2.10-1 INTRODUCTION

This section of Chapter 2 provides a quantitative analysis of the anticipated traffic with Project 1, Shaft and Bypass Tunnel Construction, and describes the potential temporary impacts on the transportation network that could result during construction. The analysis identifies the relative duration of construction activities (focusing on traffic conditions during the most active periods of construction, or peak construction conditions) and assesses the potential effects of construction-related traffic at key intersections near the west and east connection sites in two separate study areas in Orange and Dutchess Counties, NY, respectively. This section also describes the total numbers of Project 1 construction-related worker vehicle trips and truck trips.

As detailed below in section 2.10-2.1, the two study areas for this analysis were identified to characterize the effects of Project 1 construction at the west connection site and the east connection site. One study area is west of the Hudson River in Orange County (also referred to in this section as the "west of Hudson study area"), and the other is east of the Hudson in Dutchess County (the "east of Hudson study area"). The study areas for the traffic and transportation analyses were established based on expected traffic volumes, logical traffic routes, and congested locations that would be potentially affected by the construction traffic from Project 1.

Section 2.19, "Mitigation," defines the potential mitigation measures proposed for intersections that would experience predicted temporary significant adverse impacts. Suggested traffic mitigation measures would comprise signal timing changes, upgrading traffic signal controller and detectors at some intersections, a Traffic Management Plan (which would include an outreach/communication plan with the towns, schools, police, and other area agencies) for the connection sites and west of Hudson and east of Hudson study areas, roadway pavement monitoring on local roads accessed by trucks for the east connection site, potential additional signage (including no parking signs), and clearing some vegetation in the right-of-way near a few intersections in the east of Hudson study area.

The rest of Section 2.10 is organized as follows:

- Section 2.10-2 describes the methodology employed to analyze potential temporary traffic impacts from Project 1.

- Sections 2.10-3 and 2.10-4 analyze potential temporary traffic impacts from construction, compare projected future conditions in the two study areas—both with and without Project 1—and also describe the existing operating conditions of the two study areas' transportation systems. These transportation systems include the roadway network and traffic conditions, on- and off-street parking, accident rates, public transit availability and capacity (i.e., bus service), and pedestrian conditions (pedestrian safety, in particular) along truck routes.
- Section 2.10-5 presents conclusions.

2.10-2 METHODOLOGY

Guidelines from *New York City Environmental Quality Review (CEQR) Technical Manual* (January 2012) were followed for the technical methodologies and procedures required to perform the traffic and transportation analyses. This methodology was adopted because the established guidelines are recognized to be conservative and provide consistency in evaluating potential impacts at the various locations examined in the two study areas. Based on trip generation estimates and traffic assignment patterns for the construction-related traffic, geographic study areas were identified and intersections were selected for detailed study and analysis. Details on specific methodologies followed in this section of the EIS are presented below.

2.10-2.1 STUDY AREA CHARACTERIZATION

As mentioned earlier, the traffic analysis has been divided into two study areas because of Project 1's large geographical area and the distance between the west and east connection sites.

The west of Hudson study area is located in the Town of Newburgh and includes intersections along roadways close to the west connection site, including U.S. Route 9W, Old Post Road, and Lattintown Road (see **Figure 2.10-1**).

The east of Hudson study area is located in the Town of Wappinger, Town of Fishkill, and Village of Fishkill and includes intersections along roadways close to the east connection site, including New York State (NYS) Route 9D, Chelsea Road, and Old State Road (see **Figure 2.10-2**).

2.10-2.2 TRAFFIC ANALYSES

The 2000 *Highway Capacity Manual (HCM 2000)*, which is the national standard methodology utilized by traffic engineers to analyze intersection operations, was used to analyze the operational conditions of intersections within the two study areas for existing conditions and future conditions with and without Project 1, Shaft and Bypass Tunnel Construction. Whereas the *CEQR Technical Manual* provides guidance for data collection and analysis strategies, the *HCM 2000* procedures contain the actual intersection operation analysis methodologies. The *HCM 2000* procedures provide methods for evaluating signalized and unsignalized intersections,

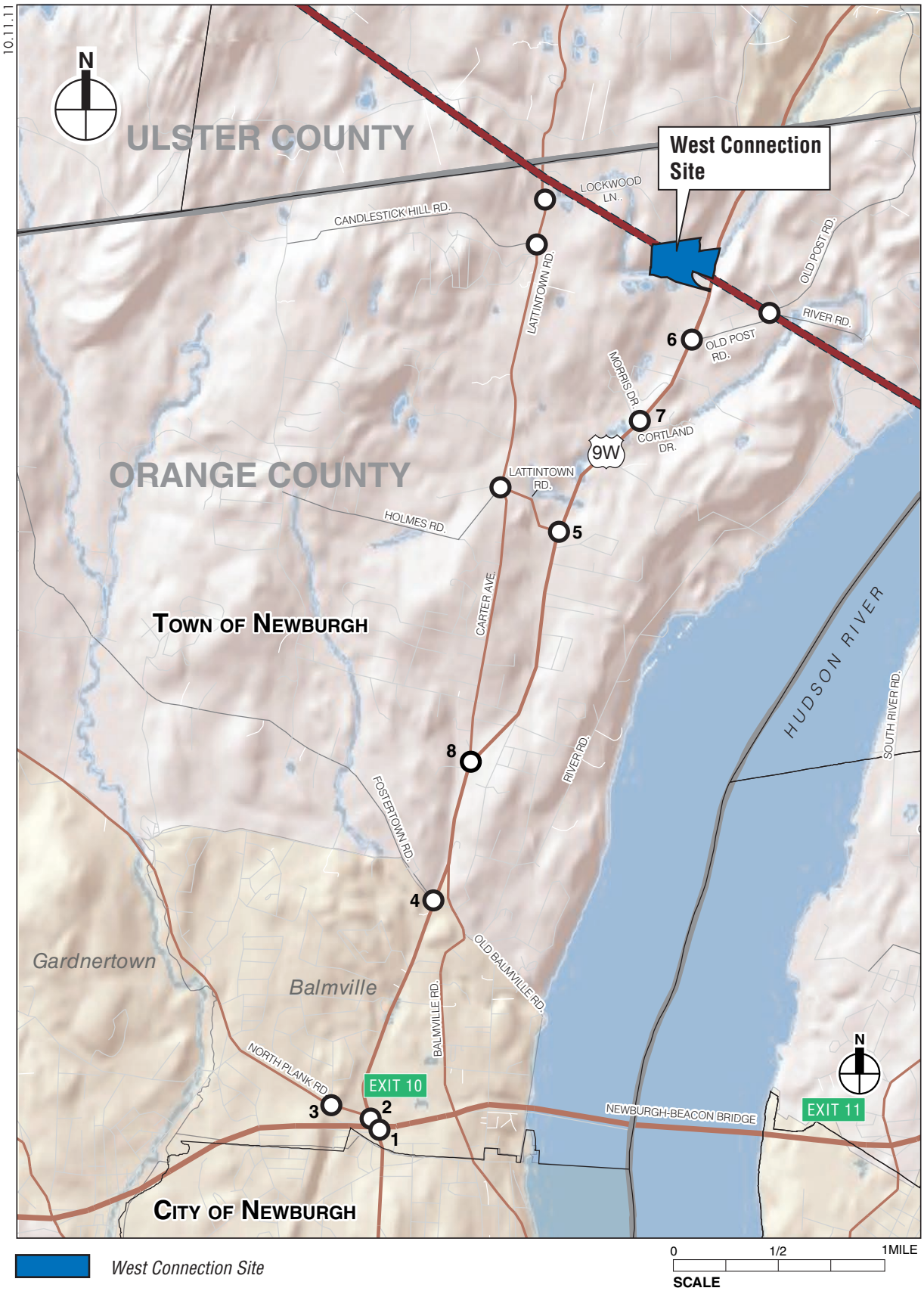


Figure 2.10-1

Traffic Study Area
West of Hudson Study Area

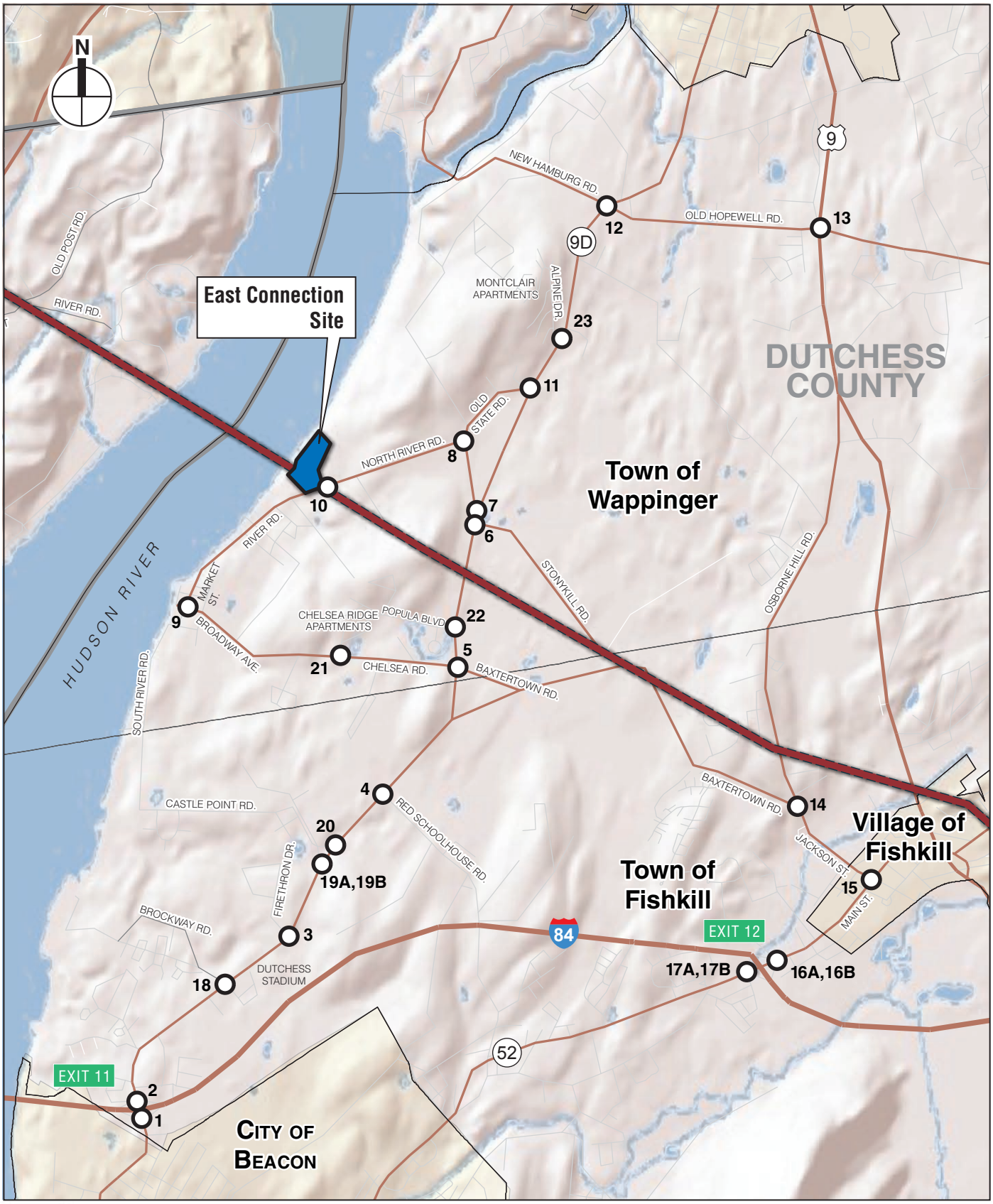


Figure 2.10-2

Traffic Study Area
East of Hudson Study Area

as described below. (At the time the EIS was developed, the *HCM 2010* was the most recent version of the *Highway Capacity Manual*. Since that time, the New York State Department of Transportation (NYSDOT) has directed all traffic consultants to continue utilizing the *HCM 2000*. The changes incorporated in the *HCM 2010* were reviewed as part of this assessment, and the changes between the *HCM 2000* and *HCM 2010* were not consequential for the analyses performed for this study, and no changes to the determination of temporary significant adverse impact predictions would have occurred if the *HCM 2010* was used.)

Next, this section identifies the street system and data collection effort undertaken for the traffic analyses.

SIGNALIZED INTERSECTION CAPACITY ANALYSIS METHODOLOGY

The operation of intersections with traffic lights (called "signalized intersections") in the study areas was analyzed applying the Percentile Delay Methodology included in the Synchro traffic signal software. Official signal timings (field adjusted where necessary) were obtained from the NYSDOT and used in Synchro modeling, including any intersections identified as being part of a linked system. This methodology builds on the methodology presented in the *HCM* 2000 for signalized intersections and accounts for variations in traffic flow that often occur with actuated signals.[1] This procedure evaluates signalized intersections for average control delay per vehicle and level of service (LOS).

LOS for the signalized intersections is based on the average control delay per vehicle for the various lane group movements within the intersection. Control delay comprises the amount of time the stopped vehicle is at the intersection, along with the delays experienced by the vehicle moving at slower speeds at intersection approaches as the vehicle moves up in the queue or slowing down while approaching an intersection. This delay is the basis for a LOS determination for individual lane groups, each approach as a whole, and the overall intersection.

The control delay criteria for the range of service levels for signalized intersections are shown in **Table 2.10-1**. The control delay criteria for the Percentile Delay Methodology utilized in Synchro is identical to the control delay criteria used in the *HCM* methodology.

[1] An actuated signal is a traffic signal with timed limits for intersection movements that can automatically adjust timing for each part of an intersection depending on where traffic demand is highest.

Table 2.10-1
LOS Criteria for Signalized Intersections

Level of Service (LOS)	Control Delay Per Vehicle
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.

Although the *HCM 2000* methodology calculates a volume-to-capacity (v/c) ratio[2], there is no strict relationship between v/c ratios and LOS as defined in the *HCM*. A high v/c ratio indicates that high amounts of traffic for a particular roadway pass through an intersection. But a high v/c ratio does not necessarily mean that a roadway is overly congested. A high v/c ratio combined with low average delay indicates that there is optimal traffic flow at an approach or entire intersection, where traffic is processed close to its theoretical maximum with minimum delay for vehicles (processing high volumes of traffic with low delays reflects optimal traffic conditions during the peak hours). However, very high v/c ratios, especially those greater than 1.0, are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, green time, and progression (which is the coordination of signal timings so that a group of vehicles traveling on a street arrive at a succession of green lights and proceed through multiple intersections without stopping). LOS A and LOS B indicate good operating conditions with minimal delay. At LOS C, the number of vehicles stopping at an intersection is greater, 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 LOS F reflect poor service levels, and cycle breakdowns (when traffic cannot be fully processed through an intersection in one signal cycle length, e.g., cars pull up to a red light, it turns green, but it turns red again at least once before they can go through the intersection) are frequent.

For developed areas, such as the roadway network within Project 1's two study areas, a mid-range LOS D or better generally indicates acceptable operating conditions. The *HCM* methodology calculates a summary of the total intersection LOS. The analysis chooses the two worst-case movements and calculates a single critical v/c ratio, delay, and LOS.

UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS METHODOLOGY

In contrast, this section also assesses the LOS criteria for intersections without a traffic light (unsignalized intersections), summarized in **Table 2.10-2**. For this analysis, control delay is de-

[2] A v/c ratio is a comparison of the amount of traffic volume traveling on any given roadway to the total capacity that roadway has to handle traffic. The higher the v/c ratio, the more congested the roadway is.

fined as the total elapsed time required for all the following, including initial deceleration delay (delay from vehicles slowing down as they approach an intersection), queue move-up time (time spent moving forward in a line of vehicles after having come to a complete stop), stopped delay (delay from vehicles sitting at an intersection approach), and final acceleration delay (delay from accelerating from a complete stop to free-flow conditions speed). The average control delay for any particular minor movement is the result of the capacity of any given approach and how saturated it is with traffic. For unsignalized intersections, the Synchro traffic signal software only uses the *HCM* methodology for intersection analysis.

Table 2.10-2
LOS Criteria for Unsignalized Intersections

Level of Service (LOS)	Control Delay Per Vehicle
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.

Note that the LOS criteria for unsignalized intersections are somewhat different from the criteria used in signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. In addition, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax at a red light, whereas drivers on the minor approaches at an unsignalized intersection must remain attentive to identifying acceptable gaps in roadways they wish to turn into to avoid other oncoming vehicles. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than at signalized intersections. For these reasons, the total delay threshold for any given LOS is less for an unsignalized intersection than for a signalized intersection. For developed areas, such as the roadway network within Project 1's two study areas, mid-range LOS D or better generally indicates acceptable operating conditions.

ROADWAY NETWORK WITHIN THE STUDY AREAS

Each of the two study areas encompasses the roadways that vehicles traveling to and from a connection site are most likely to use. Both study areas include an interstate highway, New York State highways, county routes, several arterial roadways, and local streets. The major roadways in each of the study areas are presented below:

West of Hudson Study Area

- Interstate 84
- U.S. Route 9W
- County Route 11 (Lattintown Road)
- County Route 32 (North Plank Road)
- Old Post Road
- River Road
- Carter Avenue

East of Hudson Study Area

- Interstate 84
- U.S. Route 9
- NYS Route 9D
- NYS Route 52 (Main Street)
- County Route 34 (Jackson Street and Baxtertown Road)
- County Route 92 (Chelsea Road)
- County Route 28 (Old Hopewell Road and New Hamburg Road)
- Stonykill Road
- Old State Road
- River Road North

DATA COLLECTION PROGRAM

For this study, existing conditions are based on traffic volumes and intersection geometric data (e.g., lane widths, pavement markings and lane designations, crosswalk locations, etc.) collected over a five-day period in mid-December 2010 and mid-September 2011.

The data collection included manual turning movement counts (MTMCs – counts of vehicles turning left, right, or proceeding straight through at an intersection), automatic traffic recorder (ATR) counts (roadway volumes collected by tubes laying across the road connected to machines for several days), and vehicle classification counts (counts of vehicles by type – autos, light trucks, or heavy trucks). MTMCs were collected on Tuesday, December 14; Wednesday, December 15; and Thursday, December 16, 2010, for the following peak periods:

- Weekday AM peak period—6 AM to 9 AM and
- Weekday PM peak period—2 PM to 8 PM.

Additional MTMCs were conducted on Tuesday, September 13 and Thursday, September 15, 2011, for the same peak periods described above.

The MTMCs were conducted at the following locations:

West of Hudson Study Area

- U.S. Route 9W at I-84 Eastbound Entrance and Exit Ramps
- U.S. Route 9W at North Plank Road/I-84 Westbound Exit Ramp
- North Plank Road at I-84 Westbound Entrance and Exit Ramps
- U.S. Route 9W at Fostertown Road (County Route 86)
- U.S. Route 9W at Lattintown Road
- U.S Route 9W at Morris Drive/Cortland Drive
- U.S. Route 9W at Old Post Road/Magyar Drive
- U.S. Route 9W and Carter Avenue
- U.S. Route 9W at Project Site Driveway (future with Project 1 conditions only, see section 2.10-3.3)
- Old Post Road at River Road[3]
- Lattintown Road at Carter Avenue[3]
- Lattintown Road at Holmes Road[3]
- Lattintown Road at Candlestick Hill Road[3]
- Lattintown Road at Lockwood Lane[3]

East of Hudson Study Area

- NYS Route 9D at I-84 Eastbound Entrance and Exit Ramps
- NYS Route 9D at I-84 Westbound Entrance and Exit Ramps
- NYS Route 9D at Dutchess Stadium/Retail Driveway
- NYS Route 9D at Red School House Road (County Route 36)
- NYS Route 9D at Chelsea Road (County Route 92)/ Baxtertown Road (County Route 34)
- NYS Route 9D at Stonykill Road
- NYS Route 9D at Old State Road (Southern Intersection)
- Old Post Road at River Road North
- Broadway at Market Street

[3] This intersection was among several originally identified in the proposed program's Draft Scope of Work (Draft Scope) as a key location requiring traffic analysis to determine the potential impacts from Project 1 construction. However, since publication of the Draft Scope, DEP has agreed to acquire the west connection site properties on Route 9W. Therefore, no major construction traffic is expected at this particular intersection, and it was not analyzed in this EIS. See section 2.1-3.3 for more details.

- River Road North at East Connection West Driveway (Site Driveway)
- NYS Route 9D at Old State Road (Northern Intersection)
- NYS Route 9D at New Hamburg Road/Old Hopewell Road (County Route 28)
- U.S. Route 9 at Old Hopewell Road (County Route 28)
- Baxtertown Road (County Route 34) and Osborne Hill Road (County Route 35)/Jackson Street
- Jackson Street and NYS Route 52
- I-84 Westbound Ramps and NYS Route 52
- I-84 Eastbound Ramps and NYS Route 52
- NYS Route 9D at Brockway Road/Pappas Lane
- NYS Route 9D at Castle Point Road
- NYS Route 9D at Old Castle Point Road
- Chelsea Road at Chelsea Ridge Drive
- NYS Route 9D at Popula Boulevard (Chelsea Ridge Apartments)
- NYS Route 9D at Alpine Drive (Montclair Apartments)

In addition to the MTMCs, ATR counts were conducted for 24-hour periods for 12 days. The scheduling of the ATR counts was conducted to coincide with the dates of the manual counts as well as include two weekends. The ATR counts were performed starting on Saturday, December 11, 2010, through Wednesday, December 22, 2010, at the following locations:

West of Hudson Study Area

- U.S. Route 9W, South of Old Post Road
- Lattintown Road, West of U.S. Route 9W
- Lattintown Road, North of Holmes Road, Carter Road

East of Hudson Study Area

- NYS Route 9D, North of Red School House Road
- Chelsea Road (County Route 92), Near Chelsea Ridge Apartments
- North River Road, North of Existing Shaft 6 Site

The vehicle classification counts were performed on each side of the Hudson River at the following representative locations:

West of Hudson Study Area

- U.S. Route 9W at Fostertown Road (County Route 86)
- U.S. Route 9W at Lattintown Road

East of Hudson Study Area

- NYS Route 9D at Chelsea Road (County Route 92)/ Baxtertown Road (County Route 34)

Additional ATR counts were conducted for 24-hour periods for nine days in mid-September 2011 at the following locations:

East of Hudson Study Area

- NYS Route 9D, South of Old Hopewell Road (County Route 28) – Volumes and Speeds
- NYS Route 9D, Between Both Legs of Old State Road – Volumes and Speeds
- Broadway Avenue, East of Market Street – Volumes and Speeds
- Market Street, Just North of Broadway – Volumes
- NYS Route 9D, North of Dutchess Stadium – Volumes
- NYS Route 9D, South of Dutchess Stadium –Volumes

Appendix 2.10, "Transportation," provides field measured geometries and summaries of the data collected.

TRAFFIC VOLUME NETWORKS

To develop the existing condition traffic volumes for the two study areas' intersections, traffic volumes from the MTMCs were adjusted using adjacent roadway ATR counts to ensure consistency in traffic volume data between the two types of counts. The resulting intersection turning movement volumes represent average mid-weekday volumes as the *CEQR Technical Manual* specifies the use of Tuesday, Wednesday, and Thursday traffic volume data for weekday traffic analysis. Since the intersections evaluated represent only a portion of the roadways in the study area, the turning movement volumes of adjacent intersections may not balance (i.e., the traffic exiting one study intersection may not equal the traffic entering the adjacent study intersection). This is due to several possible factors, including other intersecting roads and residential and commercial entrances between study area intersections. Therefore, ATR volume and turning movement counts were examined to assess variations in study area traffic volumes. An examination of the traffic data collected reveals that the peak traffic volumes for both the AM and PM periods generally occur at:

- AM peak hour—7:15 AM to 8:15 AM
- PM peak hour—4:30 PM to 5:30 PM

Traffic volumes outside of these hours are generally lower than the peak hour volumes. The off-peak hours generally have between 15 percent and 95 percent less traffic than the peak hour volumes.

As noted in Section 2.1, "Project 1, Description of Project 1 Construction Program," there would be multiple work shifts by phase of construction. However, in general, 8-hour work shifts are

expected much of the time, and the time periods for the construction worker shifts are generally expected to be 7 AM to 3 PM for the first shift, 3 PM to 11 PM for the second shift (when needed), and 11 PM to 7 AM for the third shift (when needed). Since it was desired to undertake a conservative assessment of the potential impacts from construction-related traffic, the period with the greatest commuter traffic in the AM and PM periods was employed to determine the potential impacts from construction-related traffic.

See sections 2.10-3.1 and 2.10-4.1 for existing traffic volumes in the west and east of Hudson study areas, respectively.

2.10-2.3 PUBLIC TRANSIT

Similar to the vehicular traffic analysis, two public transit study areas were delineated by noting the bus lines and stops within reasonable walking distance of both the west connection site and east connection site. During Project 1's construction period, construction workers are assumed to all travel by private automobile; therefore, a bus transit analysis was not conducted, since there are no conditions anticipated in which the volumes of bus trips would exceed the *CEQR Technical Manual* threshold warranting additional analysis.

However, general information on the bus routes that serve the study areas was collected from the Orange County Department of Transportation and the Dutchess County Department of Transportation. This information is presented in Appendix 2.10.

WEST OF HUDSON

Mass transit is available in the study area, although mainly concentrated in the southern portion of the study area near the City of Newburgh. Local and express routes are operated in the study area by the Newburgh/Beacon Bus Corporation (Leprechaun Lines), Ulster County Area Transit, Coach USA/Shortline, and Adirondack Trailways. Local bus service in the study area is primarily limited to the Newburgh/Beacon Bus Corporation North Side Line, which operates along North Plank Road. The Newburgh-Beacon Shuttle provides service to the Beacon Metro-North Railroad Station. Only the Adirondack Trailways express line with service to Kingston traverses the length of Route 9W within the study area. Detailed maps of these routes can be found in Appendix 2.10. Paratransit and Dial-A-Ride bus services are also available in the area.

To ensure a conservative analysis and because mass transit facilities are relatively far from and not easily accessible to the west connection site (the nearest bus stop is over 2 miles away), this analysis assumes that all Project 1 construction workers would drive to the site in their own vehicles. The analysis also assumes that there would be no increase in demand for transit services with Project 1 construction and, therefore, no new riders would be added to buses operating in the area.

EAST OF HUDSON

The Dutchess County LOOP system offers local bus service in the study area. Bus service is provided along NYS Route 9D, U.S. Route 9, NYS Route 52, and County Route 28 via the following Routes: Route A, Route B, Route F, the Beacon RailLink route, and the New Hamburg RailLink route. Detailed maps of these routes can be found in Appendix 2.10. There are no bus stops within walking distance of the east connection site. Paratransit and Dial-A-Ride bus services are also available in the area.

Metro-North Railroad has two stations in the area, Beacon Station and New Hamburgh Station.

To ensure a conservative analysis and because mass transit facilities are relatively far from and not easily accessible to the east connection site, this analysis assumes that all Project 1 construction workers would drive to the site in their own vehicles. The analysis also assumes there would be no increase in demand for transit services with Project 1 construction and, therefore, no new riders would be added to buses or commuter rail operating in the area.

2.10-2.4 SCHOOL BUS OPERATIONS

A review of school bus operations in the two study areas indicates that student pick-up and drop-off times during the AM and PM peak periods may generally coincide with Project 1's construction worker shift change. ~~Student pick-up and drop-off times during the PM peak period would generally not coincide with the expected construction worker shift change.~~

Student pick-up and drop-off location data in the immediate vicinity of the west and east connection sites was obtained from the local school districts in Orange and Dutchess Counties, respectively.

Meetings were conducted with the following districts:

WEST OF HUDSON

- Marlboro Central School District
- Newburgh Enlarged City School District

EAST OF HUDSON

- Beacon City School District
- Wappingers Central School District

Information was obtained regarding school bus hours of operation, school bus routes, and bus stop locations. To ensure safe operating conditions (construction- and school bus-related traffic) during construction, a Traffic Management Plan (TMP) has been developed; see Section 2.19, "Mitigation."

2.10-2.5 PEDESTRIAN CONDITIONS

Pedestrian volumes on the streets adjacent to the west and east connection sites are generally very low. All Project 1 construction workers are assumed to travel by private automobile; therefore, a pedestrian analysis was not conducted, since there are no conditions in which the volume of pedestrian trips would exceed the *CEQR Technical Manual* threshold warranting additional analysis. There is minimal pedestrian traffic in the vicinity of both connection sites. There are also no sidewalks along the roadways near the sites.

2.10-2.6 SAFETY

To perform the safety analysis for the two study areas, accident records were reviewed. The accident reports for the most recently available three-year period were collected from the NYSDOT as well as state and local police departments (e.g., New York State Police, Dutchess County Sherriff, Town of Newburgh Police Department, and the Dutchess County Department of Public Works [DPW]). The purpose of reviewing the accident reports was to determine whether there are any "high-accident locations" (HALs) in the study areas. A HAL is defined by the *CEQR Technical Manual* as a location with 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclists injury crashes in any consecutive 12 months of the most recent three-year period for which data is available.

2.10-3 WEST OF HUDSON

2.10-3.1 EXISTING CONDITIONS—WEST OF HUDSON

This section presents the existing traffic volumes and the operation of the various intersections and their approaches and lane groups in the west of Hudson study area based on their ability to process traffic as calculated using *HCM* methodologies. In addition, this section describes existing parking, pedestrian, and public transit facilities and conditions near the west connection site, and summarizes recent accident data collected in the study area to determine whether there are any problematic locations.

TRAFFIC VOLUME NETWORKS

Figures 2.10-3 and **2.10-4** present the weekday AM and PM peak hour traffic volumes for existing conditions for the west of Hudson study area.

CAPACITY ANALYSIS RESULTS

Table 2.10-3 presents the existing conditions LOS summary for the intersections in the west of Hudson study area.

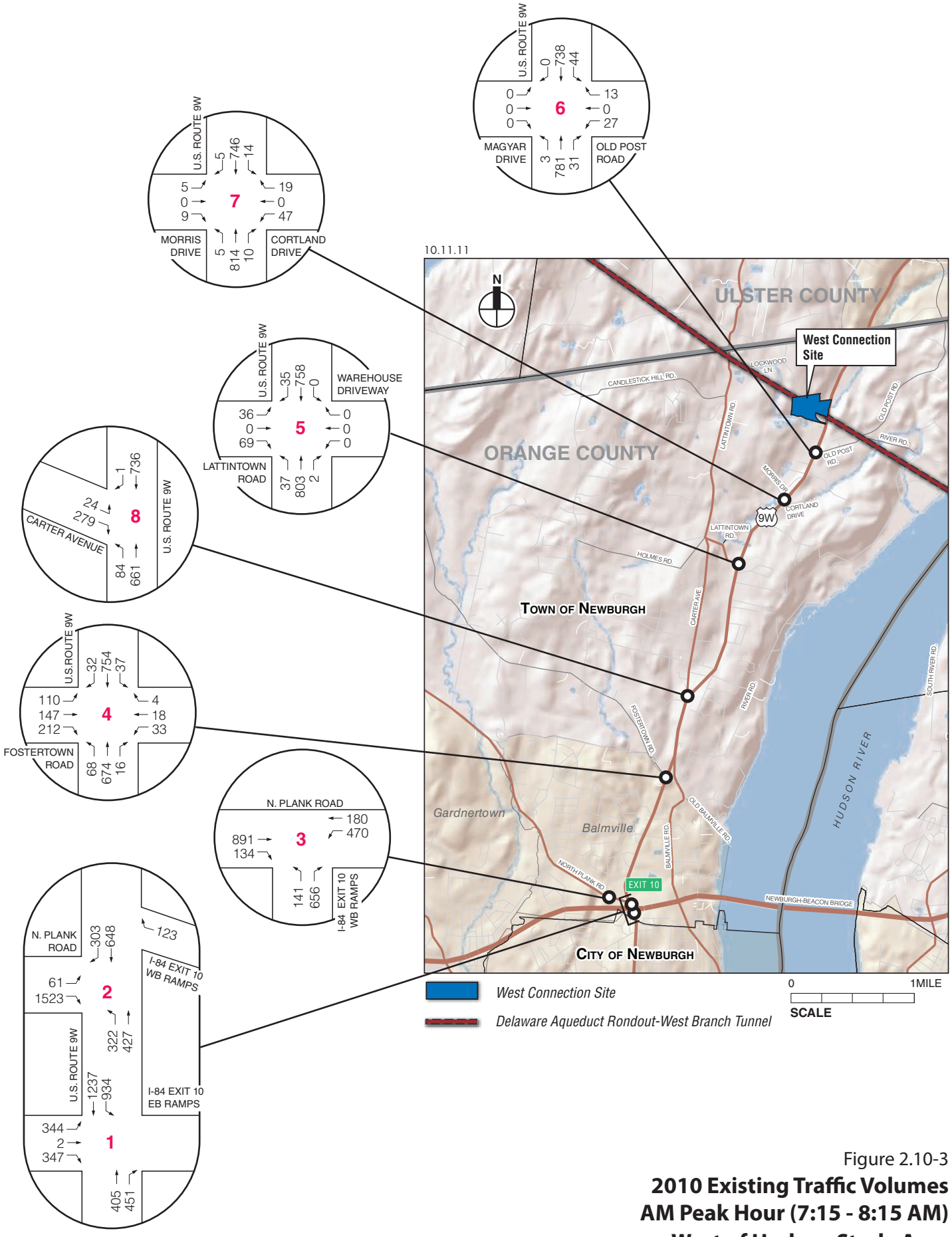


Figure 2.10-3

2010 Existing Traffic Volumes
AM Peak Hour (7:15 - 8:15 AM)
West of Hudson Study Area

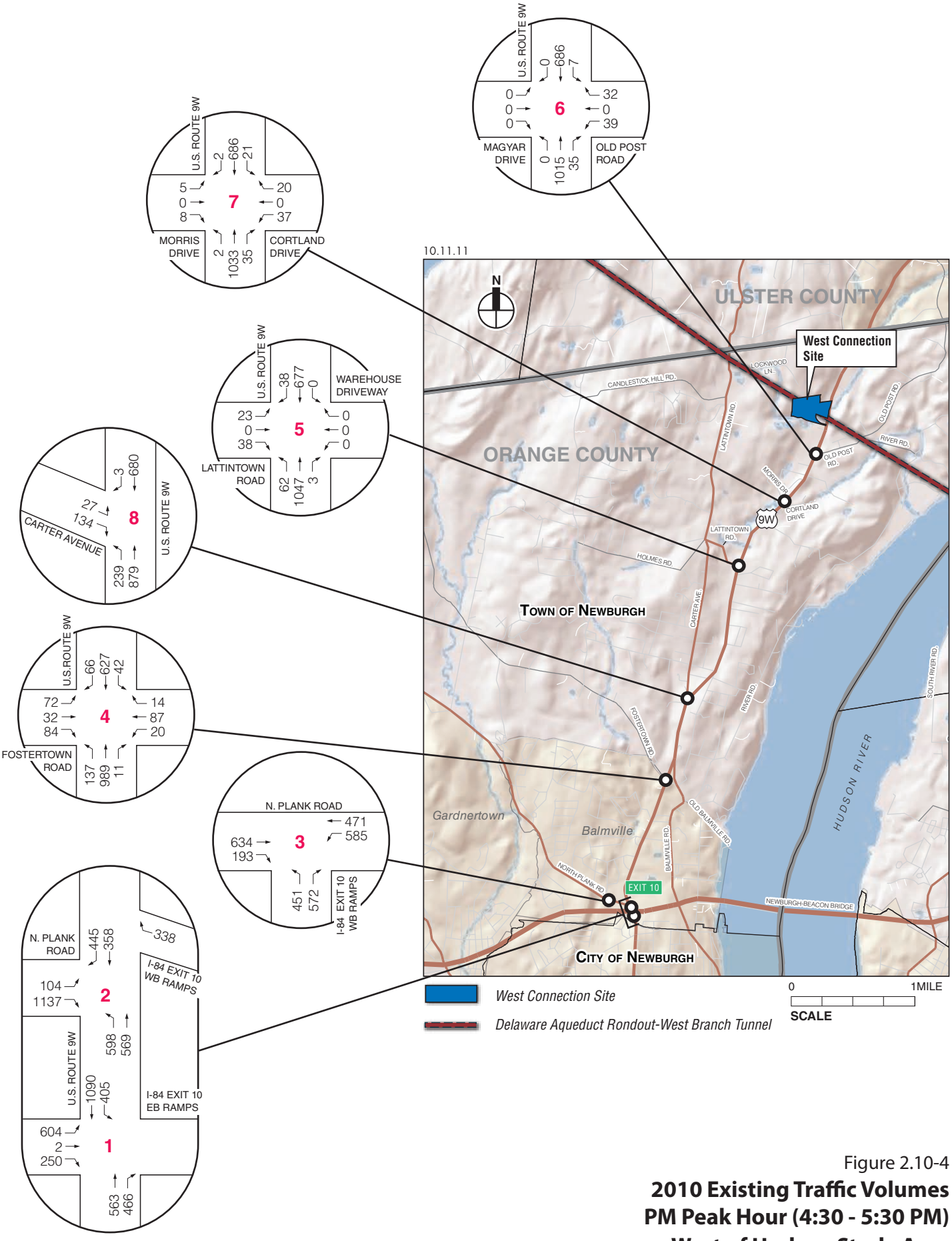


Figure 2.10-4

2010 Existing Traffic Volumes
PM Peak Hour (4:30 - 5:30 PM)
West of Hudson Study Area

Table 2.10-3
2010 Existing Conditions LOS Summary, West of Hudson Study Area

No.[1]	Intersection	Approach	Lane Group	7:15 - 8:15 AM V/C Ratio	7:15 - 8:15 AM Delay (SPV)	7:15 - 8:15 AM LOS	4:30 - 5:30 PM V/C Ratio	4:30 - 5:30 PM Delay (SPV)	4:30 - 5:30 PM LOS
Signalized Intersections									
1	Route 9W (N-S) & I-84 EB Ramps	EB	L	0.56	38.2	D	0.79	46.0	D
			LT	0.55	37.6	D	0.77	43.8	D
			R	0.98	70.4	E	0.56	24.3	C
		NB	T	0.40	24.4	C	0.43	22.4	C
			R	0.59	5.9	A	0.53	4.6	A
		SB	L	1.09	77.3	E	0.69	35.3	D
			T	0.60	8.1	A	0.54	7.4	A
		INT			35.8	D		20.8	C
2	Route 9W (N-S) & N. Plank Rd./I-84 WB Off Ramp	EB	L	0.14	25.4	C	0.36	35.4	D
			R	1.00	156.0	F	0.83	16.7	B
		WB	R	0.19	0.6	A	0.63	9.4	A
		NB	L	0.36	34.6	C	0.82	49.2	D
			T	0.21	9.4	A	0.24	11.0	B
		SB	T	0.77	37.0	D	0.25	16.2	B
			R	0.48	5.4	A	0.50	3.5	A
		INT			81.7	F		19.2	B
3	N. Plank Road (E-W) & I-84 WB Ramps	EB	T	1.08	79.0	E	0.98	67.8	E
			R	0.18	9.9	A	0.31	12.2	B
		WB	L	0.72	38.7	D	0.83	52.6	D
			T	0.15	4.3	A	0.45	13.2	B
		NB	L	0.59	44.1	D	0.93	66.7	E
			R	0.43	0.8	A	0.35	0.6	A
		INT			39.5	D		38.9	D
4	Route 9W (N-S) & Fostertown Road	EB	LTR	1.33	188.0	F	0.75	44.4	D
		WB	LTR	0.26	27.3	C	0.46	34.5	C
		NB	L	0.41	41.5	D	0.60	47.6	D
			TR	0.83	29.0	C	1.00	48.6	D
		SB	L	0.26	39.9	D	0.26	43.9	D
			TR	1.12	93.7	F	0.86	32.9	C
		INT			93.3	F		42.3	D
8	Route 9W (N-S) & Carter Avenue	EB	LR	0.76	21.8	C	0.57	15.7	B
		NB	L	0.35	6.2	A	0.79	26.0	C
			T	0.62	7.5	A	0.73	9.5	A
		SB	TR	0.82	19.1	B	0.80	18.4	B
		INT			14.5	B		15.2	B
Unsignalized Intersections									
5	Route 9W (N-S) & Lattintown Road	EB	LTR	0.86	101.5	F	0.71	99.9	F
		WB	LTR	0.00	0.0	A	0.00	0.0	A
		NB	LTR	0.05	1.3	A	0.08	2.4	A
6	Route 9W (N-S) & Old Post Road/Magyar Drive	EB	LTR	0.00	0.0	A	0.00	0.0	A
		WB	LTR	0.37	39.7	E	0.97	118.7	F
		NB	LTR	0.00	0.1	A	0.00	0.0	A
		SB	LTR	0.06	1.6	A	0.01	0.3	A
7	Route 9W (N-S) Morris Drive/Cortland Drive	EB	LTR	0.12	34.5	D	0.28	63.6	F
		WB	LTR	0.82	134.0	F	0.82	146.2	F
		NB	LTR	0.01	0.2	A	0.00	0.1	A
		SB	LTR	0.02	0.5	A	0.04	1.2	A

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-3 and 2.10-4.

Signalized Intersections—West of Hudson Study Area

Nearly all signalized intersections examined in the study area currently operate acceptably at an overall LOS D or better during the peak hours analyzed. However, two intersections currently operate unacceptably (note that LOS D is generally considered unacceptable when the vehicle delay at the signalized intersection is greater than 45.0 seconds):

- U.S. Route 9W at North Plank Road/I-84 Westbound Exit Ramp operates at an overall LOS F with an intersection delay of 81.7 seconds during the AM peak hour.
- U.S. Route 9W at Fostertown Road (County Route 86) operates at an overall LOS F with an intersection delay of 93.3 seconds during the AM peak hour.

Unsignalized Intersections—West of Hudson Study Area

At intersections without traffic lights in the study area ("unsignalized intersections"), most traffic lanes and approaches at intersections generally operate acceptably during the peak hours analyzed, with a majority at LOS A. However, four groups of traffic lanes and approaches in the west of Hudson study area currently operate unacceptably:

- The eastbound approach at U.S. Route 9W and Lattintown Road operates at LOS F during the AM peak hour (approach delay of 101.5 seconds) and PM peak hour (approach delay of 99.9 seconds).
- The westbound approach at U.S. Route 9W and Old Post Road/Magyar Drive operates at LOS E during the AM peak hour (approach delay of 39.7 seconds) and at LOS F during the PM peak hour (approach delay of 118.7 seconds).
- The eastbound approach at U.S. Route 9W and Morris Drive/Cortland Drive operates at above mid-LOS D during the AM peak hour (approach delay of 34.5 seconds) and at LOS F during the PM peak hour (approach delay of 63.6 seconds).
- The westbound approach at U.S. Route 9W and Morris Drive/Cortland Drive operates at LOS F during the AM peak hour (approach delay of 134.0 seconds) and at LOS F during the PM peak hour (approach delay of 146.2 seconds). This intersection will be signalized in the future without Project 1 condition; see section 2.10-3.2.

It is not uncommon for minor approaches (the intersection approaches that generally carry lighter volumes of traffic) at unsignalized intersections to operate at LOS E or F during peak hour conditions. This is often due to the heavy opposing traffic on the major roadway (the roadway that generally carries heavier volumes of traffic) and makes turns onto the major roadway from the minor roadway difficult. However, field measurements at these minor approaches during the peak hours indicate delay ranges of between 10 seconds and 35 seconds. These field measurements indicate LOS conditions ranging from B to D, which is better than conditions modeled by Synchro.

VEHICLE QUEUES

Vehicle queues, or the lines of traffic that form while waiting at an intersection, were examined for the study area intersections. Vehicle queues generally range between 20 and 1,100 feet, with longer queues primarily occurring at the signalized intersections in the southern portion of the study area (i.e., I-84 ramps and the Fostertown Road intersection with Route 9W). Queuing on Route 9W southbound is particularly long during the AM peak hour, with some traffic spilling back to the next intersection.

ACCIDENT DATA

Detailed accident reports were obtained from NYSDOT. These accident reports covered the most recent three-year period for which data is available: from July 1, 2007, through June 30, 2010, and covered 11 locations in the west of Hudson study area. **Table 2.10-4** presents a summary of the accident data, including the number and type of accidents at each intersection, and the average annual accident rate. The table also presents a breakdown of accidents by severity. It is important to note that no fatalities have been reported within the study area over the three-year period.

According to the *CEQR Technical Manual*, a high-accident location is defined as either having (1) 48 or more total reportable and non-reportable crashes in 12 consecutive months or (2) five or more pedestrian/bicyclists injury crashes in 12 consecutive months. In addition, the accidents must occur during the most recent three-year period for which data is available. Based on these guidelines, none of the intersections in the study area can be considered a high-accident location. However, some accidents did occur. The following intersections had the largest number of accidents in the study area:

- U.S. Route 9W at North Plank Road/I-84 Westbound Exit Ramp averaged 7.7 accidents per year over the three-year period. Of the 23 total accidents, eight accidents, or 35 percent, were reported as "rear-end" collisions and five, or 22 percent, were reported as "overtaking." The remaining 10 accidents were unknown, non-reported, or undefined. Thirteen, or 57 percent, of the 23 total accidents did report a personal injury.
- U.S. Route 9W at Carter Avenue averaged 4.3 accidents per year over the three-year period. A total of 13 accidents were reported over the study period. Seven, or 54 percent, were reported as "rear-end" collisions, and one accident was reported as a "left-turn against another car." The remaining five accidents were unknown or undefined. Four, or 31 percent, of the 13 accidents involved personal injury.
- U.S. Route 9W at Fostertown Road (County Route 86) averaged 4.0 accidents per year over the three-year period. A total of 12 accidents were reported over the study period. Four, or 33 percent, were reported as "rear-end" collisions, two accidents were reported as "right-angle" collisions, and one accident was attributed to "overtaking." The remaining five accidents were unknown, non-reported, or undefined. Five, or 42 percent, of the 12 accidents involved personal injury.

Table 2.10-4
West of Hudson Study Area Accident Summary

Intersection/ Corridor	Number of Accidents		Accident Trend															
	Avg/ Yr	Period	Fatalities	Personal Injury	Non-Reported	Reported	Overtaking	Rear End	Right Angle	Left Turn (with other car)	Left Turn (against other car)	Right Turn (with other car)	Right Turn (against other car)	Sideswipe	Ped/ Bike	Head On	Other	Unknown
Single Intersection Locations																		
1. I-84 Eastbound ramps and U.S. Route 9W	2.7	8 Period: 7/1/07 to 6/30/10		5	1	7		3	2									3
2. I-84 Westbound off-ramp/N. Plank Road (NYS Route 32) and U.S. Route 9W	1.7	5 Period: 7/1/07 to 6/30/10		2		5		1	1	1								2
3. N. Plank Road (NYS Route 32) and I-84 Westbound Ramps	7.7	23 Period: 7/1/07 to 6/30/10		13	1	22	5	8									5	5
4. U.S. Route 9W and Fostertown Road (County Route 86)	4.0	12 Period: 7/1/07 to 6/30/10		5		12	1	4	2								5	
5. U.S. Route 9W and Lattintown Road	2.0	6 Period: 7/1/07 to 6/30/10		6		6	1	1									3	1
6. U.S. Route 9W and Old Post Road	1.0	3 Period: 7/1/07 to 6/30/10		1		3		1									1	1
7. Route 9W and Morris Drive/ Cortland Avenue	1.0	1 Period: 7/1/07 to 6/30/10				1											1	
8. Route 9W and Carter Avenue	4.3	13 Period: 7/1/07 to 6/30/10		4		13		7			1						4	1
Corridor Locations																		
9. U.S. Route 9W from I 84 to Old Post Road	135.0	405 Period: 7/1/07 to 6/30/10		181	68	337	9	135	30	18	57		4	14	4	5	113	16
10. U.S. Route 9W from I 84 Exit 10 to Ulster County Border	151.3	454 Period: 7/1/07 to 6/30/10	2	232	48	406	32	172	47	6	10	2	10	4	1	6	104	60
11. Old Post Road from U.S. Route 9W to River Road	0.7	2 Period: 7/1/07 to 6/30/10		1		2					1						1	

Source: NYSDOT

Local and state police agencies were also contacted for their input regarding accidents in the study area. Generally, they reported that accident reports were sent to NYSDOT. Therefore, accident information would be consistent between the local police departments and NYSDOT. Regardless, accident reports were requested and obtained from some of the local police departments to confirm that a consistent number of accidents were reported between the police department records and NYSDOT records.

PARKING CONDITIONS

On-street parking is generally not permitted along the study area roadways. Most of the land uses in the study area have their own off-street parking facilities.

TRANSIT CONDITIONS

Limited public transit is available in the study area. Local as well as express bus routes provide regional and local service. Shuttle bus service in the study area is available from Newburgh to the Metro-North Railroad commuter station in Beacon.

PEDESTRIAN CONDITIONS

Pedestrian volumes in the study area were generally observed to be minimal.

2.10-3.2 FUTURE WITHOUT PROJECT 1, SHAFT AND BYPASS TUNNEL CONSTRUCTION—WEST OF HUDSON

This section describes the assumptions used to develop the future traffic volumes and framework for the future without Project 1. At the west connection site, the 2015 peak year was chosen to reflect Project 1's peak construction activity (of both workers and trucks combined), which would occur during the excavation phase for the bypass tunnel.

TRAFFIC VOLUME NETWORKS

Regardless of whether Project 1 is completed, it is assumed that increased traffic in the west of Hudson study area will be generated by development in the project area as well as from general background traffic growth. To develop the future condition traffic volumes, the 2010 existing volumes were "grown" to the future analysis year by incorporating growth factors that account for general background growth, unrelated to Project 1, in the study area.

To account for anticipated traffic increases (due to factors like increased population and development outside of the immediate study area) an average annual growth rate of 1 or 2 percent is typically used in the Lower Hudson Valley. In an effort to be conservative, the higher average annual growth factor of 2.0 percent was utilized for the west of Hudson study area. This means that the existing traffic volumes were multiplied by the number of years into the future (five), growing the traffic volumes by 2.0 percent per year (or 10 percent total) to develop traffic volumes in the future without Project 1 traffic conditions from general growth.

One development project was identified in the Town of Newburgh that would contribute to an increase in traffic along the study area's roadway network. The Orchard Hill residential development is a proposed 280-unit residential development to be located on the east side of Route 9W off Cortland Drive. Based on information provided in the Orchard Hill traffic impact study, the proposed development would generate approximately 116 vehicle trips (20 entering, 96 exiting) during the AM peak hour and 143 vehicle trips (96 entering, 47 exiting) during the PM peak hour. These trips were assigned to the traffic network based on data presented in the Orchard Hill study and existing travel patterns in the area. The study also identifies that the intersection of Route 9W and Morris Drive/Cortland Drive, which is currently unsignalized, would have a signal installed and would also have new roadway improvements, which would provide left-turn lanes at the northbound, southbound, and westbound approaches. These geometric improvements and the vehicle trips generated by the Orchard Hill development were included in the future without Project 1 analysis.

Figures 2.10-5 and **2.10-6** present the weekday AM and PM peak hour traffic volumes, respectively, for future conditions without Project 1 for the west of Hudson study area**.**

CAPACITY ANALYSIS RESULTS

At most locations in the study area, traffic conditions are projected to worsen slightly, compared with existing conditions, as a result of projected future increases in traffic. The following is a summary of 2015 future without Project 1 traffic conditions at signalized and unsignalized intersections. **Table 2.10-5** presents the LOS summary for the intersections in the west of Hudson study area.

Signalized Intersections—West of Hudson Study Area

In the future without Project 1, most signalized intersections are expected to continue to operate at an acceptable overall LOS D or better during the AM and PM peak hours analyzed with the exception of four locations in the west of Hudson study area (LOS D for signalized intersections is considered unacceptable when the vehicle delay value is greater than 45.0 seconds, mid-range LOS D):

- U.S. Route 9W at I-84 Eastbound Ramps is expected to experience an increase in delay during the AM peak hour from LOS D with an intersection delay of 35.8 seconds to LOS D with a delay of 54.9 seconds.
- U.S. Route 9W at North Plank Road/I-84 Westbound Exit Ramp is expected to experience an increase in delay during the AM peak hour from LOS F with an intersection delay of 81.7 seconds to LOS F with a delay of 160.6 seconds.
- North Plank Road at I-84 Westbound Entrance and Exit Ramps is expected to experience an increase in delay during the AM peak hour from LOS D with an intersection delay of 39.5 seconds to LOS E with a delay of 62.5 seconds. During the PM peak hour, the intersection is expected to experience an increase in delay from LOS D with an intersection delay of 38.9 seconds to LOS D with a delay of 51.9 seconds.

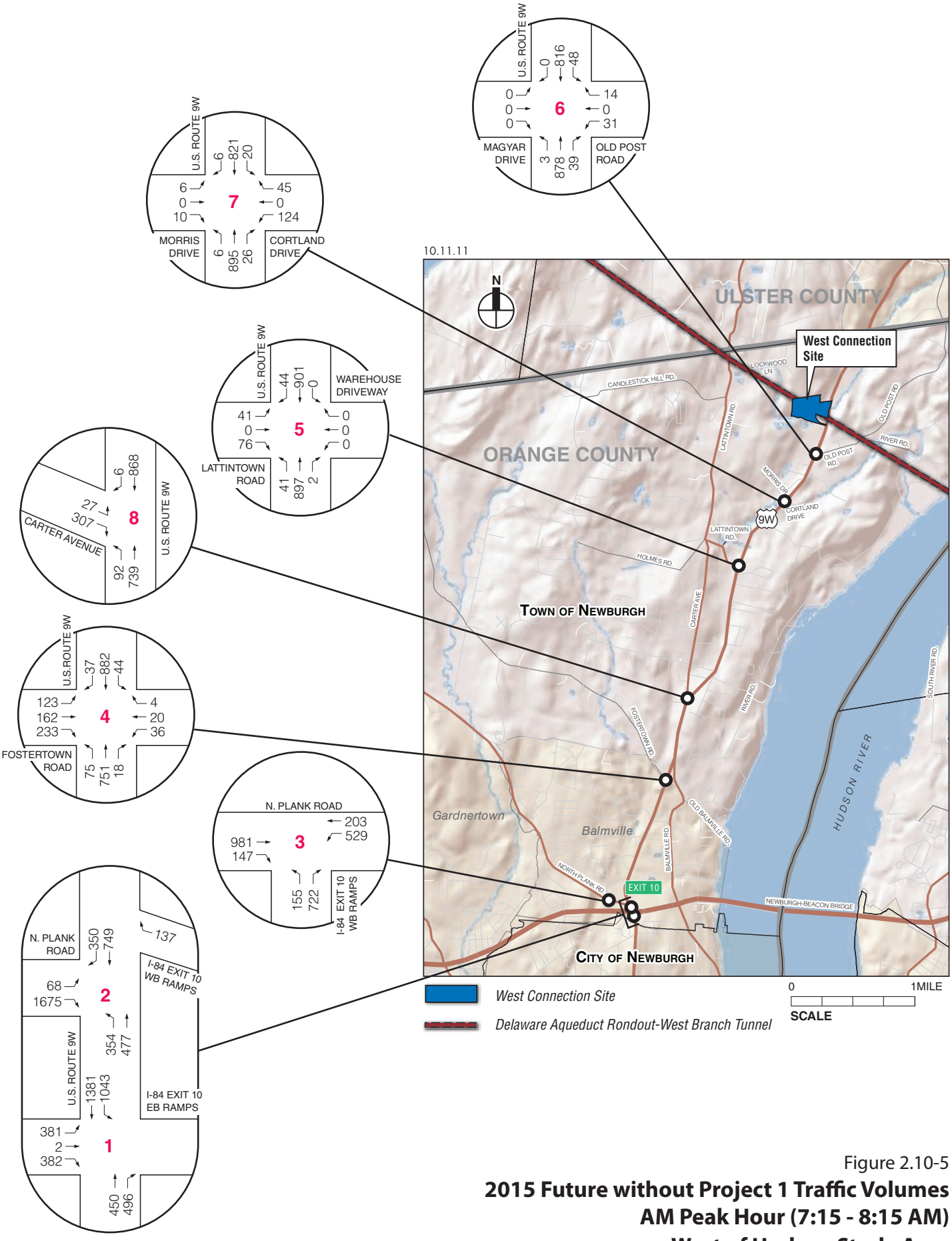


Figure 2.10-5

2015 Future without Project 1 Traffic Volumes
AM Peak Hour (7:15 - 8:15 AM)
West of Hudson Study Area

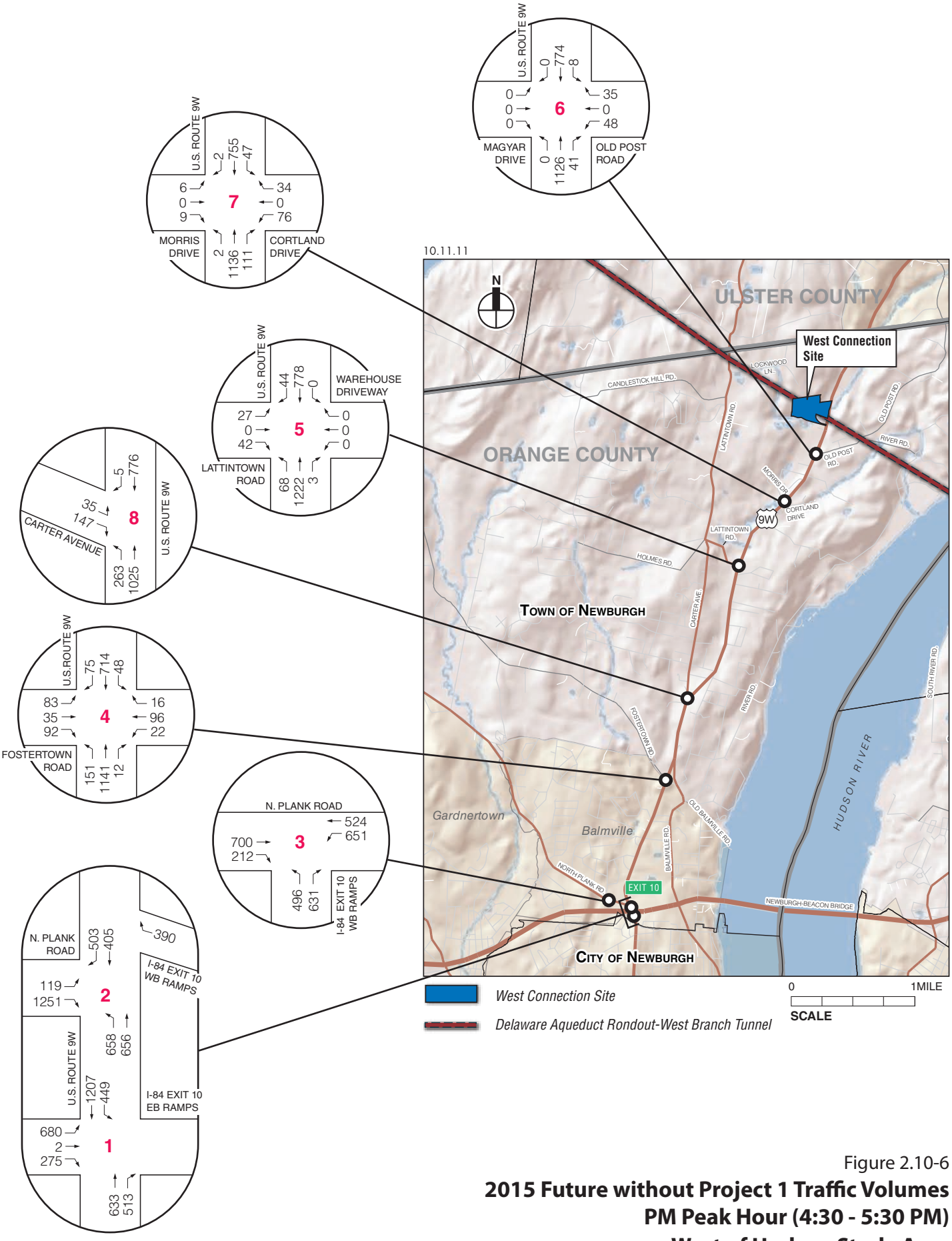


Figure 2.10-6

2015 Future without Project 1 Traffic Volumes
PM Peak Hour (4:30 - 5:30 PM)
West of Hudson Study Area

Table 2.10-5

2010 Existing and 2015 Future Without Project 1 Conditions | LOS Summary - West of Hudson Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9W (N-S) & I-84 EB Ramps	EB	L	0.56	38.2	D	L	0.63	40.4	D	L	0.79	46.0	D	L	0.85	50.6	D
			LT	0.55	37.6	D	LT	0.61	39.5	D	LT	0.77	43.8	D	LT	0.82	47.6	D
			R	0.98	70.4	E	R	1.12	113.8	F	R	0.56	24.3	C	R	0.62	28.7	C
		NB	T	0.40	24.4	C	T	0.44	25.0	C	T	0.43	22.4	C	T	0.52	25.1	C
			R	0.59	5.9	A	R	0.65	8.2	A	R	0.53	4.6	A	R	0.58	5.1	A
		SB	L	1.09	77.3	E	L	1.21	128.3	F	L	0.69	35.3	D	L	0.71	35.8	D
			T	0.60	8.1	A	T	0.67	13.3	B	T	0.54	7.4	A	T	0.61	8.4	A
		INT			35.8	D			54.9	D			20.8	C			22.9	C
2	Route 9W (N-S) & N. Plank Rd./I-84 WB Off Ramp	EB	L	0.14	25.4	C	L	0.15	25.6	C	L	0.36	35.4	D	L	0.41	36.4	D
			R	1.00	156.0	F	R	1.10	**	F	R	0.83	16.7	B	R	0.94	29.7	C
		WB	R	0.19	0.6	A	R	0.22	0.7	A	R	0.63	9.4	A	R	0.78	22.0	C
		NB	L	0.36	34.6	C	L	0.40	34.7	C	L	0.82	49.2	D	L	0.90	54.2	D
			T	0.21	9.4	A	T	0.23	9.4	A	T	0.24	11.0	B	T	0.28	11.2	B
		SB	T	0.77	37.0	D	T	0.79	37.0	D	T	0.25	16.2	B	T	0.28	16.5	B
			R	0.48	5.4	A	R	0.52	5.5	A	R	0.50	3.5	A	R	0.56	4.7	A
		INT			81.7	F			160.6	F			19.2	B			25.6	C
3	N. Plank Road (E-W) & I-84 WB Ramps	EB	T	1.08	79.0	E	T	1.23	141.4	F	T	0.98	67.8	E	T	1.12	108.7	F
			R	0.18	9.9	A	R	0.21	11.7	B	R	0.31	12.2	B	R	0.35	13.9	B
		WB	L	0.72	38.7	D	L	0.75	39.5	D	L	0.83	52.6	D	L	0.88	56.8	E
			T	0.15	4.3	A	T	0.16	4.6	A	T	0.45	13.2	B	T	0.50	14.2	B
		NB	L	0.59	44.1	D	L	0.62	46.3	D	L	0.93	66.7	E	L	1.02	84.8	F
			R	0.43	0.8	A	R	0.48	0.9	A	R	0.35	0.6	A	R	0.39	0.7	A
		INT			39.5	D			62.5	E			38.9	D			51.9	D
4	Route 9W (N-S) & Fostertown Road	EB	LTR	1.33	188.0	F	LTR	1.47	**	F	LTR	0.75	44.4	D	LTR	0.84	55.4	E
		WB	LTR	0.26	27.3	C	LTR	0.29	28.4	C	LTR	0.46	34.5	C	LTR	0.49	35.8	D
		NB	L	0.41	41.5	D	L	0.43	41.9	D	L	0.60	47.6	D	L	0.69	54.3	D
			TR	0.83	29.0	C	TR	0.93	39.5	D	TR	1.00	48.6	D	TR	1.15	100.9	F
		SB	L	0.26	39.9	D	L	0.29	40.5	D	L	0.26	43.9	D	L	0.31	46.4	D
			TR	1.12	93.7	F	TR	1.31	172.7	F	TR	0.86	32.9	C	TR	0.95	46.9	D
		INT			93.3	F			140.8	F			42.3	D			72.3	E
7	Route 9W (N-S) Morris Drive/Cortland Drive	EB	Unsignalized in Existing Conditions				LTR	0.06	11.4	B	Unsignalized in Existing Conditions				LTR	0.14	18.7	B
		WB					L	0.50	24.2	C					L	0.48	39.1	D
							TR	0.13	2.4	A					TR	0.14	3.6	A
		NB					L	0.03	5.8	A					L	0.01	3.5	A
							TR	0.79	17.2	B					TR	0.96	28.5	C
		SB					L	0.13	8.2	A					L	0.59	39.7	D
							TR	0.72	14.2	B					TR	0.61	7.6	A
		INT							15.9	B							21.1	C
8	Route 9W (N-S) & Carter Avenue	EB	LR	0.76	21.8	C	LR	0.93	47.7	D	LR	0.57	15.7	B	LR	0.63	18.4	B
		NB	L	0.35	6.2	A	L	0.50	13.9	B	L	0.79	26.0	C	L	1.02	76.9	E
			T	0.62	7.5	A	T	0.67	8.2	A	T	0.73	9.5	A	T	0.83	13.0	B
		SB	TR	0.82	19.1	B	TR	0.90	25.6	C	TR	0.80	18.4	B	TR	0.85	20.8	C
		INT			14.5	B			22.2	C			15.2	B			23.5	C

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-5 and 2.10-6.

Table 2.10-5 (cont'd)

2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - West of Hudson Study Area

			AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
No.[1]	Intersection	Approach	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
5	Route 9W (N-S) & Lattintown Road	EB	LTR	0.86	101.5	F	LTR	1.43	**	F	LTR	0.71	99.9	F	LTR	1.32	**	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A
		NB	LTR	0.05	1.3	A	LTR	0.06	1.8	A	LTR	0.08	2.4	A	LTR	0.09	4.0	A
6	Route 9W (N-S) & Old Post Road/Magyar Drive	EB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A
		WB	LTR	0.37	39.7	E	LTR	0.54	63.4	F	LTR	0.97	118.7	F	LTR	1.51	**	F
		NB	LTR	0.00	0.1	A	LTR	0.00	0.1	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A
		SB	LTR	0.06	1.6	A	LTR	0.07	2.0	A	LTR	0.01	0.3	A	LTR	0.01	0.4	A
7	Route 9W (N-S) Morris Drive/Cortland Drive	EB	LTR	0.12	34.5	D	Signalized in No Build				LTR	0.28	63.6	F	Signalized in No Build			
		WB	LTR	0.82	134.0	F					LTR	0.82	146.2	F				
		NB	LTR	0.01	0.2	A					LTR	0.00	0.1	A				
		SB	LTR	0.02	0.5	A					LTR	0.04	1.2	A				

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-5 and 2.10-6.

- U.S. Route 9W at Fostertown Road (County Route 86) is expected to experience an increase in delay from an overall LOS F with an intersection delay of 93.3 seconds during the AM peak hour to LOS F with a delay of 140.8 seconds. During the PM peak hour, the intersection is expected to experience an increase in delay from LOS D with an intersection delay of 42.3 seconds to LOS E with a delay of 72.3 seconds.

Unsignalized Intersections—Westof Hudson Study Area

In the future without Project 1, most approaches or lane groups of the study area's unsignalized intersections are expected to continue to operate at an acceptable overall LOS D or better during the peak hours analyzed with the exception of two lane groups/approaches in the west of Hudson study area (LOS D for unsignalized intersection lane groups or approaches is considered unacceptable when the vehicle delay value is greater than 30.0 seconds, mid-range LOS D):

- The eastbound approach at U.S. Route 9W and Lattintown Road is expected to experience an increase in delay during the AM peak hour from LOS F with an approach delay of 101.5 seconds to LOS F with a delay of greater than 240.0 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS F with an intersection delay of 99.9 seconds to LOS F with a delay of greater than 240.0 seconds.
- The westbound approach at U.S. Route 9W and Old Post Road/Magyar Drive is expected to experience an increase in delay during the AM peak hour from LOS E with an approach delay of 39.7 seconds to LOS F with a delay of 63.4 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS F with an intersection delay of 118.7 seconds to LOS F with a delay of greater than 240.0 seconds.

VEHICLE QUEUES

Vehicle queues are expected to increase on average by approximately 60 feet in 2015 future without Project 1 conditions.

ACCIDENT DATA

No significant changes in accidents in the west of Hudson study area are expected in 2015 future without Project 1 conditions.

PARKING CONDITIONS

No significant changes in parking conditions in the west of Hudson study area are expected in 2015 future without Project 1 conditions.

TRANSIT CONDITIONS

No significant changes in transit conditions in the west of Hudson study area are expected in 2015 future without Project 1 conditions.

PEDESTRIAN CONDITIONS

No significant changes in pedestrian conditions in the west of Hudson study area are expected in 2015 future without Project 1 conditions.

2.10-3.3 PROBABLE IMPACTS OF PROJECT 1, SHAFT AND BYPASS TUNNEL CONSTRUCTION—WEST OF HUDSON

This section describes the analysis assumptions used to develop the future traffic volumes and analysis parameters for the future with Project 1. At the west connection site, the 2015 peak year was chosen to reflect Project 1's peak construction activity (of both workers and trucks combined), which would occur during the excavation phase for the bypass tunnel. This would be the phase of construction with the greatest amount of construction worker and truck trips over an extended period of time, and 2015 would represent a year such activity would be occurring. This section also describes the assumptions and methodology employed in developing the future with Project 1 traffic assignments used for the traffic analysis for this project. Trip assignments—meaning, the projections of how many and what types of vehicle trips would be generated by Project 1— have been developed. They are based on the worker and truck activity estimates, and likely travel routes for the construction-related vehicles. The total number of vehicle trips and their associated routings are described in more detail below.

The water main extension and dewatering pipeline would require temporary construction to construct the water main and pipeline underground. Temporary Work Zone Traffic Control Plans would likely be implemented, as required, to ensure worker and public safety during construction on or adjacent to public roadways.

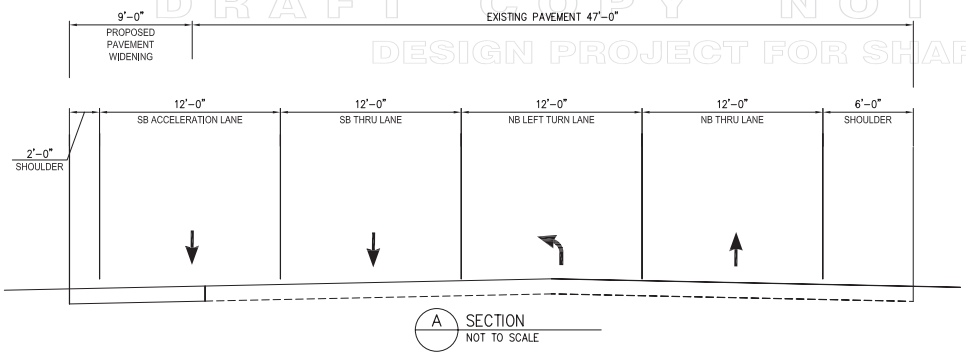
CONSTRUCTION TRAFFIC ASSIGNMENTS

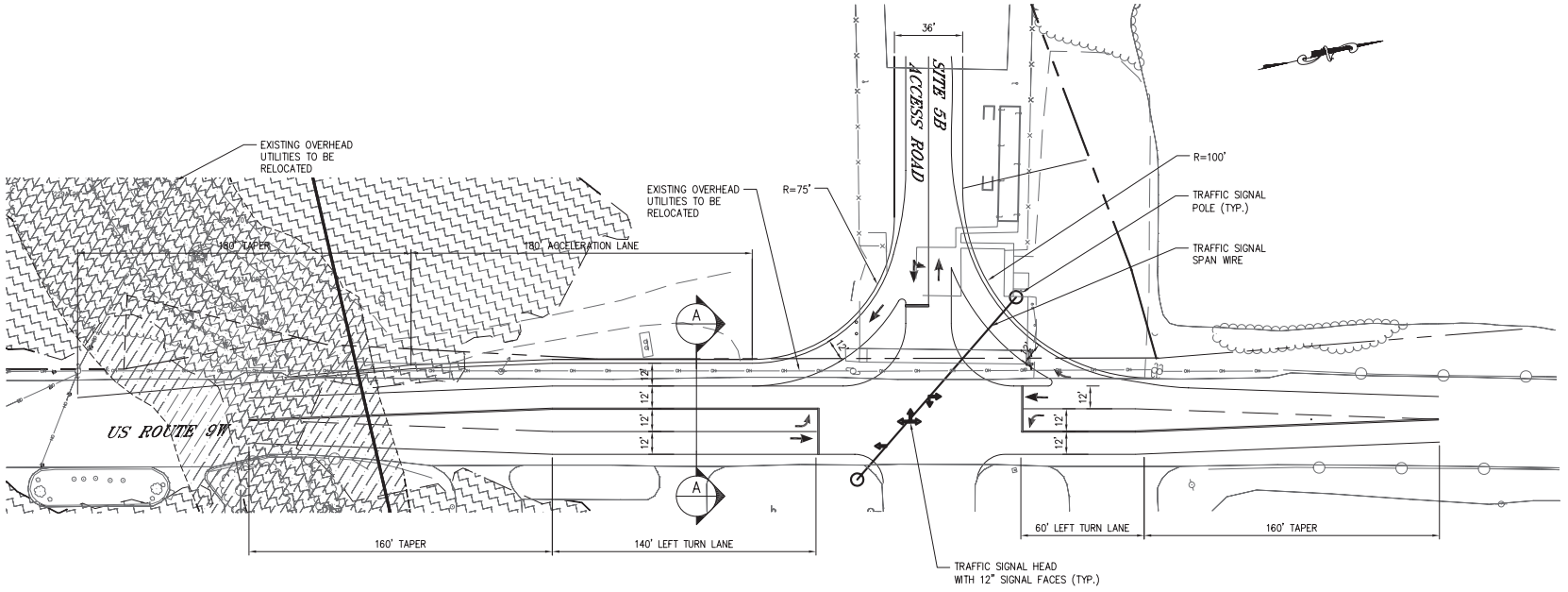
During the construction period for this project, vehicle trips to and from the west connection site would consist of worker trips (by car) and truck trips. Vehicles would access the site by a newly constructed entrance and roadway along Route 9W, just opposite the Green Valley Motel (see **Figure 2.10-7**). In addition to the new entrance, the intersection would be designed to provide exclusive northbound and southbound left turn storage lanes along Route 9W. Channelized right turn lanes (which are exclusive flared turning lanes that allow right-turning vehicles not to be impeded by through traffic waiting at an intersection) would also be provided to and from the site entrance from Route 9W. All movements through the intersection would be controlled by a temporary traffic signal to be installed as part of Project 1. Installation would occur during the site preparation phase and maintained over the entire construction time period. This design would be subject to NYSDOT approval and would go through the highway work permit process. ~~Upon project construction completion, the geometric improvements to the intersection, including both the northbound left-turn lane and the southbound left-turn lane would remain in place~~. Based on meetings conducted with NYSDOT before the DEIS was issued, it was determined that the southbound right- and left-turn lanes would remain in place after construction is complete; the northbound left-turn lane space would

CONTRACT BT-1

NOTES:

1. RELOCATION OF OVERHEAD ELECTRIC UTILITY LINES CURRENTLY UNDER COORDINATION WITH CENTRAL HUDSON GAS AND ELECTRIC. NEW LOCATION OF UTILITIES WILL BE SHOWN ON ELECTRICAL DRAWINGS IN SUBSEQUENT SUBMITTALS.
2. SITE ENTRANCE IMPROVEMENTS SHOWN ARE SUBJECT TO REVIEW & APPROVAL BY NYSDOT.





Hirani Group

60 % SUBMISSION
VERSION 6.2, SEPTEMBER 2011

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NEW YORK CITY ENVIRONMENTAL PROTECTION
BUREAU OF ENGINEERING DESIGN & CONSTRUCTION

RONDOUT - WEST BRANCH BYPASS TUNNEL CONTRACT BT-1
CIVIL
SHAFT 5B
SITE ENTRANCE IMPROVEMENTS

DATE: 09/07/2011
SCALE: AS SHOWN
SHEET NO: 64 OF 174
DRAWING NO. 5C–230.00

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Date Plotted: 9/7/2011 8:32 PM\Author: eramos\File Location: I:\dep-bedc\bt-1\design\1-1 drawings\civil\bt-1-5c230-00.dwg

Figure 2.10-7

Preliminary Intersection Design of Shaft 5B Driveway and Route 9W (60% Design)

remain but would be converted to a painted median opposite the southbound left-turn lane. Only the temporary traffic signal would be removed after construction has been completed.

For all Project 1-related traffic, the analysis assumes that 10 percent would arrive and depart from north of the west connection site and 90 percent would arrive and depart from south of the site. This assumption is supported by the Census data, see Appendix 2.10. The assignments for both auto and truck trips are the same. **Figure 2.10-8** presents the assignments for both the auto and truck trips. In addition, the 90 percent of vehicles arriving and departing from the south have predominantly been assigned to Route 9W and I-84. It is anticipated that this traffic would generally not use the local roadways east and west of Route 9W. The contractor would decide where to take excavation material removed from the site. However, since the west connection site is close to the interstate highway system (I-84), it is anticipated that the majority of the trips would be on I-84.

WEST SIDE TUNNEL BORING MACHINE (TBM) DELIVERY TO SHAFT 5B

It would be up to DEP's contractor to arrange delivery of the TBM, in segments, during the tunnel excavation phase. There are a variety of potential approaches to delivering such large pieces of construction equipment (within the study area I-84 to Route 9W would be utilized), and it is anticipated that trucking activity associated with delivering the TBM would extend over two weeks and may require overnight deliveries (between 11 PM and 5 AM), since there may be restrictions on transport, such as the New York State Bridge Authority (NYSBA) time restrictions for oversized loads on the Newburgh-Beacon Bridge. During such deliveries, it is anticipated that the TBM delivery trucks would require oversized/weight permits and would need escort vehicles as they travel to and from the west connection site.

It may be necessary to implement Work Zone Traffic Control Plans (WZTCPs) (see Traffic Management Plan [TMP] in Section 2.19, "Mitigation") at certain intersections and roadways segments. The need for the implementation of WZTCPs would be determined before the start of this work in consultation with the roadway governing agencies and as part of the overall TMP for Project 1.

CONSTRUCTION TRAFFIC TRIP GENERATION

Auto trips to and from the west connection site during the construction period would be generated by workers at the site. The number of workers on-site would vary with the various work shifts. An estimated total of 228 daily workers would be at the site during peak construction, which is expected to occur during the excavation of the tunnel phase. By applying the estimated auto occupancy of 1.2 persons (approximately 16.5 percent) to account for carpooling, total worker peak hour trips can be calculated, as shown in **Table 2.10-6**. The trip generation numbers shown in Table 2.10-6 are the average peak trips during the excavation phase.

The peak hours of construction may be earlier than the peak hours examined. However, the construction traffic was applied to the commuter peak hour traffic to provide for a conservative analysis. This will account for any overlap that may occur between construction worker arrivals and departures and the commuter peak hour traffic, even though the peak hours are somewhat different.

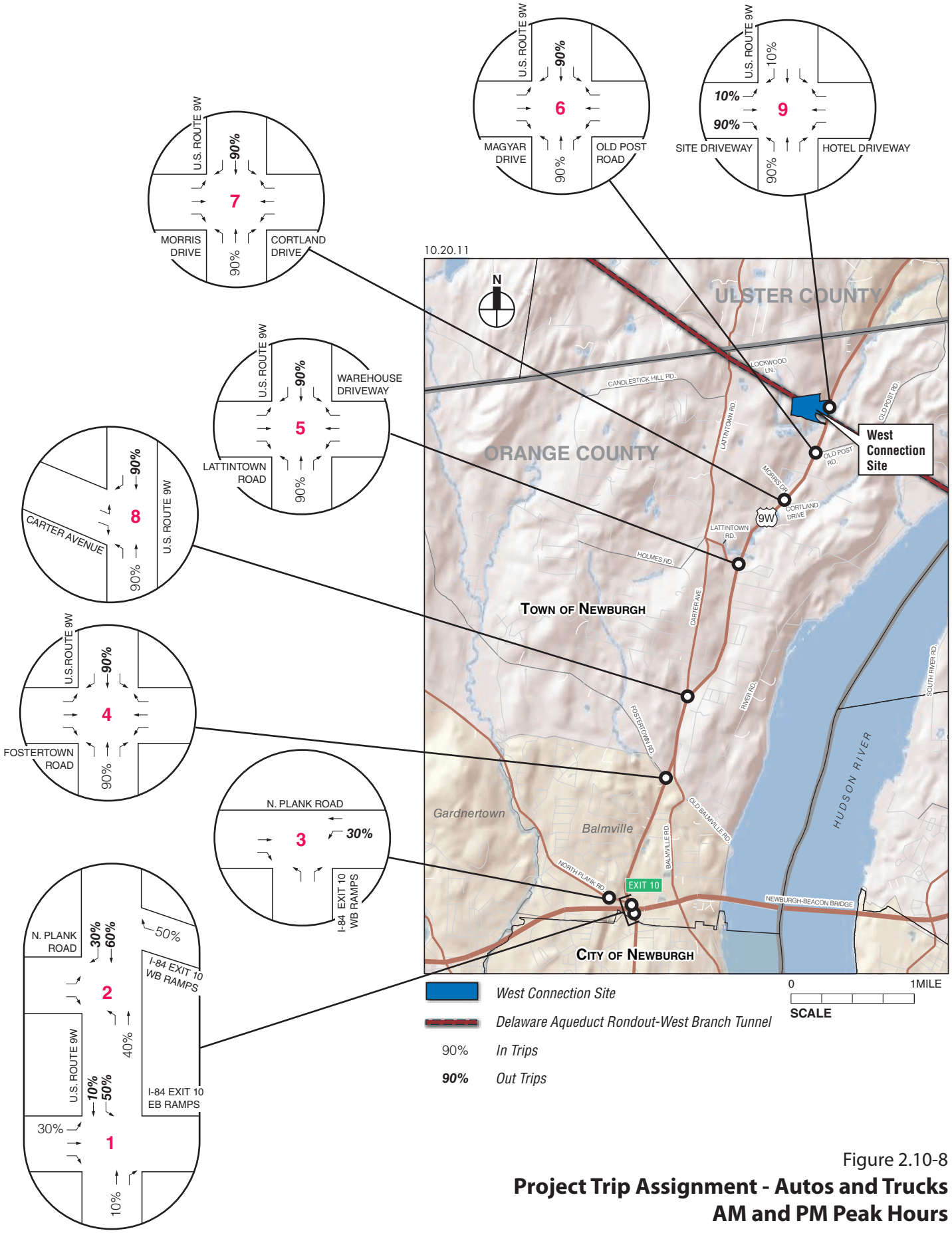


Figure 2.10-8

Project Trip Assignment - Autos and Trucks
AM and PM Peak Hours
West of Hudson Study Area

While the number of trucks expected would vary by phase of work at the connection site, the traffic analysis conservatively projects the maximum number of trucks that the site can process in any hour. This is to ensure that the potential worst-case impact is assessed for intersection capacities and the ability for turning lanes to address the potential queuing capacity with these maximum potential short-term peak truck trips. An estimated maximum of 12 trucks entering and 12 trucks departing can likely be processed at the west connection site. The actual number of peak hour truck trips would average between one and five, so the assumption of 12 trucks entering and 12 trucks departing during the peak hours provides for a conservative analysis to determine potential impacts on intersection capacities and queue lengths for turning movements.

Table 2.10-6
Trip Generation - West of Hudson Study Area*

A) Worker Trips

1) Peak Activity Tunnel Excavation
Daily Workers = 228

		Converted to Auto Trips with 1.2 vehicle occupancy factor
11 PM - 7 AM Shift =	66 workers →	55 Auto Trips
7 AM - 4 PM Shift =	81 workers →	68 Auto Trips
4 PM - 11 PM Shift =	81 workers →	68 Auto Trips

B) Truck Trips

1) Peak Activity Tunnel Excavation
Average number of truck trips per day (2 trips per truck) = 90
Peak Hour Trips (maximum) = 12 Trips In / 12 Trips Out
Passenger Car Equivalents (PCEs) = 24 Trips In / 24 Trips Out[1]

C) Summary

1)

Worker Trips[2]			
Time	**In**	**Out**	**Total**
7 AM	68	55	123
4 PM	68	68	136

2)

Truck Trips (Passenger Car Equivalents shown)[1]			
Time	**In**	**Out**	**Total**
7 AM	24	24	48
4 PM	24	24	48

3)

Total Trips			
Time	**In**	**Out**	**Total**
7 AM	92	79	171
4 PM	92	92	184

Notes:
[1] Based on *CEQR Technical Manual* suggested PCE factor of 2.0.
[2] Assumes a vehicle occupancy = 1.2 persons per vehicle.
* Average peak trips during the excavation phase

CONSTRUCTION-GENERATED TRAFFIC

Each of the auto and truck trips described was assigned to the traffic study area using the percentage assignments and routings described above. **Figure 2.10-9** illustrates the resulting 2015 total construction peak Project 1-generated traffic volumes for the AM and PM peak hours.

TRAFFIC ANALYSIS IMPACT CRITERIA

The *CEQR Technical Manual* has established criteria for evaluating traffic impacts. For Project 1, these would be temporary construction period traffic impacts, because the predicted impacts would happen during the construction period. The peak construction year of 2015 was analyzed. For locations where potential adverse impacts were predicted for peak construction traffic with

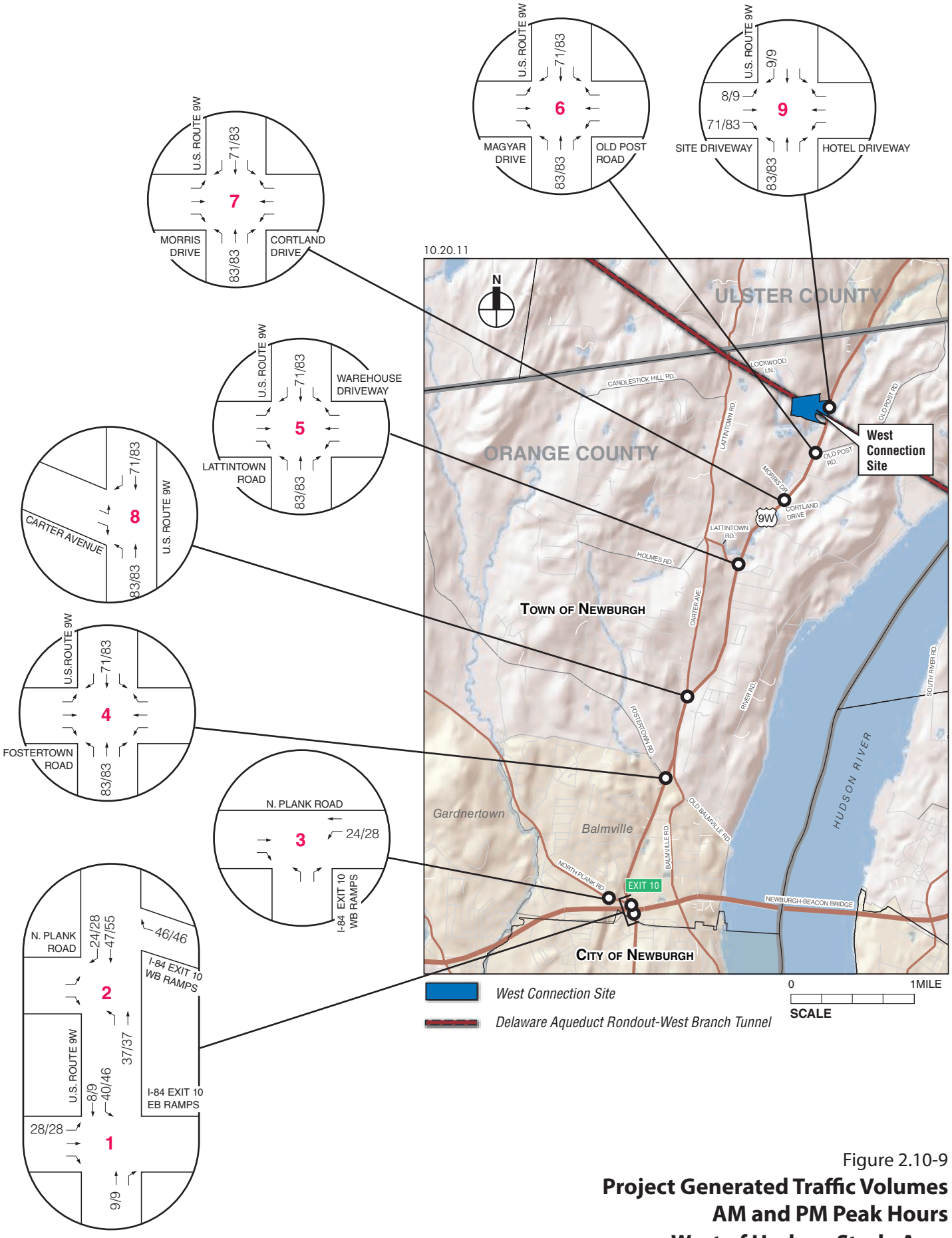


Figure 2.10-9

Project Generated Traffic Volumes
AM and PM Peak Hours
West of Hudson Study Area

Project 1, an assessment was also made to estimate the potential duration of such impacts over the complete construction timeframe for Project 1. The evaluation of the potential for temporary adverse impacts to occur at the different signalized and unsignalized intersection analysis locations throughout the study area's traffic network was determined by comparing the LOS and delay results to the thresholds established in the *CEQR Technical Manual*. The impact significance thresholds for signalized and unsignalized intersections are described below.

Signalized Intersections

According to the *CEQR Technical Manual*, if a signalized intersection operating at LOS A, B, or C in the future without Project 1 worsens to a marginally unacceptable mid-LOS D or an unacceptable LOS E or F in the future with Project 1, then a predicted temporary significant adverse traffic impact would occur. Any other LOS change in the future with Project 1 is not considered an impact. Impacts can also result when delays worsen as a result of a project's traffic. For example, for a lane group that operates at LOS D in the future without Project 1, an increase in delay of 5 seconds or more with Project 1 is considered an impact. For a lane group that operates at LOS E in the future without Project 1, an increase in delay of 4 seconds or more with Project 1 is considered an impact. Finally, for a lane group that operates at LOS F in the future without Project 1, an increase in delay of 3 seconds or more with Project 1 is considered an impact. It is important to note that this guidance was developed for permanent traffic changes associated with an action, not for construction-related impacts. However, due to the time required for construction of Project 1 these criteria were employed, along with an assessment of the duration of predicted impacts to determine potential temporary significant adverse traffic impacts expected with Project 1.

Unsignalized Intersections

The same impact criteria described above for signalized intersections are also applicable to unsignalized intersections (assuming that Project 1 adds traffic to the minor roadway/cross street). However, mid-LOS D would become a delay of 30 seconds for an unsignalized intersection. For the minor street to trigger a temporary significant adverse impact, 90 passenger car equivalents (PCEs) must be identified in the future with Project 1 condition in any peak hour.

TRAFFIC CONDITIONS AND CAPACITY ANALYSIS RESULTS

For the analyses in this section, the peak construction period traffic generated during the AM and PM peak hours is referred to as the 2015 future with Project 1 conditions. The project-generated construction traffic was added to the 2015 future without Project 1 volumes in the AM and PM peak periods, and capacity analyses were performed. **Figures 2.10-10 and 2.10-11** illustrate the resulting 2015 future with Project 1 traffic volumes for the AM and PM peak hours, respectively. The results of these analyses are discussed below.

Table 2.10-7 compares the level of service results for future without Project 1 to the future with Project 1 at the study area intersections. Below is a summary of the predicted exceedances of the *CEQR Technical Manual* criteria associated with the anticipated peak construction activity. All

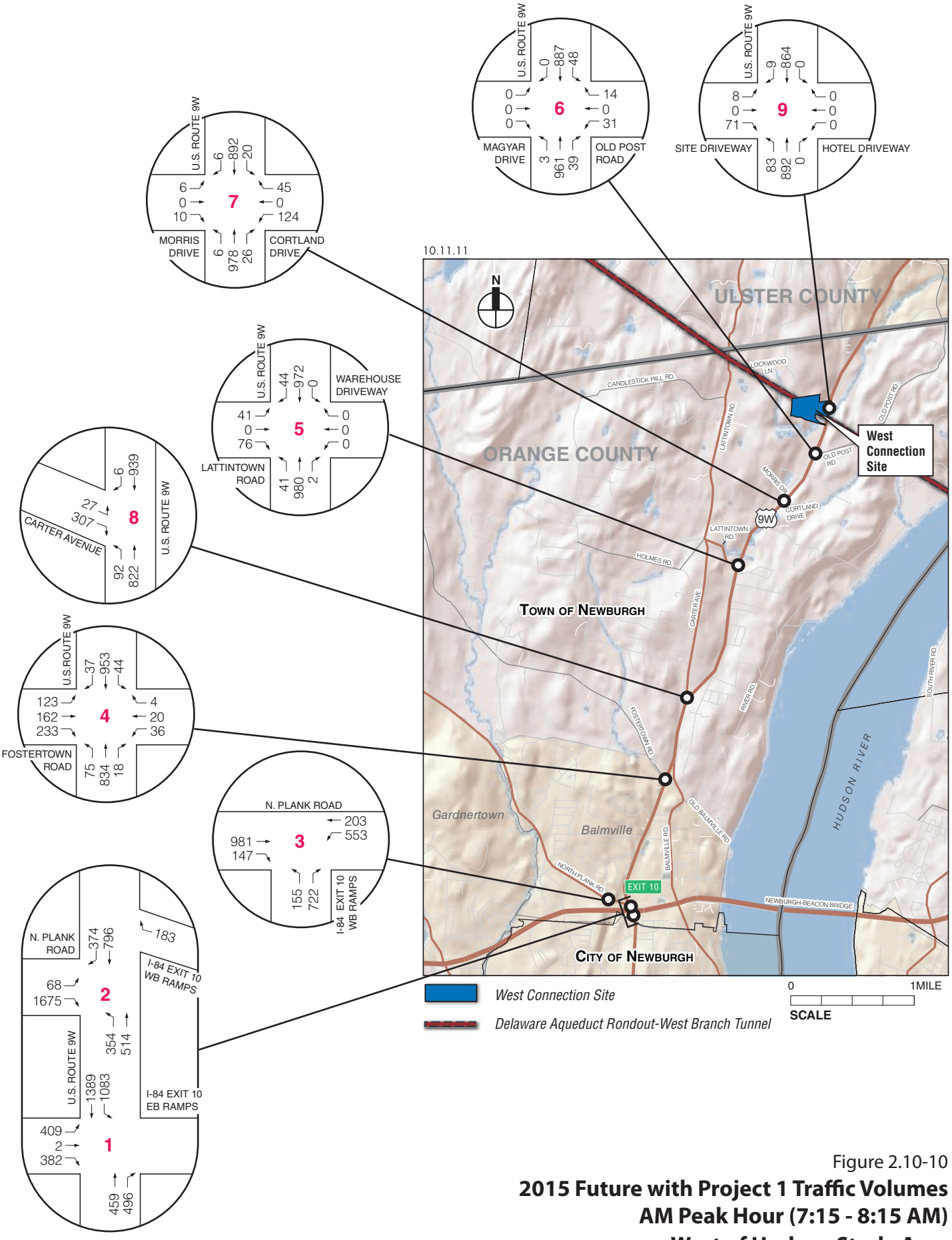


Figure 2.10-10

2015 Future with Project 1 Traffic Volumes
AM Peak Hour (7:15 - 8:15 AM)
West of Hudson Study Area

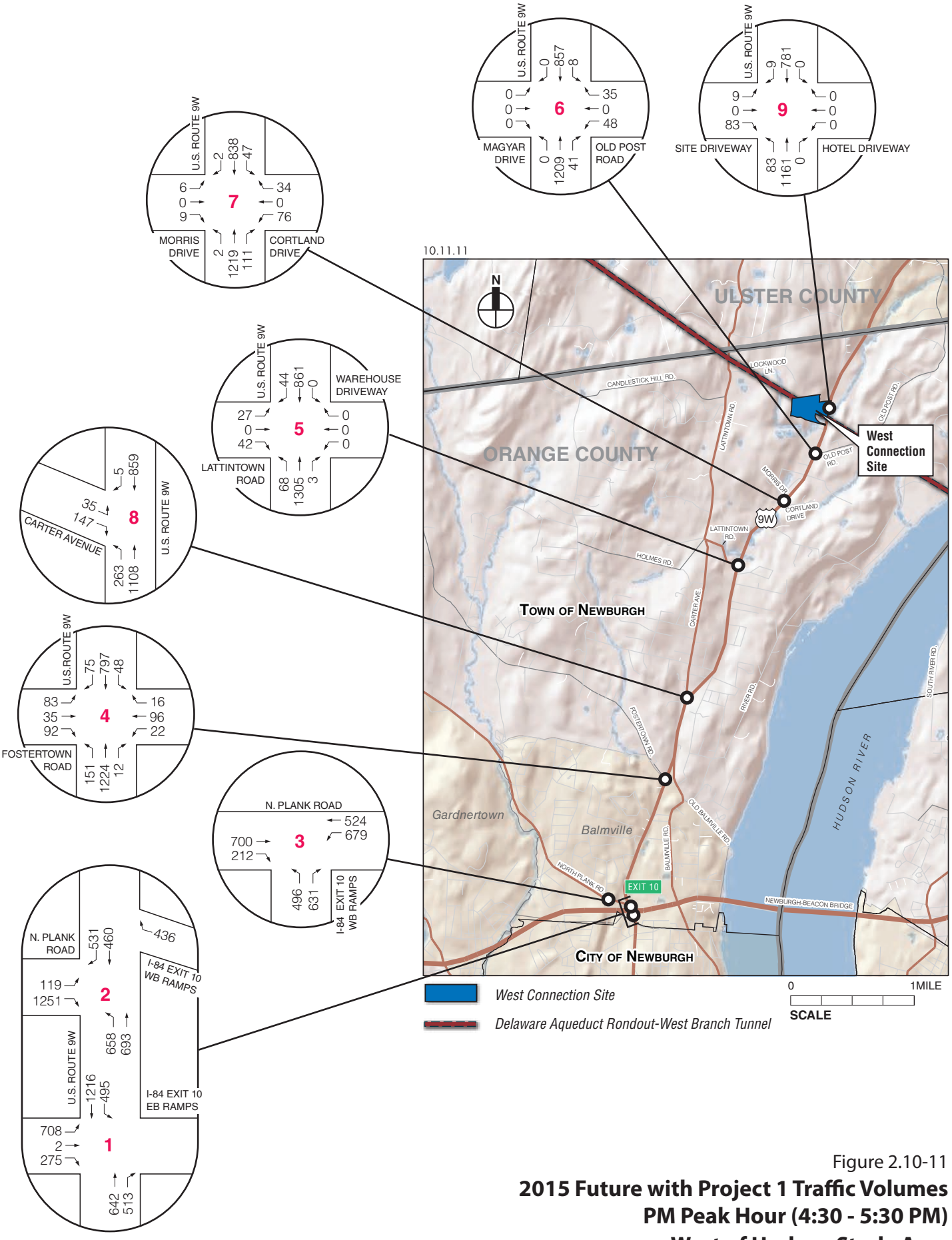


Figure 2.10-11

2015 Future with Project 1 Traffic Volumes
PM Peak Hour (4:30 - 5:30 PM)
West of Hudson Study Area

predicted increases in traffic delays described below are given in comparison to the 2015 future without Project 1 conditions.

Predicted Exceedances of the Traffic Impact Criteria at Signalized Intersections

Following the traffic impact criteria described above, predicted exceedances of the traffic impact criteria would occur with Project 1 at nine signalized approaches in the study area. For the intersections where the analysis indicated a potential exceedance of the traffic impact criteria during the peak construction period, as discussed below, additional analyses were undertaken to assist in determining how long the exceedance would last. These exceedances predicted for the peak construction period would occur at five intersections, including some intersections with more than one approach having predicted exceedances of the traffic impact criteria. Six of these predicted exceedances of the traffic impact criteria would occur during the AM peak hour and three during the PM peak hour, as described below:

AM Peak

- *Route 9W and I-84 Eastbound Ramps*: The southbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 128.3 seconds (LOS F) to 147.2 seconds (LOS F).
- *Route 9W and North Plank Road/I-84 Westbound Off-Ramp*: The eastbound right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions. Although no project-generated traffic is assigned to this movement, a predicted temporary significant adverse impact would occur due to the Synchro model anticipating that the actuated signal system would rebalance/reallocate signal timings against this approach during the signal timing optimization process.
- *North Plank Road and I-84 Westbound Ramps*: The eastbound through lane group of this intersection would be adversely impacted, with the lane group delay increasing from 141.4 seconds (LOS F) to 146.9 seconds (LOS F). Although no project-generated traffic is assigned to this movement, a predicted temporary significant adverse impact would occur due to the Synchro model anticipating that the actuated signal system would rebalance/reallocate signal timings against this approach during the signal timing optimization process.
- *Route 9W and Fostertown Road*: The northbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 39.5 seconds (LOS D) to 61.4 seconds (LOS E).

Table 2.10-7
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions
LOS Summary - West of Hudson Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9W (N-S) & I-84 EB Ramps	EB	L	0.63	40.4	D	L	0.67	42.5	D	L	0.85	50.6	D	L	0.87	53.4	D
			LT	0.61	39.5	D	LT	0.65	41.4	D	LT	0.82	47.6	D	LT	0.85	49.9	D
			R	1.12	113.8	F	R	1.12	113.8	F	R	0.62	28.7	C	R	0.61	28.7	C
		NB	T	0.44	25.0	C	T	0.45	25.1	C	T	0.52	25.1	C	T	0.56	26.9	C
			R	0.65	8.2	A	R	0.65	8.2	A	R	0.58	5.1	A	R	0.59	5.5	A
		SB	L	1.21	128.3	F	L	1.26	147.2	F+	L	0.71	35.8	D	L	0.73	34.7	C
			T	0.67	13.3	B	T	0.68	14.3	B	T	0.61	8.4	A	T	0.62	8.2	A
		INT			54.9	D			60.7	E			22.9	C			23.8	C
2	Route 9W (N-S) & N. Plank Rd./I-84 WB Off Ramp	EB	L	0.15	25.6	C	L	0.15	25.6	C	L	0.41	36.4	D	L	0.41	36.4	D
			R	1.10	**	F	R	1.10	**	F+	R	0.94	29.7	C	R	0.97	37.3	D
		WB	R	0.22	0.7	A	R	0.31	1.2	A	R	0.78	22.0	C	R	0.90	37.4	D
		NB	L	0.40	34.7	C	L	0.40	34.0	C	L	0.90	54.2	D	L	0.90	53.7	D
			T	0.23	9.4	A	T	0.25	9.6	A	T	0.28	11.2	B	T	0.29	11.4	B
		SB	T	0.79	37.0	D	T	0.84	38.3	D	T	0.28	16.5	B	T	0.32	16.9	B
			R	0.52	5.5	A	R	0.55	5.6	A	R	0.56	4.7	A	R	0.59	5.6	A
		INT			160.6	F			182.2	F			25.6	C			29.3	C
Signalized Intersections																		
3	N. Plank Road (E-W) & I-84 WB Ramps	EB	T	1.23	141.4	F	T	1.25	146.9	F+	T	1.12	108.7	F	T	1.12	111.2	F
			R	0.21	11.7	B	R	0.21	12.0	B	R	0.35	13.9	B	R	0.35	14.0	B
		WB	L	0.75	39.5	D	L	0.76	39.7	D	L	0.88	56.8	E	L	0.90	59.1	E
			T	0.16	4.6	A	T	0.16	4.6	A	T	0.50	14.2	B	T	0.50	14.2	B
		NB	L	0.62	46.3	D	L	0.63	46.9	D	L	1.02	84.8	F	L	1.02	86.4	F
			R	0.48	0.9	A	R	0.48	0.9	A	R	0.39	0.7	A	R	0.39	0.7	A
		INT			62.5	E			64.4	E			51.9	D			53.2	D
4	Route 9W (N-S) & Fostertown Road	EB	LTR	1.47	**	F	LTR	1.47	**	F	LTR	0.84	55.4	E	LTR	0.84	55.4	E
		WB	LTR	0.29	28.4	C	LTR	0.29	28.4	C	LTR	0.49	35.8	D	LTR	0.49	35.8	D
		NB	L	0.43	41.9	D	L	0.43	41.9	D	L	0.69	54.3	D	L	0.69	54.3	D
			TR	0.93	39.5	D	TR	1.03	61.4	E+	TR	1.15	100.9	F	TR	1.23	134.3	F+
		SB	L	0.29	40.5	D	L	0.29	40.5	D	L	0.31	46.4	D	L	0.31	46.4	D
			TR	1.31	172.7	F	TR	1.41	216.3	F+	TR	0.95	46.9	D	TR	1.05	72.2	E+
		INT			140.8	F			162.0	F			72.3	E			95.9	F
7	Route 9W (N-S) Morris Drive/Cortland Drive	EB	LTR	0.06	11.4	B	LTR	0.06	11.4	B	LTR	0.14	18.7	B	LTR	0.14	18.7	B
		WB	L	0.50	24.2	C	L	0.50	24.2	C	L	0.48	39.1	D	L	0.48	39.1	D
			TR	0.13	2.4	A	TR	0.13	4.2	A	TR	0.14	3.6	A	TR	0.15	5.8	A
		NB	L	0.03	5.8	A	L	0.03	6.2	A	L	0.01	3.5	A	L	0.01	3.5	A
			TR	0.79	17.2	B	TR	0.86	21.8	C	TR	0.96	28.5	C	TR	1.02	43.8	D
		SB	L	0.13	8.2	A	L	0.16	9.6	A	L	0.59	39.7	D	L	0.59	39.7	D
			TR	0.72	14.2	B	TR	0.78	17.0	B	TR	0.61	7.6	A	TR	0.67	9.0	A
		INT			15.9	B			19.2	B			21.1	C			29.9	C
8	Route 9W (N-S)& Carter Avenue	EB	LR	0.93	47.7	D	LR	1.00	66.6	E+	LR	0.63	18.4	B	LR	0.65	19.7	B
		NB	L	0.50	13.9	B	L	0.52	16.6	B	L	1.02	76.9	E	L	1.19	138.4	F+
			T	0.67	8.2	A	T	0.72	9.3	A	T	0.83	13.0	B	T	0.87	15.5	B
		SB	TR	0.90	25.6	C	TR	0.94	30.5	C	TR	0.85	20.8	C	TR	0.88	23.2	C
		INT			22.2	C			27.3	C			23.5	C			31.8	C
9	Route 9W (N-S) Site Driveway [2]	EB	Does Not Exist in No Build				LTR	0.37	13.1	B	Does Not Exist in No Build				LTR	0.40	12.8	B
		WB					LTR	0.08	20.1	C					LTR	0.08	19.9	B
		NB					L	0.26	5.9	A					L	0.21	4.9	A
							TR	0.64	7.5	A					TR	0.84	15.3	B
		SB					L	0.01	3.0	A					L	0.04	3.8	A
							TR	0.66	7.8	A					TR	0.58	6.5	A
		INT							7.9	A							11.5	B
Unsignalized Intersections																		
5	Route 9W (N-S) & Lattintown Road	EB	LTR	1.43	**	F	LTR	1.81	**	F	LTR	1.32	**	F	LT	1.75	**	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A	R	0.00	0.0	A
		NB	LTR	0.06	1.8	A	LTR	0.07	2.2	A	LTR	0.09	4.0	A	L	0.10	5.5	A
6	Route 9W (N-S) & Old Post Road/Magyar Drive	EB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	0.0	A
		WB	LTR	0.54	63.4	F	LTR	0.66	91.8	F	LTR	1.51	**	F	LTR	1.85	**	F
		NB	LTR	0.00	0.1	A	LTR	0.00	0.1	A	LTR	0.00	0.0	A	LTR	0.00	9.0	A
		SB	LTR	0.07	2.0	A	LTR	0.08	2.3	A	LTR	0.01	0.4	A	LTR	0.02	0.5	A
9	Route 9W (N-S) Site Driveway [2]	EB	Does Not Exist In No Build				LTR	0.60	58.6	F	Does Not Exist In No Build				LTR	0.77	88.7	F
		WB					LTR	0.32	107.4	F					LTR	0.44	162.5	F
		NB					L	0.12	10.6	B					L	0.11	10.0	A
		SB					L	0.01	9.9	A					L	0.01	11.3	B

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
+ Predicted exceedance of the traffic impact criteria
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-10 and 2.10-11.
[2] West connection site driveway analyzed as both as a signalized and an unsignalized intersection for comparison purposes.

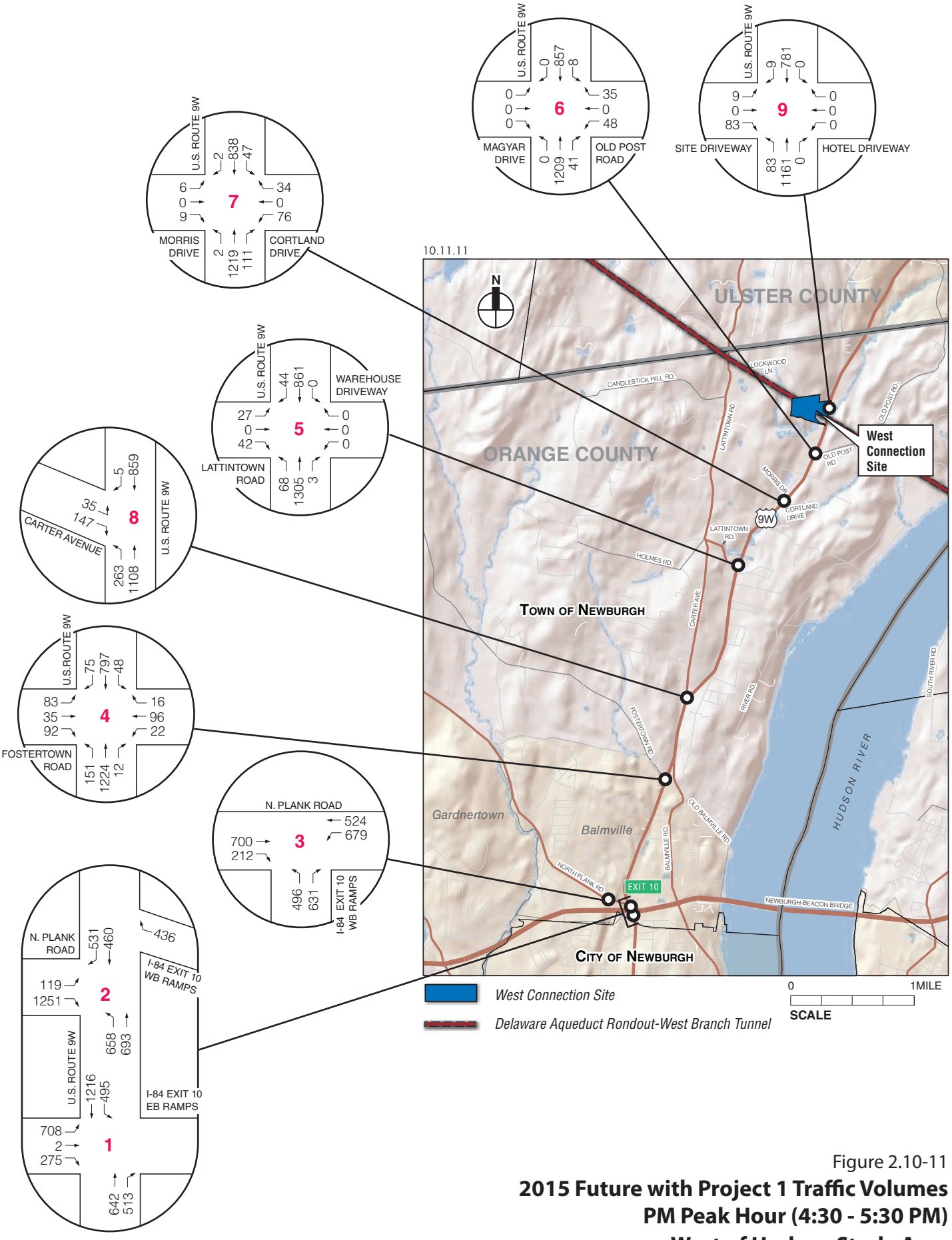


Figure 2.10-11

2015 Future with Project 1 Traffic Volumes
PM Peak Hour (4:30 - 5:30 PM)
West of Hudson Study Area

- *Route 9W and Fostertown Road*: The southbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 172.7 seconds (LOS F) to 216.3 seconds (LOS F).
- *Route 9W and Carter Avenue*: The eastbound approach of this intersection would be adversely impacted, with the approach delay increasing from 47.7 seconds (above mid-LOS D) to 66.6 seconds (LOS E).

PM Peak

- *Route 9W and Fostertown Road*: The northbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 100.9 seconds (LOS F) to 134.3 seconds (LOS F).
- *Route 9W and Fostertown Road*: The southbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 46.9 seconds (LOS D) to 72.2 seconds (LOS E).
- *Route 9W and Carter Avenue*: The northbound left-turn lane group of this intersection would be adversely impacted, with the approach delay increasing from 76.9 seconds (LOS E) to 138.4 seconds (LOS F).

Predicted Exceedances of the Traffic Impact Criteria at Unsignalized Intersections

There would be no predicted exceedances of the traffic impact criteria at any of the unsignalized intersections in the study area.

VEHICLE QUEUES

An examination of vehicular queuing data indicates that the proposed construction of Project 1 would result in an increase in queue lengths at the study area intersections by an average of between 20 and 60 feet. Intersections that would experience queues that would likely exceed the capacity (room available for vehicles to queues along a roadway segment before the queues spill back to the adjacent intersection) of the roadways include Route 9W at I-84 EB Ramps (eastbound left turn, southbound left turn), Route 9W and N. Plank Road/I-84 WB Off Ramp (northbound left turn), N. Plank Road at I-84 WB Ramps (westbound left turn), and Route 9W at Fostertown Road (northbound left turn). Queues at these locations currently exceed the storage capacities, and would continue to exceed them in the future without Project 1. Therefore, Project 1 construction would generally not result in queues further exceeding roadway storage capacities.

ACCIDENT DATA

Given the small increase in traffic from Project 1, no increase in accidents is expected in 2015 with Project 1, even without implementation of proposed mitigation measures.

PARKING CONDITIONS

No predicted temporary significant adverse impacts on parking conditions in the west of Hudson study area are expected in 2015 with Project 1. All parking for construction activity would be accommodated on-site, as described in section 2.1-4 of "Description of Project 1 Construction Program."

TRANSIT CONDITIONS

No predicted temporary significant adverse impacts on transit conditions in the west of Hudson study area would be expected in 2015 with Project 1. As all workers would likely arrive to the west connection site by auto, there would be no increase in demand in transit services, and no new trips would be added to buses operating in the area.

SCHOOL BUS OPERATIONS

No predicted temporary significant adverse impacts on school bus operations in the west of Hudson study area are expected in 2015 with Project 1. DEP would coordinate with the local school districts (see TMP in Section 2.19).

PEDESTRIAN CONDITIONS

No predicted temporary significant adverse impacts on pedestrian conditions in the west of Hudson study area are anticipated in 2015 with Project 1.

DURATION OF IMPACTS

For the intersections where the analysis indicated a potential exceedance of the traffic impact criteria during the peak construction period, additional analyses were undertaken to assist in determining how long the adverse traffic impacts would last. First, the minimal number of vehicles required to result in a traffic impact was determined. That number was then compared to the estimated Project 1 construction traffic to determine how many days during construction the exceedance would occur. The results represent the likely amount of time during construction when a traffic impact would occur, and is shown in **Table 2.10-8**.

Based on this evaluation, it was determined that construction of Project 1 would result in predicted temporary significant adverse impacts on traffic at all of the approaches identified for the anticipated peak construction period.

Table 2.10-8
Duration of Impacts Near West Connection Site with Peak Trucks - West of Hudson Study Area

	Duration of Impact									
	Route 9W & I-84 EB Ramps		Route 9W & N. Plank Rd./I-84 WB Off Ramp		N. Plank Road & I-84 WB Ramps		Route 9W & Fostertown Road		Route 9W & Carter Avenue	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Approximate Duration of Impact	83 months (6 years and 11 months)	0	69 months (5 years and 9 months)	0	42 months (3 years 6 months)	0	83 months (6 years and 11 months)	83 months (6 years and 11 months)	75 months (6 years and 3 months)	83 months (6 years and 11 months)
Impact Duration as a Percent of Construction Period	94%	0	78%	0	47%	0	94%	94%	85%	85%

Notes:
Total construction duration on the west side is 88 months (7 years and 4 months).
The Inundation Plug, Shaft 5B Connector Tunnel, and the Bypass Tunnel Driving (TBM) phases partially overlap for a period of approximately 16 months. The cumulative number of workers and trucks for all phases was used to determine the impacts to each intersection during the overlap of the construction activities.
The duration of the Bypass Tunnel Driving (TBM) Phase is 41 months in total. The first 16 months overlap with the Inundation Plug and Shaft 5B connector phases. There is no overlap for the remaining 25 months.
Installation of the Final Liner is expected to overlap with the delivery of raw materials and concrete for the CIP liner and the raw materials and concrete delivery for the plug at Shaft 5B for a period of 3 months.

2.10-4 EAST OF HUDSON

2.10-4.1 EXISTING CONDITIONS—EAST OF HUDSON

This section presents the existing traffic volumes and the operation of the various intersections and their approaches and lane groups in the east of Hudson study area based on their ability to process traffic as calculated using *HCM* methodologies. In addition, this section describes existing parking, pedestrian, and public transit facilities and conditions near the east connection site, and summarizes recent accident data collected in the east of Hudson study area to determine whether there are any problematic locations.

TRAFFIC VOLUME NETWORKS

Figures 2.10-12 and **2.10-13** present the weekday AM and PM peak hour traffic volumes, respectively, for existing conditions for the east of Hudson study area.

EXAMINATION OF SEASONAL TRAFFIC PATTERNS

To examine seasonal variations in traffic (winter vs. summer volumes variations due to seasonal uses in the study area, such as marinas, minor league baseball at Dutchess Stadium, etc.), ATR counts that represented spring and summer traffic conditions were obtained from both Dutchess County Department of Public Works (DPW) and the NYSDOT. The majority of the traffic counts collected for this study were collected in December. ATR counts obtained from NYSDOT were conducted in August 2009 along NYS Route 9D, just south of Stonykill Road. The ATR counts obtained from the Dutchess County DPW were conducted in May 2010 along Chelsea Road, east of Chelsea Ridge Drive.

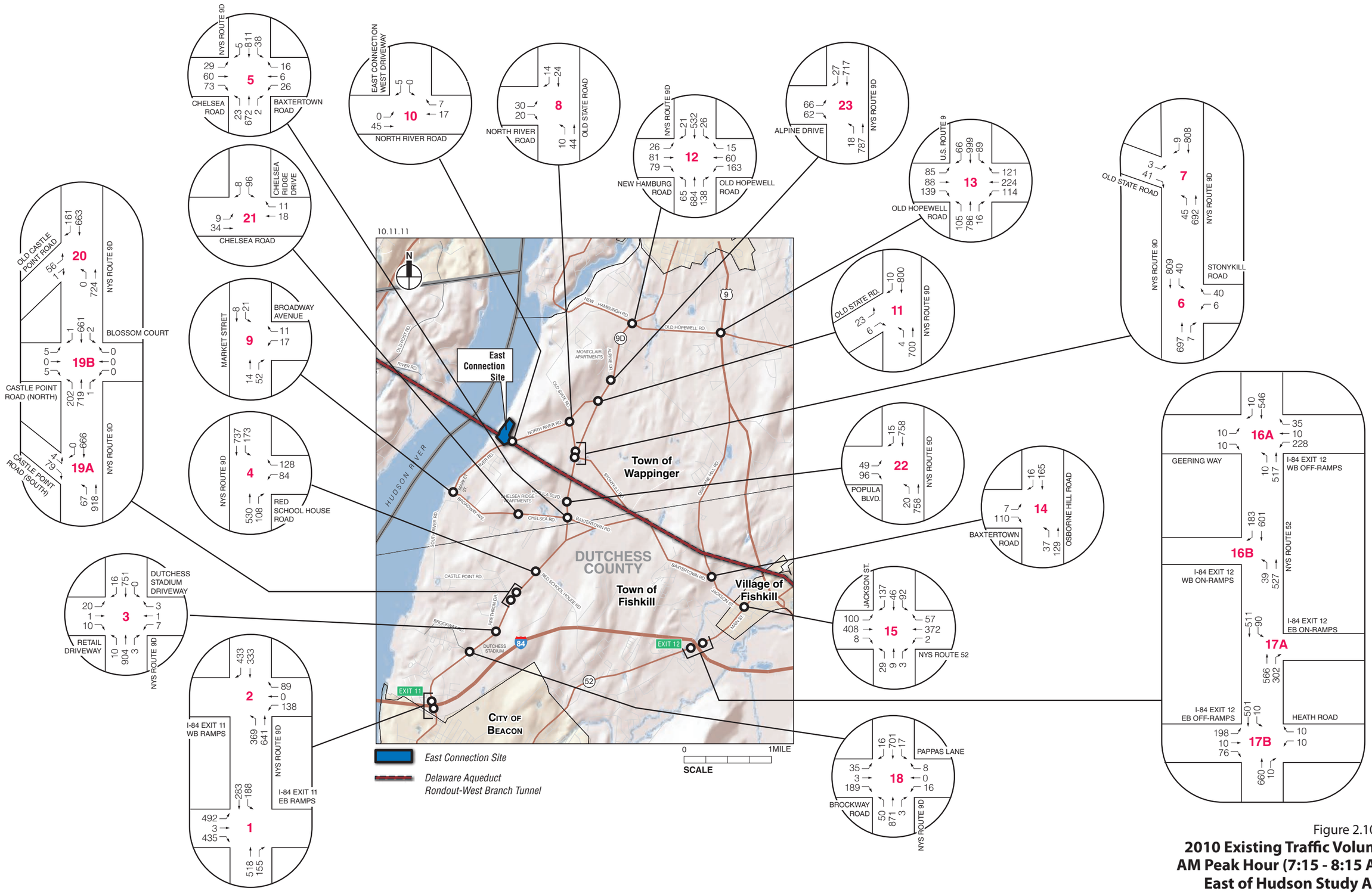


Figure 2.10-12
2010 Existing Traffic Volumes
AM Peak Hour (7:15 - 8:15 AM)
East of Hudson Study Area

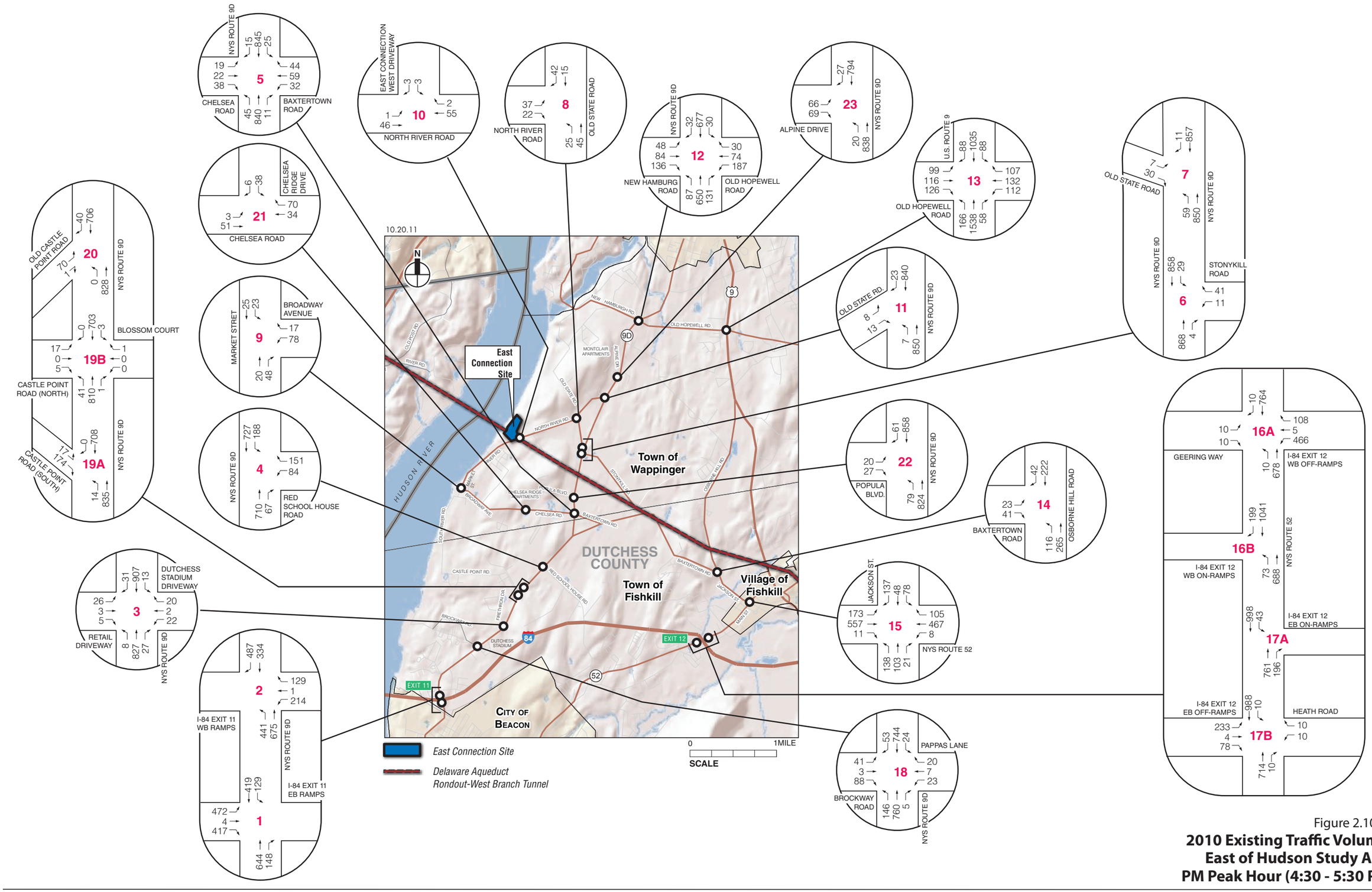


Figure 2.10-13
2010 Existing Traffic Volumes
East of Hudson Study Area
PM Peak Hour (4:30 - 5:30 PM)

A comparison of these ATR volumes (summer months) during peak periods with the existing conditions traffic volumes (winter) indicates that the existing conditions traffic volumes are generally comparable to or exceed the ATR volumes and adequately represent any seasonal variations in traffic that may occur in the traffic study area, as shown in **Table 2.10-9**.

Table 2.10-9
Comparison of DEIS Existing Traffic Volumes and ATR Data

		AM Peak			PM Peak		
Roadway/Location	**Direction**	**2010 Existing Conditions Volumes (DEIS)**	**2010 NYSDOT ATR Volume Range**	**Range of Percentage Increase of DEIS Volumes from ATR Volumes**	**2010 Existing Conditions Volumes (DEIS)**	**2010 NYSDOT ATR Volume Range**	**Range of Percentage Increase of DEIS Volumes from ATR Volumes**
NYS Route 9D, South of Stonykill Road	Northbound	704	572-615	14% - 23%	872	775-781	12% - 13%
	Southbound	815	536-612	33% - 52%	869	757-801	8% - 15%
		2010 Existing Conditions Volumes (DEIS)	**2010 Dutchess County ATR Volume Range**	**Range of Percentage Increase of DEIS Volumes from ATR Volumes**	**2010 Existing Conditions Volumes (DEIS)**	**2010 Dutchess County ATR Volume Range**	**Range of Percentage Increase of DEIS Volumes from ATR Volumes**
Chelsea Road, East of Chelsea Ridge Drive	Eastbound	162	101-138	17% - 60%	79	74-87	0% - 7%
	Westbound	34	31-34	0% - 10%	119	99-108	10% - 20%

VEHICLE SPEEDS

In response to a request from the Town of Wappinger Planning Board, vehicle speeds were assessed along selected study area roadways, including NYS Route 9D and Chelsea Road/Broadway (County Route 92). NYS Route 9D has a posted speed limit of 45 mph (35 mph near Old Hopewell Road) in the vicinity of Old State Road, and Chelsea Road has a posted speed limit of 40 mph in the vicinity of NYS Route 9D.

Vehicle speed data was collected in September 2011 at three locations to assess general vehicle speed conditions in the study area. Vehicle speed data was collected utilizing ATR machines along NYS Route 9D at two locations: (1) between the two Old State Road intersections and (2) just south of Old Hopewell Road/New Hamburg Road and also along Broadway (east of Market Street). The results are described below.

NYS Route 9D

An assessment of the ATR speed data indicates that the 85th percentile speed along NYS Route 9D is approximately 49 mph in the northbound direction and 48 mph in the southbound direction (the 85th percentile speed is the speed at which 85 percent of vehicles are traveling at or below). The ATR speed data indicates that the average speed along NYS Route 9D is approximately 45 mph in the northbound directions and 35 mph in the southbound direction.

The 85th percentile speeds in both directions along NYS Route 9D reveal vehicle speeds slightly in excess of the posted speed limit. The average speed along northbound NYS Route 9D exceeds the posted speed limit while the average speed along southbound NYS Route 9D is lower than the posted speed limit.

Chelsea Road/Broadway (County Route 92)

An assessment of the ATR speed data indicates that the 85th percentile speeds along Broadway are approximately 37 mph in the eastbound direction and 33 mph in the westbound direction. The ATR speed data indicates that the average speeds along Broadway are approximately 31 mph in the eastbound direction and 26 mph in the westbound direction. The 85th percentile and average speeds in both directions along Broadway are all lower than the posted speed limit of 40 mph.

CAPACITY ANALYSIS RESULTS

Table 2.10-10 presents the existing conditions LOS summary for the intersections in the east of Hudson study area.

Signalized Intersections—East of Hudson River Study Area

Nearly all signalized intersections examined in the study area currently operate acceptably at an overall LOS D or better during the peak hours analyzed. However, four locations currently operate unacceptably (note that LOS D for signalized intersections is generally considered unacceptable when the vehicle delay value is greater than 45.0 seconds, mid-range LOS D):

- NYS Route 9D at I-84 Eastbound Entrance and Exit Ramps operates at an overall LOS E with an intersection delay of 60.2 seconds during the AM peak hour and at an overall LOS D with an intersection delay of 51.5 seconds during the PM peak hour.
- NYS Route 9D at New Hamburg Road/Old Hopewell Road (County Route 28) operates at an overall LOS D with an intersection delay of 54.8 seconds during the PM peak hour.
- U.S Route 9 at Old Hopewell Road (County Route 28) operates at an overall LOS E with an intersection delay of 55.5 seconds during the AM peak hour and at an overall LOS D with an intersection delay of 47.7 seconds during the PM peak hour.
- NYS Route 52 at I-84 Westbound Off-Ramp/Geering Way operates at an overall LOS E with an intersection delay of 61.7 seconds during the PM peak hour.

Table 2.10-10
2010 Existing Conditions LOS Summary, East of Hudson Study Area

No.[1]	Intersection	Approach	Lane Group	7:15 - 8:15 AM V/C Ratio	7:15 - 8:15 AM Delay (SPV)	7:15 - 8:15 AM LOS	4:30 - 5:30 PM V/C Ratio	4:30 - 5:30 PM Delay (SPV)	4:30 - 5:30 PM LOS
Signalized Intersections									
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	1.30	202.0	F	1.21	171.0	F
			T	0.01	37.3	D	0.01	37.2	D
			R	0.67	8.3	A	0.70	12.3	B
		NB	TR	0.29	17.8	B	0.39	23.9	C
		SB	L	0.42	15.8	B	0.29	14.6	B
			T	0.31	12.0	B	0.43	16.5	B
		INT			60.2	E		51.5	D
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	0.38	44.0	D	0.59	50.3	D
			R	0.23	8.0	A	0.32	12.4	B
		NB	L	0.55	17.5	B	0.62	19.6	B
			T	0.30	14.3	B	0.31	11.8	B
		SB	T	0.23	25.1	C	0.23	26.7	C
			R	0.49	4.3	A	0.53	4.6	A
		INT			16.5	B		18.2	B
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	0.13	25.0	C	0.19	26.7	C
			R	0.06	14.5	B	0.03	16.0	B
		WB	LT	0.05	24.6	C	0.16	26.3	C
			R	0.02	17.7	B	0.13	12.3	B
		NB	L	0.02	2.3	A	0.02	2.9	A
			T	0.62	5.6	A	0.58	8.7	A
			R	0.00	0.0	A	0.02	0.0	A
		SB	L	0.00	0.0	A	0.03	2.9	A
			T	0.51	6.5	A	0.67	11.0	B
			R	0.01	3.4	A	0.03	3.5	A
		INT			6.4	A		10.3	B
4	Route 9D (N-S) & Red School House Road	WB	L	0.37	27.4	C	0.38	27.4	C
			R	0.25	6.9	A	0.31	10.3	B
		NB	T	0.67	18.9	B	0.79	24.9	C
			R	0.15	3.2	A	0.08	3.8	A
		SB	L	0.37	8.3	A	0.43	12.4	B
			T	0.62	8.1	A	0.54	6.9	A
		INT			11.9	B		15.2	B
5	Route 9D (N-S) & Chelsea Road/Baxtertown Road	EB	LTR	0.65	32.3	C	0.37	20.6	C
		WB	LTR	0.34	24.5	C	0.53	30.6	C
		NB	L	0.09	4.8	A	0.15	4.9	A
			TR	0.74	18.3	B	0.71	16.1	B
		SB	L	0.11	4.8	A	0.08	4.4	A
			TR	0.78	19.2	B	0.76	19.7	B
		INT			19.8	B		18.4	B
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	0.53	41.1	D	0.61	44.0	D
			R	0.33	12.0	B	0.46	9.8	A
		WB	L	0.79	57.6	E	1.04	109.2	F
			TR	0.34	31.6	C	0.53	39.4	D
		NB	L	0.21	8.9	A	0.45	17.0	B
			TR	1.02	58.6	E	1.03	64.3	E
		SB	L	0.12	8.2	A	0.16	10.8	B
			TR	0.72	24.4	C	0.96	48.8	D
		INT			42.3	D		54.8	D

Table 2.10-10 (cont'd)
2010 Existing Conditions LOS Summary, East of Hudson Study Area

No.[1]	Intersection	Approach	Lane Group	7:15 - 8:15 AM V/C Ratio	7:15 - 8:15 AM Delay (SPV)	7:15 - 8:15 AM LOS	4:30 - 5:30 PM V/C Ratio	4:30 - 5:30 PM Delay (SPV)	4:30 - 5:30 PM LOS
Signalized Intersections (cont'd)									
13	U.S. Route 9 (N-S) & Old Hopewell Road (CR 28)	EB	L	0.48	58.8	E	0.57	64.9	E
			T	0.48	58.2	E	0.63	67.6	E
			R	0.49	14.1	B	0.47	12.6	B
		WB	LT	1.29	186.4	F	0.88	83.3	F
			R	0.43	25.6	C	0.33	12.9	B
		NB	L	0.56	60.5	E	0.74	73.7	E
			T	0.60	28.1	C	0.98	52.9	D
			R	0.02	2.3	A	0.06	2.9	A
		SB	L	0.53	60.7	E	0.56	71.7	E
			T	0.80	35.0	D	0.70	35.3	D
			R	0.08	2.7	A	0.09	2.6	A
		INT			55.5	E		47.7	D
15	Jackson Street & NYS Route 52 (E-W)	EB	L	0.29	15.0	B	0.59	35.5	D
			TR	0.62	18.6	B	0.72	29.3	C
		WB	L	0.01	10.5	B	0.04	16.2	B
			T	0.63	25.2	C	0.79	39.4	D
			R	0.12	19.1	B	0.22	25.8	C
		NB	L	0.18	37.2	D	0.55	48.9	D
			TR	0.07	36.8	D	0.47	46.0	D
		SB	L	0.35	31.0	C	0.38	42.4	D
			TR	0.57	23.1	C	0.72	36.9	D
		INT			22.4	C		36.2	D
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/Geering Way	EB	LTR	0.07	16.3	B	0.07	17.2	B
		WB	LT	0.91	63.0	E	1.38	214.4	F
			R	0.10	8.3	A	0.22	6.2	A
		NB	L	0.04	7.0	A	0.06	7.3	A
			T	0.59	11.0	B	0.64	11.7	B
		SB	TR	0.57	14.8	B	0.77	22.6	C
		INT			22.0	C		61.7	E
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	0.96	68.2	E	0.88	55.0	D
		WB	LTR	0.06	16.3	B	0.05	16.8	B
		NB	TR	0.69	18.0	B	0.66	16.5	B
		SB	L	0.05	5.8	A	0.03	6.4	A
			T	0.55	10.7	B	0.87	21.1	C
		INT			26.6	C		24.7	C
18	Route 9D (N-S) & Brockway Road/Pappas Lane (E-W)	EB	LT	0.15	31.2	C	0.22	30.4	C
			R	0.48	8.4	A	0.25	7.5	A
		WB	LTR	0.11	25.7	C	0.30	23.3	C
		NB	L	0.09	2.3	A	0.34	4.8	A
			TR	0.61	8.5	A	0.59	9.2	A
		SB	L	0.04	2.3	A	0.06	3.1	A
			T	0.36	6.0	A	0.45	8.1	A
			R	0.02	2.5	A	0.07	1.9	A
		INT			8.0	A		9.1	A

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-12 and 2.10-13.

Table 2.10-10 (cont'd)
2010 Existing Conditions LOS Summary, East of Hudson Study Area

No.[1]	Intersection	Approach	Lane Group	7:15 - 8:15 AM V/C Ratio	7:15 - 8:15 AM Delay (SPV)	7:15 - 8:15 AM LOS	4:30 - 5:30 PM V/C Ratio	4:30 - 5:30 PM Delay (SPV)	4:30 - 5:30 PM LOS
Unsignalized Intersections									
6	Route 9D (N-S) & Stonykill Road	WB	LR	0.29	24.8	C	0.39	39.1	E
		SB	LT	0.05	1.5	A	0.05	1.4	A
7	Route 9D (N-S) & Old State Road (Southern Intersection)	EB	L	0.04	42.2	E	0.13	60.3	F
			R	0.14	17.0	C	0.13	18.6	C
		NB	LT	0.07	1.9	A	0.09	2.7	A
		SB	R	0.01	8.6	A	0.01	8.6	A
8	Old State Road (N-S) & River Road North[(2)]	EB	LR	0.07	7.4	A	0.09	7.6	A
		NB	LT	0.09	7.6	A	0.09	7.7	A
		SB	TR	0.07	7.2	A	0.09	7.1	A
9	Broadway (E-W) & Market Street	WB	LR	0.05	9.3	A	0.13	10.0	A
		SB	LT	0.02	5.5	A	0.02	3.7	A
10	River Road North (E-W) & East Connection West Driveway	EB	LT	0.00	0.0	A	0.00	0.2	A
		SB	LR	0.01	8.5	A	0.01	9.1	A
11	Route 9D (N-S) & Old State Road (Northern Intersection)	EB	LR	0.24	41.2	E	0.28	43.3	E
		NB	LT	0.01	0.2	A	0.01	0.4	A
14	Baxtertown Road (E-W) & Osborne Hill Road/Jackson Street	EB	L	0.19	10.6	B	0.12	13.6	B
		NB	LT	0.04	2.0	A	0.11	3.3	A
16B	NYS Route 52 (N-S) & I-84 WB On-Ramp	NB	L	0.08	10.7	B	0.23	18.5	C
17A	NYS Route 52 (N-S) & I-84 EB On-Ramp	SB	L	0.20	12.9	B	0.08	11.9	B
19A	Route 9D (N-S) & Castle Point Road (Southern Intersection)	EB	LR	0.26	18.8	C	0.85	57.0	F
		NB	L	0.08	9.5	A	0.02	9.3	A
			T	0.59	0.0	A	0.53	0.0	A
		SB	TR	0.42	0.0	A	0.45	0.0	A
19B	Route 9D (N-S) & Castle Point Road (Northern Intersection) (E-W)	EB	LTR	0.15	62.2	F	0.38	73.3	F
		WB	LTR	0.00	0.0	A	0.00	15.3	C
		NB	L	0.25	10.4	B	0.05	9.4	A
			TR	0.46	0.0	A	0.51	0.0	A
		SB	L	0.00	9.3	A	0.00	9.7	A
			TR	0.41	0.0	A	0.44	0.0	A
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	0.72	93.9	F	0.74	94.0	F
		NB	LT	0.00	0.0	A	0.00	0.0	A
		SB	TR	0.52	0.0	A	0.46	0.0	A
21	Chelsea Ridge Drive & Chelsea Road (E-W)	EB	LT	0.01	1.6	A	0.00	0.4	A
		WB	TR	0.02	0.0	A	0.07	0.0	A
		SB	LR	0.17	9.8	A	0.07	9.5	A
22	Route 9D (N-S) & Popula Boulevard	EB	LR	1.99	**	F	1.54	**	F
		NB	LT	0.03	0.9	A	0.12	3.2	A
		SB	TR	0.49	0.0	A	0.58	0.0	A
23	Route 9D (N-S) & Alpine Drive	EB	LR	0.92	105.5	F	1.07	163.1	F
		NB	LT	0.02	0.6	A	0.80	0.8	A
		SB	TR	0.47	0.0	A	0.00	0.0	A

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-12 and 2.10-13.
[2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

Unsignalized Intersections—East of Hudson Study Area

At intersections without traffic lights in the study area (unsignalized intersections), most traffic lanes and approaches at intersections generally operate acceptably during the peak hours analyzed, with a majority at LOS C or better. However, eight groups of traffic lanes and approaches s in the east of Hudson study area currently operate unacceptably:

- The westbound approach at NYS Route 9D and Stonykill Road operates at LOS E during the PM peak hour (approach delay of 39.1 seconds).
- The eastbound left turn movement at NYS Route 9D and Old State Road (Southern Intersection) operates at LOS E during the AM peak hour (lane group delay of 42.2 seconds) and LOS F during the PM peak hour (lane group delay of 60.3 seconds).
- The eastbound approach at NYS Route 9D and Old State Road (Northern Intersection) operates at LOS E during the AM peak hour (approach delay of 41.2 seconds) and LOS E during the PM peak hour (approach delay of 43.3 seconds).
- The eastbound approach at NYS Route 9D and Castle Point Road (Southern Intersection) operates at LOS F during the PM peak hour (approach delay of 57.0 seconds).
- The eastbound approach at NYS Route 9D and Castle Point Road (Northern Intersection) operates at LOS F during the AM peak hour (approach delay of 62.2 seconds) and LOS F during the PM peak hour (approach delay of 73.3 seconds).
- The eastbound approach at NYS Route 9D and Old Castle Point Road operates at LOS F during the AM peak hour (approach delay of 93.9 seconds) and LOS F during the PM peak hour (approach delay of 94.0 seconds).
- The eastbound approach at NYS Route 9D and Popula Boulevard operates at LOS F during both the AM and PM peak hours (approach delay greater than 240.0 seconds).
- The eastbound approach at NYS Route 9D and Alpine Drive operates at LOS F during the AM peak hour (approach delay of 105.5 seconds) and LOS F during the PM peak hour (approach delay of 163.1 seconds).

It is not uncommon for minor approaches (the intersection approaches that generally carry lighter volumes of traffic) at unsignalized intersections to operate at LOS E or F during peak hour conditions. This is often due to the heavy opposing traffic on the major roadway (meaning, the roadway that generally carries more traffic) that make turns onto the major roadway from the minor roadway difficult. However, field measurements at these minor approaches during the peak hours indicate delays ranging between 10 and 35 seconds. These field measurements indicate LOS conditions ranging from B to D, which is better than conditions modeled by Synchro.

VEHICLE QUEUES

Vehicle queues, or the lines of traffic that form while waiting at an intersection, were examined for the study area intersections. Vehicle queues, which generally range between 20 and 1,060

feet, occur at several of the Route 9D intersections during both the AM and PM peak hours, primarily on the through movements, in addition to certain locations along other major study area roadways (e.g., U.S. Route 9, NYS Route 52).

ACCIDENT DATA

Detailed accident reports were obtained from NYSDOT for the most recent three-year period from July 1, 2007, through June 30, 2010, for 33 locations in the east of Hudson study area. **Table 2.10-11** presents a summary of the accident data, including the number and type of accidents at each intersection and the average annual accident rates over the analysis period. The table also presents a breakdown of accidents by severity. It is important to note that no fatalities have been reported within the study area over the three-year period.

According to the *CEQR Technical Manual*, a high-accident location is defined as either having (1) 48 or more total reportable and non-reportable crashes in 12 consecutive months or (2) five or more pedestrian/bicyclists injury crashes in 12 consecutive months. In addition, the accidents must occur during the most recent three-year period for which data is available. Based on these guidelines, none of the intersections in the east of Hudson study area can be considered a high-accident location. However, the following intersections had the largest number of accidents in the study area:

- U.S. Route 9 at Old Hopewell Road averaged 11.3 accidents per year over the three-year period. Of the 34 total accidents, 14 accidents, or 41 percent, were reported as "rear-end" collisions. The remaining 19 accidents were right-angle, left-turn, right-turn, head-on, non-reported, or undefined. Twenty, or 59 percent, of the 34 total accidents did report a personal injury.
- Jackson Street at NYS Route 52 averaged 5.0 accidents per year over the three-year period. Of the 15 total accidents, 10 accidents, or 67 percent, were reported as "rear-end" collisions. The remaining five accidents were right-angle, left-turn, sideswipe, non-reported, or undefined. Ten, or 67 percent, of the 15 total accidents did report a personal injury.
- NYS Route 9D at Red School House Road (County Route 36) averaged 4.7 accidents per year over the three-year period. Of the 14 total accidents, seven accidents, or 50 percent, were reported as "rear-end" collisions, and one involved a "left turn movement against another vehicle." The remaining six accidents were unknown, non-reported, or undefined. Five, or 36 percent, of the 14 total accidents did report a personal injury.

Table 2.10-11
East of Hudson Study Area Accident Summary

Intersection	Number of Accidents		Accident Trend															
	Avg/Yr	Period	Fatalities	Personal Injury	Non-Reported	Reported	Overtaking	Rear End	Right Angle	Left Turn (with other car)	Left Turn (against other car)	Right Turn (with other car)	Right Turn (against other car)	Sideswipe	Ped/ Bike	Head On	Other	Unknown
Single Intersection Locations																		
1. I-84 Eastbound ramps and NYS Route 9D	1.0	3 Period: 7/1/07 to 6/30/10				3	1				2							
2. I-84 Westbound ramps and NYS Route 9D	1.3	4 Period: 7/1/07 to 6/30/10		2		4		1			2						1	
3. NYS Route 9D and Dutchess Stadium	0.3	1 Period: 7/1/07 to 6/30/10		1		1		1										
4. NYS Route 9D Red School House Road (County Route 36)	4.7	14 Period: 7/1/07 to 6/30/10		5		14		7			1						5	1
5. NYS Route 9D and Chelsea Road (County Route 92) and Baxtertown Road (County Route 34)	1.0	3 Period: 7/1/07 to 6/30/10			1	2		1	1		1							
6-7. NYS Route 9D and Old State Road (Southern Intersection)/Stonykill Road	2.0	6 Period: 7/1/07 to 6/30/10				6	1		1					1			3	
8. Old State Road and River Road North	1.3	4 Period: 7/1/07 to 6/30/10			3	1				1							3	
9. Broadway (County Route 92) and Market Street	0.3	1 Period: 7/1/07 to 6/30/10		1		1											1	
10. North River Road and Shaft 6 Driveway	0.3	1 Period: 7/1/07 to 6/30/10				1											1	
11. NYS Route 9D and Old State Road (Northern Intersection)	0.3	1 Period: 7/1/07 to 6/30/10			1					1								
12. NYS Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)	2.3	7 Period: 7/1/07 to 6/30/10			4	3		5									1	1
13. U.S. Route 9 and Old Hopewell Road (County Route 28)	11.3	34 Period: 7/1/07 to 6/30/10		20	8	26	1	14	6		2	1				1	2	7

Table 2.10-11 (cont'd)
East of Hudson Study Area Accident Summary

Intersection	Number of Accidents		Accident Trend															
	Avg/Yr	Period	Fatalities	Personal Injury	Non-Reported	Reported	Overtaking	Rear End	Right Angle	Left Turn (with other car)	Left Turn (against other car)	Right Turn (with other car)	Right Turn (against other car)	Sideswipe	Ped/Bike	Head On	Other	Unknown
Single Intersection Locations																		
14. Baxtertown Road & Osborne Hill Road/Jackson Street	0.7	2 Period: 7/1/07 to 6/30/10		1	1	1		1			1							
15. Jackson Street and NYS Route 52	5.0	15 Period: 7/1/07 to 6/30/10		10	4	11		10	1		1			1			1	1
16-17. I-84 EB & WB Ramps and NYS Route 52[1]	0.7	2 Period: 7/1/07 to 6/30/10				2		1									1	
18. NYS Route 9D and Brockway Road/Pappas Lane	4.0	12 Period: 7/1/07 to 6/30/10		5	3	9		4	2		1		2				3	
19. NYS Route 9D and Castle Point Road	2.0	6 Period: 7/1/07 to 6/30/10		2	1	5		4	1		1							
20. NYS Route 9D and Old Castle Point Road	0.7	2 Period: 7/1/07 to 6/30/10		1	1	1				1					1			
21. Chelsea Road and Chelsea Ridge Drive	0.0	0 Period: 7/1/07 to 6/30/10																
22.NYS Route 9D and Popula Boulevard	0.7	2 Period: 7/1/07 to 6/30/10		3		2			1		1							
23.NYS Route 9D and Alpine Drive	2.3	7 Period: 7/1/07 to 6/30/10		3	1	6	1	2				1					1	2
Corridor locations																		
24. County Route 92/Chelsea Road from Market Street to NYS Route 9D	6.0	18 Period: 7/1/07 to 6/30/10		11	4	14		6	3		2		1				6	
25. North River Road from CR 92/Chelsea Road to Old State Road	1.3	4 Period: 7/1/07 to 6/30/10			3	1											4	
26. Old State Road from River Road North to NYS Route 9D (southern intersection)	2.3	7 Period: 7/1/07 to 6/30/10		1		7		1	1					1			4	

Table 2.10-11 (cont'd)
East of Hudson Study Area Accident Summary

Corridor	Number of Accidents		Accident Trend															
	Avg/Yr	Period	Fatalities	Personal Injury	Non-Reported	Reported	Overtaking	Rear End	Right Angle	Left Turn (with other car)	Left Turn (against other car)	Right Turn (with other car)	Right Turn (against other car)	Sideswipe	Ped/Bike	Head On	Other	Unknown
Corridor locations																		
27. Old State Road from River Road North to NYS Route 9D (Northern intersection)	1.3	4 Period: 7/1/07 to 6/30/10		1	1	3		1	1			1					1	
28. NYS Route 9D from Old State Road (Southern Intersection) to Old Hopewell Road (CR 28)	28.7	86 Period: 7/1/07 to 6/30/10		30	24	62	2	32	4	1	4	2		5			31	5
29. Old Hopewell Road (County Route 28) from NYS Route 9D to U.S. Route 9	9.3	28 Period: 7/1/07 to 6/30/10		6	12	16	2	9	1	1	2				1	1	9	2
30. Baxtertown Road from NYS Route 9D to Osborne Hill Road/Jackson Street	13.0	39 Period: 7/1/07 to 6/30/10		16	9	30		8	6	1	3		1				19	1
31.Stonykill Road from NYS Route 9D to Baxtertown Road	4.0	12 Period: 7/1/07 to 6/30/10		7	1	11		2	1	1				1			1	1
32 Jackson Street from Baxtertown Road to NYS Route 52	11.3	34 Period: 7/1/07 to 6/30/10		15	12	22	3	14	3		3			2			7	2
33. NYS Route 52 from I-84 Ramps to Jackson Street	41.7	125 Period: 7/1/07 to 6/30/10		39	54	71	6	50	10	3	9	2	2	4	1	3	25	11

Note: (1) NYSDOT records do not distinguish between EB and WB Ramps**Source:** NYSDOT
Source: NYSDOT

Local and state police agencies were contacted to determine their experiences of accidents in the study area. Agencies generally reported that their accident reports were sent to NYSDOT, and therefore the data should be consistent between the police departments and NYSDOT. To ensure consistency, accident reports were requested and obtained from some of the local county police departments and the Dutchess County DPW, and it was shown that a consistent number of accidents were reported between the police department records, Dutchess DPW records, and NYSDOT records.

PARKING CONDITIONS

On-street parking is generally not permitted along the east of Hudson study area roadways. Most of the land uses in the study area have their own off-street parking facilities.

TRANSIT CONDITIONS

The Dutchess County LOOP transit system provides fixed bus route service and demand response services, such as Dial-A-Ride and Paratransit service. LOOP also runs a RailLink bus service in cooperation with Metro-North Railroad. Metro-North's Hudson Line provides service to New York City via its stations in Beacon and New Hamburg, which is just southwest of the study area.

PEDESTRIAN CONDITIONS

Pedestrian volumes in the east of Hudson study area were generally observed to be minimal.

2.10-4.2 FUTURE WITHOUT PROJECT 1, SHAFT AND BYPASS TUNNEL CONSTRUCTION—EAST OF HUDSON

This section describes the assumptions used to develop the future traffic volumes and framework for the future without Project 1. At the east connection site, the 2015 peak year was chosen to reflect Project 1's peak construction activity (of both workers and trucks combined), which would occur during the excavation phase for the bypass tunnel.

TRAFFIC VOLUME NETWORKS

Regardless of whether Project 1 is completed, it is assumed that increased traffic in the east of Hudson study area will be generated by the other site developments as well as from general background traffic growth. To develop the future condition traffic volumes, the 2010 existing volumes were "grown" to the future analysis year by incorporating growth factors that account for general background growth in the study area.

To account for anticipated traffic increases (due to factors such increased population and development outside of the immediate study area) an average annual growth rate of 1 or 2 percent is typically utilized in the Lower Hudson Valley. In an effort to be conservative, the higher average annual growth factor of 2.0 percent was utilized for the east of Hudson study area. This means that

the existing traffic volumes were multiplied by the number of years into the future (five), growing the traffic volumes by 2.0 percent per year (or 10 percent total) to develop traffic volumes in the future without Project 1 traffic conditions from general growth.

Figures 2.10-14 and **2.10-15** present the weekday AM and PM peak hour traffic volumes, respectively, for future conditions without Project 1 for the east of Hudson study area**.**

CAPACITY ANALYSIS RESULTS

At most locations in the study area, traffic conditions are projected to worsen slightly, compared with existing conditions, as a result of projected future increases in traffic. The following is a summary of 2015 future without Project 1 traffic conditions at signalized and unsignalized intersections. **Table 2.10-12** presents the LOS summary for the intersections in the east of Hudson study area.

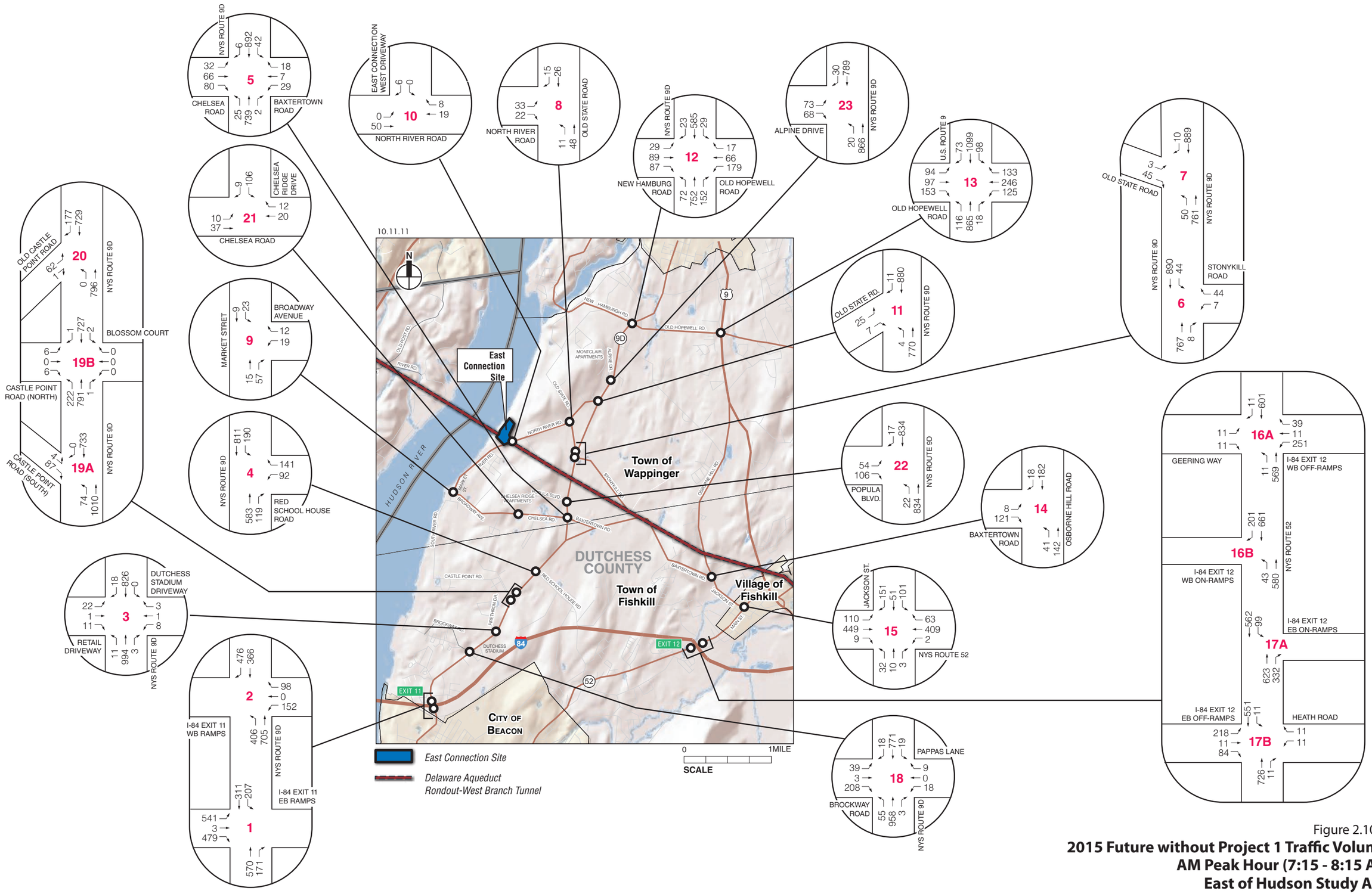


Figure 2.10-14
2015 Future without Project 1 Traffic Volumes
AM Peak Hour (7:15 - 8:15 AM)
East of Hudson Study Area

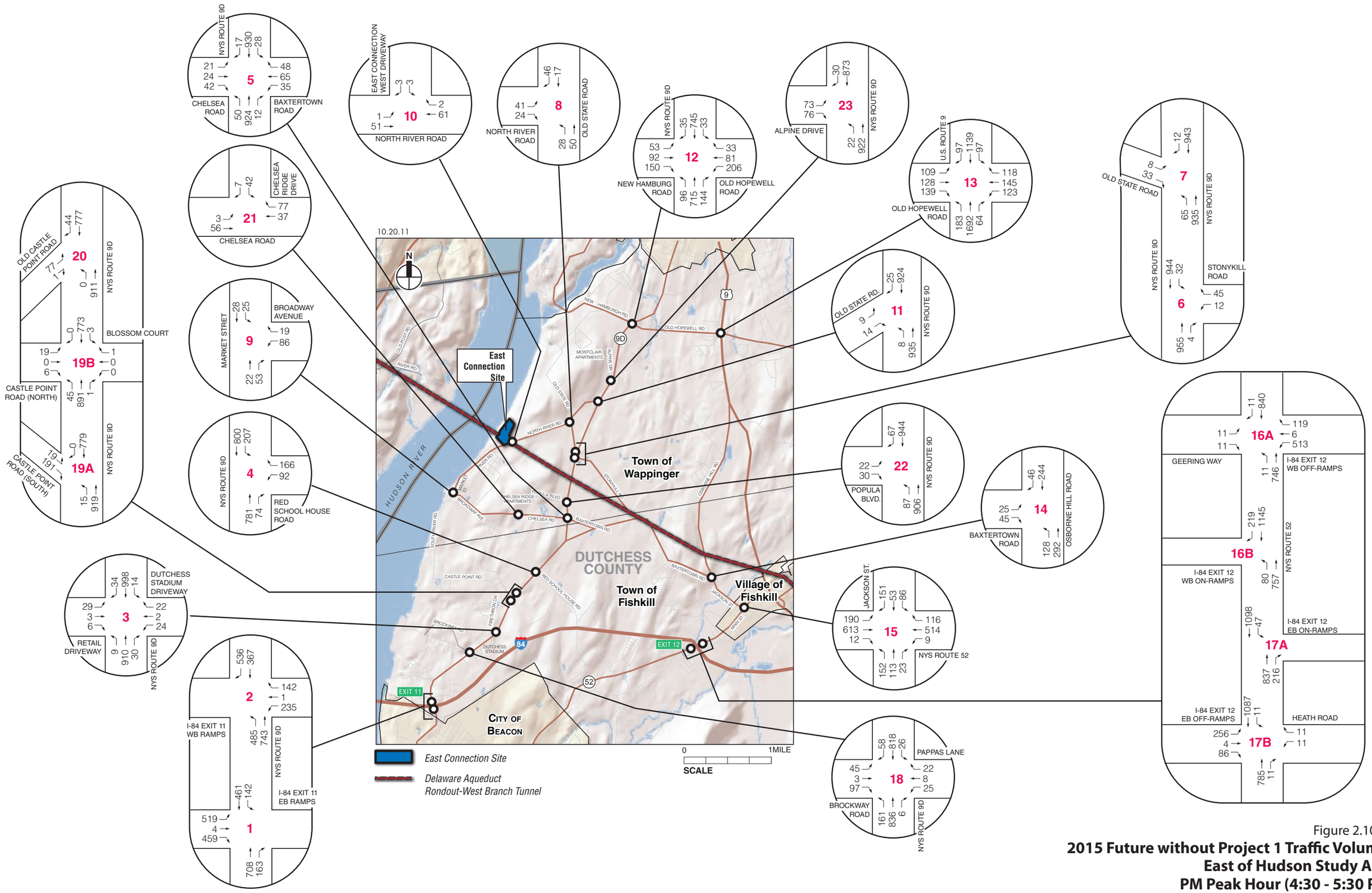


Figure 2.10-15

2015 Future without Project 1 Traffic Volumes
East of Hudson Study Area
PM Peak Hour (4:30 - 5:30 PM)

Table 2.10-12

2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - East of Hudson Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	1.30	202.0	F	L	1.43	**	F	L	1.21	171.0	F	L	1.33	**	F
			T	0.01	37.3	D	T	0.01	37.3	D	T	0.01	37.2	D	T	0.01	37.2	D
			R	0.67	8.3	A	R	0.71	9.1	A	R	0.70	12.3	B	R	0.80	22.2	C
		NB	TR	0.29	17.8	B	TR	0.33	19.4	B	TR	0.39	23.9	C	TR	0.45	26.7	C
		SB	L	0.42	15.8	B	L	0.47	18.4	B	L	0.29	14.6	B	L	0.32	15.8	B
			T	0.31	12.0	B	T	0.34	12.2	B	T	0.43	16.5	B	T	0.47	17.0	B
		INT			60.2	E			75.5	E			51.5	D			70.4	E
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	0.38	44.0	D	LT	0.42	45.0	D	LT	0.59	50.3	D	LT	0.65	53.0	D
			R	0.23	8.0	A	R	0.25	7.8	A	R	0.32	12.4	B	R	0.36	14.7	B
		NB	L	0.55	17.5	B	L	0.62	19.0	B	L	0.62	19.6	B	L	0.69	27.7	C
			T	0.30	14.3	B	T	0.33	14.6	B	T	0.31	11.8	B	T	0.34	12.2	B
		SB	T	0.23	25.1	C	T	0.26	26.8	C	T	0.23	26.7	C	T	0.27	28.2	C
			R	0.49	4.3	A	R	0.53	4.6	A	R	0.53	4.6	A	R	0.57	4.9	A
		INT			16.5	B			17.3	B			18.2	B			20.5	C
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	0.13	25.0	C	LT	0.14	26.2	C	LT	0.19	26.7	C	LT	0.21	26.9	C
			R	0.06	14.5	B	R	0.08	14.3	B	R	0.03	16.0	B	R	0.04	15.2	B
		WB	LT	0.05	24.6	C	LT	0.06	25.5	C	LT	0.16	26.3	C	LT	0.17	26.5	C
			R	0.02	17.7	B	R	0.02	17.7	B	R	0.13	12.3	B	R	0.13	12.1	B
		NB	L	0.02	2.3	A	L	0.03	2.7	A	L	0.02	2.9	A	L	0.03	3.1	A
			T	0.62	5.6	A	T	0.73	9.3	A	T	0.58	8.7	A	T	0.64	10.3	B
			R	0.00	0.0	A	R	0.00	0.0	A	R	0.02	0.0	A	R	0.02	0.0	A
		SB	L	0.00	0.0	A	L	0.00	0.0	A	L	0.03	2.9	A	L	0.04	3.1	A
			T	0.51	6.5	A	T	0.60	9.2	A	T	0.67	11.0	B	T	0.74	13.1	B
			R	0.01	3.4	A	R	0.02	3.6	A	R	0.03	3.5	A	R	0.03	3.6	A
		INT			6.4	A			9.6	A			10.3	B			12.0	B
4	Route 9D (N-S) & Red School House Road	WB	L	0.37	27.4	C	L	0.40	27.5	C	L	0.38	27.4	C	L	0.41	27.5	C
			R	0.25	6.9	A	R	0.27	8.5	A	R	0.31	10.3	B	R	0.34	11.8	B
		NB	T	0.67	18.9	B	T	0.76	23.4	C	T	0.79	24.9	C	T	0.90	33.5	C
			R	0.15	3.2	A	R	0.17	3.2	A	R	0.08	3.8	A	R	0.10	3.8	A
		SB	L	0.37	8.3	A	L	0.45	11.7	B	L	0.43	12.4	B	L	0.55	19.5	B
			T	0.62	8.1	A	T	0.69	10.2	B	T	0.54	6.9	A	T	0.60	8.0	A
		INT			11.9	B			14.6	B			15.2	B			19.6	B

Table 2.10-12 (cont'd)

2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - East of Hudson Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
5	Route 9D (N-S) & Chelsea Road/Baxtertown Road	EB	LTR	0.65	32.3	C	LTR	0.68	34.2	C	LTR	0.37	20.6	C	LTR	0.38	20.9	C
		WB	LTR	0.34	24.5	C	LTR	0.38	25.2	C	LTR	0.53	30.6	C	LTR	0.58	32.2	C
		NB	L	0.09	4.8	A	L	0.12	5.4	A	L	0.15	4.9	A	L	0.20	5.8	A
			TR	0.74	18.3	B	TR	0.82	22.8	C	TR	0.71	16.1	B	TR	0.86	23.3	C
		SB	L	0.11	4.8	A	L	0.15	5.4	A	L	0.08	4.4	A	L	0.12	5.1	A
			TR	0.78	19.2	B	TR	0.87	25.3	C	TR	0.76	19.7	B	TR	0.93	32.1	C
		INT			19.8	B			24.5	C			18.4	B			27.0	C
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	0.53	41.1	D	LT	0.60	45.4	D	LT	0.61	44.0	D	LT	0.64	45.1	D
			R	0.33	12.0	B	R	0.36	12.1	B	R	0.46	9.8	A	R	0.48	9.6	A
		WB	L	0.79	57.6	E	L	0.92	79.4	E	L	1.04	109.2	F	L	1.15	143.6	F
			TR	0.34	31.6	C	TR	0.40	33.6	C	TR	0.53	39.4	D	TR	0.59	42.8	D
		NB	L	0.21	8.9	A	L	0.28	9.8	A	L	0.45	17.0	B	L	0.49	19.2	B
			TR	1.02	58.6	E	TR	1.17	109.4	F	TR	1.03	64.3	E	TR	1.14	102.8	F
		SB	L	0.12	8.2	A	L	0.14	8.4	A	L	0.16	10.8	B	L	0.17	11.2	B
			TR	0.72	24.4	C	TR	0.82	30.4	C	TR	0.96	48.8	D	TR	1.06	75.9	E
		INT			42.3	D			68.6	E			54.8	D			80.4	F

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-14 and 2.10-15.

Table 2.10-12 (cont'd)
2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - East of Husdon Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
13	U.S. Route 9 (N-S)& Old Hopewell Road (CR 28)	EB	L	0.48	58.8	E	L	0.53	63.5	E	L	0.57	64.9	E	L	0.60	67.2	E
			T	0.48	58.2	E	T	0.52	62.5	E	T	0.63	67.6	E	T	0.67	70.5	E
			R	0.49	14.1	B	R	0.52	14.1	B	R	0.47	12.6	B	R	0.49	12.3	B
		WB	LT	1.29	186.4	F	LT	1.52	**	F	LT	0.88	83.3	F	LT	0.99	107.3	F
			R	0.43	25.6	C	R	0.50	30.4	C	R	0.33	12.9	B	R	0.37	16.0	B
		NB	L	0.56	60.5	E	L	0.61	65.1	E	L	0.74	73.7	E	L	0.78	77.4	E
			T	0.60	28.1	C	T	0.62	28.9	C	T	0.98	52.9	D	T	1.08	83.3	F
			R	0.02	2.3	A	R	0.02	2.3	A	R	0.06	2.9	A	R	0.07	3.2	A
		SB	L	0.53	60.7	E	L	0.57	65.5	E	L	0.56	71.7	E	L	0.59	74.1	E
			T	0.80	35.0	C	T	0.84	37.3	D	T	0.70	35.3	D	T	0.78	39.4	D
			R	0.08	2.7	A	R	0.09	3.1	A	R	0.09	2.6	A	R	0.10	2.6	A
		INT			55.5	E			71.2	E			47.7	D			63.6	E
15	Jackson Street & NYS Route 52 (E-W)	EB	L	0.29	15.0	B	L	0.38	19.4	B	L	0.59	35.5	D	L	0.61	42.9	D
			TR	0.62	18.6	B	TR	0.64	20.9	C	TR	0.72	29.3	C	TR	0.74	30.7	C
		WB	L	0.01	10.5	B	L	0.01	10.5	B	L	0.04	16.2	B	L	0.05	19.7	B
			T	0.63	25.2	C	T	0.69	27.4	C	T	0.79	39.4	D	T	0.87	49.2	D
			R	0.12	19.1	B	R	0.13	18.9	B	R	0.22	25.8	C	R	0.25	28.2	C
		NB	L	0.18	37.2	D	L	0.22	41.0	D	L	0.55	48.9	D	L	0.63	56.4	E
			TR	0.07	36.8	D	TR	0.08	40.2	D	TR	0.47	46.0	D	TR	0.54	51.9	D
		SB	L	0.35	31.0	C	L	0.38	32.9	C	L	0.38	42.4	D	L	0.42	46.6	D
			TR	0.57	23.1	C	TR	0.63	26.3	C	TR	0.72	36.9	D	TR	0.80	46.2	D
		INT			22.4	C			24.8	C			36.2	D			42.1	D
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/Geering Way	EB	LTR	0.07	16.3	B	LTR	0.07	16.1	B	LTR	0.07	17.2	B	LTR	0.09	17.3	B
		WB	LT	0.91	63.0	E	LT	0.96	72.2	E	LT	1.38	214.4	F	LT	1.52	**	F
			R	0.10	8.3	A	R	0.11	7.9	A	R	0.22	6.2	A	R	0.24	6.1	A
		NB	L	0.04	7.0	A	L	0.05	7.0	A	L	0.06	7.3	A	L	0.07	7.6	A
			T	0.59	11.0	B	T	0.67	12.3	B	T	0.64	11.7	B	T	0.70	12.5	B
		SB	TR	0.57	14.8	B	TR	0.64	16.7	B	TR	0.77	22.6	C	TR	0.85	32.3	C
		INT			22.0	C			24.9	C			61.7	E			79.2	E
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	0.96	68.2	E	LTR	1.07	95.2	F	LTR	0.88	55.0	D	LTR	0.92	60.8	E
		WB	LTR	0.06	16.3	B	LTR	0.07	16.0	B	LTR	0.05	16.8	B	LTR	0.06	16.5	B
		NB	TR	0.69	18.0	B	TR	0.76	20.7	C	TR	0.66	16.5	B	TR	0.74	19.5	B
		SB	L	0.05	5.8	A	L	0.07	6.8	A	L	0.03	6.4	A	L	0.05	6.5	A
			T	0.55	10.7	B	T	0.60	11.8	B	T	0.87	21.1	C	T	0.98	46.6	D
		INT			26.6	C			34.1	C			24.7	C			38.7	D
18	Route 9D (N-S) & Brockway Road/Pappas Lane (E-W)	EB	LT	0.15	31.2	C	LT	0.19	34.7	C	LT	0.22	30.4	C	LT	0.25	33.6	C
			R	0.48	8.4	A	R	0.48	9.4	A	R	0.25	7.5	A	R	0.29	7.9	A
		WB	LTR	0.11	25.7	C	LTR	0.17	28.4	C	LTR	0.30	23.3	C	LTR	0.33	26.1	C
		NB	L	0.09	2.3	A	L	0.12	2.9	A	L	0.34	4.8	A	L	0.39	5.2	A
			TR	0.61	8.5	A	TR	0.72	12.3	B	TR	0.59	9.2	A	TR	0.61	9.4	A
		SB	L	0.04	2.3	A	L	0.06	2.8	A	L	0.06	3.1	A	L	0.08	3.0	A
			T	0.36	6.0	A	T	0.40	7.2	A	T	0.45	8.1	A	T	0.47	7.9	A
			R	0.02	2.5	A	R	0.02	2.4	A	R	0.07	1.9	A	R	0.07	1.7	A
		INT			8.0	A			10.5	B			9.1	A			9.2	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn.V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-14 and 2.10-15.
[2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

Table 2.10-12 (cont'd)

2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - East of Husdon Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
6	Route 9D (N-S) & Stonykill Road	WB	LR	0.29	24.8	C	LR	0.39	32.8	D	LR	0.39	39.1	E	LR	0.54	58.9	F
		SB	LT	0.05	1.5	A	LT	0.06	2.0	A	LT	0.05	1.4	A	LT	0.06	1.9	A
7	Route 9D (N-S) & Old State Road (Southern Intersection)	EB	L	0.04	42.2	E	L	0.04	53.0	F	L	0.13	60.3	F	L	0.19	83.5	F
			R	0.14	17.0	C	R	0.17	19.1	C	R	0.13	18.6	C	R	0.17	21.1	C
		NB	LT	0.07	1.9	A	LT	0.08	2.5	A	LT	0.09	2.7	A	LT	0.11	3.6	A
		SB	R	0.01	8.6	A	R	0.01	8.6	A	R	0.01	8.6	A	R	0.01	8.7	A
8	Old State Road (N-S) & River Road North[2]	EB	LR	0.07	7.4	A	LR	0.08	7.5	A	LR	0.09	7.6	A	LR	0.10	7.7	A
		NB	LT	0.09	7.6	A	LT	0.10	7.6	A	LT	0.09	7.7	A	LT	0.11	7.8	A
		SB	TR	0.07	7.2	A	TR	0.07	7.3	A	TR	0.09	7.1	A	TR	0.10	7.2	A
9	Broadway (E-W) & Market Street	WB	LR	0.05	9.3	A	LR	0.06	9.4	A	LR	0.13	10.0	A	LR	0.15	10.2	B
		SB	LT	0.02	5.5	A	LT	0.03	5.5	A	LT	0.02	3.7	A	LT	0.03	3.6	A
10	River Road North (E-W) & East Connection West Driveway	EB	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.2	A	LT	0.00	0.2	A
		SB	LR	0.01	8.5	A	LR	0.01	8.5	A	LR	0.01	9.1	A	LR	0.01	9.1	A
11	Route 9D (N-S) & Old State Road (Northern Intersection)	EB	LR	0.24	41.2	E	LR	0.33	55.2	F	LR	0.28	43.3	E	LR	0.40	63.9	F
		NB	LT	0.01	0.2	A	LT	0.01	0.2	A	LT	0.01	0.4	A	LT	0.01	0.5	A
14	Baxtertown Road (E-W)& Osborne Hill Road/Jackson Street	EB	L	0.19	10.6	B	L	0.21	11.0	B	L	0.12	13.6	B	L	0.15	14.7	B
		NB	LT	0.04	2.0	A	LT	0.05	2.1	A	LT	0.11	3.3	A	LT	0.12	3.5	A
16B	NYS Route 52 (N-S) & I-84 WB On-Ramp	NB	L	0.08	10.7	B	L	0.10	11.6	B	L	0.23	18.5	C	L	0.34	26.7	D
17A	NYS Route 52 (N-S) & I-84 EB On-Ramp	SB	L	0.20	12.9	B	L	0.26	15.1	C	L	0.08	11.9	B	L	0.10	13.4	B

Table 2.10-12 (cont'd)

2010 Existing and 2015 Future Without Project 1 Conditions LOS Summary - East of Husdon Study Area

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2010 Existing				2015 Future w/o Project 1				2010 Existing				2015 Future w/o Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
19A	Route 9D (N-S) & Castle Point Road (Southern Intersection)	EB	LR	0.26	18.8	C	LR	0.33	22.0	C	LR	0.85	57.0	F	LR	1.09	120.2	F
		NB	L	0.08	9.5	A	L	0.10	9.8	A	L	0.02	9.3	A	L	0.02	9.6	A
			T	0.59	0.0	A	T	0.65	0.0	A	T	0.53	0.0	A	T	0.58	0.0	A
		SB	TR	0.42	0.0	A	TR	0.46	0.0	A	TR	0.45	0.0	A	TR	0.49	0.0	A
19B	Route 9D (N-S) & Castle Point Road (Northern Intersection) (E-W)	EB	LTR	0.15	62.2	F	LTR	0.26	95.1	F	LTR	0.38	73.3	F	LTR	0.56	118.7	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	15.3	C	LTR	0.00	16.6	C
		NB	L	0.25	10.4	B	L	0.29	11.1	B	L	0.05	9.4	A	L	0.06	9.8	A
			TR	0.46	0.0	A	TR	0.51	0.0	A	TR	0.51	0.0	A	TR	0.56	0.0	A
		SB	L	0.00	9.3	A	L	0.00	9.6	A	L	0.00	9.7	A	L	0.00	10.0	B
			TR	0.41	0.0	A	TR	0.46	0.0	A	TR	0.44	0.0	A	TR	0.49	0.0	A
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	0.72	93.9	F	LR	1.01	181.8	F	LR	0.74	94.0	F	LR	1.02	181.8	F
		NB	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A
		SB	TR	0.52	0.0	A	TR	0.57	0.0	A	TR	0.46	0.0	A	TR	0.50	0.0	A
21	Chelsea Ridge Drive & Chelsea Road (E-W)	EB	LT	0.01	1.6	A	LT	0.01	1.6	A	LT	0.00	0.4	A	LT	0.00	0.4	A
		WB	TR	0.02	0.0	A	TR	0.03	0.0	A	TR	0.07	0.0	A	TR	0.08	0.0	A
		SB	LR	0.17	9.8	A	LR	0.19	10.0	B	LR	0.07	9.5	A	LR	0.07	9.6	A
22	Route 9D (N-S) & Popula Boulevard	EB	LR	1.99	**	F	LR	4.12	**	F	LR	1.54	**	F	LR	3.61	**	F
		NB	LT	0.03	0.9	A	LT	0.04	1.1	A	LT	0.12	3.2	A	LT	0.14	4.3	A
		SB	TR	0.49	0.0	A	TR	0.54	0.0	A	TR	0.58	0.0	A	TR	0.64	0.0	A
23	Route 9D (N-S) & Alpine Drive	EB	LR	0.92	105.5	F	LR	1.26	227.2	F	LR	1.07	163.1	F	LR	1.51	**	F
		NB	LT	0.02	0.6	A	LT	0.03	0.8	A	LT	0.80	0.8	A	LT	0.03	1.0	A
		SB	TR	0.47	0.0	A	TR	0.52	0.0	A	TR	0.00	0.0	A	TR	0.58	0.0	A

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** indicates a calculated delay greater than 240.0 seconds
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-14 and 2.10-15.
[2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

Signalized Intersections—East of Hudson Study Area

In 2015 without Project 1, with this projected growth most signalized intersections are expected to continue to operate at an acceptable overall LOS D or better during the AM and PM peak hours analyzed (LOS D for signalized intersections is considered unacceptable when the vehicle delay value is greater than 45.0 seconds, mid-range LOS D) with the exception of four locations in the east of Hudson study area:

- NYS Route 9D at I-84 Eastbound Entrance and Exit Ramps is expected to experience an increase in delay from an overall LOS E with an intersection delay of 60.2 seconds during the AM peak hour to LOS E with a delay of 75.5 seconds. During the PM peak hour, the intersection is expected to experience an increase in delay from LOS D with an intersection delay of 51.5 seconds to LOS E with a delay of 70.4 seconds.
- NYS Route 9D at New Hamburg Road/Old Hopewell Road is expected to experience an increase in delay from an overall LOS D with an intersection delay of 42.3 seconds during the AM peak hour to LOS E with a delay of 68.6 seconds. During the PM peak hour, the intersection is expected to experience an increase in delay from LOS D with an intersection delay of 54.8 seconds to LOS F with a delay of 80.4 seconds.
- U.S. Route 9 at Old Hopewell Road is expected to experience an increase in delay from an overall LOS E with an intersection delay of 55.5 seconds during the AM peak hour to LOS E with a delay of 71.2 seconds. During the PM peak hour, the intersection is expected to experience an increase in delay from LOS D with an intersection delay of 47.7 seconds to LOS E with a delay of 63.6 seconds.
- NYS Route 52 at I-84 Westbound Off-Ramp/Geering Way is expected to experience an increase in delay from an overall LOS E with an intersection delay of 61.7 seconds during the PM peak hour to LOS E with a delay of 79.2 seconds.

Unsignalized Intersections—East of Hudson Study Area

With this projected growth, most approaches or lane groups of the study area's unsignalized intersections are expected to continue to operate at an acceptable overall LOS D or better during the peak hours analyzed (LOS D for unsignalized intersection lane groups or approaches is considered unacceptable when the vehicle delay value is greater than 30.0 seconds, mid-range LOS D) with the exception of eight lane groups/approaches in the east of Hudson study area:

- The westbound approach at NYS Route 9D and Stonykill Road is expected to experience an increase in delay during the AM peak hour from LOS C with an approach delay of 24.8 seconds to LOS D with a delay of 32.8 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay during the PM peak hour from LOS E with an approach delay of 39.1 seconds to LOS F with a delay of 58.9 seconds.

- The eastbound left-turn lane group at NYS Route 9D and Old State Road (Southern Intersection) is expected to experience an increase in delay during the AM peak hour from LOS E with a delay of 42.2 seconds to LOS F with a delay of 53.0 seconds. During the PM peak hour, the same lane group is expected to experience an increase in delay from LOS F with a delay of 60.3 seconds to LOS F with a delay of 83.5 seconds.
- The eastbound approach at NYS Route 9D and Old State Road (Northern Intersection) is expected to experience an increase in delay during the AM peak hour from LOS E with an approach delay of 41.2 seconds to LOS F with a delay of 55.2 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS E with an approach delay of 43.3 seconds to LOS F with a delay of 63.9 seconds.
- The eastbound approach at NYS Route 9D and Castle Point Road (Southern Intersection) is expected to experience an increase in delay during the PM peak hour from LOS F with an approach delay of 57.0 seconds to LOS F with a delay of 120.2 seconds.
- The eastbound approach at NYS Route 9D and Castle Point Road (Northern Intersection) is expected to experience an increase in delay during the AM peak hour from LOS F with an approach delay of 62.2 seconds to LOS F with a delay of 95.1 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS F with an approach delay of 73.3 seconds to LOS F with a delay of 118.7 seconds.
- The eastbound approach at NYS Route 9D and Old Castle Point Road is expected to experience an increase in delay during the AM peak hour from LOS F with an approach delay of 93.9 seconds to LOS F with a delay of 181.8 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS F with an approach delay of 94.0 seconds to LOS F with a delay of 181.8 seconds.
- The eastbound approach at NYS Route 9D and Popula Boulevard is expected to experience a lane group delay increase of more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both the AM and PM peak hours.
- The eastbound approach at NYS Route 9D and Alpine Drive is expected to experience an increase in delay during the AM peak hour from LOS F with an approach delay of 105.5 seconds to LOS F with a delay of 227.2 seconds. During the PM peak hour, the same approach is expected to experience an increase in delay from LOS F with an approach delay of 163.1 seconds to LOS F with a delay of greater than 240.0 seconds.

ACCIDENT DATA

No significant changes in accidents in the east of Hudson study area are expected in 2015 future without Project 1 conditions.

VEHICLE QUEUES

Vehicle queues are expected to increase on average by approximately 60 feet in 2015 future without Project 1 conditions.

PARKING CONDITIONS

No significant changes in parking conditions in the east of Hudson study area are expected in 2015 future without Project 1 conditions.

TRANSIT CONDITIONS

No significant changes in transit conditions in the east of Hudson study area are expected in 2015 future without Project 1 conditions.

PEDESTRIAN CONDITIONS

No significant changes in pedestrian conditions in the east of Hudson study area are anticipated in 2015 future without Project 1 conditions.

2.10-4.3 PROBABLE IMPACTS OF PROJECT 1, SHAFT AND BYPASS TUNNEL CONSTRUCTION—EAST OF HUDSON

This section describes the assumptions used to develop the future traffic volumes and framework for the future with Project 1. At the east connection site, the 2015 peak year was chosen to reflect Project 1's peak construction activity (of both workers and trucks combined), which would occur during the shaft construction phase. See Section 2.1, "Description of Project 1 Construction program," for more details on Project 1's peak construction period and the various activities that would take place on the east connection site during this time.

This section also describes the assumptions and methodology employed in developing the future with Project 1 traffic assignments—meaning, the projections of how many and what types of vehicle trips would be generated by Project 1— used for the traffic analysis for this project. They are based on the worker and truck activity estimates, and likely travel routes for the construction-related vehicles. The total number of vehicle trips and their associated routings are described in more detail below.

As noted in Chapter 1, "Program Description," an alternate option to provide a reliable potable water supply to the east connection site would involve the potential construction of a water main between the site and the Town of Wappinger water supply (United Wappinger Water District [UWWD]), prior to construction of the east connection shaft under Project 1. The likely route of this water main would be to the north, and not on the local roads that construction trucks from

Project 1 would be traversing to access the east connection site. The construction and environmental review of this water main connection would be undertaken by the Town of Wappinger. If this option is chosen, construction of the water main would be similar to a typical utility installation along public right-of-ways, and would cover approximately 100 linear feet per day. Temporary Work Zone Traffic Control Plans would likely be implemented, as required, to ensure worker and public safety during construction on or adjacent to public roadways.

CONSTRUCTION TRAFFIC ASSIGNMENTS

During the construction period for Project 1, vehicle trips to and from the east connection site would consist of worker trips (made by auto) and truck trips. Vehicles would access the site via the existing east connection site driveway.

The assignments for all traffic assume a split of 10 percent coming from north of the east connection site and 90 percent coming from south of the site, as supported by the Census data, (see Appendix 2.10). Three assignment scenarios that construction workers (autos) would potentially use via these routes were examined. The initial assignment, Scenario 1, assumes vehicles would arrive and depart from the east connection site with 100 percent on Old State Road and 0 percent on Chelsea Road. An alternative assignment, Scenario 2, assumes vehicles would arrive and depart from the site with 50 percent on Old State Road and 50 percent on Chelsea Road. The assignments for Scenario 2 would be identical to those for Scenario 1 with the exception of the following nine intersections:

- NYS Route 9D at Chelsea Road (County Route 92)/ Baxtertown Road (County Route 34)
- NYS Route 9D at Stonykill Road
- NYS Route 9D at Old State Road (Southern Intersection)
- Old Post Road at River Road North
- Broadway at Market Street
- River Road North at East Connection West Driveway (Site Driveway)
- NYS Route 9D at Old State Road (Northern Intersection)
- Chelsea Road at Chelsea Ridge Drive
- NYS Route 9D at Popula Boulevard

A third scenario, Scenario 3, assumes vehicles would arrive and depart from the east connection site with 0 percent on Old State Road and 100 percent on Chelsea Road.

Figures 2.10-16a, 2.10-16b, and 2.10-16c present the auto assignments (in percentages) for Scenario 1, Scenario 2, and Scenario 3, respectively. **Figure 2.10-16d** presents the initial truck assignment (in percentages) that was used for all three scenarios. These initial assignments were analyzed and the results of the analysis are reported in this section.

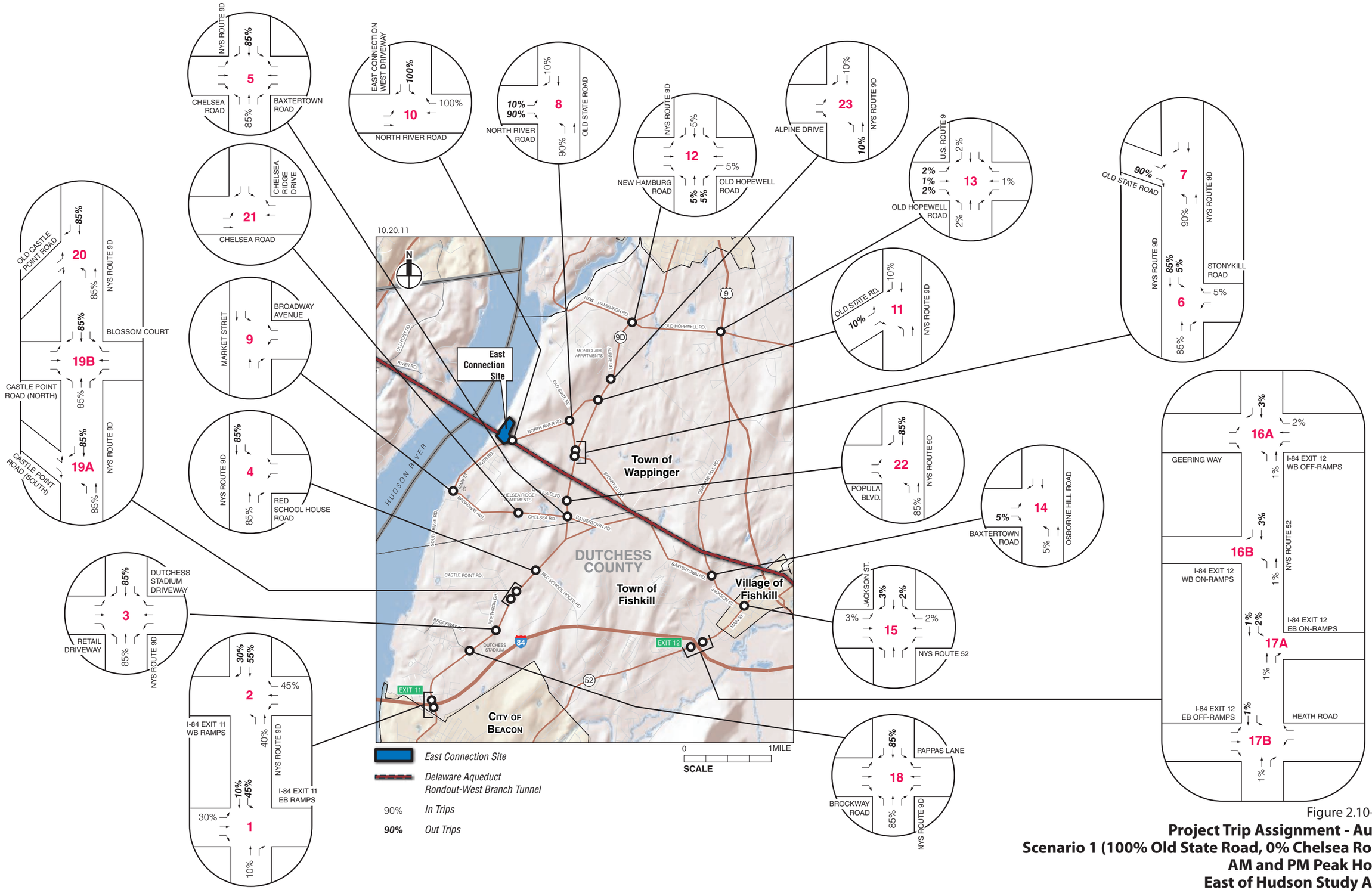


Figure 2.10-16a

Project Trip Assignment - Autos
Scenario 1 (100% Old State Road, 0% Chelsea Road)
AM and PM Peak Hours
East of Hudson Study Area

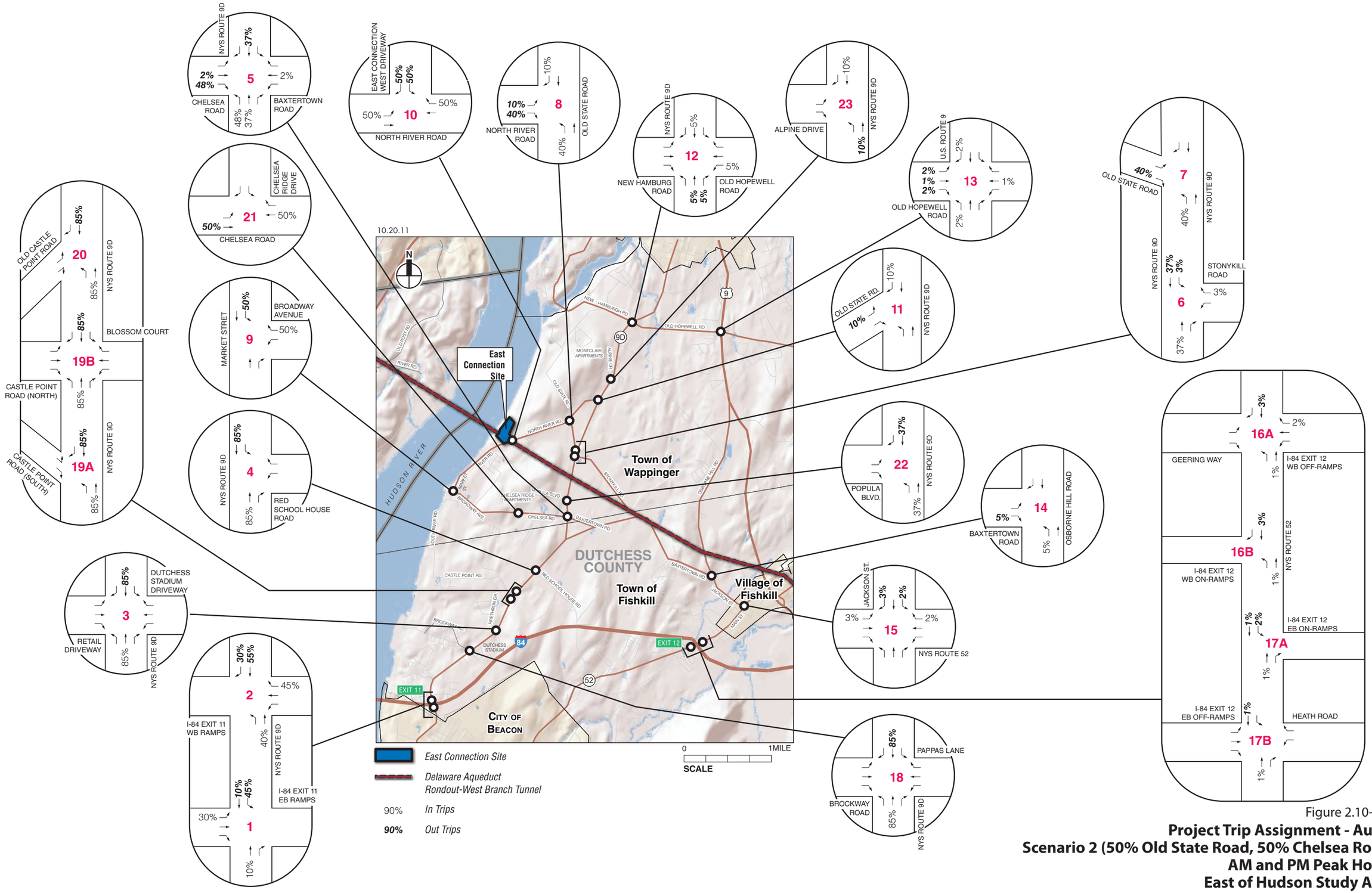


Figure 2.10-16b

Project Trip Assignment - Autos
Scenario 2 (50% Old State Road, 50% Chelsea Road)
AM and PM Peak Hours
East of Hudson Study Area

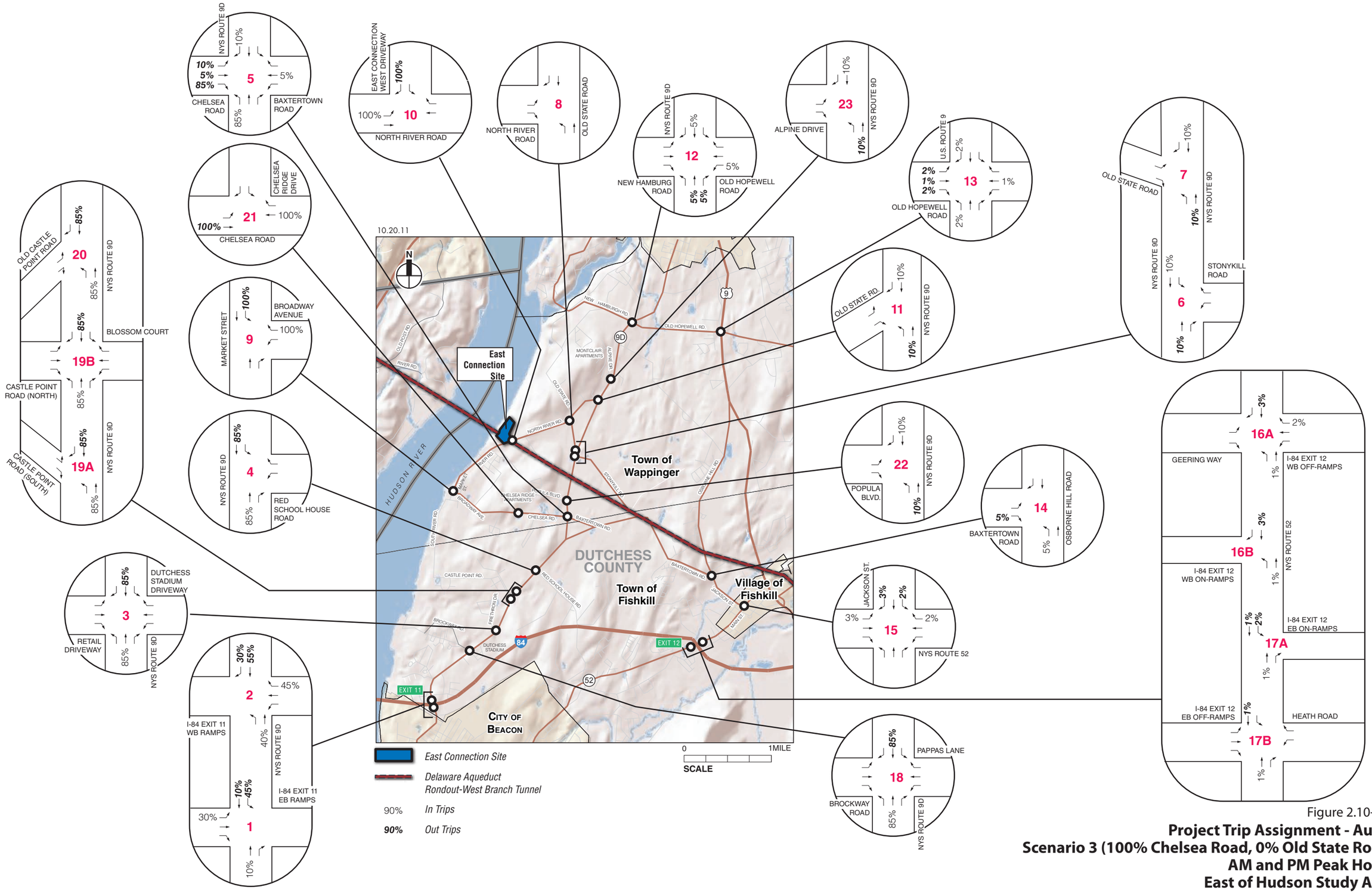


Figure 2.10-16c

Project Trip Assignment - Autos
Scenario 3 (100% Chelsea Road, 0% Old State Road)
AM and PM Peak Hours
East of Hudson Study Area

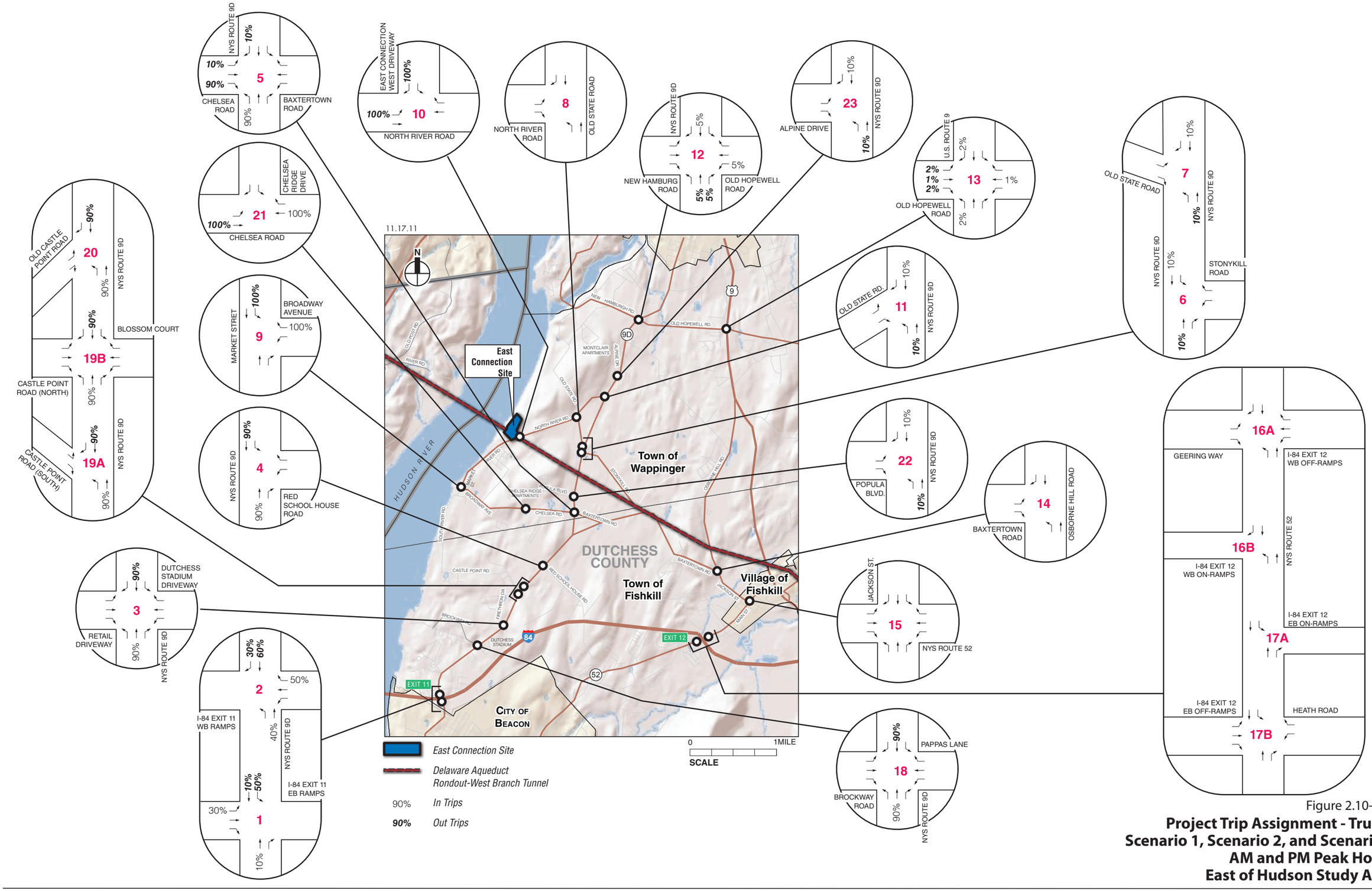


Figure 2.10-16d

Project Trip Assignment - Trucks
Scenario 1, Scenario 2, and Scenario 3
AM and PM Peak Hours
East of Hudson Study Area

After these initial analyses were performed and consultations with the Town of Wappinger, Dutchess County DPW, and NYSDOT were undertaken, DEP reached an agreement to route all trucks to depart/arrive to the east connection site via Chelsea Road to/from Route 9D. However, as seen in the results from the analyses below, there is very little difference between the three modeled scenarios, and the analysis of Scenario 3 would be essentially the same as that expected with DEP's commitment to require trucks to use Chelsea Road to access the east connection site.

The contractor would decide where to take excavated material that would be removed from the site. However, given the east connection site's close proximity to the regional highway system, it is anticipated that the majority of the trips would be on I-84. The number of truck trips per hour associated with excavated fill would likely be less than five trucks per hour. If these trucks do not use I-84, no additional predicted temporary significant adverse impacts would be expected.

EAST SIDE TUNNEL BORING MACHINE (TBM) EXTRACTION FROM SHAFT 6B

For an approximate two-week period during the extraction of the TBM (during the TBM demobilization and tunnel cleanup phase), trucks approximately 70 feet in length (AAHSTO Designation WB-62) would likely be utilized to transport the dismantled components of the TBM from the east connection site to I-84 via River Road, Chelsea Road, and Route 9D. It is anticipated that this activity may be performed overnight (between 11 PM and 5 AM). Approximately 30 trucks trips would be used (15 in and 15 out) during this two-week period. AutoTurn software was utilized to model the WB-62 turning movements through the intersections adjacent to the east connection site. The modeling showed that the WB-62 truck would be able to make all the turns within the paved roadway width (see Appendix 2.10 for the AutoTurn output). The DEIS looked at worst-case locations in the study area and determined that even the contractor's largest vehicles that may be required at limited times would be able to make turns at the most difficult locations. Therefore, no physical improvements would be required. It may be necessary to implement WZTCPs during this time period (see TMP in Section 2.19) at certain intersections and roadway segments, including visual assistance for any off-site truck turnarounds. The need for the implementation of WZTCPs would be determined before the start of this work in consultation with the roadway governing agencies and as part of the overall TMP for Project 1.

It is anticipated that the TBM extraction trucks would require oversized/weight permits and would need escort vehicles as they travel to and from the east connection site.

CONSTRUCTION TRAFFIC TRIP GENERATION

Auto trips to and from the east connection site during the construction period would be generated by workers at the site. The number of workers on-site would vary with the various work shifts. An estimated maximum total of 116 daily workers would be at the site during extended peak construction, which is expected during shaft construction. By applying the estimated auto occupancy of 1.2 persons (approximately 16.5 percent) to account for carpooling, total worker

peak hour trips can be calculated, as shown in **Table 2.10-13**. The trip generation numbers shown in Table 2.10-12 are the average peak trips during the shaft construction phase.

The peak hours of construction may be earlier than the peak hours examined. However, the construction traffic was applied to the commuter peak hour traffic to provide for a conservative analysis. This will account for any overlap that may occur between construction worker arrivals and departures and the commuter peak hour traffic, even though the peak hours are somewhat different.

While the number of trucks expected would vary by phase of work at the connection site, the traffic analysis conservatively projected the likely maximum number of trucks that could occur in any hour, in order to address the potential worst-case impact on intersection capacities and the ability for turning lanes to address the potential queuing capacity with these maximum potential short-term peak truck trips. An estimated maximum of 12 trucks entering and 12 trucks departing can be processed at the east connection site. The actual number of peak hour truck trips would average between one and five when construction is active at the east connection site, so the assumption of 12 trucks entering and 12 trucks departing during the peak hours provides for a conservative analysis to determine potential impacts on intersection capacities and queue lengths for turning movements.

Table 2.10-13
Trip Generation - East of Hudson Study Area*

A) Worker Trips

East of Hudson -- Peak Activity Shaft Construction
Daily Workers = 116

		Converted to Auto Trips with 1.2 vehicle occupancy factor
7 AM - 4 PM Shift =	58 workers →	48 Auto Trips
4 PM - 11 PM Shift =	58 workers →	48 Auto Trips

B) Truck Trips

2) East of Hudson -- Peak Activity Shaft Construction
Average number of truck trips per day (2 trips per truck) = 48
Peak Hour Trips (maximum) = 12 Trips In / 12 Trips Out
Passenger Car Equivalents (PCEs) = 24 Trips In / 24 Trips Out[1]

C) Summary

1)

Worker Trips[2]			
Time	**In**	**Out**	**Total**
7 AM	48	0	48
4 PM	48	48	96

2)

Truck Trips (Passenger Car Equivalents shown)[1]			
Time	**In**	**Out**	**Total**
7 AM	24	24	48
4 PM	24	24	48

3)

Total Trips			
Time	**In**	**Out**	**Total**
7 AM	72	24	96
4 PM	72	72	144

Notes:
[1] Based on *CEQR Technical Manual* suggested PCE factor of 2.0.
[2] Assumes a vehicle occupancy = 1.2 persons per vehicle.
* Average peak trips during the shaft construction phase

WHARF AND BARGE ACTIVITY

The traffic analysis does not assume barge or wharf activity as part of the construction as rail or barge is not expected to be used to deliver or remove construction materials to and from the east connection site. Barge and wharf activity is addressed in Chapter 7, "Alternatives."

CONSTRUCTION PROJECT-GENERATED TRAFFIC

Each of the auto and truck trips was assigned to the traffic study area using the percentage assignments and routings described above. **Figures 2.10-17a, 2.10-17b, and 2.10-17c** illustrate the resulting 2015 total construction peak project-generated traffic volumes in the AM and PM peak hours for Scenario 1, Scenario 2, and Scenario 3, respectively. **Figure 2.10-17d** presents the incremental auto traffic (in actual vehicles) for Scenario 3, and **Figure 2.10-17e** presents the incremental truck traffic (in actual vehicles, not PCEs) for Scenario 3.

TRAFFIC ANALYSIS IMPACT CRITERIA

The *CEQR Technical Manual* has established criteria for evaluating traffic impacts. For Project 1, these would be temporary construction period traffic impacts, because the predicted impacts would happen during the construction period. The peak construction year of 2015 was analyzed. For locations where potential adverse impacts were predicted for peak construction traffic with Project 1, an assessment was also made to estimate the potential duration of such impacts over the complete construction timeframe for Project 1. The evaluation of the potential for temporary adverse impacts to occur at the different signalized and unsignalized intersection analysis locations throughout the study area's traffic network was determined by comparing the LOS and delay results to the thresholds established in the *CEQR Technical Manual*. The impact significance thresholds for signalized and unsignalized intersections are described below.

Signalized Intersections

According to the *CEQR Technical Manual*, if a signalized intersection operating at LOS A, B, or C in the future without Project 1 worsens to a marginally unacceptable mid-LOS D or an unacceptable LOS E or F in the future with Project 1, then a predicted temporary significant adverse traffic impact would occur. Any other LOS change in the future with Project 1 is not considered an impact. Impacts can also result when delays worsen as a result of a project's traffic. For example, for a lane group that operates at LOS D in the future without Project 1, an increase in delay of 5 seconds or more with Project 1 is considered an impact. For a lane group that operates at LOS E in the future without Project 1, an increase in delay of 4 seconds or more with Project 1 is considered an impact. Finally, for a lane group that operates at LOS F in the future without Project 1, an increase in delay of 3 seconds or more with Project 1 is considered an impact. It is important to note that this guidance was developed for permanent traffic changes associated with an action not for construction-related impacts. However, due to the time required for construction of Project 1

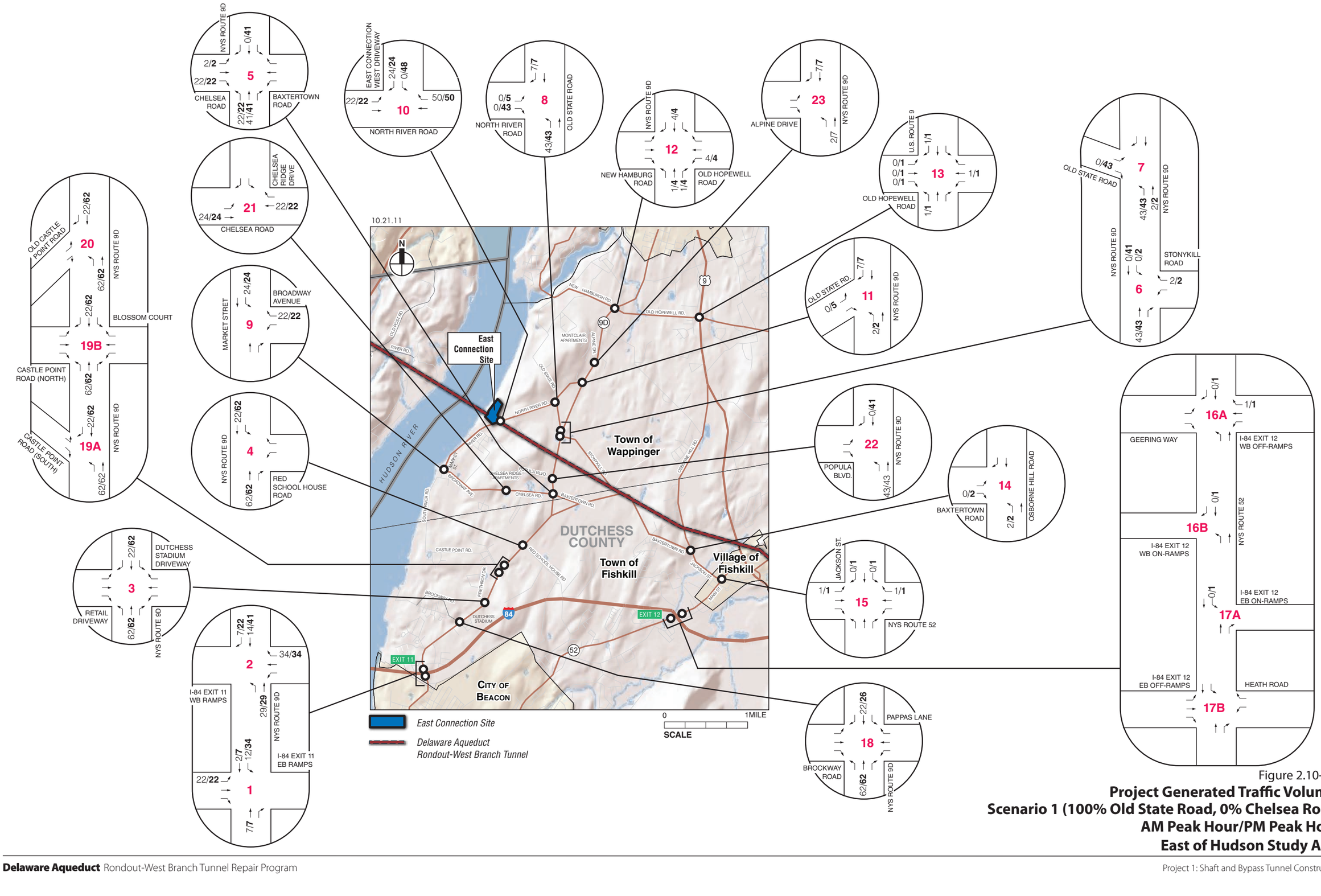


Figure 2.10-17a

Project Generated Traffic Volumes
Scenario 1 (100% Old State Road, 0% Chelsea Road)
AM Peak Hour/PM Peak Hour
East of Hudson Study Area

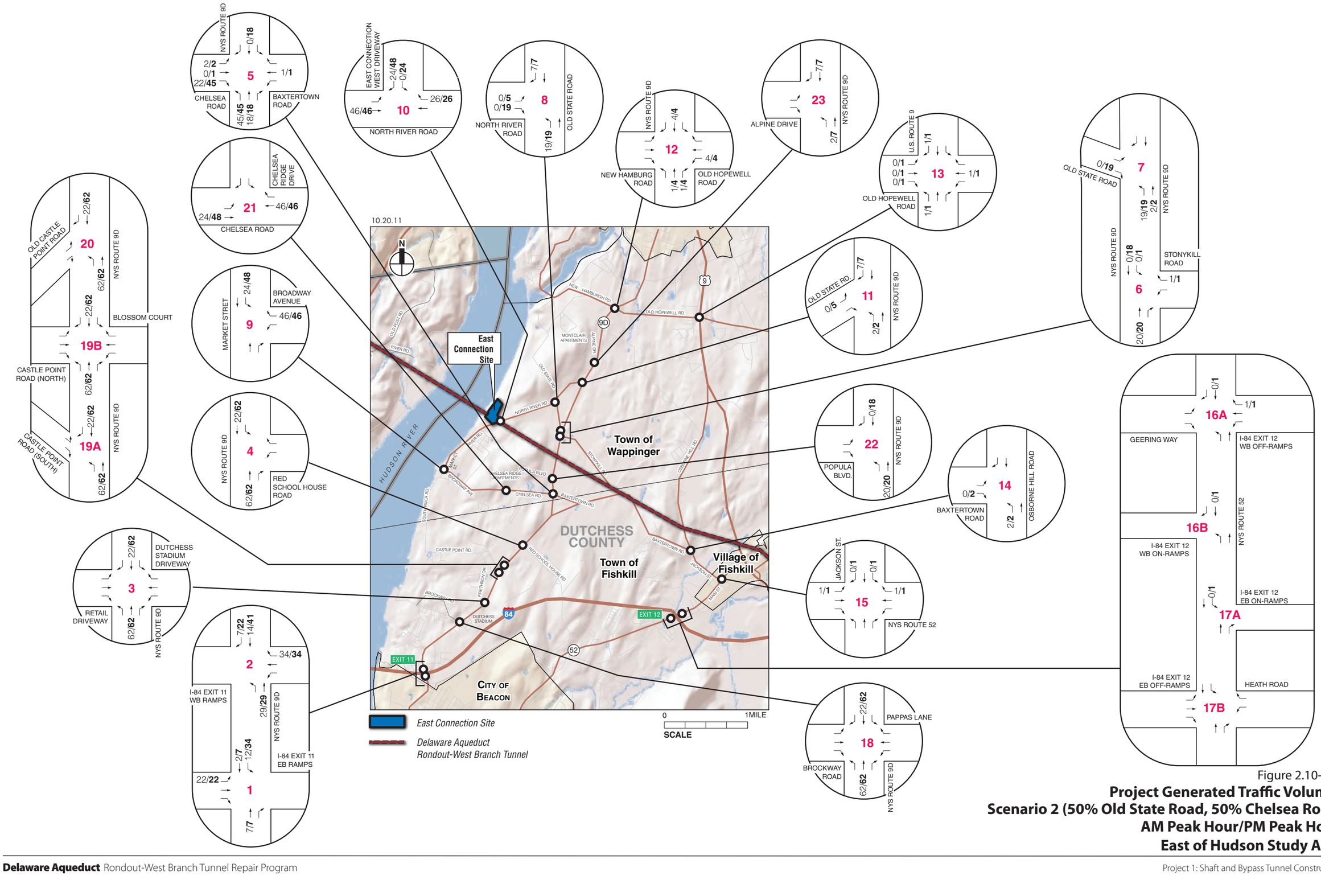


Figure 2.10-17b

Project Generated Traffic Volumes
Scenario 2 (50% Old State Road, 50% Chelsea Road)
AM Peak Hour/PM Peak Hour
East of Hudson Study Area

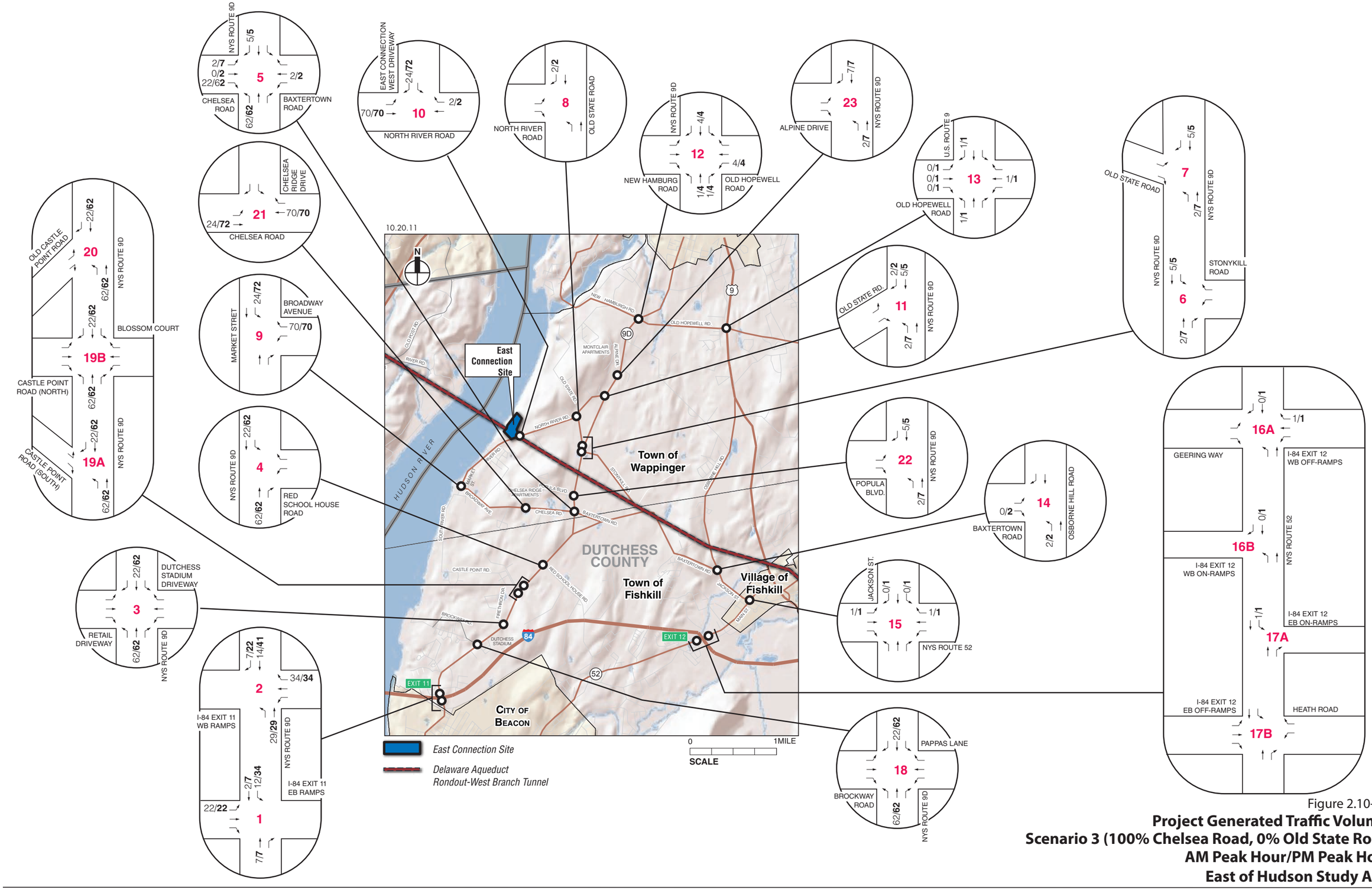


Figure 2.10-17c

Project Generated Traffic Volumes
Scenario 3 (100% Chelsea Road, 0% Old State Road)
AM Peak Hour/PM Peak Hour
East of Hudson Study Area

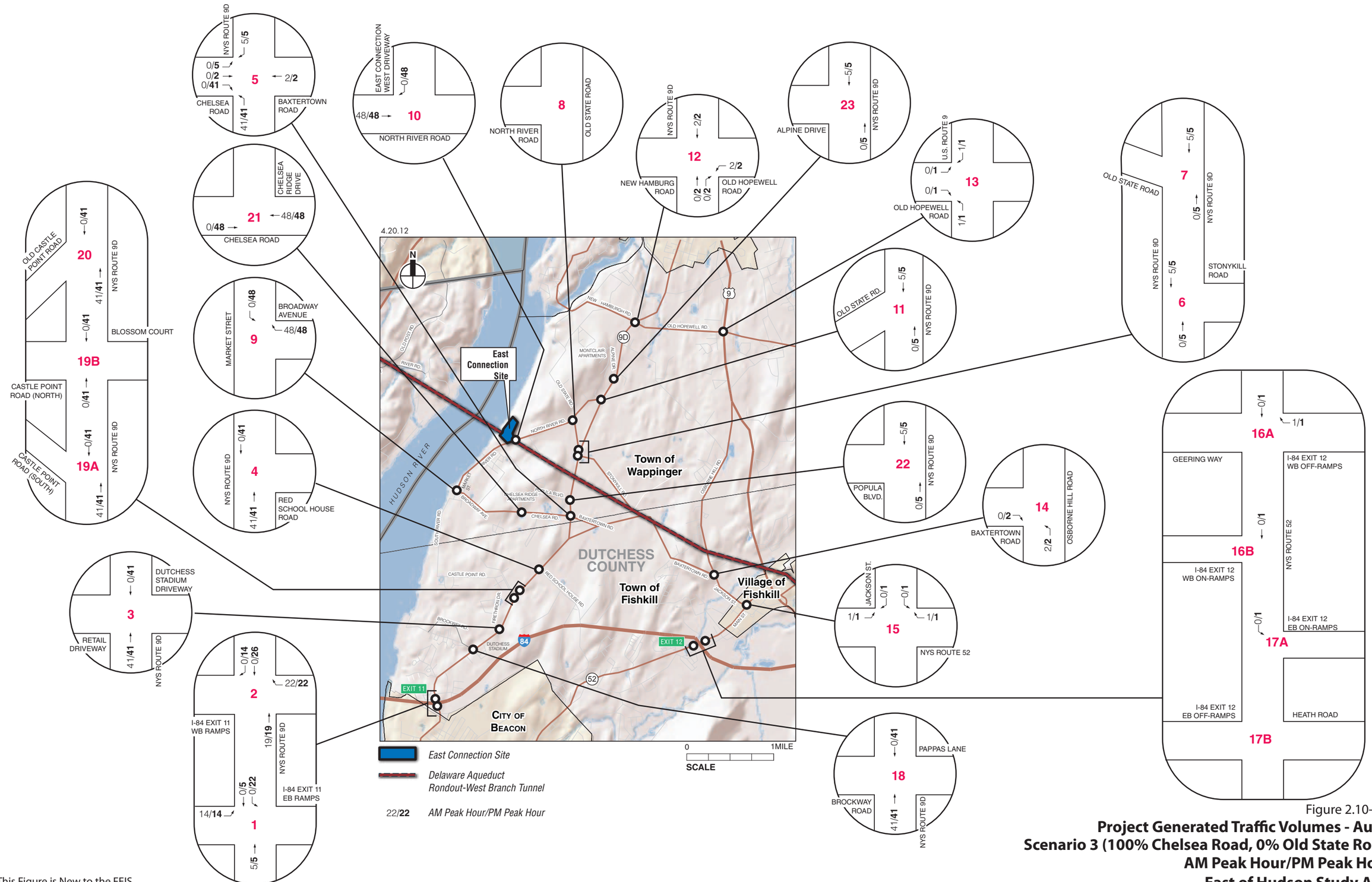
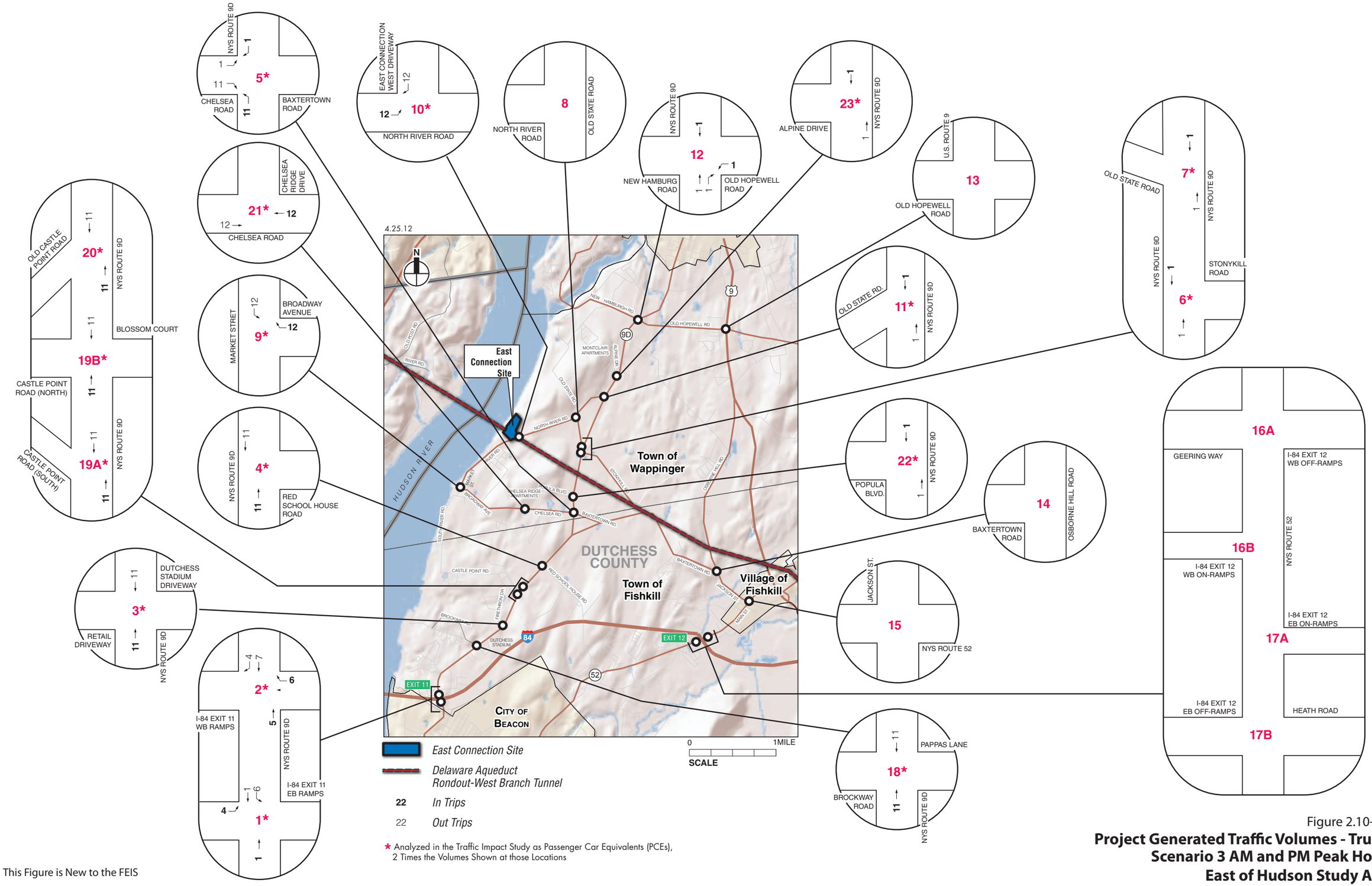


Figure 2.10-17d

Project Generated Traffic Volumes - Autos
Scenario 3 (100% Chelsea Road, 0% Old State Road)
AM Peak Hour/PM Peak Hour
East of Hudson Study Area

This Figure is New to the FEIS



This Figure is New to the FEIS

Figure 2.10-17e

Project Generated Traffic Volumes - Trucks
Scenario 3 AM and PM Peak Hours
East of Hudson Study Area

these criteria were employed, along with an assessment of the duration of predicted impacts to determine potential temporary significant adverse traffic impacts expected with Project 1.

Unsignalized Intersections

The same impact criteria described above for signalized intersections are also applicable to unsignalized intersections (assuming that Project 1 adds traffic to the minor roadway or cross street). However, mid-LOS D equates to a delay of 30 seconds for an unsignalized intersection. For the minor street to trigger predicted temporary significant adverse impacts, 90 passenger car equivalents (PCEs) must be identified in the future with Project 1 condition in any peak hour.

TRAFFIC CONDITIONS AND CAPACITY ANALYSIS RESULTS

For the analyses in this section, the peak construction period traffic generated during the AM and PM peak hours is referred to as the 2015 future with Project 1 conditions. The project-generated construction traffic was added to the 2015 future without Project 1 volumes in the AM and PM peak periods, and capacity analyses were performed. **Figures 2.10-18a and 2.10-18b** illustrate the resulting 2015 future with Project 1 traffic volumes for the AM and PM peak hours, respectively, for Scenario 1. **Figures 2.10-19a and 2.10-19b** illustrate the resulting 2015 future with Project 1 traffic volumes for the AM and PM peak hours, respectively, for Scenario 2. **Figures 2.10-20a and 2.10-20b** illustrate the resulting 2015 future with Project 1 traffic volumes for the AM and PM peak hours, respectively, for Scenario 3. The results of these analyses are discussed below.

CAPACITY ANALYSIS RESULTS – SCENARIO 1 (100% WORKER TRIPS OLD STATE ROAD, 0% WORKER TRIPS CHELSEA ROAD; 100% TRUCK TRIPS CHELSEA ROAD)

Table 2.10-14a compares the level of service results for 2015 future without Project 1 conditions to those for the 2015 future with Project 1 conditions for the study area intersections for Scenario 1. Below is a summary of the predicted exceedances of the *CEQR Technical Manual* traffic impact criteria associated with the anticipated peak construction activity. All predicted increases in delay described below are given in comparison to the 2015 future without Project 1 conditions.

Predicted Exceedances of the Traffic Impact Criteria at Signalized Intersections

Following the traffic impact criteria described above, predicted exceedances of the traffic impact criteria would occur with Project 1 at seven signalized approaches in the study area. For the intersections where the analysis indicated a potential exceedance of the traffic impact criteria during the peak construction period, additional analyses were undertaken to assist in determining how long the exceedance would last. Two predicted exceedances of the impact criteria for the peak construction period would occur during the AM peak hour and five during the PM peak hour, as described below.

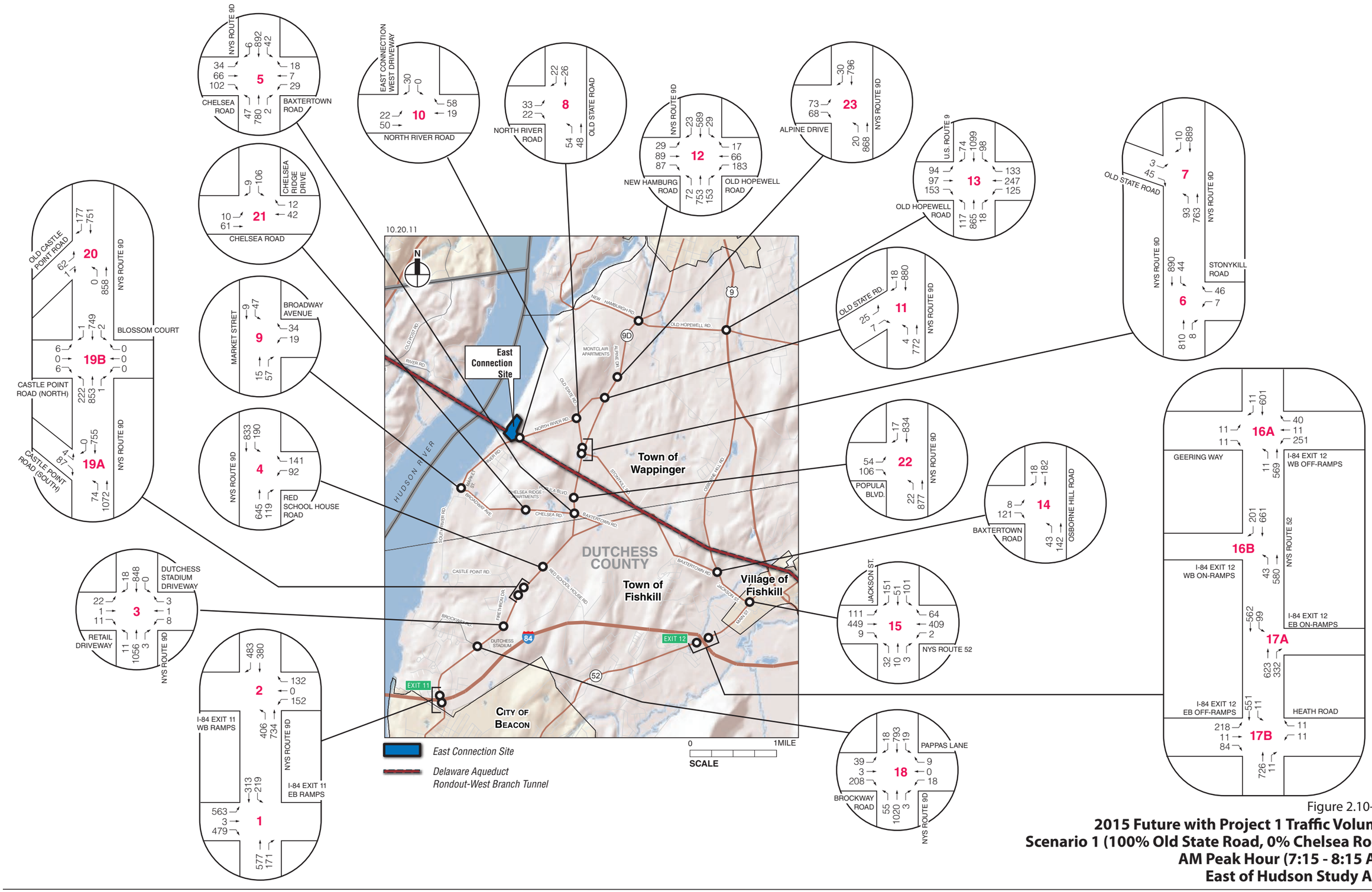


Figure 2.10-18a

2015 Future with Project 1 Traffic Volumes
Scenario 1 (100% Old State Road, 0% Chelsea Road)
AM Peak Hour (7:15 - 8:15 AM)
East of Hudson Study Area

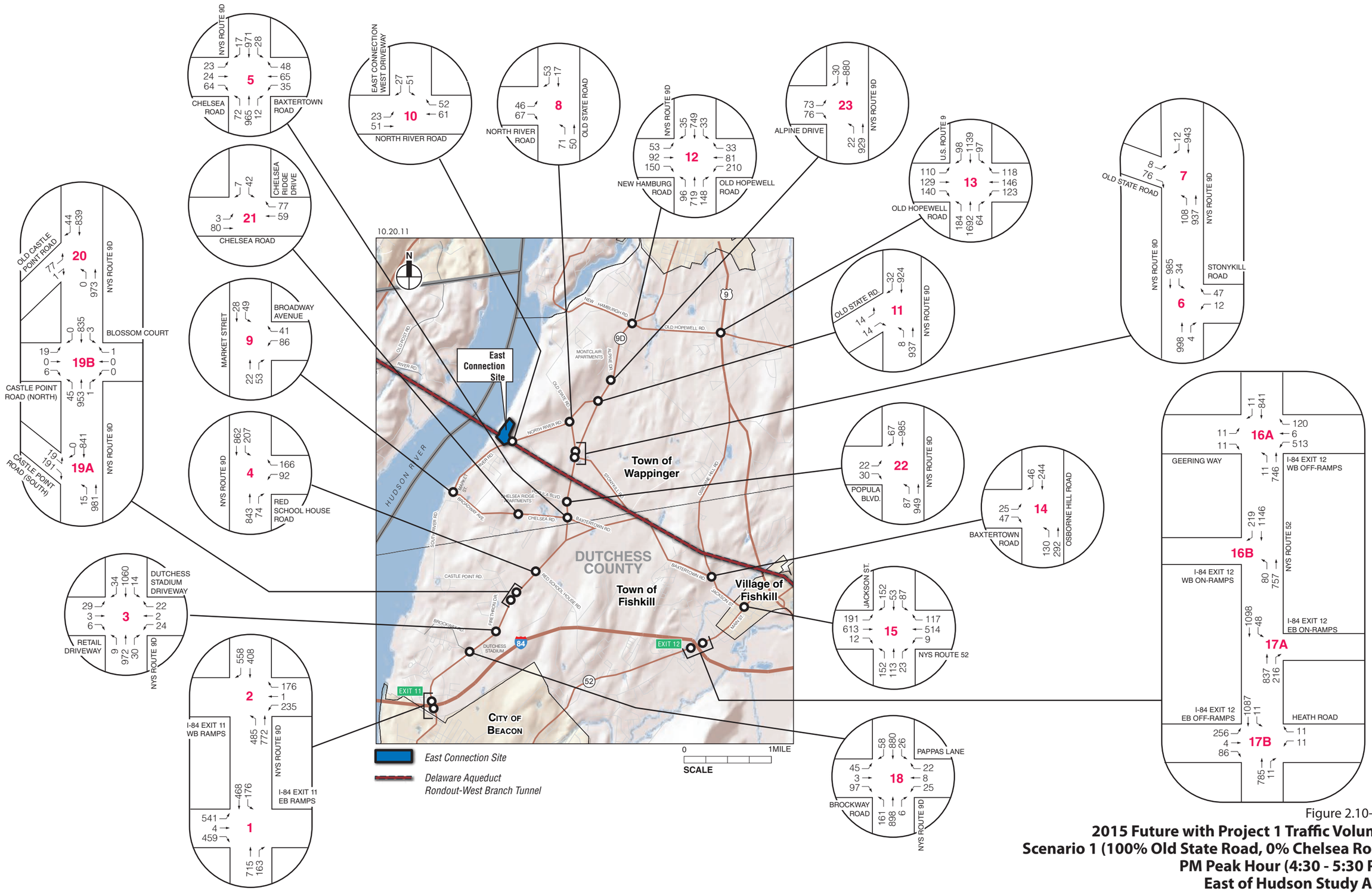


Figure 2.10-18b

2015 Future with Project 1 Traffic Volumes
Scenario 1 (100% Old State Road, 0% Chelsea Road)
PM Peak Hour (4:30 - 5:30 PM)
East of Hudson Study Area

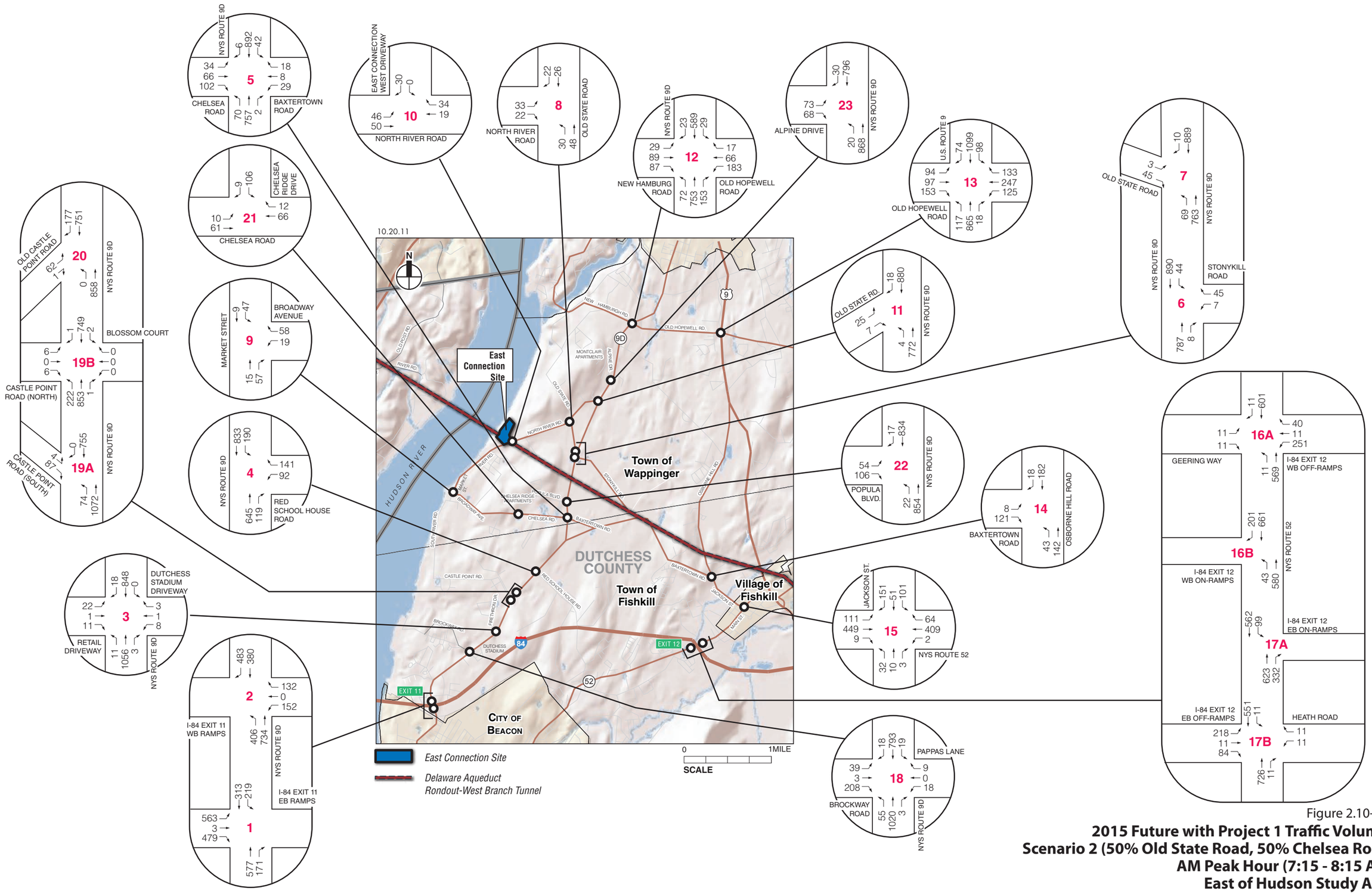


Figure 2.10-19a

2015 Future with Project 1 Traffic Volumes
Scenario 2 (50% Old State Road, 50% Chelsea Road)
AM Peak Hour (7:15 - 8:15 AM)
East of Hudson Study Area

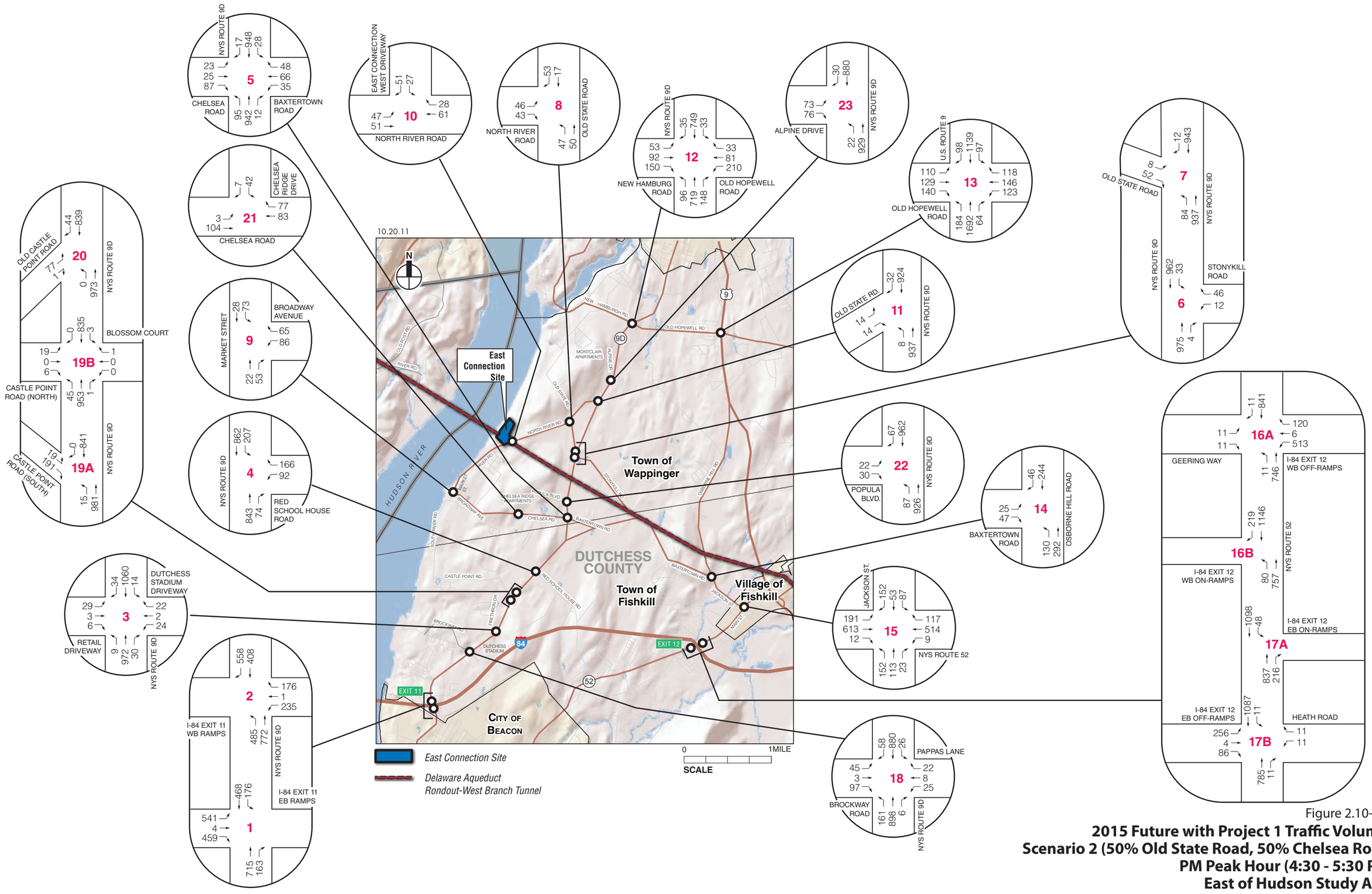


Figure 2.10-19b

2015 Future with Project 1 Traffic Volumes
Scenario 2 (50% Old State Road, 50% Chelsea Road)
PM Peak Hour (4:30 - 5:30 PM)
East of Hudson Study Area

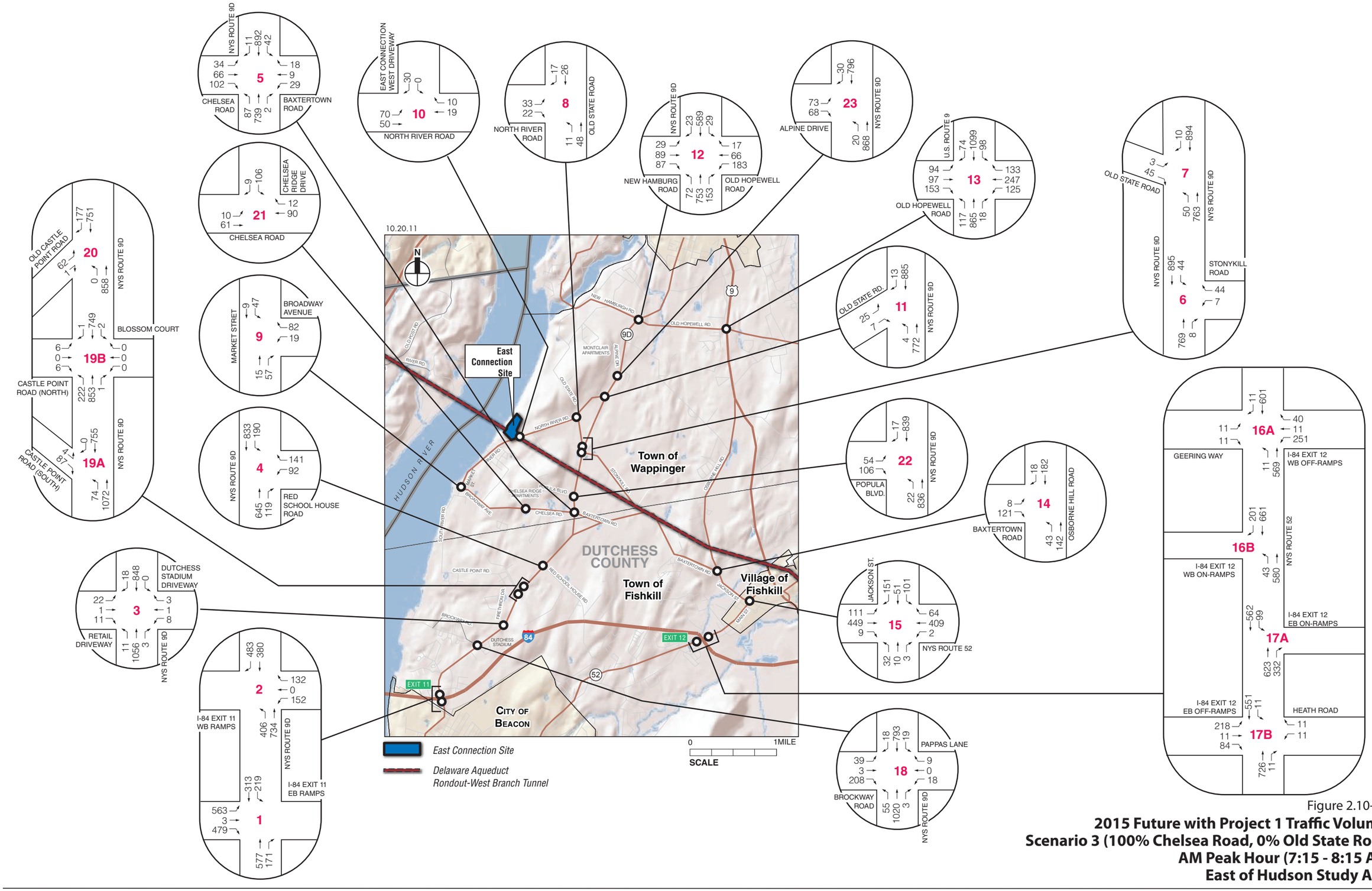


Figure 2.10-20a

2015 Future with Project 1 Traffic Volumes
Scenario 3 (100% Chelsea Road, 0% Old State Road)
AM Peak Hour (7:15 - 8:15 AM)
East of Hudson Study Area

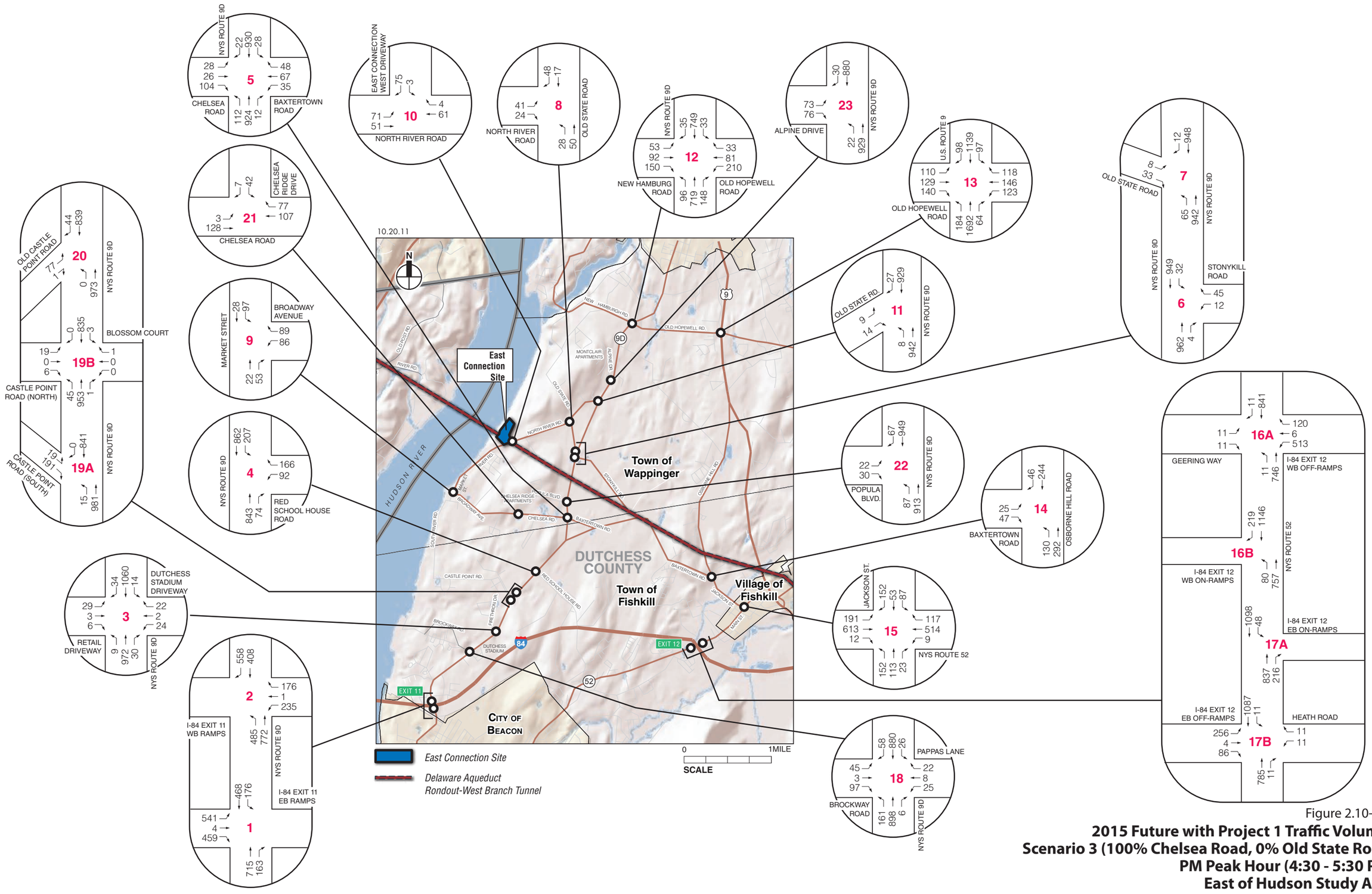


Figure 2.10-20b

2015 Future with Project 1 Traffic Volumes
Scenario 3 (100% Chelsea Road, 0% Old State Road)
PM Peak Hour (4:30 - 5:30 PM)
East of Hudson Study Area

AM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and New Hamburg Road/Old Hopewell Road (CR 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 79.4 seconds (LOS E) to 84.2 seconds (LOS F).

PM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and Red School House Road*: The northbound through lane group of this intersection would be adversely impacted, with the lane group delay increasing from 33.5 seconds (LOS C) to 45.8 seconds (higher than mid-LOS D).
- *Route 9D and Chelsea Road/Baxtertown Road*: The southbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 32.1 seconds (LOS C) to 50.6 seconds (higher than mid-LOS D).
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 143.6 seconds (LOS F) to 149.5 seconds (LOS F).
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The northbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 102.8 seconds (LOS F) to 107.5 seconds (LOS F).

Predicted Exceedances of the Traffic Impact Criteria at Unsignalized Intersections

There would be no predicted exceedances of the traffic impact criteria at any of the unsignalized intersections in the study area.

Table 2.10-14a

2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary | East of Hudson Study Area—Scenario 1

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	1.43	**	F	L	1.48	**	F+	L	1.33	**	F	L	1.39	**	F+
			T	0.01	37.3	D	T	0.01	37.3	D	T	0.01	37.2	D	T	0.01	37.2	D
			R	0.71	9.1	A	R	0.71	9.3	A	R	0.80	22.2	C	R	0.80	23.0	C
		NB	TR	0.33	19.4	B	TR	0.33	19.6	B	TR	0.45	26.7	C	TR	0.46	27.1	C
		SB	L	0.47	18.4	B	L	0.50	19.7	B	L	0.32	15.8	B	L	0.39	19.5	B
			T	0.34	12.2	B	T	0.35	11.9	B	T	0.47	17.0	B	T	0.47	16.1	B
		INT			75.5	E			84.1	F			70.4	E			77.5	E
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	0.42	45.0	D	LT	0.42	45.0	D	LT	0.65	53.0	D	LT	0.65	52.6	D
			R	0.25	7.8	A	R	0.32	7.3	A	R	0.36	14.7	B	R	0.42	14.9	B
		NB	L	0.62	19.0	B	L	0.62	19.0	B	L	0.69	27.7	C	L	0.71	33.2	C
			T	0.33	14.6	B	T	0.35	15.1	B	T	0.34	12.2	B	T	0.35	12.5	B
		SB	T	0.26	26.8	C	T	0.28	27.3	C	T	0.27	28.2	C	T	0.30	28.9	C
			R	0.53	4.6	A	R	0.54	4.7	A	R	0.57	4.9	A	R	0.59	5.0	A
		INT			17.3	B			17.3	B			20.5	C			21.5	C
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	0.14	26.2	C	LT	0.14	26.2	C	LT	0.21	26.9	C	LT	0.21	26.9	C
			R	0.08	14.3	B	R	0.08	14.3	B	R	0.04	15.2	B	R	0.04	15.2	B
		WB	LT	0.06	25.5	C	LT	0.06	25.5	C	LT	0.17	26.5	C	LT	0.17	26.5	C
			R	0.02	17.7	B	R	0.02	17.7	B	R	0.13	12.1	B	R	0.13	12.1	B
		NB	L	0.03	2.7	A	L	0.03	2.7	A	L	0.03	3.1	A	L	0.03	3.1	A
			T	0.73	9.3	A	T	0.77	11.4	B	T	0.64	10.3	B	T	0.68	11.5	B
			R	0.00	0.0	A	R	0.00	0.0	A	R	0.02	0.0	A	R	0.02	0.0	A
		SB	L	0.00	0.0	A	L	0.00	0.0	A	L	0.04	3.1	A	L	0.04	3.1	A
			T	0.60	9.2	A	T	0.62	9.6	A	T	0.74	13.1	B	T	0.78	14.8	B
			R	0.02	3.6	A	R	0.02	3.6	A	R	0.03	3.6	A	R	0.03	3.7	A
		INT			9.6	A			10.8	B			12.0	B			13.3	B
4	Route 9D (N-S) & Red School House Road	WB	L	0.40	27.5	C	L	0.40	27.5	C	L	0.41	27.5	C	L	0.41	27.5	C
			R	0.27	8.5	A	R	0.28	9.7	A	R	0.34	11.8	B	R	0.34	12.5	B
		NB	T	0.76	23.4	C	T	0.84	28.6	C	T	0.90	33.5	C	T	0.97	45.8	D+
			R	0.17	3.2	A	R	0.17	3.2	A	R	0.10	3.8	A	R	0.10	3.8	A
		SB	L	0.45	11.7	B	L	0.51	15.3	B	L	0.55	19.5	B	L	0.56	20.4	C
			T	0.69	10.2	B	T	0.71	10.9	B	T	0.60	8.0	A	T	0.65	9.0	A
		INT			14.6	B			17.2	B			19.6	B			24.8	C
5	Route 9D (N-S) & Chelsea Road/Baxtertown Road	EB	LTR	0.68	34.2	C	LTR	0.73	36.0	D	LTR	0.38	20.9	C	LTR	0.47	21.1	C
		WB	LTR	0.38	25.2	C	LTR	0.38	25.2	C	LTR	0.58	32.2	C	LTR	0.62	35.0	C
		NB	L	0.12	5.4	A	L	0.22	6.5	A	L	0.20	5.8	A	L	0.29	7.3	A
			TR	0.82	22.8	C	TR	0.87	27.1	C	TR	0.86	23.3	C	TR	0.88	25.2	C
		SB	L	0.15	5.4	A	L	0.18	6.0	A	L	0.12	5.1	A	L	0.12	5.2	A
			TR	0.87	25.3	C	TR	0.93	34.0	C	TR	0.93	32.1	C	TR	1.01	50.6	D+
		INT			24.5	C			30.0	C			27.0	C			35.6	D
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	0.60	45.4	D	LT	0.60	45.4	D	LT	0.64	45.1	D	LT	0.64	45.1	D
			R	0.36	12.1	B	R	0.36	12.1	B	R	0.48	9.6	A	R	0.48	9.6	A
		WB	L	0.92	79.4	E	L	0.94	84.2	F+	L	1.15	143.6	F	L	1.17	149.5	F+
			TR	0.40	33.6	C	TR	0.40	33.7	C	TR	0.59	42.8	D	TR	0.59	42.8	D
		NB	L	0.28	9.8	A	L	0.28	9.8	A	L	0.49	19.2	B	L	0.49	19.2	B
			TR	1.17	109.4	F	TR	1.17	110.0	F	TR	1.14	102.8	F	TR	1.15	107.5	F+
		SB	L	0.14	8.4	A	L	0.14	8.4	A	L	0.17	11.2	B	L	0.17	11.2	B
			TR	0.82	30.4	C	TR	0.83	30.8	C	TR	1.06	75.9	E	TR	1.07	77.6	E
		INT			68.6	E			69.4	E			80.4	F			83.3	F

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized lane groups at LOS F).
+ Predicted exceedance of the traffic impact criteria.
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-18a and 2.10-18b.

Table 2.10-14a (cont'd)

2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary | East of Hudson Study Area—Scenario 1

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
13	U.S. Route 9 (N-S) & Old Hopewell Road (CR 28)	EB	L	0.53	63.5	E	L	0.53	63.6	E	L	0.60	67.2	E	L	0.61	67.7	E
			T	0.52	62.5	E	T	0.52	62.5	E	T	0.67	70.5	E	T	0.67	70.8	E
			R	0.52	14.1	B	R	0.52	14.1	B	R	0.49	12.3	B	R	0.49	12.3	B
		WB	LT	1.52	**	F	LT	1.52	**	F	LT	0.99	107.3	F	LT	1.00	108.1	F
			R	0.50	30.4	C	R	0.50	30.4	C	R	0.37	16.0	B	R	0.38	16.1	B
		NB	L	0.61	65.1	E	L	0.61	65.2	E	L	0.78	77.4	E	L	0.78	77.6	E
			T	0.62	28.9	C	T	0.62	28.9	C	T	1.08	83.3	F	T	1.08	83.3	F
			R	0.02	2.3	A	R	0.02	2.3	A	R	0.07	3.2	A	R	0.07	3.2	A
		SB	L	0.57	65.5	E	L	0.58	65.6	E	L	0.59	74.1	E	L	0.59	74.1	E
			T	0.84	37.3	D	T	0.84	37.4	D	T	0.78	39.4	D	T	0.78	39.5	D
			R	0.09	3.1	A	R	0.09	3.1	A	R	0.10	2.6	A	R	0.10	2.6	A
		INT			71.2	E			71.5	E			63.6	E			63.7	E
15	Jackson Street& NYS Route 52 (E-W)	EB	L	0.38	19.4	B	L	0.39	19.5	B	L	0.61	42.9	D	L	0.61	43.0	D
			TR	0.64	20.9	C	TR	0.64	20.9	C	TR	0.74	30.7	C	TR	0.74	30.7	C
		WB	L	0.01	10.5	B	L	0.01	11.0	B	L	0.05	19.7	B	L	0.05	19.7	B
			T	0.69	27.4	C	T	0.69	27.5	C	T	0.87	49.2	D	T	0.87	49.3	D
			R	0.13	18.9	B	R	0.14	18.9	B	R	0.25	28.2	C	R	0.25	28.2	C
		NB	L	0.22	41.0	D	L	0.22	41.0	D	L	0.63	56.4	E	L	0.63	56.2	E
			TR	0.08	40.2	D	TR	0.08	40.2	D	TR	0.54	51.9	D	TR	0.54	51.9	D
		SB	L	0.38	32.9	C	L	0.38	33.0	C	L	0.42	46.6	D	L	0.43	46.8	D
			TR	0.63	26.3	C	TR	0.63	26.4	C	TR	0.80	46.2	D	TR	0.80	46.2	D
		INT			24.8	C			24.9	C			42.1	D			42.2	D
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/ Geering Way	EB	LTR	0.07	16.1	B	LTR	0.07	16.1	B	LTR	0.09	17.3	B	LTR	0.09	17.3	B
		WB	LT	0.96	72.2	E	LT	0.96	72.2	E	LT	1.52	**	F	LT	1.52	**	F
			R	0.11	7.9	A	R	0.11	7.8	A	R	0.24	6.1	A	R	0.24	6.1	A
		NB	L	0.05	7.0	A	L	0.05	7.0	A	L	0.07	7.6	A	L	0.07	7.6	A
			T	0.67	12.3	B	T	0.67	12.3	B	T	0.70	12.5	B	T	0.70	12.5	B
		SB	TR	0.64	16.7	B	TR	0.64	16.7	B	TR	0.85	32.3	C	TR	0.85	32.6	C
		INT			24.9	C			24.9	C			79.2	E			79.2	E
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	1.07	95.2	F	LTR	1.07	95.2	F	LTR	0.92	60.8	E	LTR	0.92	60.8	E
		WB	LTR	0.07	16.0	B	LTR	0.07	16.0	B	LTR	0.06	16.5	B	LTR	0.06	16.5	B
		NB	TR	0.76	20.7	C	TR	0.76	20.7	C	TR	0.74	19.5	B	TR	0.74	19.5	B
		SB	L	0.07	6.8	A	L	0.07	6.8	A	L	0.05	6.5	A	L	0.05	6.5	A
			T	0.60	11.8	B	T	0.60	11.8	B	T	0.98	46.6	D	T	0.98	46.6	D
		INT			34.1	C			34.1	C			38.7	D			38.7	D
18	Route 9D (N-S) & Brockway Road/ Pappas Lane (E-W)	EB	LT	0.19	34.7	C	LT	0.22	36.6	D	LT	0.25	33.6	C	LT	0.27	35.5	D
			R	0.48	9.4	A	R	0.51	11.0	B	R	0.29	7.9	A	R	0.30	8.3	A
		WB	LTR	0.17	28.4	C	LTR	0.19	29.6	C	LTR	0.33	26.1	C	LTR	0.35	27.4	C
		NB	L	0.12	2.9	A	L	0.12	2.8	A	L	0.39	5.2	A	L	0.41	5.6	A
			TR	0.72	12.3	B	TR	0.75	13.7	B	TR	0.61	9.4	A	TR	0.65	10.1	B
		SB	L	0.06	2.8	A	L	0.07	2.9	A	L	0.08	3.0	A	L	0.08	3.0	A
			T	0.40	7.2	A	T	0.39	6.7	A	T	0.47	7.9	A	T	0.49	7.7	A
			R	0.02	2.4	A	R	0.02	2.4	A	R	0.07	1.7	A	R	0.07	1.6	A
		INT			10.5	B			11.2	B			9.2	A			9.5	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-18a and 2.10-18b.

Table 2.10-14a (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary | East of Hudson Study Area—Scenario 1

			AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
No.[1]	Intersection	Approach	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
6	Route 9D (N-S) & Stonykill Road	WB	LR	0.39	32.8	D	LR	0.43	36.3	E	LR	0.54	58.9	F	LR	0.62	72.7	F
		SB	LT	0.06	2.0	A	LT	0.07	2.1	A	LT	0.06	1.9	A	LT	0.06	2.3	A
7	Route 9D (N-S) & Old State Road (Southern Intersection)	EB	L	0.04	53.0	F	L	0.05	53.2	F	L	0.19	83.5	F	L	0.19	83.8	F
			R	0.17	19.1	C	R	0.17	19.1	C	R	0.17	21.1	C	R	0.39	26.7	D
		NB	LT	0.08	2.5	A	LT	0.16	4.6	A	LT	0.11	3.6	A	LT	0.18	6.1	A
		SB	R	0.01	8.6	A	R	0.01	8.8	A	R	0.01	8.7	A	R	0.01	8.9	A
8	Old State Road (N-S) & River Road North[2]	EB	LR	0.08	7.5	A	LR	0.08	7.7	A	LR	0.10	7.7	A	LR	0.18	8.1	A
		NB	LT	0.10	7.6	A	LT	0.18	8.2	A	LT	0.11	7.8	A	LT	0.17	8.4	A
		SB	TR	0.07	7.3	A	TR	0.09	7.5	A	TR	0.10	7.2	A	TR	0.11	7.5	A
9	Broadway (E-W) & Market Street	WB	LR	0.06	9.4	A	LR	0.10	9.7	A	LR	0.15	10.2	B	LR	0.19	10.8	B
		SB	LT	0.03	5.5	A	LT	0.05	6.4	A	LT	0.03	3.6	A	LT	0.05	4.9	A
10	River Road North (E-W) & East Connection West Driveway	EB	LT	0.00	0.0	A	LT	0.02	2.4	A	LT	0.00	0.2	A	LT	0.02	2.5	A
		SB	LR	0.01	8.5	A	LR	0.05	8.8	A	LR	0.01	9.1	A	LR	0.20	10.9	B
11	Route 9D (N-S)& Old State Road (Northern Intersection)	EB	LR	0.33	55.2	F	LR	0.34	55.7	F	LR	0.40	63.9	F	LR	0.58	95.8	F
		NB	LT	0.01	0.2	A	LT	0.01	0.2	A	LT	0.01	0.5	A	LT	0.01	0.5	A
14	Baxtertown Road (E-W) & Osborne Hill Road/Jackson Street	EB	L	0.21	11.0	B	L	0.21	11.0	B	L	0.15	14.7	B	L	0.15	14.7	B
		NB	LT	0.05	2.1	A	LT	0.05	2.2	A	LT	0.12	3.5	A	LT	0.12	3.5	A
16B	NYS Route 52 (N-S)& I-84 WB On-Ramp	NB	L	0.10	11.6	B	L	0.10	11.6	B	L	0.34	26.7	D	L	0.34	26.8	D
17A	NYS Route 52 (N-S)& I-84 EB On-Ramp	SB	L	0.26	15.1	C	L	0.26	15.1	C	L	0.10	13.4	B	L	0.10	13.4	B
19A	Route 9D (N-S)& Castle Point Road (Southern Intersection)	EB	LR	0.33	22.0	C	LR	0.35	23.5	C	LR	1.09	120.2	F	LR	1.14	157.5	F
		NB	L	0.10	9.8	A	L	0.10	10.0	A	L	0.02	9.6	A	L	0.03	9.9	A
			T	0.65	0.0	A	T	0.69	0.0	A	T	0.58	0.0	A	T	0.82	0.0	A
		SB	TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.53	0.0	A
19B	Route 9D (N-S)& Castle Point Road (Northern Intersection) (E-W)	EB	LTR	0.26	95.1	F	LTR	0.30	114.4	F	LTR	0.56	118.7	F	LTR	0.87	**	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	16.6	C	LTR	0.01	17.7	C
		NB	L	0.29	11.1	B	L	0.30	11.3	B	L	0.06	9.8	A	L	0.08	11.7	B
			TR	0.51	0.0	A	TR	0.55	0.0	A	TR	0.56	0.0	A	TR	0.60	0.0	A
		SB	L	0.00	9.6	A	L	0.00	9.9	A	L	0.00	10.0	B	L	0.01	10.4	B
			TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.70	0.0	A
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	1.01	181.8	F	LR	1.15	**	F	LR	1.02	181.8	F	LR	1.30	**	F
		NB	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A
		SB	TR	0.57	0.0	A	TR	0.58	0.0	A	TR	0.50	0.0	A	TR	0.63	0.0	A
21	Chelsea Ridge Drive& Chelsea Road (E-W)	EB	LT	0.01	1.6	A	LT	0.01	1.1	A	LT	0.00	0.4	A	LT	0.00	0.3	A
		WB	TR	0.03	0.0	A	TR	0.05	0.0	A	TR	0.08	0.0	A	TR	0.09	0.0	A
		SB	LR	0.19	10.0	B	LR	0.20	10.5	B	LR	0.07	9.6	A	LR	0.08	10.0	B
22	Route 9D (N-S) & Populа Boulevard	EB	LR	4.12	**	F	LR	4.95	**	F	LR	3.61	**	F	LR	5.25	**	F
		NB	LT	0.04	1.1	A	LT	0.04	1.1	A	LT	0.14	4.3	A	LT	0.15	4.7	A
		SB	TR	0.54	0.0	A	TR	0.54	0.0	A	TR	0.64	0.0	A	TR	0.67	0.0	A
23	Route 9D (N-S) & Alpine Drive	EB	LR	1.26	227.2	F	LR	1.28	234.5	F	LR	1.51	**	F	LR	5.38	**	F
		NB	LT	0.03	0.8	A	LT	0.03	0.8	A	LT	0.03	1.0	A	LT	0.03	1.1	A
		SB	TR	0.52	0.0	A	TR	0.52	0.0	A	TR	0.58	0.0	A	TR	0.59	0.0	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized
+ Predicted exceedance of the traffic impact criteria; [1] Numbers in the left column correspond to the intersection references in Figures 2.10-18a and 2.10-18b.; [2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

CAPACITY ANALYSIS RESULTS – SCENARIO 2 (50% WORKER TRIPS OLD STATE ROAD, 50% WORKER TRIPS CHELSEA ROAD; 100% TRUCK TRIPS CHELSEA ROAD)

Table 2.10-14b compares the level of service results for 2015 future without Project 1 conditions to those for the 2015 future with Project 1 conditions for the study area intersections for Scenario 2. Below is a summary of the predicted exceedances of the *CEQR Technical Manual* traffic impact criteria associated with the anticipated peak construction activity. All predicted increases in delay described below are given in comparison to the 2015 future without Project 1 conditions.

Predicted Exceedances of the Traffic Impact Criteria at Signalized Intersections

Following the traffic impact criteria described above, the potential for predicted exceedances of the traffic impact criteria would occur with Project 1 at seven signalized approaches. For the intersections where the analysis indicated a potential exceedance of the traffic impact criteria during the peak construction period, additional analyses were undertaken to assist in determining how long the exceedance would last. Two predicted exceedances of the traffic impact criteria for the peak construction period would occur during the AM peak hour and five during the PM peak hour, as described below.

AM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 79.4 seconds (LOS E) to 84.2 seconds (LOS F).

PM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and Red School House Road*: The northbound through lane group of this intersection would be adversely impacted, with the lane group delay increasing from 33.5 seconds (LOS C) to 45.8 seconds (higher than mid-LOS D).
- *Route 9D and Chelsea Road/Baxtertown Road*: The southbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 32.1 seconds (LOS C) to 48.1 seconds (LOS D).
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 143.6 seconds (LOS F) to 149.5 seconds (LOS F).

Table 2.10-14b
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 2

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	1.43	**	F	L	1.48	**	F+	L	1.33	**	F	L	1.39	**	F+
			T	0.01	37.3	D	T	0.01	37.3	D	T	0.01	37.2	D	T	0.01	37.2	D
			R	0.71	9.1	A	R	0.71	9.3	A	R	0.80	22.2	C	R	0.80	23.0	C
		NB	TR	0.33	19.4	B	TR	0.33	19.6	B	TR	0.45	26.7	C	TR	0.46	27.1	C
		SB	L	0.47	18.4	B	L	0.50	19.7	B	L	0.32	15.8	B	L	0.39	19.5	B
			T	0.34	12.2	B	T	0.35	11.9	B	T	0.47	17.0	B	T	0.47	16.1	B
		INT			75.5	E			84.1	F			70.4	E			77.5	E
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	0.42	45.0	D	LT	0.42	45.0	D	LT	0.65	53.0	D	LT	0.65	52.6	D
			R	0.25	7.8	A	R	0.32	7.3	A	R	0.36	14.7	B	R	0.42	14.9	B
		NB	L	0.62	19.0	B	L	0.62	19.0	B	L	0.69	27.7	C	L	0.71	33.2	C
			T	0.33	14.6	B	T	0.35	15.1	B	T	0.34	12.2	B	T	0.35	12.5	B
		SB	T	0.26	26.8	C	T	0.28	27.3	C	T	0.27	28.2	C	T	0.30	28.9	C
			R	0.53	4.6	A	R	0.54	4.7	A	R	0.57	4.9	A	R	0.59	5.0	A
		INT			17.3	B			17.3	B			20.5	C			21.5	C
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	0.14	26.2	C	LT	0.14	26.2	C	LT	0.21	26.9	C	LT	0.21	26.9	C
			R	0.08	14.3	B	R	0.08	14.3	B	R	0.04	15.2	B	R	0.04	15.2	B
		WB	LT	0.06	25.5	C	LT	0.06	25.5	C	LT	0.17	26.5	C	LT	0.17	26.5	C
			R	0.02	17.7	B	R	0.02	17.7	B	R	0.13	12.1	B	R	0.13	12.1	B
		NB	L	0.03	2.7	A	L	0.03	2.7	A	L	0.03	3.1	A	L	0.03	3.1	A
			T	0.73	9.3	A	T	0.77	11.4	B	T	0.64	10.3	B	T	0.68	11.5	B
			R	0.00	0.0	A	R	0.00	0.0	A	R	0.02	0.0	A	R	0.02	0.0	A
		SB	L	0.00	0.0	A	L	0.00	0.0	A	L	0.04	3.1	A	L	0.04	3.1	A
			T	0.60	9.2	A	T	0.62	9.6	A	T	0.74	13.1	B	T	0.78	14.8	B
			R	0.02	3.6	A	R	0.02	3.6	A	R	0.03	3.6	A	R	0.03	3.7	A
		INT			9.6	A			10.8	B			12.0	B			13.3	B
4	Route 9D (N-S) & Red School House Road	WB	L	0.40	27.5	C	L	0.40	27.5	C	L	0.41	27.5	C	L	0.41	27.5	C
			R	0.27	8.5	A	R	0.28	9.7	A	R	0.34	11.8	B	R	0.34	12.5	B
		NB	T	0.76	23.4	C	T	0.84	28.6	C	T	0.90	33.5	C	T	0.97	45.8	D+
			R	0.17	3.2	A	R	0.17	3.2	A	R	0.10	3.8	A	R	0.10	3.8	A
		SB	L	0.45	11.7	B	L	0.51	15.3	B	L	0.55	19.5	B	L	0.56	20.4	C
			T	0.69	10.2	B	T	0.71	10.9	B	T	0.60	8.0	A	T	0.65	9.0	A
		INT			14.6	B			17.2	B			19.6	B			24.8	C
5	Route 9D (N-S) & Chelsea Road/Baxterto wn Road	EB	LTR	0.68	34.2	C	LTR	0.74	37.4	D	LTR	0.38	20.9	C	LTR	0.53	20.7	C
		WB	LTR	0.38	25.2	C	LTR	0.40	26.7	C	LTR	0.58	32.2	C	LTR	0.65	37.2	D
		NB	L	0.12	5.4	A	L	0.32	8.8	A	L	0.20	5.8	A	L	0.37	10.1	B
			TR	0.82	22.8	C	TR	0.83	23.6	C	TR	0.86	23.3	C	TR	0.86	23.4	C
		SB	L	0.15	5.4	A	L	0.16	5.7	A	L	0.12	5.1	A	L	0.12	5.4	A
			TR	0.87	25.3	C	TR	0.97	42.5	D	TR	0.93	32.1	C	TR	1.00	48.1	D+
		INT			24.5	C			32.3	C			27.0	C			33.6	C

Table 2.10-14b (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 2

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	0.60	45.4	D	LT	0.60	45.4	D	LT	0.64	45.1	D	LT	0.64	45.1	D
			R	0.36	12.1	B	R	0.36	12.1	B	R	0.48	9.6	A	R	0.48	9.6	A
		WB	L	0.92	79.4	E	L	0.94	84.2	F+	L	1.15	143.6	F	L	1.17	149.5	F+
			TR	0.40	33.6	C	TR	0.40	33.7	C	TR	0.59	42.8	D	TR	0.59	42.8	D
		NB	L	0.28	9.8	A	L	0.28	9.8	A	L	0.49	19.2	B	L	0.49	19.2	B
			TR	1.17	109.4	F	TR	1.17	110.0	F	TR	1.14	102.8	F	TR	1.15	107.5	F+
		SB	L	0.14	8.4	A	L	0.14	8.4	A	L	0.17	11.2	B	L	0.17	11.2	B
			TR	0.82	30.4	C	TR	0.83	30.8	C	TR	1.06	75.9	E	TR	1.07	77.6	E
		INT			68.6	E			69.4	E			80.4	F			83.3	F

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized lane groups at LOS F).
+ Predicted exceedance of the traffic impact criteria
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-19a and 2.10-19b.

Table 2.10-14b (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 2

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
13	U.S. Route 9 (N-S) & Old Hopewell Road (CR 28)	EB	L	0.53	63.5	E	L	0.53	63.6	E	L	0.60	67.2	E	L	0.61	67.7	E
			T	0.52	62.5	E	T	0.52	62.5	E	T	0.67	70.5	E	T	0.67	70.8	E
			R	0.52	14.1	B	R	0.52	14.1	B	R	0.49	12.3	B	R	0.49	12.3	B
		WB	LT	1.52	**	F	LT	1.52	**	F	LT	0.99	107.3	F	LT	1.00	108.1	F
			R	0.50	30.4	C	R	0.50	30.4	C	R	0.37	16.0	B	R	0.38	16.1	B
		NB	L	0.61	65.1	E	L	0.61	65.2	E	L	0.78	77.4	E	L	0.78	77.6	E
			T	0.62	28.9	C	T	0.62	28.9	C	T	1.08	83.3	F	T	1.08	83.3	F
			R	0.02	2.3	A	R	0.02	2.3	A	R	0.07	3.2	A	R	0.07	3.2	A
		SB	L	0.57	65.5	E	L	0.58	65.6	E	L	0.59	74.1	E	L	0.59	74.1	E
			T	0.84	37.3	D	T	0.84	37.4	D	T	0.78	39.4	D	T	0.78	39.5	D
			R	0.09	3.1	A	R	0.09	3.1	A	R	0.10	2.6	A	R	0.10	2.6	A
		INT			71.2	E			71.5	E			63.6	E			63.7	E
15	Jackson Street & NYS Route 52 (E-W)	EB	L	0.38	19.4	B	L	0.39	19.5	B	L	0.61	42.9	D	L	0.61	43.0	D
			TR	0.64	20.9	C	TR	0.64	20.9	C	TR	0.74	30.7	C	TR	0.74	30.7	C
		WB	L	0.01	10.5	B	L	0.01	11.0	B	L	0.05	19.7	B	L	0.05	19.7	B
			T	0.69	27.4	C	T	0.69	27.5	C	T	0.87	49.2	D	T	0.87	49.3	D
			R	0.13	18.9	B	R	0.14	18.9	B	R	0.25	28.2	C	R	0.25	28.2	C
		NB	L	0.22	41.0	D	L	0.22	41.0	D	L	0.63	56.4	E	L	0.63	56.2	E
			TR	0.08	40.2	D	TR	0.08	40.2	D	TR	0.54	51.9	D	TR	0.54	51.9	D
		SB	L	0.38	32.9	C	L	0.38	33.0	C	L	0.42	46.6	D	L	0.43	46.8	D
			TR	0.63	26.3	C	TR	0.63	26.4	C	TR	0.80	46.2	D	TR	0.80	46.2	D
		INT			24.8	C			24.9	C			42.1	D			42.2	D
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/Geering Way	EB	LTR	0.07	16.1	B	LTR	0.07	16.1	B	LTR	0.09	17.3	B	LTR	0.09	17.3	B
		WB	LT	0.96	72.2	E	LT	0.96	72.2	E	LT	1.52	**	F	LT	1.52	**	F
			R	0.11	7.9	A	R	0.11	7.8	A	R	0.24	6.1	A	R	0.24	6.1	A
		NB	L	0.05	7.0	A	L	0.05	7.0	A	L	0.07	7.6	A	L	0.07	7.6	A
			T	0.67	12.3	B	T	0.67	12.3	B	T	0.70	12.5	B	T	0.70	12.5	B
		SB	TR	0.64	16.7	B	TR	0.64	16.7	B	TR	0.85	32.3	C	TR	0.85	32.6	C
		INT			24.9	C			24.9	C			79.2	E			79.2	E
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	1.07	95.2	F	LTR	1.07	95.2	F	LTR	0.92	60.8	E	LTR	0.92	60.8	E
		WB	LTR	0.07	16.0	B	LTR	0.07	16.0	B	LTR	0.06	16.5	B	LTR	0.06	16.5	B
		NB	TR	0.76	20.7	C	TR	0.76	20.7	C	TR	0.74	19.5	B	TR	0.74	19.5	B
		SB	L	0.07	6.8	A	L	0.07	6.8	A	L	0.05	6.5	A	L	0.05	6.5	A
			T	0.60	11.8	B	T	0.60	11.8	B	T	0.98	46.6	D	T	0.98	46.6	D
		INT			34.1	C			34.1	C			38.7	D			38.7	D
18	Route 9D (N-S) & Brockway Road/Pappas Lane (E-W)	EB	LT	0.19	34.7	C	LT	0.22	36.6	D	LT	0.25	33.6	C	LT	0.27	35.5	D
			R	0.48	9.4	A	R	0.51	11.0	B	R	0.29	7.9	A	R	0.30	8.3	A
		WB	LTR	0.17	28.4	C	LTR	0.19	29.6	C	LTR	0.33	26.1	C	LTR	0.35	27.4	C
		NB	L	0.12	2.9	A	L	0.12	2.8	A	L	0.39	5.2	A	L	0.41	5.6	A
			TR	0.72	12.3	B	TR	0.75	13.7	B	TR	0.61	9.4	A	TR	0.65	10.1	B
		SB	L	0.06	2.8	A	L	0.07	2.9	A	L	0.08	3.0	A	L	0.08	3.0	A
			T	0.40	7.2	A	T	0.39	6.7	A	T	0.47	7.9	A	T	0.49	7.7	A
			R	0.02	2.4	A	R	0.02	2.4	A	R	0.07	1.7	A	R	0.07	1.6	A
		INT		0.00	10.5	B			11.2	B			9.2	A			9.5	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized lane groups at LOS F)
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-19a and 2.10-19b.

Table 2.10-14b (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 2

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
6	Route 9D (N-S) & Stonykill Road	WB	LR	0.39	32.8	D	LR	0.41	34.3	D	LR	0.54	58.9	F	LR	0.57	64.7	F
		SB	LT	0.06	2.0	A	LT	0.07	2.0	A	LT	0.06	1.9	A	LT	0.06	2.1	A
7	Route 9D (N-S) & Old State Road (Southern Intersection)	EB	L	0.04	53.0	F	L	0.05	53.2	F	L	0.19	83.5	F	L	0.19	83.8	F
			R	0.17	19.1	C	R	0.17	19.1	C	R	0.17	21.1	C	R	0.27	23.2	C
		NB	LT	0.08	2.5	A	LT	0.12	3.4	A	LT	0.11	3.6	A	LT	0.14	4.7	A
		SB	R	0.01	8.6	A	R	0.01	8.7	A	R	0.01	8.7	A	R	0.01	8.8	A
8	Old State Road (N-S) & River Road North[2]	EB	LR	0.08	7.5	A	LR	0.08	7.6	A	LR	0.10	7.7	A	LR	0.14	7.9	A
		NB	LT	0.10	7.6	A	LT	0.13	7.9	A	LT	0.11	7.8	A	LT	0.13	8.1	A
		SB	TR	0.07	7.3	A	TR	0.08	7.3	A	TR	0.10	7.2	A	TR	0.11	7.3	A
9	Broadway (E-W) & Market Street	WB	LR	0.06	9.4	A	LR	0.15	9.7	A	LR	0.15	10.2	B	LR	0.24	11.5	B
		SB	LT	0.03	5.5	A	LT	0.05	6.4	A	LT	0.03	3.6	A	LT	0.08	5.7	A
10	River Road North (E-W) & East Connection West Driveway	EB	LT	0.00	0.0	A	LT	0.03	3.7	A	LT	0.00	0.2	A	LT	0.04	3.8	A
		SB	LR	0.01	8.5	A	LR	0.05	8.7	A	LR	0.01	9.1	A	LR	0.19	10.5	B
11	Route 9D (N-S) & Old State Road (Northern Intersection)	EB	LR	0.33	55.2	F	LR	0.34	55.7	F	LR	0.40	63.9	F	LR	0.58	95.8	F
		NB	LT	0.01	0.2	A	LT	0.01	0.2	A	LT	0.01	0.5	A	LT	0.01	0.5	A
14	Baxtertown Road (E-W) & Osborne Hill Road/Jackson Street	EB	L	0.21	11.0	B	L	0.21	11.0	B	L	0.15	14.7	B	L	0.15	14.7	B
		NB	LT	0.05	2.1	A	LT	0.05	2.2	A	LT	0.12	3.5	A	LT	0.12	3.5	A
16B	NYS Route 52 (N-S) & I-84 WB On-Ramp	NB	L	0.10	11.6	B	L	0.10	11.6	B	L	0.34	26.7	D	L	0.34	26.8	D
17A	NYS Route 52 (N-S) & I-84 EB On-Ramp	SB	L	0.26	15.1	C	L	0.26	15.1	C	L	0.10	13.4	B	L	0.10	13.4	B
19A	Route 9D (N-S) & Castle Point Road (Southern Intersection)	EB	LR	0.33	22.0	C	LR	0.35	23.5	C	LR	1.09	120.2	F	LR	1.14	157.5	F
		NB	L	0.10	9.8	A	L	0.10	10.0	A	L	0.02	9.6	A	L	0.03	9.9	A
			T	0.65	0.0	A	T	0.69	0.0	A	T	0.58	0.0	A	T	0.82	0.0	A
		SB	TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.53	0.0	A
19B	Route 9D (N-S) & Castle Point Road (Northern Intersection) (E-W)	EB	LTR	0.26	95.1	F	LTR	0.30	114.4	F	LTR	0.56	118.7	F	LTR	0.87	**	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	16.6	C	LTR	0.01	17.7	C
		NB	L	0.29	11.1	B	L	0.30	11.3	B	L	0.06	9.8	A	L	0.08	11.7	B
			TR	0.51	0.0	A	TR	0.55	0.0	A	TR	0.56	0.0	A	TR	0.60	0.0	A
		SB	L	0.00	9.6	A	L	0.00	9.9	A	L	0.00	10.0	B	L	0.01	10.4	B
			TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.70	0.0	A
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	1.01	181.8	F	LR	1.15	**	F	LR	1.02	181.8	F	LR	1.30	**	F
		NB	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A
		SB	TR	0.57	0.0	A	TR	0.58	0.0	A	TR	0.50	0.0	A	TR	0.63	0.0	A
21	Chelsea Ridge Drive& Chelsea Road (E-W)	EB	LT	0.01	1.6	A	LT	0.01	1.1	A	LT	0.00	0.4	A	LT	0.00	0.2	A
		WB	TR	0.03	0.0	A	TR	0.07	0.0	A	TR	0.08	0.0	A	TR	0.11	0.0	A
		SB	LR	0.19	10.0	B	LR	0.21	10.9	B	LR	0.07	9.6	A	LR	0.08	10.4	B
22	Route 9D (N-S) & Popula Boulevard	EB	LR	4.12	**	F	LR	4.54	**	F	LR	3.61	**	F	LR	4.48	**	F
		NB	LT	0.04	1.1	A	LT	0.04	1.1	A	LT	0.14	4.3	A	LT	0.14	4.5	A
		SB	TR	0.54	0.0	A	TR	0.54	0.0	A	TR	0.64	0.0	A	TR	0.65	0.0	A
23	Route 9D (N-S) & Alpine Drive	EB	LR	1.26	227.2	F	LR	1.28	234.5	F	LR	1.51	**	F	LR	5.38	**	F
		NB	LT	0.03	0.8	A	LT	0.03	0.8	A	LT	0.03	1.0	A	LT	0.03	1.1	A
		SB	TR	0.52	0.0	A	TR	0.52	0.0	A	TR	0.58	0.0	A	TR	0.59	0.0	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service. ** Indicates a calculated delay greater than 240.0 seconds. + Predicted exceedance of the traffic impact criteria [1] Numbers in the left column correspond to the intersection references in Figures 2.10-19a and 2.10-19b. [2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The northbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 102.8 seconds (LOS F) to 107.5 seconds (LOS F).

Predicted Exceedances of the Traffic Impact Criteria at Unsignalized Intersections

There would be no predicted exceedances of the traffic impact criteria at any of the unsignalized intersections in the study area.

CAPACITY ANALYSIS RESULTS – SCENARIO 3 (0% WORKER TRIPS OLD STATE ROAD, 100% WORKER TRIPS CHELSEA ROAD; 100% TRUCK TRIPS CHELSEA ROAD)

Table 2.10-14c compares the level of service results for 2015 future without Project 1 conditions to those for the 2015 future with Project 1 conditions for the study area intersections for Scenario 3, which is most comparable to the future condition with DEP's commitment to require trucks to access the east connection site via Chelsea Road. Below is a summary of the predicted exceedances of the *CEQR Technical Manual* traffic impact criteria associated with the anticipated peak construction activity. All predicted increases in delay described below are given in comparison to the 2015 future without Project 1 conditions.

Predicted Exceedances of the Traffic Impact Criteria at Signalized Intersections

Following the traffic impact criteria described above, predicted exceedances of the traffic impact criteria would occur with Project 1 at eight signalized approaches in the study area. For the intersections where the analysis indicated a potential exceedance of the traffic impact criteria during the peak construction period, additional analyses were undertaken to assist in determining how long the exceedance would last. Three predicted exceedances of the traffic impact criteria for the peak construction period would occur during the AM peak hour and five during the PM peak hour, as described below.

AM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and Chelsea Road/Baxtertown Road*: The southbound through-right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 25.3 seconds (LOS C) to 45.9 seconds (higher than mid-LOS D).
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 79.4 seconds (LOS E) to 84.2 seconds (LOS F).

Table 2.10-14c
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 3

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	1.43	**	F	L	1.48	**	F+	L	1.33	**	F	L	1.39	**	F+
			T	0.01	37.3	D	T	0.01	37.3	D	T	0.01	37.2	D	T	0.01	37.2	D
			R	0.71	9.1	A	R	0.71	9.3	A	R	0.80	22.2	C	R	0.80	23.0	C
		NB	TR	0.33	19.4	B	TR	0.33	19.6	B	TR	0.45	26.7	C	TR	0.46	27.1	C
		SB	L	0.47	18.4	B	L	0.50	19.7	B	L	0.32	15.8	B	L	0.39	19.5	B
			T	0.34	12.2	B	T	0.35	11.9	B	T	0.47	17.0	B	T	0.47	16.1	B
		INT			75.5	E			84.1	F			70.4	E			77.5	E
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	0.42	45.0	D	LT	0.42	45.0	D	LT	0.65	53.0	D	LT	0.65	52.6	D
			R	0.25	7.8	A	R	0.32	7.3	A	R	0.36	14.7	B	R	0.42	14.9	B
		NB	L	0.62	19.0	B	L	0.62	19.0	B	L	0.69	27.7	C	L	0.71	33.2	C
			T	0.33	14.6	B	T	0.35	15.1	B	T	0.34	12.2	B	T	0.35	12.5	B
		SB	T	0.26	26.8	C	T	0.28	27.3	C	T	0.27	28.2	C	T	0.30	28.9	C
			R	0.53	4.6	A	R	0.54	4.7	A	R	0.57	4.9	A	R	0.59	5.0	A
		INT			17.3	B			17.3	B			20.5	C			21.5	C
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	0.14	26.2	C	LT	0.14	26.2	C	LT	0.21	26.9	C	LT	0.21	26.9	C
			R	0.08	14.3	B	R	0.08	14.3	B	R	0.04	15.2	B	R	0.04	15.2	B
		WB	LT	0.06	25.5	C	LT	0.06	25.5	C	LT	0.17	26.5	C	LT	0.17	26.5	C
			R	0.02	17.7	B	R	0.02	17.7	B	R	0.13	12.1	B	R	0.13	12.1	B
		NB	L	0.03	2.7	A	L	0.03	2.7	A	L	0.03	3.1	A	L	0.03	3.1	A
			T	0.73	9.3	A	T	0.77	11.4	B	T	0.64	10.3	B	T	0.68	11.5	B
			R	0.00	0.0	A	R	0.00	0.0	A	R	0.02	0.0	A	R	0.02	0.0	A
		SB	L	0.00	0.0	A	L	0.00	0.0	A	L	0.04	3.1	A	L	0.04	3.1	A
			T	0.60	9.2	A	T	0.62	9.6	A	T	0.74	13.1	B	T	0.78	14.8	B
			R	0.02	3.6	A	R	0.02	3.6	A	R	0.03	3.6	A	R	0.03	3.7	A
		INT			9.6	A			10.8	B			12.0	B			13.3	B
4	Route 9D (N-S) & Red School House Road	WB	L	0.40	27.5	C	L	0.40	27.5	C	L	0.41	27.5	C	L	0.41	27.5	C
			R	0.27	8.5	A	R	0.28	9.7	A	R	0.34	11.8	B	R	0.34	12.5	B
		NB	T	0.76	23.4	C	T	0.84	28.6	C	T	0.90	33.5	C	T	0.97	45.8	D+
			R	0.17	3.2	A	R	0.17	3.2	A	R	0.10	3.8	A	R	0.10	3.8	A
		SB	L	0.45	11.7	B	L	0.51	15.3	B	L	0.55	19.5	B	L	0.56	20.4	C
			T	0.69	10.2	B	T	0.71	10.9	B	T	0.60	8.0	A	T	0.65	9.0	A
		INT			14.6	B			17.2	B			19.6	B			24.8	C
5	Route 9D (N-S) & Chelsea Road/Baxtertown Road	EB	LTR	0.68	34.2	C	LTR	0.75	38.7	D	LTR	0.38	20.9	C	LTR	0.62	25.2	C
		WB	LTR	0.38	25.2	C	LTR	0.40	27.2	C	LTR	0.58	32.2	C	LTR	0.68	40.1	D
		NB	L	0.12	5.4	A	L	0.38	10.8	B	L	0.20	5.8	A	L	0.42	12.3	B
			TR	0.82	22.8	C	TR	0.81	22.0	C	TR	0.86	23.3	C	TR	0.84	22.3	C
		SB	L	0.15	5.4	A	L	0.16	5.6	A	L	0.12	5.1	A	L	0.12	5.4	A
			TR	0.87	25.3	C	TR	0.99	45.9	D+	TR	0.93	32.1	C	TR	0.99	47.7	D+
		INT			24.5	C			33.5	C			27.0	C			33.3	C
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	0.60	45.4	D	LT	0.60	45.4	D	LT	0.64	45.1	D	LT	0.64	45.1	D
			R	0.36	12.1	B	R	0.36	12.1	B	R	0.48	9.6	A	R	0.48	9.6	A
		WB	L	0.92	79.4	E	L	0.94	84.2	F+	L	1.15	143.6	F	L	1.17	149.5	F
			TR	0.40	33.6	C	TR	0.40	33.7	C	TR	0.59	42.8	D	TR	0.59	42.8	D
		NB	L	0.28	9.8	A	L	0.28	9.8	A	L	0.49	19.2	B	L	0.49	19.2	B
			TR	1.17	109.4	F	TR	1.17	110.0	F	TR	1.14	102.8	F	TR	1.15	107.5	F
		SB	L	0.14	8.4	A	L	0.14	8.4	A	L	0.17	11.2	B	L	0.17	11.2	B
			TR	0.82	30.4	C	TR	0.83	30.8	C	TR	1.06	75.9	E	TR	1.07	77.6	E
		INT			68.6	E			69.4	E			80.4	F			83.3	F

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service. ** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized lane groups at LOS F). +Predicted exceedance of the traffic impact criteria

[1] Numbers in the left column correspond to the intersection references in Figures 2.10-20a and 2.10-20b.

Table 2.10-14c (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 3

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Signalized Intersections																		
13	U.S. Route 9 (N-S) & Old Hopewell Road (CR 28)	EB	L	0.53	63.5	E	L	0.53	63.6	E	L	0.60	67.2	E	L	0.61	67.7	E
			T	0.52	62.5	E	T	0.52	62.5	E	T	0.67	70.5	E	T	0.67	70.8	E
			R	0.52	14.1	B	R	0.52	14.1	B	R	0.49	12.3	B	R	0.49	12.3	B
		WB	LT	1.52	**	F	LT	1.52	**	F	LT	0.99	107.3	F	LT	1.00	108.1	F
			R	0.50	30.4	C	R	0.50	30.4	C	R	0.37	16.0	B	R	0.38	16.1	B
		NB	L	0.61	65.1	E	L	0.61	65.2	E	L	0.78	77.4	E	L	0.78	77.6	E
			T	0.62	28.9	C	T	0.62	28.9	C	T	1.08	83.3	F	T	1.08	83.3	F
			R	0.02	2.3	A	R	0.02	2.3	A	R	0.07	3.2	A	R	0.07	3.2	A
		SB	L	0.57	65.5	E	L	0.58	65.6	E	L	0.59	74.1	E	L	0.59	74.1	E
			T	0.84	37.3	D	T	0.84	37.4	D	T	0.78	39.4	D	T	0.78	39.5	D
			R	0.09	3.1	A	R	0.09	3.1	A	R	0.10	2.6	A	R	0.10	2.6	A
		INT			71.2	E			71.5	E			63.6	E			63.7	E
15	Jackson Street & NYS Route 52 (E-W)	EB	L	0.38	19.4	B	L	0.39	19.5	B	L	0.61	42.9	D	L	0.61	43.0	D
			TR	0.64	20.9	C	TR	0.64	20.9	C	TR	0.74	30.7	C	TR	0.74	30.7	C
		WB	L	0.01	10.5	B	L	0.01	11.0	B	L	0.05	19.7	B	L	0.05	19.7	B
			T	0.69	27.4	C	T	0.69	27.5	C	T	0.87	49.2	D	T	0.87	49.3	D
			R	0.13	18.9	B	R	0.14	18.9	B	R	0.25	28.2	C	R	0.25	28.2	C
		NB	L	0.22	41.0	D	L	0.22	41.0	D	L	0.63	56.4	E	L	0.63	56.2	E
			TR	0.08	40.2	D	TR	0.08	40.2	D	TR	0.54	51.9	D	TR	0.54	51.9	D
		SB	L	0.38	32.9	C	L	0.38	33.0	C	L	0.42	46.6	D	L	0.43	46.8	D
			TR	0.63	26.3	C	TR	0.63	26.4	C	TR	0.80	46.2	D	TR	0.80	46.2	D
		INT			24.8	C			24.9	C			42.1	D			42.2	D
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/ Geering Way	EB	LTR	0.07	16.1	B	LTR	0.07	16.1	B	LTR	0.09	17.3	B	LTR	0.09	17.3	B
		WB	LT	0.96	72.2	E	LT	0.96	72.2	E	LT	1.52	**	F	LT	1.52	**	F
			R	0.11	7.9	A	R	0.11	7.8	A	R	0.24	6.1	A	R	0.24	6.1	A
		NB	L	0.05	7.0	A	L	0.05	7.0	A	L	0.07	7.6	A	L	0.07	7.6	A
			T	0.67	12.3	B	T	0.67	12.3	B	T	0.70	12.5	B	T	0.70	12.5	B
		SB	TR	0.64	16.7	B	TR	0.64	16.7	B	TR	0.85	32.3	C	TR	0.85	32.6	C
		INT			24.9	C			24.9	C			79.2	E			79.2	E
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	1.07	95.2	F	LTR	1.07	95.2	F	LTR	0.92	60.8	E	LTR	0.92	60.8	E
		WB	LTR	0.07	16.0	B	LTR	0.07	16.0	B	LTR	0.06	16.5	B	LTR	0.06	16.5	B
		NB	TR	0.76	20.7	C	TR	0.76	20.7	C	TR	0.74	19.5	B	TR	0.74	19.5	B
		SB	L	0.07	6.8	A	L	0.07	6.8	A	L	0.05	6.5	A	L	0.05	6.5	A
			T	0.60	11.8	B	T	0.60	11.8	B	T	0.98	46.6	D	T	0.98	46.6	D
		INT			34.1	C			34.1	C			38.7	D			38.7	D
18	Route 9D (N-S) & Brockway Road/Pappas Lane (E-W)	EB	LT	0.19	34.7	C	LT	0.22	36.6	D	LT	0.25	33.6	C	LT	0.27	35.5	D
			R	0.48	9.4	A	R	0.51	11.0	B	R	0.29	7.9	A	R	0.30	8.3	A
		WB	LTR	0.17	28.4	C	LTR	0.19	29.6	C	LTR	0.33	26.1	C	LTR	0.35	27.4	C
		NB	L	0.12	2.9	A	L	0.12	2.8	A	L	0.39	5.2	A	L	0.41	5.6	A
			TR	0.72	12.3	B	TR	0.75	13.7	B	TR	0.61	9.4	A	TR	0.65	10.1	B
		SB	L	0.06	2.8	A	L	0.07	2.9	A	L	0.08	3.0	A	L	0.08	3.0	A
			T	0.40	7.2	A	T	0.39	6.7	A	T	0.47	7.9	A	T	0.49	7.7	A
			R	0.02	2.4	A	R	0.02	2.4	A	R	0.07	1.7	A	R	0.07	1.6	A
		INT		0.00	10.5	B			11.2	B			9.2	A			9.5	A

Notes:
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service.
** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-20a and 2.10-20b.

Table 2.10-14c (cont'd)
2015 Future Without Project 1 and 2015 Future with Project 1 Conditions LOS Summary
East of Hudson Study Area | Scenario 3

No.[1]	Intersection	Approach	AM Peak Hour (7:15 AM - 8:15 AM)								PM Peak Hour (4:30 PM - 5:30 PM)							
			2015 Future w/o Project 1				2015 Future with Project 1				2015 Future w/o Project 1				2015 Future with Project 1			
			Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS	Movement	V/C Ratio	Delay (SPV)	LOS
Unsignalized Intersections																		
6/	Route 9D (N-S) & Stonykill Road	WB	LR	0.39	32.8	D	LR	0.39	33.1	D	LR	0.54	58.9	F	LR	0.55	60.6	F
		SB	LT	0.06	2.0	A	LT	0.07	2.0	A	LT	0.06	1.9	A	LT	0.06	1.9	A
7	Route 9 (N-S) & Old State Road (Southern Intersection)	EB	L	0.04	53.0	F	L	0.05	53.6	F	L	0.19	83.5	F	L	0.20	85.4	F
			R	0.17	19.1	C	R	0.17	19.2	C	R	0.17	21.1	C	R	0.17	21.3	C
		NB	LT	0.08	2.5	A	LT	0.09	2.5	A	LT	0.11	3.6	A	LT	0.11	3.7	A
		SB	R	0.01	8.6	A	R	0.01	8.6	A	R	0.01	8.7	A	R	0.01	8.7	A
8	Old State Road (N-S) & River Road North[2]	EB	LR	0.08	7.5	A	LR	0.08	7.5	A	LR	0.10	7.7	A	LR	0.10	7.7	A
		NB	LT	0.10	7.6	A	LT	0.10	7.7	A	LT	0.11	7.8	A	LT	0.11	7.8	A
		SB	TR	0.07	7.3	A	TR	0.08	7.3	A	TR	0.10	7.2	A	TR	0.10	7.2	A
9	Broadway (E-W) & Market Street	WB	LR	0.06	9.4	A	LR	0.19	9.9	A	LR	0.15	10.2	B	LR	0.29	12.2	B
		SB	LT	0.03	5.5	A	LT	0.05	6.4	A	LT	0.03	3.6	A	LT	0.11	6.1	A
10	River Road North (E-W) & East Connection West Driveway	EB	LT	0.00	0.0	A	LT	0.05	4.5	A	LT	0.00	0.2	A	LT	0.06	4.6	A
		SB	LR	0.01	8.5	A	LR	0.05	8.6	A	LR	0.01	9.1	A	LR	0.17	9.6	A
11	Route 9D (N-S) & Old State Road (Northern Intersection)	EB	LR	0.33	55.2	F	LR	0.34	56.0	F	LR	0.40	63.9	F	LR	0.41	65.7	F
		NB	LT	0.01	0.2	A	LT	0.01	0.2	A	LT	0.01	0.5	A	LT	0.01	0.5	A
14	Baxtertown Road (E-W) & Osborne Hill Road/Jackson Street	EB	L	0.21	11.0	B	L	0.21	11.0	B	L	0.15	14.7	B	L	0.15	14.7	B
		NB	LT	0.05	2.1	A	LT	0.05	2.2	A	LT	0.12	3.5	A	LT	0.12	3.5	A
16B	NYS Route 52 (N-S) and & I-84 WB On-Ramp	NB	L	0.10	11.6	B	L	0.10	11.6	B	L	0.34	26.7	D	L	0.34	26.8	D
17A	NYS Route 52 (N-S) & I-84 EB On-Ramp	SB	L	0.26	15.1	C	L	0.26	15.1	C	L	0.10	13.4	B	L	0.10	13.4	B
19A	Route 9D (N-S) & Castle Point Road (Southern Intersection)	EB	LR	0.33	22.0	C	LR	0.35	23.5	C	LR	1.09	120.2	F	LR	1.14	157.5	F
		NB	L	0.10	9.8	A	L	0.10	10.0	A	L	0.02	9.6	A	L	0.03	9.9	A
			T	0.65	0.0	A	T	0.69	0.0	A	T	0.58	0.0	A	T	0.82	0.0	A
		SB	TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.53	0.0	A
19B	Route 9D (N-S) & Castle Point Road (Northern Intersection) (E-W)	EB	LTR	0.26	95.1	F	LTR	0.30	114.4	F	LTR	0.56	118.7	F	LTR	0.87	**	F
		WB	LTR	0.00	0.0	A	LTR	0.00	0.0	A	LTR	0.00	16.6	C	LTR	0.01	17.7	C
		NB	L	0.29	11.1	B	L	0.30	11.3	B	L	0.06	9.8	A	L	0.08	11.7	B
			TR	0.51	0.0	A	TR	0.55	0.0	A	TR	0.56	0.0	A	TR	0.60	0.0	A
		SB	L	0.00	9.6	A	L	0.00	9.9	A	L	0.00	10.0	B	L	0.01	10.4	B
			TR	0.46	0.0	A	TR	0.47	0.0	A	TR	0.49	0.0	A	TR	0.70	0.0	A
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	1.01	181.8	F	LR	1.15	**	F	LR	1.02	181.8	F	LR	1.30	**	F
		NB	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A	LT	0.00	0.0	A
		SB	TR	0.57	0.0	A	TR	0.58	0.0	A	TR	0.50	0.0	A	TR	0.63	0.0	A
21	Chelsea Ridge Drive& Chelsea Road (E-W)	EB	LT	0.01	1.6	A	LT	0.01	1.1	A	LT	0.00	0.4	A	LT	0.00	0.2	A
		WB	TR	0.03	0.0	A	TR	0.09	0.0	A	TR	0.08	0.0	A	TR	0.12	0.0	A
		SB	LR	0.19	10.0	B	LR	0.22	11.2	B	LR	0.07	9.6	A	LR	0.09	10.8	B
22	Route 9D (N-S) & Popula Boulevard	EB	LR	4.12	**	F	LR	4.27	**	F	LR	3.61	**	F	LR	4.66	**	F
		NB	LT	0.04	1.1	A	LT	0.04	1.1	A	LT	0.14	4.3	A	LT	0.14	4.3	A
		SB	TR	0.54	0.0	A	TR	0.55	0.0	A	TR	0.64	0.0	A	TR	0.64	0.0	A
23	Route 9D (N-S) & Alpine Drive	EB	LR	1.26	227.2	F	LR	1.28	234.5	F	LR	1.51	**	F	LR	5.38	**	F
		NB	LT	0.03	0.8	A	LT	0.03	0.8	A	LT	0.03	1.0	A	LT	0.03	1.1	A
		SB	TR	0.52	0.0	A	TR	0.52	0.0	A	TR	0.58	0.0	A	TR	0.59	0.0	A

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection. L = Left-Turn; T = Through; R = Right-Turn. V/C = Volume to Capacity; SPV = Seconds per Vehicle; LOS = Level of Service. ** Indicates a calculated delay greater than 240.0 seconds. Delay values are not shown, however the increase in delay is greater than 3.0 seconds at impacted locations (the CEQR impact threshold for signalized +Predicted exceedance of the traffic impact criteria

[1] Numbers in the left column correspond to the intersection references in Figures 2.10-20a and 2.10-20b.

[2] Intersection analyzed as an all-way stop - Degree Utilization computed and presented in place of v/c ratio.

PM Peak

- *Route 9D and I-84 Eastbound Ramps*: The eastbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing by more than 3 seconds with a delay greater than 240.0 seconds (LOS F) in both 2015 future without Project 1 conditions and 2015 future with Project 1 conditions.
- *Route 9D and Red School House Road*: The northbound through lane group of this intersection would be adversely impacted, with the lane group delay increasing from 33.5 seconds (LOS C) to 45.8 seconds (higher than mid-LOS D).
- *Route 9D and Chelsea Road/Baxtertown Road*: The southbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 32.1 seconds (LOS C) to 47.7 seconds (LOS D).
- *Route 9D and New Hamburg Road/Old Hopewell Road (CR 28)*: The westbound left-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 143.6 seconds (LOS F) to 149.5 seconds (LOS F).
- *Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28)*: The northbound through/right-turn lane group of this intersection would be adversely impacted, with the lane group delay increasing from 102.8 seconds (LOS F) to 107.5 seconds (LOS F).

Common Analysis Results for Scenario 1, Scenario 2, and Scenario 3

For all three scenarios, the predicted exceedances in traffic impact criteria are similar. Scenarios 1, 2, and 3 would all result in predicted exceedances of the traffic impact criteria for the peak construction period at the same lane groups or approaches at the following intersections for the AM peak hour:

- Route 9D and I-84 Eastbound Ramps (eastbound left turn)
- Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28) (westbound left turn)

Scenarios 1, 2, and 3 would also result in predicted exceedances of the traffic impact criteria for the peak construction period at the same lane groups or approaches at the following intersections for the PM peak hour:

- Route 9D and I-84 Eastbound Ramps (eastbound left turn)
- Route 9D and Red School House Road (northbound through)
- Route 9D and Chelsea Road/Baxtertown Road (southbound through/right turn)
- Route 9D and New Hamburg Road/Old Hopewell Road (County Route 28) (westbound left turn and northbound through/right turn)

The exceedances of the traffic impact criteria predicted for the peak construction period would be identical for Scenarios 1, 2, and 3 at each of the locations identified above. Therefore, the

route workers take leaving the east connection site is not anticipated to affect the impacts at the locations described above.

Differences in Analysis Results for Scenario 1, Scenario 2, and Scenario 3

There is, however, a difference in the predicted traffic impact during the AM peak hour at the intersection of Route 9D and Chelsea Road/Baxtertown Road in Scenario 3. With all workers assumed to travel south from the east connection site, there would be an exceedance of the traffic impact criteria predicted for the peak construction period in the southbound/through/right turn during the AM peak hour at the intersection of Route 9D and Chelsea Road/Baxtertown Road. This exceedance would not occur in Scenario 1 or Scenario 2 during the AM peak hour.

For the PM peak hour, there is a difference in the magnitude of the exceedance predicted to occur at the intersection of Route 9D and Chelsea Road/Baxtertown Road. Scenarios 1, 2, and 3 would differ slightly (within a range of approximately 5 seconds of delay for the three scenarios). This difference is due to the differences in the assignment of the project-generated traffic by scenario. However, the locations of these exceedances (southbound through/right turn) would be the same for Scenarios 1, 2, and 3.

Predicted Exceedances of the Traffic Impact Criteria at Unsignalized Intersections

There would be no predicted exceedances of the traffic impact criteria at any of the unsignalized intersections in the study area.

VEHICLE QUEUES

An examination of vehicular queuing data for all three scenarios analyzed generally indicates that the proposed construction of Project 1would result in an increase in queue lengths at the study area intersections by an average of between 20 and 60 feet from Project 1-generated traffic. **Table 2.10-14d** provides a summary of the calculated 95th percentile queues from Synchro in 2015 for the east of Hudson study area intersections with and without Project 1. Intersections that would experience queues that would likely exceed the capacity (room available for vehicles to queues along a roadway segment before the queues spillback to the adjacent intersection) of the roadways include NYS Route 9D at New Hamburg Road/Old Hopewell Road (westbound left turn), U.S. Route 9 at New Hamburg Road/Old Hopewell Road (eastbound left turn), and Jackson Street at NYS Route 52 (eastbound, northbound, and southbound left turns). Queues at these locations generally exceed the capacities in existing and future without Project 1 conditions. Therefore, Project 1 construction would generally not cause queues to exceed roadway capacities.

ACCIDENT DATA

Given the small increase in traffic from Project 1, no increase in accidents is expected in 2015 with Project 1, even without implementation of proposed mitigation measures.

Table 2.10-14d*
Vehicular Queueing Analysis - East of Hudson Study Area

No.[1]	Intersection	Approach	Movement	Storage Length (ft)	AM Peak Hour (7:15 AM - 8:15 AM) 2015 Future w/o Project 1 Queue Length (ft)	AM Peak Hour (7:15 AM - 8:15 AM) 2015 Future with Project 1 (Scenario 3) Queue Length (ft)	PM Peak Hour (4:30 PM - 5:30 PM) 2015 Future w/o Project 1 Queue Length (ft)	PM Peak Hour (4:30 PM - 5:30 PM) 2015 Future with Project 1 (Scenario 3) Queue Length (ft)
Signalized Intersections								
1	Route 9D (N-S) & I-84 EB Ramps	EB	L	820	910	960	850	900
			T	820	10	10	10	10
			R	820	70	70	230	240
		NB	TR	420	190	190	270	280
		SB	L	330	120	130	100	140
			T	330	150	150	280	270
2	Route 9D (N-S) & I-84 WB Ramps	WB	LT	1040	190	190	290	290
			R	125	30	40	70	80
		NB	L	330	220	220	250	260
			T	330	190	200	180	190
		SB	T	390	170	180	170	180
			R	250	80	80	80	80
3	Route 9D (N-S) & Dutchess Stadium/Retail Driveway	EB	LT	300	30	30	40	40
			R	300	10	10	10	10
		WB	LT	345	10	10	30	30
			R	345	10	10	10	10
		NB	L	275	5	5	5	5
			T	825	460	680	560	660
			R	275	0	0	0	0
		SB	L	350	0	0	10	10
			T	540	540	560	740	800
			R	225	10	10	20	20
4	Route 9D (N-S) & Red Schoolhouse Road	WB	L	1710	70	70	70	70
			R	400	50	50	70	70
		NB	T	1420	400	460	570	620
			R	275	20	20	20	20
		SB	L	275	50	60	80	90
			T	600	340	360	290	340
5	Route 9D (N-S) & Chelsea Road/Baxtertown Road	EB	LTR	610	130	160	60	90
		WB	LTR	1600	40	50	120	130
		NB	L	250	10	40	20	50
			TR	1305	560	560	760	760
		SB	L	200	20	20	10	10
			TR	1080	750	800	790	850
12	Route 9D (N-S) & New Hamburg Road/Old Hopewell Road (CR 28)	EB	LT	500	120	120	140	140
			R	100	40	40	40	40
		WB	L	100	220	230	280	290
			TR	695	80	80	110	110
		NB	L	125	30	30	60	60
			TR	1565	890	890	930	940
		SB	L	100	20	20	20	20
			TR	460	480	480	790	800
13	U.S. Route 9 (N-S) & Old Hopewell Road (CR 28)	EB	L	125	150	150	170	170
			T	369	150	150	200	200
			R	125	70	70	40	40
		WB	LT	2600	710	710	520	520
			R	200	110	110	80	80
		NB	L	650	180	180	270	270
			T	2100	420	420	1230	1230
			R	225	10	10	20	20
		SB	L	550	160	160	150	150
			T	1535	620	620	630	630
			R	225	20	20	30	30

Table 2.10-14d (cont'd)
Vehicular Queueing Analysis - East of Hudson Study Area\

No.[1]	Intersection	Approach	Movement	Storage Length (ft)	AM Peak Hour (7:15 AM - 8:15 AM)		PM Peak Hour (4:30 PM - 5:30 PM)	
					2015 Future w/o Project 1	2015 Future with Project 1 (Scenario 3)	2015 Future w/o Project 1	2015 Future with Project 1 (Scenario 3)
					Queue Length (ft)	Queue Length (ft)	Queue Length (ft)	Queue Length (ft)
Signalized Intersections								
15	Jackson Street & NYS Route 52 (E-W)	EB	L	50	70	70	180	190
			TR	345	400	400	860	860
		WB	L	50	5	5	10	10
			T	590	360	360	630	630
			R	170	60	60	130	130
		NB	L	75	50	50	200	200
			TR	300	30	30	180	180
		SB	L	100	110	110	120	120
			TR	405	140	140	180	180
16A	NYS Route 52 (N-S) & I-84 WB Off-Ramp/Geering Way	EB	LTR	420	20	20	20	20
		WB	LT	825	270	270	650	650
			R	825	20	20	40	40
		NB	L	110	10	10	5	5
			T	110	280	280	340	340
		SB	TR	680	430	430	790	790
17B	NYS Route 52 (N-S) & I-84 EB Off-Ramp/Heath Road	EB	LTR	655	300	300	360	360
		WB	LTR	80	20	20	20	20
		NB	TR	110	630	630	670	670
		SB	L	410	10	10	5	5
			T	410	210	210	420	430
18	Route 9D (N-S) & Brockway Road/Pappas Lane (E-W)	EB	LT	930	60	60	60	60
			R	930	60	70	30	30
		WB	LTR	375	30	30	50	50
		NB	L	520	10	10	30	30
			TR	520	760	850	450	520
		SB	L	260	10	10	10	10
			T	700	120	130	140	150
			R	265	10	10	10	10
Unsignalized Intersections								
6	Route 9D (N-S) & Stonykill Road	WB	LR	1570	40	40	70	70
		SB	LT	150	5	5	5	5
7	Route 9D (N-S) & Old State Road (Southern Intersection)	EB	L	960	5	5	20	20
			R	960	15	15	20	20
		NB	LT	110	10	10	10	10
		SB	R	3425	5	5	5	5
8	Old State Road (N-S) & River Road North[2]	EB	LR	835	N/A	N/A	N/A	N/A
		NB	LT	1045	N/A	N/A	N/A	N/A
		SB	TR	320	N/A	N/A	N/A	N/A
9	Broadway (E-W) & Market Street	WB	LR	485	5	20	10	30
		SB	LT	240	5	5	5	10
10	River Road North (E-W) & East Connection West Driveway	EB	LT	525	0	5	0	10
		SB	LR	585	5	5	5	20
11	Route 9D (N-S) & Old State Road (Northern Intersection)	EB	LR	225	30	30	40	40
		NB	LT	3425	0	0	5	5
14	Baxtertown Road (E-W) & Osborne Hill Road/Jackson Street	EB	L	350	20	20	10	10
		NB	LT	935	5	5	10	10
16B	NYS Route 52 (N-S) & I-84 WB On-Ramp	NB	L	245	10	10	40	40
17A	NYS Route 52 (N-S) & I-84 EB On-Ramp	SB	L	245	30	30	10	10

Table 2.10-14d (cont'd)
Vehicular Queueing Analysis - East of Hudson Study Area

No.[1]	Intersection	Approach	Movement	Storage Length (ft)	AM Peak Hour (7:15 AM - 8:15 AM)		PM Peak Hour (4:30 PM - 5:30 PM)	
					2015 Future w/o Project 1	2015 Future with Project 1 (Scenario 3)	2015 Future w/o Project 1	2015 Future with Project 1 (Scenario 3)
					Queue Length (ft)	Queue Length (ft)	Queue Length (ft)	Queue Length (ft)
Unsignalized Intersections								
19A	Route 9D (N-S) & Castle Point Road (Southern Intersection)	EB	LR	100	40	40	310	350
		NB	L	1300	10	10	5	5
			T	1300	0	0	0	0
		SB	TR	95	0	0	0	0
19B	Route 9D (N-S) & Castle Point Road (Northern Intersection) (E-W)	EB	LTR	60	20	30	60	80
		WB	LTR	625	0	0	0	5
		NB	L	95	30	30	10	10
			TR	95	0	0	0	0
		SB	L	120	0	0	0	0
			TR	555	0	0	0	0
20	Route 9D (N-S) & Old Castle Point Road	EB	LR	385	150	160	150	170
		NB	LT	555	0	0	0	0
		SB	TR	325	0	0	0	0
21	Chelsea Ridge Apartments & Chelsea Road (E-W)	EB	LT	980	5	5	0	0
		WB	TR	1030	0	0	0	0
		SB	LR	280	20	20	10	10
22	Route 9D (N-S) & Chelsea Ridge Apartments	EB	LR	435	**	**	**	**
		NB	LT	1080	5	5	10	10
		SB	TR	880	0	0	0	0
23	Route 9D (N-S) & Alpine Drive	EB	LR	420	260	260	300	300
		NB	LT	1450	5	5	5	0
		SB	TR	210	0	0	0	0

Notes:
* This table is new to the FEIS.
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; INT = Intersection.
L = Left-Turn; T = Through; R = Right-Turn.
[1] Numbers in the left column correspond to the intersection references in Figures 2.10-12 and 2.10-13.

PARKING CONDITIONS

No predicted temporary significant adverse impacts on parking conditions in the east of Hudson study area are expected in 2015 future with Project 1 conditions. All parking for Project 1 construction activity would be accommodated on-site.

TRANSIT CONDITIONS

No predicted temporary significant adverse impacts on transit conditions in the east of Hudson study area are expected in 2015 future with Project 1 conditions. As all workers would likely arrive to the east connection site by auto, there would be no increase in demand in transit services, and no new trips would be added to buses operating in the area.

SCHOOL BUS OPERATIONS

No predicted temporary significant adverse impacts on school bus operations in the east of Hudson study area are expected in 2015 with Project 1. DEP would coordinate with the local school districts (see Traffic Management Plan in Section 2.19).

PEDESTRIAN CONDITIONS

No predicted temporary significant adverse impacts on pedestrian conditions in the east of Hudson study area are anticipated in 2015 with Project 1 conditions.

DURATION OF IMPACTS

For the intersections where the analysis indicated a potential traffic impact during the peak construction period, additional analyses were undertaken to assist in determining how long the adverse traffic impacts would last. First, the minimum number of vehicles required to result in a traffic impact was determined. That number was then compared to the estimated Project 1 construction traffic to determine how many days during construction the exceedance would occur. The results represent the likely amount of time during construction when a traffic impact would occur, as shown in **Table 2.10-15**.

Table 2.10-15
Duration of Impacts Near East Connection Site with Peak Trucks - East of Hudson Study Area

	Duration of Impacts During Construction							
	Route 9D & I-84 EB Ramps		Route 9D & Red School House Road		Route 9D & Chelsea Road/ Baxtertown Road		Route 9D & New Hamburg Road /Old Hopewell Road (CR 28)	
	AM	PM	AM	PM	AM	PM	AM	PM
Total Duration of Impact	59 months (4 years and 11 mos)	59 months (4 years and 11 mos)	0	24 months (2 years and 0 mo)	25 months (2 years and 1 mo)	27 months (2 years and 3 mos)	33 months (2 years and 9 mos)	25 months (2 years and 1 mos
Impact Duration as a Percent of Construction Period	81%	81%	0%	33%	34%	37%	45%	34%

Notes:

Total construction duration on the east side is 73 months (6 years and 1 month). The duration and extent of the construction activity that would occur during the Inundation Plug phase would depend on the number of drill rigs employed by the contractor; if the contractor employs three drill rigs, the inundation plug drilling work would occur over an approximately 16-month period in 2016 and 2017. If only one or two rigs are employed on site during this phase, the duration would be longer. Construction Impacts at all four intersections would be similar under Scenarios 1, 2, and 3.

The Site Preparation phase and Stages 1, 2, and 3 of construction partially overlap for a period of approximately three months. The cumulative number of workers and trucks for all phases was used to determine the impacts to each intersection during the overlap of the construction activities.

Based on this evaluation, it was determined that construction of Project 1 would result in predicted temporary significant adverse impacts on traffic at all of the approaches identified for the anticipated peak construction period.

2.10-5 CONCLUSIONS

2.10-5.1 WEST OF HUDSON

The west of Hudson study area for this traffic analysis comprises eight intersections (with a ninth intersection at the west connection site drive) in Orange County, NY. The analysis conducted for the west of Hudson study area concluded that predicted temporary significant adverse impacts would result at nine signalized approaches at five intersections (if an approach to an intersection would be impacted during the AM and PM peak hours, then two approaches would be considered impacted). Potential mitigation measures for these impacts are described in Section 2.19, "Mitigation."

Project 1 would not result in predicted temporary significant adverse impacts to pedestrians, parking, or mass transit in the area.

2.10-5.2 EAST OF HUDSON

The east of Hudson study area for this traffic analysis comprises 23 intersections in Dutchess County, NY. The analysis conducted for the east of Hudson study area concluded that predicted temporary significant adverse impacts would result at eight signalized approaches at four intersections (if an approach to an intersection would be impacted during the AM and PM peak hours, then two approaches would be considered impacted). Mitigation measures for these impacts are described in Section 2.19, "Mitigation."

Project 1 would not result in predicted temporary significant adverse impacts to pedestrians, parking, or mass transit in the area. ✷