Chapter 10: Transportation

A. INTRODUCTION

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site by 2019, as described in Chapter 1, "Project Description." For 11 months of the year, the NTC is primarily a public recreational facility, except during the US Open period at the end of August and early September. Principal elements of the proposed project that are addressed for potential transportation-related impacts include:

1. A proposed increase in the permitted attendance for the daytime sessions of the US Open of 10,000 persons, resulting in a permitted capacity of 50,000 on non-conflict days (without a New York Mets game), and 45,000 on conflict days (with a New York Mets game).
2. Construction of two new parking garages where there are currently surface lots, providing approximately 389 net additional parking spaces. The parking garages are proposed to accommodate the existing demand experienced at the NTC on an everyday basis during non-US Open conditions and are not considered a traffic generating element during the US Open or during other times.
3. At the southwest corner of the NTC where a new stadium would be constructed, the internal park roadway would be realigned to maintain the existing circulation pattern.

Of the three principal elements, the proposed increase in attendance has the greatest potential to impact traffic and transportation conditions and therefore is the focus of the following traffic and transportation analysis. The parking garages and roadway realignment are proposed to accommodate or maintain an existing condition. Other less significant improvements include changes to site layout, visitor amenities, and support services that would not affect travel characteristics associated with the US Open.

This chapter examines the potential effects of the proposed project on nearby transportation systems to determine whether the proposed project is expected to have potential significant impacts on traffic operations and mobility, public transportation facilities and services, pedestrian elements and flow, safety of roadway users (pedestrians, bicyclists, and vehicles), on- and off-street parking, and goods movement. Presented in the following sections is a description of the proposed project, an overview of the analysis methodology, a projection of site generated trips and assignments, the results of the traffic analysis for existing and future conditions with and without the proposed project (analyzed cumulatively with other relevant projects in the study area), and findings of potential significant adverse transportation impacts. The travel demand projections, trip assignments, and capacity analysis were conducted pursuant to the methodologies outlined in the 2012 *City Environmental Quality Review (CEQR) Technical Manual*.

PRINCIPAL CONCLUSIONS

The proposed increase in attendance of 10,000 persons for the daytime session would result in a projected peak period increase of approximately 2,030 transit trips and 954 vehicle trips. The peak period transit trips would consist of approximately 1,540 subway trips, 455 Long Island Rail Road (LIRR) trips, and 35 Metropolitan Transportation Authority (MTA) New York City Transit bus trips. The peak period vehicle trips are estimated to consist of 452 auto trips, 498 taxi trips (or 249 roundtrips), and four charter bus trips.

When distributed over the transportation network, the projected trip increments would result in significant adverse traffic impacts, including increased levels of congestion and delays, though temporary in nature and only during the event's peak periods. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would be able to effectively manage the increased level of traffic operations and project-related significant adverse impacts on traffic. This is primarily due to the distribution of trips over the large transportation network, the proximity and direct access to the local highway network from the project site, the capacity of the Mets-Willets Point subway station, and the special event management program implemented by the New York City Police Department (NYPD), especially along College Point Boulevard. There are no significant impacts to transit, pedestrian, or safety conditions.

Though the projected increase in vehicle trips exiting the US Open at the conclusion of the daytime session is anticipated to lengthen the travel time for departing patrons, these delays would largely be confined within Flushing Meadows Corona Park and to a segment of the Long Island Expressway (LIE).

With the additional site-generated traffic, the roadway network is anticipated to continue to experience congested levels of service and delays during event conditions. Due to the traffic management program, however, conditions typically observed when intersection operations become saturated (queues extending beyond storage capacity, blocked turning movements, aggressive driver behavior, etc.) would be managed in the field. Field observations conducted during the US Open validate that the traffic management program and TEAs are able to effectively manage traffic flow during event peak periods.

These findings take into consideration the frequency of the event, the duration of the event's peak period, the infrequency of conflict dates with Mets games, direct connectivity to the area highways, and the special event traffic management provided by the New York City Police Department including TEAs.

B. FRAMEWORK FOR ANALYSIS AND ADDITIONAL CONSIDERATIONS

In coordination with the New York City Department of Transportation (NYCDOT), the transportation analysis was focused on the critical period representing a Reasonable Worst-Case scenario (RWCS). The critical period was identified as the weekday evening peak hour conflicting with a Mets home game during the first week of the US Open. During this period, focus was placed on identifying potential impacts due to the proposed increase in attendance, which consists of additional patrons departing the daytime event. The following section presents the framework for analysis and other considerations that served as the basis for selecting the critical period.

An important initial step for analyzing a special event condition such as the US Open is establishing the framework for the analysis. This section presents the critical elements and time periods affecting traffic conditions during the US Open as well as the parking and traffic management plans implemented to manage this event.

The critical time period to be analyzed was established as the weekday evening peak period from 6:00 PM to 7:00 PM during a conflict date, meaning a day in which a Citi Field event coincides with the US Open. It has been identified as the critical peak period since it experiences the overlap of four critical elements: (1) the end of the weekday commuter peak period; (2) the departure of tennis patrons from the US Open's daytime session; (3) patrons arriving for the evening session; and (4) the arrival of baseball fans for a Mets home game. This time was validated based on a review of current and historical data including parking lot counts, manual turning movement counts and Automatic Traffic Recorder (ATR) counts.

In addition to the conflict date, a non-conflict date was also evaluated. In coordination with NYCDOT, it was determined that transportation conditions during a non-conflict event closely resemble a typical Mets home game with less intensive peak hour arrival and departure volumes. The findings were supported by discussions with NYPD supervisors responsible for managing the events. These considerations, combined with the overall infrequency of the event, indicate a quantitative analysis for the non-conflict event was not warranted. It was also determined that traffic impacts to the local street network are more likely to be experienced during the conflict dates. On non-conflict dates, US Open patrons have full use of the Citi Field parking facilities. Consistent with the previous Final Environmental Impact Statement (FEIS) from 1993 described below, no weekend or weekday morning analyses were conducted.

Although the previous Final Environmental Impact Statement (FEIS) was a larger project, the analysis and methodologies followed are consistent with the current project. *The USTA National Tennis Center Project FEIS*, dated July 23, 1993, involved expanding the size of the NTC from 17.3 acres to 42.2 acres, an increase of 24.9 acres. Elements of the project included the construction of the Arthur Ashe Stadium (Stadium 1, 23,500 capacity) and renovations to Louis Armstrong Stadium (Stadium 2) and the Grandstand Stadium (Stadium 3). Additionally, 28 outdoor tennis courts were replaced with 15 tournament quality courts and 20 practice courts. Off-site improvements included the construction of a new park entrance at College Point Boulevard and new ramps to the Grand Central Parkway, specifically a southbound on ramp from the Hall of Science and a northbound on and off ramp at the USTA Main Entrance, known as Exit 9P.

Additional background information on the US Open, including average daily ticket scans for each week of the US Open and the frequency of the conflicts dates is presented in **Table 10-1** and **Table 10-2**, respectively. **Table 10-1** shows attendance is highest during the first week of the tournament, when all tennis courts are active.

A review of the data presented in **Table 10-2** demonstrates that a weekday analysis for a conflict date during the first week of the tournament represents a conservative "reasonable worst case scenario" that has occurred historically but infrequently. Over the past five years, there have been a total of six weekday Mets games and two weekend games scheduled during the first week of the US Open.

Table 10-1
US Open Average Daily Ticket Scans Including Daytime and Evening Sessions

	1st Week		2nd Week	
Year	Mon-Fri	Sat-Sun	Mon-Fri	Sat-Sun
2011	46,562	53,228	20,723	25,037
2010	45,096	52,152	28,638	21,216
Sources: USTA, draft				

Table 10-2
Number of Occurrences When a Mets Home Game Conflicted with the US Open

	1st Week		2nd Week	
Year	Mon-Fri	Sat-Sun	Mon-Fri	Sat-Sun
2012	0	0	1	2
2011	4	0	2	2
2010	0	0	1	2
2009	1	2	3	0
2008	1	0	1	1
2007	0	0	1	2
Sources: BaseballReference.com, USopen.org				

Therefore, in coordination with the New York City Department of Transportation (NYCDOT), it was determined that the traffic and transportation analysis would focus on the weekday evening peak hour with a Mets home game during the first week of the US Open with a specific focus on the potential impacts created from the proposed increase in patrons departing the daytime event.

PARKING AND TRAFFIC MANAGEMENT

Parking for the US Open is generally divided into two categories: Permit Parking and General Parking.

PERMIT PARKING

Permit parking is defined as parking for those vehicles with parking permits issued by USTA as part of the purchase of an advance ticket package. Vehicles with USTA-issued parking permits are not subject to parking fees. Permit lots are identified as the lettered lots “A” through “H” and are located throughout Flushing Meadows Corona Park. **Figure 10-1** identifies the parking layout for the USTA US Open within the NTC and roadway network.

- Lots A, B, C, and D are composed primarily of special suite holders, sponsors and USTA Executive staff.
- Lots E, F, and G are primarily used by US Open seasonal staff and vendors.
- Lot H is a cluster of three lots used by seasonal staff as well as ticket holders who have purchased a full series parking plan. Bus parking is available in Lot H with a limited capacity for 5 buses. Americans with Disabilities Act (ADA) parking is also permitted in this lot, and anyone arriving at the US Open with an ADA placard or license plate is directed to park in this area for the standard general parking rate. An ADA golf cart and shuttle bus is operated from this lot providing service to the South Gate entrance.

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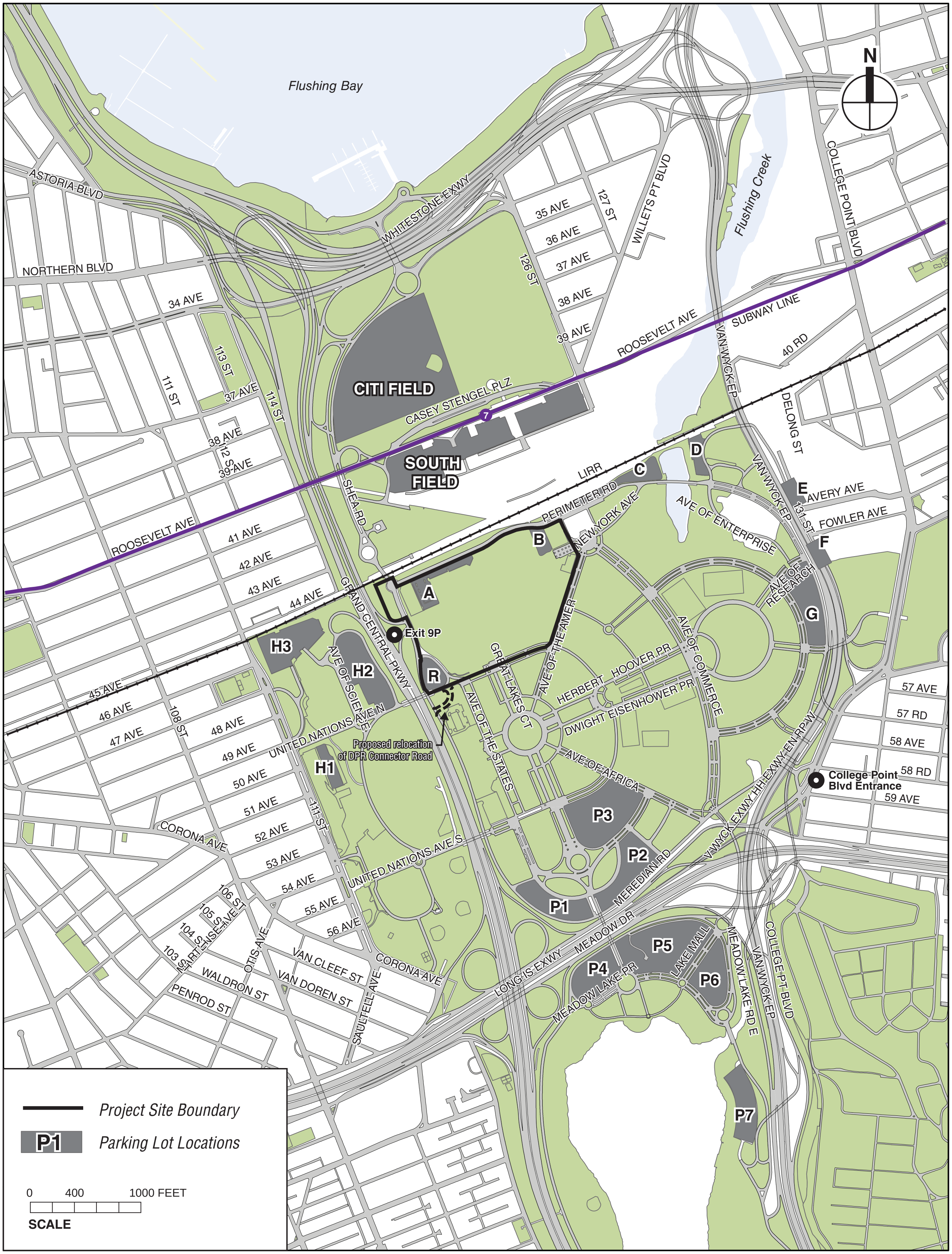


Roadway Network and Parking Lot Layout

Figure 10-1

GENERAL PARKING

General parking is defined as parking available to all patrons upon arrival at the US Open. The primary lots are operated by the Mets parking vendor and are located at Citi Field and the Southfield lot; however, parking operation changes on conflict days, in which the Mets also have a home game.

On conflict dates, the US Open attendees are directed to General Parking Lots #1-7. These lots are dedicated to US Open patron parking.

On non-conflict dates, US Open attendees will be directed to park in the Citi Field lots located adjacent to the stadium and parking operations are comparable to a typical Mets home game.

The Southfield parking lot is available to US Open attendees on conflict and non-conflict dates. Even on conflict dates, a component of the US Open population will park at Citi Field, when it is available. The parking lot typically opens four hours before the start of a Met's game; however, historically the Mets have opened the parking lot earlier to accommodate US Open attendees.

A summary of the capacities of the USTA parking lots follows in **Table 10-3**. Shuttle bus service is available from all of the USTA public parking lots.

Table 10-3
Parking Lot Capacities and Availalibilty for US Open Patrons

Type	Designation	Parking Spaces	Conflict Day	Non Conflict Day
Permit, Vendor and Staff	A (1)	200	X	X
	B (1)	104	X	X
	C (1)	156	X	X
	D (1)	150	X	X
	E (2)	339	X	X
	F (2)	334	X	X
	G (2)	300	X	X
	H (3)	865	X	X
	R (3)	50	X	X
	S1/2 (3)	300	X	X
	Subtotal	**2,798**	**2,789**	**2,789**
General	#1	450	X	--
	#2	500	X	--
	#3	800	X	--
	#4	937	X	--
	#5	500	X	--
	#6	250	X	--
	#7	404	X	--
	Subtotal	**3,841**	**3,841**	**--**
Citi Field	Main Lot	4,500	--	X
	Southfield Lot(4)	1,795	**1,795**	X
	Subtotal	**6,295**	**--**	**6,295**
All Lots	**Grand Total**	**12,934**	**8,425**	**9,084**

Notes:
(1) Suite holders, sponsors executive staff.
(2) Seasonal staff and vendors
(3) Seasonal staff and full series ticket holders, ADA parking and bus parking.
(4) Estimated based on data from previous studies.
(5) All of the Permit, Vendor, Staff and General parking lots are paved with the exception of Lots G, #1, #2, #3, #5 and #6
Source: USTA

TRAFFIC MANAGEMENT

The Traffic Management Program is characterized by a heavy presence of Traffic Enforcement Agents (TEAs) from the NYPD providing safety, security, maintaining circulation and directing vehicles to parking areas. The TEAs are heavily staffed both within the park and at all local and highway access points to the park. This includes staffing along College Point Boulevard from the Van Wyck Expressway access ramp near Booth Memorial Avenue to the Horace Harding Expressway and at access points to the Grand Central Parkway. On conflict dates, additional TEAs are staffed around the perimeter of Citi Field along 126th Street, Roosevelt Avenue, and Northern Boulevard. Within the park, TEAs are staffed at every principal intersection along Meridian Road, Perimeter Road, and Shea Road.

In addition to maintaining safety and security, the objectives of the TEAs are to get patrons to and from the park using the most direct route. To minimize impacts to local roadways and the highway network TEAs work to keep the queue moving during arrivals as well as metering the traffic flow to College Point Boulevard and the area highways during departures. In order to control traffic, barricades are erected at some locations to channelize and restrict vehicle movements. Police override traffic signal phasing, stop traffic to allow safe pedestrian crossings, and redirect traffic as parking areas reach capacity.

In preparing EIS analyses, meetings were held with NYPD on two occasions; in addition, a "ride-along" tour was conducted during the US Open to observe traffic and parking conditions under special event conditions.

The following traffic and parking management program was observed for vehicles arriving at the US Open on a conflict date:

- US Open patrons are first directed to parking Lot #4 because it is the closest paved parking lot (parking Lot #4 and #7 are the only paved non-Citi Field parking lots).
- Once Lot #4 is nearly filled, patrons are directed to parking Lot #2 and then Lot #3. These lots are grass banked parking areas. The first vehicles arriving are directed to park around the border of the lot to create a perimeter and later arriving vehicles fill in the interior spaces. This approach is effective to managing ingress and egress from the lot.
- After Lot #3 is nearly filled, vehicles are routed to Lot #5.
- Parking Lot #1, Lot #6, and Lot #7 serve as overflow lots and are used less frequently.

The following program was observed for vehicles departing the US Open:

- All patrons departing Lots #1, #2, and #3 are directed to the College Point Boulevard exit. Once exiting the park, the TEAs require all vehicles to turn right onto College Point Boulevard. From southbound College Point Boulevard, the patrons gain access to the Van Wyck Expressway and the Horace Harding Expressway. The Horace Harding Expressway serves as the service road for the Long Island Expressway and provides access to the Grand Central Parkway.
- US Open patrons departing from Lot #4, Lot #5, and Lot #6 are directed to cross the boathouse bridge and travel through parking Lot #7. Once exiting Lot #7, they will have direct access to the Van Wyck Expressway and the Horace Harding Expressway via College Point Boulevard.

The TEAs were observed on site as early as 7:00 AM (the US Open daytime session begins at 11:00 AM) and remained in position until the last patron exited the site or they received the "All

Clear" notice from their Supervisor. The effectiveness of the NYPD TEAs is partially attributable to their long term experience managing these events.

C. PRELIMINARY ANALYSIS METHODOLOGY

The *CEQR Technical Manual* recommends a two-tier screening procedure for the preparation of a "preliminary analysis" to determine if quantified operational analyses of transportation conditions are warranted. As discussed in the following sections, the preliminary analysis begins with a trip generation analysis (Level 1) to estimate the volume of person and vehicle trips attributable to the proposed project. According to the *CEQR Technical Manual*, if the proposed project is expected to result in fewer than 50 peak period vehicle trips and fewer than 200 peak period transit or pedestrian trips, further quantified analyses are not warranted. If these thresholds are exceeded, detailed trip assignments (Level 2) are performed to estimate the incremental trips for specific transportation elements and to identify potential locations for further analyses. If the trip assignments show that the proposed project would generate 50 or more peak period vehicle trips at an intersection, 200 or more peak period subway trips at a station, 50 or more peak period bus trips in one direction along a bus route, or 200 or more peak period pedestrian trips traversing a pedestrian element, then further quantified operational analyses may be warranted to assess the potential for significant adverse impacts on traffic, transit, pedestrians, parking, and vehicular and pedestrian safety.

LEVEL 1 SCREENING ASSESSMENT

A Level 1 trip generation screening assessment was conducted to estimate the number of person and vehicle trips by mode expected to be generated by the proposed project during the peak period. These estimates were then compared to the CEQR analysis thresholds to determine if a Level 2 screening and/or quantified operational analyses may be warranted.

The trip generation estimates and departure routing assignments were developed based on a review of the data collected at the 2011 US Open and with consideration to previous studies. These previous studies include:

- USTA Patron Survey data, September 2010 and 2011
- *USTA National Tennis Center Project FEIS*, July 1993
- *Shea Stadium Redevelopment FEIS*, December 2001

The 2011 US Open data collection effort was conducted over a two-week period at the end of August and early September during the 2011 US Open. The primary data collection survey was conducted on Wednesday, August 31, 2011 during a conflict date. The August survey was conducted under normal special event operations and clear weather conditions.

The Level 1 trip generation and Level 2 departure routing assignments are summarized as follows:

- <u>Modal Split</u> – Modal splits were identified using on-site patron interviews conducted on the date of the survey, August 31, 2011. The results are consistent with similar surveys conducted at the 2010 US Open. The results of the 2011 surveys are provided in **Appendix E**.
- <u>Vehicle Occupancy Rate</u> – The vehicle occupancy rate for auto trips was determined based on field surveys conducted at general parking Lots #4, #5, and #6. Observations of vehicles entering the parking lot from 9:00 AM to 9:00 PM were conducted, encompassing a sample size of 814 vehicles. The vehicle occupancy rate for taxi and charter bus trips were carried

forward from the 1993 *USTA National Tennis Center Project FEIS*. The taxi occupancy rate of 1.67 is approximately 20 percent greater than the standard Manhattan occupancy rate of 1.40. This reflects a greater number of multi-person taxi trips as would be expected for a special event destination such as the US Open. To account for the potential increase in charter buses, a vehicle occupancy rate of 40 persons per bus was utilized reflecting 73 percent occupancy of a typical 55-seat charter bus.

- Peak Period Departure Rate – The peak departure rates were adjusted based on site observations and data obtained during the 4-hour transit counts conducted at the Willets Point subway station, the LIRR station and parking lot counts conducted at Lots #4, #5, and #6 and Lot "H." The peak departure rate represents the 6:00 PM to 7:00 PM departures as a percentage of the four hours of highest activity, from 4:00 PM to 8:00 PM. Although this time frame captures the majority of patrons leaving the daytime session, using only the four highest hours for comparison in place of the ten hours the lots are typically open, results in a conservative rate. Since there was a consistency in range of departure rates by mode, a single rate of 35 percent was used for all travel modes.
- Regional Route Assignments - Regional area trip assignments were based on the origin and destination patron interviews conducted at the 2011 US Open and validated against the previous year's survey and information provided in the 1993 *USTA National Tennis Center Project FEIS*.

Table 10-4 summarizes the estimated increases in vehicular and transit trips for a departure scenario at a daytime event at the US Open for the projected increase in attendance of 10,000 patrons. The table includes a small component of "Other" trips; for analysis purposes, these trips were added to the subway trip population.

Table 10-4
Travel Demand Assumptions and Trip Generation Estimates

	Daily Trip Increment				Peak Period Departure Trip Increment		
Modal Split	Percent	Person Trips	VOR (1)	Vehicle Trips (2)	Peak Period	Person Trips	Vehicle Trips (2)
Auto	25.9%	2,590	2.01	1,288	35%	907	452
Taxi/Car Service	11.9%	1,190	1.67	713	35%	416	249
Charter Bus	4.2%	420	40.0	11	35%	147	4
MTA NYCT Bus	1.0%	100	--	--	35%	35	--
Subway	40.4%	4,040	--	--	35%	1,414	--
LIRR	13.0%	1,300	--	--	35%	455	--
Other	3.6%	360	--	--	35%	126	--
Total	**100.0%**	**10,000**	**--**	**2,012**	**--**	**3,500**	**705**

Notes: (1) Vehicle Occupancy Rate
(2) Projected total vehicle trip-ends will be 2,725 daily and 952 peak period with the additional taxi/car service round trips.

LEVEL 2 SCREENING ASSESSMENT

A Level 2 screening assessment involves the distribution and assignment of projected trips to the transportation network and the determination of whether specific locations are expected to incur volumes in excess of the CEQR thresholds. For the proposed project, trips projected for the 2019 analysis year, representing the maximum amount of project-generated trips, were allocated to the area's roadways, transit facilities, and pedestrian elements to identify the various study areas for which detailed analyses of potential impacts would be prepared.

Table 10-5 summarize the projected regional auto departure route trip distribution and increment trip volumes for a departure scenario following a daytime US Open event for the proposed increase in attendance of 10,000 patrons. As previously stated, the departure assignments were developed based on a review of the data collected at the 2011 US Open, including patron interviews, and with consideration of previous studies. The taxi trips followed the same route assignments as the auto trips.

Table 10-5
Regional Auto Departure Route Trip Assignments

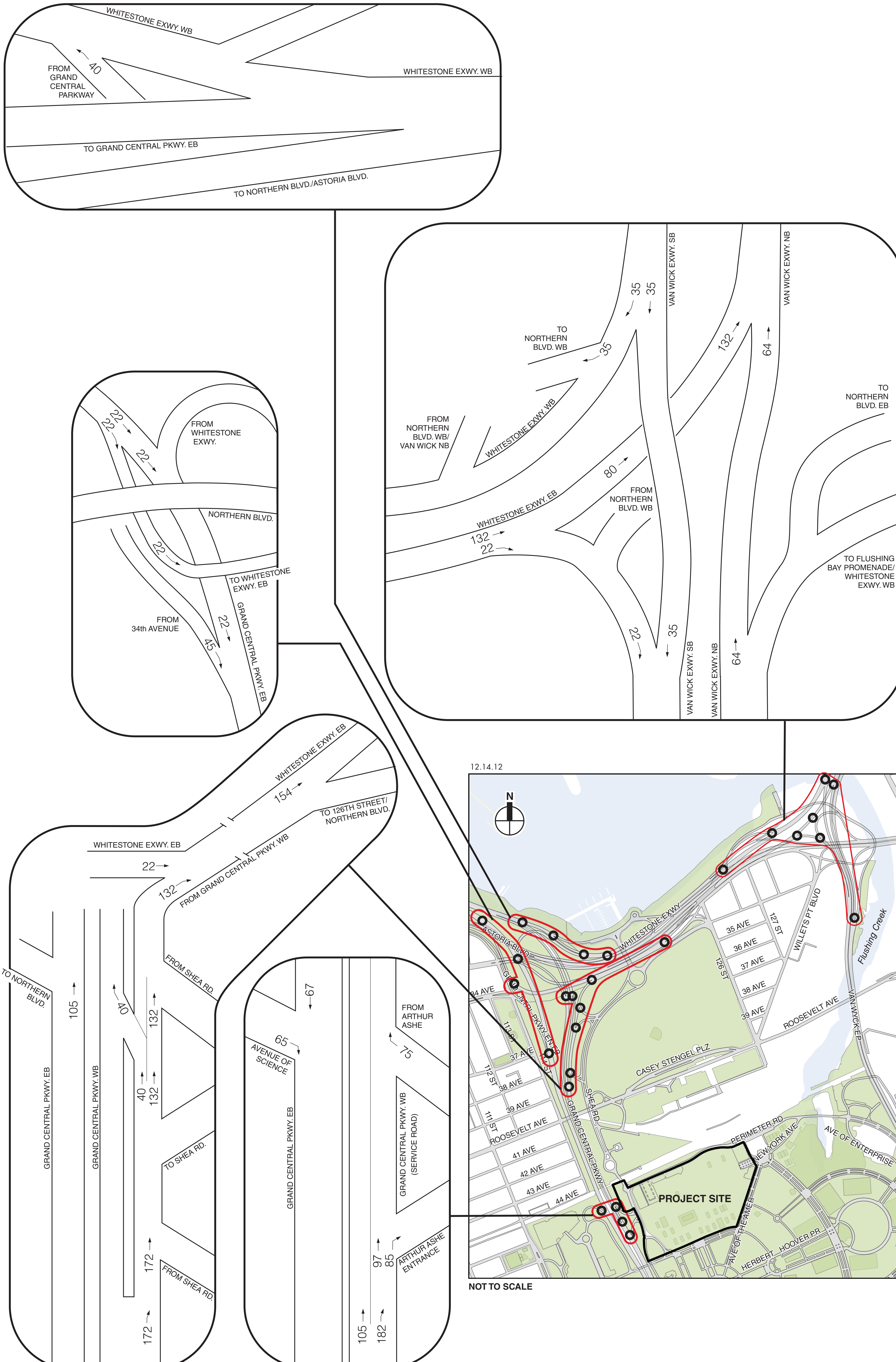
Regional Departure Route	Percent	Vehicle Trips	Typical Destination
Long Island Expressway E/B	25%	113	Nassau County & Long Island
Long Island Expressway W/B	15%	68	Manhattan, NJ, & PA
Grand Central Parkway E/B	5%	23	Brooklyn & Queens
Grand Central Parkway W/B	18%	81	Manhattan, NJ, & PA
Van Wyck Expressway S/B	5%	23	Brooklyn & Queens
Whitestone Expressway N/B	27%	121	Bronx, NY & NJ
Local Assignments	5%	23	Northern Blvd., Roosevelt Av., etc.
Total	**100.0%**	**452**	**--**

TRAFFIC

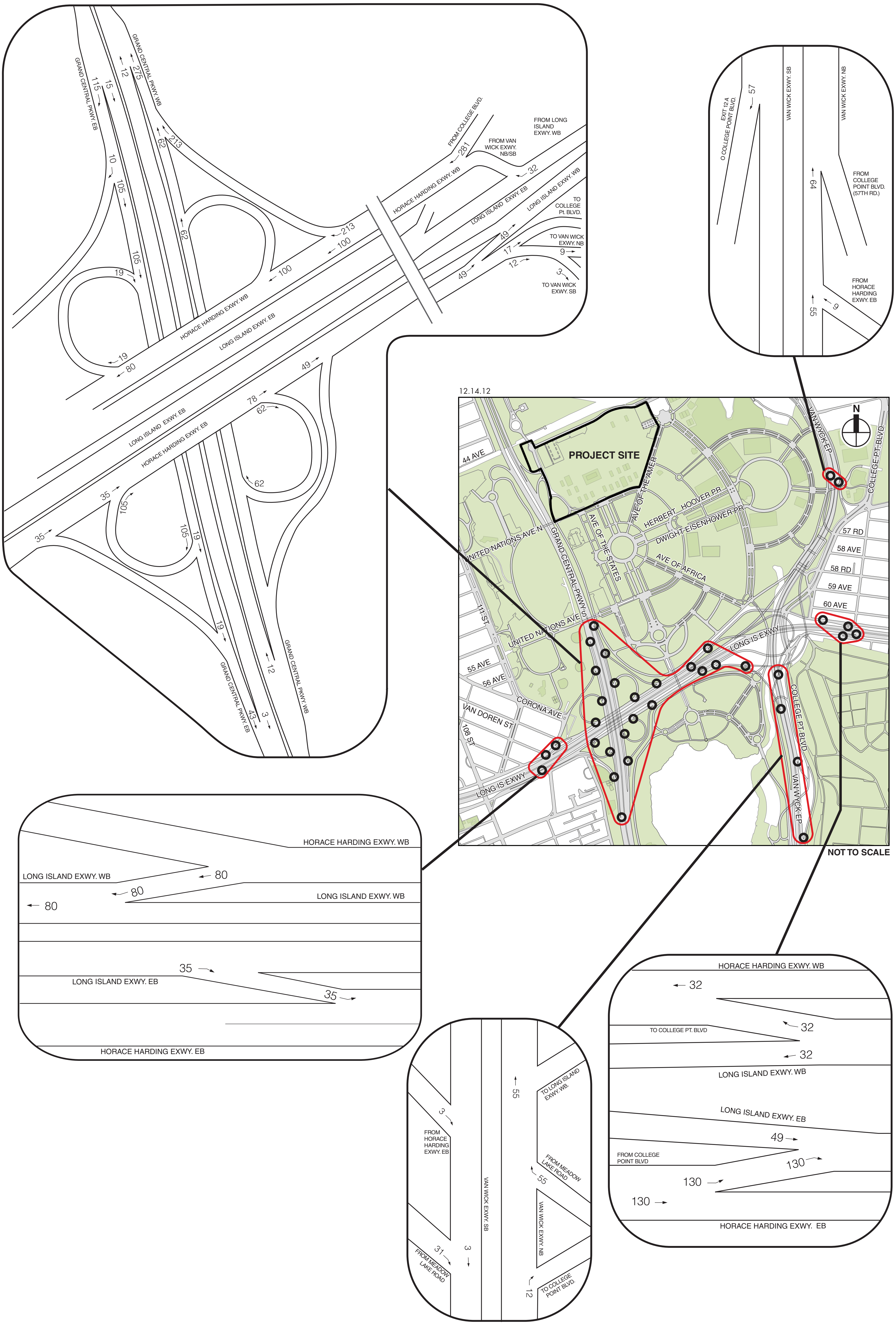
Figures 10-2A through 10-2D present the trip assignments of project traffic to the local intersections and highway networks. As indicated in the tables and the trip assignment figures, the CEQR threshold for quantified analysis is projected to be exceeded for traffic and transit operations.

Two factors were considered when assigning the departure routes for the auto trips. First, the regional assignments were determined based on on-site patron interviews at the 2011 US Open. This information was validated against patron interviews from previous years. The second factor is the pattern of where and how the patrons depart from the US Open. A majority of the additional auto trips would be generated from the general admission and permit parking lots. As previously, discussed the general admission lots are designated as the numbered Lots #1 through #7. The permit lots are designated as Lot H, Lot F, and Lot G. The peak period auto trips were assigned to the area roadways based on the following:

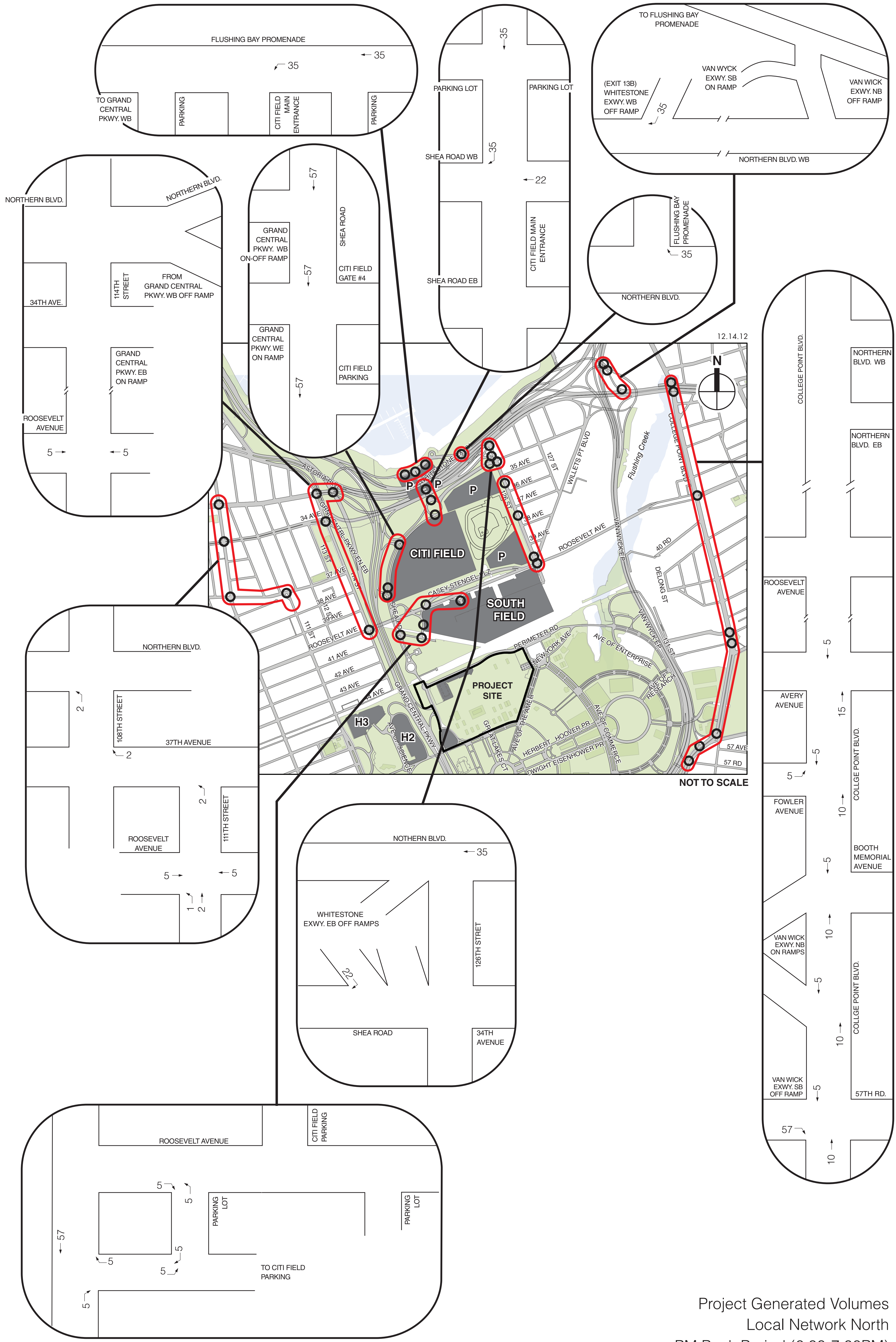
- General Admission Parking Lots #1, #2, and #3 – approximately 35 percent, or 158 trips, are anticipated to depart from this lot via the College Point Boulevard exit.
- General Admission Parking Lots #4, #5, and #6 – approximately 45 percent, or 203 trips, are anticipated to depart from this lot via the Boathouse Bridge.
- Permit Lot H – approximately 15 percent, or 68 trips, are anticipated to depart from this lot via the ramp to the Grand Central Parkway (95 percent of the 68 trips) and 111th Street (5 percent).
- Permit Lot F and Lot G – approximately 5 percent, or 23 trips, are anticipated to depart from this lot via the College Point Boulevard exit.



Project Generated Volumes
Highway Network North
PM Peak Period (6:00-7:00PM)
Figure 10-2A

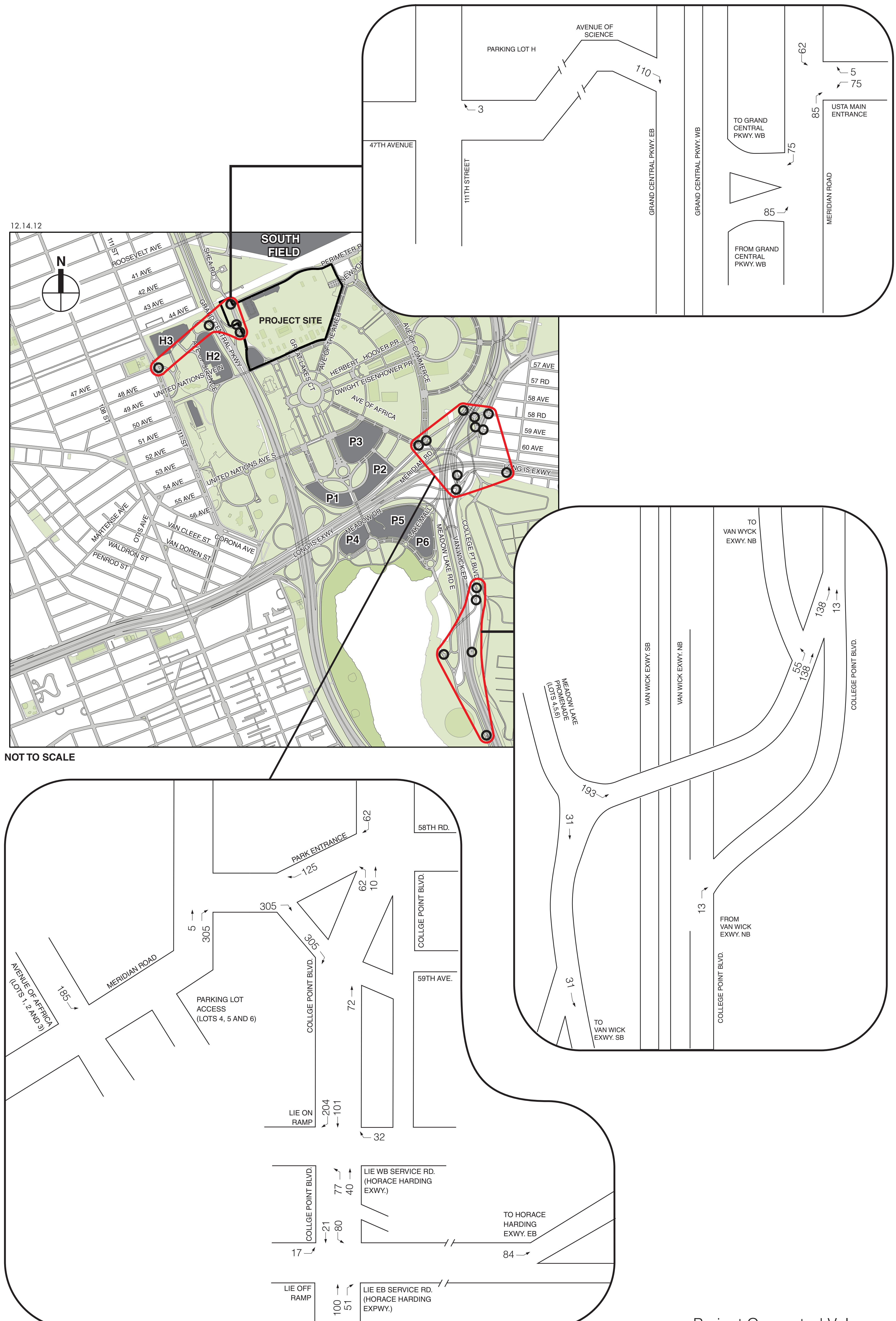


Project Generated Volumes
Highway Network South
PM Peak Period (6:00-7:00PM)
Figure 10-2B



Project Generated Volumes
Local Network North
PM Peak Period (6:00-7:00PM)

Figure 10-2C



Project Generated Volumes
Local Network South
PM Peak Period (6:00-7:00PM)
Figure 10-2D

The taxi and car service trips are projected to follow the same regional assignments as the auto trips. All taxi and car service trips are conservatively assumed to arrive and depart the US Open within the same peak period. Based on site observations, approximately 50 percent of the taxi/car service drop offs will occur at the Presidents Gate, near Exit 9P of the Grand Central Parkway, and the remaining 50 percent will access the site via the College Point Boulevard entrance to drop off near the South Gate.

Since approximately 4 percent of patrons attend the US Open on a charter bus, it is estimated that the proposed increase in attendance would result in a corresponding increase in the number of charter buses. As indicated in **Table 10-4**, four additional charter buses are projected to arrive and depart the site during the peak period. These vehicles are projected to arrive and depart via the Long Island Expressway to Manhattan.

Additional detail regarding site access, circulation and parking management is presented in Section B, "Framework for Analysis and Additional Considerations."

LOCAL INTERSECTIONS

Trip projections for the additional traffic were developed and assigned to the roadway network via departure points from the US Open. The local roadway network included areas within the communities of Flushing, Corona, Elmhurst, North Corona and Jackson Heights.

In coordination with NYCDOT, the overall traffic network was examined and an analysis was conducted of those locations demonstrating the greatest potential for impacts. Only those locations with the potential for significant adverse impacts under the guidelines of the *CEQR Technical Manual* are studied in the EIS. Based on a review of the trip generation and trip assignments, the following local intersections have been identified for analysis:

1. College Point Boulevard at Long Island Expressway Eastbound Service Road Exit (Horace Harding Expressway S);
2. College Point Boulevard at Long Island Expressway Westbound Service Road Entrance (Horace Harding Expressway N);
3. College Point Boulevard at the Flushing Meadows Corona Park Exit—South Leg;
4. College Point Boulevard at the Flushing Meadows Corona Park Entrance—North Leg (58th Road); and,
5. College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road.

HIGHWAY NETWORK

Segments of the highway network serving the US Open, including ramps and connector roads, were analyzed using VISSIM micro-simulation modeling software. The micro-simulation model includes the following critical freeway segments:

- Horace Harding Expressway (or Long Island Expressway westbound service road) starting at the entrance from College Point Boulevard to just beyond the ramp connections to the Grand Central Parkway, this includes the merge from the westbound Long Island Expressway;
- Grand Central Parkway westbound just south of the entrance ramp from the Horace Harding Expressway to a point just past the exit and entrance ramps to the NTC;
- Van Wyck Expressway northbound at the entrance ramp from Meadow Lake Road/College Point Boulevard to just beyond the Long Island Expressway overpass; and
- Other associated connectors/ramps between the above freeway segments.

VISSIM micro-simulation software was utilized since it provides the capability to model complex interchange configurations and merge/diverge areas that operate at capacity that other traditional software packages are not able to analyze. Output from the VISSIM model provided the ability to quantify the operational impacts of queuing from downstream bottlenecks. For this application, the VISSIM model was used to determine travel times, speeds and the back of queue length within the study area for a one-hour peak condition.

TRANSIT

SUBWAY

The project site is located in close proximity to the Mets-Willets Point subway station (No. 7 line) operated by the MTA New York City Transit (NYCT). The Passerelle ramp provides a connection from the NTC to the LIRR and the Mets-Willets Point subway station. Therefore, all projected subway trips are expected to be served by this station and the No.7 line.

As presented in **Table 10-4**, the proposed project is projected to result in an additional 1,540 subway trips departing the NTC during the weekday PM peak departure period. These trips were assigned to the Mets-Willets Point station (No. 7), which links Times Square and Grand Central Terminal in Manhattan to the NTC, Citi Field, and Main Street in Flushing, Queens.

The following station elements were identified for a detailed analysis for the weekday PM peak period departure:

- Station passageways to/from Manhattan (north platform) and the adjoining control area elements;
- Station stairways (P-2, P-4, P-10, and P-12) to/from Flushing (center platform) and the adjoining control area elements;
- Station stairway (P-6) to/from the southern platform; and
- Station passageway connecting the Passerelle ramp and the Mets-Willets Point station.

The estimated incremental ridership for the No. 7 subway line by direction was compared with the peak period service frequency to determine the increase in subway riders per subway car as shown in **Table 10-6**.

Table 10-6
Subway Line Haul Screening Analysis
PM Peak Period Departure

No. 7 Subway Line	Projected Riders	No. of Cars	No. Riders/Car
To Manhattan	1,463	231	6.3
To Main Street	77	253	0.3

Source: Number of cars available for each line during the PM peak period was obtained from MTA New York City Transit 2010 Weekday Cordon Count.

According to the *CEQR Technical Manual*, an incremental ridership of fewer than five riders per subway car is unlikely to result in the potential for a significant subway line-haul impact. The detailed subway trip assignments as presented **Table 10-6** show that the downtown subway service (to Manhattan) would experience slightly more than five additional riders per car. The data in **Table 10-6** reflect PM peak period subway service during a typical weekday when downtown subway ridership to Manhattan is the off peak direction experiencing substantially lower background ridership. Moreover, these conditions are not adjusted to reflect special event conditions experienced during the US Open when additional trains are in service. Discussions with NYCT indicate that service at the Mets-Willets Point subway station is adjusted to reflect events at Citi Field and the US Open.

Based on the anticipated special event conditions, the infrequency of the event, and the fact USTA patron travel is in the off-peak direction when a line-haul analysis is typically conducted in the peak direction, a detailed subway line-haul analysis was not warranted.

LIRR

Port Washington Branch trains stop at the Mets-Willets Point LIRR station during Mets home games and the US Open. As presented in **Table 10-4**, the proposed project is expected to generate approximately 455 incremental peak period LIRR trips during the weekday PM peak period departure, which would exceed the CEQR analysis threshold of 200 peak period transit trips per station. However, given the capacity of the control area and the fact that NTC would be the primary generator at the station, the proposed project is not expected to result in any significant adverse LIRR impacts, and a quantified analysis of the LIRR was not performed.

NYCT BUS

As presented in **Table 10-4**, the proposed project is expected to generate approximately 35 incremental peak period bus trips during the weekday PM peak period departure. The bus routes would not experience more than 50 peak period bus trips in one direction—the CEQR recommended threshold for undertaking a quantified bus analysis. Therefore, the proposed project is not expected to result in any significant adverse bus impacts.

PEDESTRIANS

As shown in **Table 10-4**, the projected peak period pedestrian departure trips would be greater than the CEQR analysis threshold, requiring a Level 2 screening assessment.

As described above, all of the subway and LIRR person trips generated by the proposed project would connect directly from the station to the NTC via the Passerelle ramp and a majority of all the non-transit orientated patrons leaving the NTC would connect directly to the various general admission or permit parking lots within the park grounds. Therefore, US Open patrons will not utilize any of the off-site pedestrian facilities—sidewalks, corner reservoirs, and crosswalks—from the local street network.

Internal to the park, the USTA provides shuttle bus service between every parking area and the NTC. The walking environment within the park is characterized by broad pedestrian boulevards.

There would be a negligible amount of person trips generated by the proposed project that would walk to the project grounds from the surrounding area, and as discussed above, only 35 NYCT bus trips would be generated. Based on these assignments, no public pedestrian elements are expected to receive more than 200 project-generated pedestrian trips, the CEQR pedestrian analysis threshold, and a detailed pedestrian analysis is not warranted. The proposed project is not expected to result in any significant adverse pedestrian impacts.

D. TRANSPORTATION ANALYSIS METHODOLOGY

TRAFFIC OPERATIONS

The operation of all of the signalized and unsignalized intersections in the study area were assessed using methodologies presented in the *2000 Highway Capacity Manual (HCM)* using the *Highway Capacity Software (HCS+ 5.5)*. The *HCM* procedure evaluates the levels of service

(LOS) for signalized and unsignalized intersections using average control delay, in seconds per vehicle, as described below.

For signalized and unsignalized intersections, the average control delay is defined as the total elapsed time from which a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue to the first-in-queue position. The average control delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

SIGNALIZED INTERSECTIONS

The average control delay per vehicle is the basis for LOS determination for individual lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersection. The LOS are defined in **Table 10-7**.

Table 10-7
LOS Criteria for Signalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds
Source:	Transportation Research Board. *Highway Capacity Manual*, 2000.

The *HCM* methodology calculates a volume-to-capacity (v/c) ratio and a high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay actually represents the most efficient condition in terms of traffic engineering standards, where an approach or the whole intersection processes traffic close to its theoretical maximum capacity with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, progression, and green time. LOS A and B indicate good operating conditions with minimal delay. At LOS C, the number of vehicles stopping is higher, but congestion is still fairly light. LOS D describes a condition where congestion levels are more noticeable and individual cycle failures (a condition where motorists may have to wait for more than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels, and cycle breakdowns are frequent. The *HCM* methodology also provides for a summary of the total intersection operating conditions. The analysis chooses the critical movements (the worst case from each cycle phase) and calculates a summary critical v/c ratio. The overall intersection delay, which determines the intersection's LOS, is based on a weighted average of control delays of the individual lane groups. Within New York City, the midpoint of LOS D (45 seconds of delay) is generally considered as the threshold between acceptable and unacceptable operations.

Significant Impact Criteria

According to the criteria presented in the *CEQR Technical Manual*, impacts are considered significant and require examination of mitigation under the following conditions. For a lane group operating at LOS D in the No Action condition, an increase of 5 or more seconds is considered significant if the With Action delay exceeds mid-LOS D. For No-Action condition

LOS E, a 4-second increase in delay is considered significant. For No-Action condition LOS F, a 3-second increase in delay is considered significant. In addition, impacts are considered significant if levels of service deteriorate from acceptable A, B, or C in the No-Action condition to marginally unacceptable LOS D (a delay in excess of 45 seconds, the midpoint of LOS D), or unacceptable LOS E or F in the With Action condition.

UNSIGNALIZED INTERSECTIONS

The LOS criteria for unsignalized intersections are summarized in **Table 10-8**.

Table 10-8
LOS Criteria for Unsignalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 15.0 seconds
C	> 15.0 and ≤ 25.0 seconds
D	> 25.0 and ≤ 35.0 seconds
E	> 35.0 and ≤ 50.0 seconds
F	> 50.0 seconds
Source: Transportation Research Board. *Highway Capacity Manual*, 2000.	

The LOS thresholds for unsignalized intersections are different from those for signalized intersections. The primary reason is that drivers expect different levels of performance from different types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection; hence, the corresponding control delays are higher at a signalized intersection than at an unsignalized intersection for the same LOS. In addition, certain driver behavioral considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections. For these reasons, the corresponding delay thresholds for unsignalized intersections are lower than those of signalized intersections. As with signalized intersections, within New York City, the midpoint of LOS D (30 seconds of delay) is generally perceived as the threshold between acceptable and unacceptable operations.

Significant Impact Criteria

The same sliding scale of significant delays described for signalized intersections applies for unsignalized intersections. For the minor street to trigger significant impacts, at least 90 passenger car equivalents (PCE) must be identified in the With Action condition in any peak period.

HIGHWAY NETWORK

Due to existing congestion on the adjacent freeways and the existing queues created from downstream bottlenecks, traditional analysis of freeway operations are beyond the capabilities of standard traffic operations software (i.e., Highway Capacity Software). Therefore, a VISSIM micro-simulation model representing a weekday 6:00 PM to 7:00 PM peak period was applied to quantify the potential impacts generated by an increase in the volume of patrons departing the daytime session at the US Open. The calibration of the VISSIM model is addressed in

Appendix E. Measures for evaluating the highway network includes vehicles processed, travel times, speeds, and queue lengths.

TRANSIT OPERATIONS

SUBWAY STATION ELEMENTS

The methodology for assessing station circulation (stairs, escalators, and passageways) and fare control (regular turnstiles, high entry/exit turnstiles, and high exit turnstiles) elements compares the user volume with the analyzed element's design capacity, resulting in a volume-to-capacity (v/c) ratio.

For stairs, the design capacity considers the effective width of a tread, which accounts for railings or other obstructions, the friction or counter-flow between upward and downward pedestrians (up to 10 percent capacity reduction applied to account for counter-flow friction), surging of exiting pedestrians (up to 25 percent capacity reduction applied to account for detraining surges near platforms), and the average area required for circulation. For passageways, similar considerations are made. For escalators and turnstiles, capacities are measured by the number and width of an element and the NYCT optimum capacity per element. The analysis accounts for the surging of exiting pedestrians. In the analysis for each of these elements, volumes and capacities are presented for 15-minute intervals.

The estimated v/c ratio is compared with NYCT criteria to determine a LOS for the operation of an element, as summarized in **Table 10-9**.

Table 10-9
LOS Criteria for Subway Station Elements

LOS	V/C Ratio
A	0.00 to 0.45
B	0.45 to 0.70
C	0.70 to 1.00
D	1.00 to 1.33
E	1.33 to 1.67
F	Above 1.67

Source: *CEQR Technical Manual* (January 2012).

At LOS A ("free flow") and B ("fluid flow"), there is sufficient area to allow pedestrians to freely select their walking speed and bypass slower pedestrians. When cross and reverse flow movement exists, only minor conflicts may occur. At LOS C ("fluid, somewhat restricted"), movement is fluid although somewhat restricted. While there is sufficient room for standing without personal contact, circulation through queuing areas may require adjustments to walking speed. At LOS D ("crowded, walking speed restricted"), walking speed is restricted and reduced. Reverse and cross flow movement is severely restricted because of congestion and the difficult passage of slower moving pedestrians. At LOS E ("congested, some shuffling and queuing") and F ("severely congested, queued"), walking speed is restricted. There is also insufficient area to bypass others, and opposing movement is difficult. Often, forward progress is achievable only through shuffling, with queues forming.

Significant Impact Criteria

The determination of significant impacts for station elements varies based on their type and use. For stairs and passageways, significant impacts are defined in term of Width Increment

Threshold (WIT) based on the minimum amount of additional capacity that would be required either to mitigate the location to its service conditions (LOS) under the future No-Action condition levels, or to bring it to a v/c ratio of 1.00 (LOS C/D), whichever is greater. Significant impacts are typically considered to occur once the WITs in **Table 10-10** are reached or exceeded.

For escalators and control area elements, impacts are significant if the proposed action causes a v/c ratio to increase from below 1.00 to 1.00 or greater. Where a facility is already at or above its capacity (a v/c of 1.00 or greater) in the No-Action condition, a 0.01 increase in v/c ratio is also significant.

Table 10-10
Significant Impact Guidance for Stairs and Passageways

No Action V/C Ratio	WIT for Significant Impact (inches)	
	Stairway	Passageway
1.00 to 1.09	8.0	13.0
1.10 to 1.19	7.0	11.5
1.20 to 1.29	6.0	10.0
1.30 to 1.39	5.0	8.5
1.40 to 1.49	4.0	6.0
1.50 to 1.59	3.0	4.5
1.60 and up	2.0	3.0

Notes: WIT = Width Increment Threshold
Source: *CEQR Technical Manual* (January 2012).

VEHICULAR AND PEDESTRIAN SAFETY EVALUATION

An evaluation of vehicular and pedestrian safety is necessary for locations within the traffic and pedestrian study areas that have been identified as high accident locations: where 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclist injury crashes occurred in any consecutive 12 months of the most recent three-year period for which data are available.

For the high accident locations, accident trends would be identified to determine whether projected vehicular and pedestrian traffic would further impact safety at these locations or whether existing unsafe conditions could adversely impact the flow of the projected new trips. The determination of potential significant safety impacts depends on the type of area where the project site is located, traffic volumes, accident types and severity, and other contributing factors. Where appropriate, measures to improve traffic and pedestrian safety should be identified and coordinated with NYCDOT. The results of the safety assessment are provided in Section G, Vehicular and Pedestrian Safety.

PARKING CONDITIONS ASSESSMENT

The parking conditions assessment for the USTA is specialized for the character of this site and event since the inventory of parking available to the US Open patrons includes the parking lots at and around Citi Field, the Southfield commuter parking lot, and a large inventory of paved and land-banked parking provided within Flushing Meadows Corona Park. Moreover, the large dedicated parking supply features remote shuttle operations and a directed parking management operation. The objective of the parking conditions assessment is to determine if the anticipated increase in parking can be accommodated within the footprint of the existing parking program.

E. TRAFFIC

2011 EXISTING CONDITIONS

ROADWAY NETWORK

The roadway network supporting the US Open includes the following local roadways and area highways:

- College Point Boulevard
- Roosevelt Avenue
- Horace Harding Expressway
- Grand Central Parkway
- Long Island Expressway
- Whitestone Expressway
- Van Wyck Expressway

TRAFFIC OPERATIONS

Existing traffic volumes for the study area intersections were established based on manual turning movement counts in conjunction with Automatic Traffic Recorder (ATR) counts, conducted over a two-week period at the end of August and early September during the 2011 US Open.

ATRs collected hourly traffic data from Monday, August 30, 2011 through Tuesday, September 13, 2011. The primary survey date for manual traffic and parking counts was Wednesday, August 31st, 2011 during a “conflict date,” which is when the US Open coincides with a Mets home game. The August 31, 2011 survey was conducted under normal special event operations and clear weather conditions.

As stated previously in Section B, “Parking and Traffic Management,” traffic operations within the study are characterized by a heavy presence of TEAs maintaining circulation and managing parking assignments.

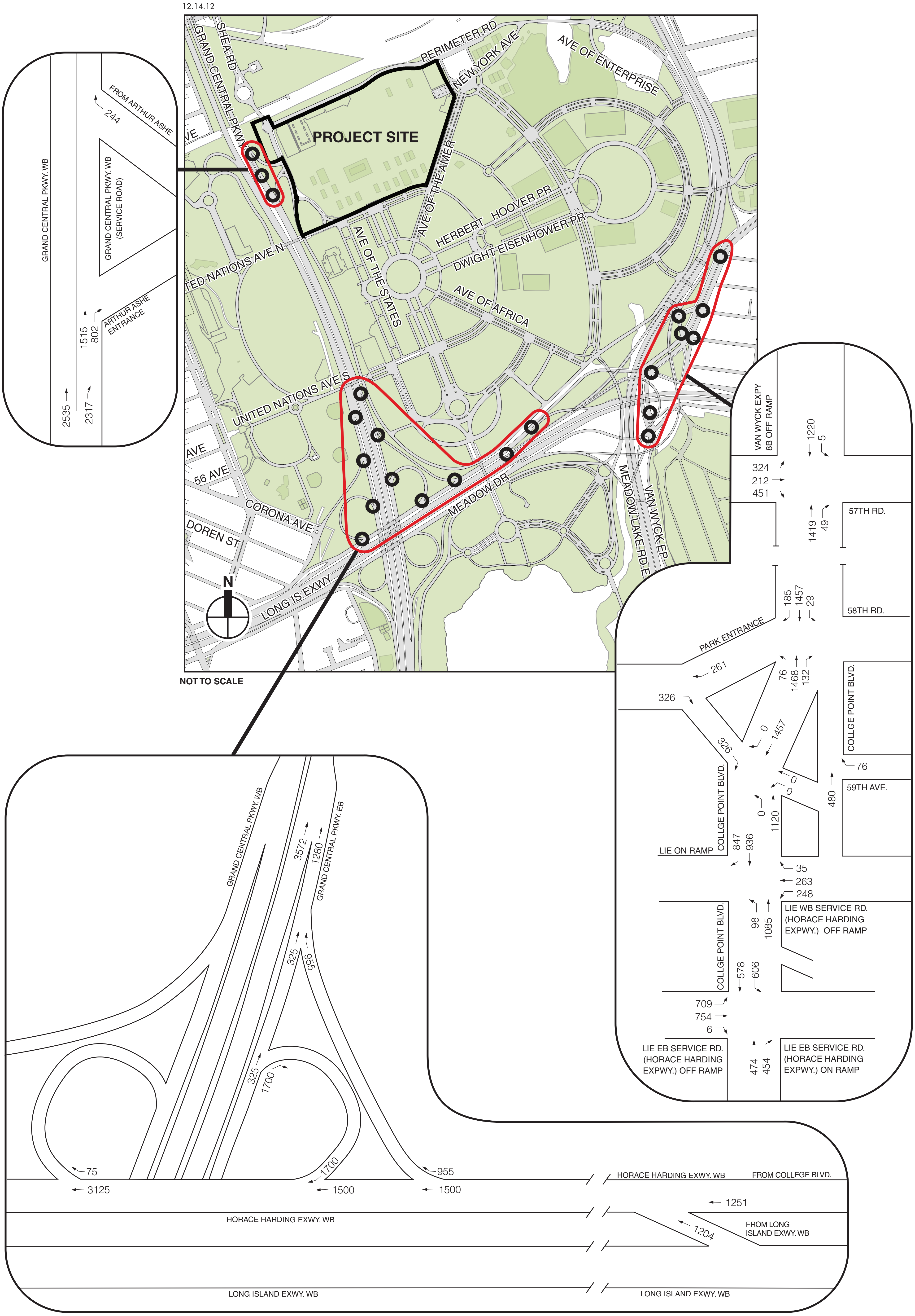
The analyses of traffic conditions on the local street network reflects operations with permanent traffic controls and special event turn restrictions (e.g., traffic signals, traffic cones, stop signs, striping) but do not reflect the enhanced traffic service conditions which occur due to the dynamic TEA operations.

A summary of the Existing traffic volumes is presented in **Figure 10-3**.

TRAFFIC CONDITIONS

Local Roadway Network

Table 10-11 provides a summary of the results of the Level of Service analysis for Existing Conditions. As indicated in the table, the overall levels of service are LOS D or better.



2011 Existing Traffic Volumes
PM Peak Period (6:00-7:00PM)
Figure 10-3

Table 10-11
2011 Existing Conditions Level of Service Analysis

Intersection	Approach	Lane Group	v/c Ratio	Delay (sec.)	LOS
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.26	20.8	C
	Southbound	LT	0.09	16.8	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.83	33.1	C
		R	0.79	31.1	C
	Northbound	TR	0.76	23.9	C
	Southbound	LT	0.66	21.5	C
	Overall	**--**	--	**25.3**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.53	24.2	C
	Westbound	LTR	0.00	16.8	B
	Northbound	LT	0.72	20.4	C
	Southbound	TR	0.66	18.1	B
	Overall	**--**	**--**	**19.7**	**B**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.52	22.7	C
	Northbound	L	0.27	28.1	C
		T	0.67	18.9	B
	Southbound	T	1.03	67.6	E
		R	0.93	57.7	E
	Overall	**--**	**--**	**39.3**	**D**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.00	43.5	D
	Northbound	T	0.74	40.0	D
	Southbound	L	1.05	76.6	E
		T	0.49	22.8	C
	Overall	**--**	**--**	**45.5**	**D**

Highway Network

As previously discussed, the critical highway segment identified for analysis is the westbound Horace Harding Expressway from the College Point Boulevard on ramp to the Grand Central Parkway access ramps and includes the on-ramp from the westbound Long Island Expressway. The initial step to evaluating traffic conditions on this critical highway segment is establishing a calibrated existing conditions model, which serves as the basis for comparing future conditions with and without the proposed project.

The main objective of model calibration effort is to ensure that the model accurately reflects the special event traffic conditions experienced on the date of the survey. This includes reasonably replicating traffic flow to match observed operating conditions, volume data, and queue observations.

Lane geometries (lane widths, interchange designs, etc.) were coded into the model based on field observations and existing aerials. Existing counts collected during the opening week of the US Open were also coded into the model in 15-minute intervals.

During calibration of a VISSIM model, individual components are adjusted to match field-observed data. Calibration involves setting background traffic operation and driver behavior characteristics including yielding right-of-way, gap acceptance, driver aggressiveness, and vehicle characteristics. The VISSIM model was calibrated and validated to the 6:00-7:00 PM peak hour period based on traffic volumes and observed vehicle queues. During this process, the model was visually inspected to ensure that it accurately reflected observed conditions. **Appendix E** provides a detailed description of the model calibration methodology

Free Flow Travel Speeds

Table 10-12 presents the free-flow travel speed ranges for passenger vehicles and trucks coded into the VISSIM model.

Table 10-12
Free Flow Speeds

Location	Free Flow Speed (MPH)	
	Passenger Cars	Trucks
Grand Central Parkway	50-60	-
Collector-Distributor Roads	33-37	33-37
Loop Ramps	20-30	-
Direct Ramps	40-45	-
Perimeter Road	13-17	-

Model Validation

During validation, the VISSIM model output is compared against field data to determine if the output is within acceptable levels. The following criteria, based on the "Guidelines for Applying Traffic Microsimulation Modeling Software Volume III (Federal Highway Administration, 2003)" were used for the model calibration:

Hourly Flows, VISSIM Model vs. Field Counts

Individual Link Flows

Within 100 vph, for Flow < 700 vph	>85% of Cases
Within 15% for 700 vph < Flow < 2,700 vph	>85% of Cases
Within 400 vph, for Flow > 2,700 vph	>85% of Cases

GEH Statistic

GEH < 5	> 85% of Cases

The GEH statistic is computed as follows:

$$GEH = \sqrt{\frac{(V-C)^2}{(V+C)/2}}$$

Where:
V = model estimated directional hourly volume at a location.
C = directional hourly count at a location.

The results from the VISSIM analysis are summarized **Table 10-13.** This table presents the field counts and the resulting VISSIM simulated volumes and shows that the VISSIM model is successfully meeting the calibration criteria.

Table 10-13
Traffic Volume Comparison - Microsimulation Model vs. Field Counts

Location	Field Counts	VISSIM	Difference[1]	Percent Served[2]	GEH	Meets Criteria?
College Point on-ramp to Horace Harding Expressway	1,360	1,360	0	0%	0.0	YES
LIE off-ramp to Horace Harding Expressway	1,204	1,220	-16	-1%	0.5	YES
Horace Harding Expressway to Grand Central Parkway (GCP) westbound direct ramp	955	934	+21	2%	0.7	YES
GCP westbound to loop ramp service road	1,700	1,688	+12	1%	0.3	YES
Horace Harding Expressway to GCP east loop ramp	75	72	+3	4%	0.3	YES
GCP service road westbound at loop ramp	325	324	+1	0%	0.1	YES
GCP mainline westbound at loop ramps	3,572	3,574	-2	0%	0.0	YES
GCP westbound on-ramp from Horace Harding Expressway	1,280	1,247	+33	3%	0.9	YES
GCP westbound off-ramp to Exit 9P USTA	802	750	+52	6%	1.9	YES
GCP westbound mainline at off-ramp to Exit 9P USTA	4,050	4,046	+4	0%	0.1	YES
GCP westbound mainline (after split)	2,535	2,522	+13	1%	0.3	YES
GCP westbound service road (after split)	1,515	1,515	0	0%	0.0	YES
GCP westbound on-ramp from Exit 9P USTA	244	235	+9	4%	0.6	YES

Notes: Average of ten simulation runs.
1. Difference = Field Counts –VISSIM
2. Percent Served = (Field Counts – VISSIM) / Field Counts

In addition to validating the model to field counts, the simulation was checked to demonstrate queuing that is consistent with the field observations. During the 6:00 PM to 7:00 PM peak period, the Grand Central Parkway westbound off-ramp to Exit 9P was observed to queue back to the Grand Central Parkway mainline, growing throughout the peak hour. By the end of the peak hour (around 7:00 PM), the queue from the Exit 9P exit ramp extended to the Horace Harding Expressway.

The VISSIM model replicated this queue length during the simulation, with queues from the Exit 9P off-ramp extending through the peak hour, spilling back onto the Horace Harding Expressway and back to the College Point Boulevard and Long Island Expressway (LIE) approaches at the end of the simulation peak hour.

Table 10-14 provides a summary of the VISSIM travel time analysis for 2011 Existing Conditions. The table presents the estimated travel times for two key routes within the highway segment under analysis. As indicated in the table, the estimated travel time on the Horace Harding Expressway from the entrance point from the Long Island Expressway (LIE) to a point on the exit ramp to the Grand Central Parkway (GCP) westbound, a segment of 2,911 feet, would be 106.9 seconds, or at an average speed 18.6 miles per hour. Similarly, the estimated travel time from the entrance point from College Point Boulevard to a point on the Horace Harding Expressway, just past the exit ramp to the Grand Central Parkway, a segment of 2,218 feet, would be 60.4 seconds, or at an average speed 25.0 miles per hour.

Table 10-14
2011 Existing Conditions - Travel Time Analysis

Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Existing	LIE to GCP Westbound Entrance	2,911	106.9	18.6
	College Point Blvd. to mid-GCP	2,218	60.4	25.0

2019 FUTURE NO-ACTION CONDITION

DEVELOPMENT OF A FUTURE DUAL EVENT CONDITION

The 2019 Future No-Action condition includes the development of a Reasonable Worst-Case Scenario (RWCS). A component of this scenario is a future condition where the US Open coincides with a well-attended Mets home game. Consistent with the *Shea Stadium Redevelopment FEIS*, December 2001, and the previous *USTA National Tennis Center Project FEIS*, July 1993, an 85th percentile attendance condition was identified for analysis.

On the date of the 2011 US Open survey, the Mets attendance was 27,905. Based on a review of the attendance data for all weekday Mets games over the 2010 and 2011 baseball seasons, the 85th percentile attendance was 35,914. Therefore, an adjustment was made to the traffic and transit networks to reflect an increase in attendance of 8,009 baseball fans to Citi Field.

Trip generation and trip assignments for the additional 8,009 patrons were based on the information provided in the *Shea Stadium Redevelopment FEIS*, December 2001. For auto trips, the FEIS identified a 62 percent mode share, a 2.70 vehicle occupancy rate, and a 61 percent total vehicle peak hour arrival rate (please see FEIS Table 11-1, p 11-5).

In order to account for the increase in Mets attendance, an additional 1,122 vehicle trip ends were assigned to the roadway network and Citi Field parking lot under the future condition. Subsequently, 562 US Open patrons departing the Citi Field lot during the peak departure hour under existing conditions were “reassigned” to general parking lots #4, #5 and #6 under the future condition.

For transit trips, the FEIS identified a subway modal split of 31 percent and a temporal distribution of 62 percent during the peak hour; therefore, an additional 1,539 subway trips were added to the transit network during the peak hour. This corresponds to approximately 428 additional subway trips exiting the Mets-Willets Point subway station and entering the stadium during the peak 15 minutes.

The number of US Open patrons (568 vehicle trips) departing the Citi Field parking lots was determined by reviewing the volumes exiting the Citi Field parking lots and volumes observed on the highway entrance ramps in the immediate vicinity of Citi Field during the peak hour departure period. A total volume of 568 vehicle trips were observed departing the Citi Field parking lot during the peak departure period. Under the future dual event condition, with an escalated Mets attendance level, the 568 vehicles trips were “reassigned” to depart the US Open general public parking Lots #4, #5, and #6.

BACKGROUND GROWTH

The 2019 Future No-Action condition was developed by increasing existing traffic volumes by the expected growth in overall travel through and within the study area. As per *CEQR* guidelines, an annual background growth rate of 0.5 percent was assumed for the first five years and then 0.25 percent for the remaining years to the year 2019.

In addition, planned or proposed background projects were researched within the study area. **Table 10-15** and **Figure 10-4** summarize the projects that were included in the future 2019 baseline. Smaller projects that would generate a very modest volume of traffic were considered as part of the general study area background traffic growth rate while others of greater significance were evaluated individually. Projects still under development, such as Willets Point Redevelopment, were evaluated based on information available at the time of this report. Person and vehicle trips generated were then determined, their traffic assigned, and their trips added to background growth to form the 2019 Future No-Action traffic volumes.

Similar to the other No-Action projects in the vicinity of the study area, the proposed Willets Point Redevelopment Project was evaluated based on information available at the time of the preparation of this DEIS and may not reflect the final assumptions used in the proposed Willets Point project's environmental review. The proposed Willets Point program is not expected to be increased beyond what is accounted for in the No Action analysis. Overall, any future modifications to the Willets Point program are not expected to change the findings of the DEIS transportation analysis, especially when considering the differences in travel patterns and the frequency and duration of the US Open event. Therefore, the procedures and methodologies followed for the No Action analysis are appropriate for the specific needs of the USTA Billie Jean King National Tennis Center Strategic Vision DEIS.

In the event the Major League Soccer (MLS) stadium project is approved and developed, it is expected that games or other events would not be permitted during the two-week US Open. While it is possible that a single evening soccer game could occur during the preceding qualifying week, such a condition is not of concern with respect to environmental impacts because the NTC is unticketed and has lower attendance during the qualifying week, qualifying round tennis matches are scheduled only during a day session, and operations during that period would not change as a result of the proposed project. In any case, such an event would occur only one evening per year.

A summary of the Future No-Action condition traffic volumes is presented in **Figure 10-5**.

TRAFFIC CONDITIONS

Local Roadway Network

Table 10-16 provides a summary of the results of the LOS analysis for the 2019 Future No-Action condition. As with existing conditions, the analysis does not take credit for the effect of dynamic TEA operations. Based on the analysis results, the majority of the approaches/lane groups would operate at the same LOS as in existing conditions with the following notable exceptions:

College Point Boulevard at Horace Harding Expressway Westbound

- The northbound left turn movement experiences an increase in delay of 26.1 seconds and a change from LOS C to LOS D.
- The southbound through movement experiences an increase in delay of 48.1 seconds and a change from LOS E to LOS F.
- Overall, the intersection experiences an increase in delay of 17.7 seconds and change from LOS D to LOS E.

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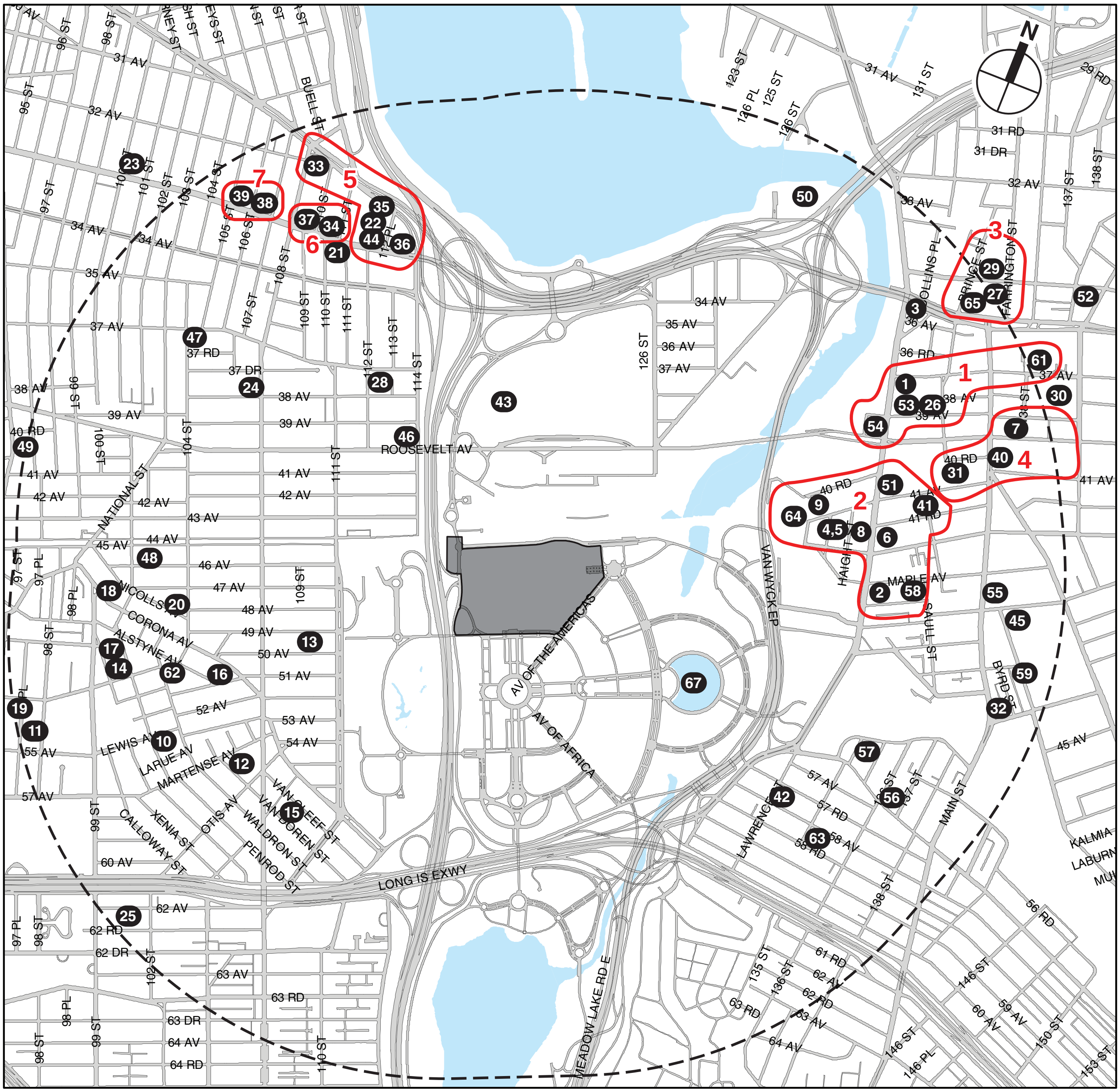


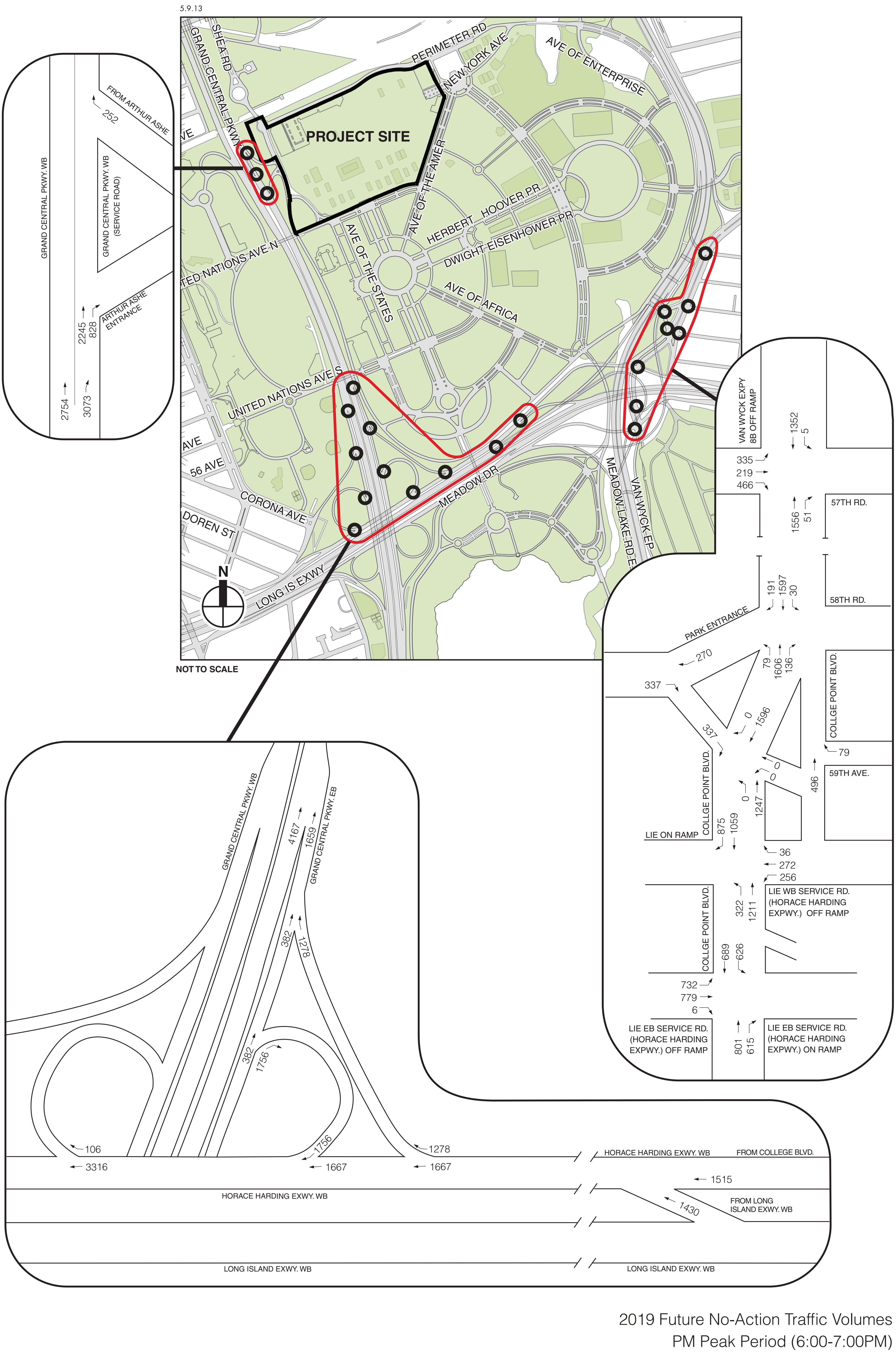
0 1000 2000 FEET

SCALE

(grey box)	*Project Site Boundary*
(dashed line)	*1-Mile Study Area Perimeter*
11	*No-Action Projects*
1	*Cluster*

Transportation Analysis No-Action Projects

Figure 10-4



2019 Future No-Action Traffic Volumes
PM Peak Period (6:00-7:00PM)

Figure 10-5

Table 10-15
Planned Projects Within or Near the Study Area

Site No.	Location	Description	Transportation Assumptions	Build Year
1	133-12 37th Avenue	Mixed use development with 10 dwelling units, 22,336 sf of commercial use, and a 1,971 sf community facility	Travel demand assumptions from the *Willets Point Development Plan FGEIS* (2008)	2018
2	132-08 Pople Ave	Mixed use development with 22 dwelling units, a 4,500 sf community facility, and 12 parking spaces	See Site 1	2018
3	35-19 College Point Boulevard	35,580 sf of light manufacturing and 11 parking spaces	Trip rates and temporal distributions from *Greenpoint Williamsburg Rezoning FEIS* (2005); modal split and auto and taxi vehicle occupancies from 2000 U.S. Census Transportation Planning Package Reverse Journey-to-Work Data and *Greenpoint Williamsburg Rezoning FEIS* (2005)	2018
4	41-09-15 Haight Street	Mixed use development with 28 dwelling units and a 12,584 sf community facility	See Site 1	2018
5	33-39 Prince Street	6,396 sf of light manufacturing	See Site 3	2018
6	132-18 41st Road	Mixed use development with 10 dwelling units and a 4,095 sf community facility	See Site 1	2018
7	136-11 Roosevelt Avenue	2,800 sf commercial development	See Site 1	2018
8	41-38 College Point Boulevard	Mixed use development with 8 dwelling units, 1,577 sf retail use, and a 4,095 sf community facility	See Site 1	2018
9	131-10-14 40 Road	5,795 sf retail development	See Site 1	2018
10	102-06-10 Lewis Avenue	Residential development with 14 dwelling units and 8 parking spaces	Included in background growth	2018
11	50-18 98 Street	8,000 sf of of light manufacturing and 6 parking spaces	Included in background growth	2018
12	105-10-12 Martense Avenue	Residential development with 6 units and 2 parking spaces	Included in background growth	2018
13	108-30 49 Avenue	Residential development with 3 units and 2 parking spaces	Included in background growth	2018
14	50-30-32 102 Street	Residential development with 8 units and 4 parking spaces	Included in background growth	2018
15	57-37 Van Doren Street	Residential development with 4 units and 1 parking space	Included in background growth	2018
16	104-24-28 Corona Avenue	Mixed use development with 4 residential units and1,144-sf retail use	Included in background growth	2018
17	50-08-10 102nd Street	Residential development with 6 dwelling units	Included in background growth	2018
18	99-21 Corona Avenue	Mixed use development with 6 residential units and a 280-sf community facility	Included in background growth	2018
19	50-02 97th Place	Mixed use development with a 10,530 sf community facility and 9,105 sf light manufacturing use	Included in background growth	2018
20	102-57 Nicolls Avenue	Mixed use development with 5 residential units and 1,434-sf retail	Included in background growth	2019

Table 10-15 (cont'd)
Planned Projects Within or Near the Study Area

Site No.	Location	Description	Transportation Assumptions	Build Year
21	PS 287: 110-08 Northern Boulevard	A 379-seat (49,471 sf) primary school	Assumed no trips during the evening peak period	2016
22	32-29-33 112th Street	A residential development with 2 dwelling units	See Site 1	2018
23	32-56 101st Street	11,407 sf commercial development	Included in background growth	2016
24	37-56 108th Street	Mixed use development with 4 residential units and 1,785-sf retail	Included in background growth	2018
25	99-31 62nd Road	A residential development with 2 dwelling units	Included in background growth	2018
26	133-47 39th Avenue	Mixed use development with 12,270 sf office use, 11,420 sf retail, and a 9,755 sf medical office	See Site 1	2018
27	RKO Keith Theater - Main Street and Northern Boulevard	Mixed use development with 357 residential units, 17,000 sf retail, a 12,500 sf community facility, and 385 parking spaces	See Site 1	2018
28	37-06 112th Street	A residential development with 3 dwelling units	Included in background growth	2018
29	New Millennium - 134-03 35th Avenue	Mixed use development with 84 residential units, 3,600 sf retail, a 33,600 sf community facility, and 222 parking spaces	See Site 1	2016
30	Flushing Commons (Municipal Parking Lot 1) and Macedonia Plaza - 138th Street, 37th Avenue, 39th Avenue, and Union Street	Mixed use development with 620 residential units, 275,000 sf retail, 110,000 sf office, a 98,000 sf community facility, either 250 hotel rooms or an additional 124,000 sf office and 1,600 parking spaces	See Site 1	2016
31	Flushing Municipal Lot 3	Mixed use development with 120 residential units, 23,000 sf commercial, a 10,000 sf community facility, and 200 parking spaces	See Site 1	2015
32	43-57 Main Street	2,085 sf of office and retail uses	See Site 1	2018
33	108-04, 14, 16 Astoria Boulevard	Mixed use development with 84 residential units, and a 34,965 sf community facility	See Site 1	2018
34	110-09 Northern Boulevard	Mixed use development with 31 residential units, and a 15,500 sf community facility	See Site 1	2018
35	112-12, 18, 24 Astoria Boulevard	Mixed use development with 38 residential units, and a 16,034 sf community facility	See Site 1	2018
36	Block bounded by Astoria Boulevard, Northern Blvd, and 112th Place	Mixed use development with 147 residential units, and 73,329 sf of commercial use	See Site 1	2018
37	108-09 Northern Boulevard	Mixed use development with 18 residential units, and 8,970 sf retail	See Site 1	2016
38	106-15 Northern Boulevard	Mixed use development with 11 residential units, and 5,502 sf retail	See Site 1	2016
39	32-56 106th Street	Mixed use development with 14 residential units, and 7,144 sf retail	See Site 1	2016
40	Caldor Site - 136-20 Roosevelt Avenue	155,000 sf retail	See Site 1	2016
41	132-27 to 132-61 41st Road	Residential development with 37 units	See Site 1	2018
42	57-35 Lawrence Street	Residential development with 5 units	See Site 1	2016
43	Willets Point Redevelopment Phase 1A	Mixed use development with retail uses within the existing Citi Field parking lot and local retail, hotel, and other recreational uses within the Willets Point District	Trip generation factors from the *CEQR Technical Manual* (2012), the *Willets Point Development Plan FGEIS* (2008), and other applicable sources, including inter-agency coordination regarding the new 2012 plan.	2018
44	112-15 Northern Boulevard	163-room hotel	See Site 1	2018

Table 10-15 (cont'd)
Planned Projects Within or Near the Study Area

Site No.	Location	Description	Transportation Assumptions	Build Year
45	P.S. 244 - 137-20 Franklin Avenue	A 425-seat primary school	Assumed no trips during the evening peak period	2016
46	39-14 114th Street	Mixed use development with 23 residential units, 18,638 sf commercial use, a 4,794 sf community facility, and 38 parking spaces	Included in background growth	2018
47	37-19 104th Street	Mixed use development with 2 residential units and a 1,100 sf community facility	Included in background growth	2018
48	102-12-14 45th Avenue	Residential development with 8 dwelling units and 2 parking spaces	Included in background growth	2018
49	40-53 Junction Boulevard	Mixed use development with 7 residential units and a 1,458 sf community facility	Included in background growth	2018
50	32-11 Harper Street	137 sf Diesel Monitoring Booth	Included in background growth	2018
51	132-15 41st Avenue	Mixed use development with 25 residential units, a 5,933 sf community facility, and 8 parking spaces	See Site 1	2018
52	35-01-05 Leavitt Street	Residential development with 12 dwelling units and 6 parking spaces	See Site 1	2018
53	37-19 College Point Boulevard	Mixed use development with 1 residential unit, 56,595 sf commercial, a 1,000 sf community facility, and 31 parking spaces	See Site 1	2018
54	One Fulton Square	Mixed use development with 88 residential units, 142,180 sf office, a 168-room hotel, a 16,722 sf community facility, and 283 parking spaces	See Site 1	2018
55	42-33 Main Street	Residential development with 79 dwelling units	See Site 1	2018
56	56-40 137th Street	Mixed use development with 3 residential units and a 4,401 sf community facility	Included in background growth	2018
57	56-18 135th Street	Residential development with 2 dwelling units	Included in background growth	2018
58	132-29 Pople Avenue	Mixed use development with 9 residential units and a 560 sf community facility	See Site 1	2018
59	43-02 Colden Street	Mixed use development with 7 residential units, 2,298 sf of office, and 3 parking spaces	Included in background growth	2018
60	136-68 Roosevelt Avenue	Mixed use development with 29,124 sf commercial, a 14,279 sf community facility, and 34 parking spaces	See Site 1	2018
61	136-33 37th Avenue	116,894 sf of office and 97 parking spaces	See Site 1	2018
62	50-15 103rd Street	A residential development with 1 dwelling unit	Included in background growth	2018
63	134-06 58th Avenue	Addition of 1 residential dwelling unit	Included in background growth	2018
64	131-08 40 Road	4,548 sf retail	See Site 1	2018
65	135-17 Northern Boulevard	Mixed use development with 28 residential units, 8,465 sf retail, a 2,867 sf community facility, and 45 parking spaces	See Site 1	2018
66	154-32 Barclay Avenue	Mixed use development with 18 residential units and a 5,950 sf community facility	Included in background growth	2018
67	Flushing Meadows Corona Park	Major league soccer stadium	Assumed no event overlap with 2-week ticketed US Open USTA events	2016

Sources: AKRF, Inc., New York City Department of City Planning, New York City Department of Buildings

Table 10-16
2019 Future No Action Level of Service Analysis

Intersection	Approach	Lane Group	v/c Ratio	Delay (sec.)	LOS
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.31	24.6	C
	Southbound	LT	0.11	18.7	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.86	35.4	D
		R	0.81	32.9	C
	Northbound	TR	0.84	26.5	C
	Southbound	LT	0.74	23.1	C
	Overall	--	--	**27.3**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.55	24.6	C
	Westbound	LTR	0.00	16.8	B
	Northbound	LT	0.81	23.2	C
	Southbound	TR	0.72	19.4	B
	Overall	**--**	**--**	**21.4**	**C**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.54	23.0	C
	Northbound	L	0.88	54.2	D
		T	0.74	20.8	C
	Southbound	T	1.16	115.7	F
		R	0.99	70.4	E
	Overall	**--**	**--**	**57.0**	**E**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.03	52.1	D
	Northbound	T	1.26	163.1	F
	Southbound	L	1.09	87.7	F
		T	0.58	24.4	C
	Overall	**--**	**--**	**77.3**	**E**

College Point Boulevard at Horace Harding Expressway Eastbound

- The northbound through movement experiences an increase in delay of 123.1 seconds and a change from LOS D to LOS F.
- The southbound left turn movement experiences an increase in delay of 11.1 seconds and a change from LOS E to LOS F.
- Overall, the intersection experiences an increase in delay of 31.8 seconds and change from LOS D to LOS E.

Highway Network

Table 10-17 provide a summary of the results of the micro-simulation model analysis for the 2019 Future No-Action condition. The vehicle demand analysis presented in **Table 10-17** indicates the critical roadway segment is operating above capacity.

Table 10-17
2019 Future No-Action Condition - Vehicle Demand Analysis

Design Year	Segment (Ramp Approach)	Demand Volume	Vehicles Served	Unmet Demand	Percent Served
Future No-Action	College Point Boulevard	1,624	1,588	36	98%
	Long Island Expressway	1,467	994	473	68%

The results of the analysis for the College Point Boulevard approach indicates 1,588 of the total peak hour demand of 1,624 vehicle, or 98 percent, can be processed by the highway segment. The remaining unmet demand will contribute to the queuing that currently extends along College Point Boulevard and into the park.

For the Long Island Expressway approach, 988 of the total peak hour demand of 1,467, or 67 percent, can be processed by the highway segment during the peak hour. The remaining unmet demand will be processed outside of the peak hour and will contribute to congestion on the Long Island Expressway.

Table 10-18 provides additional information regarding traffic operations projected for the 2019 Future No-Action condition. The table presents the estimated travel times for two key routes within the highway segment under analysis. As indicated in the table, the estimated travel time on the Horace Harding Expressway from the entrance point from the Long Island Expressway (LIE) to a point on the exit ramp to the Grand Central Parkway (GCP) westbound, a segment of 2,911 feet, would be 179.0 seconds, or at an average speed 11.1 miles per hour. Similarly, the estimated travel time from the entrance point from College Point Boulevard to a point on the Horace Harding Expressway, just past the exit ramp to the Grand Central Parkway, a segment of 2,218 feet, would be 128.3 seconds, or at an average speed 11.8 miles per hour.

Table 10-18
2019 Future No-Action Condition - Travel Time Analysis

Design Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Future No-Action	LIE to GCP Westbound Entrance	2,911	179.0	11.1
	College Point Blvd. to mid-GCP	2,218	128.3	11.8

2019 FUTURE WITH ACTION CONDITION

As discussed above in Section C, "Level 2 Screening Assessment," the project-generated vehicle trips were assigned to the study area.

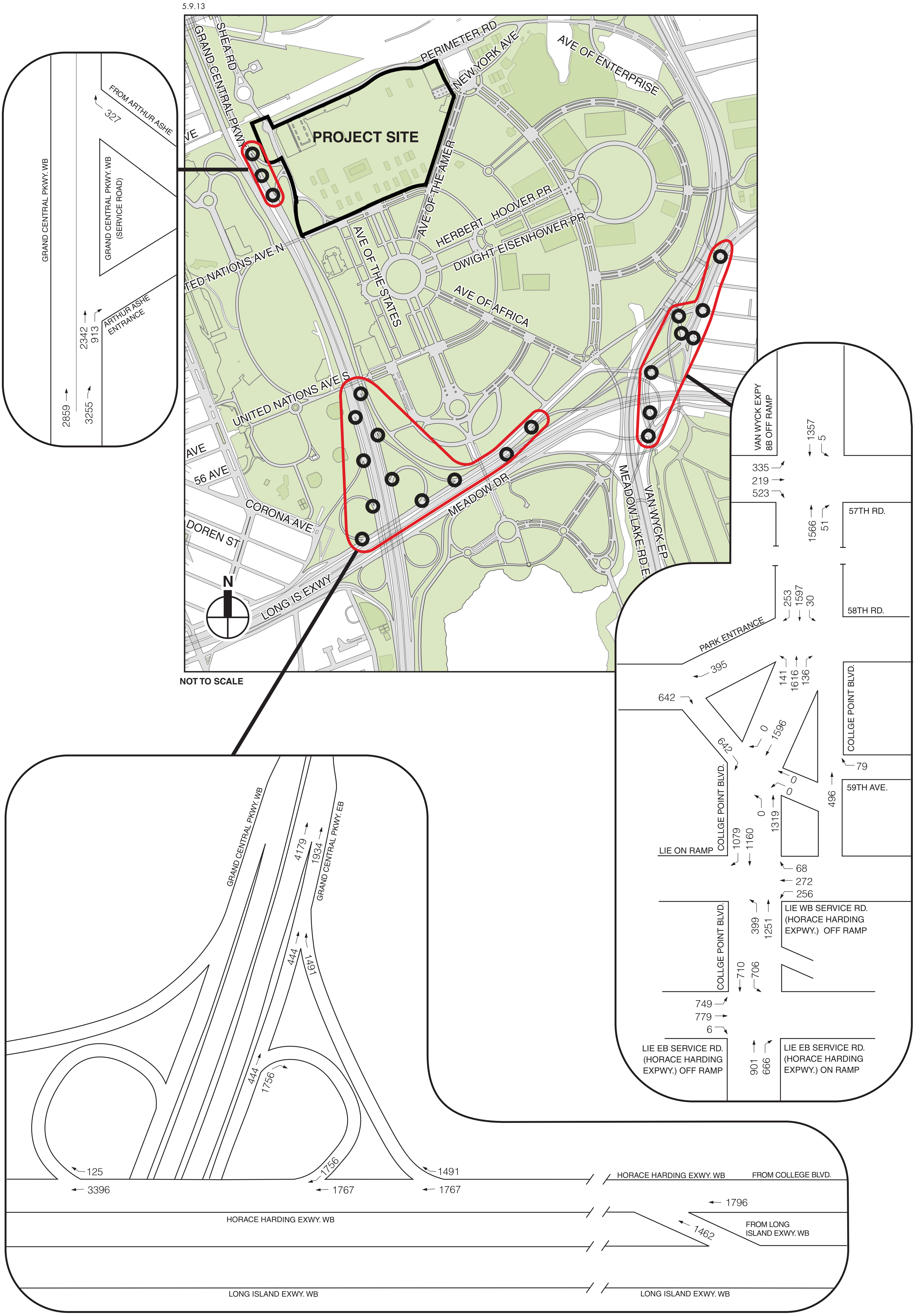
The related peak hour traffic and assignments are discussed above in Section C, "Level 2 Screening Assessment," and the incremental peak hour trips resulting from the proposed project are shown in **Figures 10-2A through 10-2D**.

TRAFFIC CONDITIONS

The 2019 Future With Action condition traffic volumes were constructed by layering the Future No-Action condition traffic volumes and the incremental peak hour trips resulting from the proposed project. The Future With Action traffic volumes are shown in **Figure 10-6**.

Local Roadway Network

Table 10-19 provides a comparison of the results of the LOS analysis for the 2019 Future With Action condition with the Future No-Action condition. As with Existing and No Action conditions, the capacity analysis does not take credit for the effect of the Traffic Enforcement Agents (TEAs) staffed at every intersection.



2019 Future With-Action Traffic Volumes
PM Peak Period (6:00-7:00PM)
Figure 10-6

Table 10-19
2019 Future No-Action and Future With Action Level of Service Analysis

Intersection	Approach	Lane Group	Future No Action v/c Ratio	Future No Action Delay (sec.)	Future No Action LOS	Future With Action v/c Ratio	Future With Action Delay (sec.)	Future With Action LOS
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.31	24.6	C	0.58	38.1	E
	Southbound	LT	0.11	18.7	C	0.11	18.9	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.86	35.4	D	0.86	35.4	D
		R	0.81	32.9	C	0.91	43.3	D
	Northbound	TR	0.84	26.5	C	0.84	26.7	C
	Southbound	LT	0.74	23.1	C	0.74	23.2	C
	Overall	--	--	**27.3**	**C**	--	**28.9**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.55	24.6	C	1.05	75.8	E
	Westbound	LTR	0.00	16.8	B	0.00	16.8	B
	Northbound	LT	0.81	23.2	C	0.85	25.4	C
	Southbound	TR	0.72	19.4	B	0.72	19.4	B
	Overall	**--**	**--**	**21.4**	**C**	**--**	**32.0**	**C**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.54	23.0	C	0.57	23.6	C
	Northbound	L	0.88	54.2	D	1.09	106.7	F
		T	0.74	20.8	C	0.77	21.5	C
	Southbound	T	1.16	115.7	F	1.27	162.0	F
		R	0.99	70.4	E	1.43	238.3	F
	Overall	**--**	**--**	**57.0**	**E**	**--**	**103.1**	**F**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.03	52.1	D	1.04	55.6	E
	Northbound	T	1.26	163.1	F	1.41	230.5	F
	Southbound	L	1.09	87.7	F	1.23	140.4	F
		T	0.58	24.4	C	0.60	24.7	C
	Overall	**--**	**--**	**77.3**	**E**	**--**	**105.8**	**F**

College Point Boulevard at 58th Road and the Park Entrance (unsignalized)

- The northbound approach experiences a change in level of service from LOS C to LOS E and an increase in delay from 24.6 seconds to 38.1 seconds, an increase of 13.5 seconds.

College Point Boulevard at 59th Avenue and the Park Exit

- The eastbound approach experiences a change in level of service from LOS C to LOS E and an increase in delay from 24.6 seconds to 75.8 seconds, an increase of 51.2 seconds.

College Point Boulevard at Horace Harding Expressway Westbound

- The northbound left turn lane group experiences a change in level of service from LOS D to LOS F and an increase in delay from 54.2 seconds to 106.7 seconds, an increase of 52.5 seconds.
- The southbound through lane group remains at LOS F but experiences an increase in delay from 115.7 seconds to 162.0 seconds, an increase of 46.3 seconds.
- The southbound right turn lane group experiences a change in level of service from LOS E to LOS F and an increase in delay from 70.4 seconds to 238.3 seconds, an increase of 167.9 seconds.

College Point Boulevard at Horace Harding Expressway Eastbound

- The eastbound approach experiences a change in level of service from LOS D to LOS E and an increase in delay from 52.1 seconds to 55.6 seconds, an increase of 3.5 seconds.

- The northbound approach remains at LOS F but experiences an increase in delay from 163.1 seconds to 230.5 seconds, an increase of 67.4 seconds.
- The southbound approach remains at LOS F but experiences an increase in delay from 87.7 seconds to 140.0 seconds, an increase of 52.3 seconds.

According to the CEQR impact criteria outlined in Section D, "Transportation Analysis Methodology," the projected levels-of-service deterioration and increased delay would constitute significant adverse impacts during the analysis peak hour. However, as mentioned earlier, the capacity analysis summarized in **Table 10-19** does not reflect actual field conditions as the analysis does not quantitatively account for the special event traffic management provided by the New York City Police Department including TEAs.

Multiple TEAs are staffed at each intersection within the study area along College Point Boulevard during the full duration of the US Open. The TEAs are onsite in the early morning and remain in position until the completion of the event day. The TEAs ensure that traffic operation and safety of all street users (i.e., pedestrians, cyclists, transit users and motorists) are managed in the field when traffic operations become saturated (i.e., queues extending beyond storage capacity, blocked turning movements, grid-lock, aggressive driver behavior, etc.).

Additionally, this analysis reflects a weekday evening commuter peak hour during the first week of the tournament when US Open patrons are departing the daytime event, patrons are arriving for the evening event and baseball fans are arriving for a Mets home game. These conditions reflect a worst case scenario which occurs infrequently, typically two to four times every other year.

Due to the infrequency and duration of the event, and the ability of the traffic management program and TEAs to adequately manage traffic flow and safety of all street users during the US Open, no mitigation measures beyond the continuous traffic management provided by the TEAs would be necessary.

Highway Network

Table 10-20 provide a summary of the results of the micro-simulation model analysis for the 2019 Future With Action condition. As indicated in the table, the vehicle demand analysis shows the critical roadway segment, which was operating above capacity in Future No-Action condition worsens under the Future With Action condition.

The results of the analysis under the Future With Action condition for the College Point Boulevard indicates that 1,679 of the total peak hour demand of 1,903 vehicles, or 88 percent, can be processed by the highway segment. The remaining 224 vehicles, or the unmet demand, would contribute to the queuing that currently extends along College Point Boulevard and into the park.

Vehicles merging from the Long Island Expressway approach would also experience greater delays due to the reduction in opportunities to merge. As indicated in the table, only 788 of the total peak hour demand of 1,499, or 53 percent, can be processed by the highway segment during the peak hour. The remaining 711 "unserved" vehicles, or unmet demand, would be processed outside of the peak hour and would contribute to congestion on the Long Island Expressway.

Table 10-20
2019 Future No-Action and Future With Action - Vehicle Demand Analysis

Design Year	Segment (Ramp Approach)	Demand Volume	Vehicles Served	Unmet Demand	Percent Served
Future No-Action	College Point Boulevard	1,624	1,588	36	98%
	Long Island Expressway	1,467	994	473	68%
Future With Action	College Point Boulevard	1,903	1,679	224	88%
	Long Island Expressway	1,499	788	711	53%
Change	College Point Boulevard	**+279**	**+91**	**+188**	--
	Long Island Expressway	**+32**	**-206**	**+238**	**--**
Future With Action With TEA metering	College Point Boulevard	1,679	1,683	0	100%
	Long Island Expressway	1,499	850	649	57%
Change	College Point Boulevard	**+55**	**+95**	**0**	**--**
	Long Island Expressway	**+32**	**-144**	**+176**	**--**

As a result of the proposed project, the volumes of unmet demand during the peak hour would increase by 188 vehicles at the College Point Boulevard approach and 238 vehicles at the Long Island Expressway merge.

In addition, a VISSIM analysis was conducted to reflect the TEA metering described above. Under this scenario, all of the College Point Boulevard demand would be met. However, while improved compared to the Future With Action scenario, there will continue to be unmet demand from the Long Island Expressway, which would be served outside the peak hour.

Table 10-21 provides a travel time comparison of the Future With Action and Future No-Action conditions for two routes within the highway segment under analysis. As indicated in the table, the average speed for the travel segment from the Long Island Expressway (LIE) to the westbound entrance to the Grand Central Parkway (GCP) would decrease from 11.1 miles per hour to 8.6 miles per hour. Comparably, the highway segment from College Point Boulevard to a point just past the Grand Central Parkway entrance ramp would experience a decrease in average speed from 11.8 miles per hour to 7.6 miles per hour. In addition, **Table 10-21** presents the travel times and speeds for the Future With Action with TEA metering. While travel times will continue to increase and speeds continue to decrease, there is still improvement compared to the Future With Action condition.

Table 10-21
2019 Future No-Action and Future With Action – Travel Time Analysis

Design Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Future No Action	LIE to GCP Westbound Entrance	2,911	179.0	11.1
	College Point Blvd. to mid-GCP	2,218	128.3	11.8
Future With Action	LIE to GCP Westbound Entrance	2,911	230.6	8.6
	College Point Blvd. to mid-GCP	2,218	197.7	7.6
Change	LIE to GCP Westbound Entrance	--	**+51.7**	**-2.5**
	College Point Blvd. to mid-GCP	--	**+69.3**	**-4.1**
Future With Action With TEA Metering	LIE to GCP Westbound Entrance	2,911	212.4	9.3
	College Point Blvd. to mid-GCP	2,218	181.9	8.3
Change	LIE to GCP Westbound Entrance	--	**33.4**	**-1.7**
	College Point Blvd. to mid-GCP	--	**53.5**	**-3.5**

The results are conservative since they do not reflect how congestion on the Long Island Expressway serves to meter the demand onto the Horace Harding Expressway. The design of the model assumes all drivers wanting to exit onto the Horace Harding Expressway can do so during the peak hour analysis period, without regard to traffic conditions on the Long Island Expressway. However, field observations and video surveys indicate congestion on the Long Island Expressway constrain this demand. The metering effect results in a reduction in the demand volume of vehicles exiting the Long Island Expressway. Although the results are more conservative by not accounting for these conditions, the methodology and findings of the analysis are appropriate to identify the incremental effects of the proposed project on the transportation network.

F. TRANSIT

Mass transit options serving the study area are provided by the NYCT and include the No. 7 subway line at the Mets-Willets Point station, Port Washington Branch trains at the Mets-Willets Point LIRR station during game days, and the Q19, Q48, and Q66 local bus routes. An analysis of subway station operations during the weekday PM peak period departure is presented below.

2011 EXISTING CONDITIONS—SUBWAY STATION OPERATIONS

As presented in **Table 10-4**, “Travel Demand Assumptions and Trip Generation Estimates,” the proposed project is expected to result in approximately 1,540 project-generated subway trips during the weekday PM peak period departure. These trips were all assigned to the Mets-Willets Point station and the corresponding station elements. As detailed in Section C, “Level 2 Screening Assessment,” the following station elements were identified for analysis:

- Station passageways to/from Manhattan (north platform) and the adjoining control area elements;
- Station stairways (P-2, P-4, P-10, and P-12) to/from Flushing (center platform) and the adjoining control area elements;
- Station stairway (P-6) to/from the southern platform; and
- Station passageway connecting the Passerelle ramp and the Mets-Willets Point station.

Field surveys conducted on August 31, 2011 during the hours of 4:00 to 8:00 PM provided the baseline volumes for the analysis of the above subway station elements. As shown in **Tables 10-22** and **Table 10-23**, all analyzed stairways, passageways, and control areas currently operate at acceptable levels during the weekday PM peak period departure.

Table 10-22
2011 Existing Conditions: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes Up	15-Minute Pedestrian Volumes Down	Surging Factor	Friction Factor	V/C Ratio	LOS
Manhattan Platform								
West Ramp Passageway	17.6	15.6	431	51	0.75	0.90	0.158	A
East Ramp Passageway	19.6	17.6	284	89	0.75	0.90	0.113	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	12	524	0.75	1.00	0.552	B
West Stair (P-10)	9.6	8.3	6	575	0.75	1.00	0.618	B
East Stair (P-4)	9.9	8.7	16	427	0.75	1.00	0.450	B
East Stair (P-2)	10.1	8.8	28	455	0.75	0.90	0.532	B
Stair to/from Southern Platform (P-6)	5.8	4.8	16	81	0.75	0.90	0.190	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,476	1,960	0.80	0.90	0.464	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-23
2011 Existing Conditions: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes Into Control Area	15-Minute Pedestrian Volumes Out from Control Area	Surging Factor	Friction Factor	V/C Ratio	LOS
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	284	89	0.75	0.90	0.14	A
Two-Way Turnstiles West	6	431	51	0.75	0.90	0.21	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	60	963	0.80	0.90	0.28	A
Two-Way Turnstiles West	6	18	1,099	0.80	1.00	0.36	A

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

2019 FUTURE NO-ACTION CONDITION—SUBWAY STATION OPERATIONS

As detailed in Section E, “Traffic,” the existing transit volumes were adjusted to reflect an 85th percentile attendance at a Citi Field event. Using trip generation assumptions presented in the

Shea Stadium Redevelopment FEIS (December 2001), a subway modal split of 31 percent and a peak period temporal distribution of 62 percent was used, resulting in an additional 1,539 subway trips being added to the subway network during the peak period. This corresponds to approximately 428 subway trips exiting the Mets-Willets Point subway station and entering Citi Field during the peak 15-minute period. Consistent with the *Willets Point FGEIS* (2008), it was assumed that 95 percent of the additional subway trips entering/exiting the station would be originating/ending in Manhattan, Brooklyn, or other areas in Queens, and the remaining 5 percent would be originating/ending in Flushing.

Estimates of peak period subway volumes in the 2019 No-Action condition were developed by applying the *CEQR Technical Manual* recommended annual background growth rates to the adjusted 85th percentile volumes. An annual compounded background growth rate of 0.5 percent was applied to the transit volumes from 2011 to 2016, and an annual compounded background growth rate of 0.25 percent was applied to the transit volumes from 2016 to 2019. In addition, trips associated with the *Willets Point Development Plan SEIS* Phase 1A No Action project were incorporated into the No-Action condition transit volumes.

The No-Action condition peak period volume projections were allocated to the transit analysis elements described above.

As shown in **Tables 10-24** and **Table 10-25**, all station stairways, passageways, and control area elements would continue to operate at acceptable levels during the weekday PM peak period departure.

Table 10-24
2019 Future No-Action Condition: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
			Up	Down				
Manhattan Platform								
West Ramp Passageway	17.6	15.6	524	65	0.75	0.90	0.193	A
East Ramp Passageway	19.6	17.6	346	108	0.75	0.90	0.137	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	13	685	0.75	1.00	0.719	C
West Stair (P-10)	9.6	8.3	7	750	0.75	1.00	0.806	C
East Stair (P-4)	9.9	8.7	18	555	0.75	1.00	0.583	B
East Stair (P-2)	10.1	8.8	32	590	0.75	0.90	0.687	B
Stair to/from Southern Platform (P-6)	5.8	4.8	18	107	0.75	0.90	0.246	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,525	2,025	0.80	0.90	0.480	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-25
2019 Future No-Action Condition: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
		Into Control Area	Out from Control Area				
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	346	108	0.75	0.90	0.17	A
Two-Way Turnstiles West	6	524	65	0.75	0.90	0.26	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	68	1,252	0.80	0.90	0.36	A
Two-Way Turnstiles West	6	20	1,434	0.80	1.00	0.47	B

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

2019 FUTURE WITH ACTION CONDITION—SUBWAY STATION OPERATIONS

The 1,540 PM peak period departure project-generated subway trips (see **Table 10-4**) were allocated to the transit analysis elements previously described. These trips were added to the projected 2019 No Action volumes to generate the 2019 With Action volumes for analysis.

As shown in **Tables 10-26** and **Table 10-27**, all station stairways, passageways, and control area elements would continue to operate at acceptable levels during the weekday PM peak period departure. Therefore, the proposed project would not result in any significant adverse subway impacts.

Table 10-26
2019 Future With Action Condition: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
			Up	Down				
Manhattan Platform								
West Ramp Passageway	17.6	15.6	755	65	0.75	0.90	0.266	A
East Ramp Passageway	19.6	17.6	500	108	0.75	0.90	0.181	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	19	685	0.75	1.00	0.724	C
West Stair (P-10)	9.6	8.3	10	750	0.75	1.00	0.808	C
East Stair (P-4)	9.9	8.7	27	555	0.75	1.00	0.590	B
East Stair (P-2)	10.1	8.8	48	590	0.75	0.90	0.700	B
Stair to/from Southern Platform (P-6)	5.8	4.8	27	107	0.75	0.90	0.260	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,953	2,025	0.80	0.90	0.530	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-27
2019 Future With Action Conditions: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
		Into Control Area	Out from Control Area				
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	500	108	0.75	0.90	0.22	A
Two-Way Turnstiles West	6	755	65	0.75	0.90	0.36	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	102	1,252	0.80	0.90	0.37	A
Two-Way Turnstiles West	6	29	1,434	0.80	1.00	0.47	B

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

G. VEHICULAR AND PEDESTRIAN SAFETY

Accident data for the study area intersections was obtained from the New York State Department of Transportation (NYSDOT) for the time period between January 1, 2009 and December 31, 2011. The data obtained quantify the total number of reportable accidents (involving fatality, injury, or more than $1,000 in property damage), fatalities, and injuries during the study period, as well as a yearly breakdown of pedestrian- and bicycle-related accidents at each location. According to the *CEQR Technical Manual*, a high pedestrian accident location is one where there were five or more pedestrian/bicyclist-related accidents or 48 or more reportable and non-reportable accidents in any consecutive 12 months of the most recent three-year period for which data are available. During the three-year period, a total of 221 reportable and non-reportable accidents were recorded along College Point Boulevard within the study area, an average of 74 accidents per year. Seventy-three accidents were recorded in 2009, 76 accidents in 2010 and 72 accidents in 2011. The eastbound and westbound intersections of Horace Harding Expressway at College Point Boulevard experienced a total of 101 accidents over the three-year period, or approximately 46-percent of the total 221 accidents. No fatalities were recorded; however, a total of 203 injuries including 10 pedestrian/bicyclist-related accidents were reported.

Based on a review of the accident data, the intersections within the study area are not identified as high-accident locations according to the *CEQR Technical Manual*. It should be noted the NYSDOT data did not distinguish between the eastbound and westbound Horace Harding Expressway; therefore, the two locations were conservatively analyzed as a single intersection. **Table 10-28** depicts total accident characteristics by intersection during the study period, as well as a breakdown of pedestrian and bicycle accidents by year and location.

Table 10-28
Accident Summary

Intersection		Study Period					Accidents by Year					
		All Accidents by Year					Pedestrian			Bicycle		
North-South Roadway	East-West Roadway	2009	2010	2011	Total Fatalities	Total Injuries	2009	2010	2011	2009	2010	2011
College Point Boulevard	Roosevelt Avenue	14	13	11	0	41	0	2	1	2	1	2
College Point Boulevard	Avery Avenue	3	0	5	0	11	0	0	0	0	0	0
College Point Boulevard	Fowler Avenue	2	3	4	0	10	0	0	0	0	0	0
College Point Boulevard	Booth Memorial Ave.	2	8	2	0	4	0	0	0	0	1	0
Lawrence Street	57th Avenue	1	0	0	0	0	0	0	0	0	0	0
College Point Boulevard	57th Road	8	17	13	0	40	0	0	0	0	0	0
College Point Boulevard	58th Avenue	3	1	1	0	4	0	0	0	0	0	0
College Point Boulevard	58th Road	4	2	2	0	4	0	0	0	0	0	0
College Point Boulevard	59th Avenue	0	0	0	0	0	0	0	0	0	0	0
College Point Boulevard	60th Avenue	1	0	0	0	1	0	0	0	0	1	0
College Point Boulevard	Horace Harding Expressway	35	32	34	0	88	0	0	0	0	0	0
TOTAL	--	73	76	72	0	203	0	2	1	2	3	2

Notes: NYSDOT does not distinguish between Horace Harding Expressway Eastbound and Westbound service roads
Source: NYSDOT

H. PARKING

Parking needs were evaluated for two conditions: (1) parking during the US Open under the Future With Action scenario and (2) parking needs on a daily basis outside the US Open period.

As previously discussed, there are approximately 2,798 permit spaces and 3,841 general parking spaces available for US Open staff, vendors, and patrons in Flushing Meadows Corona Park. Parking supply at the NTC would be increased by 389 spaces with the construction of parking structures on Lots A and B.

As indicated in **Table 10-4**, the proposed program would result in a daily increase of 1,288 autos during the daytime session of the US Open. It was estimated that 193 vehicles, or 15 percent, would be assigned to the permit parking Lot H. Approximately 580 vehicles, or 45 percent would be assigned to General Parking Lots #4, 5, 6, and 7, and the remaining 515 vehicles, or 40 percent would be assigned to General Parking Lots #1, 2, and 3.

Lot H has a capacity of 865 spaces and historically does not exceed 2/3 capacity, or 577 spaces occupied. Therefore, a minimum of 288 spaces are available to accommodate the estimated additional demand of 193 vehicles.

General Parking Lot #1 is generally not used for event parking and could accommodate 450 of the 515 vehicles assigned to General Parking Lots #1, 2, and 3. The remaining demand of 65 spaces can be accommodated among Lot #2 and Lot #3. Lot #2 has a capacity of 500 spaces, and Lot #3 has a capacity of 800 spaces. The additional 65 parking spaces would result in a 5 percent demand on the combined parking inventory.

General Parking Lots #6 and #7 are also infrequently used and have capacities of 250 and 404 spaces, respectively. Combined, the 654 parking spaces in these lots could accommodate the remaining 580 spaces. However, it should be noted that General Parking Lot #7 is immediately adjacent to the Flushing Meadows Corona Park Boathouse on Meadow Lake. Recent renovations to the Boathouse have increased activity and programming on Meadow Lake and subsequently increased the usage of the parking lot. Therefore, additional coordination and advance planning will be required should the parking lot be designated for US Open use in the future.

Based on a review of historical data, interviews with the NYPD staff managing the parking lots and informal parking lot counts, the USTA parking facilities rarely exceed 85 percent capacity during the US Open. Additionally, it is important to note the availability of an estimated 300 to 400 partially paved parking spaces under the Van Wyck Expressway adjacent to Lot #4 and Lot #6. An estimated 50 to 60 spaces are also available parallel to Meadow Drive between parking Lot #4 and Lot #5. Overall, there is sufficient parking inventory available to accommodate the estimated increase in demand.

During non-event conditions, parking Lots A and B are designated to serve the every day needs of the NTC, including administrative, facility and park users, as well as visitors. Lot A has a capacity of 200 spaces, and Lot B has a capacity of 104 spaces. Both surface lots are currently often over capacity with double parking. In addition, overflow parking occurs along the park roadways, and on the grass areas under and adjacent to the Passerelle ramp.

During event conditions, the US Open parking Lots A and B are designated for suite holders, sponsors and executive staff. Parking Lot A also serves as a pickup and drop-off location for participants during the US Open. Under the proposed project, new parking garages would be constructed expanding the capacity of Lots A and B by approximately 223 spaces and 166 spaces, respectively. The proposed Lot A would consist of a 2-story garage accommodating 423 vehicles with approximately 6,500 square feet designated for a traffic management center. The center would be used primary by NYPD staff and TEAs and would be most active in the weeks leading up to and including the US Open. Currently, the NYPD operate out of a temporary trailer and guard house located across from Lot A. The proposed Lot B would serve as a 3-story garage accommodating 270 vehicles.

The proposed construction of two new parking garages in place of the currently surface lots will provide for additional parking spaces to satisfy the existing and future daily demand experienced for year-round operations at the NTC. ✷