

TRAFFIC IMPACT STUDY

Proposed Commercial Redevelopment

Wendy's ***Restaurant***

Cranston, Rhode Island

Prepared for:

Mr. Michael Grilo
Picerno Real Estate Group
75 Lambert Lind Highway
Warwick, Rhode Island 02886

November, 2012

November 19, 2012

Mr. Michael Grilo
Picerne Real Estate Group
75 Lambert Lind Highway
Warwick, Rhode Island 02886

Re: *Wendy's* Restaurant
Reservoir Avenue
Cranston, Rhode Island

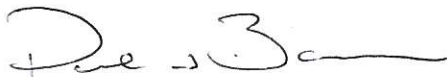
Dear Mr. Grilo:

RAB Professional Engineers, Inc., in accordance with our scope of services has completed a traffic impact study for the redevelopment of a commercial property in the City of Cranston, Rhode Island. The site is located on the easterly side of the Reservoir Avenue (Route 2) north of Nowell Road at 950 Reservoir Avenue, which contains the *Cranston Professional Building*. The property is defined by Assessors Plat 9-3, Lots 2901, 3361 and 2899 and contains approximately 0.95 acres of land.

The site redevelopment project will combine two developed properties into one lot to allow construction of a building containing a *Wendy's* restaurant. Existing buildings on the properties have been or will be razed to permit construction of the new restaurant. Access to the business will be provided at two curb openings on Reservoir Avenue with an entrance and exit driveway.

The study included herein, was conducted to determine the adequacy of the existing servicing roadway to accommodate anticipated traffic to be generated by the commercial redevelopment project. An analysis of potential impacts to the roadway capacity and safety has been completed, and is discussed in the following report.

Sincerely,
RAB Professional Engineers, Inc.



Paul J. Bannon
President



Judith Zimmerman-Resch
No. 6813
REGISTERED
PROFESSIONAL ENGINEER
Senior Transportation Engineer

Introduction

The objective of the following study is to assess the potential traffic impacts associated with a proposed *Wendy's* restaurant development in the City of Cranston, Rhode Island. The property is situated on a parcel of land on the on the easterly side of the Reservoir Avenue (Route 2), immediately north of Nowell Road. Refer to the Figure 1 on the following page for the project vicinity in the city.

The commercial business proposal will consist of combining three platted lots and removing one remaining building on the property to permit construction of a 2,000 square foot *Wendy's* restaurant. The new restaurant will have seating for approximately 70 patrons, and include a drive-thru window situated on the northerly side of the building. Parking will be provided for 39 vehicles, and access to the parking lot will be limited to two driveway openings on Reservoir Avenue permitting one-way site circulation.

The study summarized herein focused on both traffic flow efficiency and safety along the main servicing roadway in the immediate vicinity of the property, Reservoir Avenue. The impacts associated with the site related traffic have been defined and evaluated in accordance with the standard traffic engineering guidelines and procedures.

The traffic engineering study completed for this project included the following:

- Record traffic data from the Rhode Island Department of Transportation (RIDOT), was reviewed to define existing traffic patterns on Reservoir Avenue. For this study a manual turning movement count was conducted by RAB at the intersection of the Reservoir Avenue with Nowell Road during the daily midday and afternoon peak periods.
- Accident records obtained from the City of Cranston Police Department were analyzed to define potential safety issues along the section of Reservoir Avenue in the project area.
- An inventory of the physical roadway characteristics of Reservoir Avenue in the site vicinity was conducted to determine the adequacy of the existing roadway geometric features in reference to safety and capacity.

Wendy's Restaurant



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10 Ross Simons Drive
Cranston, RI 02920
401.463.4100

Proposed Restaurant

950 Reservoir Avenue
Cranston, Rhode Island

Figure 1
Vicinity Map

- Future traffic volumes for the proposed commercial development were estimated using data from the 8th Edition of the “Trip Generation Manual”, an informational report published by the Institute of Transportation Engineers (ITE) and from data obtained at existing *Wendy's* restaurants in the region.
- Evaluation and analysis of the traffic safety and capacity issues were performed for future conditions.
- Recommendations were developed, where necessary, that would be required to maintain safe and efficient traffic flow in the project area.

Project Area

As noted in the previous section, the *Wendy's* restaurant is proposed on a property situated at 950 Reservoir Avenue. The subject lots are defined by Assessors Plat 9-3, Lots; 2901, 3361 and 2899 and contain approximately 0.95 acres of land. Two lots combine to form the *Cranston Professional Building* property, while the third smaller lot is currently vacant. Figure 2 on the following page depicts the general project area, and the property boundaries of the subject parcels.

Land use in the immediate area can be defined as primarily commercial along the frontage of Reservoir Avenue. The properties in the site vicinity include *Babkirk Professional Building* immediately south of the site, *Jacky's Galaxie Restaurant* on the northwest corner of Nowell Road, and *Tiffany Place Salon*, north of the site. Other businesses include a *Shell* gas station, *Hair Transplant Associates*, *Flagship Mortgage Corporation*, *D'Angelo's Restaurant*, *Roman Jewelers*, *Salon Ellie Rose* and *ReMax*.

Reservoir Avenue will serve as the main access route to the new business. Based upon the volume and operating characteristics of this roadway, and the proposed commercial use of the property, a study impact area was defined for this project. The limits of our analysis focused on Reservoir Avenue between Aqueduct Road and Hazelwood Street.

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Figure 2
Study Area

Reservoir Avenue

Reservoir Avenue (Route 2) is a major north/south arterial in the project area connecting to Route 10 to the north and Route 37 to the south. The roadway is 65 feet wide and consists of two through lanes for both the northbound and southbound direction, separated by a two-foot median area. No separate lanes are available for turning vehicles in the project area. An 8-foot parking lane is provided on both sides of the road. Granite curbing and concrete sidewalks are



located on both sides of the road. Utility poles with cobra head lighting are located along the east side of the road. These physical features of Reservoir Avenue can be seen in the above photograph looking south towards Nowell Road.

The pavement condition can be classified as fair providing an acceptable riding surface. The speed limit is posted at 35 miles per hour (mph) on Reservoir Avenue in the site vicinity. The nearest traffic signal is located at the intersection of Reservoir Avenue with Nowell Road, immediately south of the site.

Safety Analysis

The horizontal and vertical alignment of Reservoir Avenue in the vicinity of the subject parcel can be defined as generally straight and on a gradual upgrade in the northbound direction as shown in the photograph on the following page. The observed sight distances to the north and south along the property frontage was found to be in excess of 500 feet in both directions. The sight distances measured are greater than the minimum stopping sight distance of 250-feet required according to the industry standard AASHTO criteria for the posted speed limit of 35 mph and the 360 feet required for the observed travel speeds on Reservoir Avenue of 40-45 mph.

Based upon the preliminary evaluation of the existing roadway geometry and physical features, it does not appear that any significant roadway safety deficiencies exist within the study area. Also, as part of our analysis, a review of accident statistics was completed. Data was reviewed from the City of Cranston Police Department for a three year time period from January, 2009 to December, 2011 to determine if any location in



the project area experienced a high frequency or pattern of accidents. A summary of the accident data can be found in the Appendix.

Analysis of the information did not reveal either, a high incidence or severity of accidents along the segment of road servicing the development. The following table summarizes the number of accidents that are on record from the police department.

TABLE 1
Accident Data Summary

Location	Number of Accidents		Type of Accidents			
	PD	PI	Rear End	Angle	Fixed Object	Total
Reservoir Avenue						
@ Nowell Road	2	4	5	0	1	6
@ 950 Reservoir Avenue	1	0	1	0	0	1
@ Jacky's Galaxie Restaurant	1	0	0	1	0	1
@ Tiffany's Place Salon	1	1	1	1	0	2
Btw Nowell Road & Viking Rd	1	1	2	0	0	2
Total	6	6	9	2	1	12

A total of 12 accidents occurred on Reservoir Avenue between Nowell Road and Viking Road for the three-year study period. Of the 12 accidents, 6 involved injuries. Nine of the crashes were rear end collisions. Most of these accidents involved vehicles stopped at the signalized intersection with Nowell Road. One of the rear end crashes involved a vehicle turning right into the existing office building on site. Two accidents were angle collisions, involving driveways in the study area. In addition, there was one fixed object crash involving a northbound vehicle turning left onto Nowell Road and losing control.

Traffic Flow Data

Existing traffic flow characteristics for this area were developed from a review of historical information available from the RIDOT and from a traffic counting program conducted by *RAB*. The *RAB* data collection included a manual turning movement count at the intersection of Reservoir Avenue with Nowell Road, Viking Road and the existing office building driveway during the midday and afternoon peak hours of traffic.

The Rhode Island Department of Transportation (RIDOT) has a continuous count station on Reservoir Avenue south of Park Avenue and monthly data for 2012 was obtained to define traffic patterns of the major roadway providing access to the site. Utilizing this data, a weekday average annual daily traffic (AADT) of approximately 25,700 vehicles was determined for Reservoir Avenue south of Park Avenue.

On a typical weekday along this section of Reservoir Avenue, traffic volumes begin to increase at 6:00 AM, where during the commuter peak between 8:00 and 9:00 AM, a total volume of approximately 1,550 vehicles is serviced. The traffic continues to increase to 12 noon, with an hourly volume of 1,945 vehicles between 11:00 and 12:00. The volumes remain between 1,900 and 2,000 vehicles per hour to the daily afternoon peak traffic from 4:00 to 5:00 PM with 1,995 vehicles.

Traffic at noontime is similar to volumes during the afternoon peak hour due to the commercial nature of the land uses along the roadway. A review of Saturday traffic volumes indicates an AADT of 20,800 vehicles and 1,630 vehicles per hour during the

peak period from 11:00 AM to 1:00 PM. Lesser volumes are recorded during other hours of the day. These volumes are much less than the weekday volumes between 12:00 and 5:00 PM.

Specifically for this study, a manual turning movement count was conducted at the Reservoir Avenue intersection with Nowell Road, Viking Road and the existing office building driveway. Data was collected during a midday peak period from 11:30 AM to 1:30 PM, and an afternoon peak period between 4:30 to 6:30 PM when the site and surrounding roadway service their highest daily traffic volumes. Figure 3 on the following page depicts the peak hour turning movement volumes for the midday and afternoon period at the study intersections. Complete count information can be found in the Appendix.

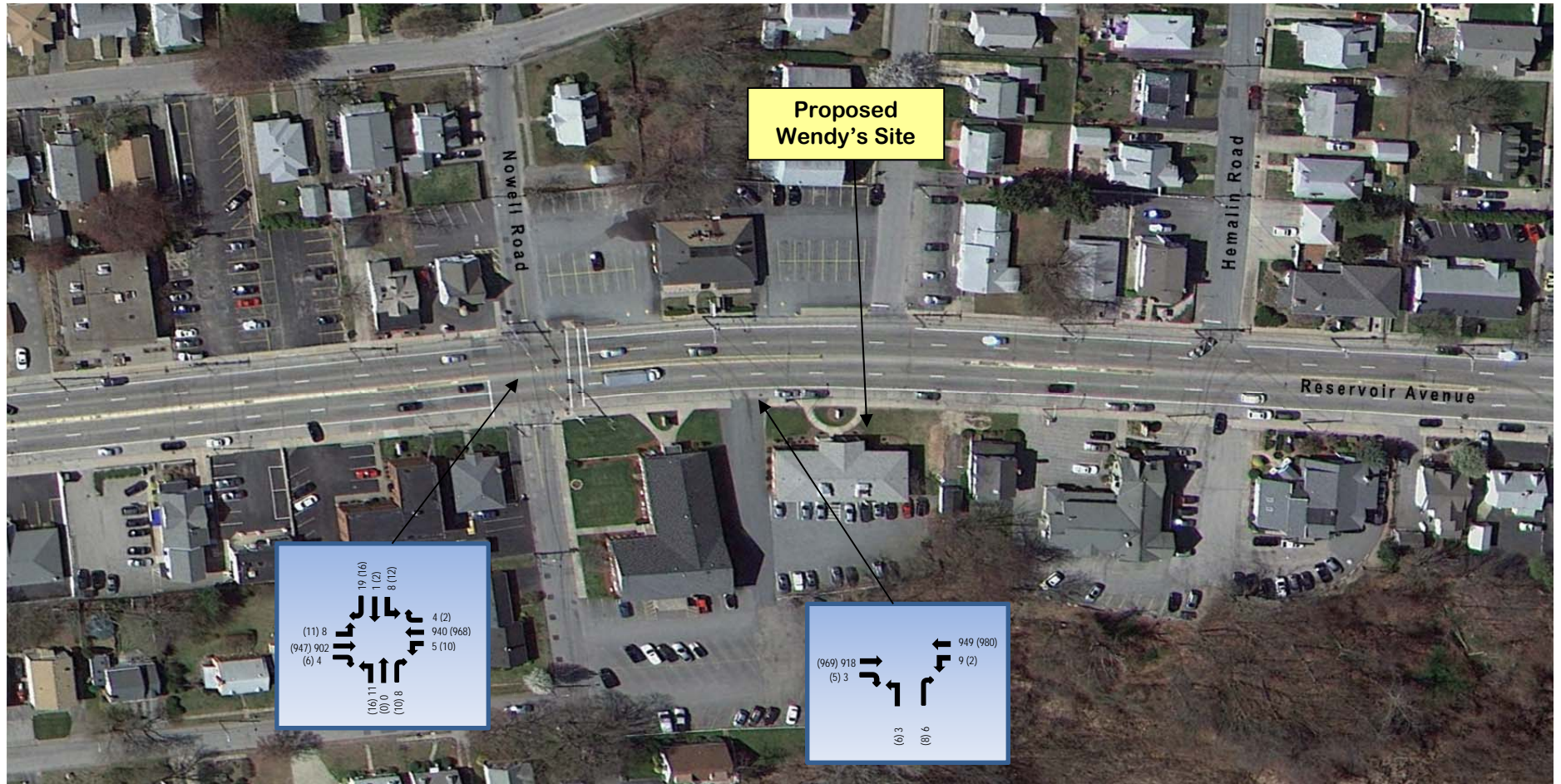
Based upon the manual count data, during the midday peak hour from 12:00 to 1:00 PM there were 1,870 vehicles on Reservoir Avenue north of Nowell Road, with 920 vehicles northbound and 950 vehicles southbound. During the afternoon peak hour from 4:30 to 5:30 PM there were 1,950 vehicles on Reservoir Avenue north of Nowell Road, with 970 vehicles northbound and 980 vehicles southbound.

Trip Generation

To determine the traffic impacts of a proposed development, estimates of anticipated traffic to be generated by that particular land use must be calculated. As previously discussed, the current proposal includes combining three lots (two properties), to allow construction of a 2,000 square foot building with 70 seats, a drive-thru window, and parking for 39 vehicles. Access to the site will be provided at two curb openings on Reservoir Avenue with separate entrance and exit driveways. A site plan, prepared by *DiPrete Engineering Associates, Inc.* depicting the site layout and access can be found on Figure 4.

For this project, estimated traffic volumes for the new *Wendy's* restaurant were based on trip data obtained at existing *Wendy's* facilities in the region, and the use of trip

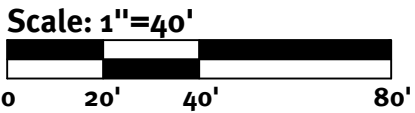
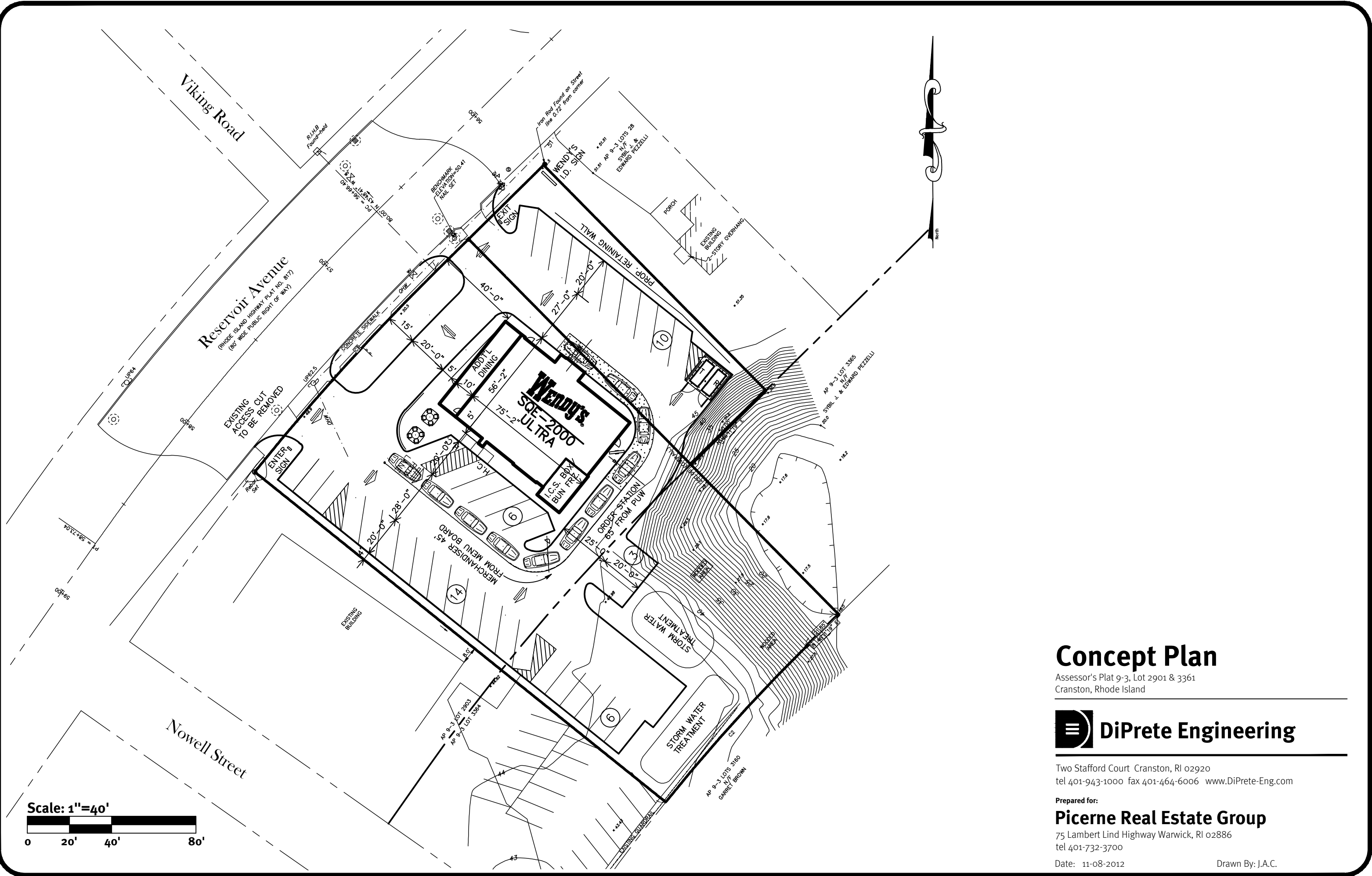
Wendy's Restaurant



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Proposed Restaurant
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Figure 3
Existing MD/PM Peaks Hours



Concept Plan

Assessor's Plat 9-3, Lot 2901 & 3361
Cranston, Rhode Island



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Date: 11-08-2012 Drawn By: J.A.C.

generation factors. These factors are taken from the "Trip Generation Manual", an informational report published by the Institute of Transportation Engineers (ITE), a national professional organization for traffic and transportation engineers. The data provided in the ITE report are based on extensive traffic studies for various types of land uses (residential, commercial, industrial, etc.). This data has been found to be very reliable and provides a sound basis for estimating vehicle trips for new development projects. For the proposed *Wendy's, Land Use Code 934 Fast Food Restaurant with Drive-Through Window* was found to be the most appropriate land use code to develop an estimate of site related vehicle trips.

In addition, existing *Wendy's* restaurants at the Rhode Island Mall in Warwick, and count data obtained at a *Wendy's* restaurant on Route 2 in Warwick from another study was also utilized for verification of trip volumes for this land use. The ITE manual suggests that if a similar or like land use is available in the region of study, data could be obtained to confirm ITE rates, or to use the independent study rates if they are more appropriate. The appropriate worksheets from the manual and the count data is included in the Appendix and is summarized in Table 2 below.

TABLE 2
Site Traffic Volumes

Wendy's with Drive-Thru Window, Rhode Island Mall

<u>Midday Peak Hour</u>	<u>PM Peak Hour</u>
<i>Two Way Trip Total:</i> 274	<i>Two Way Trip Total:</i> 174
Entering: 140	Entering: 91
Exiting: 134	Exiting: 83

Wendy's with Drive-Thru Window, Route 2 Warwick, RI

<u>Midday Peak Hour</u>	<u>PM Peak Hour</u>
<i>Two Way Trip Total:</i> 222	<i>Two Way Trip Total:</i> 92
Entering: 111	Entering: 46
Exiting: 111	Exiting: 46

ITE Land Use Code 934 Fast Food Restaurant with Drive-Thru Window

<u>Midday Peak Hour</u>		<u>PM Peak Hour</u>	
<i>Two Way Trip Total:</i>	114	<i>Two Way Trip Total:</i>	66
Entering:	57	Entering:	35
Exiting:	57	Exiting:	31

The highest volume of site-generated trips was found to occur during the midday period (lunchtime), from 12:00 to 1:00 PM. The Rhode Island Mall restaurant generated 274 trips during this time period. During the afternoon peak hour (5:00 to 6:00 PM) there were a total of 174 vehicle trips. As can be seen the Route 2 *Wendy's* generated lower hourly volumes for both time periods studied and the ITE volumes were even lower. To be conservative in our analysis, the higher hourly volumes for the Rhode Island Mall site were utilized as an estimate of future site related trips.

In reviewing the drive-thru component of the restaurant development, documentation of vehicles using the drive-thru window was obtained. Typically for restaurants with drive-thru lanes, between 55 and 75 percent of site entering traffic can be expected to use the drive-thru lane. The data collected at the referenced *Wendy's* restaurants found that approximately 65% of the site entering vehicles used the drive-thru window. At the Rhode Island Mall location it was found that 63% of the site entering vehicles used the drive-thru in the midday peak hour and 66% used the drive-thru in the afternoon peak hour. The drive-thru volumes resulted in a maximum queue of seven vehicles waiting at the order board at any one time, with an average of 3 to 5 vehicles during the peak lunchtime hour. Based upon this review of existing *Wendy's* drive-thru operations, it is anticipated that the proposed design for the Reservoir Avenue site, will operate efficiently, not causing excessive queuing or vehicle congestion.

It should also be noted that a trip is defined as a one-way vehicle movement, therefore driving to and from the development, for example is equivalent to two trips. In addition studies have found that pass-by trips for fast food restaurants with drive-thru windows, can account for between 25 to 70 percent of the site related traffic. Consequently much

of the traffic associated with the *Wendy's* originates from traffic already passing by the site on Reservoir Avenue, which is a commercial corridor with many, similar high turnover sit down restaurants. In addition, the site currently generates traffic from the existing office building on site, which will be removed. However, to be conservative no reductions were made in projected intersection volumes to account for these conditions.

Future Traffic Volumes

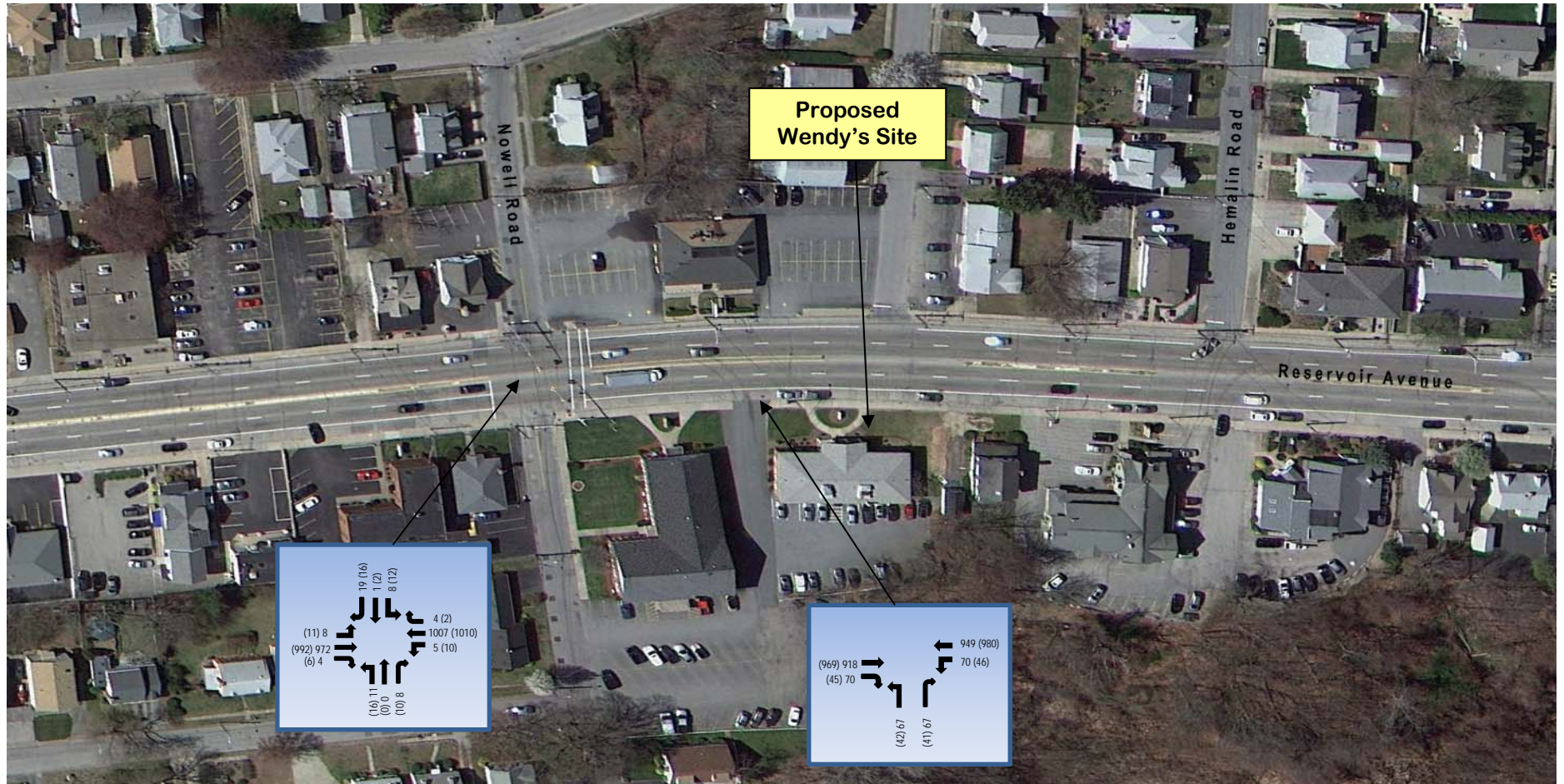
In order to properly assess the impacts of a development, future traffic conditions of area roadways should be estimated for the period when the development is constructed and fully occupied. Typically, the expansion of base traffic is calculated when a project is to be constructed over an extended period (3 to 5 years). In all instances, area growth that may affect capacity results should be considered. Due to the small scale of the commercial development it is estimated that the business could be open and fully operational within one year. Since this project will be completed in such a short time period, where roadway volumes will be substantially the same, a future no-build scenario was not considered necessary in accordance with ITE guidelines.

In developing the intersection volumes to be analyzed under build conditions, a directional distribution of the site traffic was estimated. The distribution was based on current traffic patterns in the area. It is estimated that 50% of the site traffic will arrive from and depart to the north and south on Reservoir Avenue. Figure 5 on the following page depicts the estimated future traffic volumes at the Reservoir Avenue intersection with Nowell Road and the site driveways including the new trips generated by the proposed restaurant business.

Traffic Capacity Analysis

The key to any traffic impact analysis is the evaluation of roadway operations during peak traffic periods on the servicing roadway system. This situation would occur when the site-generated traffic, combined with the traffic volumes on the main roadway, result in the highest one-hour volume serviced along a roadway segment, or through an intersection. Analysis found that the weekday midday and PM peak hours would

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Figure 5
Build MD/PM Peaks Hours

represent this worst-case combination of site-generated traffic with the servicing roadway peak traffic period.

The most accurate means of evaluating traffic capacity is through the utilization of the methodology presented in the 2000 *Highway Capacity Manual*. The results of this procedure are expressed in terms of Level of Service (LOS). Level of Service is a qualitative measure of traffic flow efficiency based on anticipated vehicle delays. For example, LOS "A" represents the best condition with little or no delay, while LOS "F" indicates that the roadway/intersection is at full capacity resulting in extended vehicle delays and potential queuing.

Listed below in Table 3 is the Level of Service delay criteria presented in the *Highway Capacity Manual* for unsignalized and signalized intersections;

TABLE 3

Highway Capacity Manual Criteria

<u>Level of Service</u>	<u>Unsignalized Delay Per Vehicle (sec)</u>	<u>Signalized Delay Per Vehicle (sec)</u>
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 20
C	>15 and ≤ 25	>20 and ≤ 35
D	>25 and ≤ 35	>35 and ≤ 55
E	>35 and ≤ 50	>55 and ≤ 80
F	>50	>80

The intersection of Reservoir Avenue with Nowell Road was analyzed for the existing and future build traffic volumes during the weekday midday and afternoon peak periods. The intersection of Reservoir Avenue with the site driveways was analyzed for the future conditions during these same two periods. The capacity analysis worksheets are included in the Appendix. Table 4 summarizes the results of the analyses.

Traffic on Reservoir Avenue was found to operate at a good level of service A for both the midday and afternoon peak hours. Nowell Road, which services very low hourly

volumes operated at LOS C or better during these same time periods. The intersection is part of a coordinated traffic signal system on Reservoir Avenue that emphasizes arterial progression over greater delays for the minor intersecting roadways.

TABLE 4
Level Of Service Summary

<i>Location/ Movement</i>	EXISTING		FUTURE BUILD	
	Midday	PM	Midday	PM
<i>Reservoir Avenue at Nowell Road (S)</i>				
Reservoir Avenue NB	A	A	A	A
Reservoir Avenue SB	A	A	A	A
Nowell Road EB	B	C	B	C
Nowell Road WB	C	C	C	C
Overall Intersection	A	A	A	A
<i>Reservoir Avenue at Site Entrance Driveway (U)</i>				
Reservoir Avenue SB left	-	-	B	B
<i>Reservoir Avenue at Site Exit Driveway (U)</i>				
Site Driveway WB Left	-	-	F	F
Site Driveway WB Right	-	-	B	B

(S) – Signalized intersection
(U) – Unsignalized intersection

The site entrance driveway will operate at a good level of service for vehicles turning left into the site. Vehicles turning right out of the site will also operate at a good level of service. Vehicles turning left out of the site will operate at LOS F during both peak hours with a queue of two to three vehicles waiting to exit. The greater delays, are due to the heavy traffic volumes on Reservoir Avenue and is similar to other unsignalized driveways and intersecting side streets along the road. It should be noted that the traffic signal at Nowell Road will help reduce the left turning driveway traffic delays. The signal will provide additional gaps in the Reservoir Avenue through traffic during the side street green interval, permitting driveway traffic to more safely and efficiently access Reservoir Avenue.

Conclusions and Recommendations

In summary, the study has shown that the proposed site redevelopment project access and circulation plan has been designed to provide a level of traffic safety and efficiency on the servicing roadway system. The safety of the proposed access driveways on Reservoir Avenue were reviewed for geometry and sight distances. The proposed intersections were determined to provide sufficient sight distances in accordance with AASHTO criteria for visibility and decision making of drivers attempting to enter/exit main street traffic from the proposed commercial driveways.

The results of the operational analysis indicate that the estimated increase in traffic during the peak periods resulting from the proposed *Wendy's* restaurant project will have a minimal effect on overall traffic operations along Reservoir Avenue. It can also be concluded that much of the traffic estimated for the new *Wendy's* is already on Reservoir Avenue. At the site driveway intersections with Reservoir Avenue, operations were determined to be efficient under future build conditions for left turn entering and right turn exiting traffic. Left turn exiting traffic will operate with similar delays to other unsignalized driveways along the roadway in the immediate project area with typically one vehicle queued on the driveway during off-peak traffic conditions and two to three vehicles during peak conditions.

Therefore, based upon the data collected on the servicing roadways, and the analysis completed as part of this study, it can be concluded that with the access design proposed, the commercial redevelopment project has adequate and safe access to a public street, and will not have a detrimental effect on public safety and welfare in the study area.