EVALUATION OF TRAFFIC CONDITIONS RELATED TO CANON, U.S.A. MELVILLE, NY

September 2014

Presented to:

Town of Huntington

GPI Greenman-Pedersen, Inc.

Engineering and Construction Services

Table of Contents

I. EXECUTIVE SUMMARY 1

II. INTRODUCTION 7

CANON SITE DESCRIPTION 7

ROADWAY NETWORK AND LAND USE 9

PROJECT METHODOLOGY 10

TRAFFIC IMPACT ASSESSMENT CRITERIA 11

DATA COLLECTION 12

III. EXISTING CONDITION TRAFFIC ASSESSMENT (2014) 14

EXISTING CONDITION (2014) COMPARATIVE TRAFFIC VOLUME ANALYSIS 17

CANON SITE COMPARATIVE TRIP GENERATION ANALYSIS (2014) 17

EXISTING CONDITION CAPACITY ANALYSIS 19

IV. MITIGATION MEASURES (2014) 24

RECOMMENDED MITIGATION MEASURES 24

V. TRAFFIC OPERATIONAL IMPACTS ON WALT WHITMAN ROAD BRIDGE OVER THE LIE DUE TO CANON'S FULL EMPLOYMENT CONDITION (2020) 34

MINIMUM BRIDGE WIDENING - CAPACITY ANALYSIS 39

VI. CONCLUSION 42

Table of Figures

Figure 1: Proposed Widening of Walt Whitman Road Bridge Over LIE 4
Figure 2: Project Location Map 8
Figure 3: Existing AM Peak Hour Traffic Volume Map 15
Figure 4: Existing PM Peak Hour Traffic Volume Map 16
Figure 5: The Future Build AM Peak Hour Traffic Volume Map 36
Figure 6: The Future Build PM Peak Hour Traffic Volume Map 37

List of Tables

Table 1: Traffic Volume Comparison 17
Table 2: Driveway Trip Generation Volume Comparison 18
Table 3: Comparison of Capacity Analysis Results between Existing (2014) and the Previously Conducted 2008/2009 Canon Traffic Study 21
Table 4: Summary of Recommended Mitigation Measures 25
Table 5: Comparison of Capacity Analysis Results between Existing (2014) and the Mitigation (2014) Conditions 32
Table 6: Net Project Generated Traffic Increase under Canon's Full Employment Conditions 34
Table 7: Capacity Analysis Results under Canon's Full Employment Condition at Walt Whitman Road Bridge over the LIE and Adjacent Service Road Intersections 39
Table 8: Comparison of Capacity Analysis Results between Canon Full Employment (2020) and the Mitigation (2020) Conditions Depicting Bridge Widening 41

I. EXECUTIVE SUMMARY

Canon U.S.A. Inc. opened its new headquarters in February 2013 on a 52 acre campus located along the Long Island Expressway (LIE) South Service Road and Walt Whitman Road in Melville, New York. The site is located within the Melville Employment Center (MEC) which is Long Island's largest employment hub. The project was the subject of an EIS that included a traffic impact study and proposed mitigation measures. The purpose of this study is to conduct a comprehensive "After" study that focuses on the effectiveness of traffic mitigation measures that were implemented on the surrounding roadway system. Specifically, the Town of Huntington wants to evaluate whether the objectives of the implemented mitigation measures are met, as predicted, under the previously conducted 2008/2009 Canon U.S.A Traffic Study.

Based on a comprehensive traffic assessment, key traffic Measures of Effectiveness (MOE's) including; traffic delays and levels of service (LOS) derived from current 2014 traffic volumes and patterns were compared to similar MOE's outlined in the 2008/2009 Canon Traffic Study. This comparison of operating predictions versus actual current operating conditions identifies deficiencies, and highlights shortcomings in the implemented mitigation. To address such deficiencies, feasible solutions were developed and tested through traffic analyses to alleviate any presently observed constrained traffic operating conditions.

Our analysis has revealed the following key facts:

- A comparison of traffic volumes between Existing (2014) Condition and the 2010 Build condition (as predicted in the 2008/2009 Canon U.S.A Traffic Study) has indicated that overall traffic growth within the project study was significantly less than anticipated. During the weekday AM and PM peak hours there are approximately 14% and 10% less overall traffic activity than predicted. This reduced growth may be attributable to the lengthy economic recession.

- A comparison of the 2010 Build Condition vehicular trip generation (as predicted in the FEIS) and actual Canon driveway traffic counts has indicated that there are significantly less trips occurring today than originally anticipated.

    - During a typical weekday AM peak hour a total of 1395 vehicular trips were anticipated to be generated by the Canon project (1224 inbound trips, 171 outbound trips). However, the 2014 driveway counts indicated only 1213 vehicular trips were actually generated (1178 inbound trips, 35 outbound trips). This is approximately 13% less trips than originally forecasted.

    - During a typical weekday PM peak hour a total of 1341 vehicular trips were anticipated to be generated by the Canon project (225 inbound trips, 1116

outbound trips). However, the 2014 driveway counts indicated only 952 vehicular trips were actually generated (34 inbound trips, 918 outbound trips). This is approximately 29% less than originally forecasted.

- Thus, the present day 2014 traffic (background traffic + project generated traffic) is significantly less than what was anticipated four years ago in 2010.

- The capacity analysis results from the Existing (2014) Condition has indicated that 12 intersections (or specific lane groups) operate under constrained traffic conditions (LOS E or worse) for either AM and/or PM peak hours.

- Proposed traffic signal timing modifications under this traffic study will help improve the intersection operations, when compared to the Existing 2014 peak hour traffic conditions. However, the proposed traffic signal timing mitigation can't totally eliminate constrained traffic operating conditions at all intersections below LOS E.

- As part of the Country Pointe at Plainview Traffic Study, dated March 2013, the developer has committed to fully fund and construct mitigation measures for the Round Swamp Road underpass at LIE and the LIE North and South Service Roads intersections. The proposed recommendations include significant geometrical improvements that are necessary as signal timing modifications alone will not be able to alleviate all existing traffic operational impacts at these locations. GPI understands that the recommendations made in the Country Pointe at Plainview Traffic Study will be implemented once approval is granted for this project in order to improve traffic operations.

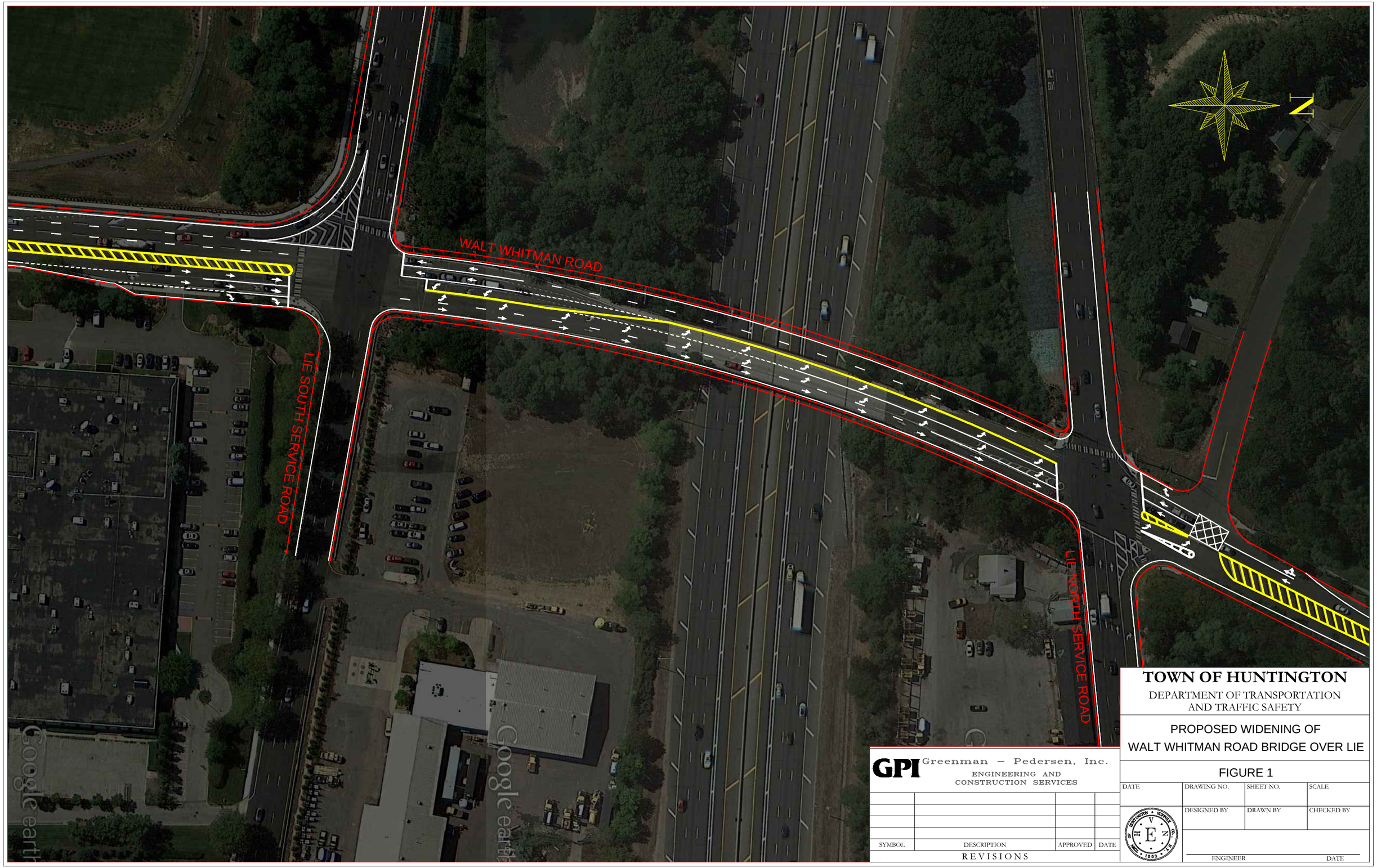
- One of the key "choke points" that could not be mitigated by simple signal timing adjustments within the immediate vicinity of the Canon U.S.A. Inc. headquarters building is the Walt Whitman Road Bridge over the LIE. This bridge section presently has one southbound and two northbound travel lanes (3-10 ft narrow lanes without shoulders). The single southbound bridge lane does open up to a left turn bay and two southbound through lanes at its intersection with the LIE South Service Road but occurs essentially at the throat of the intersection. The two northbound bridge lanes operate as a left only lane and a through lane as it intersects the LIE North Service Road. Traffic analysis conducted at the two intersections located adjacent to this bridge shows significant capacity constraints during various peak traffic hours. The Walt Whitman Road and LIE North Service Road intersection is noted to be the worst of the two adjacent intersections where all approach legs to the intersection operate at LOS E/F, especially during the PM peak hour. During this peak period the northbound segment of the bridge currently forms vehicle queues that extend over the bridge. The northbound left turn during this peak hour is operating at LOS F with delays of 92.2 seconds per vehicle and 50% percentile queue length reaching more

than 600 ft. Thus, simple signal timing changes alone will not nearly be able to significantly mitigate this congestion.

At this intersection, the geometrical mitigation measures proposed by the 2008/2009 Canon U.S.A Traffic Study have not been fully implemented. The previously proposed mitigation measures at this intersection called for an additional northbound left-turn bay and an additional westbound through lane. The NYSDOT has already implemented the additional westbound through lane but the second northbound left-turn bay was not installed. Even if the pavement was restriped to provide a double left turn lane operations would not improve measurably since the length of the second turn lane would only be about 100 feet long due to the narrow width of the bridge. Furthermore, the double turn lane would require modifying the signal operation so that left turns could only be made with a fully protected phase. In order to be effective, the turn lanes would have to be extended over the bridge to provide proper storage for this heavy left turn movement particularly during the PM peak hour. Without the necessary widening of the bridge structure; vehicle queuing issues will continue to worsen as Canon's employment figures increase.

- According to the Highway Capacity Manual (HCM), if the left-turn volume of an approach to an intersection exceeds 300 vph, provision of a second left-turn bay/lane is warranted. In the PM peak hour the 2014 northbound left turn traffic volume at the Walt Whitman Road intersection with the LIE North Service Road are 690 vehicles. This existing condition volume is significantly higher than the HCM threshold. Thus, consideration should be given at to provide at a minimum an additional left turn northbound bay, and to widen the bridge structure to five travel lanes with standard shoulders (3 lanes northbound – two left turn lanes and one through lane, 2 lanes southbound) in order to improve traffic flow and reduce queuing of vehicles over the bridge and at its adjacent intersections. The widening of the bridge structure will also require, for alignment and operational purposes, adding a through lane on the southbound approach of LIE North Service Road intersection and a northbound right turn bay at the LIE South Service Road intersection. See Figure 1 for details.

- It is very important to note that full employment build out has been slower than what was originally anticipated and will not be met until sometime in the next 5+ years. Presently, Canon has 1,879 employees (including 275 consultants). According to Canon officials, by 2020 the full build employment potential calls for an estimated total of 2,700 employees. This employment level was expected to have occurred by now, however due to the economic downturn it will take more time. Thus, based on the existing trip generation volumes that were obtained from the 2014 driveway counts, the full employment levels will result in following **additional** trips within the project study area:



TOWN OF HUNTINGTON

DEPARTMENT OF TRANSPORTATION
AND TRAFFIC SAFETY

PROPOSED WIDENING OF
WALT WHITMAN ROAD BRIDGE OVER LIE

FIGURE 1

GPI Greenman – Pedersen, Inc.
ENGINEERING AND
CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE

- **529** vehicular trips (514 inbound, 15 outbound) during the AM peak hour between 8:00 am and 9:00 am, and
- **414** vehicular trips (15 inbound, 399 outbound) during the PM peak hour between 5:00 pm and 6:00 pm.

These new trips alone (without considering additional trips from other planned projects within the project vicinity over the next several years) when assigned to the roadway network will further exacerbate traffic operations especially at the Walt Whitman Road Bridge over the LIE and its adjacent intersections on LIE service roadways. Capacity analyses were conducted with these additional traffic volumes generated by Canon at the LIE service road intersections with Walt Whitman Road Bridge. It is anticipated that the bridge segment will be subjected to significant queuing and over-spillage of traffic at its northbound approach due to the anticipated traffic demand, with worst case traffic operation anticipated during the PM peak period. During the PM peak hour the intersection of Walt Whitman Road and LIE North Service Road will operate at LOS F with 118.3 sec average intersection delays per vehicle. On the bridge approach the worst delays will be on the northbound left-turn lane group where the 50% percentile queue length could be reach 1023 ft. i.e., spilling well beyond the bridge segment and past the LIE South Service Road intersection ending in front of the Canon property. Delays on this lane group are anticipated to about 236.5 seconds per vehicle with LOS F. With the exception of westbound right and northbound through lane groups that will operate at LOS B or better, all other lane groups will be operating at LOS E or F with significant traffic operating constraints.

- Apart from the above noted capacity constraints and queuing issue, the congestion coupled with existing non-standard lane widths on Walt Whitman Road Bridge over the LIE will potentially create vehicle safety issues.

- By providing a minimum of five travel lanes with standard shoulders on Walt Whitman Road bridge segment, the above noted congestion can be significantly mitigated. In 2020 with full Canon employment, the PM peak hour of operation for the intersection of Old Walt Whitman Road and LIE North Service Road will improve from LOS F with to LOS E with 67.7 sec average intersection delays per vehicle (a 43% delay reduction). The anticipated northbound left-turn lane group 50% percentile queue length would be 385’ (62% reduction in queue) i.e., no spilling on to the adjacent LIE South Service Road intersection with delays anticipated to about 45.0 (a 81% delay reduction) seconds per vehicle. (Note: Queue reductions and delay benefits based on comparison between 2020 Full Employment Conditions with and without proposed mitigations).

- Once the proposed widening of the Walt Whitman Road Bridge over the LIE has been achieved it would be further beneficial to provider a coordinated signal timing network along Walt Whitman Road within the overall project study area.

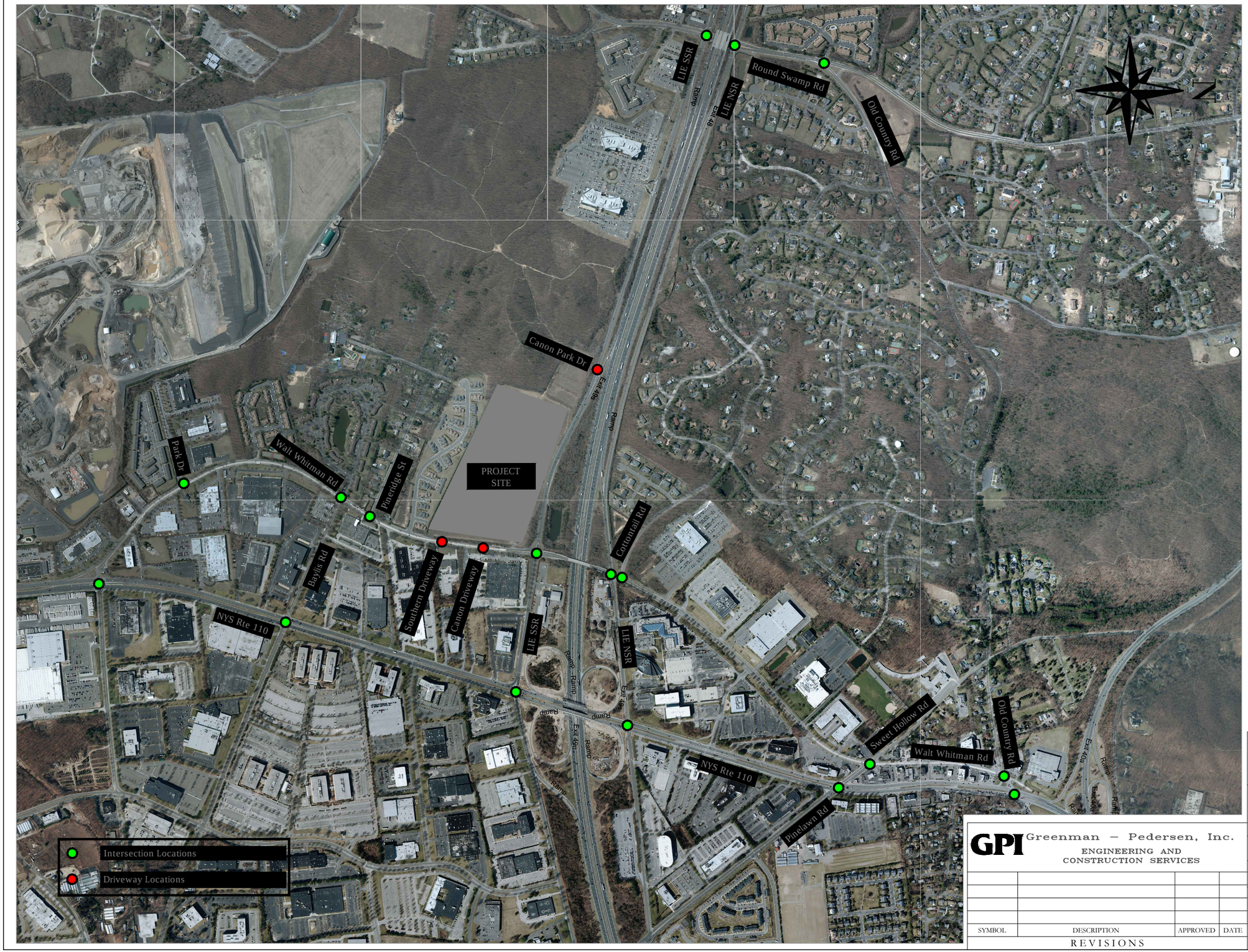
The traffic assessment conducted for this "After" study indicates most of the mitigation needs at network intersections could be accommodated by modifying (fine tuning) the traffic signal timings at various study intersections in order to improve the MOE's to a level better than the Existing 2014 peak hour traffic conditions. However, a transportation infrastructure investment strategy (both for short-term and long-term) is needed to widen the Walt Whitman Road Bridge over the LIE. This will ensure that adequate storage length is available on the bridge to accommodate Existing (2014) and the anticipated Full Employment Condition (2020) traffic operational needs at this location. Please be aware that this analysis is limited to only the immediate capacity needs. When a project is progressed to replace or widen the existing structure a detailed analysis of future capacity needs will be required. Typically, traffic volumes are projected out 30 years after the estimated time of completion for the construction of a bridge replacement or widening to ensure that the major investment will be serviceable over the life of the bridge.

II. INTRODUCTION

Canon U.S.A. Inc. opened its new headquarters in February 2013 on a 52 acre campus located along the Long Island Expressway (LIE) South Service Road and Walt Whitman Road in Melville, New York. The traffic impact assessment presented in this comprehensive study is an "After Study" that mainly focuses on the effectiveness of mitigation measures that were proposed and implemented on the surrounding roadway system as a result of this Canon project. This traffic study has been prepared under the direction of the Town of Huntington to ascertain the potential of traffic related impacts associated with Canon U.S.A. headquarters generated trips, and, if necessary, to identify and offer recommendations for its mitigation. This traffic impact assessment evaluates and compares whether or not the objectives of the implemented mitigation measures are met, as predicted, under the previously conducted Canon U.S.A Traffic Study. Thus, utilizing key traffic Measure of Effectiveness (MOE's) including; traffic delays, Levels of Service (LOS) derived from the current 2014 traffic volumes and patterns and comparing it with the benefits predicted (contained within the 2008/2009 traffic study), will help in identifying current problem locations so that feasible solutions could be developed to alleviate any presently observed constrained traffic operating conditions during peak traffic hours.

CANON SITE DESCRIPTION

The Canon site is located at the southwest corner of the Long Island Expressway (LIE) South Service Road and Old Walt Whitman Road intersection in Melville, New York. Figure 2 presents the project Location Map. The subject site previously operated as a farm with access provided via one (1) uncontrolled curb cut along Old Walt Whitman Road. The current site includes a 900,000-square-foot office complex that serves as the new headquarters for Canon U.S.A., Inc. There are three (3) access points to the Canon site. Primary access along the LIE South Service Road is via one unsignalized driveway that allows vehicles to enter only between 6:00 AM to 10:30 AM , Monday through Friday but permits exits during all times. The gated entrance remains close during all other times of a typical weekday. This access point is located west of Exit 49S (off-ramp) from the eastbound Long Island Expressway. Access is also provided via two other intersection driveways located along Walt Whitman Road. The Canon Park driveway intersects Walt Whitman Road approximately 750' south of the LIE South Service Road. This is a signalized intersection and serves as the Canon complex's main access point. Also attached to this main access point is a "right-in" slip entrance that operates between 6:00 AM to 10:30 AM, Monday through Friday. However, the main Canon Park Drive is open 24/7 to all inbound and outbound traffic to/from the site. The southerly driveway along Old Walt Whitman Road is an unsignalized intersection that is primarily utilized by truck deliveries and employees. This southerly access is also open 24/7.



GPI Greenman – Pedersen, Inc.
ENGINEERING AND CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

TOWN OF HUNTINGTON

DEPARTMENT OF TRANSPORTATION AND TRAFFIC SAFETY

PROJECT LOCATION MAP

FIGURE 2

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE

ROADWAY NETWORK AND LAND USE

Roadway Network:

The *LIE*, also known as Interstate 495, is a two-way roadway under the jurisdiction of the New York State Department of Transportation (NYSDOT). This roadway has a general east/west orientation and provides three (3) standard general use travel lanes, one (1) high-occupancy vehicle (HOV) lane, and a full-width shoulder in each direction of travel. The posted speed limit is 55 miles per hour and the pavement and striping are in fair condition near the subject property. Within the immediate vicinity of Canon site the LIE provides access to Round Swamp Road, via exit 48 off ramp and the Canon driveway, Walt Whitman Road and NYS Route 110 via exit 49S off ramp.

The *LIE South Service Road*, also known as Route 906A, is a one-way roadway under the jurisdiction of NYSDOT. The LIE South Service Road has a general east/west orientation and typically provides two (2) eastbound travel lanes with separate turn lanes at key intersections, and narrow shoulders along both sides of the roadway. NYSDOT recently completed a contract that added a third eastbound travel lane on the LIE South Service Road between Exit 49s and east of Route 110. The posted speed limit in the vicinity of the site is 40 miles per hour and the pavement and lane striping are in fair condition. The roadway provides connections to local roads in the Town of Huntington including; Round Swamp Road, Walt Whitman Road and NYS Route 110.

The *LIE North Service Road,* also known as Route 906B, is a one-way roadway under the jurisdiction of NYSDOT. The LIE North Service Road has a general east/west orientation and provides two (2) westbound travel lanes with separate turn lanes at key intersections. NYSDOT recently completed a contract that added a third westbound travel lane on the LIE North Service Road between Route 110 and just west of Walt Whitman Road. Shoulders are provided along each side of the roadway, the posted speed limit is 40 miles per hour in the vicinity of the site and the pavement and lane striping are in fair condition. The LIE North Service Road also provides connections to local roads in the Town of Huntington including; Round Swamp Road, Walt Whitman Road and NYS Route 110.

Walt Whitman Road is a local two-way road under Town of Huntington jurisdiction. This roadway has a general north/south orientation, and provides one (1) travel lane and a narrow shoulder in each direction. Within the vicinity of the Canon site the posted speed limit on this roadway is 30 miles per hour, and the pavement and striping are in fair condition.

NYS Route 110, also known as Broad Hollow Road, is a two-way roadway under the jurisdiction of NYSDOT. This roadway has a general north/south orientation and provides three (3) travel lanes along with a shoulder in each direction. Within the vicinity of the Canon site the posted speed limit on this roadway varies between 45 and 55 miles per hour.

The pavement and lane striping are in fair condition with on-street parking provided in certain areas.

Figure 2 depicts the project Location Map along with the surrounding roadway network.

Land Use:

Canon U.S.A in Melville is the headquarters of the company and attracts high volume of traffic during weekday peak hour. Other land uses within the study area consist of various commercial offices, businesses, restaurants and pockets of residential neighborhoods. The residential areas are mainly located south of the new office building while commercial office buildings are located along Old Walt Whitman Road and NYS Route 110. The Canon U.S.A headquarters is one of the largest traffic generators within the Melville Employment Center.

PROJECT METHODOLOGY

Signalized Intersection

Signalized intersection operations were evaluated using the Synchro© Delay Method (Percentile Method). This method takes into account the variation in the traffic arrival pattern by using five different scenarios to predict traffic arrivals at an intersection. This is especially helpful for analyzing system-wide signal coordination and actuated signals. The percentile delay calculations look at five different levels of traffic arrival patterns (90th, 70th, 50th, 30th and 10th percentile scenarios) so that signals can be evaluated under varying traffic patterns. This allows the engineers to rationally model the random or non-linear behavior of traffic operations. The analysis under this methodology will determine the traffic operations in terms of flow rates, volume to capacity (v/c) ratios, traffic delays and Levels of Service (LOS), which are discussed in detail below. These are the typical Measures of Effectiveness (MOE's) that are used in the traffic impact evaluations.

Unsignalized Intersection

Unsignalized intersection operations were also evaluated using the above noted Synchro© software. The methodology for determining traffic operating conditions for signalized intersections is different than unsignalized intersections. *For a Two Way Stop Control (TWSC) intersection* the traffic operation is quantified by the ability of the stop controlled roadway (minor roadway) to utilize the main street traffic gaps in order to systematically complete a safe maneuver. Thus, capacity of the controlled leg is based on: distribution of gap in the major traffic stream, driver's judgment in selecting gaps through which to execute the required movement and follow-up time required by each driver in a queue. This analysis assumes that with the exception of major street left turns, major street through traffic in generally not affected by the minor street traffic flow. *For an All Way Stop Control (AWSC) intersection* every vehicle is required to stop at the intersection before proceeding. The decision to proceed into the intersection is thus dependent on traffic operating conditions on other intersecting approaches and the headways requirements that

are necessary to safely complete the intersection crossing requirements. The LOS for unsignalized intersections is evaluated on the basis of control delay in seconds per vehicle for a particular approach (or lane group). The calculation of these control delay are based on the 2010 Highway Capacity Manual (HCM). The factors influencing these delays include traffic volume, intersection geometry, heavy vehicle usage, etc.

Volume-to-Capacity Ratio: Volume-to-capacity ratio (v/c), also known as degree of saturation, is an indicator of the amount of congestion that occurs at a particular location. A v/c equal to or greater than 1 indicates traffic operations at or above capacity (high levels of congestion); a v/c less than 1 indicates traffic operations below capacity (lower levels of congestion). Synchro© calculates v/c for each signalized intersection lane group.

***Delay*:** Delay is an indicator of how much travel time, in addition to that which would be incurred for base conditions, is experienced on a transportation facility. Total delay comprises control delay and queue delay. Control delay is additional time experienced due to downstream signalized or unsignalized traffic control; queue delay is additional time incurred on short links and left-turn bays due to spillback, starvation, and storage blocking. Synchro© calculates all of these delays (in seconds per vehicle) for each signalized intersection and signalized intersection lane group.

Level-of-Service: Level-of-Service (LOS), defined in terms of control delay, is an indicator of how efficient traffic operations are at a particular location. A LOS is a letter designation that describes a range of traffic operating conditions on a particular type of facility. LOS A typically represents the best traffic operating conditions, while E/F represents the constrained traffic operating conditions with traffic flow near or at capacity. F usually depicts breakdown – an operating condition resulting in lengthy delays and traffic congestion.

The LOS classifications in relation to the letter designations (noted above) and control delays are further discussed and presented in Appendix A.

TRAFFIC IMPACT ASSESSMENT CRITERIA

The following traffic impact criteria will be used to determine traffic impacts for this "After" conditions traffic study.

***Traffic Impact Criteria*:**

- This traffic impacts will be determined by comparing the peak hour capacity analysis results (delays, v/c ratios, LOS) against the peak hour capacity analysis results that were previously predicted under the Build Condition in the 2008/2009 Canon Traffic Study

report. This comparison will help in determining problem locations within the study area where the objectives of already implemented mitigation measures are not met. The problem locations or intersections that are presently operating under constrained traffic conditions during various peak hours will be identified for necessary mitigation requirements in order to achieve the expected traffic operating effectiveness/benefits. The criteria of unacceptable LOS thresholds that may require mitigation would be at the intersections and locations where comparison of the capacity analyses results indicates comparatively worst results (LOS E and/or F, delays, queues), indicating significant traffic congestion. At these locations the proposed mitigation measures would help in improving traffic operations to a level which was predicted in the 2008/2009 Canon Traffic Study report, or better.

DATA COLLECTION

In order to conduct a comprehensive "After" study to determine the effectiveness of mitigation measures that were proposed and implemented on the surrounding roadway system as a result of this Canon project, it is necessary to study, analyze and then compare the traffic operations with the Existing 2014 operating conditions. The traffic data required and collected for these analyses includes:

Site Inventory: The GPI staff conducted a site inventory to obtain data such as street widths, intersection geometry, lane configuration, posted speed limits, and surrounding study area land use. The official traffic signal timing was also obtained from the New York State Department of Transportation (NYSDOT) and the Town of Huntington for this assessment.

Turning Movement Counts: The traffic counts were conducted to establish the baseline traffic conditions at twenty (20) key intersections, including the 3 Canon site driveways. These traffic counts were conducted during the second week of April 2014 on one typical mid-weekday (Tuesday, Wednesday or Thursday) for the AM (7:00 AM -9:00 AM) and PM (4:00 PM -6:00 PM) peak hours. Included with these counts, were vehicle classification counts (autos, buses, and trucks) needed to determine the constraints associated with various traffic operating modes in a traffic stream. These counts were conducted at the following intersections and would be used in the development of the peak hour traffic volume networks:

1. Walt Whitman Road at Old Country Road
2. Walt Whitman Road at Sweet Hollow Road
3. Walt Whitman Road at Cottontail Road
4. Walt Whitman Road at LIE SSR
5. Walt Whitman Road at LIE NSR
6. Walt Whitman Road at Canon/Fed/Ex Driveway - *(Canon Driveway)*
7. Walt Whitman Road at Southern Driveway - *(Canon Driveway)*

8. Walt Whitman Road at Pineridge Street
9. Walt Whitman Road at Baylis Road
10. Walt Whitman Road at Park Drive
11. LIE SSR at Canon Park Drive - *(Canon Driveway)*
12. NYS Route 110 at Old Country Road
13. NYS Route 110 at Pinelawn Road
14. NYS Route 110 at LIE NSR
15. NYS Route 110 at LIE SSR
16. NYS Route 110 at Baylis Road
17. NYS Route 110 at Walt Whitman Road
18. Round Swamp Road at LIE SSR
19. Round Swamp Road at LIE NSR
20. Round Swamp Road at Old Country Road

Automatic Traffic Record (ATR) Counts*:* ATR counts were conducted at 5 mid-block locations within the project study area. These counts were conducted for a typical 7-day period for one consecutive week at 15 minute intervals. These counts were conducted simultaneous to the manual turning movement counts at the following locations and were used in the development of peak hour traffic volume networks:

1. LIE South Service Road west of Walt Whitman Road (Eastbound Counts)
2. LIE South Service Road between Round Swamp Road and Canon South Service Road Driveway (Eastbound Counts)
3. LIE North Service Road west of Walt Whitman Road (Westbound Counts)
4. Walt Whitman Road between LIE North Service and LIE South Service Road (Northbound Counts and Southbound)
5. Walt Whitman Road between LIE South Service Road and Canon Driveway (Northbound Counts and Southbound)

***Driveway Counts*:** The Canon driveway counts were also conducted at the above noted three driveway locations for a continuous 12 hour (7:00 AM-7:00 PM) period during a typical weekday. These counts were also conducted simultaneous with the turning movement counts and the ATR counts. The purpose of collecting these driveway counts is to determine current trip generating ability/rates of the now already built Canon site. The Existing 2014 project-generated traffic associated with the build Canon site is compared against the traffic trip generation volume predicted under the Build Condition in the 2008/2009 Canon Traffic Study for a comprehensive "After" study assessment.

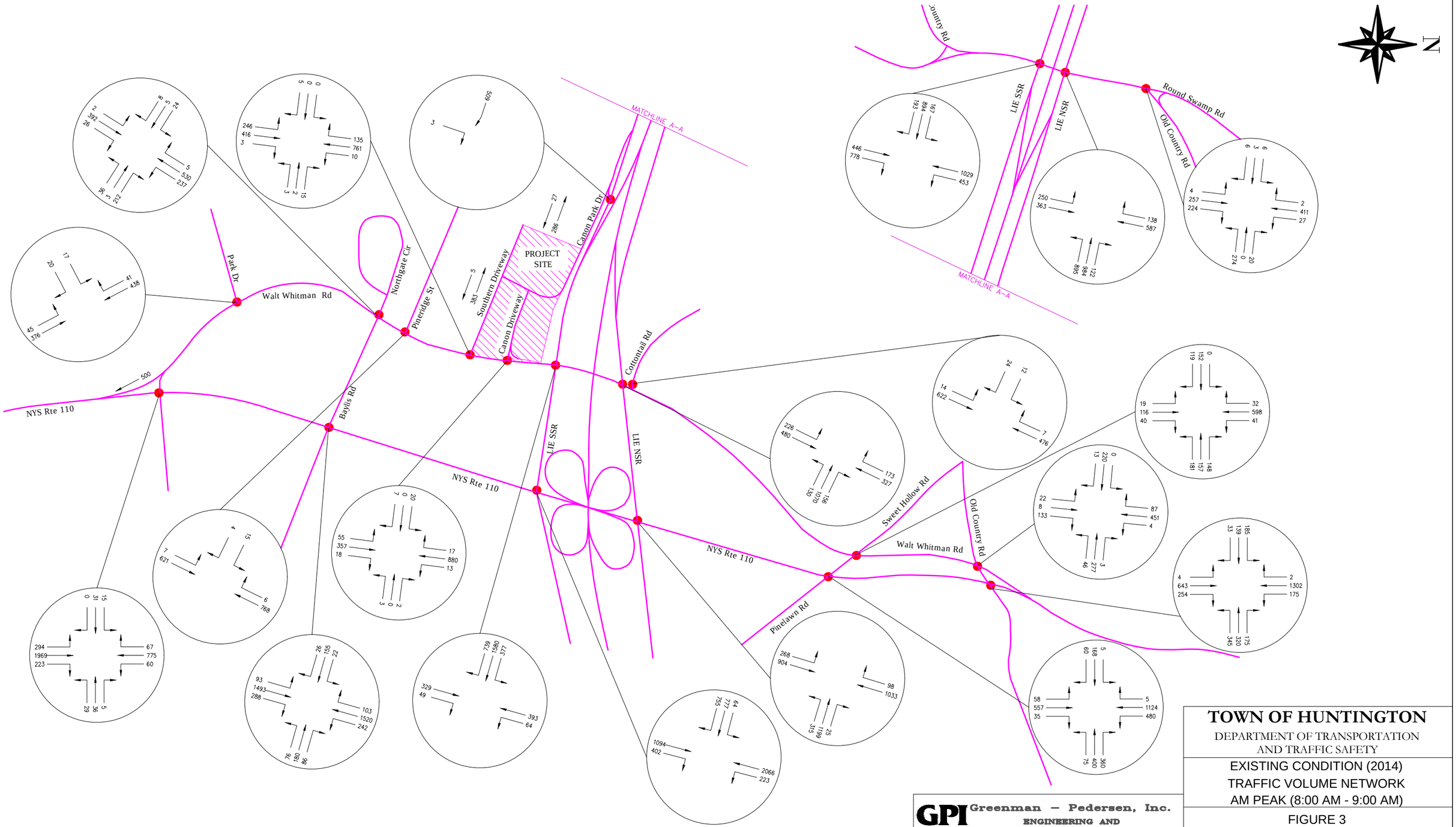
The backup count data for the above noted locations is presented in the Appendix B.

III. EXISTING CONDITION TRAFFIC ASSESSMENT (2014)

Balanced peak hour traffic volume networks were established utilizing the traffic counts recently collected by GPI. Based on data reduction the traffic volume networks were developed for the following peak hours of a typical weekday:

- The weekday AM peak between 8:00 am -9:00 am,
- Weekday PM peak between 5:00 pm – 6:00 pm.

The purpose of establishing these peak hour traffic volume networks was to determine traffic operations on the roadway network for the time periods when the Canon U.S.A. trip generation activity will be at its highest, due to its weekday peak hour trip-generation ability. This examination will help in assessing the worst case traffic impacts anticipated due to the trips generated by the Canon site on to the surrounding roadway network. Included in this assessment are the twenty (20) intersections for which the traffic counts were conducted. The resulting peak hour traffic volume networks are presented in Figures 3 and 4. The backup material is presented in the Appendix B.



NOTES:

1. TRAFFIC VOLUMES MAY NOT ALWAYS EXACTLY BALANCE DUE TO THE PRESENCE OF DRIVEWAYS, PARKING AREAS AND ROADWAYS LOCATED BETWEEN INTERSECTIONS WITHIN THE PROJECT STUDY NETWORK.

GPI Greenman – Pedersen, Inc.
ENGINEERING AND CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

TOWN OF HUNTINGTON

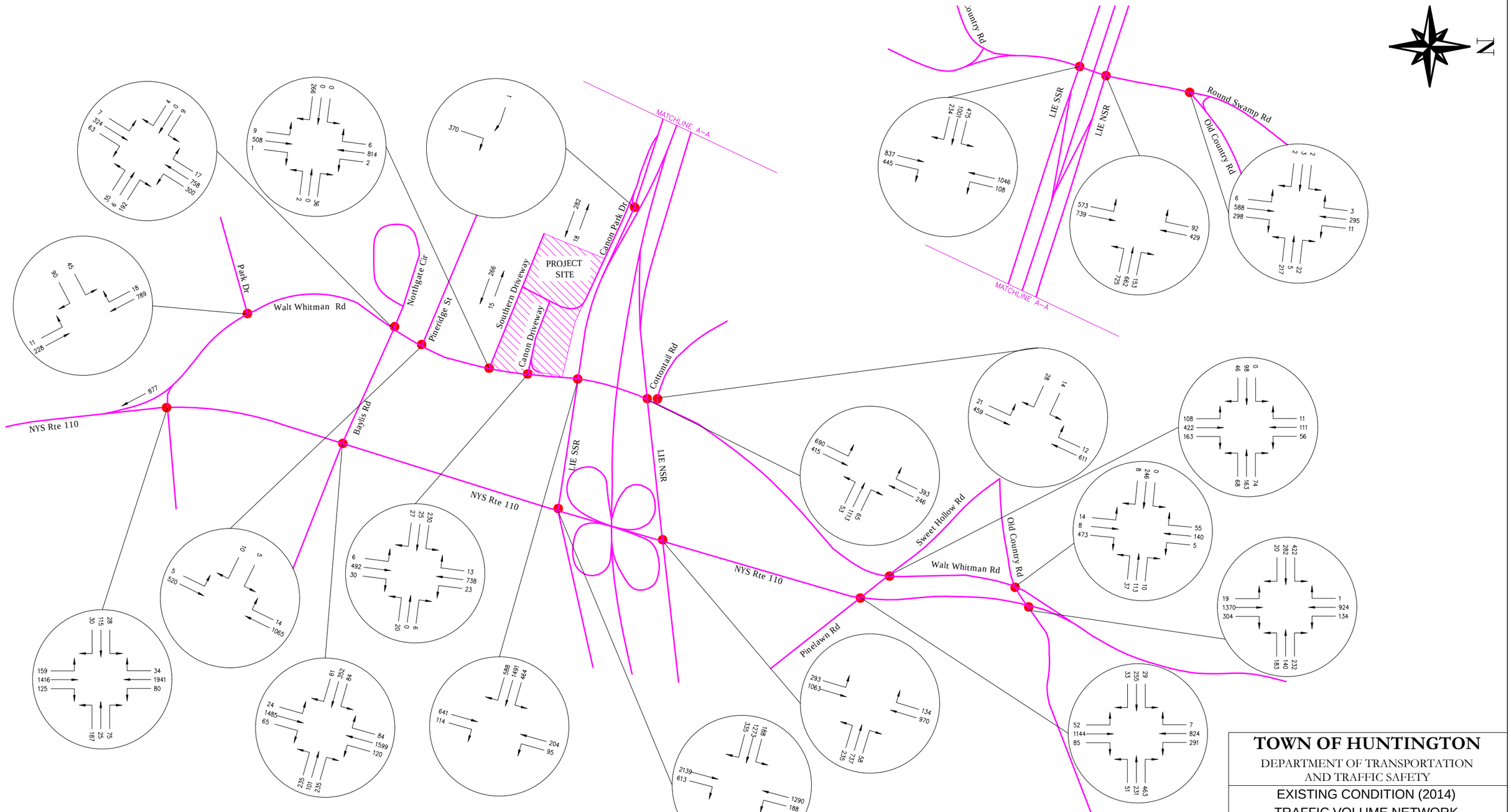
DEPARTMENT OF TRANSPORTATION AND TRAFFIC SAFETY

EXISTING CONDITION (2014)
TRAFFIC VOLUME NETWORK
AM PEAK (8:00 AM - 9:00 AM)

FIGURE 3

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE



NOTES:

1. TRAFFIC VOLUMES MAY NOT ALWAYS EXACTLY BALANCE DUE TO THE PRESENCE OF DRIVEWAYS, PARKING AREAS AND ROADWAYS LOCATED BETWEEN INTERSECTIONS WITHIN THE PROJECT STUDY NETWORK.

GPI Greenman – Pedersen, Inc.
ENGINEERING AND CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

TOWN OF HUNTINGTON

DEPARTMENT OF TRANSPORTATION AND TRAFFIC SAFETY

EXISTING CONDITION (2014)
TRAFFIC VOLUME NETWORK
PM PEAK (5:00 PM - 6:00 PM)

FIGURE 4

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE

EXISTING CONDITION (2014) COMPARATIVE TRAFFIC VOLUME ANALYSIS

A comparison of traffic volumes between Existing (2014) Condition and the 2010 Build condition (as predicted in the 2008/2009 Canon U.S.A Traffic Study) were conducted at 18 key intersections for which counts were available in the previous study. This volume comparison is summarized in Table 1. There are significantly less overall traffic volumes within the project study area than originally estimated. The only exception is Canon Park Drive and Round Swamp Road intersections with LIE South Service Road, and Cottontail Road intersection with Walt Whitman Road, where traffic is about 6% to 19 % higher than expected. During the weekday AM and PM peak hours there was approximately 14% and 10%, respectively, less overall traffic activity than estimated.

Table 1: Traffic Volume Comparison

	AM Peak Hour			PM Peak Hour		
Intersection	Existing 2014 Intersection Traffic Volume	2010 Future Build Intersection Traffic Volume*	Difference (%)	Existing 2014 Intersection Traffic Volume	2010 Future Build Intersection Traffic Volume*	Difference (%)
1. Walt Whitman Road at Old Country Road	1264	1323	95.54%	1109	1118	99.19%
2. Walt Whitman Road at Sweet Hollow Road	1603	1744	91.92%	1320	1353	97.56%
3. Walt Whitman Road at Cottontail Road	1155	1289	89.60%	1153	1036	111.29%
4. Walt Whitman Road at LIE SSR	3531	4305	82.02%	3597	3930	91.53%
5. Walt Whitman Road at LIE NSR	2562	2929	87.47%	2975	3186	93.38%
6. Walt Whitman Road at Canon/Fed/Ex Driveway	1373	2054	66.85%	1625	2412	67.37%
7. Walt Whitman Road at Southern Driveway	1541	1926	80.01%	1635	1821	89.79%
8. Walt Whitman Road at Pineridge Street	1421	1771	80.24%	1619	1739	93.10%
9. Walt Whitman Road at Baylis Road	1480	1850	80.00%	1715	1786	96.02%
10. Walt Whitman Road at Park Drive	937	1409	66.50%	1181	1490	79.26%
11. LIE SSR at Canon Park Drive	512	465	110.11%	371	312	118.91%
12. NYS Route 110 at Old Country Road	3577	4319	82.82%	4031	4678	86.17%
14. NYS Route 110 at LIE NSR	3842	4198	91.52%	3490	4434	78.71%
15. NYS Route 110 at LIE SSR	5381	5562	96.75%	6026	6544	92.08%
17. NYS Route 110 at Walt Whitman Road	4004	5509	72.68%	5092	6020	84.58%
18. Round Swamp Road at LIE SSR	3960	3675	107.76%	4146	3893	106.50%
Total	**38143**	**44328**	**86.05%**	**41085**	**45752**	**89.80%**

* Data obtained from 2008/2009 Canon U.S.A Traffic Study.

CANON SITE COMPARATIVE TRIP GENERATION ANALYSIS (2014)

Traffic volumes were collected at the three Canon site driveways (LIE SSR at Canon Park Drive, Walt Whitman Road at Canon/FedEx Driveway and Walt Whitman Road at Southern Driveway) for a 12-hour period during a typical weekday in order to determine the Existing 2014 trips generated at the site during peak hours. The driveway in-bound and out-bound peak hour traffic volumes were obtained and then compared against the peak hour trip generation volumes predicted under the Build Condition in the 2008/2009 Canon Traffic Study. The purpose of this trip generation comparative assessment was to determine whether or not the Canon site has generated as much traffic as predicted, or will trips increase in the near future and add more traffic to the surrounding roadway network, which could further reduce LOS. The result of this trip generation comparison is summarized in Table 2.

Table 2: Driveway Trip Generation Volume Comparison

Peak Hour	Condition	Canon/Fed-Ex Driveway			Canon LIE SSR Entrance/Exit			Canon South Driveway			Total Driveway Counts	
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out
AM Peak	Existing 2014 - Hourly Total	286	27	313	509	3	512	383	5	388	1178	35
	2010 Future Build Projections *	637	154	791	465	0	465	122	17	139	1224	171
	Difference	**-351**	**-127**		**44**	**3**		**261**	**-12**		**-46**	**-136**
PM Peak	Existing 2014 - Hourly Total	18	282	300	1	370	371	15	266	281	34	918
	2010 Future Build Projections *	203	692	895	0	312	312	22	112	134	225	1116
	Difference	**-185**	**-410**		**1**	**58**		**-7**	**154**		**-191**	**-198**

Notes:
1. * Driveway counts obtained from 2008/2009 Canon U.S.A Traffic Study.
2. Negetive difference indicate projected traffic volumes were higher than actual (2014) traffic counts.
3. Positive difference indicate projected traffic volumes were lower than actual (2014) traffic counts.

According to the results presented in Table 2, the Canon site is presently not generating traffic up to its full trip generating potential. A comparison of vehicular trip generation between Existing (2014) Condition (Canon driveway counts) and the 2010 Build Condition (as predicted in the 2008/2009 Canon U.S.A Traffic Study based on ITE Trip Generation Manual, 7th Edition) has indicated a significant reduction in overall vehicle trips then what were anticipated to be generated by the Canon project.

- During a typical weekday AM peak hour a total of 1395 vehicular trips were forecasted to be generated (1224 inbound trips, 171 outbound trips). However, the 2014 driveway counts indicated only 1213 vehicular trips were actually generated (1178 inbound trips, 35 outbound trips). This is an overall reduction of approximately 13% in project generated trips.

- During a typical weekday PM peak hour a total of 1341 vehicular trips were forecasted to be generated (225 inbound trips, 1116 outbound trips). However, the 2014 driveway counts indicated only 952 vehicular trips were actually generated (34 inbound trips, 918 outbound trips). This is an overall reduction of approximately 29% in project generated trips.

- Even though the Existing 2014 overall project generated trips during peak hours were observed to be lower than predicted in the in the 2008/2009 Canon U.S.A Traffic Study, two of the individual peak hour driveway counts were noted to be higher in this comparison. As noted in Table 2, during both peak traffic hours the Canon site driveways at LIE SSR and Canon Park Drive, and Walt Whitman Road at Southern Driveway were utilized by more

vehicles than that were predicted in the 2008/2009 Canon Traffic Study trip generation calculations. The driveway at Walt Whitman Road at Canon/FedEx Driveway was used much less than expected.

Thus, the overall present day 2014 project generated traffic is significantly less than what was anticipated for 2010. This is mainly due to the lengthy economic recession and slow process of recovery in many areas including the Melville Employment Center (MEC). For the Canon site, the lower trip generating statistics of the site is due to the fact that the full employment build out has been slower than anticipated and will not be met until sometime in the next 5+ years. With the potential of more project generated traffic to be materialized in the near future from Canon site, the surrounding roadway network would expect more traffic activity which could add significant traffic operating constraints than that being assessed under the Existing 2014 conditions. *(Note: Section V - Traffic Operational Impacts on Walt Whitman Road Bridge over the LIE Due to Canon's Full Employment Conditions of this report will further elaborate on the expected full employment scenario traffic operations)*

EXISTING CONDITION CAPACITY ANALYSIS

The capacity analysis was conducted for the Existing 2014 traffic conditions utilizing the Synchro© software. All twenty signalized and unsignalized intersections for which traffic counts were conducted were analyzed for the weekday AM and PM peak traffic conditions. The analyses were based on the existing roadway components including intersection geometry, peak hour factors, traffic controls and traffic signal timings, signage, posted speed and the traffic volume mix (vehicle classifications). The balanced traffic volumes presented in Figures 3 and 4 were used for this assessment. This analysis was conducted to establish a benchmark, which will be used to compare, evaluate and if necessary, mitigate the traffic-related impacts that are anticipated within the study area. The existing condition analysis helps to assess the present day traffic operational deficiencies including Measures of Effectiveness (MOE's) such as; volume/capacity (v/c) ratios, delays and Level of Service (LOS) at key locations within the study area. The Existing Condition traffic operations evaluated for the study intersections will be compared against the peak hour capacity analysis results that were previously predicted under the Build Condition in the 2008/2009 Canon Traffic Study. This comparison will help in determining problem locations within the study area where the objectives of already implemented mitigation measures were not met. The problem locations or intersections that are presently operating under constrained traffic conditions during various peak hours will be identified for necessary present day mitigation requirements in order to achieve the potential traffic operating effectiveness/benefits.

The Existing (2014) Condition capacity analysis results and its comparison with the capacity analysis results presented in the 2008/2009 Canon Traffic Study for the already

implemented mitigation measures are summarized in Table 3. A complete backup of the Existing (2014) Condition capacity analysis results is contained in Appendix C.

According to the comparative analysis results, the following intersection and/or their lane groups, are presently operating under constrained traffic conditions (LOS E and/or F, or v/c ratio > 0.90) during the Existing 2014 conditions (with levels lower than it was predicted in the 2008/2009 Canon Traffic Study).

- Walt Whitman Road at Old Country Road (AM peak and PM peak)
- Walt Whitman Road at LIE SSR (AM peak and PM peak)
- Walt Whitman Road at LIE NSR (AM peak and PM peak)
- Walt Whitman Road at Canon/Fed/Ex Driveway (PM peak)
- Walt Whitman Road at Southern Driveway (AM peak and PM peak)
- NYS Route 110 at Old Country Road (AM peak and PM peak)
- NYS Route 110 at Pinelawn Road (AM peak and PM peak)
- NYS Route 110 at LIE SSR (AM peak and PM peak)
- NYS Route 110 at Baylis Road (AM peak and PM peak)
- NYS Route 110 at Walt Whitman Road (AM peak and PM peak)
- Round Swamp Road at LIE SSR (AM peak and PM peak)
- Round Swamp Road at LIE NSR (AM peak and PM peak)

At these above noted locations, the mitigation measures would be required to help in achieving traffic operations to a level that was predicted in the 2008/2009 Canon Traffic Study report, or better.

Table 3: Comparison of Capacity Analysis Results between Existing (2014) and the Previously Conducted 2008/2009 Canon Traffic Study

INTERSECTION NAME	LANE GROUP MOVEMENT		AM PEAK HOUR (EXISTING 2014)			AM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†			PM PEAK HOUR (EXISTING 2014)			PM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†		
			v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS
1. Walt Whitman Road at Old Country Road	EB	LTR	**0.69**	**66.9**	**E**	**1.09**	**151.5**	**F**	**0.90**	**143.8**	**F**	**1.47**	**266.9**	**F**
	WB	L	0.18	16.8	B	-	-	-	0.28	38.7	D	-	-	-
	WB	TR	0.64	18.3	B	-	-	-	0.50	34.1	C	-	-	-
	WB	LTR	-	-	-	0.54	54.6	D	-	-	-	0.32	34.9	C
	NB	LTR	0.26	23.8	C	-	-	-	0.43	18.6	B	-	-	-
	NB	R	0.26	23.4	C	-	-	-	0.40	17.9	B	-	-	-
	NB	L	-	-	-	0.11	28.3	C	-	-	-	0.05	12.8	B
	NB	TR	-	-	-	0.36	31.8	C	-	-	-	0.59	19.6	B
	SB	LT	0.55	29.3	C	0.55	23.9	C	0.21	14.1	B	0.25	24.9	C
	SB	R	0.11	0.3	A	0.14	7.3	A	0.07	0.1	A	0.13	10.7	B
	OVERALL**			34.7	C		50.1	D		42.9	D		**106.9**	**F**
2. Walt Whitman Road at Sweet Hollow Road	EB	LT	0.62	33.6	C	-	-	-	0.44	26.9	C	-	-	-
	EB	LTR	-	-	-	0.39	17.8	B	-	-	-	0.27	16.6	B
	EB	R	0.38	8.3	A	0.22	4.2	A	0.15	0.8	A	0.07	5.9	A
	WB	L	0.48	16.0	B	0.67	29.0	C	0.23	12.7	B	0.34	18.3	B
	WB	T	0.25	12.7	B	0.50	19.6	B	0.29	13.3	B	0.36	17.6	B
	WB	R	0.23	3.3	A	0.29	4.0	A	0.17	3.6	A	0.20	4.4	A
	NB	L	0.23	16.5	B	0.20	10.6	B	0.21	12.3	B	0.18	8.1	A
	NB	TR	0.21	9.4	A	-	-	-	0.75	20.6	C	-	-	-
	NB	T	-	-	-	0.19	8.4	A	-	-	-	0.37	9.5	A
	NB	R	-	-	-	0.10	2.4	A	-	-	-	0.28	3.9	A
	SB	L	0.11	11.8	B	0.16	8.5	A	0.71	52.1	D	0.14	8.0	A
	SB	T	0.87	32.6	C	0.76	18.4	B	0.16	11.5	B	0.21	8.1	A
	SB	R	0.06	0.2	A	0.06	2.9	A	0.02	0.1	A	0.04	3.0	A
	OVERALL**			20.5	C		15.3	B		18.3	B		10.2	B
3. Walt Whitman Road at Cottontail Road ***	EB	LR	0.16	19.5	C				0.19	19.2	C			
	NB	L	0.02	9.0	A				0.03	9.0	A			
	NB	T	0.39	0.0	A				0.30	0.0	A			
	NB	TR	0.22	0.0	A				0.26	0.0	A			
	OVERALL**			0.9	A					1.1	A			
4. Walt Whitman Road at LIE SSR	EB	LT	0.89	31.8	C	0.83	26.6	C	0.91	34.5	C	1.00	50.4	D
	EB	R	**1.08**	**86.5**	**F**	0.73	3.0	A	0.88	43.3	D	0.54	1.3	A
	NB	TR	0.48	34.2	C	0.67	23.0	C	**0.95**	**60.2**	**E**	0.86	24.6	C
	SB	L	0.20	27.6	C	0.28	15.8	B	0.55	37.6	D	0.46	15.1	B
	SB	T	0.33	30.4	C	0.58	15.7	B	0.17	34.4	C	0.17	3.6	A
	OVERALL**			42.9	D		18.4	B		41.7	D		28.8	C
5. Walt Whitman Road at LIE NSR	WB	LT	0.52	28.5	C	**1.10**	**61.3**	**E**	**1.02**	**73.4**	**E**	0.97	48.0	D
	WB	R	0.11	0.1	A	0.09	0.0	A	0.05	0.0	A	**0.05**	**0.0**	**A**
	NB	L	**0.86**	**59.4**	**E**	0.91	50.4	D	**1.12**	**92.2**	**F**	**1.50**	**245.7**	**F**
	NB	T	0.76	35.2	D	0.89	34.1	C	0.47	12.9	B	0.34	4.0	A
	SB	T	**0.95**	**79.4**	**E**	0.84	40.3	D	**0.80**	**61.6**	**E**	0.58	41.0	D
	SB	R	0.57	28.3	C	0.37	18.4	B	**1.26**	**169.8**	**F**	**1.15**	**127.9**	**F**
	OVERALL**			37.3	D		46.1	D		**79.3**	**E**		**110.4**	**F**
6. Walt Whitman Road at Canon/Fed/Ex Driveway	EB	LT	0.16	23.6	C	0.44	33.9	C	**1.06**	**98.3**	**F**	**1.12**	**100.0**	**F**
	EB	R	0.03	0.1	A	0.07	9.9	A	0.08	0.3	A	0.25	5.8	A
	WB	LTR	0.04	0.2	A	0.02	19.8	B	0.12	0.6	A	0.09	11.9	B
	NB	L	0.18	6.4	A	0.55	22.6	C	0.02	8.5	A	0.17	13.2	B
	NB	TR	0.37	10.5	B	0.45	19.0	B	0.81	27.8	C	**1.01**	**59.4**	**E**
	SB	L	0.06	6.1	A	0.01	6.5	A	0.12	9.7	A	0.11	15.4	B
	SB	T	0.43	11.0	B	0.72	14.1	B	0.47	12.8	B	0.67	25.3	C
	SB	R	0.02	0.1	A	0.16	2.1	A	0.03	0.1	A	0.26	4.0	A
	OVERALL**			10.5	B		16.4	B		32.8	C		49.2	D
7. Walt Whitman Road at Southern Driveway	EB	R	0.03	14.4	B				**1.27**	**170.1**	**F**			
	WB	LTR	**2.04**	**934.4**	**F**				**-**	**-**	**F**			
	NB	L	0.61	19.9	C				0.02	10.0	B			
	NB	TR	0.31	0.0	A				0.40	0.0	A			
	SB	L	0.02	8.5	A				0.00	9.0	A			
	SB	T	0.48	0.0	A				0.48	0.0	A			
	SB	R	0.10	0.0	A				0.00	0.0	A			
	OVERALL**			21.2	C					**-**	**F**			
8. Walt Whitman Road at Pineridge Street	EB	LR	0.07	5.8	A	0.12	25.3	C	0.06	5.3	A	0.25	31.9	C
	NB	L	0.04	3.1	A	0.04	2.8	A	0.07	4.2	A	0.27	12.5	B
	NB	T	0.44	3.9	A	0.51	4.5	A	0.37	3.2	A	0.42	3.4	A
	SB	TR	0.52	6.3	A	0.76	9.8	A	0.79	12.2	B	0.86	25.2	C
	OVERALL**			5.1	A		8.0	A		9.2	A		18.0	B

Table 3 (Cont'd): COMPARISION OF CAPACITY ANALYSIS RESULTS BETWEEN EXISTING (2014) AND THE PREVIOUSLY CONDUCTED 2008/2009 CANON TRAFFIC STUDY

INTERSECTION NAME	LANE GROUP MOVEMENT		AM PEAK HOUR (EXISTING 2014)			AM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†			PM PEAK HOUR (EXISTING 2014)			PM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†		
			v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS
9. Walt Whitman Road at Baylis Road	EB	L	0.21	25.6	C	0.32	53.1	D	0.12	24.0	C	0.30	44.8	D
	EB	TR	0.09	14.2	B	0.21	27.8	C	0.01	0.0	A	0.13	23.6	C
	WB	L	0.25	24.9	C	0.42	48.2	D	0.26	24.8	C	0.33	41.6	D
	WB	TR	0.50	8.0	A	0.56	12.9	B	0.52	8.6	A	0.61	13.9	B
	NB	L	0.04	11.5	B	0.02	1.5	A	0.05	11.7	B	0.04	2.8	A
	NB	TR	0.69	20.0	C	0.52	4.7	A	0.65	18.7	B	0.36	3.3	A
	SB	L	0.55	8.8	A	0.80	19.4	B	0.74	16.5	B	0.38	2.0	A
	SB	T	0.52	8.1	A	0.56	2.2	A	0.71	13.3	B	0.64	4.5	A
	SB	R	0.01	0.4	A	0.01	0.0	A	0.03	1.6	A	0.02	0.1	A
	OVERALL**			12.8	B		9.3	A		14.8	B		6.6	A
10. Walt Whitman Road at Park Drive	EB	LR	0.31	20.4	C	0.08	13.2	B	0.77	33.3	C	0.62	29.3	C
	NB	L	0.09	2.7	A	0.19	2.4	A	0.05	5.3	A	0.07	4.0	A
	NB	T	0.34	3.2	A	0.37	2.1	A	0.21	5.3	A	0.32	1.4	A
	SB	T	-	-	-	0.41	1.9	A	-	-	-	-	-	-
	SB	TR	0.37	3.5	A	-	-	-	0.70	11.7	B			
	SB	R	-	-	-	0.05	0.5	A	-	-	-	-	-	-
	OVERALL**			4.1	A		2.1	A		14.8	B		9.3	A
12. NYS Route 110 at Old Country Road	EB	L	**0.44**	**55.1**	**E**	**0.89**	**98.7**	**F**	**1.69**	**360.2**	**F**	**1.42**	**246.1**	**F**
	EB	T	**0.92**	**113.0**	**F**	**1.25**	**214.4**	**F**	**1.88**	**449.8**	**F**	**1.27**	**183.0**	**F**
	EB	R	0.03	0.0	A	-	-	-	0.02	0.0	A	-	-	-
	WB	L	**0.80**	**68.9**	**E**	**1.27**	**200.4**	**F**	**0.73**	**78.2**	**E**	**0.90**	**69.0**	**E**
	WB	T	**0.77**	**66.8**	**E**	-	-	-	**0.56**	**69.8**	**E**	-	-	-
	WB	LT	-	-	-	0.53	54.5	D	-	-	-	0.32	35.0	C
	WB	R	0.13	0.2	A	**0.57**	**56.8**	**E**	0.18	0.2	A	**1.02**	**102.2**	**F**
	NB	L	0.14	51.8	D	0.10	28.7	C	**0.23**	**56.6**	**E**	0.11	24.0	C
	NB	T	0.44	36.1	D	0.43	32.8	C	0.60	31.7	C	**1.25**	**148.6**	**F**
	NB	R	0.70	48.5	D	0.20	13.8	B	0.42	29.2	C	0.53	19.7	B
	SB	L	**0.83**	**90.2**	**F**	0.47	19.6	B	**0.57**	**72.4**	**E**	0.71	27.3	C
	SB	TR	0.85	48.1	D	0.64	25.3	C	0.46	26.0	C	0.51	17.7	B
	OVERALL**			52.7	D		**61.9**	**E**		**101.2**	**F**			
13. NYS Route 110 at Pinelawn Road	NB	L	**0.56**	**75.1**	**E**				**0.59**	**84.4**	**F**			
	NB	T	0.32	28.6	C				0.39	12.1	B			
	NB	R	0.03	0.0	A				0.07	0.1	A			
	SB	L	0.80	37.4	D				**1.24**	**177.3**	**F**			
	SB	T	0.48	20.6	C				0.30	19.7	B			
	SB	R	0.01	0.0	A				0.01	0.0	A			
	EB	LTR	0.42	41.1	D				**1.50**	**281.1**	**F**			
	WB	L	0.49	52.9	D				**0.99**	**163.7**	**F**			
	WB	T	**0.96**	**84.5**	**F**				**1.07**	**130.9**	**F**			
	WB	R	0.47	8.3	A				0.76	28.8	C			
	OVERALL**			33.5	C					**67.2**	**E**			
14. NYS Route 110 at LIE NSR	WB	L	0.75	43.5	D	0.29	19.3	B	0.65	44.4	D	0.57	31.7	C
	WB	T	0.86	41.9	D	0.57	22.3	C	0.73	42.2	D	0.58	28.7	C
	WB	R	0.06	0.2	A	0.15	12.4	B	0.15	2.3	A	0.19	18.5	B
	NB	L	0.55	24.9	C	0.56	11.8	B	0.70	54.1	D	0.32	10.8	B
	NB	T	0.36	2.1	A	0.53	1.4	A	0.40	12.3	B	0.58	3.4	A
	SB	T	0.71	35.2	D	0.74	31.8	C	0.57	29.2	C	0.71	23.0	C
	SB	R	0.21	6.4	A	0.37	22.5	C	0.22	9.0	A	0.36	12.9	B
	OVERALL**			28.7	C		18.3	B		29.3	C		16.7	B
15. NYS Route 110 at LIE SSR	EB	LT	0.65	31.2	C	0.75	28.6	C	**1.13**	**106.1**	**F**	**1.09**	**65.5**	**E**
	EB	R	**1.09**	**91.0**	**F**	**1.04**	**68.2**	**E**	0.49	36.4	D	0.26	9.4	A
	NB	T	0.61	25.0	C	0.80	29.8	C	**1.14**	**107.8**	**F**	1.00	47.4	D
	NB	R	0.85	36.4	D	0.57	21.9	C	**0.97**	**60.8**	**E**	0.95	52.4	D
	SB	L	**1.06**	**125.5**	**F**	0.44	14.0	B	**0.71**	**61.1**	**E**	**0.98**	**66.7**	**E**
	SB	T	0.82	21.7	C	0.70	6.5	A	0.49	14.5	B	0.92	24.8	C
	OVERALL**			38.8	D		24.3	C		**77.3**	**E**		45.3	D
16. NYS Route 110 at Baylis Road	EB	LT	**0.93**	**88.9**	**F**				**1.89**	**442.7**	**F**			
	EB	R	0.12	0.8	A				0.18	1.0	A			
	WB	L	0.42	33.9	C				**1.00**	**81.9**	**F**			
	WB	TR	0.68	39.5	D				0.54	23.2	C			
	NB	L	**0.74**	**72.4**	**E**				**0.38**	**63.4**	**E**			
	NB	T	0.75	25.0	C				0.86	37.2	D			
	NB	R	0.42	20.3	C				0.19	23.5	C			
	SB	L	**0.90**	**74.9**	**E**				**0.88**	**93.4**	**F**			
	SB	TR	0.80	25.7	C				0.87	31.1	C			
	OVERALL**			33.1	C					**81.9**	**F**			

Table 3 (Cont'd): COMPARISION OF CAPACITY ANALYSIS RESULTS BETWEEN EXISTING (2014) AND THE PREVIOUSLY CONDUCTED 2008/2009 CANON TRAFFIC STUDY

INTERSECTION NAME	LANE GROUP MOVEMENT		AM PEAK HOUR (EXISTING 2014)			AM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†			PM PEAK HOUR (EXISTING 2014)			PM PEAK HOUR (2010 BUILD WITH / WITHOUT MITIGATION)†		
			v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS
17. NYS Route 110 at Walt Whitman Road	EB	LT	**0.57**	**83.3**	**F**	0.35	54.8	D	0.47	53.1	D	0.25	37.6	D
	WB	LTR	**0.69**	**88.1**	**F**	-	-	-	**1.09**	**127.2**	**F**	-	-	-
	WB	LT	-	-	-	**0.49**	**57.2**	**E**	-	-	-	**0.96**	**88.8**	**F**
	WB	R	-	-	-	**1.14**	**158.9**	**F**	-	-	-	0.22	37.3	D
	NB	L	**0.74**	**74.8**	**E**	**0.94**	**77.4**	**E**	**0.61**	**84.9**	**F**	**0.72**	**67.4**	**E**
	NB	T	0.60	13.1	B	**1.01**	**63.0**	**E**	0.58	28.9	C	0.93	46.5	D
	NB	R	0.22	3.6	A	0.47	28.7	C	0.18	5.6	A	0.21	24.5	C
	SB	L	**0.55**	**84.7**	**F**	0.22	47.3	D	**0.67**	**94.7**	**F**	**0.24**	**58.0**	**E**
	SB	T	0.31	12.7	B	0.86	40.6	D	0.81	35.8	D	**1.24**	**153.6**	**F**
	SB	R	0.10	5.0	A	0.08	22.9	C	0.05	4.8	A	0.07	22.8	C
	OVERALL**			22.1	C		**60.2**	**E**		43.1	D		**98.6**	**F**
18. Round Swamp Road at LIE SSR	EB	L	0.33	25.2	C	0.37	24.1	C	**0.86**	**103.3**	**F**	0.85	39.4	D
	EB	LT	**1.21**	**131.6**	**F**	0.98	51.8	D	**1.47**	**245.2**	**F**	0.85	32.1	C
	EB	R	0.55	30.2	C	0.47	26.3	C	0.70	39.4	D	0.59	26.0	C
	NB	T	0.59	30.5	C	0.57	28.1	C	**0.95**	**65.2**	**E**	0.64	21.1	C
	NB	R	**1.78**	**381.3**	**F**	**0.97**	**62.5**	**E**	0.83	24.8	C	0.92	40.3	D
	SB	L	0.84	31.1	C	0.93	52.0	D	0.23	10.4	B	0.65	28.4	C
	SB	T	**1.29**	**165.6**	**F**	0.64	11.4	B	**1.26**	**152.0**	**F**	0.55	13.8	B
	OVERALL**			**155.1**	**F**		36.3	D		**131.7**	**F**		27.3	C
19. Round Swamp Road at LIE NSR	WB	L	**0.98**	**77.3**	**E**	0.64	32.1	C	**0.91**	**67.4**	**E**	0.48	21.4	C
	WB	TR	**1.36**	**196.3**	**F**	**1.01**	**62.1**	**E**	**1.08**	**85.4**	**F**	0.99	49.5	D
	NB	L	0.69	39.2	D	0.60	17.3	B	**1.01**	**82.5**	**F**	0.84	28.5	C
	NB	T	0.49	19.6	B	0.22	2.5	A	0.91	45.4	D	0.57	16.3	B
	SB	T	**0.84**	**90.3**	**F**	0.47	18.9	B	0.53	29.6	C	0.66	33.2	C
	SB	R	0.55	33.9	C	0.98	53.4	D	0.26	25.2	C	0.19	8.0	A
	OVERALL**			**109.2**	**F**		38.1	D		**63.3**	**E**		31.0	C
20. Round Swamp Road at Old Country Road	EB	LT	0.08	37.2	D				0.06	35.0	C			
	EB	R	0.05	0.3	A				0.02	0.0	A			
	NB	L	0.03	13.5	B				0.03	11.7	B			
	NB	T	0.33	14.0	B				0.68	18.7	B			
	NB	R	0.25	2.9	A				0.33	4.3	A			
	SB	L	0.08	13.3	B				0.07	13.0	B			
	SB	TR	0.49	16.0	B				0.35	12.5	B			
	WB	L	0.70	35.7	D				0.64	34.9	C			
	WB	R	0.02	0.1	A				0.02	0.0	A			
	OVERALL**			17.4	B					16.7	B			

Notes:

1. The capacity analysis is conducted by SYNCHRO, version 8, which utilizes the Highway Capacity Manual.
2. For LOS definition, see Appendix. Constrained traffic operations are presented in "Bold" letter font on this table.
3. WB = Westbound, EB = Eastbound, NB = Northbound, SB = Southbound, NEB = Northeastbound, SWB = Southwestbound, NWB = Northwestbound, SEB = Southeastbound
4. L = Left turn movement, R = Right turn movement, T = Thru movement, LT = Shared left and thru movement, TR = Shared thru and right movement, LTR =Shared left, thru and right, LR =Shared left and right.
5. ** Delay and LOS values are based on the weighted average of all signalized intersection approaches.
6. *** HCM analysis was not conducted in 2008/2009 Canon U.S.A Traffic Study.
7. † Traffic analysis results were taken from 2008/2009 Canon U.S.A Traffic Study.

No mitigation proposed at this intersection in 2008/2009 Canon U.S.A Traffic Study.

Intersection analyzed only during Existing 2014 condition.

Stop controlled intersection.

At this intersection Canon's proposed improvements are not fully implemented.

IV. MITIGATION MEASURES (2014)

The primary purpose of providing mitigation measures for this "After" study project is to help improve existing traffic operations at locations where traffic impacts are noted and the implemented mitigation measures proposed by the previous 2008/2009 Canon Traffic Study are either found ineffective or these measures were not effectively implemented. Thus, the criteria of unacceptable LOS thresholds that require traffic mitigation would be for intersections indicating comparatively worst MOE results (LOS E and/or F, delays), resulting in significant traffic congestion. At these locations, the proposed mitigation measures would help in improving Existing 2014 traffic operations to a level which was predicted either in the 2008/2009 Canon Traffic Study report, or better. Under this criterion a total of 12 key intersections that are depicted in Section III (under the Existing Condition Capacity Analysis) would require mitigation measures as follows:

RECOMMENDED MITIGATION MEASURES

The following mitigation measures have been developed for the locations that are operating under constrained traffic conditions during the Existing 2014 peak hour conditions. The mitigation measures include traffic engineering techniques such as: simple traffic signal timing modifications utilizing existing controllers, lane configuration changes within existing curb width, traffic demand management and capital improvements requiring major construction. A summary of recommended mitigation measures are presented in Tables 4 followed by detailed account of each modification. A complete backup of the capacity analysis results is contained in Appendix D.

Table 4: Summary of Recommended Mitigation Measures

Intersection Number	Study Intersection	Existing Signal Timings			Proposed Signal Timings			Proposed Intersection Geometry/Lane Configuration Improvements
		Existing Cycle Length	Existing Offsets	Existing Splits	New Cycle Length	New Offsets	New Splits	
1	Walt Whitman Road @ Old Country Road	140 (AM, PM)	94, 114 (AM, PM)	71/37/32, 88/26/26 (AM, PM)	135, 150 (AM, PM)	0, 0 (AM, PM)	77/31/27, 102/22/26 (AM, PM)	-
2	Walt Whitman Road @ Sweet Hollow Road	60 (AM, PM)	-	30/15/15 (AM, PM)	-	-	32/13/15 (PM)	-
4	Walt Whitman Road @ LIE North Service Road	110, 115 (AM, PM)	30, 71 (AM, PM)	28/20/62, 28/43/44 (AM, PM)	-	101, 76 (AM, PM)	31/22/57, 36/33/46 (AM, PM)	Widening Walt Whitman Road Bridge over the LIE to a minumum of 5 travel lanes and shoulders. At this intersection add a SB thru lane and NB left turn bay.
5	Walt Whitman Road @ South Service Road	110, 115 (AM, PM)	30, 66 (AM, PM)	19/31/60, 19/34/62 (AM, PM)	-	29, 10 (AM, PM)	19/26/65, 13/40/62 (AM, PM)	Widening Walt Whitman Road Bridge over the LIE to a minumum of 5 travel lanes and shoulders. At this intersection add a NB right turn bay.
6	Walt Whitman Road @ Canon Park Drive North	70 (AM, PM)	-	10/30/15/15 (AM, PM)	-	-	10/29/20/11 (PM)	-
12	Route 110 @ Old Country Road	140 (AM, PM)	94, 114 (AM, PM)	15/56/37/32, 15/73/26/26 (AM, PM)	135, 150 (AM, PM)	0, 0 (AM, PM)	9(23)/68(54)/31/27, 12(20)/90(82)/22/26 (AM, PM)	-
13	Route 110 @ Pinelawn Road	140 (AM, PM)	34, 83 (AM, PM)	24(44)/73(53)/43, 15/98/27 (AM, PM)	110, 115 (AM, PM)	46, 111 (AM, PM)	17(29)/46(34)/47, 17(23)/58(52)/40 (AM, PM)	-
14	Route 110 @ LIE North Service Road	110, 115 (AM, PM)	70, 7 (AM, PM)	43/25/42, 48/25/42 (AM, PM)	-	92, 106 (AM, PM)	-	-
15	Route 110 @ LIE South Service Road	110, 115 (AM, PM)	82, 9 (AM, PM)	56/15/39, 55/20/40 (AM, PM)	-	64, 36 (AM, PM)	-	-
16	Route 110 @ Baylis Road	100, 115 (AM, PM)	0, 10 (AM, PM)	14/53/12/21, 12/53/20/30 (AM, PM)	110 (AM)	32, 3 (AM, PM)	18/52/12/28 (AM)	Modify lane striping to convert EB exclusive right turn lane to thru-right shared lane.
17	Route 110 @ Walt Whitman Road	155, 170 (AM, PM)	114, 113 (AM, PM)	38/80/37, 25/92/53 (AM, PM)	150, 150 (AM, PM)	0, 0 (AM, PM)	20(30)/103(93)/27, 21(14)/73(80)/56 (AM, PM)	-
18	Round Swamp Road @ LIE South Service Road	80 (AM, PM)	44, 78 (AM, PM)	24/26/30, 25/28/27 (AM, PM)	110, 115 (AM, PM)	0, 109 (AM, PM)	21/48/41, 30(21)/41(50)/44 (AM, PM)	Traffic Study for Country Pointe at Plainview (March 2013) has also proposed major geometric improvement at this intersection. These recommendations include; Add a second left-turn lane with storage of 400 feet at eastbound approach and add a third through lane and extend right turn lane to provide additional storage at northbound approach. (Build Year 2016)
19	Round Swamp Road @ LIE North Service Road	80 (AM, PM)	44, 78 (AM, PM)	24/26/30, 25/28/27 (AM, PM)	110, 115 (AM, PM)	0, 109 (AM, PM)	21/48/41, 30(21)/41(50)/44 (AM, PM)	Traffic Study for Country Pointe at Plainview (March 2013) has also proposed major geometric improvement at this intersection. These recommendations include; Add a second left-turn lane at northbound approach and add a third through lane at southbound approach. (Build Year 2016)

Signal Timing/Phasing/Offset Modifications:
The proposed signal timing, phasing and offset modifications are as follows:

1. *Walt Whitman Road @ Old Country Road*
   - AM Peak Hour: New cycle length of 135 sec is proposed. New NB/SB split = 77 sec, WB split = 31 sec and EB split = 27 sec.
   - PM Peak Hour: New cycle length of 150 sec is proposed. New NB/SB split = 102 sec, WB split = 22 sec and EB split = 26 sec.
2. *Walt Whitman Road @ Sweet Hollow Road*
   - PM Peak Hour: Cycle length to remain same at 60 sec. New NB/SB split = 32 sec, WB protected Left split = 13 sec and EB/WB split = 15 sec.
3. *Walt Whitman Road @ LIE North Service Road*
   - AM Peak Hour: Cycle length to remain same at 110 sec. New NB/SB split = 31 sec, New NB protected Left turn phase = 22 sec and WB split = 57 sec.
   - PM Peak Hour: Cycle length to remain same at 115 sec. New NB/SB split = 36 sec, New NB protected Left turn phase= 33 sec and WB split = 46 sec.

   (Note: Widening to the Walt Whitman Road Bridge over the LIE is also recommended and is discussed further under Geometric Modifications below).
4. *Walt Whitman Road @ LIE South Service Road*
   - AM Peak Hour: Cycle length to remain same at 110 sec. New SB protected Left = 19 sec, NB/SB split = 26 sec and EB split = 65 sec.
   - PM Peak Hour: Cycle length to remain same at 115 sec. New SB protected Left = 19 sec, NB/SB split = 34 sec and EB split = 62 sec.

   (Note: Widening to the Walt Whitman Road Bridge over the LIE is also recommended and is discussed further under Geometric Modifications below).
5. *Walt Whitman Road @ Canon Park Drive North*
   - PM Peak Hour: Cycle length to remain same at 70 sec. New NB/SB protected Left split = 10 sec, NB/SB split = 29 sec, EB split = 20 sec and WB split = 11 sec.
6. *Route 110 @ Old Country Road*
   - AM Peak Hour: New cycle length of 135 sec is proposed. New NB protected Left = 9 sec, SB protected Left = 23 sec, NB/SB split = 54 sec, WB split = 31 sec and EB split = 27 sec.

- PM Peak Hour: New cycle length of 150 sec is proposed. New NB protected Left = 12 sec, SB protected Left = 20 sec, NB/SB split = 82 sec, WB split = 22 sec and EB split = 26 sec.

7. *Route 110 @ Pinelawn Road*
    - AM Peak Hour: New cycle length of 110 sec is proposed. New NB protected Left = 17 sec, SB protected Left = 29 sec, NB/SB split = 34 sec and WB/EB split = 47 sec.
    - PM Peak Hour: New cycle length of 115 sec is proposed. New NB protected Left = 17 sec, SB protected Left = 23 sec, NB/SB split = 52 sec and WB/EB split = 40 sec.
8. *Route 110 @ Baylis Road*
    - AM Peak Hour: New cycle length of 110 sec is proposed. New NB/SB protected Left = 18 sec, NB/SB split = 52 sec, WB protected Left = 12 sec and WB/EB split = 28 sec. (Note: Lane configuration modification is also recommended for this intersection that is noted below).
9. *Route 110 @ Walt Whitman Road*
    - AM Peak Hour: New cycle length of 150 sec is proposed. New NB protected Left = 30 sec, SB protected Left = 20 sec, NB/SB split = 93/103 sec and WB/EB split = 27 sec.
    - PM Peak Hour: New cycle length of 150 sec is proposed. New NB protected Left = 14 sec, SB protected Left = 21 sec, NB/SB split = 80/73 sec and WB/EB split = 56 sec.
10. *Round Swamp Road @ LIE South Service Road*
    - AM Peak Hour: New cycle length of 110 sec is proposed. New SB protected Left = 21 sec, NB/SB split = 48 sec and WB/EB split = 41 sec.
    - PM Peak Hour: New cycle length of 115 sec is proposed. New SB protected Left = 21 sec, NB/SB split = 41 sec and WB/EB split = 44 sec.

    (Note: The above noted signal timing changes could be considered as an interim measure since the Country Pointe at Plainview Traffic Study, dated March 2013, has proposed significant modifications to intersection lane configuration. The applicant of this project has committed to fully fund the design and construction of the proposed improvements at this intersection as noted below under Geometric Modifications).

11. Round Swamp Road @ LIE North Service Road

- AM Peak Hour: New cycle length of 110 sec is proposed. New NB protected Left = 21 sec, NB/SB split = 48 sec and WB/EB split = 41 sec.
- PM Peak Hour: New cycle length of 115 sec is proposed. New NB protected Left = 30 sec, NB/SB split = 41 sec and WB/EB split = 44 sec.

  (Note: See note above under Round Swamp Road @ LIE South Service Road).

Geometric Modifications:

1. *Walt Whitman Road Bridge over the LIE (between LIE North and South Service Roads)*

   One of the key "choke points" that could not be mitigated by simple signal timing adjustments within the immediate vicinity of the Canon U.S.A. Inc. headquarters building is the Walt Whitman Road Bridge over the LIE. This bridge section presently has one southbound and two northbound travel lanes (3-10 ft narrow lanes without shoulders). The single southbound bridge lane does open up to a left turn bay and two southbound through lanes at its intersection with the LIE South Service Road but occurs essentially at the throat of the intersection. The two northbound bridge lanes operate as a left turn only lane and a through lane as it intersects the LIE North Service Road. Traffic analysis conducted at the two intersections located adjacent to this bridge shows significant capacity constraints during various peak traffic hours (even though less traffic is present that originally predicted). The Walt Whitman Road and LIE North Service Road intersection is noted to be the worst of the two adjacent intersections where all approach legs to the intersection are noted to operate at LOS E/F, especially during the PM peak hour. During this peak period the northbound segment of the bridge currently forms significant vehicle queues in the left turn lane over the bridge. The northbound left turn during this peak hour is operating at LOS F with delays of 92.2 seconds per vehicle and 50% percentile queue length reaching more than 600 ft. Thus, simple signal timing changes alone will not be able to significantly mitigate this congested situation or vehicle queuing issue.

   At this intersection the geometrical mitigation measures proposed by the 2008/2009 Canon U.S.A Traffic Study have not been fully implemented. The previously proposed mitigation measures at this intersection called for an additional northbound left-turn bay and an additional westbound through lane. The NYSDOT has already implemented the additional westbound through lane but the northbound left-turn bay is presently not in place. According to the Highway Capacity Manual (HCM), if the left-turn volume of an approach to an intersection exceeds 300 vph, provision of a second left-turn bay/lane is warranted. In the PM peak hour the 2014 northbound left turn traffic volume at the Walt Whitman Road intersection with the LIE North Service Road are 690 vehicles. This existing condition

volume is significantly higher than the HCM threshold. Thus, even if the pavement was restriped to squeeze-in an additional left turn bay (within existing curb-to-curb width), it is doubtful that operations would improve measurably since the length of the second turn bay would only be about 100 feet long due to the width constraint of the bridge. Furthermore, the double turn lane would require modifying the signal operation so that left turns could only be made with a fully protected phase. In order to be effective, the turn bay would have to be extended over the bridge to provide proper storage for this heavy left turn movement particularly during the PM peak hour. Without the necessary widening of the bridge structure; vehicle queuing issues will continue to worsen. At a minimum, the structure needs to be widened to accommodate the following: 2 southbound travel lanes and 3 northbound travel lanes (2 left turn lanes and a single northbound through lane) in order to improve traffic flow and reduce queuing of vehicles over the bridge and at its adjacent intersections. Furthermore for alignment and operational purposes an additional through lane on the southbound approach of LIE North Service Road intersection and a northbound right turn bay at the LIE South Service Road intersection is warranted.

It is important to note that without the necessary bridge widening and the adjacent intersection improvements; vehicle queuing issues will continue to worsen as Canon's employment figures are expected to increase as noted in the Section V (*Traffic Operational Impacts on Walt Whitman Road Bridge over the LIE Due to Canon's Full Employment Conditions*) of the study report.

2. *Route 110 @ Baylis Road*

   Apart from these signal timing modifications noted earlier, it is recommended to modify the pavement markings at the eastbound approach of Baylis Road from a left-thru shared lane and a right turn bay to an exclusive left turn lane and a shared through-right turn lane. This configuration would reduce the severe congestion currently occurring on the eastbound approach of this intersection. It should be noted that no changes to the eastbound receiving lanes is necessary since it already has two lanes in operation.

3. *Round Swamp Road underpass at LIE (between LIE North and South Service Roads)*

   Under the Country Pointe at Plainview Traffic Study, dated March 2013, the developer has committed to making the below changes to mitigate traffic impacts due to their development. The improvements are expected to be implemented by 2016. These recommendations will be implemented once approval is granted by TOH and NYSDOT.

- At the intersection of Round Swamp Road and LIE North Service Road provide a second left-turn lane on its northbound approach. The new lane configuration for this approach will include two left turn lanes and two through lanes. It is also recommended to provide a third through lane on its southbound approach as well. The new lane configuration for this approach will include three through lanes and one right turn lane. The signal phasing has to be revised by including a northbound protected phase when this geometry is implemented.

- At the intersection of Round Swamp Road and LIE South Service Road provide a second left-turn lane on its eastbound approach. The new lane configuration for this approach will include two left turn lanes and two through lanes and a right turn lane. It is also recommended to provide a third through lane and an extended right turn lane on its northbound approach as well. The new lane configuration for this approach will include three through lanes and one right turn lane. The signal phasing has to be revised when this geometry is implemented.

Intersection Control Modification:

1. *Old Walt Whitman Road @ Canon Park Drive South*

   As indicated earlier in Section III of this study report, Canon Park Drive South is presently being utilized by more than twice the amount of project generated traffic during peak traffic hours than it was previously predicted in the 2008/2009 Canon Traffic Study. As a result, the Existing 2014 condition capacity analysis has indicated significant traffic operating constraint, LOS F in the PM peak period on the driveway approaches (the Canon Park Drive and the 1660 Walt Whitman Road property driveway) of this intersection. This analysis has however shown no capacity constraints on Walt Whitman Road approaches of this driveway intersection. This could be addressed by installing a traffic signal, however, that may not be desirable since a traffic signal may degrade operations on Walt Whitman Road.

Transportation Demand Management:

Staggered work hours should be strictly implemented in order to minimize the concentration of Canon's project generated traffic on to the surrounding roadway network. The arrival-departure pattern for the staggered work hours should be set such that the consecutive employee work schedule have a shift start/end time gap of at least one hour (eg. 8:00 am to 4:00 pm, 9:00 am to 5 pm). This way the arriving or departing trips are not made within the same peak hour, thereby help in reducing peak hour congestion. Additionally, Canon should look into providing incentives to

its employees by encouraging car pooling, sponsor vanpools and telecommuting options.

The capacity analysis result of the recommended mitigation measures are presented in Tables 5 for the AM and PM peak hours. This table also presents a comparison of the traffic operating conditions (MOE's – v/c ratios, delays, LOS) between the Existing 2014 and the Mitigated 2014 Conditions. This comparison indicates that proposed improvements will enable all intersections with existing constraints to operate better. Nevertheless, some of these intersections will still operate at LOS E/F, but their delays, v/c ratios will be reduced. A complete backup of the capacity analysis results is contained in Appendix D.

Table 5: Comparison of Capacity Analysis Results between Existing (2014) and the Mitigation (2014) Conditions

INTERSECTION NAME	LANE GROUP MOVEMENT		AM PEAK HOUR (EXISTING 2014)			AM PEAK HOUR (EXISTING MITIGATION 2014)			PM PEAK HOUR (EXISTING 2014)			PM PEAK HOUR (EXISTING MITIGATION 2014)		
			v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS
1. Walt Whitman Road at Old Country Road	EB	LTR	**0.69**	**66.9**	**E**	**0.65**	**61.3**	**E**	**0.90**	**143.8**	**F**	**0.61**	**69.3**	**E**
	WB	L	0.18	16.8	B	0.17	13.4	B	0.28	38.7	D	0.26	27.5	C
	WB	TR	0.64	18.3	B	0.60	14.9	B	0.50	34.1	C	0.47	25.0	C
	WB	LTR	-	-	-	-	-	-	-	-	-	-	-	-
	NB	LTR	0.26	23.8	C	0.22	17.3	B	0.43	18.6	B	0.39	14.6	B
	NB	R	0.26	23.4	C	0.23	17.3	B	0.40	17.9	B	0.37	14.1	B
	NB	L	-	-	-	-	-	-	-	-	-	-	-	-
	NB	TR	-	-	-	-	-	-	-	-	-	-	-	-
	SB	LT	0.55	29.3	C	0.48	21.3	C	0.21	14.1	B	0.19	11.3	B
	SB	R	0.11	0.3	A	0.10	3.1	A	0.07	0.1	A	0.07	1.5	A
	OVERALL**			34.7	C		25.4	C		42.9	D		25.2	C
2. Walt Whitman Road at Sweet Hollow Road	EB	LT	0.62	33.6	C	0.62	33.6	C	0.44	26.9	C	0.45	27.8	C
	EB	LTR	-	-	-	-	-	-	-	-	-	-	-	-
	EB	R	0.38	8.3	A	0.38	8.3	A	0.15	0.8	A	0.15	0.9	A
	WB	L	0.48	16.0	B	0.48	16.0	B	0.23	12.7	B	0.24	14.0	B
	WB	T	0.25	12.7	B	0.25	12.7	B	0.29	13.3	B	0.31	14.6	B
	WB	R	0.23	3.3	A	0.23	3.3	A	0.17	3.6	A	0.17	4.0	A
	NB	L	0.23	16.5	B	0.23	16.5	B	0.21	12.3	B	0.20	11.4	B
	NB	TR	0.21	9.4	A	0.21	9.4	A	0.75	20.6	C	0.72	18.0	B
	NB	T	-	-	-	-	-	-	-	-	-	-	-	-
	NB	R	-	-	-	-	-	-	-	-	-	-	-	-
	SB	L	0.11	11.8	B	0.11	11.8	B	0.71	52.1	D	0.62	37.8	D
	SB	T	0.87	32.6	C	0.87	32.6	C	0.16	11.5	B	0.15	10.7	B
	SB	R	0.06	0.2	A	0.06	0.2	A	0.02	0.1	A	0.02	0.1	A
	OVERALL**			20.5	C		20.5	C		18.3	B		16.7	B
4. Walt Whitman Road at LIE SSR	EB	LT	0.89	31.8	C	0.81	22.8	C	0.91	34.5	C	0.91	23.5	C
	EB	R	**1.08**	**86.5**	**F**	0.99	51.2	D	0.88	43.3	D	0.88	31.7	C
	NB	TR	0.48	34.2	C	-	-	-	**0.95**	**60.2**	**E**	-	-	-
	NB	T	-	-	-	0.47	37.9	D	-	-	-	0.73	41.7	D
	NB	R	-	-	-	0.21	36.3	D	-	-	-	0.34	34.9	C
	SB	L	0.20	27.6	C	0.21	10.1	B	0.55	37.6	D	0.50	30.7	C
	SB	T	0.33	30.4	C	0.37	13.7	B	0.17	34.4	C	0.17	5.3	A
	OVERALL**			42.9	D		29.1	C		41.7	D		27.7	C
5. Walt Whitman Road at LIE NSR	WB	LT	0.52	28.5	C	0.50	31.2	C	**1.02**	**73.4**	**E**	0.96	28.1	C
	WB	R	0.11	0.1	A	0.11	0.1	A	0.05	0.0	A	0.05	0.0	A
	NB	L	**0.86**	**59.4**	**E**	0.63	39.2	D	**1.12**	**92.2**	**F**	**0.99**	**59.9**	**E**
	NB	T	0.76	35.2	D	0.80	30.0	C	0.47	12.9	B	0.48	13.4	B
	SB	T	**0.95**	**79.4**	**E**	0.58	45.2	D	**0.80**	**61.6**	**E**	0.31	35.0	D
	SB	R	0.57	28.3	C	0.63	31.7	C	**1.26**	**169.8**	**F**	**0.99**	**73.8**	**E**
	OVERALL**			37.3	D		31.6	C		**79.3**	**E**		38.6	D
6. Walt Whitman Road at Canon/Fed/Ex Driveway	EB	LT	0.16	23.6	C	0.16	23.6	C	**1.06**	**98.3**	**F**	0.77	38.2	D
	EB	R	0.03	0.1	A	0.03	0.1	A	0.08	0.3	A	0.06	0.2	A
	WB	LTR	0.04	0.2	A	0.04	0.2	A	0.12	0.6	A	0.14	0.8	A
	NB	L	0.18	6.4	A	0.18	6.4	A	0.02	8.5	A	0.02	9.8	A
	NB	TR	0.37	10.5	B	0.37	10.5	B	0.81	27.8	C	0.88	35.7	D
	SB	L	0.06	6.1	A	0.06	6.1	A	0.12	9.7	A	0.12	11.0	B
	SB	T	0.43	11.0	B	0.43	11.0	B	0.47	12.8	B	0.50	14.9	B
	SB	R	0.02	0.1	A	0.02	0.1	A	0.03	0.1	A	0.03	0.1	A
	OVERALL**			10.5	B		10.5	B		32.8	C		25.6	C
12. NYS Route 110 at Old Country Road	EB	L	**0.44**	**55.1**	**E**	0.41	49.6	D	**1.69**	**360.2**	**F**	**1.14**	**146.6**	**F**
	EB	T	**0.92**	**113.0**	**F**	**0.86**	**89.8**	**F**	**1.88**	**449.8**	**F**	**1.27**	**204.0**	**F**
	EB	R	0.03	0.0	A	0.03	0.0	A	0.02	0.0	A	0.02	0.0	A
	WB	L	**0.80**	**68.9**	**E**	**0.75**	**62.2**	**E**	**0.73**	**78.2**	**E**	**0.68**	**78.0**	**E**
	WB	T	**0.77**	**66.8**	**E**	**0.72**	**60.7**	**E**	**0.56**	**69.8**	**E**	**0.52**	**71.4**	**E**
	WB	LT	-	-	-	-	-	-	-	-	-	-	-	-
	WB	R	0.13	0.2	A	0.13	0.2	A	0.18	0.2	A	0.18	0.2	A
	NB	L	0.14	51.8	D	**0.25**	**73.8**	**E**	**0.23**	**56.6**	**E**	**0.35**	**81.6**	**F**
	NB	T	0.44	36.1	D	0.40	31.3	C	0.60	31.7	C	0.56	27.1	C
	NB	R	0.70	48.5	D	0.40	15.8	B	0.42	29.2	C	0.31	13.1	B
	SB	L	**0.83**	**90.2**	**F**	**0.57**	**63.5**	**E**	**0.57**	**72.4**	**E**	**0.40**	**67.1**	**E**
	SB	TR	0.85	48.1	D	0.65	30.5	C	0.46	26.0	C	0.39	19.7	B
	OVERALL**			52.7	D		39.1	D		**101.2**	**F**		54.5	D
13. NYS Route 110 at Pinelawn Road	NB	L	**0.56**	**75.1**	**E**	0.54	49.1	D	**0.59**	**84.4**	**F**	0.47	53.7	D
	NB	T	0.32	28.6	C	0.40	29.8	C	0.39	12.1	B	0.52	20.4	C
	NB	R	0.03	0.0	A	0.03	0.0	A	0.07	0.1	A	0.07	0.1	A
	SB	L	0.80	37.4	D	0.79	51.4	D	**1.24**	**177.3**	**F**	**0.68**	**55.4**	**E**
	SB	T	0.48	20.6	C	0.55	25.7	C	0.30	19.7	B	0.36	16.5	B
	SB	R	0.01	0.0	A	0.01	0.0	A	0.01	0.0	A	0.01	0.0	A
	EB	LTR	0.42	41.1	D	0.31	24.8	C	**1.50**	**281.1**	**F**	0.80	53.5	D
	WB	L	0.49	52.9	D	0.38	32.7	C	**0.99**	**163.7**	**F**	0.45	47.5	D
	WB	T	**0.96**	**84.5**	**F**	0.80	46.8	D	**1.07**	**130.9**	**F**	0.71	51.7	D
	WB	R	0.47	8.3	A	0.41	3.6	A	0.76	28.8	C	0.54	7.2	A
	OVERALL**			33.5	C		30.0	C		**67.2**	**E**		26.3	C

Table 5 (Cont'd): Comparison of Capacity Analysis Results between Existing (2014) and the Mitigation (2014) Conditions

INTERSECTION NAME	LANE GROUP MOVEMENT		AM PEAK HOUR (EXISTING 2014)			AM PEAK HOUR (EXISTING MITIGATION 2014)			PM PEAK HOUR (EXISTING 2014)			PM PEAK HOUR (EXISTING MITIGATION 2014)		
			v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS	v/c ratio	Delay (sec)	LOS
14. NYS Route 110 at LIE NSR	WB	L	0.75	43.5	D	0.75	43.5	D	0.65	44.4	D	0.65	44.4	D
	WB	T	0.86	41.9	D	0.86	41.9	D	0.73	42.2	D	0.73	42.2	D
	WB	R	0.06	0.2	A	0.06	0.2	A	0.15	2.3	A	0.15	2.3	A
	NB	L	0.55	24.9	C	0.55	31.9	C	0.70	54.1	D	0.70	54.1	D
	NB	T	0.36	2.1	A	0.36	1.9	A	0.40	12.3	B	0.40	12.3	B
	SB	T	0.71	35.2	D	0.71	23.9	C	0.57	29.2	C	0.57	22.4	C
	SB	R	0.21	6.4	A	0.21	5.2	A	0.22	9.0	A	0.22	6.4	A
	OVERALL**			28.7	C		26.0	C		29.3	C		27.4	C
15. NYS Route 110 at LIE SSR	EB	LT	0.65	31.2	C	0.65	20.9	C	**1.13**	**106.1**	**F**	**1.13**	**94.5**	**F**
	EB	R	**1.09**	**91.0**	**F**	**1.09**	**83.5**	**F**	0.49	36.4	D	0.49	22.3	C
	NB	T	0.61	25.0	C	0.61	6.1	A	**1.14**	**107.8**	**F**	**1.14**	**92.4**	**F**
	NB	R	0.85	36.4	D	0.85	15.4	B	**0.97**	**60.8**	**E**	0.97	41.5	D
	SB	L	**1.06**	**125.5**	**F**	**1.06**	**125.5**	**F**	**0.71**	**61.1**	**E**	**0.71**	**61.1**	**E**
	SB	T	0.82	21.7	C	0.82	21.7	C	0.49	14.5	B	0.49	14.5	B
	OVERALL**			38.8	D		30.6	C		**77.3**	**E**		**66.4**	**E**
16. NYS Route 110 at Baylis Road	EB	LT	**0.93**	**88.9**	**F**	-	-	-	**1.89**	**442.7**	**F**	-	-	-
	EB	R	0.12	0.8	A	-	-	-	0.18	1.0	A	-	-	-
	EB	LTR	-	-	-	0.65	50.1	D	-	-	-	**1.17**	**133.8**	**F**
	WB	L	0.42	33.9	C	0.38	35.7	D	**1.00**	**81.9**	**F**	**1.00**	**81.9**	**F**
	WB	TR	0.68	39.5	D	0.68	43.0	D	0.54	23.2	C	0.54	23.2	C
	NB	L	**0.74**	**72.4**	**E**	**0.59**	**59.1**	**E**	**0.38**	**63.4**	**E**	**0.38**	**63.4**	**E**
	NB	T	0.75	25.0	C	0.78	29.6	C	0.86	37.2	D	0.86	37.2	D
	NB	R	0.42	20.3	C	0.44	24.2	C	0.19	23.5	C	0.19	23.5	C
	SB	L	**0.90**	**74.9**	**E**	0.69	40.2	D	**0.88**	**93.4**	**F**	**0.88**	**85.4**	**F**
	SB	TR	0.80	25.7	C	0.80	30.4	C	0.87	31.1	C	0.87	40.1	D
	OVERALL**			33.1	C		33.0	C		**81.9**	**F**		53.1	D
17. NYS Route 110 at Walt Whitman Road	EB	LT	**0.57**	**83.3**	**F**	**0.55**	**78.4**	**E**	0.47	53.1	D	0.43	41.6	D
	WB	LTR	**0.69**	**88.1**	**F**	**0.67**	**82.6**	**F**	**1.09**	**127.2**	**F**	**0.95**	**83.7**	**F**
	WB	LT	-	-	-	-	-	-	-	-	-	-	-	-
	WB	R	-	-	-	-	-	-	-	-	-	-	-	-
	NB	L	**0.74**	**74.8**	**E**	**0.74**	**72.5**	**E**	**0.61**	**84.9**	**F**	**0.74**	**87.7**	**F**
	NB	T	0.60	13.1	B	0.59	12.6	B	0.58	28.9	C	0.63	31.2	C
	NB	R	0.22	3.6	A	0.21	1.5	A	0.18	5.6	A	0.20	6.5	A
	SB	L	**0.55**	**84.7**	**F**	**0.56**	**83.0**	**F**	**0.67**	**94.7**	**F**	**0.67**	**86.2**	**F**
	SB	T	0.31	12.7	B	0.32	12.8	B	0.81	35.8	D	0.85	36.9	D
	SB	R	0.10	5.0	A	0.10	3.6	A	0.05	4.8	A	0.06	4.2	A
	OVERALL**			22.1	C		21.3	C		43.1	D		40.5	D
18. Round Swamp Road at LIE SSR	EB	L	0.33	25.2	C	0.31	31.4	C	**0.86**	**103.3**	**F**	0.67	54.3	D
	EB	LT	**1.21**	**131.6**	**F**	**1.12**	**104.9**	**F**	**1.47**	**245.2**	**F**	**1.14**	**113.8**	**F**
	EB	R	0.55	30.2	C	0.51	36.2	D	0.70	39.4	D	0.54	37.3	D
	NB	T	0.59	30.5	C	0.38	26.2	C	**0.95**	**65.2**	**E**	0.67	33.1	C
	NB	R	**1.78**	**381.3**	**F**	**1.33**	**188.9**	**F**	0.83	24.8	C	0.79	32.6	C
	SB	L	0.84	31.1	C	0.89	35.0	C	0.23	10.4	B	0.34	18.9	B
	SB	T	**1.29**	**165.6**	**F**	**0.83**	**69.2**	**E**	**1.26**	**152.0**	**F**	**1.12**	**109.5**	**F**
	OVERALL**			**155.1**	**F**		**89.1**	**F**		**131.7**	**F**		**76.1**	**E**
19. Round Swamp Road at LIE NSR	WB	L	**0.98**	**77.3**	**E**	**0.91**	**97.0**	**F**	**0.91**	**67.4**	**E**	**0.71**	**88.5**	**F**
	WB	TR	**1.36**	**196.3**	**F**	**1.27**	**161.7**	**F**	**1.08**	**85.4**	**F**	0.84	44.4	D
	NB	L	0.69	39.2	D	0.76	39.8	D	**1.01**	**82.5**	**F**	**1.08**	**100.8**	**F**
	NB	T	0.49	19.6	B	0.32	18.4	B	0.91	45.4	D	0.64	26.1	C
	SB	T	**0.84**	**90.3**	**F**	0.54	29.1	C	0.53	29.6	C	0.47	35.2	D
	SB	R	0.55	33.9	C	0.36	27.2	C	0.26	25.2	C	0.23	32.1	C
	OVERALL**			**109.2**	**F**		**90.7**	**F**		**63.3**	**E**		**57.2**	**E**

Notes:

1. The capacity analysis is conducted by SYNCHRO, version 8, which utilizes the Highway Capacity Manual.
2. For LOS definition, see Appendix. Constrained traffic operations are presented in "Bold" letter font on this table.
3. WB = Westbound, EB = Eastbound, NB = Northbound, SB = Southbound, NEB = Northeastbound, SWB = Southwestbound, NWB = Northwestbound, SEB = Southeastbound
4. L = Left turn movement, R = Right turn movement, T = Thru movement, LT = Shared left and thru movement, TR = Shared thru and right movement, LTR =Shared left, thru and right, LR =Shared left and right.
5. ** Delay and LOS values are based on the weighted average of all signalized intersection approaches.

V. TRAFFIC OPERATIONAL IMPACTS ON WALT WHITMAN ROAD BRIDGE OVER THE LIE DUE TO CANON'S FULL EMPLOYMENT CONDITION (2020)

One of the most important mitigation recommendations is the widening of Walt Whitman Road Bridge over the LIE. This bridge section with a total of three existing operating lanes will continue to be the peak hour choke point and result in spillbacks and delays. This section of the report presents a scenario in which traffic operational impacts on Walt Whitman Road Bridge over the LIE are further assessed based on the Canon's Full Employment to better understand the traffic impacts and propose an effective solution.

As evaluated in Section III (Existing Condition Traffic Assessment 2014) of this report, the present day Canon site 2014 project generated traffic is significantly less than what was anticipated in 2010. This is mainly due to the lengthy economic recession and slow process of recovery in many areas including the Melville Employment Centre. For the Canon site, the current lower than expected trips is due to the full employment build out has being slower than anticipated. Full employment will not be met until sometime in the next 5+ years. With the potential of more site generated traffic to materialize in the near future from Canon, the key choke point, Walt Whitman Road Bridge over the LIE, will continue to operate at a poor level of service resulting in more delays and longer queues.

Presently, the Canon building has 1,879 employees (including 275 consultants). According to Canon officials, by 2020 the full employment potential calls for an estimated total of 2,700 employees. This employment level was expected to have already occurred by now, however due to the economic downfall it will take more time (by 2020). Table 6 presents the additional project generated traffic that would be generating from the Canon site as a result of its full employment potential.

Table 6: Net Project Generated Traffic Increase under Canon's Full Employment Conditions

Peak Period	Direction	Canon Full Employement (2020)	Trip Generation Rate*	Directional Distribution (%)	Peak Hour Vehicle Trip End (2020)	Total Vehicular Trips (2020)	Canon Partial Employement (2014)*	Net Trip Increase from 2014 to 2020
AM (8:00 AM - 9:00 AM)	IN OUT	2700	0.645	97.10% 2.90%	1692 50	1742	1178 35	**514** **15**
PM (5:00 PM - 6:00 PM)	IN OUT	2700	0.506	3.60% 96.40%	49 1317	1366	34 918	**15** **399**

Notes:
1. * Trip Generation Rate and Total Vehicle Trips based on Existing (2014) Canon driveway counts.
2. Full Employement numbers are obtained from Canon officials.
3. Inbound and outbound driveway distribution is obtained from Existing (2014) Canon driveway counts.

Thus, based on the existing trip generation volumes that were obtained from the 2014 driveway counts, the full pro-rated employment will result in following **additional** trips (more than what has been recorded in 2014) within the project study area:

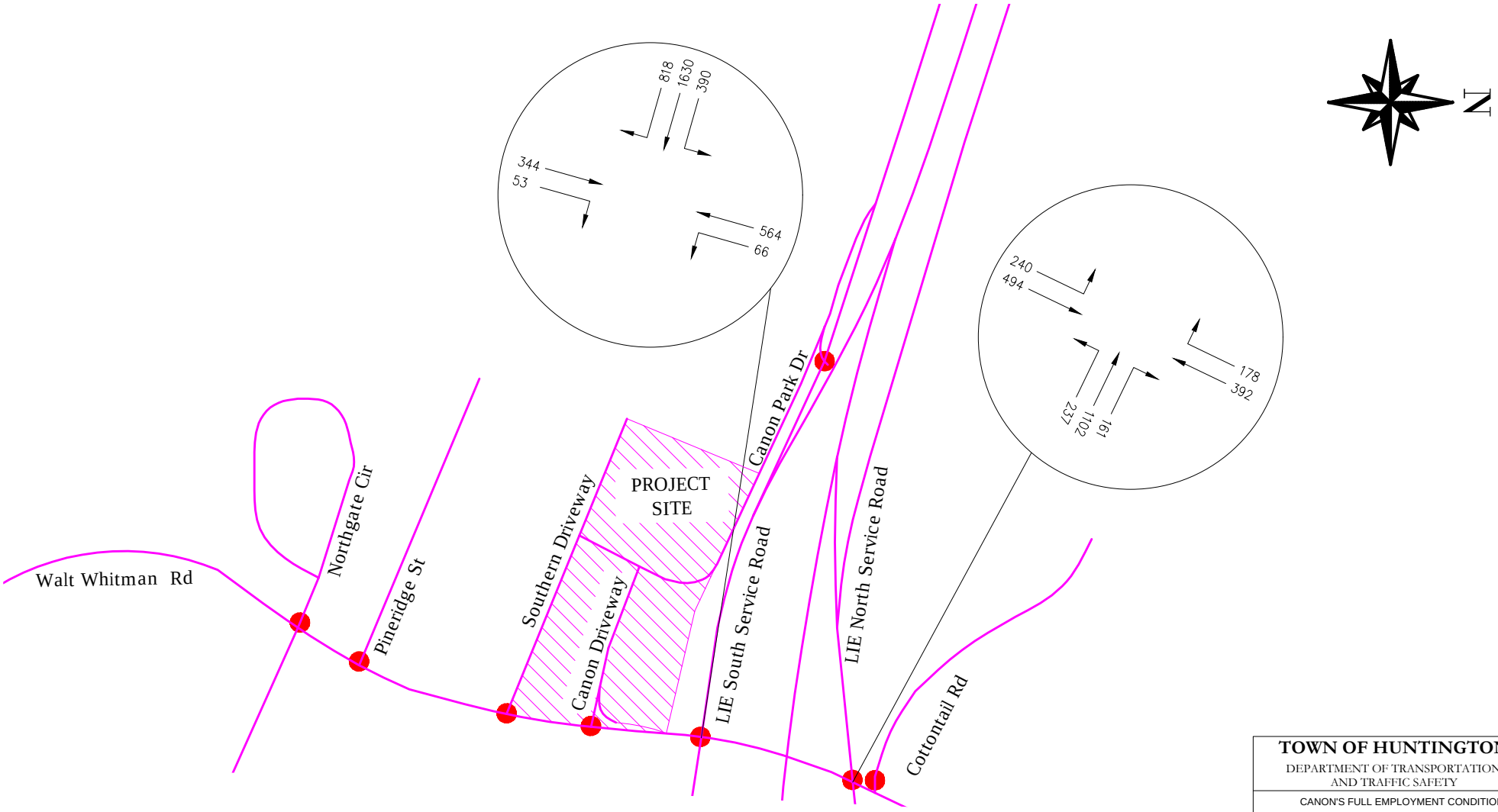
- **529** vehicular trips (514 inbound, 15 outbound) during the AM peak hour between 8:00 am and 9:00 am, and
- **414** vehicular trips (15 inbound, 399 outbound) during the PM peak hour between 5:00 pm and 6:00 pm.

These new full employment based additional trips (along with a background traffic growth of approximately 0.544% per year, based on NYMTC Regional Transportation Plan 2040) were assigned on the Walt Whitman Road Bridge over the LIE and its adjacent LIE North and South service road intersections following the same traffic assignment pattern as developed in the 2008/2009 Canon U.S.A Traffic Study. Figures 5 and 6 presents the resulting peak hour Canon's "Full Employment" 2020 traffic volumes on the Walt Whitman Road Bridge over the LIE and its adjacent LIE North and South service road intersections. Based on these additional traffic volumes, capacity analysis was also conducted at the two LIE service road intersections depicting the following peak hour traffic operating conditions. Table 7 summarizes these analysis results. A complete backup of the capacity analysis results is contained in Appendix E.

Old Walt Whitman Road @ LIE North Service Road:

- AM Peak Hour: During the AM peak hour this intersection will operate at LOS D with 43.3 sec average intersection delays per vehicle. On the bridge approach the worst delays will be on the northbound left-turn lane group where the 50% percentile queue length is estimated to be 154 ft. Delays on this lane group are anticipated to about 83.8 seconds per vehicle with LOS F. The southbound through lane group will also operate at LOS F with delays of 129.6 sec and v/c ratio 1.14. The 50% percentile queue length for this lane group could reach more than 355 ft. All other lane groups will be operating at LOS C or better.

- PM Peak Hour: During the PM peak hour this intersection will operate at LOS F with 118.3 sec average intersection delays per vehicle. On the bridge approach the worst delays will be on the northbound left-turn lane group where the 50% percentile queue length could reach 1023 ft. i.e., spilling well beyond the bridge segment past LIE South Service Road intersection and ending in front of the Canon property. Delays on this lane group are anticipated to about 236.5 seconds per vehicle with LOS F. With the exception of westbound right and northbound through lane groups that will operate at LOS B or better, all other lane groups will be operating at LOS E or F with significant traffic operating constraints.



TOWN OF HUNTINGTON

DEPARTMENT OF TRANSPORTATION AND TRAFFIC SAFETY

CANON'S FULL EMPLOYMENT CONDITION
WALT WHITMAN ROAD BRIDGE AM PEAK
AM PEAK (8:00 AM - 9:00 AM)

FIGURE 5

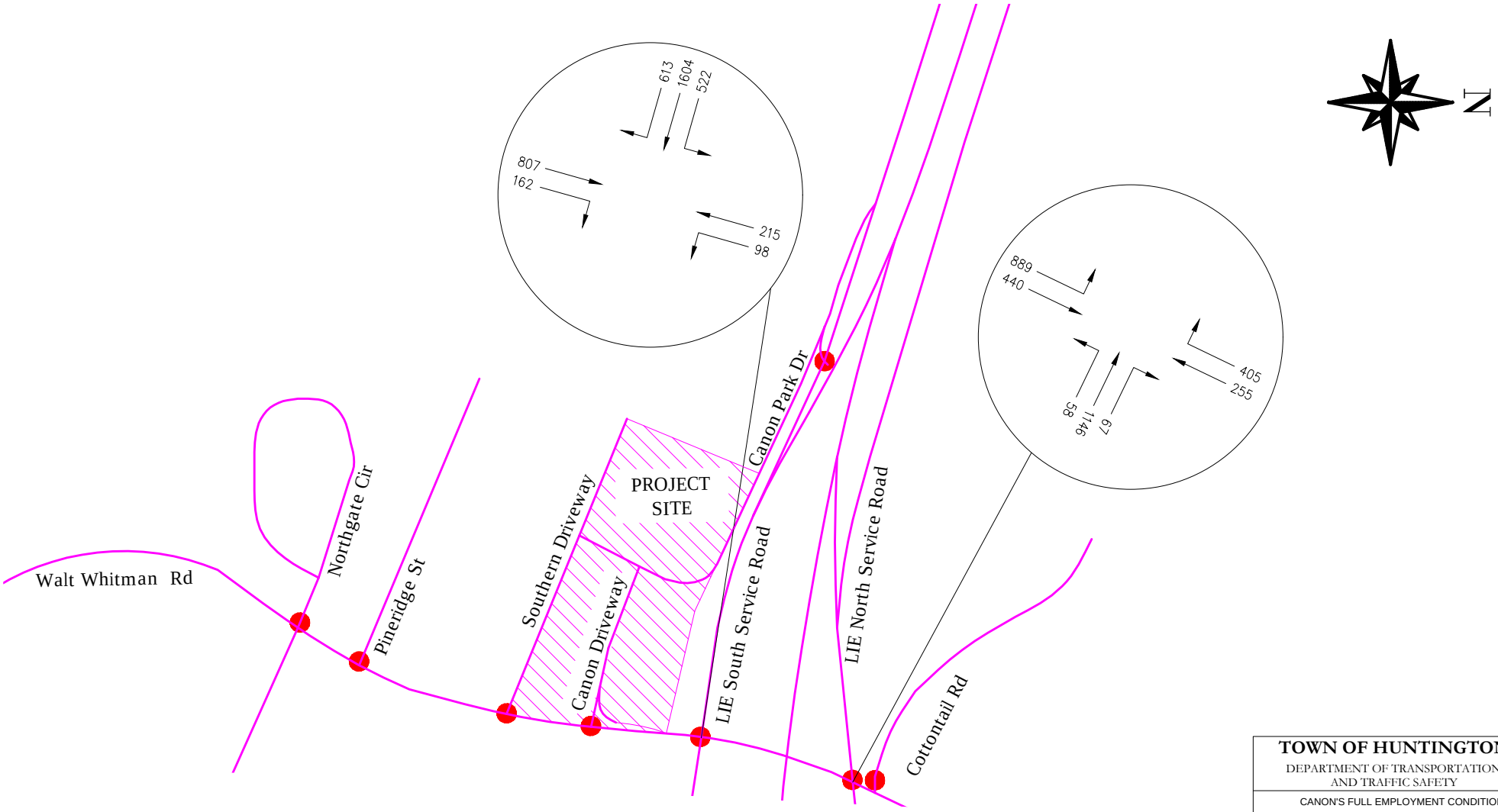
GPI Greenman – Pedersen, Inc.
ENGINEERING AND CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE



TOWN OF HUNTINGTON

DEPARTMENT OF TRANSPORTATION AND TRAFFIC SAFETY

CANON'S FULL EMPLOYMENT CONDITION
WALT WHITMAN ROAD BRIDGE PM PEAK
PM PEAK (5:00 PM - 6:00 PM)

FIGURE 6

GPI Greenman – Pedersen, Inc.
ENGINEERING AND CONSTRUCTION SERVICES

SYMBOL	DESCRIPTION	APPROVED	DATE

REVISIONS

DATE	DRAWING NO.	SHEET NO.	SCALE
	DESIGNED BY	DRAWN BY	CHECKED BY

ENGINEER DATE

Old Walt Whitman Road @ LIE South Service Road:

- AM Peak Hour: During the AM peak hour this intersection will operate at LOS D with 52.6 sec average intersection delays per vehicle. The worst delays will be on eastbound right lane group which will operate at a LOS F with delays of 129.7 sec./veh and v/c ratio of 1.20. The 50% percentile queue length for this lane group could reach more than 730 ft. All other lane groups will be operating at LOS C or better.

- PM Peak Hour: During the PM peak hour this intersection will operate at LOS E with 71.7 sec average intersection delays per vehicle. The worst delays will be on northbound thru-right lane group which will operate at a LOS F with delays of 148.9 sec./veh and v/c ratio of 1.23. The 50% percentile queue length for this lane group could reach more than 552 ft. All other lane groups will be operating at LOS D or better.

The Canon's "Full Employment" 2020 condition capacity analysis indicates Walt Whitman Road over the LIE will operate at a very poor LOS especially in the PM peak period. The anticipated northbound PM peak hour left turn volume is 889 vehicles (as Walt Whitman Road intersects the North Service Road at this bridge approach). This left turn volume is significantly high and could not be accommodated by one left turn lane (as presently exist) without compromising the capacity or safety of the traveling public. Thus, as indicated in the Existing 2014 Condition traffic operational assessment, widening of the Walt Whitman Bridge over the LIE will essentially be needed both for the short-term and long-term in order to meet the growing demand within the project study area. Once the proposed widening of the Walt Whitman Road Bridge over the LIE has been achieved it would be further beneficial to provider a coordinated signal timing network along Walt Whitman Road within the overall project study area.

Table 7: Capacity Analysis Results under Canon's Full Employment Condition at Walt Whitman Road Bridge over the LIE and Adjacent Service Road Intersections

INTERSECTION NAME	LANE GROUP MOVEMENT		Link Distance (ft)	AM PEAK HOUR (FULL EMPLOYMENT 2020)				PM PEAK HOUR FULL EMPLOYMENT 2020)			
				Queue(ft)*	v/c ratio	Delay (sec)	LOS	Queue(ft)*	v/c ratio	Delay (sec)	LOS
4. Walt Whitman Road at LIE SSR	EB	LT	5500	498	0.92	34.1	C	607	0.99	46.0	D
	EB	R	1670	**~738**	**1.20**	**129.7**	**F**	437	0.92	48.3	D
	NB	TR	625	155	0.50	34.7	C	**~552**	**1.23**	**148.9**	**F**
	NB	T	625	-	-	-	-	**-**	**-**	**-**	**-**
	NB	R	150	-	-	-	-	**-**	**-**	**-**	**-**
	SB	L	112	34	0.21	22.9	C	89	0.57	37.2	D
	SB	T	725	166	0.47	27.3	C	92	0.18	34.5	C
	OVERALL**					52.6	D			**71.7**	**E**
5. Walt Whitman Road at LIE NSR	WB	LT	1500	262	0.60	21.0	C	**~502**	**1.05**	**75.1**	**E**
	WB	R	135	0	0.11	0.1	A	0	0.05	0.1	A
	NB	L	725	**154**	**0.98**	**83.8**	**F**	**~1023**	**1.46**	**236.5**	**F**
	NB	T	725	319	0.76	34.5	C	259	0.50	13.3	B
	SB	T	3330	**~355**	**1.14**	**129.6**	**F**	**215**	**0.83**	**64.5**	**E**
	SB	R	180	81	0.59	29.4	C	**~419**	**1.30**	**185.4**	**F**
	OVERALL**					43.3	D			**118.3**	**F**

Notes:

1. The capacity analysis is conducted by SYNCHRO, version 8, which utilizes the Highway Capacity Manual.
2. For LOS definition, see Appendix. Constrained traffic operations are presented in "Bold" letter font on this table.
3. WB = Westbound, EB = Eastbound, NB = Northbound, SB = Southbound, NEB = Northeastbound, SWB = Southwestbound, NWB = Northwestbound, SEB = Southeastbound
4. L = Left turn movement, R = Right turn movement, T = Thru movement, LT = Shared left and thru movement, TR = Shared thru and right movement, LTR =Shared left, thru and right, LR =Shared left and right.
5. Link Distance (ft) represents available lane length to the nearest signalized intersection or turn bay length.
6. * Queue (ft) depicts 50th percentile queue length. This queue length represents longest queue in lane within lane group.
7. ** Delay and LOS values are based on the weighted average of all signalized intersection approaches.
8. ~ Volume exceeds capacity, queue is theoretically infinite.

MINIMUM BRIDGE WIDENING - CAPACITY ANALYSIS

By providing a minimum of five lane bridge (two southbound through lanes, two northbound left turn lanes and one northbound through lane) on the Walt Whitman Road segment over the LIE, the “choke point” as noted earlier could be significantly mitigated. It is also recommended that the widening of bridge structure be accompanied by an additional through lane on the southbound approach of LIE North Service Road intersection and a northbound right turn bay at the LIE South Service Road intersection. The capacity analysis results of this recommendation along with its comparison to the Canon’s “Full Employment” 2020 condition without any mitigation measures are summarized in Table 8. A complete backup of the capacity analysis results is contained in Appendix F.

These capacity analysis results indicate that the widening of the bridge will improve the traffic operating condition during various peak traffic hours. During the worst case PM peak hour of operation the intersection of Walt Whitman Road and LIE North Service Road will operate at LOS E with 67.7 sec average intersection delays per vehicle (a 43% delay reduction). The anticipated northbound left-turn lane group 50% percentile queue length would be 385’ (62% reduction in queue) i.e., no spilling on to the adjacent LIE South Service Road intersection with delays anticipated to about 45.0 seconds per vehicle (a 81% delay

reduction). Please be aware that this analysis is limited to only the immediate capacity needs. When a project is progressed to replace or widen the existing structure a detailed analysis of future capacity needs will be required. Typically, traffic volumes are projected out 30 years after the estimated time of completion for the construction of a bridge replacement or widening to ensure that the major investment will be serviceable over the life of the bridge.

Table 8: Comparison of Capacity Analysis Results between Canon Full Employment (2020) and the Mitigation (2020) Conditions Depicting Bridge Widening

INTERSECTION NAME	LANE GROUP MOVEMENT		Link Distance (ft)	AM PEAK HOUR (FULL EMPLOYMENT 2020)				AM PEAK HOUR (MITIGATION FULL EMPLOYMENT 2020)				PM PEAK HOUR (FULL EMPLOYMENT 2020)				PM PEAK HOUR (MITIGATION FULL EMPLOYMENT 2020)			
				Queue(ft)*	v/c ratio	Delay (sec)	LOS	Queue(ft)*	v/c ratio	Delay (sec)	LOS	Queue(ft)*	v/c ratio	Delay (sec)	LOS	Queue(ft)*	v/c ratio	Delay (sec)	LOS
4. Walt Whitman Road at LIE SSR	EB	LT	5500	498	0.92	34.1	C	449	0.84	25.9	C	607	0.99	46.0	D	607	0.99	46.0	D
	EB	R	1670	**~738**	**1.20**	**129.7**	**F**	**~688**	**1.09**	**87.2**	**F**	437	0.92	48.3	D	437	0.92	48.3	D
	NB	TR	625	155	0.50	34.7	C	-	-	-	-	**~552**	**1.23**	**148.9**	**F**	**-**	**-**	**-**	**-**
	NB	T	625	-	-	-	-	136	0.49	38.4	D	**-**	**-**	**-**	**-**	**356**	**0.96**	**63.3**	**E**
	NB	R	150	-	-	-	-	44	0.20	36.0	D	**-**	**-**	**-**	**-**	138	0.51	40.7	D
	SB	L	112	34	0.21	22.9	C	34	0.22	28.6	C	89	0.57	37.2	D	89	0.57	43.6	D
	SB	T	725	166	0.47	27.3	C	200	0.53	35.0	C	92	0.18	34.5	C	92	0.18	37.2	D
	OVERALL**					52.6	D			41.3	D			**71.7**	**E**			49.1	D
5. Walt Whitman Road at LIE NSR	WB	LT	1500	262	0.60	21.0	C	247	0.57	18.9	B	**~502**	**1.05**	**75.1**	**E**	**~502**	**1.04**	**70.9**	**E**
	WB	R	135	0	0.11	0.1	A	0	0.11	0.1	A	0	0.05	0.1	A	0	0.05	0.1	A
	NB	L	725/400 ***	**154**	**0.98**	**83.8**	**F**	93	0.69	51.2	D	**~1023**	**1.46**	**236.5**	**F**	385	0.95	45.0	D
	NB	T	725	319	0.76	34.5	C	335	0.82	38.8	D	259	0.50	13.3	B	259	0.50	14.3	B
	SB	T	3330	**~355**	**1.14**	**129.6**	**F**	151	0.68	47.7	D	**215**	**0.83**	**64.5**	**E**	103	0.44	43.0	D
	SB	R	180	81	0.59	29.4	C	84	0.64	32.5	C	**~419**	**1.30**	**185.4**	**F**	**~419**	**1.30**	**185.4**	**F**
	OVERALL**					43.3	D			29.1	C			**118.3**	**F**			**67.7**	**E**

Notes:

1. The capacity analysis is conducted by SYNCHRO, version 8, which utilizes the Highway Capacity Manual.
2. For LOS definition, see Appendix. Constrained traffic operations are presented in "Bold" letter font on this table.
3. WB = Westbound, EB = Eastbound, NB = Northbound, SB = Southbound, NEB = Northeastbound, SWB = Southwestbound, NWB = Northwestbound, SEB = Southeastbound
4. L = Left turn movement, R = Right turn movement, T = Thru movement, LT = Shared left and thru movement, TR = Shared thru and right movement, LTR =Shared left, thru and right, LR =Shared left and right.
5. Link Distance (ft) represents available lane length to the nearest signalized intersection or turn bay length.
6. * Queue (ft) depicts 50th percentile queue length. This queue length represents longest queue in lane within lane group.
7. ** Delay and LOS values are based on the weighted average of all signalized intersection approaches.
8. *** Turn bay length is based on proposed Mitigation Condition under Canon Full employement 2020 condition.
9. ~ Volume exceeds capacity, queue is theoretically infinite.

VI. CONCLUSION

The traffic assessment conducted for this "After" study indicates most of the mitigation needs could be accommodated by modifying (fine tuning) the traffic signal timings at various study intersections in order to improve the MOE's to a level which was predicted in the 2008/2009 Canon Traffic Study report, or better. However, traffic operating conditions at Walt Whitman Road Bridge over the LIE could not be mitigated by simple fine tuning of signal timings at its adjacent intersection. The bridge segment will be subjected to significant queuing and over-spillage of traffic at its northbound approach due to the anticipated traffic demand, with worst case traffic operation anticipated during the PM peak period. Thus, recommendations are warranted to widening the Walt Whitman Road Bridge over the LIE. This measure will ensure that adequate capacity and storage length is available on the bridge in order to accommodate Existing (2014) and the anticipated Full Employment Condition (2020) peak hour traffic operational needs at this location. It should also be noted that under the Country Pointe at Plainview Traffic Study, dated March 2013, that the developer has committed to fully fund and construct mitigation measures for the Round Swamp Road underpass at LIE and the LIE North and South Service Roads intersections. GPI understands that the recommendations made in the Country Pointe at Plainview Traffic Study will be fully implemented once approval is granted for this project in order to improve traffic operations.