The eastbound stop bar, therefore, was located 50 feet from the intersection and the southbound stop bar was 40 feet, increasing loss time. Furthermore, buses waiting to turn caused back-ups for through vehicles behind the bus. In order to allow traffic to move more smoothly on both Nelson Avenue and Amboy Road, the S54 bus was re-routed to head straight onto Nelson Avenue, then turn right onto Brower Court and continue left onto Giffords Lane. In addition, the southbound bus stop at Nelson Avenue was relocated from the south side of the intersection to the north side, which has a wider southbound lane that would allow vehicles to pass a standing bus. Figure 10.6.1 shows the previous bus route and the improved bus route.



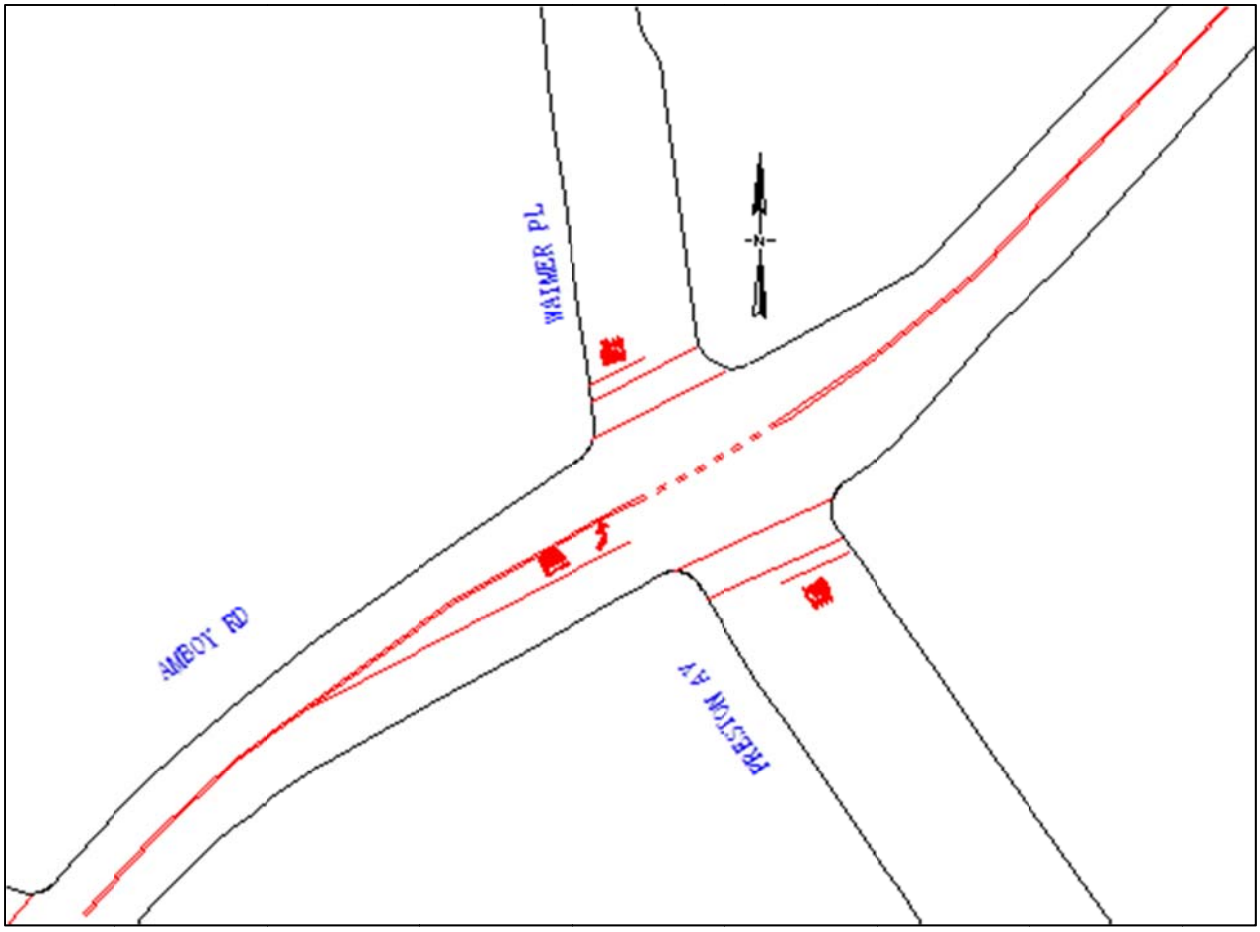
Previous Route and Stops



Improved Route and Stops

10.7 Amboy Road and Waimer Place/Preston Avenue

An eastbound left-turn bay was installed at the intersection of Amboy Road and Waimer Place/Preston Avenue to remove turning vehicles from traffic flow and further reduce congestion along Amboy Road. This location has been identified as a bottleneck, particularly during the AM peak period. This is presented in Figure 10.7.1.



CHAPTER 11 LONG TERM IMPROVEMENTS

Two locations have been identified whose improvements are more long term in nature. Both have been initiated as capital projects with the New York City Department of Design and Construction (DDC).

11.1 Amboy Road from Richmond Avenue to Armstrong Avenue (Eltingville Town Center).

Community input and traffic analysis has shown the need to improve Amboy Road from Richmond Avenue to Armstrong Avenue to expand vehicular capacity, improve safety, promote a more pedestrian friendly environment and increase economic activity within this Eltingville commercial corridor. Figure 11.1.1 is a photo of the existing condition.

Figure 11.1.1: Congested Conditions on Amboy Road Looking West Towards Eltingville Shopping Center from Old Amboy Road.

The proposed changes include road widening, provision of dedicated turning lanes, and installation of new medians and sidewalks. These concepts are illustrated in Figure 11.1.2.

Figure 11.1.2: Conceptual Plan of Amboy Road and Eltingville Town Center.

Amboy Road in this section is mapped at a width of 80 feet, but it is built to only 40 feet. These changes would require the acquisition of private property on the north side of Amboy Road. Figure 11.1.3 shows the frontage section of some properties on the north curbside of Amboy Road where road widening is being proposed.

Figure 11.1.3: Frontage of Section of Amboy Road Where Widening is Proposed.

Figure 11.1.4 presents the proposed schematic geometric design. Figure 11.1.5 presents the proposed pavement marking plan. The proposal is to create an “Eltingville Town Center,” which would promote a more pedestrian friendly environment, improve traffic and safety conditions and ultimately increase economic activity in this commercial area. The major elements of the plan include:

1. Widen the corridor of Amboy Road to 80 feet as mapped.
2. Allow for two travel lanes in each direction.
3. Install left-turn bays where needed.
4. Install new medians, plantings, sidewalks and site appurtenances that will improve safety, promote a more walkable environment and provide a “toen center” esthetic for the Eltingville neighborhood.

Preliminary design is completed. At the time of this writing, final design is currently being done by the New York City Department of Design and Construction.

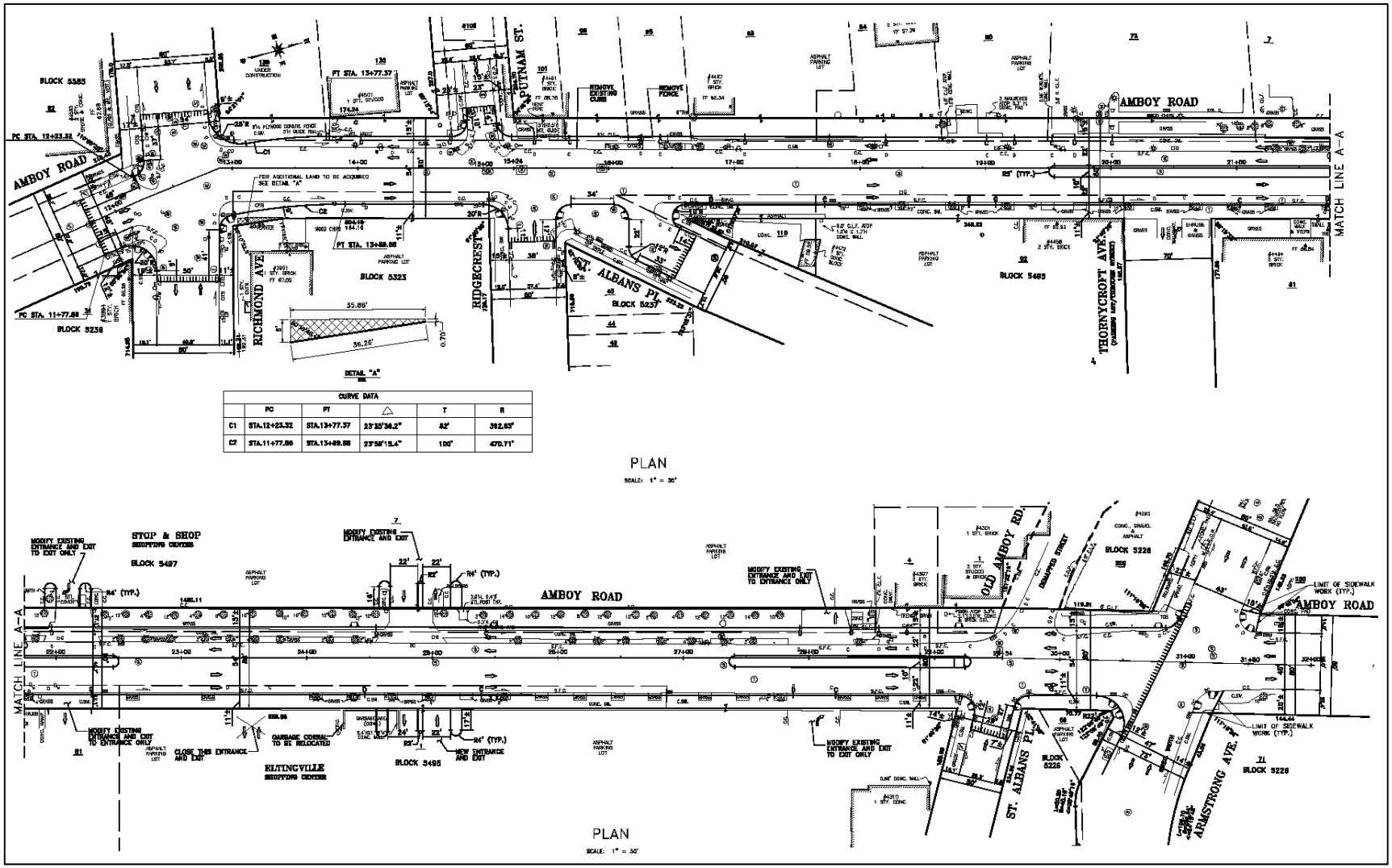


Figure 11.1.4: Proposed Schematic Geometric Design for Amboy Road between Armstrong Avenue and Richmond Avenue.

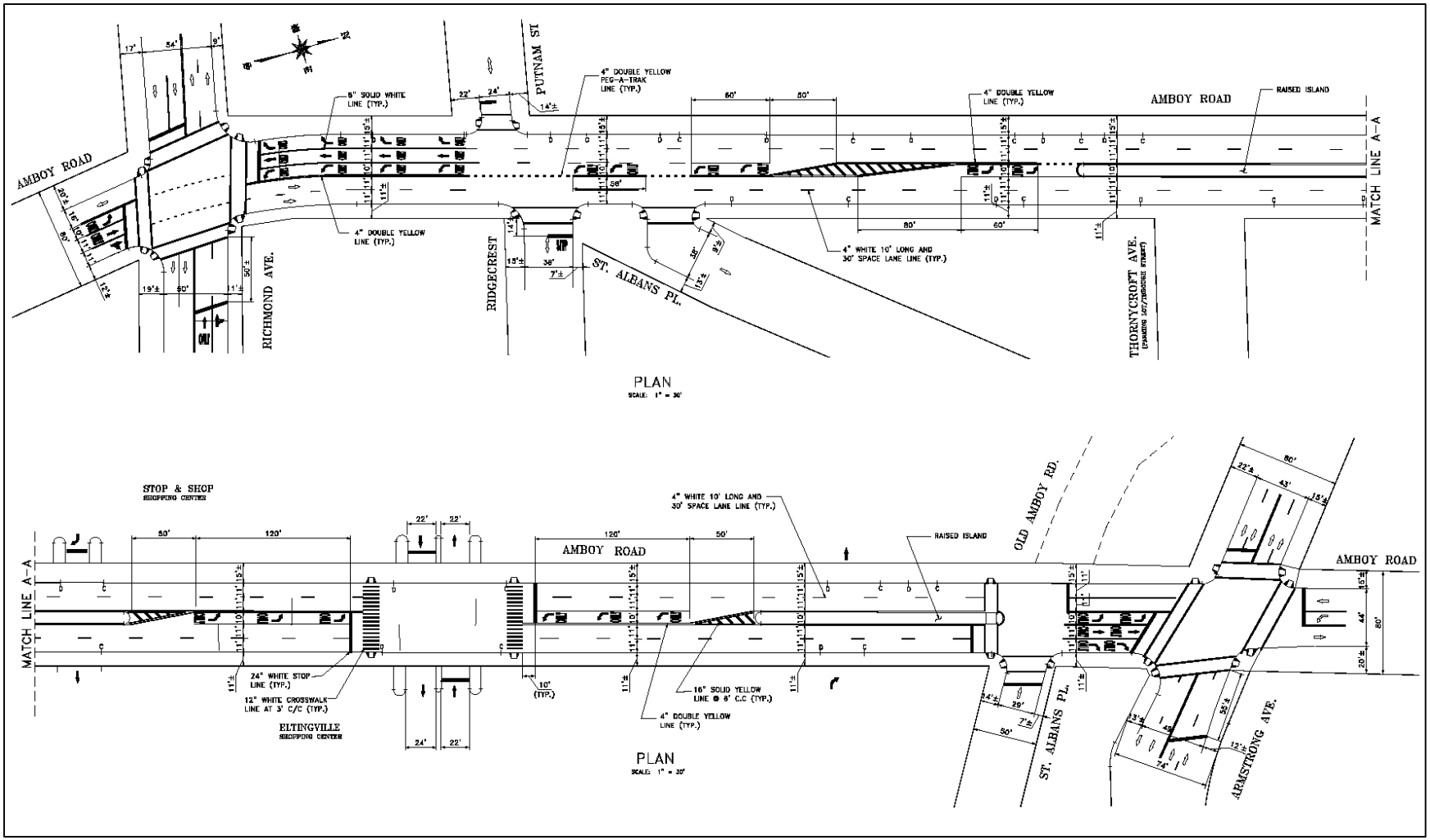
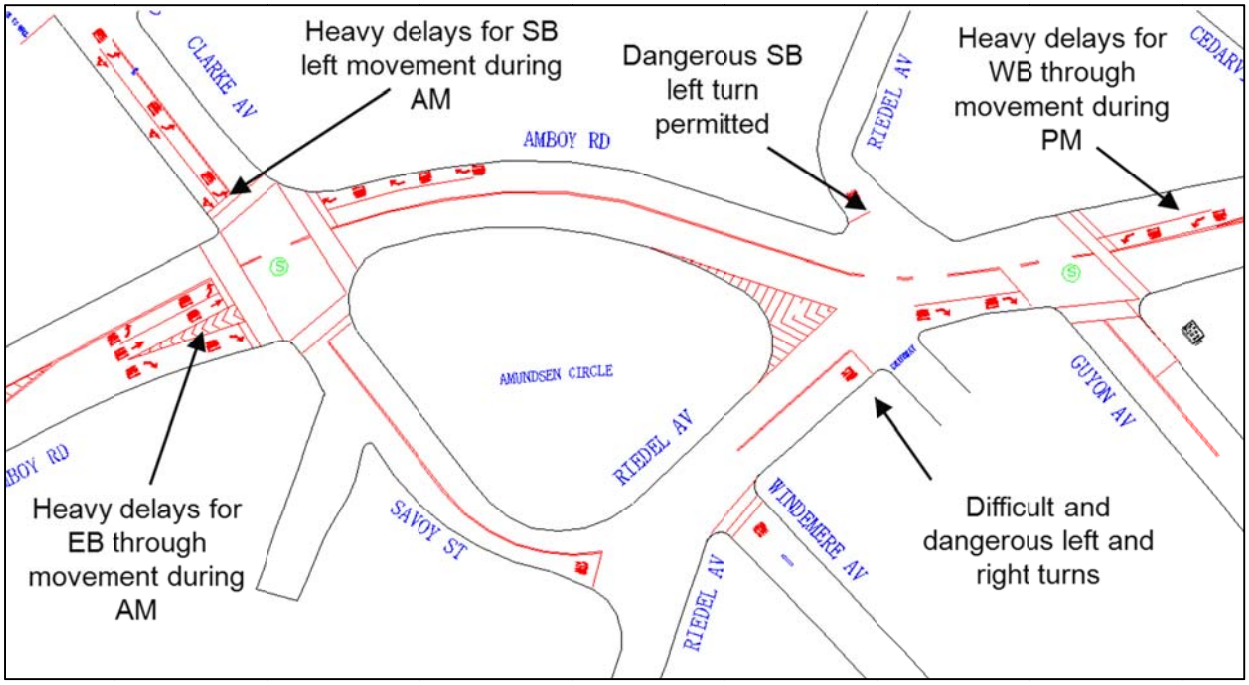


Figure 11.1.5: Proposed Pavement Marking Plan for Amboy Road between Armstrong Avenue and Richmond Avenue.

11.2 Amboy Road from Clarke Ave to Guyon Ave (Amundsen Circle)

The existing conditions along the northern section of Amboy Road from Clarke Avenue to Guyon Avenue reveal many traffic and safety issues. They are illustrated in Figure 11.2.1. During the weekday AM period, there are heavy delays for eastbound Amboy Road approaching Clarke Avenue, and for the southbound left-turn movement from Clarke Avenue onto eastbound Amboy Road. During the weekday PM period, there are heavy delays for westbound Amboy Road approaching Guyon Avenue. On Riedel Avenue approaching Amboy Road, which is a stop-controlled two-way street, northbound vehicles wanting to turn left or continue through on Riedel Avenue face a difficult and dangerous maneuver, especially because it is often impossible to pass the vehicles backed-up along Amboy Road approaching the Guyon Avenue signal. The southbound left turn from Reidel Avenue is similarly difficult and dangerous, often leaving motorists stranded in the oncoming lane. There were seven collisions at this intersection between the years 2001 and 2006.



The circular portion of Savoy Street and Riedel Avenue that borders the south side of Amundsen Circle is underused and provides an opportunity to create additional capacity and more efficient lane assignments. This is illustrated in Figure 11.2.2. By converting this semi-circular roadway from a two-way street with one lane in each direction to a one-way eastbound street (counter-clockwise around the circle) with two lanes, all eastbound traffic previously heading eastbound on Amboy would be directed to turn right onto Savoy Street. To accommodate those heavy AM volumes, the eastbound approach of Amboy Road at Clarke Avenue/Savoy Street would have two eastbound right-turn lanes (for through traffic). The southbound approach of Clark Avenue at Amboy Road would have two through lanes (one exclusive through and one shared through-right) for those vehicles who currently turn left onto Amboy Road. This also allows for the portion of Amboy Road north of the park to be converted into a three-lane westbound approach with one left, one through and one right lane approaching Clarke Avenue/Savoy Street. The southwest curb would be built out to reduce the crossing distance. In order to allow for safe turning radii and lane widths, the sidewalk along the south side of the park would be cut about 15 feet but the north side could be extended north by a comparable amount. Raised concrete channelizing islands would be built at Riedel Avenue and Savoy Street, and at Riedel Avenue at Amboy Road. Other improvements would include reversing the direction of Windemere Avenue from a northbound street to a southbound street, channelizing the left turn from northbound Reidel Avenue onto westbound Amboy Road and removing the stop sign at the northbound approach of Riedel Avenue and Amboy Road as it is no longer necessary. Prohibiting left turns from Riedel Avenue and re-assigning them to turn left at the upstream intersection of Cedarview Avenue would further ease congestion on Amboy Road.

A Capital Project Initiation (CPI) was issued in December 2013.

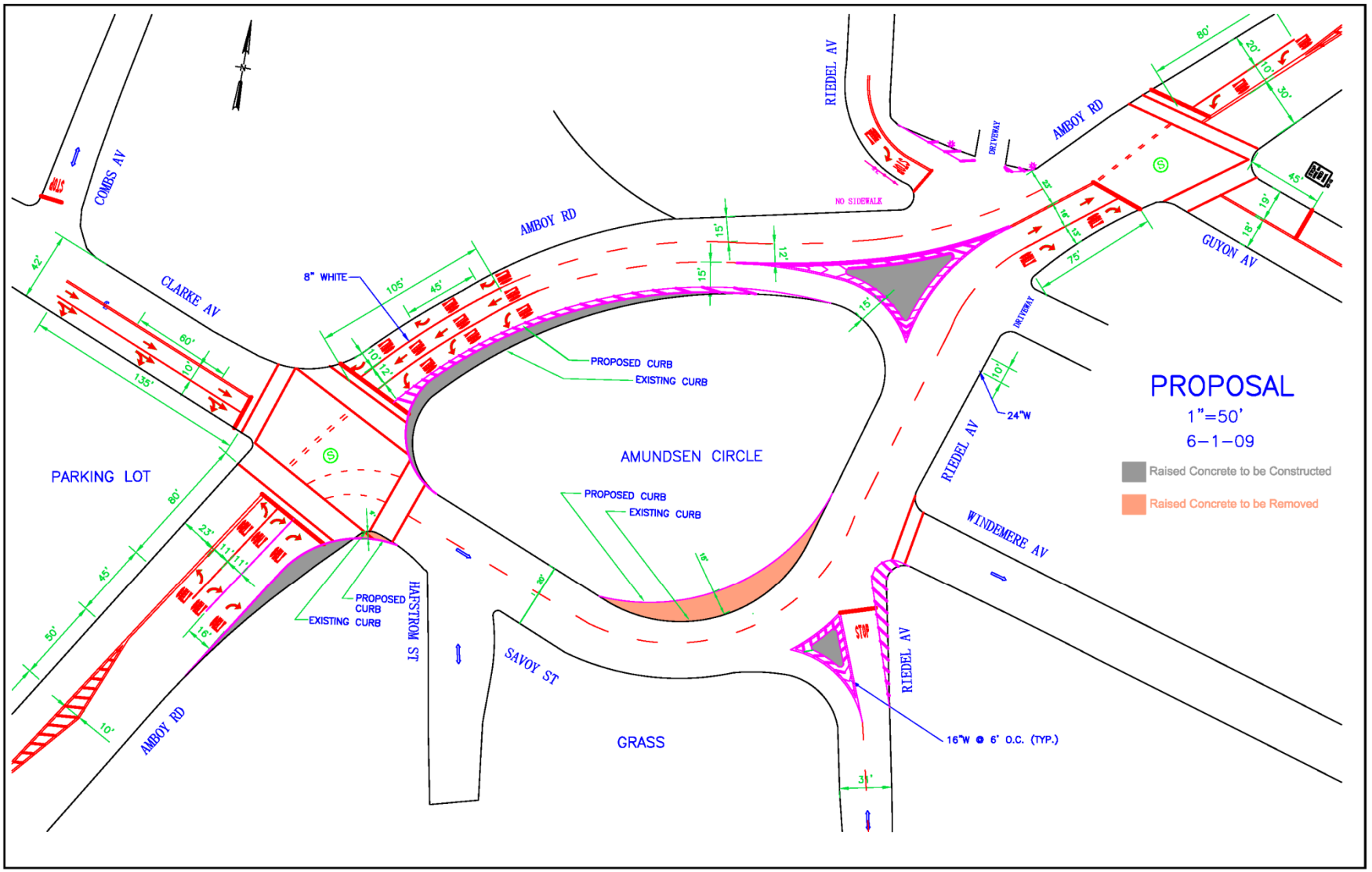


Figure 11.2.2: Proposed Improvements for Amboy Road and Amundsen Circle.

CHAPTER 12 EVALUATION OF IMPROVEMENTS

12.1 Short Term Improvements – Traffic

The short-term improvements were analyzed using the Synchro modeling software. In addition, travel time runs were conducted before and after implementation as part of the monitoring process. Most of these improvements were implemented during July and August 2009. The travel time data is presented for April 2007 (before implementation) and October 2009 (after implementation). Figure 12.1.1 presents the results for the eastbound direction from Arden Avenue to Guyon Avenue. Figure 12.1.2 presents the results for the westbound direction from Guyon Avenue to Arden Avenue.

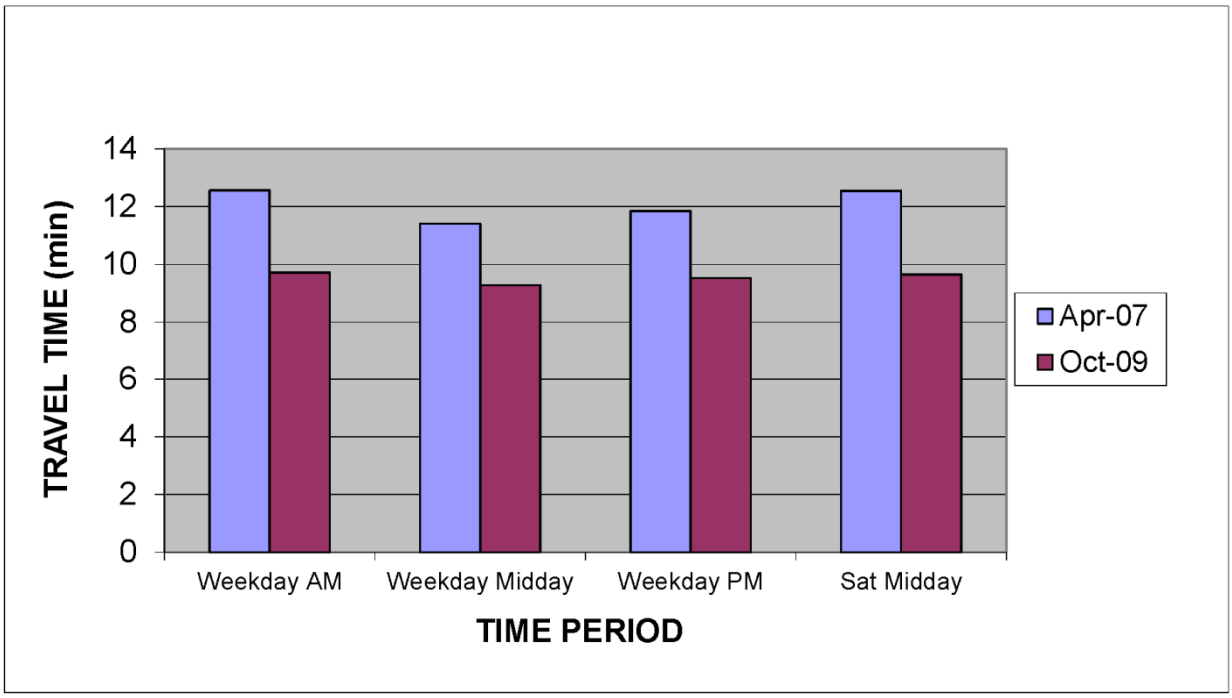


Figure 12.1.1: Average Travel Speeds for Eastbound Direction Before and After Implementation of Short Term Improvements.

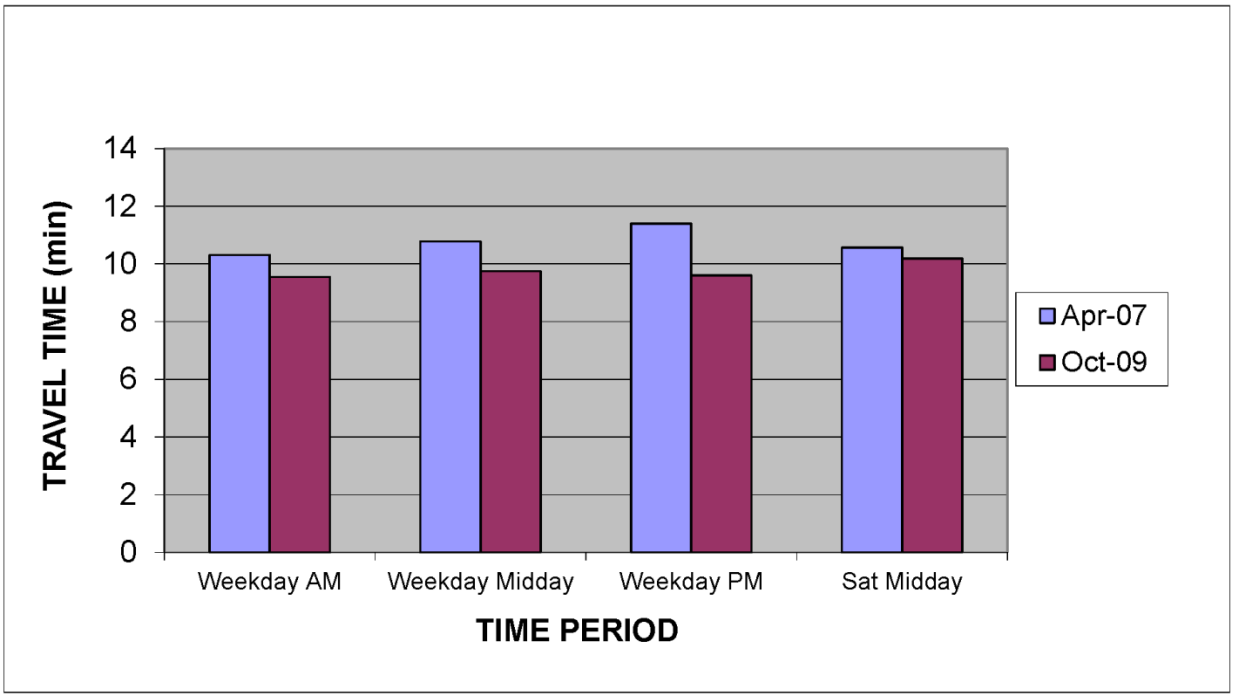


Figure 12.1.2: Average Travel Speeds for Westbound Direction Before and After Implementation of Short Term Improvements.

Table 12.1.1 presents the traffic effects of the short term improvements in terms of travel speed. shows that there were significant improvements in overall speeds during every time period. The average improvement for both eastbound and westbound runs for the four study time periods was a 18.4% increase in travel speed. The eastbound direction showed more improvement than the westbound, an average of 26.6% increase in average travel speed vs. 10.2%. For the peak directions, the eastbound direction during the weekday AM period showed an improvement in average travel speed from 13.1 mph to 16.9 mph, an increase of 29.2%. For the westbound direction during the weekday PM period, the improvement in travel speed was 14.5 mph to 17.2 mph, an improvement of 18.7%.

Table 12.1.1
Amboy Road Travel Speeds Before and After Implementation of Short-Term Improvements

	EASTBOUND				WESTBOUND			
	BEFORE SPEED	AFTER SPEED	IMPROVEMENT		BEFORE SPEED	AFTER SPEED	IMPROVEMENT	
	(mph)	(mph)	(mph)	%	(mph)	(mph)	(mph)	%
WEEKDAY AM	13.1	16.9	3.8	29.2%	16.0	17.3	1.3	8.0%
WEEKDAY MIDDAY	14.4	17.7	3.3	22.9%	15.3	16.9	1.6	10.6%
WEEKDAY PM	13.9	17.3	3.4	24.4%	14.5	17.2	2.7	18.7%
SAT MIDDAY	13.1	17.1	3.9	30.0%	15.6	16.2	0.6	3.7%

12.2 Short-Term Improvements – Safety

A crash analysis was conducted for the Amboy Road corridor from Arden Avenue to Guyon Avenue. Figure 12.2.1 presents results for total crashes and crashes with injuries. The three year before period is from June 1, 2006 to May 31, 2009. The three year after period is from September 1, 2009 to August 31, 2012. The implementation period of June 1 to August 31, 2009 is excluded.

Figure 12.2.1 presents crash analysis for three years before and three years after implementation. The results indicate that crashes after implementation increased, but the trend has reversed. There is a noticeable upward trend in total crashes before implementation, from 127 during the first before year (2006/07) to 222 during the third before year (2008/09). This is likely due to the rapid growth and resulting increase in vehicular traffic. During the three years after implementation, total crashes decreased from 211 during the first after year (2009/10) to 182 during the third after year (2011/12).

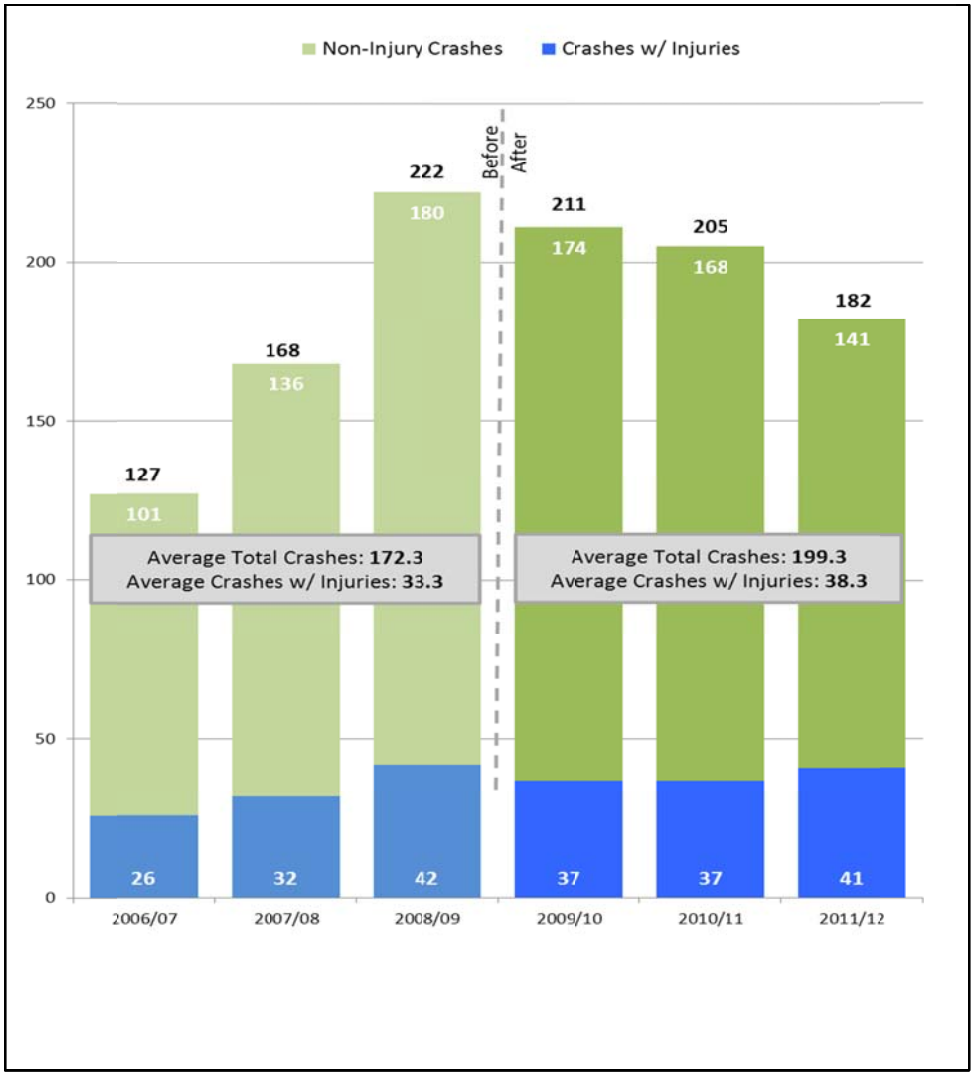


Table 12.2.1 presents the crash data that shows the details of injuries. Pedestrian injuries for the three year after period increased by 15% compared to the three year before period. Total injuries increased 10% during this time. However, as with total crashes, the three year after period shows a slight decrease in injuries compared to the one year before period.

Table 12.2.1

Crashes and Injuries
Three-Year After Analysis, Amboy Rd (Arden Ave to Guyon Ave)

	Before				After				Change	
	'06/ '07	'07/ '08	'08/ '09	Average	'09/ '10	'10/ '11	'11/ '12	Average	Actual	Percent
Total Crashes	127	168	222	**172.3**	211	205	182	**199.3**	27.0	**16%**
Crashes w/ Injuries	26	32	42	**33.3**	37	37	41	**38.3**	5.0	**15%**
Motor Vehicle Occupant	29	40	53	**40.7**	45	37	49	**43.7**	3.0	**7%**
Pedestrian	4	5	11	**6.7**	4	6	13	**7.7**	1.0	**15%**
Cyclist	0	0	0	**0.0**	1	0	1	**0.7**	0.7	**N/A**
Total Injuries	33	45	64	**47.3**	50	43	63	**52.0**	4.7	**10%**

12.3 Long Term Improvements

Level of Service traffic analysis was conducted for the long term capital improvement. Under the improvement scenario, Amboy Road between Armstrong Avenue and Richmond Avenue would operate as a four lane roadway with two travel lanes in each direction with a raised median and left turn bays. Analysis was performed for the future condition for the years 2015 and 2035 at all intersections within the project limits.

CHAPTER 13 CONCLUSION

In the development of improvements, every attempt was made to include as many multimodal elements as is practically possible because of the conflicting needs of street users. Following the Complete Street concept, emphasis is placed on safety and operation of all street users, including pedestrians, cyclists, transit users, and motorists.

Improvement measures have been developed, evaluated and proposed for implementation within the confines of existing constraints. Community feedback was instrumental in identifying problems and refining solutions. It is anticipated that the improvements will benefit all users along the Amboy Road study corridor.

The short term improvements have already been implemented and monitored. The long term improvements are projected to be implemented in 2016.