4B. Highways and Local Intersections

This subchapter presents the highways and local intersections traffic assessment of the CBD Tolling Alternative for the 2023 analysis year.[1] This subchapter provides an overview of the regional highway network and evaluates the potential traffic effects of the CBD Tolling Alternative on key highway segments accessing the Manhattan CBD and along circumferential highways. It also examines the potential change in traffic operations at local intersections that could increase or decrease volumes with the implementation of the CBD Tolling Alternative. Throughout the public outreach process, the potential effects of traffic changes at key locations, many of which are in or adjacent to environmental justice communities, was raised, and are discussed in this subchapter.

4B.1 INTRODUCTION

This subchapter focuses on regional highways at points where they would experience the greatest potential effect of shifts in travel and roadways near Manhattan CBD access points and circumferential routes that avoid the Manhattan CBD. The traffic on local roadways resulting from these shifts was analyzed at intersections, using accepted standards of level of service (LOS) and vehicle delay criteria as the basis for evaluating changes in traffic operations. While the MTA Reform and Traffic Mobility Act (Traffic Mobility Act) exempts the Project from any state or local environmental review, the methodology used for this analysis is based on the State Environmental Quality Review Act (SEQRA).[2]

To evaluate the potential effects of the Project on the highway system and local intersections the following steps were performed and documented in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation"**:

- Used the New York Metropolitan Transportation Council Best Practice Model (BPM) to model regional travel for the seven tolling scenarios, in addition to the No Action Alternative, to identify changes in regional travel demand and patterns (shift in modes and diversion of traffic).
- Assigned BPM traffic flows to the highway and street network for all tolling scenarios.
- Performed a screening analysis using the BPM for all tolling scenarios to identify additional highway segments, in addition to the four tunnels within the Manhattan CBD, with a potential increase in traffic volumes greater than 5 percent. In consultation with the Project Sponsors, 10 highway corridors were analyzed for traffic operations using a using a traffic model or qualitative analyses as shown in **Figure 4B-1**.
- Determined the tolling scenario that would be representative of those with the highest potential to increase traffic along certain alternate routes and at local intersections (**Section 4B.4**).

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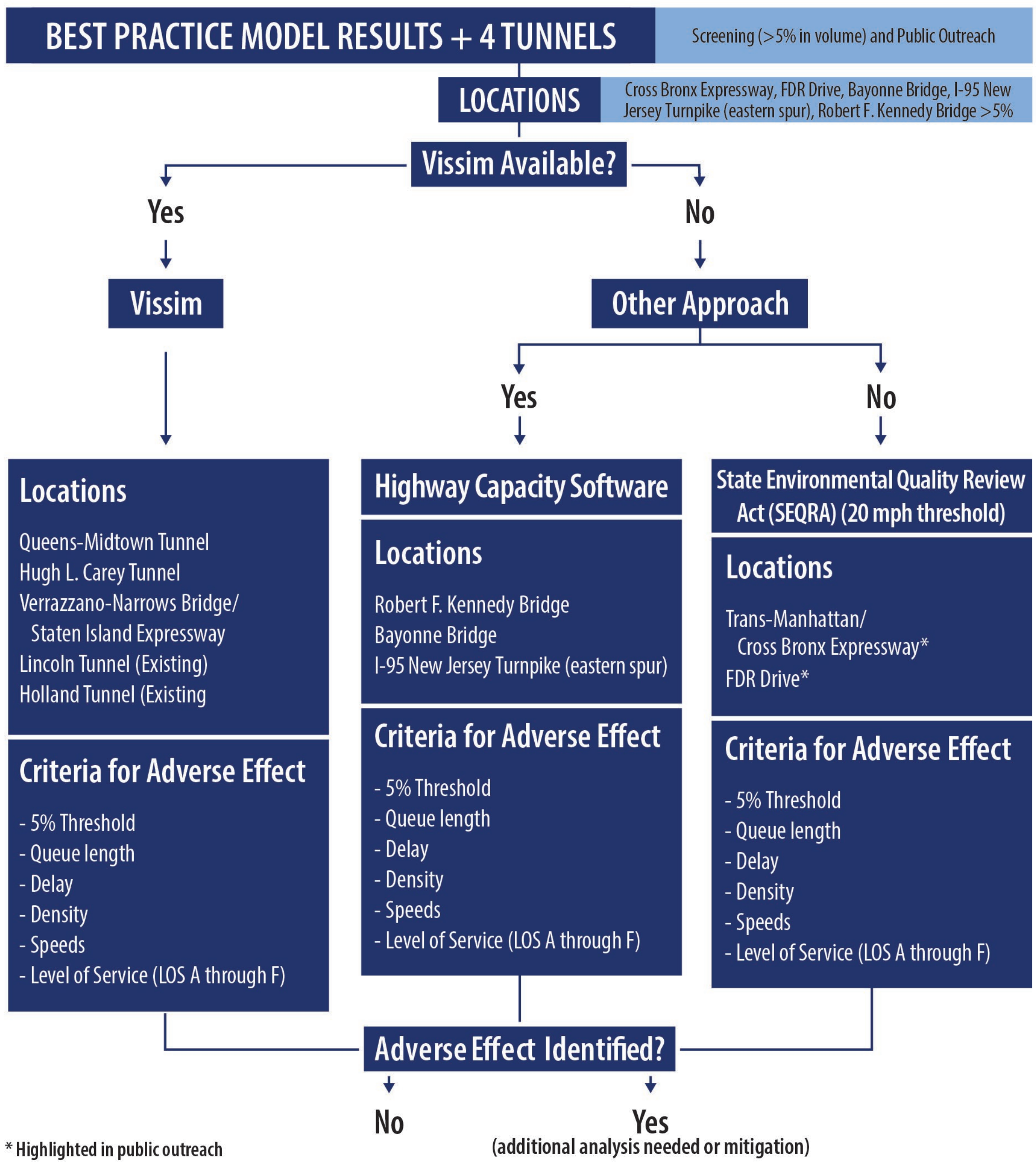
1 A 2045 horizon year traffic analysis is not required for this Environmental Assessment because the CBD Tolling Alternative would be expected to have a similar effect on traffic in 2045 as the 2023 analysis year due to capacity constraints at the Manhattan CBD crossings, which resulted in very low growth in traffic. However, a 2045 regional transportation and air quality analyses were performed using the BPM in order to meet state and Federal regional conformity requirements.

2 Traffic analyses for intersections were also performed using the methodology in the *New York City Environmental Quality Review (CEQR) Technical Manual*. See **Appendix 4B.5, "Transportation: Traffic LOS CBD Tolling Alternative with Mitigation."**

- To determine whether there was an adverse effect, changes in queue length, delay times, density, speeds, and LOS were assessed (**Section 4B.4**).
- Performed an assessment of effects on roadways in Central Park (**Section 4B.5**).
- In consultations with NYCDOT, identified and analyzed 102 local intersections within and outside the Manhattan CBD, grouping them functionally into 15 local study areas to be assessed (**Section 4B.6**).

Figure 4B-1. Analytical Approach Diagram



Source: WSP USA, 2022.

Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation" documents the following steps taken to assess the effect of the CBD Tolling Alternative on local intersections:

- Calibrated Synchro traffic model to reflect baseline intersection counts and operations.
- Determined analysis hours.
- Established traffic volumes for the No Action Alternative.
- Screened traffic volumes for various tolling scenarios to identify representative incremental traffic volumes.
- Projected CBD Tolling Alternative incremental traffic volumes and total traffic at each intersection based on regional travel model forecasting and trip assignment.
- Projected potential delays and LOS at key intersections.
- Identified potentially affected study area intersections with potential increases in delays that would exceed SEQRA criteria.[3]
- Developed minor intersection improvements (e.g., signal-timing, striping) to be incorporated into the Project that would reduce delays at the potentially affected intersections and avoid adverse effects.

In both the highway corridors and at the intersection locations, if an adverse effect was found after additional analyses were performed, mitigation was developed.

4B.2 SUMMARY OF EFFECTS OF THE CBD TOLLING ALTERNATIVE TOLLING SCENARIOS AND DETERMINATION OF TOLLING SCENARIO WITH LARGEST INCREASE IN LOCAL TRAFFIC VOLUMES

As set forth in **Chapter 2, "Project Alternatives,"** the proposed CBD Tolling Alternative is being evaluated through a range of tolling scenarios reflecting variations in tolls and application of possible discounts, exemptions, and/or crossing credits that would reduce or eliminate the CBD tolls paid by certain motorists or vehicle classes but would result in generally higher tolls needed to offset potential loss in revenues. These discounts, exemptions, and crossing credits have the potential to alter travel behavior and travel patterns in a manner that could result in increased traffic at some locations, although overall traffic would be reduced for all tolling scenarios.

Tolling Scenario A has the lowest overall CBD tolls with no discounts, no exemptions, and no crossing credits (limited to only those identified in the Traffic Mobility Act). This tolling scenario, if adopted, would result in a reduction of traffic volumes at all Manhattan CBD crossings.

Tolling Scenarios B and C have higher CBD tolls but with some discounts, exemptions, and/or crossing credits. These tolling scenarios would generally reduce traffic; however, Tolling Scenario C, with partial crossing credits, has the potential for a modest shift in traffic from currently toll-free facilities to tolled facilities where the crossing credits would be applied. Tolling Scenario G is similar to Tolling Scenarios A and

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3 See **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** for a detailed discussion of the applicable SEQRA criteria used to determine the significance of adverse traffic effects.

B, with lower toll costs for truck trips in the region. Tolling Scenario G would generally reduce traffic, and the lower truck toll rate would reduce truck diversions to circumferential routes around the Manhattan CBD.

Tolling Scenarios D, E, and F have the highest CBD tolls along with even higher discounts, exemptions, and/or crossing credits. These tolling scenarios would provide a full crossing credit at currently tolled facilities so that motorists would not have to pay both a facility toll and a CBD toll. This would equalize the effective tolls at all Manhattan CBD crossings and provide an incentive for some motorists currently using a toll-free facility (to avoid paying a toll) to shift to a currently tolled facility. The two facilities potentially most impacted by crossing credits are the Queens-Midtown Tunnel and the Hugh L. Carey Tunnel. The Queens-Midtown Tunnel would be expected to handle additional traffic volumes diverting primarily from the Ed Koch Queensboro Bridge and the Hugh L. Carey Tunnel would be expected to handle additional traffic diverted from the Brooklyn Bridge and the Manhattan Bridge. The shift of traffic to the Hugh L. Carey Tunnel and the Queens-Midtown Tunnel has the potential of increasing traffic at these tunnels, along the highway approaches leading to the tunnels, and at nearby intersections adjacent to the tunnel portals. Under Tolling Scenarios C, D, and E, the regional vehicle miles traveled (VMT) is expected to have larger reductions than Tolling Scenarios A, B, F, and G. However, for the Manhattan CBD, Tolling Scenarios D, E, and G would have the most significant reductions in VMT.

All tolling scenarios would be expected to divert some Manhattan CBD through traffic originating from Brooklyn, Queens, and Long Island to points in New Jersey and beyond to circumferential routes using the George Washington Bridge via the Cross Bronx Expressway and the Verrazzano-Narrows Bridge via the Staten Island Expressway. The higher overall CBD tolls under Tolling Scenarios D, E, and F would result in higher circumferential diversions compared to Tolling Scenarios A, B, C, and G, with lower CBD tolls.

4B.2.1 Summary of Highway Analysis to Determine Representative Tolling Scenario with Largest Increases in Traffic

Preliminary analyses were performed for all tolling scenarios to identify which tolling scenario(s) would have the greatest potential for traffic effects at local intersections and along highway segments, and these tolling scenarios were analyzed in detail. **Table 4B-1** presents the change in peak-hour traffic volumes, referred to as the increment, for all tolling scenarios analyzed using the BPM. These increments were used to determine the representative tolling scenario for analysis, the facilities/highways to analyze in detail, and the direction of the highway that needed to be analyzed, inbound or outbound. [4]

The Lincoln Tunnel and Holland Tunnel would be expected to have negative increments in both directions, with reduced traffic volumes under all tolling scenarios during the peak hours in the inbound direction. Since these two facilities would be expected to generally operate with less or the same delay they were not analyzed further.

[4] Highways are analyzed by direction using peak hour one-way traffic volumes while VMT, air quality, and noise analyses utilize two-way traffic volumes as inputs. Therefore, the applicable tolling scenario(s) with the highest potential for adverse effects may be different for traffic analyses than the scenario(s) used to analyze VMT, air quality, and noise effects.

Table 4B-1. Peak-Hour Incremental Traffic Volumes: Comparison of Tolling Scenarios*

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEAK-HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Lincoln Tunnel/ NJ Route 495	Inbound	AM	-407	-433	-209	-86	-205	-162	-533
		MD	-434	-478	-283	-147	-269	-109	-508
		PM	-248	-243	-141	-73	-135	-140	-287
	Outbound	AM	-137	-149	-177	-173	-178	-184	-177
		MD	-561	-584	-631	-695	-741	-639	-651
		PM	-629	-672	-647	-784	-888	-805	-770
Holland Tunnel/I-78/ NJ Route 139	Inbound	AM	-206	-231	-127	-78	-164	-143	-309
		MD	-213	-231	-147	-105	-189	-70	-285
		PM	-300	-310	-215	-140	-242	-246	-386
	Outbound	AM	-210	-229	-267	-293	-307	-317	-260
		MD	-311	-354	-422	-463	-519	-465	-403
		PM	-96	-103	-71	-18	-81	-15	-109
Queens-Midtown Tunnel - Long Island Expressway (I-495)	Inbound	AM	-188	-186	253	126	127	125	-192
		MD	-114	-113	224	383	385	379	-120
		PM	-420	-358	241	203	202	202	-409
	Outbound	AM	-61	-65	-67	-25	-30	-24	-63
		MD	-229	-240	-251	163	165	162	-211
		PM	-273	-268	-316	350	335	343	-278
Hugh L. Carey Tunnel - Gowanus Expressway	Inbound	AM	52	80	145	71	71	70	30
		MD	-54	-60	217	482	482	482	-57
		PM	1	7	28	47	44	44	-7
	Outbound	AM	106	100	101	110	107	101	87
		MD	56	64	59	574	574	574	66
		PM	-58	-69	-61	543	543	547	-99

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEAK-HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
George Washington Bridge[1]	Inbound	AM	43	42	-72	-125	-144	-67	96
		MD	341	472	247	140	233	59	520
		PM	129	184	4	-89	-5	11	198
	Outbound	AM	-14	-8	-3	88	78	117	24
		MD	512	642	707	826	743	754	725
		PM	180	399	409	413	385	415	255
Verrazzano-Narrows Bridge/Staten Island Expressway	Inbound	AM	130	75	17	8	7	14	152
		MD	163	221	100	-8	37	-29	229
		PM	165	161	140	112	135	166	155
	Outbound	AM	77	89	160	230	213	209	124
		MD	211	207	290	400	372	345	248
		PM	170	174	238	240	243	235	210
FDR Drive—Between Williamsburg Bridge and Brooklyn Bridge	Southbound	AM	307	298	356	294	311	314	302
		MD	282	293	281	445	457	458	287
		PM	404	406	440	566	598	666	405
		LN	324	338	348	342	344	370	331
	Northbound	AM	253	298	249	275	285	313	276
		MD	156	231	105	97	107	61	193
		PM	307	298	356	294	311	314	302
		LN	282	293	281	445	457	458	287
Bayonne Bridge	Inbound	AM	421	154	137	275	376	415	145
		MD	273	160	144	266	317	346	142
		PM	239	78	57	161	213	248	87
		LN	47	7	9	37	54	66	9
	Outbound	AM	81	35	41	93	81	68	30
		MD	63	109	86	103	97	103	94
		PM	184	126	131	136	148	192	131
		LN	-1	19	15	12	1	6	25

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEAK-HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Robert F. Kennedy Bridge	Inbound	AM	586	457	481	506	508	487	527
		MD	261	250	233	273	261	250	279
		PM	600	558	510	521	634	581	576
		LN	110	89	86	78	93	117	77
	Outbound	AM	418	374	387	396	396	404	485
		MD	505	569	503	545	474	512	559
		PM	630	597	605	606	612	617	637
		LN	576	569	554	607	598	636	630
I-95 Eastern Spur	Inbound	AM	143	-33	-12	26	98	89	-31
		MD	202	183	130	203	218	193	217
		PM	61	21	6	39	56	65	23
		LN	109	3	3	65	104	138	8
	Outbound	AM	58	53	35	38	53	58	51
		MD	62	76	90	80	63	121	118
		PM	144	100	58	102	80	93	95
		LN	-22	0	-5	-12	-16	-13	0

Source: BPM Facility Volumes (CBD Tolling Alternative minus No Action Alternative).
* Analyzed demand volumes.
1 **Table 4B-21** shows a detailed breakdown of the projected traffic volume increases along the Trans-Manhattan Expressway and Cross Bronx Expressway, which would be lower.

Two facilities crossing the Manhattan CBD—the Queens-Midtown Tunnel and Hugh L. Carey Tunnel—would be expected to have higher increases in traffic volumes inbound under Tolling Scenarios C, D, E, and F compared to other tolling scenarios, some of which have a negative increment. The volume increments for these tolling scenarios generally fall within a very narrow range and are expected to have similar effects. Only the inbound direction was analyzed because that direction experiences higher levels of congestion and delays.

Two facilities that handle circumferential diversion of through Manhattan CBD trips—the Verrazzano-Narrows Bridge and the George Washington Bridge—are expected to have higher increases in outbound (westbound) traffic volumes under Tolling Scenarios C, D, E, and F compared to other tolling scenarios. The George Washington Bridge/Trans-Manhattan/Cross Bronx Expressway corridor was assessed analytically and qualitatively because the data to properly build and calibrate a Vissim microsimulation model were not available (and current data would not be representative given the COVID-19 pandemic). Only the outbound (westbound) direction was analyzed for both the George Washington Bridge (New Jersey-bound) and the Verrazzano-Narrows Bridge (Staten Island bound) because the volume increments and congestion would be higher in that direction.

For all highway analyses, Tolling Scenario D was chosen as the representative tolling scenario due to having daily volumes that land between Tolling Scenarios E and F. In addition, Tolling Scenario D generally presented larger peak-hour volumes. For these reasons, Tolling Scenario D was analyzed in detail. For congested roadway segments, a Vissim microsimulation model was used to analyze the No Action Alternative and the CBD Tolling Alternative for the representative tolling scenario where a model was available. For roadways operating at higher speeds of 40 mph or greater, the Highway Capacity Software (HCS) model was used. A qualitative and analytical method was used to analyze congested roadways where neither a Vissim model nor reliable pre-COVID-19-pandemic traffic data were available since the HCS is not applicable for evaluation of congested roadways. A qualitative approach was also used in instances where all tolling scenarios would result in lower traffic volumes at a facility and its approaches.

4B.2.2 Summary of Intersection Analysis to Determine Representative Tolling Scenario with Highest Potential Increase in Traffic

The number of intersections projected to have an increase of 50 or more vehicles in a peak hour was used as a basis for evaluating the relative potential of each tolling scenario to trigger adverse effects and to determine which tolling scenario(s) to analyze in detail. The tolling scenarios with the highest crossing credits produced the highest number of intersections that would experience an increase of 50 or more vehicles in a peak hour. Because the number of intersections that would be potentially adversely affected correlates directly with the increase in facility crossing volumes feeding those intersections, this methodology was also used to identify which tolling scenario(s) to analyze in detail to evaluate potential adverse effects along highways leading to these crossing facilities. Diversion to circumferential routes that avoid the Manhattan CBD was found to be directly related to the level of CBD tolls (due to CBD toll crossing credits); therefore, the methodology also works to identify which tolling scenario(s) to analyze in detail for circumferential routes. The results of the BPM modeling confirmed that tolling scenarios with the highest tolls (and tolling crossing credits) produced the highest diversions to the Hugh L. Carey Tunnel and Queens-Midtown Tunnel, as well as along circumferential routes.

Table 4B-2 summarizes the number of times the peak-hour volume increment meets or exceeds the threshold of 50 or more vehicles for any given intersection (or intersection approach) within the traffic study areas established for this EA. Peak-hour traffic increments generated by each tolling scenario were assigned to evaluate the potential increase (or decrease) in traffic per the methodology described in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation**." This evaluation was the basis for determining the representative tolling scenario to use for detailed traffic impact analysis.[5]

As shown in **Table 4B-2**, Tolling Scenarios A, B, and G—with the lowest tolls along with the fewest discounts or exemptions, and no crossing credits—would result in an overall reduction in traffic and minimal shift of traffic to alternate routes. Increases in traffic volumes along alternate routes would result in 9, 10, and 10 instances out of 363,[6] respectively, where intersection or approach volumes would increase by 50 or more vehicles in a peak hour. Tolling Scenario C—with higher tolls along with discounts, exemptions, and partial crossing credits—would result in routing changes that lead to 24 instances where peak-hour volumes would increase by 50 or more vehicles at intersections or approaches. Tolling Scenarios D, E, and F incorporate higher tolls and more widely applied crossing credits, discounts, and/or exemptions, leading to 50, 48 and 50 instances out of 363 of an increase of 50 or more peak-hour vehicles at any intersection or intersection approach, respectively.

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5 The 50 or more additional vehicles threshold was used only to determine the representative tolling scenario for detailed traffic analysis; all intersections in the 15 study areas were analyzed regardless of whether traffic volumes increased or decreased.

6 A total of 363 intersection analyses were performed at 102 locations during the AM, MD, PM, and LN peak hours.

Table 4B-2. Instances of Intersections Meeting/Exceeding the Traffic Volume Screening Threshold in an Analysis Hour: Comparison of Tolling Scenarios

STUDY AREA	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Downtown Brooklyn	2	2	2	0	0	0	2
Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan	0	0	8	18	17	17	0
Hugh L. Carey Tunnel—Red Hook	0	0	0	7	7	7	0
Holland Tunnel—Jersey City	0	0	0	2	0	2	0
Lincoln Tunnel—Manhattan	0	0	0	0	0	0	0
East Side at 60th Street—Manhattan	1	1	1	2	2	2	1
West Side at 60th Street—Manhattan	0	0	0	0	0	0	0
Queens-Midtown Tunnel—Manhattan	0	0	2	5	5	5	0
Queens-Midtown Tunnel/Ed Koch Queensboro Bridge—Long Island City	1	1	4	9	9	10	1
Robert F. Kennedy Bridge—Queens	2	2	3	3	3	2	2
Robert F. Kennedy Bridge—Bronx	0	0	0	0	0	0	0
Robert F. Kennedy Bridge—Manhattan	3	4	3	3	4	4	3
West Side Highway/Route 9A at West 24th Street	0	0	0	0	0	0	0
Lower East Side—Manhattan	0	0	0	0	0	0	0
Little Dominican Republic—Manhattan	0	0	1	1	1	1	1
TOTAL	**9**	**10**	**24**	**50**	**48**	**50**	**10**

Source: WSP USA, 2022.

Tolling Scenarios D, E, and F provide the most extensive crossing credits for tolls paid at existing tolled facilities and would result in the greatest shift of traffic to the Queens-Midtown Tunnel and the Hugh L. Carey Tunnel. These tolling scenarios also have the highest tolls, due to the need to offset the revenue loss due to crossing credits, resulting in the highest diversion to circumferential routes via the Verrazzano-Narrows Bridge and the George Washington Bridge. Although Tolling Scenarios D and F have the same number of exceedances of the threshold with 50 instances, Tolling Scenario D was selected for detailed traffic analysis because it has a higher number of potentially affected intersections in the critical Lower Manhattan Study Area. However, it should be noted that Tolling Scenarios D, E, and F are very similar and would be expected to have very similar potential traffic effects; therefore, Tolling Scenario D is considered to be the representative tolling scenario inclusive of Tolling Scenarios E and F.

The Synchro traffic model was used to perform a detailed analysis of intersections for Tolling Scenario D. An additional Synchro analysis was performed in the Downtown Brooklyn study area for Tolling Scenario C, which was determined to have a higher potential for traffic effects in two instances where the increase in traffic volumes is projected to be 50 or more vehicles.

Calibrated Vissim microsimulation traffic models adapted for the CBD Tolling Alternative were used to perform detailed traffic analyses of the highway approaches to the Hugh L. Carey Tunnel and Queens-Midtown Tunnel, which are projected to have the highest increase in traffic volumes under Tolling Scenario D. A Vissim analysis was also performed at the Verrazzano-Narrows Bridge and its approaches to evaluate the potential traffic effects due to circumferential route diversion. An analytical and qualitative traffic analysis was performed at the George Washington Bridge including its approaches, and the Franklin D. Roosevelt (FDR) Drive near the Manhattan Bridge because pre-COVID-19-pandemic data were not available to create a Vissim traffic model at these locations. An estimation of the potential traffic effects was made based on the projected increase in traffic volumes in relation to the projected increase in traffic volumes at the Queens-Midtown Tunnel and the Long Island Expressway where detailed modeling was performed. Additional analyses were completed using HCS for the Bayonne Bridge, the Eastern Spur of I-95 New Jersey Turnpike, and a section of the Robert F. Kennedy (RFK) Bridge from Queens to the ramp connecting with the Manhattan leg of the RFK Bridge.

4B.3 OVERVIEW AND CONTEXT

An extensive network of highways serves the 28-county regional study area (see **Figure 3-1** in **Chapter 3, "Environmental Analysis Framework"**). This section describes the existing highway network at two levels:

- A broad discussion of highways throughout the regional study area
- A more detailed presentation of the highways that directly connect to the Manhattan CBD or are used to bypass the Manhattan CBD

Many of the region's highways connect directly with the bridges, tunnels, and local roadways that access the Manhattan CBD. Other major highways are circumferential in nature and provide regional access, bypassing the Manhattan CBD. The highway network includes several primary interstates (e.g., I-78, I-80, I-84, I-87, and I-95), auxiliary interstate routes (e.g., I-278, I-287, I-495, and I-684), and other limited-access state highways (e.g., NJ Route 3, NJ Route 4, NJ Route 17) and parkways (e.g., Grand Central Parkway, Henry Hudson Parkway). See **Appendix 4B.8, "Transportation: Overview of Highways Throughout the Study Area."**

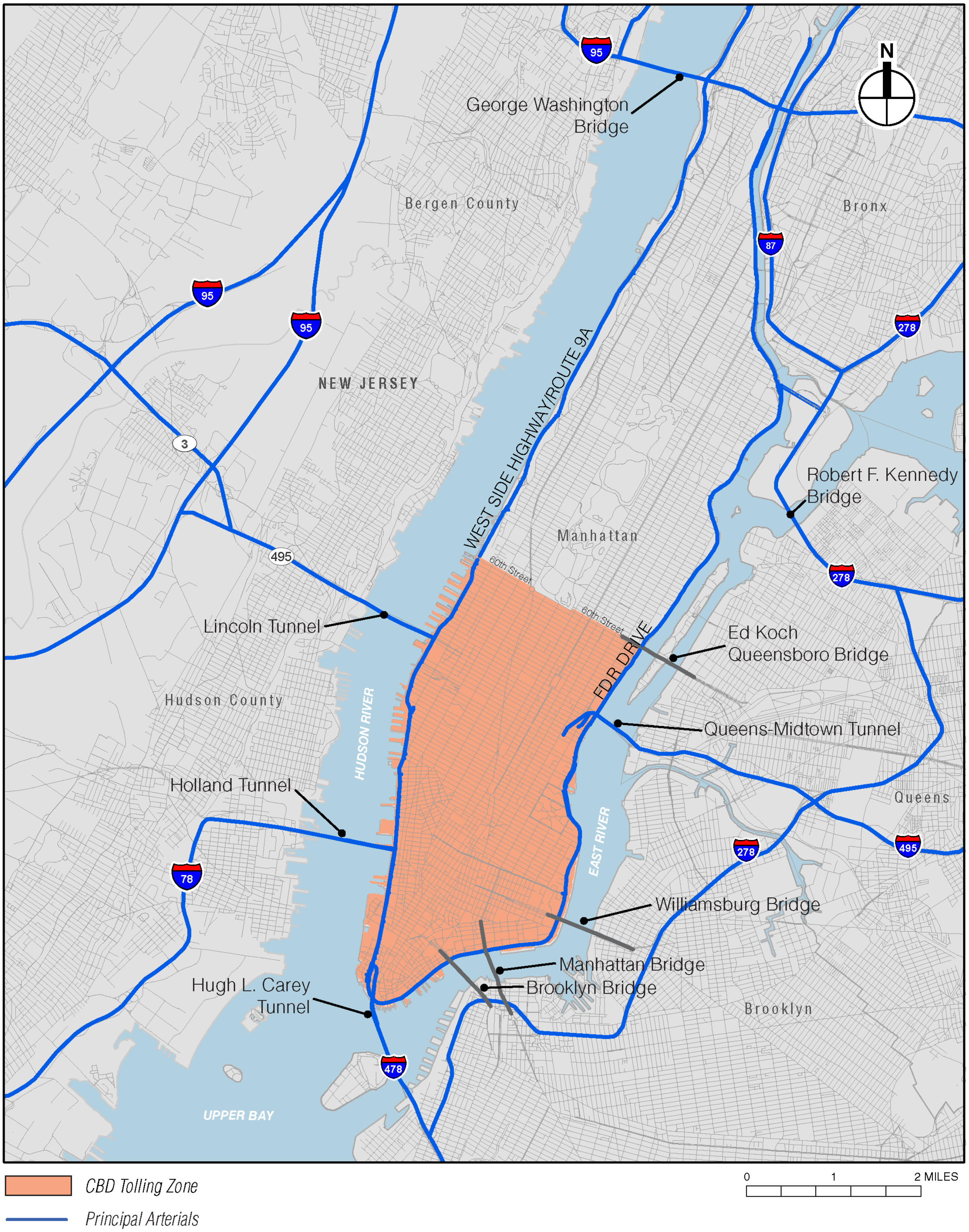
The potential effects on area highways from the Project under the representative tolling scenario would be concentrated on certain highways that directly lead into the Manhattan CBD and those that provide circumferential service around the Manhattan CBD. Direct highway routes to the Manhattan CBD that are unlikely to experience increases in traffic volumes from diversions would be expected to have reductions in traffic across all tolling scenarios and, therefore, a beneficial effect on traffic operations. Locations farther from the Manhattan CBD (or without direct routes to and from the Manhattan CBD) would be less affected as Manhattan CBD traffic becomes more dispersed throughout the region.

4B.3.1 Overview of Roadways and Highways Leading to the Manhattan CBD

This section gives an overview of the key roadways and highways that lead directly to the Manhattan CBD, for the purpose of providing appropriate background and context for the highway and intersection impact analyses later in this subchapter. The roadway descriptions are grouped by crossing location: Uptown Manhattan, Queens, Brooklyn, and New Jersey.

Figure 4B-2 shows the key highways in the area directly leading to the Manhattan CBD.

Figure 4B-2. Highways Leading to the Manhattan CBD



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

UPTOWN MANHATTAN APPROACHES (60TH STREET CROSSINGS)

The northern boundary of the CBD tolling area inclusive of 60th Street is accessed by two highways and 16 avenues. From west to east, these highways and avenues are listed below, along with the number of lanes at the 60th Street Manhattan CBD boundary:

- **Route 9A** runs along the east side of the Hudson River from Lower Manhattan continuing northward through Upper Manhattan, the Bronx and Westchester County. It is known as West Street from the southern tip of Manhattan to West 14th Street, Eleventh Avenue from West 14th Street until West 22nd Street, Twelfth Avenue from West 22nd Street until West 58th Street, the Joe DiMaggio Highway from West 58th Street to West 72nd Street, and the Henry Hudson Parkway from West 72nd Street through the Bronx. In the Bronx, Route 9A serves as a local arterial up to the northern end of Westchester County. It is a bi-directional highway with six to eight lanes, with an elevated northern section (from West 59th Street to West 72nd Street) and an at-grade southern section south of West 59th Street. Trucks and buses are permissible only on the surface section, south of West 59th Street.
- **Twelfth Avenue** is a one-way, northbound street. It begins at an intersection with West Side Highway/Route 9A at West 54th Streets and continues to West 61st Street with one traffic lane and one parking lane. At West 61st Street, it continues as Riverside Boulevard, which is a two-way street with one traffic and one parking lane in both directions.
- **Eleventh Avenue/West End Avenue** starts at the West Side Highway/Route 9A between West 21st Street and West 22nd Street and continues north along the west side of Manhattan. South of West 34th Street, it is one-way southbound. Between West 34th and West 40th Street it is a two-way street. Between West 40th and West 57th Street, it is one-way southbound. North of West 57th Street, it is a two-way street. The number of traffic lanes varies; at the 60th Street Manhattan CBD boundary, it has two traffic lanes and a parking lane in both directions, plus a striped median/turn lane.
- **Tenth Avenue/Amsterdam Avenue** begins at West 14th Street and carries northbound traffic as far as West 110th Street (Cathedral Parkway), where it then continues as a two-way street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, a dedicated bicycle lane, and two parking (also used for loading and bus stop locations) lanes.
- **Ninth Avenue/Columbus Avenue** is a southbound street. It ends south of West 14th Street at Gansevoort Street in the West Village and extends uptown to West 59th Street, where it becomes Columbus Avenue. Columbus Avenue extends through the Upper West Side to West 110th Street, where it changes name to Morningside Drive, and runs north through Morningside Heights to West 122nd Street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, two parking lanes, and a protected bicycle lane.
- **Broadway** originates in Lower Manhattan and runs diagonally across the Manhattan street grid through the length of Manhattan, through the Bronx and into Westchester County to counties north of New York City. The street width and street direction vary widely, and in certain segments such as in Times Square, the street has been pedestrianized. At the 60th Street Manhattan CBD boundary, it has three traffic lanes and one parking lane in each direction, separated by a landscaped median.

- **Eighth Avenue** is a one-way northbound street that starts in the West Village at the intersection of Hudson Street and Bleecker Street and runs north to Columbus Circle at West 59th Street and then changes name to become Central Park West. North of West 110th Street the name changes to Frederick Douglass Boulevard. This avenue ends north of West 155th Street and merges into Harlem River Drive. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, one parking lane, one loading/no standing lane, and a protected bicycle lane.
- **Seventh Avenue** is a one-way southbound street that originates at West 59th Street/Central Park South and runs south to the intersection of Carmine Street/Clarkson Street and Seventh Avenue, before turning into Varick Street. The northern boundary of the avenue connects to the Central Park roadway system, which is open to authorized vehicles part time.
- **Sixth Avenue** is a one-way northbound street that starts in Tribeca at the intersection of Church Street and Franklin Street and runs north to West 59th Street/Central Park South. The northern edge of the avenue connects to the Central Park roadway system, which is open to authorized vehicles part time.
- **Fifth Avenue** is a southbound avenue that originates at the Harlem River Drive near 143rd Street and passes through Manhattan along the east side of Central Park and through Midtown to Washington Square Park in Greenwich Village. At its northern end, the avenue is fed by both the Harlem River Drive and Madison Avenue Bridge (from the Bronx) and is bisected by Marcus Garvey Park near 120th Street. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, one bus lane, one parking lane, and a turn lane.
- **Madison Avenue** is a north–south avenue beginning at Madison Square Park (at East 23rd Street) to the Madison Avenue Bridge over the Harlem River at West 142nd Street. Madison Avenue carries one-way northbound traffic from East 23rd Street to East 135th Street. Between East 135th Street and East 142nd Street, Madison Avenue only carries traffic to/from the Madison Avenue Bridge, though there is also a service road on this segment named Madison Avenue that is not connected to the rest of the avenue in Manhattan and carries southbound traffic only from the Harlem River Drive. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, a double bus lane, and a turn lane.
- **Park Avenue** extends from Astor Place in Cooper Square to East 138th Street and carries both northbound and southbound traffic south of East 132nd Street. The avenue is called Union Square East between East 14th and East 17th Streets, and Park Avenue South between East 17th and East 32nd Streets. Between East 33rd Street and East 40th Street, there is a one lane northbound vehicular tunnel. Park Avenue splits by direction to wrap around Grand Central Terminal and other adjacent buildings at East 42nd Street. It rejoins at East 45th Street. North of East 97th Street, the landscaped median is replaced by Metro-North Railroad’s four tracks as it transitions from tunnel to an elevated structure. At the 60th Street Manhattan CBD boundary, Park Avenue has three traffic lanes and a parking lane in each direction, separated by a wide landscaped median.
- **Lexington Avenue** carries southbound, one-way traffic from East 131st Street to Gramercy Park at East 21st Street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, one weekday-only curb bus lane (parking lane on weekends), and one parking lane.

- **Third Avenue** begins at the intersection of Cooper Square and East 6th Street and continues north to 128th Street. It carries two-way traffic between East 6th Street and East 24th Street, whereupon it is one-way, northbound until it terminates at 128th Street in Manhattan. At the 60th Street Manhattan CBD boundary, it has four traffic lanes, one parking lane, and a turn lane.
- **Second Avenue** carries southbound traffic from Harlem River Drive at East 128th Street to Houston Street. South of Houston Street, the roadway continues as Chrystie Street south to Canal Street. At the 60th Street Manhattan CBD boundary, it has five traffic lanes, one bus lane, and a bicycle lane. Second Avenue provides a connection to the Ed Koch Queensboro Bridge and the Queens-Midtown Tunnel.
- **First Avenue** begins at Houston Street and travels northbound for over 125 blocks before terminating at the Willis Avenue Bridge into the Bronx at the Harlem River near East 126th Street. South of Houston Street, the roadway continues as Allen Street south to Division Street. First Avenue is a one-way, northbound street. At the 60th Street Manhattan CBD boundary, it has four traffic lanes, one bus lane and a protected bicycle lane.
- **Sutton Place/York Avenue** is a two-way street between East 53rd and East 92nd Streets. At the 60th Street Manhattan CBD boundary, York Avenue has two traffic lanes and one curb lane in each direction. Both curb lanes are used as a bus stop/additional travel lane.
- **FDR Drive** follows the East River shoreline between the Battery Park Underpass and approximately East 125th Street where it continues to Dyckman Street as the Harlem River Drive. It is a limited-access highway with interchanges at principal east–west streets. It also provides direct connections to the Brooklyn, RFK and George Washington Bridges. Commercial vehicles are prohibited on the FDR Drive, and there are height restrictions along its route.

Connections to the north end of Manhattan are provided by the George Washington Bridge (I-95), the Alexander Hamilton Bridge (I-95), the Henry Hudson Parkway and Henry Hudson Bridge, the RFK Bridge, and eight local roadway bridges that cross the Harlem River from the Bronx.

QUEENS CROSSINGS

The **Ed Koch Queensboro Bridge** connects the Upper East Side of Manhattan to Long Island City, Queens. It is a two-level bridge over the East River, passing over Roosevelt Island. In Queens, it is fed by Queens Boulevard, Northern Boulevard, 21st Street, and other local streets. The upper level of the bridge has four lanes, with two vehicular lanes in each direction. The lower level has five vehicular lanes and one shared-use bicycle and pedestrian path. During the AM time period, the upper-level southern roadway operates as a high-occupancy vehicle (HOV) contra-flow into Manhattan. The inner four and the southernmost lanes are used for automobile traffic. The northernmost lane was converted into a pedestrian walk and bicycle path in 2000.[7] In Manhattan, there are exits from the upper level of the bridge to East 62nd Street and East 63rd Street and from the lower level of the bridge to Second Avenue and East

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[7] NYCDOT plans to convert the southern outer roadway on the lower level to a dedicated pedestrian path and to move pedestrians from the existing dedicated shared bicycle/pedestrian lane on the northern outer roadway to the southern outer roadway. It was assumed that this plan will be implemented by 2023 and was therefore included in the No Action Alternative roadway network.

60th Street. There are entrances from Second Avenue, East 57th, East 58th, and East 59th Streets. There is no toll to cross this bridge.

The **Queens-Midtown Tunnel** is a vehicular tunnel under the East River from the east side of Manhattan, in the residential neighborhood of Murray Hill, to the Hunters Point District of Long Island City. In Queens, the tunnel merges directly into the Long Island Expressway (I-495), which is approximately 1.5 miles west of the Long Island Expressway interchange with the Brooklyn-Queens Expressway (BQE). There are two tubes—one eastbound and one westbound—with two travel lanes each, although one lane of the eastbound tube is operated contra-flow during the AM peak period. In Manhattan, the tunnel is accessed via East 34th Street, East 36th Street, and Second Avenue. Vehicles exiting the tunnel can access East 37th Street or East 41st and East 34th Streets via Tunnel Exit Street. The TBTA collects tolls in both directions.

BROOKLYN CROSSINGS

The **Williamsburg Bridge** connects the Lower East Side of Manhattan at Delancey Street with the Williamsburg neighborhood of Brooklyn. In Brooklyn, it is fed by the BQE (I-278) and various local streets. In Manhattan, it is primarily fed by Delancey Street. The Williamsburg Bridge has eight lanes of vehicular traffic, two subway tracks, a pedestrian walkway, and a bikeway. There is no toll to cross this bridge.

The **Manhattan Bridge** connects Lower Manhattan at Canal Street to Downtown Brooklyn at Flatbush Avenue. In Manhattan, it is primarily fed by Canal Street. In Brooklyn, it is fed by the BQE (I-278), Flatbush Avenue, and various local streets. The Manhattan Bridge has seven lanes of vehicular traffic, four subway tracks, a pedestrian walkway, and a bikeway. There is no toll to cross this bridge.

The **Brooklyn Bridge** connects Lower Manhattan near City Hall to Downtown Brooklyn. In Manhattan, it is fed by the FDR Drive, Center Street/Park Row, and other local streets. In Brooklyn, it is fed by the BQE (I-278), Cadman Plaza, and various local streets. The bridge has two inbound travel lanes, three outbound travel lanes, and a pedestrian path. A travel lane in the Manhattan-bound direction was recently converted into a two-way bicycle lane, which is included in the No Action Alternative roadway network. There is no toll to cross this bridge, and commercial vehicles are prohibited.

The **Hugh L. Carey Tunnel** (I-478) connects the southern tip of Manhattan with Red Hook in Brooklyn. There are two tubes—one northbound and one southbound—with two travel lanes each. During the AM and PM, one of the lanes operates in a contra-flow direction to provide more peak direction lane capacity. In Manhattan, the tunnel is fed by West Side Highway/Route 9A and local streets. In Brooklyn, it is fed by the BQE (I-278), the Gowanus Expressway, Prospect Expressway, and local streets. The TBTA collects tolls in both directions.

NEW JERSEY CROSSINGS

Three vehicular Hudson River crossings provide connections between New Jersey and Manhattan of which only the two tunnels connect directly to the Manhattan CBD. The Port Authority of New York and New Jersey collects tolls on the following crossings in the eastbound direction.

- The **Holland Tunnel** is a vehicular tunnel under the Hudson River, connecting Lower Manhattan and Jersey City. In New Jersey, it is fed by the New Jersey Turnpike Extension (I-78), the Pulaski Skyway (US 1/9), and local roadways. The tunnel consists of two tubes, with two traffic lanes in each tube. The northern tube, which carries westbound traffic, originates at Broome Street in Manhattan between Varick and Hudson Streets and continues to 14th Street east of Marin Boulevard in Jersey City. The southern tube, carrying eastbound traffic, originates at 12th Street, east of Marin Boulevard, in Jersey City, New Jersey, and surfaces at the Holland Tunnel rotary in Manhattan just south of Canal Street.
- The **Lincoln Tunnel** is a vehicular tunnel under the Hudson River, connecting Midtown Manhattan and Weehawken, New Jersey. The tunnel consists of three vehicular tubes, with two traffic lanes in each tube. The center tube contains reversible lanes and is heavily used by buses, particularly during the morning peak when it serves as a de facto final leg of the Exclusive Bus Line (XBL) along NJ Route 495 leading to the Lincoln Tunnel. The northern and southern tubes exclusively carry westbound and eastbound traffic, respectively. In New Jersey, the Lincoln Tunnel is fed by NJ Route 495, which connects to the New Jersey Turnpike and NJ Route 3. In Manhattan, it is fed by Ninth and Eleventh Avenues, and a combination of local streets with dedicated ramps to the Port Authority Bus Terminal.

4B.4 HIGHWAY ASSESSMENT

4B.4.1 Methodology

TRAFFIC ASSIGNMENT

The BPM was used to determine projected changes in traffic volumes at bridges, tunnels, and/or highways crossing into or out of the Manhattan CBD, along major north–south roadways in Manhattan, and along bypass routes including the Verrazzano-Narrows Bridge, George Washington Bridge, and RFK Bridge and their approaches. This increase or decrease in volume is referred to as the BPM increment. The initial 2017 BPM forecast volumes were compared to observed traffic volumes for 2017 and then calibrated at each facility within each sector to account for over- or under-assignment of trips by the BPM as detailed in the methodology for trip assignments in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation**."[8]

To evaluate the potential effects of the Project on the highway system, 10 highway corridors potentially affected were identified using the BPM and assessed as described below:[9]

- Long Island Expressway (I-495) leading to the Queens-Midtown Tunnel

8 Additional adjustments were made to account for a bounce back factor to adjust modeled demand in consideration of available capacity at any given facility when drivers would likely quickly return to their original route choice due to higher congestion and delays along the diversion route. The bounce back traffic volumes were subtracted from the initial CBD Tolling Alternative facility traffic volumes and added back to the original facility traffic volumes. Please see **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation**" for additional information on this methodology.

9 These corridors were initially identified using the BPM, which showed traffic volume increases along these corridors for some tolling scenarios. Subsequent post-processing was used to determine the volume increment after adjusting for calibration variance and capacity constraints. Subsequent BPM screening runs were made for all tolling scenarios to identify additional highway segments that are projected to have volume increases greater than 5 percent.

- Gowanus Expressway leading to I-278 Hugh L. Carey Tunnel
- Staten Island Expressway leading to the Verrazzano-Narrows Bridge
- I-78 approach to the Holland Tunnel[10]
- NJ Route 495 approach to the Lincoln Tunnel
- Trans-Manhattan/Cross Bronx Expressway between the George Washington Bridge and I-87[11]
- FDR Drive—East 10th Street to Brooklyn Bridge
- The Bayonne Bridge and Approaches
- Eastern Spur of I-95 New Jersey Turnpike
- RFK between Queens and Ramps to/from Manhattan

Refer to **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** for more information about the analysis methodology. It should be noted that throughout the public consultation period, concerns were expressed regarding potential traffic impacts on several of these highway corridors, given their proximity to environmental justice communities.

Two of the 10 corridors, the NJ Route 495 approach to the Lincoln Tunnel, and the I-78 approach to the Holland Tunnel were assessed analytically for the Existing conditions and qualitatively for the No Action Alternative and the CBD Tolling Alternative since there would be a net reduction in traffic under the analyzed tolling scenarios (Tolling Scenarios D, E, and F) and a higher net reduction in traffic for all other tolling scenarios. Therefore, these two corridors would be expected to have fewer delays and improved traffic operations under all tolling scenarios.

The remaining eight highway corridors analyzed would be expected to have higher traffic volumes at certain locations for some tolling scenarios. A variety of analytic tools and methods were used to evaluate the effects of the CBD Tolling Alternative, depending on the level of congestion and the appropriateness of the use of available models.

With highway peak-hour traffic assignments, and particularly in the absence of detailed Vissim microsimulation modeling, SEQRA and National Environmental Policy Act evaluations have used an initial assessment of incremental volumes as a more qualitative measure of potential effect. This is essentially an estimate of whether the variation in total volume falls within a reasonable band of typical volume variations that could be expected with or without a proposed project and where there would not be a noticeable change in speeds, travel times, or delays. For assessment purposes, it is assumed to be a change of 5 percent or less under congested conditions at LOS E or LOS F[12] based upon the analyzed effects of such volume increases where microsimulation was performed. If that is determined to be the case, then it can be expected that there would be no adverse effect.

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10 There was a small net decrease in traffic volumes at the Holland Tunnel approaches since the traffic reduction due to CBD tolling was greater than diverted traffic to the facility.

11 An analytical and qualitative analysis was performed at the George Washington Bridge and its approaches and along the FDR Drive south of East 10th Street because a Vissim model was not available for this location.

12 Under SEQRA, a higher increase in volume is not considered to have an adverse effect if the LOS for the build condition is D or better.

For three highway locations, there was a Vissim model available which was adapted and used to analyze the potential traffic effects of the CBD Tolling Alternative. Each model was recalibrated to the existing condition volumes, geometry, and travel times. This type of model is particularly useful under congested conditions but can also be used at non-congested locations.

For three highway locations without an available Vissim model (the Bayonne Bridge and approaches, the eastern spur of I-95 New Jersey Turnpike, and the RFK Bridge between Queens and ramps to/from Manhattan), the HCS was used to evaluate the incremental traffic volume and obtain performance measures including change in delay and LOS. HCS models cannot be used effectively under congested conditions where the volume/capacity ratio is greater than 1. None of the models exceed the volume/capacity ratio threshold under any condition.

For two congested highway segments without an available Vissim model (the Trans-Manhattan Expressway/Cross Bronx Expressway and the FDR Drive south of East 10th Street), and where the HCS methodology is not appropriate, evaluation of the incremental traffic volume change provides the basis for the assessment of potential adverse effects.[13]

HIGHWAY ANALYSIS METHODOLOGY AND DETERMINATION OF POTENTIAL ADVERSE EFFECTS

To determine whether diversions of traffic to highway segments from new tolls are significant, FHWA typically consults with state sponsoring agencies—such as NYSDOT as well as, in this case, the TBTA, an affiliate of MTA, a New York State public benefit corporation—with expertise in transportation analyses, to determine the appropriate criteria. After careful review of how other state agencies have applied SEQRA to determine the significance of diversionary effects on highways, along with detailed Vissim or HCS analyses used to evaluate roadway stress thresholds, TBTA and NYSDOT, in consultation with NYCDOT, have agreed that the following criteria are appropriate for determining the significance of traffic effects along highways potentially affected by the Project:

- Under very congested conditions, at speeds of 20 mph or less, an increase in traffic volumes of up to 5 percent would not be considered significant.
- At speeds over 20 mph, an increase in traffic volume of up to 10 percent would not be considered significant.

The above guidelines are intended as a screening threshold under congested conditions. Highway segments on the fringe of the threshold would be carefully evaluated. Cases where highway segments surpass the volume threshold but would have only a minimal degradation in traffic operations and speed would not be considered as having an adverse effect. Determination of adverse traffic effects needs to consider the overall trip length and the variability in travel time that affects user perceptions of travel time. In general, based on modeling results along congested and uncongested corridors, the 5 percent and 10 percent thresholds would produce decreases in speeds and increases in travel times that would be relatively small within the context of average travel times in the New York City area; therefore, the change in delays and

[13] A similar approach was used for the *Tappan Zee Bridge Hudson River Bridge Crossing Project FEIS*, Vol. 1, Chapter 4, Page 4-18.

travel times would not be noticeable to most motorists. More information on the highway screening process can be found in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation**."

SEQRA CRITERIA USED TO DETERMINE ADVERSE TRAFFIC EFFECTS FOR HIGHWAYS

Where a detailed traffic analysis was performed using the Vissim model or HCS an additional SEQRA criterion was applied to determine adverse highway effects that relies on an increase in delay of 2.5 minutes or greater. This criterion was derived from an examination of average weekday travel times to the Manhattan CBD from the outer Boroughs based on FHV recorded travel time and distance between passenger pickups and drop-offs prior to COVID-19 and during spring 2022 when average travel times rebounded to pre-pandemic levels.

Average travel times to the Manhattan CBD from the outer boroughs during the weekday between 6:00 a.m. and 8:00 p.m. vary from about 35 minutes from Brooklyn, 45 minutes from the Bronx, 45 minutes from Queens, and about 58 minutes from Staten Island. A 2.5 minute increase in travel time under the SEQRA threshold would represent about a 5 percent increase in total travel time, depending on the trip origin, with shorter trips experiencing a higher percent change and longer trips experiencing a smaller percent change in travel time. See **Appendix 4B.7, "Transportation: Average Travel Time by Borough."**

Because up to a 2.5 minute increase in travel time would not be noticeable to most drivers over the length of the average trip, it is an appropriate threshold for determining adverse traffic effects. This threshold was applied at all locations where a detailed traffic analysis was performed. Where a detailed traffic analysis was not performed due to the lack of availability of a calibrated Vissim model, or where reliable pre-COVID-19 traffic data were not available, the following SEQRA criteria were used to determine adverse effects: an increase in traffic volumes greater than 5 percent at speeds of less than 20 mph, or an increase in traffic volumes greater than 10 percent at speeds of 20 mph or higher.

It should be noted that the average travel time savings within the Manhattan CBD is estimated at about 4 minutes inbound and 4 minutes outbound which would offset any potential increases in travel times to the Manhattan CBD that would be experienced by some drivers under certain tolling scenarios.

MICROSIMULATION MODEL

Vissim microsimulation models were developed[14] along the key highway segments potentially affected under Tolling Scenario D, which is representative of the tolling scenarios (including Tolling Scenarios E and F), to simulate vehicular movements in a dynamic setting and to create a virtual environment to replicate traffic conditions. These models were calibrated based on 2019 existing conditions, including traffic

[14] Calibrated Vissim models were derived from previous studies, where available, and adapted and updated for the Project traffic study. Vissim models were not available for the Trans-Manhattan Expressway/Cross-Bronx Expressway corridor and the FDR Drive corridor. These two corridors were analyzed using a combination of analytical and qualitative methods. As noted in **Section 4B.1**, **"Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** current data would not be representative due to the pandemic and thus could not be used to develop a Vissim model for certain roadways.

volumes processed[15] by the model, average speed, and observed queue lengths. Processed volumes reflect the number of vehicles that were able to enter the simulation model and traverse the analyzed segment within the analysis time period. Vehicles that are not processed in the analysis time period are considered to be the unmet demand and are therefore in queue outside of the simulated area at the end of the analysis time period. Average speed is calculated over the length of the analyzed segment for the processed vehicles. Observed queue lengths are recorded for vehicles that enter the simulation model. Unmet demand is assumed to be the additional vehicle queue in the real world that would be added to the end of the observed queue in the model. Once the Vissim models were calibrated, traffic was adjusted to 2023 by adding the No Action Alternative incremental volume[16] derived from the No Action Alternative BPM to evaluate the No Action Alternative traffic conditions. Measures of performance included traffic density, speed, delays, and LOS.

For the highway analysis, the Vissim modeling focused on the 3 weekday peak 1-hour periods (AM, midday [MD], and PM) in the Manhattan-bound direction where queuing and delays on the highway network would be expected to be the most severe for the tolling scenario with the largest increases in traffic. The peak 1-hour period for the AM, MD, and PM periods vary by highway corridor and are not the same for each corridor. These models produce density outputs that enabled the evaluation of the increase in density and delays between the No Action Alternative and the CBD Tolling Alternative.

HIGHWAY CAPACITY SOFTWARE ANALYSIS[17]

HCS analyses were performed along three highways where existing speeds were about 40 mph or higher during the AM, MD, and PM peak hours:

- RFK-Queens leg
- Bayonne Bridge
- New Jersey Turnpike (I-95) Eastern Spur

The HCS provides density, LOS, speed, and measures of performance where the LOS is E or better. At LOS F, the HCS does not provide speed and density as outputs.

15 Processed traffic volumes is a measure of performance representing the ability of a roadway to meet traffic demand. When the processed volume is less than the traffic demand, the excess volume is converted to queues which result in increased travel times.

16 Incremental volumes were added to the No Action Alternative condition to account for network changes implemented by NYCDOT including a dedicated bike lane on the Brooklyn Bridge, a dedicated bike lane on the Ed Koch Queensboro Bridge, geometric changes at some intersections, and the reduction in travel lanes along portions of the BQE from three lanes to two lanes in each direction.

17 The Highway Capacity Software (HCS) is a macroscopic traffic simulation software that implements the methodology in the *Highway Capacity Manual* (HCM) 6th Edition. This tool is useful when speeds are generally 40 mph or higher. It provides LOS, speed, and density as measures of performance. At LOS F, this software does not provide useful output and, therefore, cannot be used effectively under congested conditions.

SUMMARY OF ANALYTICAL TOOLS AND CRITERIA USED TO DETERMINE ADVERSE EFFECTS

Table 4B-3 summarizes the analytical tools and the criteria used to determine adverse effects for the 10 highway study locations.

Table 4B-3. Analysis Type and Criteria Used for the Determination of Adverse Effects

ANALYSIS LOCATION[1]	% CHANGE IN VOLUME (SEQRA)	NO ACTION SPEED AT FACILITY	PASS SCREENING ?	ANALYSIS TYPE	RESULT OF ADDITIONAL ANALYSIS	CRITERIA USED TO DETERMINE ADVERSE EFFECT	ADVERSE EFFECT?
Holland Tunnel	Traffic volumes decrease	< 20 mph	Yes	No further analysis	N/A volumes decreased	> 5% volume increase	No
Lincoln Tunnel	Traffic volumes decrease	< 20 mph	Yes	No further analysis	N/A Volumes decreased	> 5% volume increase	No
QMT/LIE	> 5%	< 20 mph	No	Vissim model	Up to 4 min additional delay	> =2.5 minutes of increased delay	Yes
HCT	> 5%	< 20 mph	No	Vissim model	Up to 2.3 min additional delay	> =2.5 minutes of increased delay	No
VNB/SIE	> 10%	>= 20 mph	No	Vissim model	< 10 second increase in delay	> =2.5 minutes of increased delay	No
CBX/TME	> 5%	< 20 mph	No	SEQRA Volume Threshold	No additional analysis	> 5% volume increase	Yes
FDR Drive	> 5%	< 20 mph	No	SEQRA Volume Threshold	No additional analysis	> 5% volume increase	Yes
RFK Bridge	> 10%	>=20 mph	No	HCS	Minor changes in density/speed	>= 2.5 minutes of increased delay*	No
Bayonne Bridge	> 10%	> =20 mph	No	HCS	Minor changes in density/speed	>= 2.5 minutes of increased delay*	No
Eastern Spur of NJ Turnpike	> 10%	> =20 mph	No	HCS	Minor changes in density/speed	> =2.5 minutes of increased delay*	No

Source: WSP USA, 2022.

1 QMT-Queens-Midtown Tunnel; LIE-Long Island Expressway; HCT-Hugh L. Carey Tunnel; VNB-Verrazzano-Narrows Bridge; SIE-Staten Island Expressway; CBX-Cross Bronx Expressway; TME-Trans-Manhattan Expressway.

* For HCS analyses, it is assumed that additional delays along the corridor are less than 2.5 minutes if speeds remain at 40 mph and above.

Vissim models were available at five study locations: Lincoln Tunnel, Holland Tunnel, Queens-Midtown Tunnel-Long Island Expressway corridor, the Hugh L. Carey Tunnel-Gowanus corridor, and Verrazzano-Narrows Bridge-Staten Island Expressway corridor. Two of the study locations, the Holland Tunnel and Lincoln Tunnel, were dropped from further analysis because the volume changes were found to be negative for all tolling scenarios and there would not be an increase in delay. The remaining three Vissim study locations were analyzed in detail using an increase in delay of greater than or equal to 2.5 minutes as the primary criterion for determining adverse effects, although other factors such as speed, queue length, and density were also taken into consideration.

Three study locations were determined to be appropriate for the HCS model where speeds were 40 mph or higher: the RFK–Queens leg, the Bayonne Bridge, and the eastern spur of the New Jersey Turnpike. These locations were also evaluated using a greater than or equal to 2.5 minutes additional delay threshold as the primary criterion for the determination of adverse traffic effects along with other criteria such as LOS, speed, and density. (Note: If speeds remained greater than 40 mph under the CBD Tolling Alternative it was assumed that delays would be under 2.5 minutes for the entire corridor).

The remaining two study locations, the Trans-Manhattan/Cross Bronx Expressway and the FDR Drive between the Williamsburg Bridge and the Brooklyn Bridge, did not have an available Vissim model and the HCS was not an appropriate tool under congested conditions. Therefore, the analysis at these two locations defaulted to the SEQRA volume threshold of greater than 5 percent increase in traffic volumes under congested conditions (< 20 mph) to determine adverse effects.

4B.4.2 Long Island Expressway (I-495) Leading to the Queens-Midtown Tunnel

The Queens-Midtown Tunnel connects the boroughs of Manhattan and Queens. The tunnel is designated as NY-495 and in Queens, leads directly to and from the Long Island Expressway (I-495) at the junction with the BQE (I-278), although the section from the Queens-Midtown Tunnel to Queens Boulevard in Queens is known as the Queens-Midtown Expressway, and the section between Queens Boulevard and the Queens-Nassau County line is known as the Horace Harding Expressway. The tunnel has two tubes, an inbound and outbound tube, each with two travel lanes. A contra-flow Bus/3+ HOV lane operates westbound in the morning from 6:00 a.m. to 10:00 a.m. from Van Dam Street to Queens-Midtown Tunnel and then along the south tube of the tunnel into Manhattan, providing three travel lanes to Manhattan during this time. Figure 4B-3 depicts the location of the highways leading to the Queens-Midtown Tunnel and highlights the extent of the microsimulation model area for the Queens-Midtown Expressway/I-495 analysis.

AFFECTED ENVIRONMENT

Consistent with other highway analyses for this Project, the highway segment analysis was performed using a Vissim model, which incorporated volume data from TBTA toll transaction data and was calibrated based on traffic counts and observed speeds using data provided by StreetLight Data, Inc. (a third-party, on-demand mobility analytics platform that provides past traffic information). Collectively, the TBTA transaction data and data provided by StreetLight Data, Inc. provided performance metrics including hourly volume, travel speed in miles per hour (mph). The data were used to calculate maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS. For this microsimulation model, the maximum queue length is based on length of roadway occupied by vehicles not moving or moving below a speed of approximately 6 mph. Table 4B-4 presents a summary of the existing conditions during the weekday AM, MD, and PM peak hours.

Based on the October 2019, transaction data provided by TBTA, the highest average weekday hourly traffic volume of 3,612 vehicles (2,672 vehicles in the two inbound general-purpose lanes plus 940 vehicles in the contra-flow HOV lane) occurred along the Long Island Expressway (I-495) at the eastern portal of the Queens-Midtown Tunnel in the Manhattan-bound direction during the AM peak hour (8:00 a.m. to 9:00 a.m.).

Figure 4B-3. Highways Leading to the Queens-Midtown Tunnel

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-4. Existing Conditions: Long Island Expressway (I-495): The Queens-Midtown Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,672	2,581	2,714
I-495 Inbound, High-Occupancy Vehicle (HOV)–AM only	940	—	—
Processed Hourly Volume (vehicles)*			
I-495 Inbound, Mainline	2,436	2,396	2,311
I-495 Inbound, HOV–AM only	940	—	—
Travel Time (min:sec)			
I-495 Inbound, Mainline	05:44	05:09	08:59
I-495 Inbound, HOV–AM only	01:19	—	—
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	8.7	9.7	5.6
I-495 Inbound, HOV–AM only	40.8	—	—
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,987	4,464	5,824
I-495 Inbound, HOV–AM only	2	—	—
Density (pc/mi/ln)			
I-495 Inbound, Mainline	78	72	133
I-495 Inbound, HOV–AM only	22	—	—
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	F
I-495 Inbound, HOV–AM only	C	—	—

Source: WSP USA, 2022.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Other hourly Manhattan-bound traffic volumes at the Queens-Midtown Tunnel include 2,581 vehicles and 2,714 vehicles during the MD peak hour (1:00 p.m. to 2:00 p.m.) and the PM peak hour (5:00 p.m. to 6:00 p.m.), respectively.

Travel speeds approaching the Queens-Midtown Tunnel depend upon the time of day. In the Manhattan-bound direction, speeds along the Long Island Expressway (I-495) at the eastern portal of the Queens-Midtown Tunnel during the AM peak hour averaged approximately 9 mph on the mainline lanes and approximately 41 mph on the contra-flow HOV lane, which operates only during the morning peak period. During the MD and PM peak hours, speeds in the Manhattan-bound direction on the mainline lanes were approximately 10 mph and 6 mph, respectively.

The maximum queue lengths along the Long Island Expressway (I-495) in the Manhattan-bound direction as measured east of the Queens-Midtown Tunnel portal in the microsimulation model, are approximately 3,987 feet, 4,464 feet, and 5,824 feet during the AM, MD, and PM peak hours, respectively.

The existing LOS varies from LOS C on the HOV lane during the AM peak hour to LOS F on the mainline lanes during all peak hours of a typical weekday day.

ENVIRONMENTAL CONSEQUENCES

Table 4B-5, Table 4B-6, and Table 4B-7 present the results of the Vissim analysis for the weekday AM, MD, and PM peak hours, respectively, for Tolling Scenario D, which is representative of the tolling scenarios, including Tolling Scenarios E and F. The assessment describes the incremental change between the No Action Alternative and the CBD Tolling Alternative.

The highway analysis of the Queens-Midtown Tunnel and its approaches indicated that under Tolling Scenario D, there would be relatively small increases in traffic during the AM and PM peak hours due to capacity constraints and a larger increase in traffic during the MD peak hour. The LOS at critical locations during the weekday AM, MD, and PM peak hours are projected to remain the same (at LOS F). The most notable change is expected to occur in the MD peak hour where travel speeds would potentially drop from about 11.8 to 6.0 mph and the travel times would potentially increase by about 4 minutes.

Under the SEQRA criteria the increase in traffic volumes would be within a 5 percent threshold during the AM peak hour with an increase of 125 vehicles. However, during the MD and PM peak hours, the increase in volume of 383 and 203 vehicles, respectively, would exceed a 5 percent threshold. However, the 2.5 minutes of additional delay threshold is exceeded only during the MD peak hour.

AM Results (8:00 a.m. to 9:00 a.m.)

With CBD tolling, traffic in the Manhattan-bound direction is projected to increase by approximately 125 vehicles leading into the Queens-Midtown Tunnel. This would likely result in an increase in travel time during the AM peak of approximately 137 seconds in the mainline lanes, with the travel time in the HOV lane remaining the same as the No Action Alternative. Speeds are anticipated to decrease by 2.7 mph, from 9.1 mph to 6.4 mph, on the mainline lanes, while speeds on the HOV lane would remain the same as the No Action Alternative. Queues are expected to increase by approximately 1,719 feet (or approximately 86 vehicles) along the Long Island Expressway (I-495) mainline with no increase in the queue length expected for the HOV lane. The density along the Long Island Expressway (I-495) mainline lanes is expected to increase by approximately 39 pc/mi/ln and the LOS service would remain at LOS F. (The HOV lane would continue to operate at LOS C and the density is projected to remain the same as the No Action Alternative). Under the SEQRA criteria, the projected increase in traffic of 125 vehicles during the AM peak hour would be within a 5 percent increase and the additional delay of 2.2 minutes is less than the 2.5 minutes threshold; therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

With CBD tolling, traffic volumes in the Manhattan-bound direction are projected to increase by approximately 383 vehicles on the mainline lanes. This is projected to result in an increase of approximately 242 seconds in travel time and speeds are projected to decrease by 5.8 mph, from 11.8 mph to 6.0 mph. The maximum queue length is expected to increase by approximately 1,355 feet (or approximately 68 vehicles) along the Long Island Expressway (I-495) and the density is expected to increase approximately 76 pc/mi/ln. The LOS is expected to remain at LOS F. Under the SEQRA criteria, the projected increase in traffic of 383 vehicles during the MD peak hour would exceed 5 percent and the increased delay of 4.0 minutes would exceed the 2.5 minutes threshold; therefore, there would be a potential adverse traffic effect during the MD peak hour.

Table 4B-5. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – AM (8:00 a.m. to 9:00 a.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,680	2,805	125
I-495 Inbound, High-Occupancy Vehicle (HOV) – AM only	940	940	0
Processed Hourly Volume (vehicles)*			
I-495 Inbound, Mainline	2,432	2,434	2
I-495 Inbound, HOV – AM only	942	943	1
Travel Time (min:sec)			
I-495 Inbound, Mainline	05:31	07:48	02:17
I-495 Inbound, HOV – AM only	01:19	01:19	00:00
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	9.1	6.4	-2.7
I-495 Inbound, HOV – AM only	40.9	40.9	0.0
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,981	5,700	1,719
I-495 Inbound, HOV – AM only	6	6	0
Density (pc/mi/ln)			
I-495 Inbound, Mainline	74	113	39
I-495 Inbound, HOV – AM only	23	23	0
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	—
I-495 Inbound, HOV – AM only	C	C	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Table 4B-6. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,594	2,977	383
Processed Hourly Volume (vehicles)*			
I-495 Inbound, Mainline	2,444	2,490	46
Travel Time (min:sec)			
I-495 Inbound, Mainline	04:15	08:17	04:02
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	11.8	6.0	-5.8
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,505	4,860	1,355
Density (pc/mi/ln)			
I-495 Inbound, Mainline	55	131	76
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Table 4B-7. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – PM (5:00 p.m. to 6:00 p.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,687	2,890	203
Processed Hourly Volume (vehicles)*			
I-495 Inbound, Mainline	2,309	2,340	31
Travel Time (min:sec)			
I-495 Inbound, Mainline	08:27	09:45	01:18
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	5.9	5.1	-0.8
Maximum Queue (feet)			
I-495 Inbound, Mainline	5,859	5,872	13**
Density (pc/mi/ln)			
I-495 Inbound, Mainline	127	141	14
Level of Service (LOS)			
I-495 (Inbound, Mainline)	F	F	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.
** Maximum queue length is constrained by the extent of the Vissim model. Actual increase in queue length is estimated at about 1,500 feet. This is based on an additional 203 vehicles accommodated in three lanes and 22-foot average vehicle spacing (15-foot average vehicle length and 7-foot average vehicle separation)

PM Results (5:00 p.m. to 6:00 p.m.)

With CBD tolling, Manhattan-bound direction traffic volumes are projected to increase by approximately 203 vehicles on the mainline lanes. This would likely result in an increase of approximately 78 seconds in travel time and speeds are anticipated to decrease slightly. Maximum queues are constrained by the extent of the Vissim model but are projected to increase by about 1,500 feet, assuming an additional 203 vehicles accommodated in three lanes and 22-foot vehicle spacing (15-foot average vehicle length and 7-foot separation between vehicles). Queue delays are projected to increase, but these additional queue delays would likely occur east of Van Dam Street, which is outside of the model limits. Density is projected to increase by approximately 14 pc/mi/ln with the LOS remaining at LOS F. Under the SEQRA criteria, the projected increase in traffic of 203 vehicles during the PM peak hour would exceed 5 percent but the increase in delay would be 1.3 minutes which would be below the 2.5 minutes threshold; therefore, there would not be an adverse traffic effect during the PM peak hour.

In summary, under Tolling Scenario D, traffic volumes would increase by 125/383/203 vehicles during the AM, MD, and PM peak hours, respectively, resulting in increased queue lengths and delays for all peak hours. Under the SEQRA criteria, assuming a potential adverse effect if traffic volumes increase more than 5 percent under congested conditions and delays increase by 2.5 minutes or more, there would be a potential adverse effect in the MD peak hour but no adverse effect during the AM and PM peak hours.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc.. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase more than 2.5 minutes.

4B.4.3 Gowanus Expressway Leading to I-278 Hugh L. Carey Tunnel

The Hugh L. Carey Tunnel consists of two tubes—each with two traffic lanes—one tube for each direction. The eastern tunnel portal is in the neighborhood of Red Hook in Brooklyn and the western portal is north of Battery Park in Lower Manhattan.

The Hugh L. Carey Tunnel is part of the Interstate Highway System, designated as I-478, and encompasses the length of the tunnel and the short highway connection to I-278. The I-278 designation is applied to several expressways, including the Gowanus Expressway in southern Brooklyn and BQE across northern Brooklyn and Queens. During the weekday AM peak period, an HOV lane operates along the eastbound Gowanus Expressway toward the Hugh L. Carey Tunnel, for a total of three lanes toward Manhattan. During the weekday PM peak period the HOV lane operates in the reverse direction, westbound, along the Gowanus Expressway, for a total of three lanes toward Brooklyn. At all other times, two travel lanes operate both east and west. Figure 4B-4 presents the location of the highways leading to and from the Hugh L. Carey Tunnel.

AFFECTED ENVIRONMENT

The highway segment analysis was performed using a Vissim model calibrated using existing speeds based on data provided by StreetLight Data, Inc.. The model provides performance metrics including hourly processed volumes, travel time (in seconds), travel speed (in miles per hour), maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS. Table 4B-8 presents a summary of existing conditions during the weekday AM, MD, and PM peak hours.

Figure 4B-4. Highways Leading to the Hugh L. Carey Tunnel

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-8. Existing Conditions: Gowanus Expressway Leading to Hugh L. Carey Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	2,953	1,551	1,205
Total Volume to Brooklyn-Queens Expressway (BQE)	1,308	2,528	2,964
Total Volume Weaving Segment	2,453	3,615	3,759
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	03:53	03:43	04:54
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	02:04	01:37	01:35
High-Occupancy Vehicle Lane	02:56	—	—
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	11.6	12.5	9.8
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	13.8	17.8	18.0
High-Occupancy Vehicle Lane	17.0	—	—
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	6,555	4,687	7,006
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	1,756	158	294
High-Occupancy Vehicle Lane	0	—	—
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	77	87	93
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	34	25	15
High-Occupancy Vehicle Lane	56	—	—
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	F
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	D	C	B
High-Occupancy Vehicle Lane	F	—	—

The highest average weekday hourly traffic volume of 2,953 vehicles, based upon October 2019 data provided by TBTA, occurs in the Manhattan-bound direction during the AM peak hour (8:00 a.m. to 9:00 a.m.). Other hourly Manhattan-bound traffic volumes at the Hugh L. Carey Tunnel are 1,551 vehicles and 1,205 vehicles in the MD peak hour (1:00 p.m. to 2:00 p.m.) and PM peak hour (5:00 p.m. to 6:00 p.m.), respectively.

The speeds in the Hugh L. Carey Tunnel vary by the time of day. In the Manhattan-bound direction the slowest speeds along I-478 at the eastern portal of the Hugh L. Carey Tunnel are during the AM peak hour, averaging 13.8 mph. During the MD and PM peak hours, speeds in the Manhattan-bound direction on the same segment are 17.8 mph and 18.0 mph, respectively. The average Manhattan-bound speeds along the most critical segment—the I-478 weaving segment between the merge of the Gowanus Expressway with the Prospect Expressway, over Hamilton Avenue, to the exit ramp to the BQE and Hamilton Avenue (Exit 26)—are 11.6 mph, 12.5 mph, and 9.8 mph during the AM, MD, and PM peak hours, respectively. In the HOV lane, which operates in the Manhattan-bound direction during the AM peak period, vehicles move at an average speed of 17 mph.

The maximum queue lengths along I-478 as measured east from the Hugh L. Carey Tunnel portal segment after the exit ramp to the BQE (Exit 26 to Hamilton Avenue access to the Hugh L. Carey Tunnel entrance) are approximately 1,756 feet, 158 feet, and 294 feet during the AM, MD, and PM peak hours, respectively. The maximum queue lengths along I-478 measured on the weaving segment between the merge from Gowanus/Prospect Expressways and the exit ramp to the BQE are approximately 6,555 feet, 4,687 feet, and 7,006 feet during the AM, MD, and PM peak hours, respectively.

Three locations on the Manhattan-bound tunnel approach show the existing LOS varies from LOS B to LOS F. The I-478 weaving section before the exit ramp to the BQE on the approach to the Hugh L. Carey Tunnel operates at LOS F during the AM, MD, and PM peak hours. The section along the I-478 segment between the exit ramp to the BQE and the eastern portal of the Hugh L. Carey Tunnel operates at LOS D, LOS C, and LOS B during the AM, MD, and PM peak hours, respectively. The HOV lane operates at LOS F at about 17 miles per hour without queues.

ENVIRONMENTAL CONSEQUENCES

For the 2023 No Action Alternative and 2023 CBD Tolling Alternative (Tolling Scenario D), **Table 4B-9, Table 4B-10,** and **Table 4B-11** present results of the Vissim assessment for the weekday AM, MD, and PM peak hours, respectively. The assessment summarized below describes the incremental change between the No Action Alternative and CBD Tolling Alternative.

Overall, the highway analysis of the Hugh L. Carey Tunnel and its approaches indicates that under Tolling Scenario D, there would likely be a change in travel patterns and an increase in traffic that would result in increased travel times, higher densities, and deteriorating LOS, thereby creating potential adverse traffic effects under the SEQRA criteria.

The change in traffic patterns resulting from the CBD Tolling Alternative is expected to result in a shift of traffic from the BQE to the Hugh L. Carey Tunnel in the critical weaving section between the merge of the Gowanus and Prospect Expressways and the Hugh L. Carey Tunnel split from the BQE based on the route choice of the tunnel versus other East River crossings. The anticipated decrease in volume on the BQE would improve its operation while the increase in volume to the Hugh L. Carey Tunnel would be expected to result in increased delays at the tunnel approach. The change in traffic volumes during the AM and PM peak hours are expected to be small due to capacity constraints at the Hugh L. Carey Tunnel while larger changes in volumes are expected during the MD peak hour. **Table 4B-9, Table 4B-10,** and **Table 4B-11** provide a summary of the results by peak hour.

Table 4B-9. Hugh L. Carey Tunnel – AM (8:00 a.m. to 9:00 a.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
Total Volume to Hugh L. Carey Tunnel	3,233	3,305	72
Total Volume to Brooklyn-Queens Expressway (BQE)	1,147	1,105	-42
Total Volume Weaving Segment	2,453	2,453	0
Processed Hourly Volume (vehicles)			
Total Volume to Hugh L. Carey Tunnel	3,521	3,506	-15
Total Volume to BQE	1,294	1,212	-82
Total Volume Weaving Segment	2,821	2,780	-41
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	02:49	04:02	01:13
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	03:10	03:19	00:09
High-Occupancy Vehicle Lane	02:56	02:56	00:00
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	15.5	11.2	-4.3
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	9.1	8.7	-0.4
High-Occupancy Vehicle Lane	16.9	16.9	0.0
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	3,691	5,315	1,624
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	2,361	2,377	16
High-Occupancy Vehicle Lane	0	0	—
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	53	81	28
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	69	78	9
High-Occupancy Vehicle Lane	60	61	1
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	F	F	—
High-Occupancy Vehicle Lane	F	F	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-10. Hugh L. Carey Tunnel – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,867	2,353	486
Total Volume to Brooklyn-Queens Expressway (BQE)	2,248	1,820	-428
Total Volume Weaving Segment	3,615	3,615	0
Processed Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,858	2,348	490
Total Volume to BQE	2,320	1,882	-438
Total Volume Weaving Segment	3,639	3,636	-3
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	02:15	02:12	-00:03
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	01:39	01:43	00:04
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	19.3	19.8	0.5
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	17.4	16.7	-0.7
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	1,277	201	-1,076
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	374	772	398
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	47	45	-2
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	33	44	11
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	E	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	D	E	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-11. Hugh L. Carey Tunnel – PM (5:00 p.m. to 6:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,302	1,349	47
Total Volume to Brooklyn-Queens Expressway (BQE)	2,877	2,834	-43
Total Volume Weaving Segment	3,759	3,759	0
Processed Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,303	1,374	71
Total Volume to BQE	2,852	2,889	37
Total Volume Weaving Segment	3,722	3,815	93
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	03:56	03:07	-00:49
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	01:38	01:41	00:03
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	12.4	15.2	2.8
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	17.6	17.1	-0.5
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	4,509	2,828	-1,681
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	423	631	208
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	84	71	-13
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	18	20	2
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	C	C	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

AM Results (8:00 a.m. to 9:00 a.m.)

Under Tolling Scenario D, traffic volumes to the Hugh L. Carey Tunnel are projected to increase by approximately 72 vehicles while traffic volumes to the BQE are expected to decrease by about 42 vehicles. Traffic volumes in the critical weaving segment between the merge of the Gowanus Expressway and Prospect Expressway to the split to the BQE and the Hugh L. Carey Tunnel are expected to remain about the same. Approximately 42 vehicles would be diverted from the BQE and instead would stay on the main travel way to the Manhattan-bound Hugh L. Carey Tunnel.

This would result in an estimated 73-second increase in travel time in the weaving segment between the merge of the Gowanus/Prospect Expressway and the off-ramp to the BQE. There would be an increase in travel time of approximately 9 seconds between the BQE off-ramp and the eastern portal of the Hugh L. Carey Tunnel due to increased volumes proceeding directly to the tunnel. The travel time in the HOV lane would remain approximately the same. At the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by about 0.4 mph, while speeds would decrease in the weaving section of the approach between the Gowanus/Prospect Expressway merge and the exit ramp to the BQE by about 4.3 mph.

While total volumes in the weaving segment would be about the same, heavier weaving volumes, from the Prospect Expressway, would result in additional queues in the segment between the Gowanus and Prospect merge and the split to the Hugh L. Carey Tunnel and BQE exit ramp. Under the CBD Tolling Alternative, the queues are anticipated to increase in the weaving segment before the exit ramp to the BQE by about 1,624 feet (or approximately 82 passenger cars) and there would be no queues anticipated along the HOV lane. An increase in density of 28 pc/ln/mi is anticipated for the weave segment. The LOS would remain the same under the CBD Tolling Alternative as the No Action Alternative at LOS F along the general-purpose lanes.

Under SEQRA, the increase in volume would be within 5 percent and the increase in delay of 1.2 minute in the weaving segment would be below 2.5 minutes; therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

With CBD tolling, traffic volumes in the Hugh L. Carey Tunnel are projected to increase by 486 vehicles and traffic to the BQE is expected to decrease by about 428 vehicles, while total traffic volume on the I-478 weaving segment between the merge of Gowanus/Prospect Expressway and the exit ramp to the BQE would remain about the same.

Travel time in the weaving segment between the merge of Gowanus/Prospect Expressway and the exit ramp to the BQE as well as the approach to the Hugh L. Carey Tunnel would be expected to remain about the same. Overall, at the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by about 0.7 mph, while there would be improvement in speeds on the weaving section of the approach between the Gowanus/Prospect Expressway merge and BQE off-ramp by about 0.5 mph. Additional queue delays are anticipated and maximum queue lengths on this segment are expected to increase by approximately 398 feet (or approximately 20 vehicles). Reduction in queuing is anticipated in the weaving segment before the exit ramp to the BQE under the CBD Tolling Alternative by about 1,076 feet (or approximately

54 vehicles). Density along the Hugh L. Carey Tunnel approach is expected to increase by 11 pc/mi/ln, and as a result LOS would deteriorate from LOS D to LOS E. A reduction in density is anticipated by 2 pc/mi/ln in the weaving segment before the exit ramp to the BQE and the LOS is projected to improve from LOS F to LOS E.

Under the SEQRA criteria used for the initial evaluation of potential adverse effects, traffic volumes to the Hugh L. Carey Tunnel would increase more than 5 percent, but the detailed Vissim analysis indicates there is sufficient capacity in the tunnel to handle the additional traffic and there would be a minimal increase in delay of a few seconds which would be well below the 2.5 minutes threshold;[18] therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

With CBD tolling, traffic volumes in the Hugh L. Carey Tunnel are projected to increase by 47 vehicles. The total traffic volume for the critical I-478 weaving segment between the merge of Gowanus/Prospect Expressway and the off-ramp to the BQE would remain about the same. Under the CBD Tolling Alternative, approximately 43 vehicles would no longer use the BQE and would instead shift to the Manhattan-bound Hugh L. Carey Tunnel.

This would result in an estimated 49-second reduction in travel time in the weaving segment between the merge of Gowanus/Prospect Expressway and the off-ramp to the BQE. There is a small, anticipated increase of 3 seconds in travel time between the BQE exit ramp and the eastern portal of the Hugh L. Carey Tunnel. Overall, at the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by 0.5 mph, while there would be improvement in speeds on the weaving section of the approach between the Gowanus/Prospect Expressway merge and BQE exit ramp by 2.8 mph. Additional queue delays are anticipated and maximum queue lengths at the eastern portal of the Hugh L. Carey Tunnel are expected to increase by approximately 208 feet (or approximately 10 vehicles). Reduction in queuing is anticipated in the weaving segment before the exit ramp to the BQE under the CBD Tolling Alternative by 1,681 feet (or approximately 84 vehicles). At the eastern portal of the Hugh L. Carey Tunnel, density is expected to increase by 2 pc/mi/ln. A reduction in density is anticipated of 13 pc/mi/ln in the weaving segment before the exit ramp to the BQE. The LOS is projected to remain the same under the CBD Tolling Alternative as it would in the No Action Alternative for all segments. The increase in traffic would not exceed 5 percent and there would be a reduction in delays of 49 seconds in the weaving segment; therefore, there would not be an adverse effect during the PM peak hour.

In summary, under Tolling Scenario D, inbound traffic volumes to the Hugh L. Carey Tunnel would increase by 72/486/47 vehicles during the AM, MD, and PM peak hours, respectively, resulting in increased queue lengths and delays for some time periods. Under the SEQRA criteria, assuming an increase in volume within 5 percent under congested conditions would not be considered an adverse effect, there would not be an adverse effect during the AM and PM peak hours. During the MD peak hour, although the 5 percent threshold would be exceeded, further detailed analysis indicates that there would be sufficient capacity in

[18] The capacity of the two inbound lanes is approximately 2,600 vehicles per hour. The projected CBD Tolling Alternative volume under the tolling scenario analyzed would be about 2,353 vehicles, which would be below capacity.

the two inbound lanes to handle the additional traffic volumes and delays would be well below the 2.5-minute threshold; therefore, there would not be an adverse effect during the MD peak hour.

4B.4.4 Staten Island Expressway Leading to the Verrazzano-Narrows Bridge

The Verrazzano-Narrows Bridge is a major regional highway link between Staten Island and Brooklyn, providing connections to the Staten Island Expressway and the Gowanus Expressway (**Figure 4B-5**).

As established by the BPM modeling results of the total trips currently using the bridge in the eastbound direction, only 7 percent are destined to the Manhattan CBD and would be directly affected by the Project.

In the westbound direction, some CBD through trips destined to New Jersey and points beyond are expected to divert to the Verrazzano-Narrows Bridge in order to avoid the CBD toll, resulting in higher westbound traffic volumes.

Based upon the BPM results, there would either be a decrease or a marginal increase in traffic, depending on the peak period, in the eastbound (Brooklyn-bound) direction on the Verrazzano-Narrows Bridge. Therefore, this highway analysis examined only the westbound (Staten Island-bound) direction where potential additional delays and queues would occur along the Staten Island Expressway between the Verrazzano-Narrows Bridge and Hylan Boulevard due to a projected increase in traffic.

Because the Verrazzano-Narrows Bridge would experience an increase in traffic only in the westbound (Staten Island-bound) direction based on traffic projected to navigate around the Manhattan CBD, this highway analysis examined only the westbound direction where potential additional delays and queues would occur along the Staten Island Expressway between the Verrazzano-Narrows Bridge and Hylan Boulevard due to a projected increase in traffic.

AFFECTED ENVIRONMENT

The highway analyses were performed using a calibrated Vissim model specifically modified for the Project along highways that would be expected to experience an increase in traffic and slower speeds.[19] **Table 4B-12** presents a summary of existing conditions during the weekday AM, MD, and PM peak hours.

Based upon October 2019 weekday transaction data provided by TBTA, the heaviest westbound traffic volume occurs during the PM peak hour, with a total of 8,521 vehicles. Traffic volumes during the AM and MD peak hours are lower at 5,789 and 5,425 vehicles, respectively. Typically, the average speeds in the calibrated Vissim model in the westbound direction along the Staten Island Expressway (I278) between the Verrazzano-Narrows Bridge and Hylan Boulevard vary in the range of 18.4 to 29.3 mph during the AM peak hour and 27.0 to 46.7 mph during the MD peak hour. During the PM peak hour, speeds were observed to decrease to the range of 16.8 to 23.7 mph, indicating relatively congested travel conditions during that period.

[19] The model was calibrated using existing speeds provided by StreetLight Data, Inc., hourly traffic counts, and observed queue lengths. Performance measures include processed volumes, speeds, maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS.

Figure 4B-5. Highways Leading to/from the Verrazzano-Narrows Bridge

CBD Tolling Zone
Vissim Model Extent - Outbound Direction Only
Highways
HOV Lane

0 0.5 1 MILE

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-12. Existing Conditions: Staten Island Expressway (I-278) Westbound – Verrazzano-Narrows Bridge to Hylan Boulevard

PERFORMANCE (2019)	AM (7 a.m. to 8 a.m.)	MD (1 p.m. to 2 p.m.)	PM (4 p.m. to 5 p.m.)
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,153	2,656	4,281
SIE WB Lower Level (LL)	2,435	2,445	3,775
SIE WB – High-Occupancy Vehicle UL	1,201	324	465
Travel Time (min:sec)			
Verrazzano-Narrows Bridge merge to Lily Pond WB LL	01:12	00:34	01:03
To Lily Pond WB UL	00:59	00:55	00:56
Lily Pond to Hylan Boulevard WB LL	01:16	00:48	02:05
Lily Pond to Hylan Boulevard WB UL	01:17	00:50	02:14
SIE WB LL to Hylan Boulevard	02:28	01:20	03:10
SIE WB UL to Hylan Boulevard	02:06	01:42	03:06
Travel Speed (miles per hour)			
To Lily Pond WB LL	18.4	38.9	20.4
To Lily Pond WB UL	24.9	27.0	23.7
Lily Pond to Hylan Boulevard WB LL	29.2	46.7	17.3
Lily Pond to Hylan Boulevard WB UL	29.3	45.5	16.8
SIE WB LL to Hylan Boulevard	23.8	44.1	18.3
SIE WB UL to Hylan Boulevard	28.8	35.3	19.1
Density (pc/mi/ln)			
To Lily Pond WB LL	21	13	39
To Lily Pond WB UL	16	22	36
SIE WB LL to Hylan Boulevard	21	14	44
SIE WB UL to Hylan Boulevard	18	13	61
Level of Service (LOS)			
To Lily Pond WB LL	C	B	E
To Lily Pond WB UL	B	C	E
SIE WB LL to Hylan Boulevard	C	B	F
SIE WB UL to Hylan Boulevard	B	B	F

Source: WSP USA, 2022.

Travel times vary depending on whether the upper or lower level of the bridge is used. Based upon observed travel time data, it took slightly longer for westbound lower-level users to cross the bridge to Hylan Boulevard along the Staten Island Expressway (I-278) during the AM and PM peak hours, when the traffic volumes were higher. Travel times between the Verrazzano-Narrows Bridge and Hylan Boulevard in the calibrated Vissim model were approximately 148 seconds and 190 seconds for the lower-level users during the AM and PM peak, respectively. For those using the upper level, travel times were 126 seconds and 186 seconds during the AM and PM peak, respectively.

The most congested analyzed segment of the westbound Staten Island Expressway (I-278) was between Lily Pond Road and Hylan Boulevard during the PM peak hour, with the lowest observed speeds of approximately 17.3 and 16.8 mph for the lower and upper levels, respectively.

There were no queues observed along the westbound Staten Island Expressway (I-278) between the Verrazzano-Narrows Bridge and Hylan Boulevard throughout all peak hours of the day. The existing LOS on westbound Staten Island Expressway (I-278) between the Verrazzano-Narrows Bridge and Hylan Boulevard is LOS C or better during the AM and MD peak hours, and LOS E and LOS F during the PM peak hour.[20]

ENVIRONMENTAL CONSEQUENCES

Table 4B-13, **Table 4B-14**, and **Table 4B-15** present the Vissim results for the weekday AM, MD, and PM peak hours, respectively for the 2023 No Action and the 2023 CBD Tolling Alternative for Tolling Scenario D, which represents the tolling scenario with the highest increase in traffic.

In summary, the additional traffic volumes on the westbound Staten Island Expressway (I-278) are relatively small during the AM and PM peak hours, and there is sufficient capacity to handle the additional volumes expected under Tolling Scenario D and is not anticipated to result in an adverse effect to highway operations for the AM, MD, and PM peak hours. The relatively small volume changes resulted in insignificant changes across several roadway performance metrics, and thus not all metrics are presented in the table; therefore, there would not be adverse traffic effects for any of the tolling scenarios being considered nor any other tolling scenario adopted that would have lower tolls.

The results for each peak hour are described below.

AM Results (7:00 a.m. to 8:00 a.m.)

With CBD tolling, there would likely be a small increase in traffic during the AM peak hour in the westbound direction on the Verrazzano-Narrows Bridge, with an additional 32 vehicles on the upper level and an additional 64 vehicles on the lower level. Traffic in the HOV lane would likely remain the same. Under the CBD Tolling Alternative, the average speeds along the Staten Island Expressway (I-278) westbound between the Verrazzano-Narrows Bridge and Hylan Boulevard would likely remain in the range of 17.2 to 29.2 mph. There would be no queues between the Verrazzano-Narrows Bridge and Hylan Boulevard resulting from the implementation of the Project, and the LOS would remain the same at LOS C or better. The increase in volume would be small and within a 5 percent increase and the increase in delay of less than 10 seconds would be well below 2.5 minutes; therefore, there would not be an adverse effect during the AM peak hour.

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20 Two-way (split) tolling was implemented at the Verrazzano-Narrows Bridge on December 1, 2020. The BPM modeling and the Vissim analyses incorporated the change in toll collection to two-way tolling.

Table 4B-13. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – AM (7:00 a.m. to 8:00 a.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,196	2,228	32
SIE WB Lower Level (LL)	2,484	2,548	64
SIE WB – High-Occupancy Vehicle (HOV) UL	1,225	1,225	0
Travel Time (min:sec)			
To Lily Pond WB LL	01:12	01:17	00:05
To Lily Pond WB UL	00:59	01:00	00:01
Lily Pond to Hylan Boulevard WB LL	01:16	01:17	00:01
Lily Pond to Hylan Boulevard WB UL	01:17	01:17	00:00
SIE WB LL to Hylan Boulevard	02:28	02:30	00:02
SIE WB UL to Hylan Boulevard	02:06	02:06	00:00
Travel Speed (miles per hour)			
To Lily Pond WB LL	17.4	17.2	-0.2
To Lily Pond WB UL	24.9	24.8	-0.1
Lily Pond to Hylan Boulevard WB LL	29.1	29.0	-0.1
Lily Pond to Hylan Boulevard WB UL	29.4	29.2	-0.2
SIE WB LL to Hylan Boulevard	23.5	23.5	0.0
SIE WB UL to Hylan Boulevard	28.8	28.7	-0.1
Density (pc/mi/ln)			
To Lily Pond WB LL	23.8	27.0	3.2
To Lily Pond WB UL	16.5	17.4	0.9
SIE WB LL to Hylan Boulevard	21.5	22.8	1.3
SIE WB UL to Hylan Boulevard	18.7	19.7	1.0
Level of Service (LOS)			
To Lily Pond WB LL	C	C	—
To Lily Pond WB UL	B	B	—
SIE WB LL to Hylan Boulevard	C	C	—
SIE WB UL to Hylan Boulevard	B	B	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-14. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,738	2,939	201
SIE WB Lower Level (LL)	2,533	2,789	256
SIE WB – HOV UL	330	330	0
Travel Time (min:sec)			
To Lily Pond WB LL	00:33	00:34	00:01
To Lily Pond WB UL	00:55	00:55	00:00
Lily Pond to Hylan Boulevard WB LL	00:48	00:48	00:00
Lily Pond to Hylan Boulevard WB UL	00:49	00:50	00:01
SIE WB LL to Hylan Boulevard	01:20	01:20	00:00
SIE WB UL to Hylan Boulevard	01:42	01:43	00:01
Travel Speed (miles per hour)			
To Lily Pond WB LL	40.0	38.7	-1.3
To Lily Pond WB UL	27.0	26.8	-0.2
Lily Pond to Hylan Boulevard WB LL	46.8	46.7	-0.1
Lily Pond to Hylan Boulevard WB UL	45.6	45.4	-0.2
SIE WB LL to Hylan Boulevard	44.1	43.9	-0.2
SIE WB UL to Hylan Boulevard	35.4	35.2	-0.2
Density (pc/mi/ln)			
To Lily Pond WB LL	11	14	3
To Lily Pond WB UL	22	24	2
SIE WB LL to Hylan Boulevard	14	15	1
SIE WB UL to Hylan Boulevard	13	14	1
Level of Service (LOS)			
To Lily Pond WB LL	B	B	—
To Lily Pond WB UL	C	C	—
SIE WB LL to Hylan Boulevard	B	B	—
SIE WB UL to Hylan Boulevard	B	B	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-15. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – PM (4:00p.m. to 5:00p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	4,367	4,442	75
SIE WB Lower Level (LL)	3,850	3,947	97
SIE WB – High-Occupancy Vehicle (HOV) UL	474	474	0
Travel Time (min:sec)			
To Lily Pond WB LL	01:04	01:04	00:00
To Lily Pond WB UL	00:58	00:59	00:01
Lily Pond to Hylan Boulevard WB LL	02:04	02:08	00:04
Lily Pond to Hylan Boulevard WB UL	02:09	02:15	00:06
SIE WB LL to Hylan Boulevard	03:11	03:14	00:03
SIE WB UL to Hylan Boulevard	03:04	03:10	00:06
Travel Speed (miles per hour)			
To Lily Pond WB LL	20.3	20.3	0.0
To Lily Pond WB UL	22.7	22.3	-0.4
Lily Pond to Hylan Boulevard WB LL	17.5	16.9	-0.6
Lily Pond to Hylan Boulevard WB UL	17.5	16.8	-0.7
SIE WB LL to Hylan Boulevard	18.2	17.9	-0.3
SIE WB UL to Hylan Boulevard	19.3	18.7	-0.6
Density (pc/mi/ln)			
To Lily Pond WB LL	37.4	37.7	0.3
To Lily Pond WB UL	37.0	37.7	0.7
SIE WB LL to Hylan Boulevard	42.5	43.5	1.0
SIE WB UL to Hylan Boulevard	59.5	61.6	2.1
Level of Service (LOS)			
To Lily Pond WB LL	E	E	—
To Lily Pond WB UL	E	E	—
SIE WB LL to Hylan Boulevard	F	F	—
SIE WB UL to Hylan Boulevard	F	F	—

Source: WSP USA, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

MD Results (1:00 p.m. to 2:00 p.m.)

Under Tolling Scenario D, an increase in traffic is projected during the MD peak hour in the westbound direction on the Verrazzano-Narrows Bridge with an additional 201 vehicles on the upper level and an additional 256 vehicles on the lower level. Traffic in the HOV lane would likely remain the same. There would be a small reduction in speeds using the lower level or upper level of the Verrazzano-Narrows Bridge, but the change in speeds would not be noticeable. Although the projected increase in traffic volume would be nominally above normal daily fluctuation and would exceed 5 percent there would be sufficient capacity to absorb the additional traffic, with additional delays of less than 10 seconds and the LOS would remain the same at C or better; therefore, since the increase in delay would be well below the 2.5-minute threshold there would not be an adverse traffic effect under the SEQRA criteria.

PM Results (4:00 p.m. to 5:00 p.m.)

With CBD tolling, an increase in traffic is projected during the PM peak hour in the westbound direction on the Verrazzano-Narrows Bridge, with an additional 75 vehicles on the upper level and 97 vehicles on the lower level. Traffic levels in the HOV lane would remain the same. The average speeds along the Staten Island Expressway (I-278) westbound between the Verrazzano-Narrows Bridge and Hylan Boulevard would remain approximately the same as the No Action Alternative, in the range of 16.8 to 22.3 mph. There would be no increase in queues between the Verrazzano-Narrows Bridge and Hylan Boulevard and densities would be similar. Overall, there would be no change in LOS and increase in delays would be well below the 2.5-minute threshold; therefore, there would be no adverse effects associated with the additional volume during the PM peak hour.

Under Tolling Scenario D, a small increase in traffic is projected during the PM peak hour in the westbound direction on the Verrazzano-Narrows Bridge with an additional 75 vehicles on the upper level and an additional 97 vehicles on the lower level. Traffic in the HOV lane would remain the same. Average speeds under the No Action Alternative range from 16.8 to 22.3 mph. There would be a small reduction in speeds using the lower level or upper level of the Verrazzano-Narrows Bridge, but the change in speeds would be small and not noticeable. The projected increase in traffic volume is small and within 5 percent and the increase in delay would be less than 10 seconds which would be well below the 2.5-minute threshold; therefore, there would not be an adverse traffic effect during the PM peak hour.

In summary, Tolling Scenario D would result in increases in traffic volumes westbound on the Verrazzano-Narrows Bridge during the AM, MD, and PM peak hours of 32/201/75 vehicles at the lower level and 64/256/97 vehicles at the upper level, respectively. These increases in traffic volumes are relatively small and would not have an appreciable effect on travel times, delays, speeds, and densities. The LOS would remain the same during all time periods for all highway segments operating at LOS B/C during the AM and MD peak hours and LOS E/F during the PM peak hour. The increase in delay would be under 10 seconds for all time periods which would be well under the 2.5-minute threshold; therefore, Tolling Scenario D (and Tolling Scenarios E and F), would have no adverse traffic effect along the Verrazzano-Narrows Bridge and the Staten Island Expressway during any time period under the SEQRA criteria. Tolling Scenarios A, B, C, and G, with Lower Manhattan CBD tolls, would be expected to create less diversions than the tolling scenarios with the largest increase in traffic; therefore, these tolling scenarios would also not result in adverse traffic effects.

4B.4.5 I-78 and Route 139 Approach to the Holland Tunnel

The Holland Tunnel is a major gateway between New Jersey and Lower Manhattan with access from I-78 and Route 139, and connections from the New Jersey Turnpike, the Garden State Parkway, and local streets in New Jersey (**Figure 4B-6**).

The highway analysis examined only the Manhattan-bound direction where delays and queues occur along I-78 and Route 139, including the four intersections along 12th Street in Jersey City, just west of the tunnel. The New Jersey-bound traffic was not analyzed because the highways in New Jersey generally operate with less congestion and the volumes are constrained by the tunnel at the Manhattan approaches. However, the Manhattan approaches to the Holland Tunnel are examined as part of the local traffic analysis.

AFFECTED ENVIRONMENT

The highway segment analysis of the existing conditions was performed using a Vissim microsimulation model calibrated to actual volumes and speeds based on data provided by StreetLight Data, Inc. The existing volumes were based on 2019 transaction data. The model provides several important performance metrics including travel time (seconds), travel speed (mph), and maximum queue length (feet).

Table 4B16 presents a summary of existing conditions during the weekday AM, MD, and PM peak hours. The Vissim network for this highway segment includes intersections in New Jersey that were also analyzed separately using the Synchro traffic model (**Section 4B.6**).

On a typical weekday, the Holland Tunnel carries 86,800 vehicles (41,800 Manhattan-bound and 45,000 New Jersey-bound). The peak hourly Manhattan-bound traffic volumes for the highway approaches are:

- 3,103 AM peak hour
- 2,439 MD peak hour
- 2,977 PM peak hour

The average speeds along I-78 approaching the Holland Tunnel are 7.0 mph, 12.3 mph, and 8.1 mph during the AM, MD, and PM peak hours, respectively. The average speeds along Route 139 approaching the Holland Tunnel are 6.8 mph, 10.9 mph, and 8.6 mph during the AM, MD, and PM peak hours, respectively.

The maximum queue lengths along I78, as measured west from the intersection at Jersey Avenue, are approximately 529 feet, 293 feet, and 444 feet during the AM, MD, and PM peak hours, respectively. The queue lengths along NJ Route 139, also measured from the intersection at Jersey Avenue, are generally much lower in the AM peak hour and there is no queue in the MD and PM peak hours. The signalized arterial roadway segment between Jersey Avenue and the Holland Tunnel portal is typically congested during the AM, MD, and PM peak hours. These intersections along this segment were analyzed using Synchro traffic model and are included in the intersection traffic analysis (**Section 4B.6).**

Figure 4B-6. Highways Leading to the Holland Tunnel

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-16. Existing Conditions: I-78 and Route 139

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (Noon to 1 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
I-78	1,175	889	1,127
Route 139	1,928	1,550	1,850
Travel Time (min:sec)			
I-78	09:19	05:19	08:05
Route 139 Local	07:53	04:52	06:11
Route 139 Express	08:21	04:59	06:21
Travel Speed (miles per hour)			
I-78	7.0	12.3	8.1
Route 139 Local	6.8	10.9	8.6
Route 139 Express	6.4	10.7	8.4
Maximum Queue (feet)			
I-78	529	293	444
Route 139 Local	114	0	0
Route 139 Express	434	0	0

Source: WSP USA, 2022.

Based upon the results of the BPM regional model for Tolling Scenario D (the tolling scenario that would likely generate the greatest amount of adverse traffic effects), and subsequent post-processing to obtain hourly volumes, there would be a small net decrease in trips across the Holland Tunnel in the Manhattan-bound direction during the AM, MD, and PM peak hours; therefore, a qualitative assessment of potential adverse traffic effects was performed for the No Action Alternative and CBD Tolling Alternative.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the 2023 No Action Alternative and 2023 CBD Tolling Alternative (Tolling Scenario D), **Table 4B-17** presents a summary of the overall changes in traffic volume. There is little anticipated change between the existing and No Action Alternative conditions and the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and CBD Tolling Alternative for the tolling scenario that would likely generate the greatest amount of adverse traffic effects.

Table 4B-17. Holland Tunnel Eastbound Traffic Volumes during AM, MD and PM Peak Hours under Existing Conditions, No Action Alternative, and CBD Tolling Alternative

PEAK HOUR	EXISTING CONDITIONS	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (TOLLING SCENARIO D)
AM (8:00 a.m. to 9:00 a.m.)	3,103	3,109	3,060
MD (12:00 p.m. to 1:00 p.m.)	2,439	2,431	2,364
PM (5:00 p.m. to 6:00 p.m.)	2,977	2,975	2,912

Source: WSP USA, 2022.

Under the CBD Tolling Alternative, there would be a small reduction in traffic volumes during the AM, MD, and PM peak hours at the eastbound approaches to the Holland Tunnel and a small improvement in traffic operations; therefore, there would not be an adverse traffic impact during any peak hour as described below.

AM Results (8:00 a.m. to 9:00 a.m.)

During the AM peak hour, traffic volumes are projected to decrease by a total of 49 vehicles, with approximately 18 vehicles along I-78 and approximately 31 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (12:00 p.m. to 1:00 p.m.)

During the MD peak hour, traffic volumes are projected to decrease by a total of 67 vehicles, with approximately 24 vehicles along I-78 and approximately 43 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to decrease by a total of 63 vehicles, with approximately 24 vehicles along I-78, and approximately 39 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the PM peak hour.

In summary, there would be a net reduction in traffic volumes during the AM (-49), MD (-67), and PM (-63) peak hours at the Manhattan-bound approaches to the Holland Tunnel, and traffic operations would be expected to improve slightly; therefore, there would be no adverse effects as a result of Tolling Scenarios D, E, and F during the AM, MD, and PM peak hours. The net traffic reductions for Tolling Scenarios A, B, C, and G would be expected to be greater than under the remaining tolling scenarios; therefore, there would be expected to be a greater improvement in traffic operations. Since traffic volumes would decrease under all tolling scenarios, there would not be an adverse traffic effect at the Holland Tunnel and its approaches for any tolling scenario being considered.

4B.4.6 NJ Route 495 Approach to the Lincoln Tunnel

The Lincoln Tunnel is a major gateway to Midtown Manhattan from New Jersey. It provides direct access from NJ Route 495 and offers connections to and from the New Jersey Turnpike (I-95), Route 9, Route 3, and local streets in New Jersey (Figure 4B-7). In Manhattan, the Lincoln Tunnel provides connections to West 42nd Street, and south to West 30th Street and streets in between via the Lincoln Tunnel Expressway. In addition, the Lincoln Tunnel provides a direct connection for buses to the Port Authority Bus Terminal.

The highway analysis examined only the Manhattan-bound direction where delays and queues occur along NJ Route 495. The New Jersey-bound highway traffic generally operates with less congestion because the volumes are constrained by the tunnel at the Manhattan approaches (which are examined in Section 4B.6).

Figure 4B-7. Highways Leading to the Lincoln Tunnel

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

AFFECTED ENVIRONMENT

A qualitative highway segment analysis was performed because a reduction in traffic is projected by the BPM during the AM, MD, and PM peak hours. **Table 4B-18** presents a summary of the existing conditions during the weekday AM, MD, and PM peak hours.

Table 4B-18. Existing Conditions: New Jersey Route 495 Approach to the Lincoln Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
Helix to Lincoln Tunnel Entrance	1,725	1,631	771
Exclusive Bus Lane (XBL) to Lincoln Tunnel Entrance	512		
Local Ramps to Lincoln Tunnel Entrance	1,753	714	1,005
Processed Hourly Volume			
Helix to Lincoln Tunnel Entrance	1,731	1,577	775
XBL to Lincoln Tunnel Entrance	492		
Local Ramps to Lincoln Tunnel Entrance	1,541	729	957
Travel Time (min:sec)			
Helix to Lincoln Tunnel Entrance	10:45	09:47	02:03
XBL to Lincoln Tunnel Entrance	01:31		
Local Ramps to Lincoln Tunnel Entrance	02:23	00:55	04:38
Travel Speed (miles per hour)			
Helix to Lincoln Tunnel Entrance	3.5	3.9	18.4
XBL to Lincoln Tunnel Entrance	25.9		
Local Ramps to Lincoln Tunnel Entrance	6.5	17.0	3.4
Maximum Queue (feet)			
Helix to Lincoln Tunnel Entrance	8,443	951	32
XBL to Lincoln Tunnel Entrance	0		
Local Ramps to Lincoln Tunnel Entrance	1,289	0	1,681
Density (pc/mi/ln)			
Helix to Lincoln Tunnel Entrance	175	168	10
XBL to Lincoln Tunnel Entrance	19		
Level of Service (LOS)			
Helix to Lincoln Tunnel Entrance	F	F	A
XBL to Lincoln Tunnel Entrance	C	—	—

Source: WSP USA, 2022.

Based upon the results of the BPM for Tolling Scenario D, and subsequent post-processing to obtain hourly volumes, there would likely be a small decrease in trips across the Lincoln Tunnel in the Manhattan-bound direction during the AM, MD, and PM peak hours; therefore, a qualitative assessment of potential adverse traffic effects was performed for the CBD Tolling Alternative.

On a typical weekday, the Lincoln Tunnel carries 117,200 vehicles (53,900 Manhattan-bound and 63,300 New Jersey-bound). The following are peak hourly Manhattan-bound traffic volumes:

- 3,990 AM peak hour
- 2,345 MD peak hour
- 1,776 PM peak hour

The average speeds along the helix segment approaching the Lincoln Tunnel are 3.5 mph, 3.9 mph, and 18.4 mph during the AM, MD, and PM peak hours, respectively. The contra-flow XBL converts a New Jersey-bound general traffic lane on I-495 to serve as a Manhattan-bound bus-only lane. The XBL is in effect only during the AM peak period, and buses operate at an average speed of 25.9 mph during the AM peak hour. The general-purpose traffic entrance ramp from Park Avenue in Weehawken, New Jersey, has an average speed of 6.5 mph, 17.0 mph, and 3.4 mph during the AM, MD, and PM peak hours, respectively. The maximum queue lengths along NJ Route 495, measured west of the Lincoln Tunnel portal in New Jersey, are approximately 8,443 feet, 951 feet, and 32 feet during the AM, MD, and PM peak hours, respectively. The queue lengths along the entrance ramp from Park Avenue in Weehawken are approximately 1,289 feet, 0 feet, and 1,681 feet during the AM, MD, and PM peak hours, respectively. The NJ Route 495 approach to the Lincoln Tunnel operates at LOS F during the AM and MD peak hours and at LOS A during the PM peak hour.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-19** presents a summary of the overall changes in traffic volume at the Lincoln Tunnel approaches for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was derived from 2018 transaction data and adjusted to 2019 values. There is little anticipated change between existing and No Action Alternative conditions, and the assessment summarized below describes the incremental change traffic volumes between the No Action Alternative and Tolling Scenario D.

Table 4B-19. Lincoln Tunnel Traffic Volumes during AM, MD and PM Peak Hours under Existing Conditions, No Action Alternative, and CBD Tolling Alternative

PEAK HOUR	EXISTING CONDITIONS	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)
AM (8:00 a.m. to 9:00 a.m.) (including Exclusive Bus Lane)	3,990	3,955	3,869
MD (1:00 p.m. to 2:00 p.m.)	2,345	2,338	2,190
PM (5:00 p.m. to 6:00 p.m.)	1,776	1,780	1,706

Source: WSP USA, 2022.

In summary, there would be a net reduction in traffic volumes during the AM (-86), MD (-148), and PM (-74) peak hours at the Manhattan-bound approaches to the Lincoln Tunnel, and traffic operations would be expected to improve slightly; therefore, there would be no adverse effects as a result of Tolling Scenarios D, E, and F during the AM, MD, and PM peak hours. The net traffic reductions for Tolling Scenarios A, B, C, and G would be expected to be greater than under the remaining tolling scenarios; therefore, there would be expected to be a greater improvement in traffic operations. Since traffic volumes would decrease under all tolling scenarios, there would not be an adverse traffic effect at the Lincoln Tunnel and its approaches for any of the tolling scenarios being considered.

AM Results (8:00 a.m. to 9:00 a.m.)

During the AM peak hour, traffic volumes are projected to decrease by approximately 43 vehicles along the helix and 43 vehicles along the Park Avenue ramp, resulting in a small improvement in traffic operations. No additional buses are anticipated on the XBL, which comprises approximately 2.2 percent of total AM peak-hour traffic. Therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

During the MD peak hour, traffic volumes are projected to decrease by approximately 74 vehicles along the helix and 74 vehicles along Park Avenue ramp, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to slightly decrease, by approximately 37 vehicles along the helix and 37 vehicles along Park Avenue ramp, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the PM peak hour.

4B.4.7 Trans-Manhattan/Cross Bronx Expressway between the George Washington Bridge and I-87

The George Washington Bridge is a major crossing carrying I-95 and US Routes 1 and 9 across the Hudson River for trips between New Jersey and Manhattan as well as the Bronx, Queens, and Brooklyn. I-95 continues along segments known as the Trans-Manhattan Expressway and the Cross Bronx Expressway and provides connections to the Henry Hudson Parkway, Major Deegan Expressway, Harlem River Drive, and other local streets and highways (**Figure 4B-8**).

The highway analysis examines only the outbound (westbound/New Jersey-bound) direction of the Trans-Manhattan Expressway where it enters the George Washington Bridge (the convergence and maximum accumulation of vehicles from the feeder roadways to the George Washington Bridge). The BPM forecasts the traffic volumes under the representative tolling scenario in the inbound (eastbound) direction to be lower; therefore, the eastbound direction was not analyzed.

In the outbound (westbound) direction increases in vehicular trips are anticipated to occur along the major connections to the bridge approach due to circumferential diversion of through Manhattan CBD traffic taking advantage of the toll-free trans-Hudson crossings in the westbound direction to avoid the CBD toll.

Projections of changes in traffic volumes along the Trans-Manhattan/Cross Bronx Expressway as well as other feeder routes to the George Washington Bridge are based on existing bridge volume data, BPM projections of changes in traffic volumes, and travel patterns derived from data provided by StreetLight Data, Inc. used to determine the distribution of traffic using the George Washington Bridge.

Figure 4B-8. Highways Leading to the Trans-Manhattan/Cross Bronx Expressway

CBD Tolling Zone

Principal Arterials

Area of Analysis

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Due to the lack of availability of an existing calibrated highway traffic model and gaps in the pre-COVID-19 pandemic traffic data, the analysis of the Trans-Manhattan/Cross Bronx Expressway relies on a combination of analytical quantitative and qualitative evaluation of potential adverse effects. The potential traffic effects along the Trans-Manhattan/Cross Bronx Expressway corridor were estimated from the Long Island Expressway Vissim model with appropriate adjustments for the relative increase in traffic volumes and the initial No Action speeds

AFFECTED ENVIRONMENT

On a typical weekday, the George Washington Bridge carries approximately 300,000 vehicles (145,000 Manhattan-bound and 155,000 New Jersey-bound). The peak-hour westbound/New Jersey-bound traffic volumes for the bridge are:

- 7,028 AM peak hour
- 8,315 MD peak hour
- 9,660 PM peak hour

ENVIRONMENTAL CONSEQUENCES

The incremental changes in traffic resulting from the CBD Tolling Alternative were assigned to the highways leading to the George Washington Bridge using data provided by StreetLight Data, Inc. For each time period, estimates were made as to where the majority of traffic originated from before combining along the Trans-Manhattan Expressway. Over the course of the day, the majority of traffic destined to the George Washington Bridge in the westbound direction comes from the Cross Bronx Expressway, Harlem River Drive, Henry Hudson Parkway and Major Deegan Expressway. **Table 4B-20** presents the proportion of traffic along these main roadways that lead to the George Washington Bridge.

Table 4B-20. Roadway Contribution by Time Period to George Washington Bridge Traffic

HIGHWAY CONNECTIONS TO GEORGE WASHINGTON BRIDGE	AM PEAK (6 a.m. to 10 a.m.) % Traffic	MD PEAK (10 a.m. to 4 p.m.) % Traffic	PM PEAK (4 p.m. to 8 p.m.) % Traffic
Harlem River Drive	29.5%	42.4%	36.7%
Cross Bronx Expressway – Westbound	43.7%	26.6%	26.1%
Henry Hudson Parkway (north- and southbound)	12.9%	17.7%	24.4%
Major Deegan Expressway (north- and southbound)	13.8%	13.4%	12.7%
TOTAL	**100.0%**	**100.0%**	**100.0%**

Source: StreetLight Data, Inc. (2019) and WSP analysis.

Under Tolling Scenario D, there would be increases in traffic across the George Washington Bridge in the westbound/New Jersey-bound direction during the AM, MD, and PM peak hours of 87, 826, and 414 vehicles, respectively. These increases would affect routes feeding the George Washington Bridge, including the Henry Hudson Parkway, the Trans-Manhattan Expressway westbound, the Harlem River Drive, the Major Deegan Expressway, and the Cross Bronx Expressway westbound. **Table 4B-21** summarizes the incremental changes in westbound/New Jersey-bound traffic along the major highways leading to the George Washington Bridge.

Table 4B-21. Projected Increase in Traffic, compared to the No Action Alternative, along Trans-Manhattan and Cross Bronx Expressway Corridor

FACILITY/HIGHWAY	PEAK-HOUR VEHICLES		
	AM	MD	PM
George Washington Bridge	**87**	**826**	**414**
From Henry Hudson Parkway	11	146	101
Trans-Manhattan Expressway	**76**	**680**	**313**
From Harlem River Drive	26	350	152
From Major Deegan Expressway	12	110	53
Cross Bronx Expressway	**38**	**220**	**108**

Source: 2019 Port Authority of New York and New Jersey traffic data at the George Washington Bridge, 2019 StreetLight Data, Inc. origin-destination data, and WSP analysis.

An analytical and qualitative assessment of anticipated traffic effects is presented below during the AM, MD, and PM peak hours based upon the estimated increases in peak hour volumes and estimated levels of congestion.

AM Results (7:00 a.m. to 8:00 a.m.)

During the AM peak hour, traffic volumes are projected to increase by approximately 87 vehicles on the George Washington Bridge, which would be a 1.2 percent increase over existing volumes. Approximately 11 vehicles would be added to the Henry Hudson Parkway, 26 vehicles to Harlem River Drive, 12 vehicles to the Major Deegan Expressway, and 38 vehicles to the Cross Bronx Expressway westbound. These small increases in traffic volumes are well within 5 percent and there would not be a noticeable change in speeds and travel times during the AM peak hour; therefore, there would not be an adverse effect under SEQRA.

MD Results (3:00 p.m. to 4:00 p.m.)

During the MD peak hour, traffic volumes are projected to increase by approximately 826 vehicles on the George Washington Bridge, which would be an 8.8 percent increase over existing volumes. Approximately 146 vehicles would be added to the Henry Hudson Parkway, 350 vehicles to Harlem River Drive, 110 vehicles to the Major Deegan Expressway, and 220 vehicles to the Cross Bronx Expressway westbound. It is expected that delays and travel times along these roadways would increase during the MD peak hour. Along the Cross Bronx Expressway and the Trans-Manhattan Expressway, the increases in projected volumes would be considered an adverse effect under the volume increase criteria of greater than 5 percent used to determine adverse effects under SEQRA.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc.. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase more than 2.5 minutes.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to increase by approximately 414 vehicles on the George Washington Bridge, which would be a 4.3 percent increase over existing volumes. Approximately 101 vehicles would be added to the Henry Hudson Parkway, 152 vehicles to Harlem River Drive, 53 vehicles to the Major Deegan Expressway, and 108 vehicles to the Cross Bronx Expressway westbound. These relatively small increases in traffic volumes would be within the 5 percent threshold, and there would not be an adverse effect under SEQRA.

4B.4.8 FDR Drive/Lower East Side—East 10th Street to the Brooklyn Bridge

ENVIRONMENTAL CONSEQUENCES

As with the Trans-Manhattan/Cross Bronx Expressway corridor, to be able to appropriately address the questions and concerns expressed by communities affected by any traffic changes in this corridor, additional traffic counts were obtained to complete further analysis. Under the CBD Tolling Alternative, the FDR Drive would experience a net decline in traffic at 60th Street, resulting in improved travel times and operating conditions along the upper FDR Drive and the segment between East 23rd Street and East 60th Street. However, the lower FDR Drive between East 10th Street and the Brooklyn Bridge would experience a net increase in traffic, with diverted traffic greater than the suppression of traffic due to CBD tolling. Under all tolling scenarios, the FDR Drive would become a more competitive route for some origin-destination pairs, thereby offsetting the overall decline in projected traffic along the FDR Drive in this specific area south of East 10th Street.

The highest projected increase in traffic along the lower FDR Drive would occur under Tolling Scenarios D, E, and F, which have the highest levels of discounts, exemptions, and crossing credits and therefore the highest tolls that would result in the greatest levels of diversions and changes in travel patterns. The BPM analyses showed a potential 5 percent to 9 percent increase in daily traffic volumes along the northbound FDR Drive and a 19 percent to 26 percent increase in daily traffic volumes along the southbound FDR Drive in the section between East 10th Street and the Brooklyn Bridge.

Based upon a select link analysis[21] of the lower FDR Drive, the net increase in traffic in this segment would come from three primary markets:

- **Queens:** Under the CBD Tolling Alternative, with the reduction in lanes along the BQE as part of the No Action Alternative from three lanes to two lanes in each direction, some trips from Queens to Brooklyn would divert to the Ed Koch Queensboro Bridge upper level, then to the southbound FDR Drive, and then to the Brooklyn Bridge (or Hugh L. Carey Tunnel) to bypass congestion on the BQE. This alternate routing, a toll-free route, would become more attractive under the CBD Tolling Alternative due to an overall reduction of traffic along the upper portion of the FDR Drive between 60th Street and West 23rd Street. The higher the CBD toll, the more traffic would be suppressed along the upper FDR Drive and the more attractive the FDR Drive becomes as a toll-free alternative to the BQE for travel between Queens and Brooklyn. The BPM does not show a northbound diversion from Brooklyn to Queens trips because this route would be tolled under all tolling scenarios because it would require re-entry into the CBD zone via a local street to access one of the East River crossings to Queens.
- **The Bronx:** Some trips between Bronx and Brooklyn would use the FDR Drive as an alternate to the congested BQE via the Third Avenue Bridge and the Willis Avenue Bridge, which would provide a toll-free connection between the Major Deegan Expressway (I-87) and the FDR Drive.
- **North Bergen County:** Some trips between North Bergen County and Brooklyn would divert to the FDR Drive as an alternative to the West Side Highway/Route 9A and local streets used to access the Brooklyn Bridge.

Table 4B-22 summarizes the changes in traffic volumes along the FDR Drive between East 10th Street and the Brooklyn Bridge.

21 A select link analysis examines all trips using a particular highway segment and tracks the volume of traffic using the link from each origin-destination zone. This type of analysis allows a detailed review of travel pattern and routing changes.

Table 4B-22. Estimated Increase of Traffic on the Lower FDR Drive*

PERIOD		NORTHBOUND		SOUTHBOUND	
		Low	High	Low	High
AM	Peak Period	1,586	1,871	1,947	2,735
	Peak Hour	324	370	294	356
MD	Peak Period	1,219	1,535	2,524	4,117
	Peak Hour	249	313	281	458
PM	Peak Period	83	403	1,776	2,918
	Peak Hour	61	231	404	666
Daily		2,352	4,472	8,845	12,145

Source: WSP USA, 2022.
Notes:
1. Daily volumes will not equal peak-period increments due to values being pulled from differing tolling scenarios.
2. Peak-period increments are from the BPM (unadjusted).
3. Peak-hour volumes are estimated using an average and adjusted for accuracy.
4. Low = Tolling Scenarios A, B, C, and G
5. High = Tolling Scenarios D, E, and F

* NYCDOT reduced the number of lanes on the BQE from three lanes to two lanes in each direction on August 30, 2021, between Atlantic Avenue and Sands Street, to preserve the life of the cantilever structure. This has caused some motorists to divert to the FDR Drive. The Project is expected to cause additional motorists to divert to the FDR Drive to avoid congestion along the BQE.

AM Peak Hour (8:00 a.m. to 9:00 a.m.)

In the northbound direction, the AM peak-hour volume is expected to increase by about 324 to 370 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the AM peak and it is anticipated that the additional traffic can be accommodated. In the southbound direction, the AM peak-hour volume is expected to increase by about 294 to 356 vehicles. Typically, traffic flows freely along the lower FDR Drive in the southbound direction during the AM peak, and it is anticipated that the additional traffic can be accommodated for all tolling scenarios.

MD Peak Hour (1:00 p.m. to 2:00 p.m.)

In the northbound direction, the MD peak-hour volume is expected to increase by about 249 to 313 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the MD peak and it is anticipated that the additional traffic can be accommodated. In the southbound direction, the peak-hour volume is expected to increase by about 281 to 458 vehicles. Typically, traffic flows freely along the lower FDR Drive in the southbound direction during the MD peak, and it is anticipated that the additional traffic can be accommodated for all tolling scenarios.

PM Peak Hour (5:00 p.m. to 6:00 p.m.)

In the northbound direction, the PM peak-hour volume is expected to increase by about 61 to 231 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the PM peak and it is anticipated that the additional traffic can be accommodated for all scenarios, aside from Tolling Scenario B. Under this tolling scenario, the projected increase in traffic volume would be marginally above the 5 percent threshold (at 5.8 percent), resulting in potential adverse effects.

In the southbound direction, the PM peak-hour volume is expected to increase by about 404 to 666 vehicles, depending on the tolling scenario. Typically, there is severe congestion along the lower FDR Drive in the southbound direction during the PM peak, and it is not anticipated that the additional traffic can be accommodated without adverse effects. Since the FDR Drive southbound is congested during the PM peak hour and the increase in volume would exceed the 5 percent threshold, an adverse traffic effect is projected.

In summary, all tolling scenarios would result in increases in daily and peak-hour traffic along the lower FDR Drive, between East 10th Street and the Brooklyn Bridge by more than the 5 percent threshold. Tolling Scenarios A, B, and G are generally anticipated to have lower potential increases in traffic volumes, and Tolling Scenarios D, E, and F are anticipated to have higher increases in traffic volumes, with some variation based on direction. Tolling Scenario C is anticipated to have increases in traffic volumes somewhere in the middle.

In the northbound direction, projected increases in traffic volumes would be lower than in the southbound direction, and there is capacity along the lower FDR Drive to handle some or all of the additional traffic without causing adverse effects during the AM and MD peak hours. However, during the PM peak hour, it is not anticipated that the additional traffic can be accommodated without some potential adverse effects under Tolling Scenario B. However, the adverse effects in the northbound direction are expected to be marginal.

In the southbound direction, potential diversions to the FDR Drive would be higher. Typically, traffic moves freely in this segment, except during the PM peak period when there is severe congestion. It is anticipated that sufficient reserve capacity is available to handle the expected increase in traffic during the AM and MD peak hours for some of the tolling scenarios without adverse effects. However, during the PM peak hour when traffic congestion is prevalent, it is not anticipated that the additional traffic can be accommodated without adverse effects. Therefore, an adverse traffic effect is projected during the PM peak hour in the southbound direction.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc.. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase more than 2.5 minutes. Although some increases in traffic volumes and travel times are expected along the Long Island Expressway, there would be comparable decreases in traffic volumes and travel times and delays for motorists using the Queensboro Bridge along its approaches in Manhattan and Queens, which would see a higher reduction in traffic volumes under Tolling Scenario D.

4B.4.9 Bayonne Bridge

AFFECTED ENVIRONMENT

The highway segment analysis was performed using an HCS with incremental volumes from BPM analyses. The analysis provides performance metrics including speed, density (in passenger cars per mile per lane) and overall LOS. **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of existing, No Action Alternative, and CBD Tolling Alternative (Tolling Scenario D) conditions during the weekday AM, MD, PM, and late night (LN) peak hour. A map of the analyzed location is shown in **Figure 4B-9.**

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26**present a summary of the overall changes in traffic volume at the Bayonne Bridge for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from BPM. There is little anticipated change between the No Action Alternative and CBD Tolling Alternative (Tolling Scenario D), the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

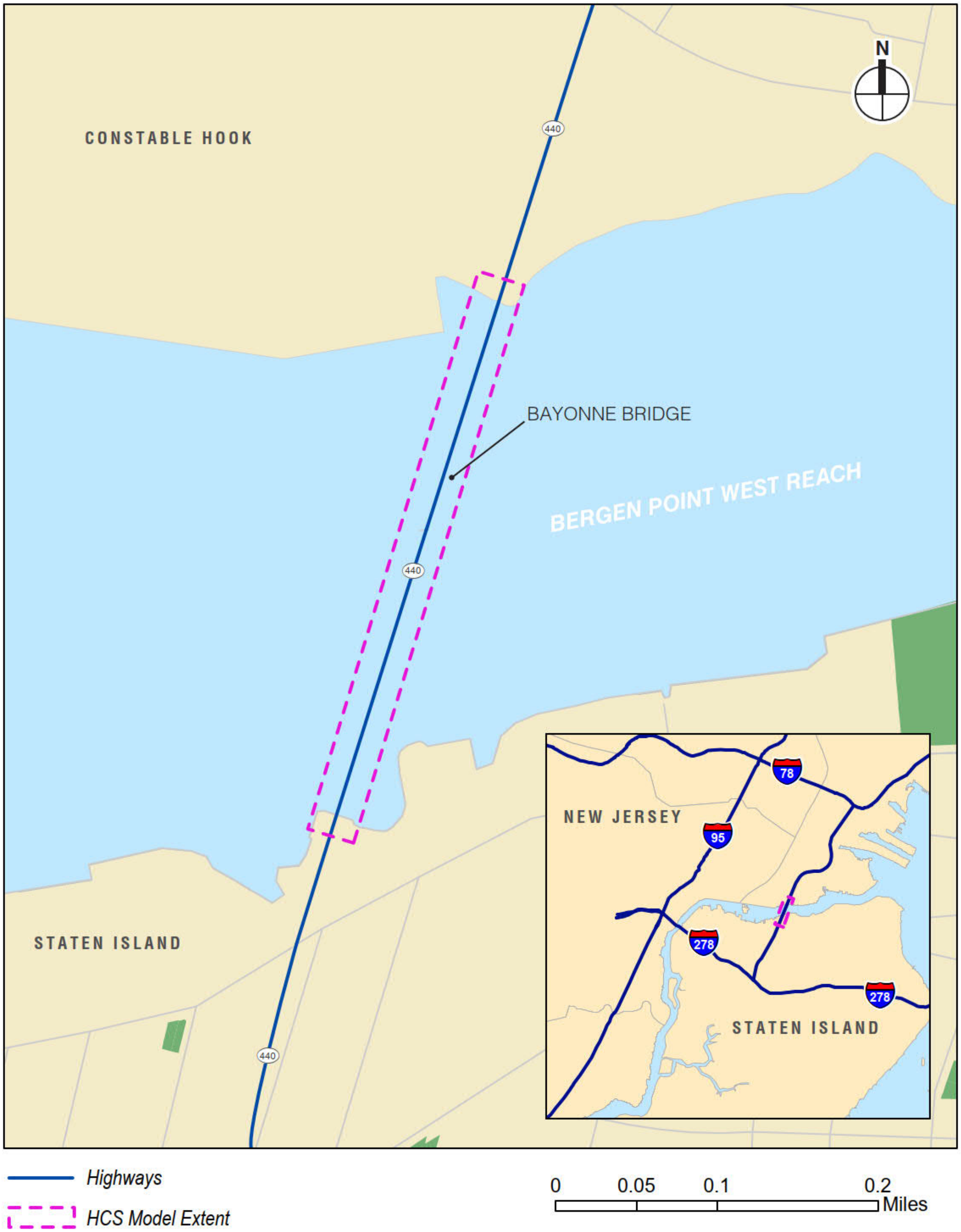
In summary, there would be a net increase in northbound traffic volumes during the AM (376), MD (317), PM (213), and LN (54) peak hours at the Bayonne Bridge. There would be a net increase in southbound traffic volumes during the AM (81), MD (97), PM (148), and LN (1) peak hours at the Bayonne Bridge. There would be no adverse effects as a result of the tolling scenarios with the largest traffic increases during the AM, MD, PM, and LN peak hours. Since traffic volumes would increase by less under the other tolling scenarios, there would not be an adverse traffic effect for any of the tolling scenarios being considered.

AM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 376 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 4.9 pc/mi/ln and the LOS would decrease from LOS B to LOS C. Under the SEQRA criteria, LOS C during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 81 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1 pc/mi/ln and the LOS would decrease from LOS A to LOS B. Under the SEQRA criteria, LOS B during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Figure 4B-9. Highways Leading to the Bayonne Bridge



Source: WSP USA, 2022.

MD Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 317 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 4.3 pc/mi/ln and the LOS would decrease from LOS A to LOS B. Under the SEQRA criteria, LOS B during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 97 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1.3 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

PM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 213 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 2.8 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 148 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1.8 pc/mi/ln and the LOS would remain LOS B. Under the SEQRA criteria, LOS B during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

LN Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 54 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 0.7 pc/mi/ln and the LOS service would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately one vehicle heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 0 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

4B.4.10 Eastern Spur of I-95 New Jersey Turnpike

AFFECTED ENVIRONMENT

The highway segment analysis was performed using an HCS with existing volumes from BPM analyses. The analysis provides performance metrics including density (in passenger cars per mile per lane) and overall LOS. Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26 present a summary of existing, No Action Alternative, and CBD Tolling Alternative Scenario D conditions during the weekday AM, MD, PM, and LN peak hour. A map of the analyzed location is shown in Figure 4B-10.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26 present a summary of the overall changes in traffic volume at the I-95 eastern spur for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from the BPM. There is little anticipated change between the No Action Alternative and CBD Tolling Alternative Tolling Scenario D. The assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

In summary, there would be a net increase in northbound traffic volumes during the AM (53), MD (63), PM (80) peak hour and a net decrease during the LN (-16) peak hour at the Bayonne Bridge. There would be a net increase in southbound traffic volumes during the AM (98), MD (218), PM (56), and LN (104) peak hours at the Eastern Spur of the New Jersey Turnpike. There would be no adverse effects as a result of the tolling scenarios with the largest increases in traffic volumes during the AM, MD, PM, and LN peak hours. Since traffic volumes would increase by less under the other tolling scenarios, there would not be an adverse traffic effect for any of the tolling scenarios being considered.

AM Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 53 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

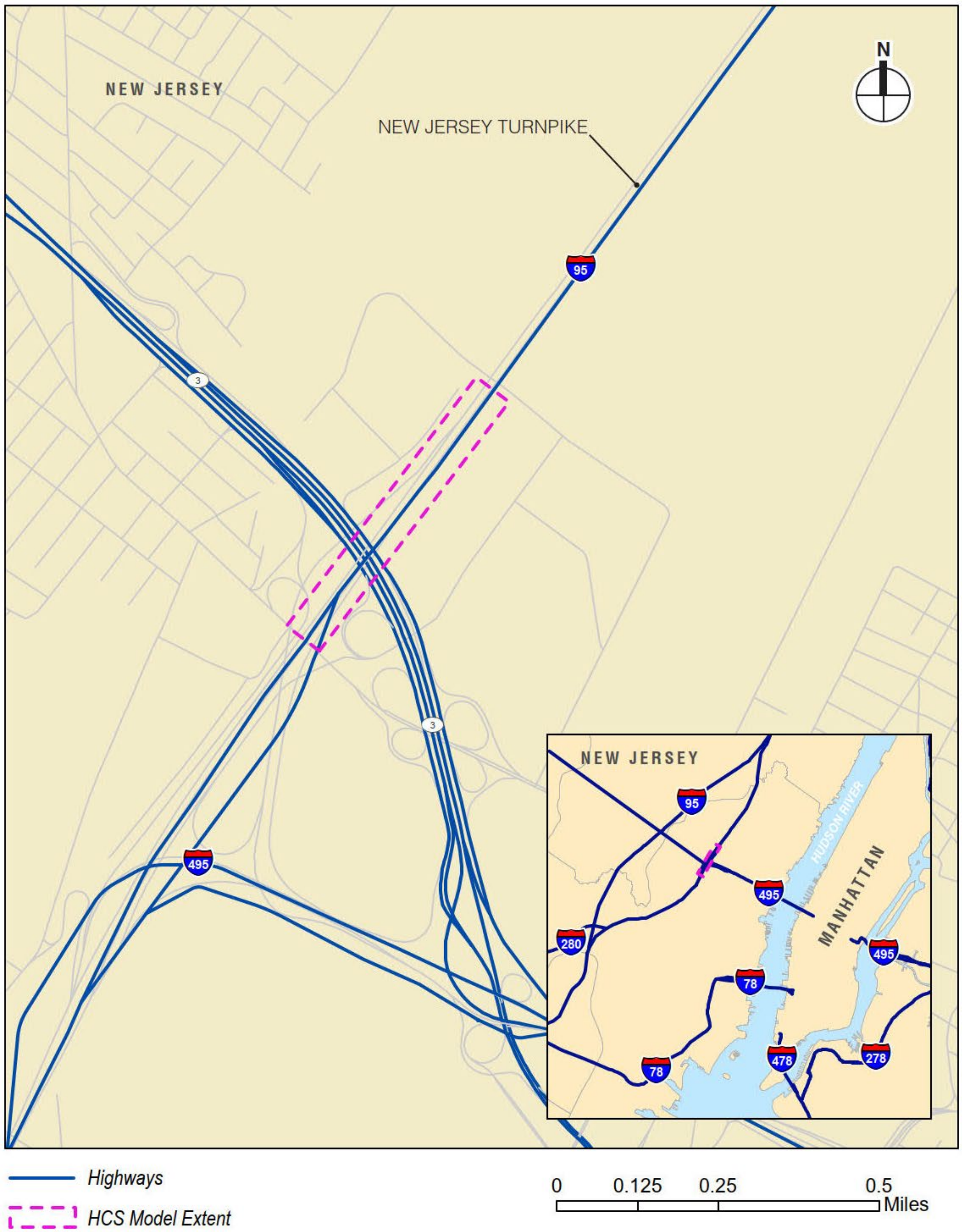
Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 98 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.6 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

MD Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 63 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 218 vehicles. This would result in the southbound density along I-95 to increase by approximately 1.7 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Figure 4B-10. Highways Leading to the Eastern Spur of I-95



Source: WSP USA, 2022.

PM Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 80 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.5 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 56 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

LN Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to decrease by approximately 16 vehicles. This would result in the northbound density along I-95 to decrease by approximately 0.2 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and therefore is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 104 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.8 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

4B.4.11 RFK Bridge between Queens and Ramps to/from Manhattan

AFFECTED ENVIRONMENT

The highway segment analysis was performed using the HCS with existing volumes and incremental volumes from BPM analyses. The analysis provides performance metrics including density (in passenger cars per mile per lane) and overall LOS. **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of existing, No Action Alternative, and CBD Tolling Alternative Scenario D conditions during the weekday AM, MD, PM, and LN peak hour. **Figure 4B-11** shows the analyzed location.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of the overall changes in traffic volume at the RFK Bridge (between Queens and ramps to/from Manhattan) for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from BPM. There is an anticipated change between the No Action Alternative and Tolling Scenario D, the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

In summary, there would be a net increase in northbound traffic volumes during the AM (508), MD (261), PM (634), and LN (93) peak hours at the RFK Bridge. There would be a net increase in southbound traffic volumes during the AM (396), MD (474), PM (612), and LN (598) peak hours at the RFK Bridge. There would be potential change in LOS from D to marginally E under the tolling scenarios with the largest increases in local traffic volumes during the AM and PM peak hours. However, the speeds would remain about the same or slightly lower at approximately 40 mph and delays would be below the 2.5-minute threshold. Therefore, there would not be an adverse effect at the RFK under any of the tolling scenarios in both the northbound and southbound directions. Therefore, there would not be an adverse traffic effect at the RFK Bridge.

AM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 508 vehicles heading into Manhattan or Bronx. This would result in the northbound density along I-278 to increase by approximately 3.6 pc/mi/ln. There would be potential change in LOS from D to marginally E under the tolling scenarios with the largest increases in traffic volumes. However, the speeds would remain about the same at approximately 40 mph and increases in delays would be below the 2.5-minute threshold; therefore, there would not be an adverse traffic effect during the AM in the northbound direction. Traffic in the southbound direction is projected to increase by approximately 396 vehicles heading into Queens. This would result in the southbound density along I-278 to increase by approximately 2.7 pc/mi/ln. There would be a potential change in LOS from D to marginally E under the tolling scenarios with the largest increases in traffic volumes. However, the speeds would remain about the same at approximately 40 mph and increases in delays would be below the 2.5-minute threshold; therefore, there would not be an adverse traffic effect during the AM in the southbound direction.

Table 4B-23 summarizes the changes in traffic volumes, density, and LOS between existing conditions, the No Action Alternative, and the CBD Tolling Alternative (Tolling Scenario D) for the Bayonne Bridge, RFK Bridge, and I-95 Eastern Spur for the AM time period.

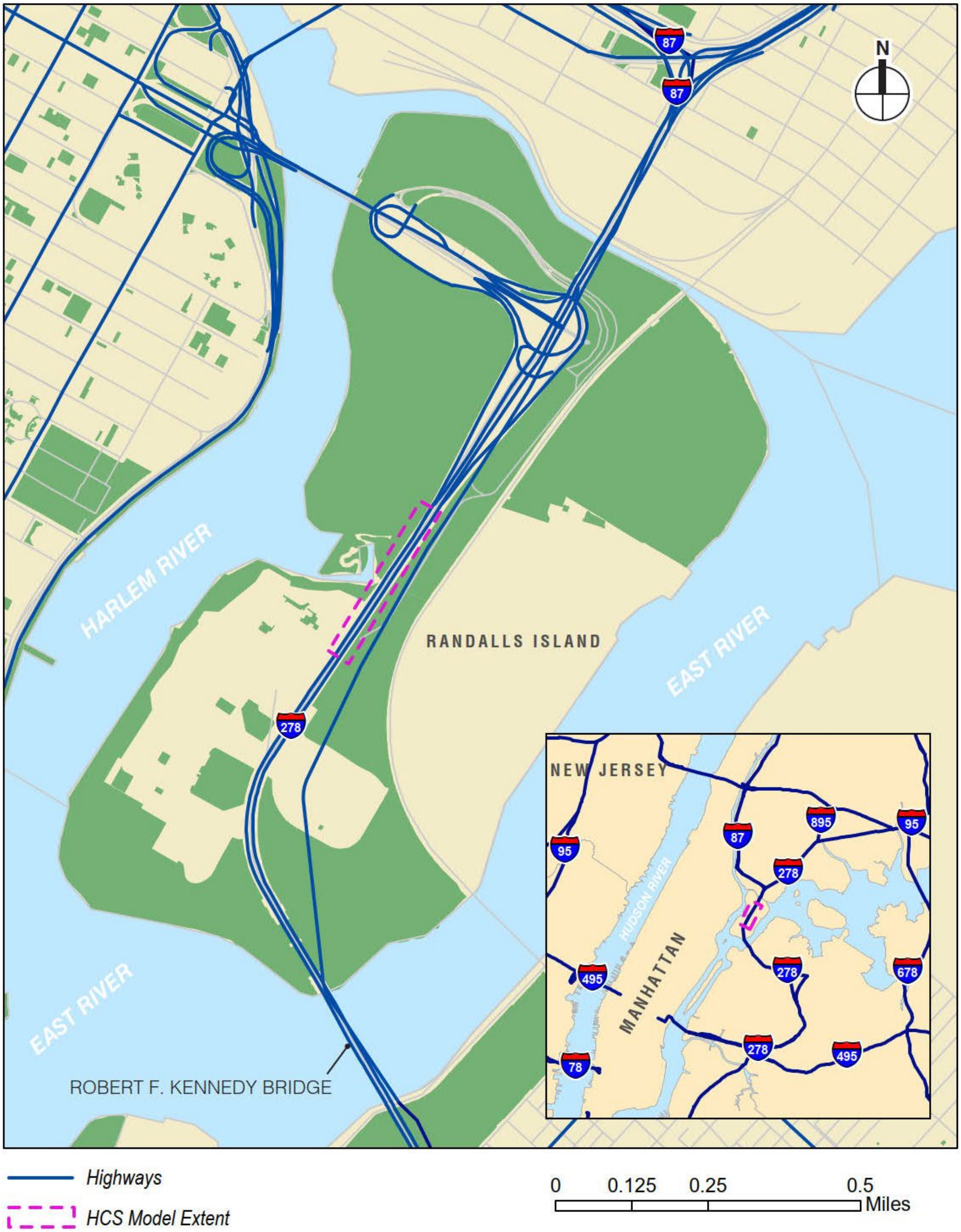
MD Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 261 vehicles heading into Manhattan or Bronx. This would result in the northbound density along I-278 to increase by approximately 2.4 pc/mi/ln and the LOS would remain LOS D. Speeds would remain about the same at 40 mph and the increase in delay would be small and well below the 2.5-minute threshold.

Traffic in the southbound direction is projected to increase by approximately 474 vehicles heading into Queens. This would result in the southbound density along I-278 to increase by approximately 3.3 pc/mi/ln. and the LOS service would decrease from LOS C to D. Speeds would remain about the same at 40 mph or higher and the increase in delay would be small and well below the 2.5-minute threshold.

Table 4B-24 summarizes the changes in traffic volumes, density, and LOS between existing conditions, the No Action Alternative, and the CBD Tolling Alternative (Tolling Scenario D) for the Bayonne Bridge, RFK Bridge, and I-95 Eastern Spur for the MD time period.

Figure 4B-11. Highways Leading to the Robert F. Kennedy Bridge



Source: WSP USA, 2022.

Table 4B-23. Highway Capacity Software Performance Measures (AM)

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume					
Northbound	Bayonne Bridge	1,075	1,091	1,467	376
	RFK Bridge	4,452	4,575	5,083	508
	Eastern Spur I-95 (Pre-ramp)	152	152	208	56
	Merge from 495	641	660	657	-3
	Eastern Spur I-95 (Post-ramp)	793	811	865	53
Southbound	Bayonne Bridge	659	678	759	81
	RFK Bridge	4,951	5,127	5,524	396
	Eastern Spur I-95 (Pre-ramp)	1,063	1,145	1,244	98
	Diverge to 495	630	627	686	59
	Eastern Spur I-95 (Post-ramp)	433	519	558	39
Density (pc/mi/ln)					
Northbound	Bayonne Bridge	15.4	15.6	20.5	4.9
	RFK Bridge	31.1	32	35.6	3.6
	Eastern Spur I-95 (Pre-ramp)	1.4	1.4	1.8	0.4
	Merge from 495	8.2	8.4	8.6	0.2
	Eastern Spur I-95 (Post-ramp)	6.5	6.7	7.1	0.4
Southbound	Bayonne Bridge	10.5	10.8	11.8	1
	RFK Bridge	34.4	35.6	38.3	2.7
	Eastern Spur I-95 (Pre-ramp)	8.6	9.3	9.9	0.6
	Diverge to 495	4.9	5.2	5.6	0.4
	Eastern Spur I-95 (Post-ramp)	3.4	4.1	4.3	0.2
Level of Service (LOS)					
Northbound	Bayonne Bridge	B	B	C	—
	RFK Bridge	D	D	E	X
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Merge from 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—
Southbound	Bayonne Bridge	A	A	B	—
	RFK Bridge	D	E	E	X
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Diverge to 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—

Source: WSP USA, 2022.

Table 4B-24. Highway Capacity Software Performance Measures (MD)

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume					
Northbound	Bayonne Bridge	459	434	751	317
	RFK Bridge	4,325	4,381	4,642	261
	Eastern Spur I-95 (Pre-ramp)	225	195	237	42
	Merge from 495	572	569	590	21
	Eastern Spur I-95 (Post-ramp)	798	764	827	63
Southbound	Bayonne Bridge	592	585	683	97
	RFK Bridge	3,430	3,551	4,025	474
	Eastern Spur I-95 (Pre-ramp)	637	629	847	218
	Diverge to 495	596	586	646	60
	Eastern Spur I-95 (Post-ramp)	40	43	201	158
Density (pc/mi/ln)					
Northbound	Bayonne Bridge	7.4	7	11.3	4.3
	RFK Bridge	30.4	30.8	33.2	2.4
	Eastern Spur I-95 (Pre-ramp)	1.9	1.7	2	0.3
	Merge from 495	8.3	8.1	8.3	0.2
	Eastern Spur I-95 (Post-ramp)	6.8	6.5	6.9	0.4
Southbound	Bayonne Bridge	9.8	9.6	10.9	1.3
	RFK Bridge	24.7	25.6	28.9	3.3
	Eastern Spur I-95 (Pre-ramp)	5.4	5.3	7.0	1.7
	Diverge to 495	3	3	3.9	0.9
	Eastern Spur I-95 (Post-ramp)	0.4	0.4	1.5	1.1
Level of Service (LOS)					
Northbound	Bayonne Bridge	A	A	B	—
	RFK Bridge	D	D	D	—
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Merge from 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—
Southbound	Bayonne Bridge	A	A	A	—
	RFK Bridge	C	C	D	—
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Diverge to 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—

Source: WSP USA, 2022.

PM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 634 vehicles heading into Manhattan or Bronx. This would result in the northbound density along I-278 to increase by approximately 4.5 pc/mi/ln. There would be potential change in LOS from D to E under the analyzed tolling scenario with the highest increase in traffic. However, the speeds would remain about the same at approximately 40 mph or higher and the increase in delay would be small and well below the 2.5-minute threshold.

Traffic in the southbound direction is projected to increase by approximately 612 vehicles heading into Queens. This would result in the southbound density along I-278 to increase by approximately 4.1 pc/mi/ln and the LOS service would remain LOS D. However, the speeds would remain about the same at approximately 40 mph or higher and the increase in delay would be small and well below the 2.5-minute threshold.

Table 4B-25 summarizes the changes in traffic volumes, density, and LOS between existing conditions, the No Action Alternative, and the CBD Tolling Alternative (Tolling Scenario D) for the Bayonne Bridge, RFK Bridge, and I-95 Eastern Spur for the PM time period.

LN Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 93 vehicles heading into Manhattan or Bronx. This would result in the northbound density along I-278 to increase by approximately 0.9 pc/mi/ln and the LOS would remain LOS A. Traffic in the southbound direction is projected to increase by approximately 598 vehicles heading into Queens. This would result in the southbound density along I-278 to increase by approximately 3.7 pc/mi/ln and the LOS service would remain at acceptable LOS A. Therefore, there would not be an adverse traffic effect during the LN.

Table 4B-26 summarizes the changes in traffic volumes, density, and LOS between existing conditions, the No Action Alternative, and the CBD Tolling Alternative (Tolling Scenario D) for the Bayonne Bridge, RFK Bridge, and I-95 Eastern Spur for the LN time period.

Table 4B-25. Highway Capacity Software Performance Measures (PM)

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume					
Northbound	Bayonne Bridge	563	570	783	213
	RFK Bridge	4,710	4,704	5,337	634
	Eastern Spur I-95 (Pre-ramp)	418	436	470	34
	Merge from 495	805	805	851	46
	Eastern Spur I-95 (Post-ramp)	1,223	1,241	1,321	80
Southbound	Bayonne Bridge	791	814	962	148
	RFK Bridge	4,159	4,344	4,957	612
	Eastern Spur I-95 (Pre-ramp)	801	792	847	56
	Diverge to 495	761	755	808	53
	Eastern Spur I-95 (Post-ramp)	40	37	39	3
Density (pc/mi/ln)					
Northbound	Bayonne Bridge	7.8	7.9	10.7	2.8
	RFK Bridge	31.3	31.2	35.7	4.5
	Eastern Spur I-95 (Pre-ramp)	3.1	3.2	3.5	0.3
	Merge from 495	10.4	10.5	10.9	0.4
	Eastern Spur I-95 (Post-ramp)	9.1	9.2	9.7	0.5
Southbound	Bayonne Bridge	11.2	11.6	13.4	1.8
	RFK Bridge	27.9	29.1	33.2	4.1
	Eastern Spur I-95 (Pre-ramp)	5.9	5.9	6.3	0.4
	Diverge to 495	3.4	3.3	3.6	0.3
	Eastern Spur I-95 (Post-ramp)	0.3	0.3	0.3	0
Level of Service (LOS)					
Northbound	Bayonne Bridge	A	A	A	—
	RFK Bridge	D	D	E	X
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Merge from 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—
Southbound	Bayonne Bridge	B	B	B	—
	RFK Bridge	D	D	D	—
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Diverge to 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—

Source: WSP USA, 2022.

Table 4B-26. Highway Capacity Software Performance Measures (Late Night)

DIRECTION	LOCATION	HOURLY VOLUME			
		EXISTING CONDITION	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume					
Northbound	Bayonne Bridge	173	175	228	54
	RFK Bridge	847	866	959	93
	Eastern Spur I-95 (Pre-ramp)	15	16	15	-1
	Merge from 495	341	343	329	-14
	Eastern Spur I-95 (Post-ramp)	356	360	344	-16
Southbound	Bayonne Bridge	207	207	208	1
	RFK Bridge	833	847	1,446	598
	Eastern Spur I-95 (Pre-ramp)	347	354	458	104
	Diverge to 495	334	340	445	105
	Eastern Spur I-95 (Post-ramp)	13	14	13	-1
Density (pc/mi/ln)					
Northbound	Bayonne Bridge	2.6	2.6	3.3	0.7
	RFK Bridge	6.1	6.1	7	0.9
	Eastern Spur I-95 (Pre-ramp)	0.1	0.2	0.1	-0.1
	Merge from 495	4.5	4.5	4.3	-0.2
	Eastern Spur I-95 (Post-ramp)	2.8	2.8	2.6	-0.2
Southbound	Bayonne Bridge	3.3	3.3	3.3	0
	RFK Bridge	5.9	6.3	10.0	3.7
	Eastern Spur I-95 (Pre-ramp)	2.7	2.7	3.5	0.8
	Diverge to 495	1.5	1.5	2	0.5
	Eastern Spur I-95 (Post-ramp)	0.1	0.1	0.1	0
Level of Service (LOS)					
Northbound	Bayonne Bridge	A	A	A	—
	RFK Bridge	A	A	A	—
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Merge from 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—
Southbound	Bayonne	A	A	A	—
	RFK	A	A	A	—
	Eastern Spur I-95 (Pre-ramp)	A	A	A	—
	Diverge to 495	A	A	A	—
	Eastern Spur I-95 (Post-ramp)	A	A	A	—

Source: WSP USA, 2022.

SUMMARY OF HIGHWAY ASSESSMENT

Tolling Scenarios A, B, C, and G with the lowest level of discounts, exemptions, and/or crossing credits reduced overall traffic entering and leaving the Manhattan CBD with the least potential effect on travel patterns and diversions. However, VMT would increase slightly in Staten Island and the Bronx due to drivers to and from New Jersey diverting around the Manhattan CBD to avoid paying the CBD toll. Tolling Scenarios D, E, and F, with higher discounts, exemptions and/or crossing credits were found to create the highest overall reduction in traffic entering and leaving the Manhattan CBD, but with higher potential changes in travel patterns and diversions to several highways.

Tolling Scenario D, with higher Manhattan CBD crossing credits and no exemptions and discounts, was determined to have the highest potential for changes in travel patterns and a shift of traffic; therefore, Tolling Scenario D was selected for detailed analysis of potential traffic effects along highway approaches to the Manhattan CBD, along circumferential routes, and at local intersections adjacent to the tunnel portals and bridges crossing into the Manhattan CBD. Potential changes in travel patterns, diversions, and increases in traffic volumes at the affected facilities would fall into a narrow range; therefore, the potential traffic effects are expected to be similar for Tolling Scenarios D, E, and F.

The following four tunnels that cross into the Manhattan CBD have a potential for net increases in traffic due to diversion of traffic:[22]

- The potential shift in traffic to the Lincoln Tunnel for Tolling Scenario D would be offset by a reduction in traffic due to CBD tolling, resulting in a net reduction in traffic. Therefore, the Lincoln Tunnel and NJ Route 495 are expected to have generally reduced traffic and improved traffic operations for all tolling scenarios during the peak hours. Therefore, this facility was not analyzed further because there would not be an adverse effect for any tolling scenario.
- The potential shift in traffic to the Holland Tunnel for Scenario D would be offset by a reduction in traffic due to CBD tolling, resulting in a net reduction in traffic. Therefore, the Holland Tunnel, I-78, and NJ Route 139 are expected to have reduced traffic based on the BPM forecast and improved traffic operations for all tolling scenarios during the peak hours. Therefore, this facility was not analyzed further because there would not be an adverse effect for any tolling scenario.
- The Hugh L. Carey Tunnel is expected to have a net increase in traffic under the tolling scenarios with the largest increases in traffic volumes. A major portion of the increase in traffic in the tunnel is attributable to traffic diverted from the BQE, but overall traffic along the Gowanus Expressway/Prospect Expressway weaving segment leading to the Hugh L. Carey Tunnel and BQE should not increase appreciably. Under Tolling Scenario D, traffic volumes to the Hugh L. Carey Tunnel would increase by 72/486/47 vehicles during the AM, MD, and PM peak hours, respectively. Under the SEQRA criteria, based on a 5 percent increase in traffic under congested conditions and less than a 2.5-minute increase in delay, there would be no adverse effect during the AM and PM peak hours. During the MD peak hour, although the 5 percent increase in traffic would be exceeded, the increase

[22] Only the inbound direction was examined because that is the critical direction due to higher congestion and greater sensitivity to increases (or decreases) in traffic volumes.

in delay would be well below the 2.5-minute threshold and, therefore, there would not be an adverse effect. The Vissim analysis indicates that there would be minimal traffic effects because there would be sufficient reserve capacity in the two inbound lanes of the tunnel to handle the additional traffic volumes during the MD peak hour.

- The Queens-Midtown Tunnel and the Long Island Expressway (I-495) approaches are expected to have a net increase in traffic under the analyzed tolling scenario with the highest increase in traffic associated with crossing credits and a reduction in traffic under all other tolling scenarios. A major portion of the increase in traffic at the Queens-Midtown Tunnel is due to expected diversion of traffic from the Ed Koch Queensboro Bridge, which would be expected to have a net decline in traffic. Under Tolling Scenario D, traffic volumes at the Queens-Midtown Tunnel would increase by 125/383/203 vehicles during the AM, MD, and PM peak hours, respectively, resulting in increased queue lengths and delays for all peak hours. Under the SEQRA criteria, assuming a 5 percent increase threshold under congested conditions and a delay of greater than 2.5 minutes, there would be a potential adverse effect in the MD peak hour but no anticipated adverse effect during the AM and PM peak hours. Representative of reduced exemptions and crossing credits, Tolling Scenarios A, B, C, and G would provide opportunities for reducing or avoiding potential adverse traffic effects.

All tolling scenarios would increase traffic along two circumferential routes—the Trans-Manhattan/Cross Bronx Expressway via the George Washington Bridge and the Staten Island Expressway (I-278) via the Verrazzano-Narrows Bridge—which would avoid the CBD tolls. In the inbound/eastbound direction, Tolling Scenarios A, B, C, and G would produce the highest diversions while in the outbound/westbound direction, Tolling Scenarios D, E, and F would produce the highest diversions. Overall, the potential diversion of traffic in the westbound direction would be expected to be higher than in the eastbound direction. The circumferential diversion of traffic is expected to have a potential effect on traffic operations along the Trans-Manhattan/Cross Bronx Expressway and, to a much lesser extent, along the Staten Island Expressway (I-278).

- Staten Island Expressway (I-278): Under Tolling Scenario D, there would be an increase in traffic volumes westbound on the Verrazzano-Narrows Bridge during the AM, MD, and PM peak hours of 32/201/75 vehicles on the lower level and 64/256/97 vehicles on the upper level, respectively. These increases in traffic are relatively small and would not have an appreciable effect on travel time, delays, speeds, and densities given the available capacity on the Verrazzano-Narrows Bridge. The LOS would remain the same during all time periods for all highway segments operating at LOS B/C during the AM and MD peak hours and LOS E/F during the PM peak hour; therefore, Tolling Scenario D (and Tolling Scenarios E and F), would have no adverse traffic effect along the Verrazzano-Narrows Bridge and the Staten Island Expressway (I-278) during any time period under the SEQRA criteria. Tolling Scenarios A, B, C, and G, with Lower Manhattan CBD tolls, would be expected to create fewer diversions than Tolling Scenarios D, E, and F; therefore, these tolling scenarios would also not result in adverse traffic effects.
- George Washington Bridge: Under Tolling Scenario D, there would be an increase in traffic volumes westbound/New Jersey-bound on the George Washington Bridge during the AM, MD, and PM peak hours of 87/826/414 vehicles, respectively. It is anticipated that the increase in traffic volumes would

be within 5 percent during the AM and PM peak hours. During the MD peak hour, it is expected that there would be sufficient capacity to accommodate the additional 826 vehicles given there are two levels on the George Washington Bridge; therefore, an adverse traffic effect under SEQRA is not anticipated.

- **Trans-Manhattan Expressway:** Under Tolling Scenario D, there would be an increase in traffic volumes westbound/New Jersey-bound on the Trans-Manhattan Expressway during the AM, MD, and PM peak hours of 76/660/313 vehicles. It is anticipated that the increase in traffic volumes would be within 5 percent during the AM and PM peak hours. The increases in traffic volumes during the MD peak hour is expected to exceed 5 percent and there is a potential adverse effect under SEQRA, depending on the available capacity to handle additional traffic.
- **Cross Bronx Expressway:** Under Tolling Scenario D, there would be an increase in traffic volumes westbound/New Jersey-bound on the Cross Bronx Expressway during the AM, MD, and PM peak hours of 61/200/108 vehicles, respectively. It is anticipated that the increase in traffic volumes would be within 5 percent during the AM and PM peak hours. The increases in traffic volumes during the MD peak hour is expected to exceed 5 percent, and there is a potential adverse effect under SEQRA, depending on the available capacity to handle additional traffic.
- **FDR Drive/Lower East Side:** The BPM analyses showed a potential 5 to 9 percent increase in daily traffic volumes along the northbound FDR Drive and a 14 to 22 percent increase in daily traffic volumes in the southbound direction in the Lower East Side. Under the SEQRA criteria based on normal traffic fluctuation, there would no adverse effect during the AM and MD peak hours and the additional increment would be absorbed due to the available capacity. During the PM peak hour, these increases in traffic volumes have the potential of creating increased queue lengths and delays during certain peak hours and an anticipated adverse traffic effect under SEQRA.

In summary, there are potential adverse traffic effects during certain peak hours under the analyzed tolling scenario with the highest increase in traffic along three of the 10 highways analyzed based upon the volume increase criteria used for a preliminary assessment of potential adverse traffic effects under SEQRA along the Long Island Expressway (I-495), the Trans-Manhattan/Cross Bronx Expressway (I-95), and the lower FDR Drive, between East 10th Street and the Brooklyn Bridge.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately three months after the start of Project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc.. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase more than 2.5 minutes. Although some increases in traffic volumes and travel times are expected along the Long Island Expressway, there would be comparable decreases in traffic volumes and travel times and delays for motorists using the Queensboro Bridge along its approaches in Manhattan and Queens, which would see a higher reduction in traffic volumes under Tolling Scenario D.

Given the few locations where there is a potential for adverse traffic effects along highways leading to and from the Manhattan CBD and circumferential highways, the offsetting reductions in traffic volumes and improvements in travel times along routes from which traffic would divert, reductions in travel times and delays within the CBD portion of the trip, and the overall Project benefits in the Manhattan CBD and regionally due to a reduction in vehicular travel, the Project when viewed holistically would not have an adverse effect on traffic.

Table 4B-27. Potential Adverse Traffic Effects on Highway Segments – SEQRA

HIGHWAY SEGMENT		TOLLING SCENARIO D		
		AM	MD	PM
Long Island Expressway (I-495)	Leading to the Queens-Midtown Tunnel	No Adverse Effect	SEQRA	No Adverse Effect
George Washington Bridge Approach – Westbound	George Washington Bridge	No Adverse Effect	No Adverse Effect	No Adverse Effect
	Trans-Manhattan Expressway (I-95)*	No Adverse Effect	SEQRA	No Adverse Effect
	Cross Bronx Expressway*	No Adverse Effect	SEQRA	No Adverse Effect
FDR Drive	Northbound Brooklyn Bridge to East 10th Street	No Adverse Effect	No Adverse Effect	SEQRA
	Southbound East 10th Street to the Brooklyn Bridge	No Adverse Effect	No Adverse Effect	SEQRA

Source: WSP USA, 2022.
Note: SEQRA indicates potential adverse effect under the New York State Environmental Quality Review Act.
* Estimated values

4B.5 POTENTIAL TRAFFIC EFFECTS ON CENTRAL PARK ROADWAYS

All tolling scenarios would result in overall lower traffic volumes along roadways within and abutting Central Park. Tolling scenarios without crossing credits would have the highest reduction in traffic volumes while tolling scenarios with crossing credits would have lower reductions in traffic volumes. Tolling Scenario F—with all Manhattan crossing credits—was determined to produce the least reduction in traffic volumes within Central Park and surrounding roadways.

Figure 4B-12 shows the percentage change in daily traffic along roadways within Central Park as well as roadways surrounding the park for Tolling Scenario F. All roadways abutting the park—including Central Park West, Fifth Avenue, 110th Street, and 59th Street—are expected to have about 10 percent lower traffic volumes during all time periods. All transverse roadways through the park at 96/97th Streets, 86th Street, 79th Street, Terrace Drive, and 65th Street would also be expected to have lower traffic volumes (about 5 percent to 10 percent less) compared to the No Action Alternative.

Based on an evaluation of the tolling scenario that would result in the highest increase in traffic volumes at certain locations, there would generally be lower traffic along roadways in Central Park and the roadways surrounding the park; therefore, there would not be an adverse traffic effect at Central Park.

Figure 4B-12. Effects of CBD Tolling Alternative on Central Park Traffic

Source: WSP USA, 2022.

4B.6 INTERSECTION IMPACT ASSESSMENT

4B.6.1 Methodology[23]

DEFINITION OF STUDY AREAS

To evaluate the potential localized traffic effects of the Project, multiple study areas were defined based on the key entry points to the CBD tolling district, including along the 60th Street Manhattan CBD boundary and on either side of the bridges and tunnels that enter and exit the Manhattan CBD. **Figure 4B-13** shows the local study areas or intersection data collection zones identified as focal points for changes in travel patterns with CBD tolling.[24] A total of 102 intersections were identified and were aggregated into 15 study areas. Similar to the highway impacts, many of these study areas were identified through the public outreach process at locations where communities expressed concerns regarding the potential impacts of more local traffic changes. Those intersections are the locations that would most likely experience increases in traffic under the various tolling scenarios, as identified by the BPM. The 15 study areas follow:

- Brooklyn Bridge/Manhattan Bridge—Downtown Brooklyn
- Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan, Brooklyn Bridge, and Manhattan Bridge
- Hugh L. Carey Tunnel—Red Hook
- Holland Tunnel—Jersey City, New Jersey
- Lincoln Tunnel—Manhattan
- Ed Koch Queensboro Bridge—East Side at 60th Street—Manhattan
- West Side at 60th Street—Manhattan
- Queens-Midtown Tunnel/Ed Koch Queensboro Bridge—Long Island City—Queens
- Queens-Midtown Tunnel—Murray Hill—Manhattan
- Robert F. Kennedy Bridge—Astoria—Queens
- Robert F. Kennedy Bridge—The Bronx
- Robert F. Kennedy Bridge—125th Street–Manhattan
- West Side Highway/Route 9A at West 24th Street
- Lower East Side—Manhattan
- Little Dominican Republic—Manhattan

The local intersections at the New Jersey and Manhattan approaches to the George Washington Bridge and the New Jersey approach to the Lincoln Tunnel were not included because traffic at those intersections connects primarily to regional highways and not local streets.

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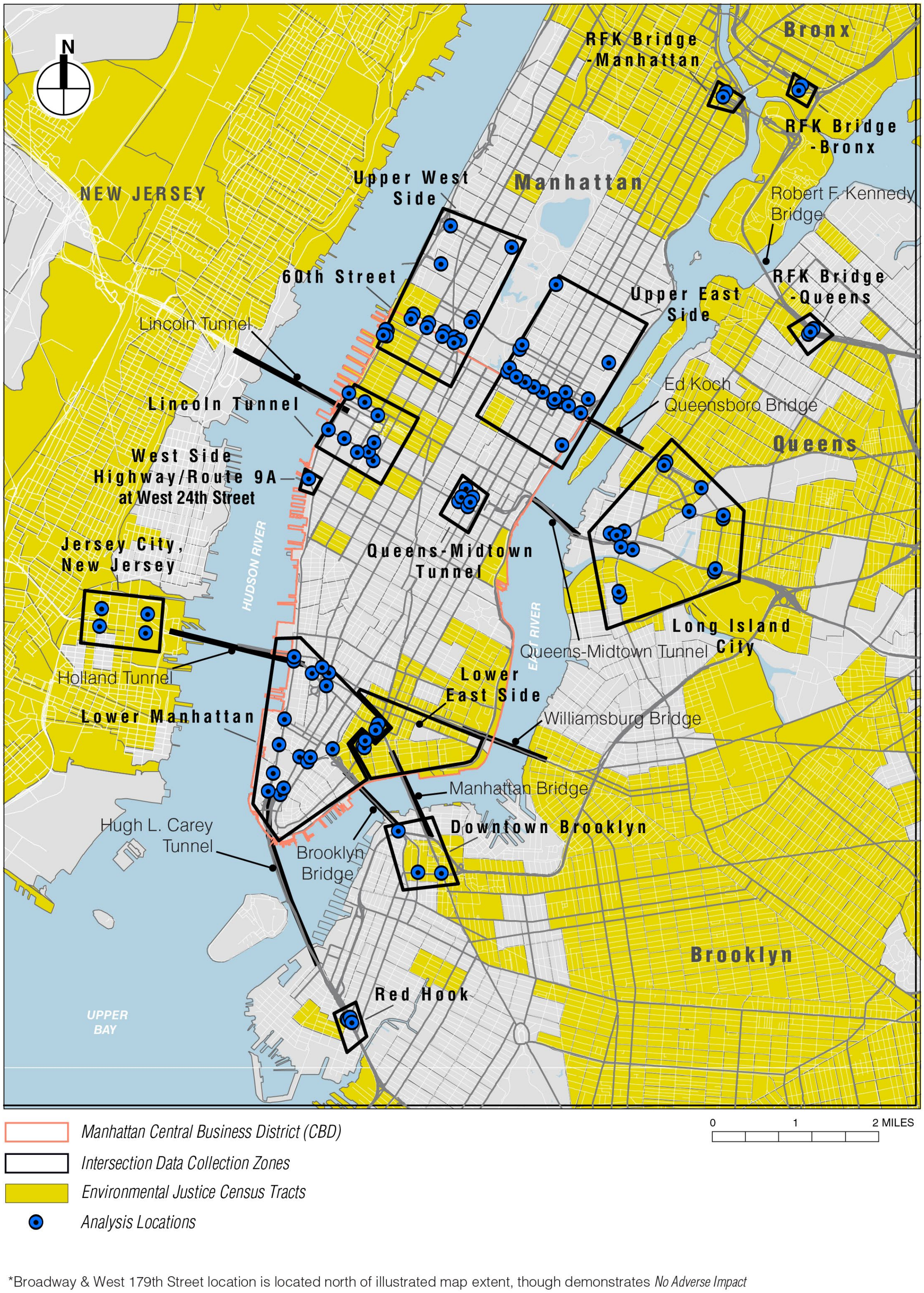
23 Detailed methodology is contained in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA."**

24 Data collection was performed in 2019 prior to the COVID-19 pandemic. Earlier data from 2016 and 2018 from previous studies were used to supplement the data collected in 2019.

Figure 4B-13. Local Intersections and Data Collection Zones



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

ANALYSIS HOURS

The analysis periods—weekday AM, MD, PM, and LN—were based on the existing peak time periods, which were assumed to be same under the various tolling scenarios. It was assumed that the volume of diverted traffic would be higher during the off-peak periods when Manhattan CBD crossings would be less congested and better able to accommodate diverted traffic. The actual analysis hour was determined by reviewing the highest volumes from the Automatic Traffic Recorder (ATR) counts and transaction data, and through consultation with NYCDOT. Table 4B-28 shows the peak hours varied by study area based on the available data that does not include LN information at certain locations.

Table 4B-28. Peak Hours by Study Area

STUDY AREA		WEEKDAY			
		AM	MD	PM	LN[1]
1	Downtown Brooklyn	8 to 9	1 to 2	5 to 6	9 to 10
2	Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan	8 to 9	1 to 2	5 to 6	—
3	Hugh L. Carey Tunnel—Red Hook	7:45 to 8:45	12 to 1	4 to 5	9 to 10
4	Holland Tunnel—Jersey City	8 to 9	12 to 1	5 to 6	—
5	Lincoln Tunnel—Manhattan	8 to 9	1 to 2	5 to 6	—
6	East Side at 60th Street—Manhattan	8 to 9	1 to 2	5 to 6	9 to 10
7	West Side at 60th Street—Manhattan	8 to 9	1 to 2	5 to 6	9 to 10
8	Queens-Midtown Tunnel/Ed Koch Queensboro Bridge—Long Island City	7 to 8	1 to 2	5 to 6	—
9	Queens-Midtown Tunnel—Manhattan	8 to 9	1 to 2	5 to 6	9 to 10
10	Robert F. Kennedy Bridge—Queens	7:15 to 8:15	12:30 to 1:30	4 to 5	9:45 to 10:45
11	Robert F. Kennedy Bridge—The Bronx	8 to 9	1 to 2	5 to 6	9 to 10
12	Robert F. Kennedy Bridge—Manhattan	7:45 to 8:45	1 to 2	4 to 5	9:45 to 10:45
13	West Side Highway/Route 9A at West 24th Street[2]	8 to 9	1 to 2	5 to 6	9 to 10
14	Lower East Side—Manhattan	8 to 9	1 to 2	5 to 6	—
15	Little Dominican Republic—Manhattan	7 to 8	3 to 4	5 to 6	—

Source: WSP analysis of traffic count data, 2019.

1 Late night data not available in some study areas.

2 This location is treated separately because it is between the Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan study area and the Lincoln Tunnel—Manhattan study area.

2023 NO ACTION ALTERNATIVE AND CBD TOLLING ALTERNATIVE (TOLLING SCENARIO D[25]) INTERSECTION TRAFFIC VOLUMES

The No Action Alternative intersection traffic volumes were estimated from the BPM results at each intersection for each of the four analysis hours. The No Action Tolling Alternative traffic volumes were estimated for each intersection by adding the 2023 No Action Alternative increment to the 2019 existing traffic volumes to account for changes in the roadway network and intersections already implemented or planned to be implemented by 2023.

Incremental traffic volumes were estimated for Tolling Scenario D at each intersection for each of the four analysis hours from the BPM results. The 2023 CBD Tolling Alternative traffic volumes were estimated for each intersection by adding the adjusted 2023 increment to the 2023 No Action Alternative traffic volumes to account for changes in the roadway network and geometry changes at intersections already implemented or planned to be implemented by NYCDOT by 2023.

INTERSECTION LEVEL OF SERVICE

Table 4B-29 shows the criteria used to determine intersection LOS for signalized and unsignalized intersections, according to the *Highway Capacity Manual*:[26]

- LOS A, B, and C reflect clearly acceptable traffic conditions.
- LOS D reflects the existence of delays within a generally tolerable range in dense urban environments.
- LOS E and F indicate levels of congestion.

DETERMINING ADVERSE TRAFFIC EFFECTS

For periodic increases in tolling on its bridges, TBTA has historically conducted environmental assessments using SEQRA criteria as a guideline, as well as other considerations, in determining whether a proposed action would result in adverse traffic effects on local intersections.

Under the SEQRA criteria used for many years by NYSDOT and other agencies for projects in the region (including National Environmental Policy Act documents with FHWA as the lead agency such as *Hunts Point Interstate Access Improvement Project EIS* and the *Miller Highway Reconstruction EIS*), an increase threshold of equal to or greater than 10 seconds in average intersection delays at LOS E or LOS F has been used as criteria to determine adverse traffic effects. Several SEQRA analyses by TBTA and other agencies have applied a more conservative criteria of an increase in average intersection delay of greater than 5 seconds at LOS E or LOS F to determine a traffic impact. At LOS D or better, the 5-second threshold could be exceeded if the LOS does not worsen to LOS E or LOS F.

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25 An additional traffic analysis was done for the Downtown Brooklyn study area where Tolling Scenario C was determined to be the representative tolling scenario.

26 *Highway Capacity Manual* (2010)

Table 4B-29. Level of Service Average Control Delay Criteria

	LEVEL OF SERVICE	SIGNALIZED INTERSECTIONS AVERAGE CONTROL DELAY (sec/veh)	UNSIGNALIZED INTERSECTIONS AVERAGE CONTROL DELAY (sec/veh)
	A	≤ 10	≤ 10
	B	> 10 and ≤ 20	> 10 and ≤ 15
	C	> 20 and ≤ 35	> 15 and ≤ 25
	D	> 35 and ≤ 55	> 25 and ≤ 35
	E	> 55 and ≤ 80	> 35 and ≤ 50
	F	> 80	> 50

Source: *Highway Capacity Manual*. 2010. Transportation Research Board, National Research Council, Washington DC.

CALIBRATION OF SYNCHRO MODELS

For calibration of Synchro models, NYCDOT provided guidance for intersection performance analysis to reflect prevailing traffic operational conditions based on count data and field observation, including volume and peak-hour factors, parking and curbside lane movements, pedestrian conflicts, and other physical and operational characteristics.

4B.6.2 Affected Environment (including No Action Alternative)

Appendix 4B.2, "Transportation: Traffic Flow Maps" and Appendix 4B.3, "Transportation: Traffic LOS Existing and No Action" presents volume maps and Synchro analysis results for existing conditions and the No Action Alternative for the intersections in the 15 study areas. The following sections summarize the results of the analyses by study area for existing conditions and the No Action Alternative. The No Action Alternative includes known changes that have been or will soon be implemented by NYCDOT, most notably including an additional bicycle lane on the Ed Koch Queensboro Bridge and Brooklyn Bridge, reduction in moving lanes on the BQE between Atlantic Avenue and Sands Street, and updated intersection geometries and signal-timings.

DOWNTOWN BROOKLYN STUDY AREA

In the downtown Brooklyn study area, three intersections were examined:

- AM Peak:
  - During the existing AM peak, 1 intersection operates at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E and 1 intersection would operate at LOS F.
- MD Peak:
  - During the existing MD peak, 1 intersection operates at LOS E and no intersection operate at LOS F.
  - During the No Action Alternative MD peak, 1 intersection would operate at LOS E and no intersection would operate at LOS F.
- PM Peak:
  - During the existing PM peak, 1 intersection operates at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative PM peak, 1 intersection would operate at LOS E and no intersection would operates at LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F

HUGH L. CAREY TUNNEL AND HOLLAND TUNNEL—LOWER MANHATTAN STUDY AREA

In the Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan study area, the analysis included 15 intersections:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, 2 intersections would operate at LOS E and no intersection would operate at LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E and 1 intersection operates at LOS F.
  - During the No Action Alternative PM peak, 1 intersection would operate at LOS E and 1 intersection would operate at LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based on lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

HUGH L. CAREY TUNNEL—RED HOOK STUDY AREA

In the Hugh L. Carey Tunnel—Red Hook study area, the analysis included two intersections:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

HOLLAND TUNNEL—JERSEY CITY STUDY AREA

In the Holland Tunnel—Jersey City study area, 4 intersections were examined:

- AM Peak:
  - During the existing AM peak, 2 intersections operate at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative AM peak, 2 intersections would operate at LOS E and 1 intersection would operate at LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, 2 intersections operate at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative PM peak, 3 intersections would operate at LOS E and no intersection would operate at LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based on lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

LINCOLN TUNNEL—MANHATTAN STUDY AREA

In the Lincoln Tunnel—Manhattan study area, 9 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based on lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

EAST SIDE AT 60TH STREET—MANHATTAN STUDY AREA

In the East Side at 60th Street—Manhattan study area, 17 signalized intersections and 2 unsignalized intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, 1 intersection would operate at LOS E and no intersection would operates at LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, 1 intersection would operate at LOS E and no intersection would operates at LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

WEST SIDE AT 60TH STREET—MANHATTAN STUDY AREA

In the West Side at 60th Street—Manhattan study area, 19 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, 1 intersection operates at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative MD peak, 1 intersection would operate at LOS E and no intersection would operate at LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

QUEENS-MIDTOWN TUNNEL—MANHATTAN STUDY AREA

In the Queens-Midtown Tunnel—Manhattan study area, 6 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E and 1 intersection would operate at LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E and 1 intersection would operate at LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

QUEENS-MIDTOWN TUNNEL/ED KOCH QUEENSBORO BRIDGE—LONG ISLAND CITY STUDY AREA

In the Queens-Midtown Tunnel—Long Island City study area, 13 intersections were examined, including 4 unsignalized intersections:

- AM Peak:
  - During the existing AM peak, 2 intersections operate at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative AM peak, 2 intersections would operate at LOS E and no intersection would operate at LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, 1 intersection operates at LOS E and no intersection operates at LOS F.
  - During the No Action Alternative PM peak, 3 intersections would operate at LOS E and no intersection would operate at LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based upon the lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

RFK BRIDGE—QUEENS STUDY AREA

In the RFK Bridge—Queens study area, 3 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E and 1 intersection operates at LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E and 1 intersection would operate at LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

RFK BRIDGE—BRONX STUDY AREA

In the RFK Bridge—Bronx study area, 2 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the projected No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

RFK BRIDGE—MANHATTAN STUDY AREA

In the RFK Bridge—Manhattan study area, 2 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

WEST SIDE HIGHWAY/ROUTE 9A AT WEST 24TH STREET STUDY AREA[27]

In the West Side Highway/Route 9A at West 24th Street study area, only 1 intersection was examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - During the existing LN peak, no intersection operates at LOS E or LOS F.
  - During the projected No Action Alternative LN peak, no intersection would operate at LOS E or LOS F.

[27] This location is treated separately because it is between the Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan Study Area and the Lincoln Tunnel—Manhattan study area.

LOWER EAST SIDE—MANHATTAN STUDY AREA

In the Lower East Side study area, 3 intersections were examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing MD peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing PM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based upon the lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

LITTLE DOMINICAN REPUBLIC—MANHATTAN STUDY AREA

In the Little Dominican Republic—Manhattan study area, 1 intersection was examined:

- AM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative AM peak, no intersection would operate at LOS E or LOS F.
- MD Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative MD peak, no intersection would operate at LOS E or LOS F.
- PM Peak:
  - During the existing AM peak, no intersection operates at LOS E or LOS F.
  - During the No Action Alternative PM peak, no intersection would operate at LOS E or LOS F.
- LN Peak:
  - The Synchro model for these intersections did not include LN data and based upon the lower overall nighttime existing conditions and No Action Alternative volumes, no further evaluation was warranted.

4B.6.3 *Environmental Consequences*

POTENTIAL TRAFFIC EFFECTS AT INTERSECTIONS

Based on the BPM analysis, Tolling Scenario D was identified as having the most number of intersection locations with a potential increase of 50 or more vehicles. Therefore, all 102 intersections were analyzed for Tolling Scenario D. An additional analysis was performed in the Downtown Brooklyn study area for Tolling Scenario C since that tolling scenario produced a larger number of intersections with an increase of 50 or more vehicles.

The Synchro model was used to analyze the No Action Alternative and CBD Tolling Alternative at each intersection during the AM, MD, PM and LN peak hours.[28] The change in average intersection delays was used to assess potential traffic effects. TBTA adopted an increase of more than 5 seconds average intersection delay at LOS E or F as the criteria for determining the significance of traffic effects under SEQRA. Increases in intersection delays greater than 5 seconds are not considered an adverse effect if the resulting LOS is D or better.

Table 4B-30 summarizes the results of the intersection analyses identifying those intersections where the SEQRA criteria used by TBTA of more than 5 seconds increase in delay would be exceeded. Potential adverse traffic effects were identified at a total of 4 intersections out of 102 intersections analyzed during one or more peak hours. Signal-timing improvements would mitigate any potential adverse traffic effects at all locations.

Table 4B-30. Potential Traffic Effects at Intersections With and Without Signal-Timing Improvements

TOLLING SCENARIO D STUDY AREA	INTERSECTION NAME	ANALYSIS PERIOD	WITHOUT IMPROVEMENTS SEQRA Impact?	WITH IMPROVEMENTS SEQRA Impact?
Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan	Trinity Place and Edgar Street	MD	Yes	No
Queens-Midtown Tunnel—Manhattan	East 36th Street and Second Avenue	MD	Yes	No
	East 37th Street and Third Avenue	LN	Yes	No
Robert F. Kennedy Bridge—Manhattan	East 125th Street and Second Avenue	AM	Yes	No
		PM	Yes	No

Source: WSP USA, 2022.
Note: Results of analysis for all intersections can be found in **Appendix 4B.5, "Transportation: Traffic LOS, CBD Tolling Alternative with Mitigation."**

DOWNTOWN BROOKLYN STUDY AREA

A detailed traffic analysis was performed at three intersections within this study area. The results of the analysis for the AM, MD, and PM peak hours, showed that none of the intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an

[28] Pre-COVID-19-pandemic intersection counts were available at only 64 of the 102 intersections analyzed during the LN peak.

adverse traffic effect; therefore, there would not be an adverse traffic impact in the Downtown Brooklyn study area.

HUGH L. CAREY TUNNEL AND HOLLAND TUNNEL—LOWER MANHATTAN STUDY AREA

A detailed traffic analysis was performed at 15 intersections within this study area. The results of the analysis for the AM, MD, and PM peak hours, without and with traffic signal-timing improvements, are described below at the potentially affected locations.

Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan Study Area—Without Signal-Timing Improvements

AM PEAK HOUR (8:00 a.m. to 9:00 a.m.)

No intersections with an increase in delay would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the AM peak hour; therefore, there would not be an adverse traffic impact during the AM peak hour.

MD PEAK HOUR (1:00 p.m. to 2:00 p.m.)

One intersection would have a potential increase in delays that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect as described below:

- **SEQRA Impacts:**
  - **Trinity Place (NB-SB) and Edgar Street (EB):** Under the No Action Alternative, this intersection would operate at LOS C, with an overall intersection delay of 24.7 seconds. With the CBD Tolling Alternative, the overall intersection delay would increase by 65.5 seconds to 90.2 seconds, due to the addition of 98 vehicles to the intersection. Under the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect the increase in average intersection delay would exceed the allowable increase in delay.

PM PEAK HOUR (5:00 p.m. to 6:00 p.m.)

No intersections with an increase in delay would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the PM peak hour; therefore, there would not be an adverse traffic effect during the PM peak hour.

Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan Study Area—With Signal-Timing Improvements

With traffic signal-timing improvements no intersections would have potential increases in delay that exceed the SEQRA threshold used to determine whether there would be an adverse traffic effect.

MD PEAK HOUR (1:00 p.m. to 2:00 p.m.)

- **SEQRA Impacts:**
  - **Trinity Place (NB–SB) and Edgar Street (EB):** With signal retiming, this intersection would operate at LOS C with a delay of 32.4 seconds, which would be 7.7 seconds greater than the No Action Alternative. This would result in a delay increase below the *SEQRA* threshold and there would be no adverse effect.

HUGH L. CAREY TUNNEL—RED HOOK STUDY AREA

A detailed traffic analysis was performed at two intersections within this study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that none of the intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect in the Hugh L. Carey Tunnel—Red Hook study area.

HOLLAND TUNNEL—JERSEY CITY, NEW JERSEY, STUDY AREA

A detailed traffic analysis was performed at four intersections within this study area. The results of the analysis for the AM, MD, and PM peak hours showed that none of the intersections would have an increase in delay that would exceed the SEQRA criteria used by TBTA.

LINCOLN TUNNEL—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at nine intersections within the study area. The results of the analysis for the AM, MD, and PM peak hours showed that none of the intersections had an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the Lincoln Tunnel—Manhattan study area.

EAST SIDE AT 60TH STREET—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at 19 intersections in the study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that none of the intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the East Side 60th Street—Manhattan study area.

WEST SIDE AT 60TH STREET—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at 19 intersections in the study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that none of the intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the West Side 60th Street - Manhattan study area.

QUEENS-MIDTOWN TUNNEL—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at six intersections within the study area. The results of the analysis for the AM, MD, PM, and LN peak hours, with and without traffic signal-timing improvements, are described below at the potentially affected locations.

Queens-Midtown Tunnel—Manhattan—Without Signal-Timing Improvements

AM PEAK HOUR (8:00 a.m. to 9:00 a.m.)

No intersections had an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the AM peak hour; therefore, there would not be an adverse traffic impact during the AM peak hour.

MD PEAK HOUR (1:00 p.m. to 2:00 p.m.)

One intersection would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect. The exceedances are described below:

- SEQRA Impacts:
  - **East 36th Street (EB) and Second Avenue (SB):** This intersection would operate at LOS F, with an overall intersection delay of 106.1 seconds, under the No Action Alternative. With the CBD Tolling Alternative, the overall intersection delay would increase by 15 seconds to 121.1 seconds, due to the addition of 16 vehicles to the intersection. Under the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect, the increase in delay would exceed the maximum allowable increase in delay.

PM PEAK HOUR (5:00 p.m. to 6:00 p.m.)

No intersections had an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the PM peak hour; therefore, there would not be an adverse traffic impact during the PM peak hour.

LN PEAK HOUR (9:00 p.m. to 10:00 p.m.)

One intersection would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect. The exceedances are described below:

- SEQRA Impacts:
  - **East 37th Street (WB) and Third Avenue (NB):** This intersection would operate at LOS C, with an overall intersection delay of 21.8 seconds, under the No Action Alternative. With the CBD Tolling Alternative, the overall intersection delay would increase by 41.1 seconds to 62.9 seconds, due to the addition of 62 vehicles to the intersection. Under the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect, the increase in delay would exceed the maximum allowable increase in delay.

Queens-Midtown Tunnel—Manhattan Study Area—With Signal-Timing Improvements

With traffic signal-timing improvements no intersections would have potential increases in delay that exceed the SEQRA threshold used to determine whether there would be an adverse traffic effect.

MD PEAK HOUR (1:00 p.m. to 2:00 p.m.)

- SEQRA Impacts:
  - **East 36th Street (EB) and Second Avenue (SB):** With signal retiming, this intersection would operate at LOS F with a delay of 109.7 seconds, which would be 3.6 seconds greater than the No Action Alternative. This would result in a delay increase below the SEQRA threshold and there would be no adverse effect.

LN PEAK HOUR (9:00 p.m. to 10:00 p.m.)

- SEQRA Impacts:
  - **East 37th Street (WB) and Third Avenue (NB):** With signal retiming, this intersection would operate at LOS C with a delay of 26.5 seconds, which would be 4.7 seconds greater than the No Action Alternative. This would result in a delay increase below the SEQRA threshold and there would be no adverse effect.

QUEENS-MIDTOWN TUNNEL/ED KOCH QUEENSBORO BRIDGE—LONG ISLAND CITY STUDY AREA

A detailed traffic analysis was performed at 13 intersections within this study area. The results of the analysis for the AM, MD, and PM peak hours showed that none of the intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the Queens—Midtown Tunnel/Ed Koch Queensboro Bridge—Long Island City study area.

RFK BRIDGE—QUEENS STUDY AREA

A detailed traffic analysis was performed at three intersections within the study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that no intersections would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the RFK Bridge—Queens study area.

RFK BRIDGE—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at two intersections within the study area. The results of the analysis for the AM, MD, PM, and LN peak hours, without and with traffic signal-timing improvements, are described below at the potentially affected locations.

RFK Bridge—Manhattan Study Area—Without Signal-Timing Improvements

AM PEAK HOUR (8:00 a.m. to 9:00 a.m.)

One intersection would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the AM peak hour. All exceedances are described below:

- SEQRA Impacts:
  - **East 125th Street (EB–WB), Second Avenue (SB), RFK Bridge Exit (SW):** This intersection would operate at LOS C, with an overall intersection delay of 34.9 seconds, under the No Action Alternative. With the CBD Tolling Alternative, the overall intersection delay would increase by 20.4 seconds to 55.3 seconds, due to the addition of 17 vehicles to the intersection. Under the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect, the increase in delay would exceed the maximum allowable increase in delay.

MD PEAK HOUR (1:00 p.m. to 2:00 p.m.)

No intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the MD peak hour.

PM PEAK HOUR (5:00 p.m. to 6:00 p.m.)

One intersection would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the PM peak hour. All exceedances are described below:

- SEQRA Impacts:
  - **East 125th Street (EB–WB), Second Avenue (SB), RFK Bridge Exit (SW)—Southwest-bound Left:** This intersection would operate at LOS C, with an overall intersection delay of 25 seconds, under the No Action Alternative. With the CBD Tolling Alternative, the overall intersection delay would increase by 52.2 seconds to 77.2 seconds, due to the additional vehicles to specific lane groups. Under the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect, the increase in delay would exceed the maximum allowable increase in delay.

LN PEAK HOUR (9:45 p.m. to 10:45 p.m.)

No intersections would have an increase in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect during the LN peak hour.

RFK Bridge—Manhattan Study Area—With Signal-Timing Improvements

With signal-timing improvements in place, no intersections would have potential increases in delay that would exceed the SEQR threshold.

AM PEAK HOUR (8:00 a.m. to 9:00 a.m.)

- SEQRA Impacts:
  - **East 125th Street (EB-WB), Second Avenue (SB), RFK Bridge Exit (SW):** With signal retiming, this intersection would operate at LOS D with a delay of 37.8 seconds, which would be 2.9 seconds greater than the No Action Alternative. This would result in a delay increase below the SEQRA threshold and there would be no adverse effect.

PM PEAK HOUR (5:00 p.m. to 6:00 p.m.)

- SEQRA Impacts:
  - **East 125th Street (EB-WB), Second Avenue (SB), RFK Bridge Exit (SW):** With signal retiming, this intersection would operate at LOS D with a delay of 36.2 seconds, which would be 11.2 seconds greater than the No Action Alternative. This would result in a LOS improvement that does not exceed the SEQRA threshold and there would be no adverse effect.

RFK BRIDGE—BRONX STUDY AREA

A detailed traffic analysis was performed at two intersections within the study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that no intersections would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the RFK Bridge—Manhattan study area.

WEST SIDE HIGHWAY/ROUTE 9A AT WEST 24TH STREET STUDY AREA[29]

A detailed traffic analysis was performed at one intersection within the study area. The results of the analysis for the AM, MD, PM, and LN peak hours showed that no intersections would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact at this location.

LOWER EAST SIDE—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at three intersections within the study area. The results of the analysis for the AM, MD, and PM peak hours showed that no intersections would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact in the Lower East Side study area.

LITTLE DOMINICAN REPUBLIC—MANHATTAN STUDY AREA

A detailed traffic analysis was performed at one intersection within the study area. The results of the analysis for the AM, MD, and PM peak hours showed that no intersections would have potential increases in delay that would exceed the SEQRA threshold used by TBTA to determine whether there would be an adverse traffic effect; therefore, there would not be an adverse traffic impact at this location.

4B.6.4 Summary of Local Intersection Performance for Scenario(s) with Highest Increase in Traffic

A total of 102 intersections were analyzed during the AM, MD, PM, and, as applicable, LN peak hours in 15 study areas. These study areas and intersections were chosen for analysis based upon the likelihood of potential traffic increases and impacts.

Table 4B-31 presents a summary of the number of analyzed signalized intersections that would be expected to have an increase, decrease, or no change in delay under the analyzed tolling scenario with the highest increase in traffic volumes. The results indicate that most intersections would see reductions in delay or there would be no change in delay while there would be 73 instances (about 20 percent of all analyses) where the delay would increase. Prior to mitigation, 5 locations (about 1 percent of all analyses) would exceed the SEQRA thresholds. **Table 4B-31** shows there would be no locations where changes in delay would create adverse effects based on the SEQRA criteria of greater than a 5-second increase in average delay that could not be addressed by incorporating signal-timing improvements into the Project. Under SEQRA (thresholds used by state agencies[30]), the criteria used for determining the significance of adverse

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[29] This location is treated separately because it is between the Hugh L. Carey and Holland Tunnel—Lower Manhattan study area and the Lincoln Tunnel—Manhattan study area.

[30] *Miller Highway Reconstruction EIS* (NYSDOT 1993) used a criteria of 10 seconds or more increase in average intersection delay per vehicle at LOS E/F.
Hunts Point Access Improvements EIS (NYSDOT 2019) used a criteria of 10 seconds or more increase in delay per vehicle and a deterioration in LOS to E/F.
Fulton Street Transit Center EIS (MTA 2004) used a criteria of 10 seconds or more increase in average vehicle delay at LOS E/F.
Toll Policy EAs (TBTA 2005–2021) used a criteria of greater than a 5 second increase in average vehicle delay at LOS E/F.
Long Island Jewish Medical Center Modernization Program Final Generic EIS (Dormitory Authority of the State of New York 2009) used a criteria of greater than a 5 second increase in average intersection approach delay at LOS E/F.

traffic effects at intersections generally varies from an increase in delay of 5 to 10 seconds per vehicle at a deteriorated LOS E or LOS F. Increases in average delays at intersections resulting in LOS D or better are not considered significant.

Table 4B-31. Summary of Local Intersection Performance With Improvements

STUDY AREA	INTERSECTIONS	TOTAL COUNT	DELAY CHANGE (COUNT)			IMPACT COUNT (SEQRA)
			Increase	Decrease	No Change	
Downtown Brooklyn*	Signalized Intersections	12	3	9	0	0
Hugh L. Carey Tunnel and Holland Tunnel—Lower Manhattan	Signalized Intersections	45	16	28	1	0
Hugh L. Carey Tunnel—Red Hook	Signalized Intersections	8	4	3	1	0
Holland Tunnel—New Jersey**	Signalized Intersections	12	0	12	0	0
Lincoln Tunnel—Manhattan	Signalized Intersections	27	1	26	0	0
East Side at 60th Street—Manhattan	Signalized Intersections	76	7	61	8	0
West Side at 60th Street—Manhattan	Signalized Intersections	76	9	66	1	0
Queens-Midtown Tunnel—Manhattan	Signalized Intersections	24	8	15	1	0
Queens-Midtown Tunnel/Ed Koch Queensboro Bridge—Long Island City	Signalized Intersections	39	9	19	11	0
Robert F. Kennedy Bridge***	Signalized Intersections	28	9	10	9	0
West Side Highway/ Route 9A at West 24th Street	Signalized Intersections	4	0	4	0	0
Lower East Side—Manhattan	Signalized Intersections	9	4	5	0	0
Little Dominican Republic - Manhattan	Signalized Intersections	3	3	0	0	0
TOTAL	**Signalized Intersections**	**363**	**73**	**258**	**32**	**0**

Source: WSP USA, 2022.
Note: Numbers may not add up due to rounding.
* The Downtown Brooklyn study area was also analyzed for Tolling Scenario C, which was projected to have higher increases in traffic volumes than Tolling Scenario D. The results from Tolling Scenario C analysis are shown for Downtown Brooklyn study area.
** New Jersey locations are outside the jurisdiction of SEQRA.
*** RFK Bridge consists of the RFK–Bronx, RFK–Queens, and RFK–Manhattan study areas.

In summary, based upon the analysis of potential changes in traffic patterns, including reductions in traffic volumes and diversions associated with the range of tolling scenarios, the overall change in LOS and delay at the 102 intersections analyzed would be modest. **Figure 4B-14 through Figure 4B-17** present the study area intersections and summarize the potential effects of the Project with and without signal-timing improvements. There were four intersections (with a total of five instances) where the incremental traffic volumes would result in potential adverse effects using the SEQRA criteria with increases in average intersection delays exceeding 5 seconds without the implementation of standard traffic signal-timing improvements.

Based on a detailed traffic analysis during the AM, MD, PM, and LN peak hours at 102 key intersections most likely to experience increases in traffic volumes and delays under Tolling Scenario D with the largest increases in local traffic volumes, there would be only minor traffic effects, which can be addressed by incorporating signal-timing adjustments.[31] Similar minor traffic effects are not anticipated for Tolling Scenarios A, B, C, or G. It is expected that, with the sponsoring agencies' commitment to monitor traffic conditions under all tolling scenarios, and make appropriate signal-timing changes if necessary, there would be no anticipated adverse effects from implementing the Project for any of the tolling scenarios when considering the SEQRA criteria for determining potential adverse traffic effects.

The Project Sponsors will undertake pre- and post-implementation monitoring at the four intersections with identified potential adverse effects during the first year after implementation of the Project, with post-implementation monitoring starting no sooner than three months after the start of operations to account for an initial period of fluctuation in travel behavior.[32] The monitoring would be used to validate the need for, and design of, potential mitigations. In line with the SEQRA criteria, the threshold for determining whether there is an adverse effect is an increase in average intersection delays exceeding 5 seconds, as described above. The Project Sponsor commits to using a toolbox of traffic operations and street design strategies (e.g., signal-timing/phasing changes, lane assignment changes, changes to curbside regulations, etc.) to mitigate adverse effects associated with the adopted tolling scenario, to the extent practicable. In addition, the robust post-implementation biennial Evaluation Report mandated by the Traffic Mobility Act will include traffic data collection at intersections in and around the Manhattan CBD and other locations of interest in the form of ATR and camera-based Vehicle Classification and Turning Movement Counts. These data will be used to identify and quantify actual traffic effects associated with the adopted tolling scenario and to inform the development of appropriate mitigation measures, if needed. Depending upon the tolling scenario selected and future unforeseen operational and geometric changes at certain intersections, it is possible that some residual traffic effects at those intersections may remain.

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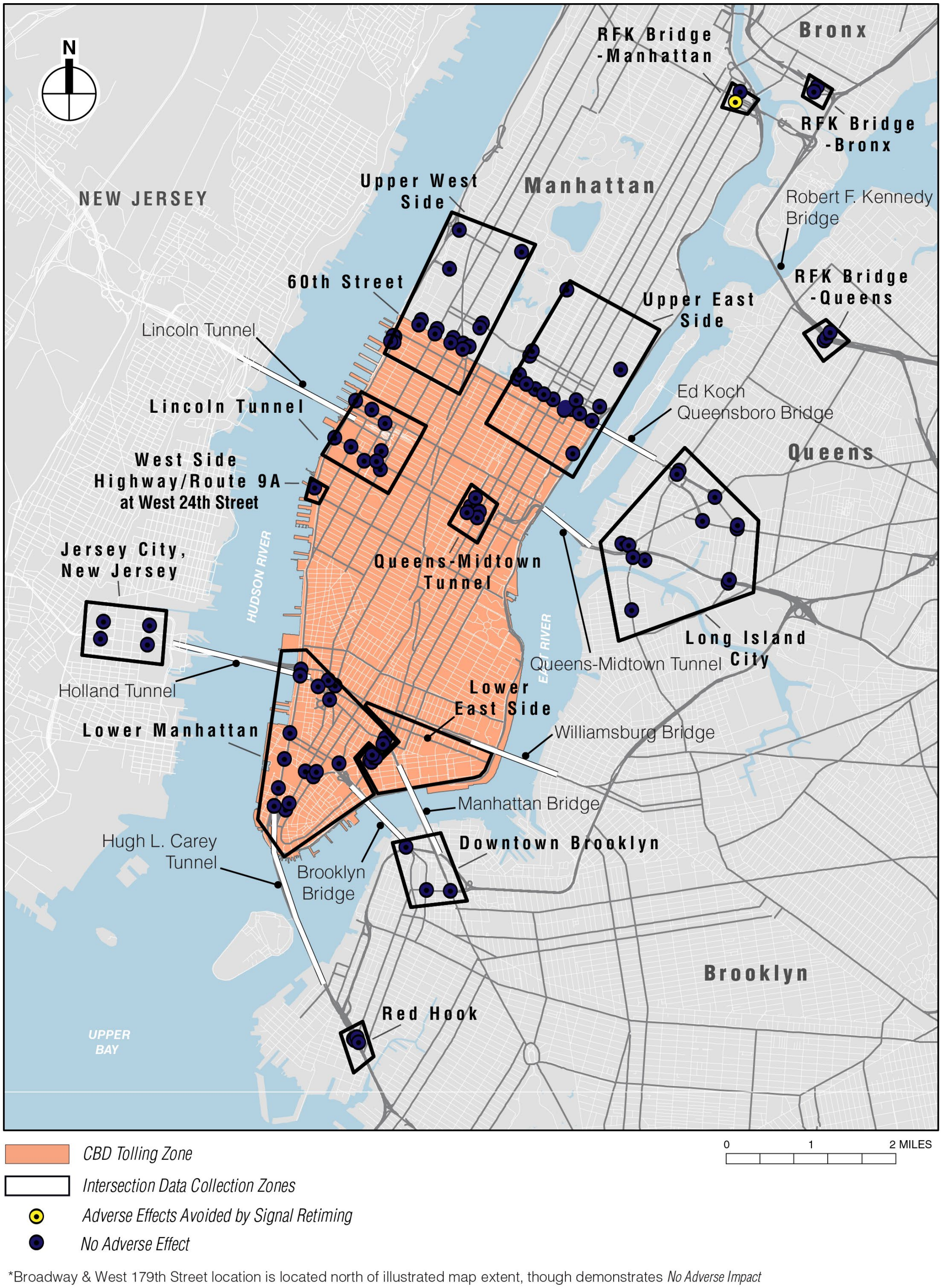
31 Appropriate signal-timing improvement measures would be undertaken post-implementation. The signal-timing improvements described in this document represent what may need to be done under the analyzed tolling scenario, but because the tolling scenario is to be determined by the Traffic Mobility Review Board, the actual scope and need for signal-timing improvements may change. The Project Sponsors would monitor traffic conditions at the study locations and NYCDOT would implement appropriate signal-timing changes if adverse effects are observed.

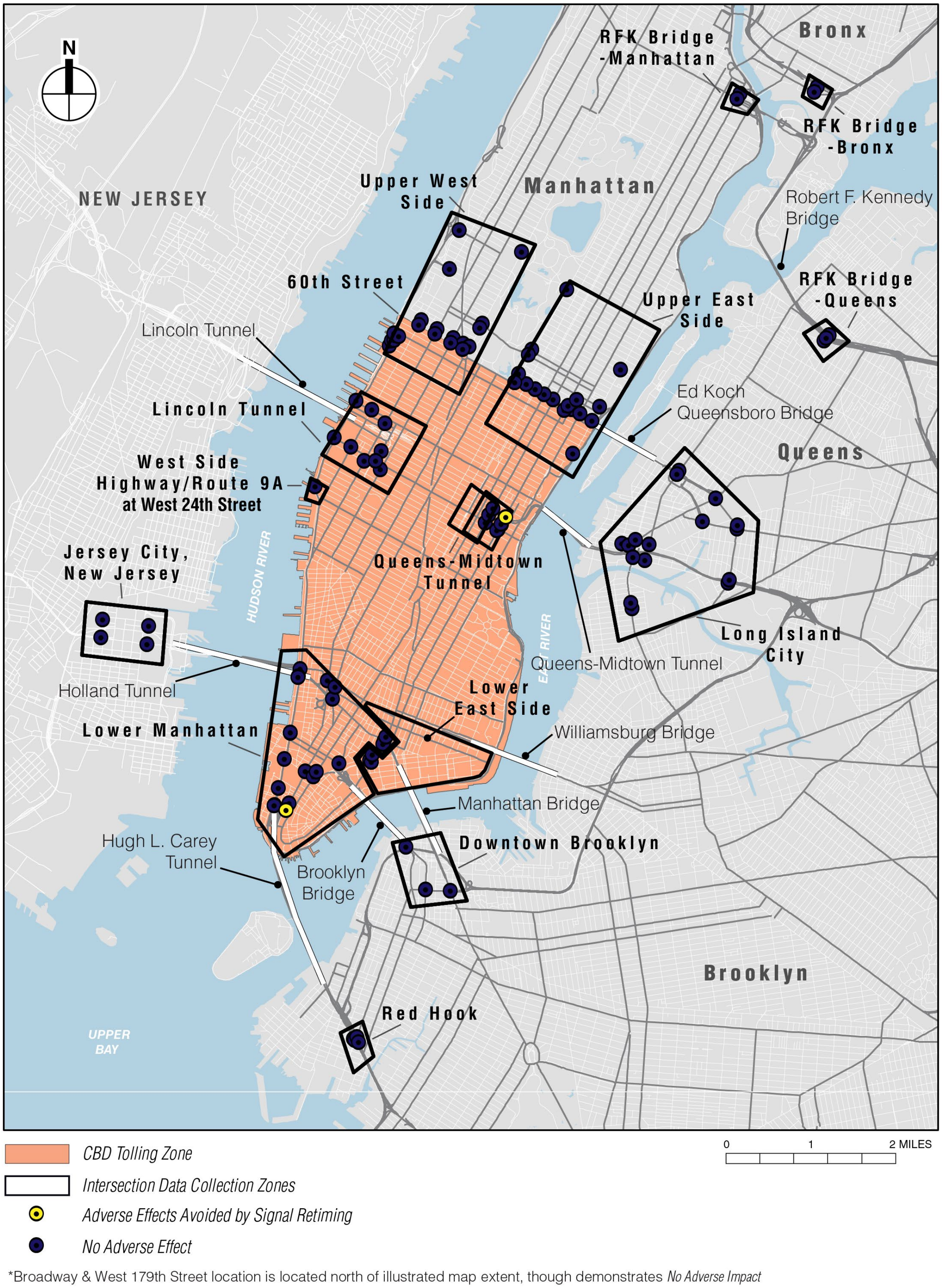
32 For London's congestion zone, a Transit Cooperative Research Program report noted that traffic patterns stabilized at six weeks after charging began. See Chapter 14, "Road Value Pricing" in *Transit Cooperative Research Program Report 95: Traveler Response to Transportation System Changes*. p. 14 to 13. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_95c14.pdf.

Figure 4B-14. Potential Adverse Traffic Effects at Local Intersections AM Period



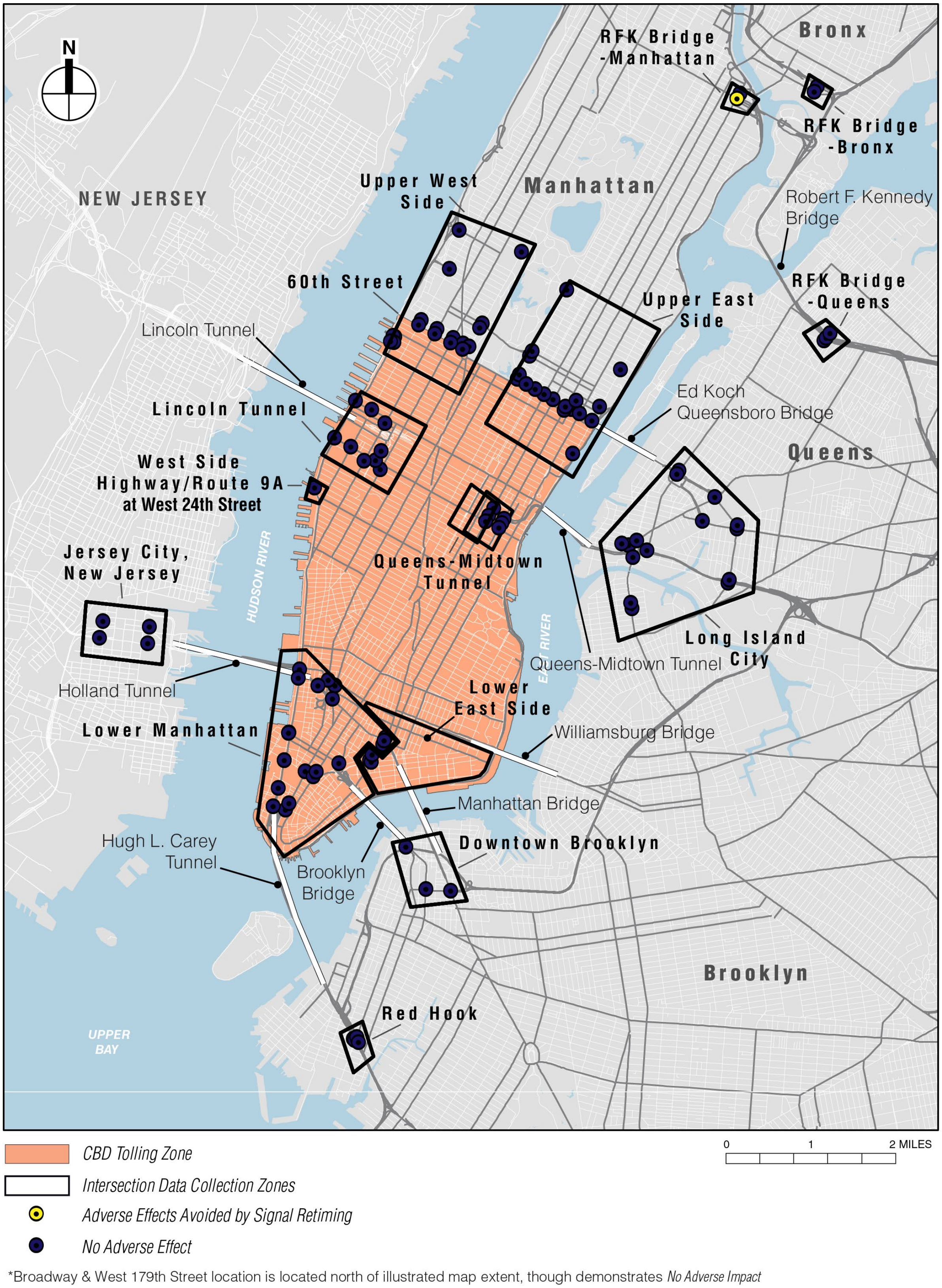
Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Figure 4B-15. Potential Adverse Traffic Effects at Local Intersections MD Period



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Figure 4B-16. Potential Adverse Traffic Effects at Local Intersections PM Period



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Figure 4B-17. Potential Adverse Traffic Effects at Local Intersections Late Night (LN) Period

*Broadway & West 179th Street location is located north of illustrated map extent, though demonstrates *No Adverse Impact*

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

4B.7 CONCLUSION

Chapter 1, "Introduction" succinctly describes the level of congestion experienced by travelers to the Manhattan CBD. The low travel speeds and unreliable travel times to, from, and within the Manhattan CBD increase auto commute times, erode worker productivity, reduce bus and paratransit service quality, raise the cost of deliveries and the overall cost of doing business, and delay emergency vehicles. A 2018 analysis by Partnership for New York City—an organization that represents the city's business leadership and largest private-sector employers—predicted that congestion in the New York City region would cost businesses, commuters, and residents $100 billion over the next 5 years.[33] Thus, there is a need to reduce vehicle congestion in the Manhattan CBD to improve the reliability and efficiency of the transportation system.

In general, the Project would reduce traffic at key Manhattan CBD crossings, the approach roadways, and at intersections within the Manhattan CBD as well as intersections outside of the Manhattan CBD. However, under certain tolling scenarios, where crossings credits would be applied at currently tolled facilities, there is a potential of traffic diversion to facilities offering a toll credit. In some locations, this is beneficial as it can aid in addressing traffic imbalances already in place as certain drivers take longer routes to avoid tolls (notably at the East River Bridges). However, by raising the overall toll these same crossing credits can cause potential for circumferential diversions, leading to increased traffic at the Verrazzano-Narrows Bridge and the George Washington Bridge for through Manhattan CBD trips between Brooklyn, Queens, and Long Island and points in New Jersey or west.

Highway corridors and intersections determined to be potentially affected by CBD tolling were identified based upon modeling runs using the regional BPM for all tolling scenarios, consultation with NYCDOT and NYSDOT, and review of previous tolling studies.

Tolling Scenario D—with the highest crossing credits, exemptions, and discounts—was determined to be representative of the tolling scenarios with the highest potential for diversions and increases in traffic at certain Manhattan CBD crossings, Manhattan CBD highway approaches, intersections within and outside of the Manhattan CBD, and circumferential routes bypassing the Manhattan CBD. Therefore, detailed traffic analyses were performed for Tolling Scenario D. In a few cases, additional traffic analyses were performed for other tolling scenarios at specific locations where the projected increases in traffic volumes were higher.

HIGHWAY ANALYSIS

A total of 10 highway corridors were identified within the 28-county New York/New Jersey metropolitan area with a potential for increased traffic and adverse effects using the BPM to screen highways with potential adverse effects for all tolling scenarios. These 10 highway corridors were analyzed using a Vissim

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33 Partnership for New York City. January 2018. *$100 Billion Cost of Traffic Congestion in Metro New York*. https://pfnyc.org/wp-content/uploads/2018/01/2018-01-Congestion-Pricing.pdf. The report defined the New York City region as New York, Kings, Queens, Bronx, Richmond, Nassau, Suffolk, Westchester, Putnam, and Rockland Counties, New York.

microsimulation model, the HCS, or applying a speed and volume increase criteria where a traffic model and/or reliable pre-COVID19-pandemic traffic data were not available.

Although the overall effects of the CBD Tolling Alternative along highways used to access the Manhattan CBD would be beneficial for all tolling scenarios, potential adverse traffic effects along 3 of the 10 highway corridors analyzed were identified under some of the tolling scenarios during certain time periods as described below:

- Trans-Manhattan/Cross Bronx Expressway—westbound during the MD peak hour
- Long Island Expressway—westbound during the MD peak hour
- FDR Drive between East 10th Street and Brooklyn Bridge—northbound and southbound during the PM peak hour

Given the few locations where there is a potential for adverse traffic effects along highways leading to and from the Manhattan CBD and circumferential highways, the offsetting reductions in traffic volumes and improvements in travel times along routes from which traffic would divert, and the overall Project benefits in the Manhattan CBD and regionally due to a reduction in vehicular travel, the Project when viewed holistically would not have an adverse effect on traffic along the highway corridors used to access the Manhattan CBD and along circumferential routes.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, signal timing changes, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation (to establish a baseline), with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase more than 2.5 minutes.

INTERSECTION ANALYSIS

A total of 102 intersections were analyzed for the tolling scenarios with the largest increase in traffic applicable to each of the 15 study areas during the AM, MD, PM, and LN hours. These intersections were selected for analysis based on an evaluation of potential highway diversions as described above.

Most intersections would experience a decrease in traffic volumes and delays under all tolling scenarios. However, under the analyzed tolling scenarios, there would be increases in average delays at 4 of the 102 intersections analyzed that would exceed the greater-than-5-second threshold at LOS E/F used for determining adverse traffic effects under SEQRA. Signal-timing adjustments would reduce the projected increase in delays below the threshold or improve the LOS to D or better. Therefore, standard mitigation measures would avoid adverse traffic effects that could result from the CBD Tolling Alternative.

The robust post-implementation biennial Evaluation Report mandated by the Traffic Mobility Act will include traffic data collection at intersections in and around the Manhattan CBD and other locations of interest in the form of ATR and camera-based Vehicle Classification and Turning Movement Counts. These data will be used to identify and quantify actual traffic effects associated with the adopted tolling scenario. If any unforeseen adverse effects on traffic at local intersections are observed, appropriate signal timing mitigation measures will be developed and implemented consistent with NYCDOT policy.

Table 4B-32. Summary of Effects of the CBD Tolling Alternative on Highways and Local Intersections

<table>
<tr><th rowspan="2">TOPIC</th><th rowspan="2">SUMMARY OF EFFECTS</th><th rowspan="2">LOCATION</th><th rowspan="2">DATA SHOWN IN TABLE</th><th colspan="7">TOLLING SCENARIO</th><th rowspan="2">POTENTIAL ADVERSE EFFECT</th><th rowspan="2">MITIGATION AND ENHANCEMENTS</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>F</th><th>G</th></tr>
<tr><td rowspan="3">Traffic – Highway Segments</td><td rowspan="3">The introduction of the CBD Tolling Program may produce increased congestion on highway segments approaching on circumferential roadways used to avoid Manhattan CBD tolls, resulting in increased delays and queues in midday and PM peak hours on certain segments in some tolling scenarios:
▪ Westbound Long Island Expressway (I-495) near the Queens-Midtown Tunnel (midday)
▪ Approaches to westbound George Washington Bridge on I-95 (midday)
▪ Southbound and northbound FDR Drive between East 10th Street and Brooklyn Bridge (PM)
▪ Other locations will see an associated decrease in congestion particularly on routes approaching the Manhattan CBD.</td><td>10 highway segments (AM)</td><td rowspan="3">Highway segments with increased delays and queues in peak hours that would result in adverse effects</td><td colspan="7">0 out of 10 highway corridors in the analyzed tolling scenario (Tolling Scenario D)</td><td rowspan="3">Yes</td><td rowspan="3">Mitigation needed. The Project Sponsors will implement a monitoring plan prior to implementation with post-implementation data collected approximately three months after the start of operations and including thresholds for effects; if the thresholds are reached or crossed, the Project Sponsors will implement Transportation Demand Management (TDM) measures, such as ramp metering, motorist information, signage at all identified highway locations with adverse effects upon implementation of the Project.
Post-implementation, the Project Sponsors will monitor effects and, if needed, TBTA will modify the toll rates, crossing credits, exemptions, and/or discounts to reduce adverse effects.</td></tr>
<tr><td>10 highway segments (midday)</td><td colspan="7">2 out of 10 highway corridors in the analyzed tolling scenario (Tolling Scenario D), as well as Tolling Scenarios E and F</td></tr>
<tr><td>10 highway segments (PM)</td><td colspan="7">1 out of 10 highway corridors in the analyzed tolling scenario (Tolling Scenario D), as well as Tolling Scenarios E and F</td></tr>
<tr><td rowspan="6">Intersections</td><td rowspan="5">Shifts in traffic patterns, with increases in traffic at some locations and decreases at other locations, would change conditions at some local intersections within and near the Manhattan CBD. Of the 102 intersections analyzed, most intersections would see reductions in delay.</td><td>363 locations (All day)</td><td rowspan="5">Number of instances of intersections with an increase in volumes of 50 or more vehicles in the peak hours.</td><td>9</td><td>10</td><td>24</td><td>50</td><td>48</td><td>50</td><td>10</td><td rowspan="6">Yes</td><td rowspan="6">Mitigation needed. The Project Sponsors will monitor those intersections where adverse effects were identified and implement appropriate signal timing adjustments to mitigate the effect, per NYCDOT's normal practice.
Enhancement
Refer to the overall Project enhancement on monitoring at the end of this table.</td></tr>
<tr><td>102 locations (AM)</td><td>2</td><td>2</td><td>3</td><td>3</td><td>3</td><td>3</td><td>2</td></tr>
<tr><td>102 locations (midday)</td><td>1</td><td>2</td><td>4</td><td>16</td><td>16</td><td>17</td><td>0</td></tr>
<tr><td>102 locations (PM)</td><td>1</td><td>1</td><td>1</td><td>10</td><td>9</td><td>9</td><td>1</td></tr>
<tr><td>57 locations (overnight)</td><td>5</td><td>5</td><td>16</td><td>21</td><td>20</td><td>21</td><td>5</td></tr>
<tr><td>Potential adverse effects on four local intersections in Manhattan: Trinity Place and Edgar Street (midday); East 36th Street and Second Avenue (midday); East 37th Street and Third Avenue (midday); East 125th Street and Second Avenue (AM, PM)</td><td>4 locations</td><td>Locations with potential adverse effects that would be addressed with signal timing adjustments</td><td>0</td><td>0</td><td>0</td><td>4</td><td>4</td><td>4</td><td>0</td></tr>
<tr><td colspan="13">OVERALL PROJECT ENHANCEMENT. The Project Sponsors commit to ongoing monitoring and reporting of potential effects on the Project, including for example, traffic entering the Manhattan CBD, taxi/FHV vehicle-miles traveled in the Manhattan CBD; transit ridership from providers across the region; bus speeds within the Manhattan CBD; air quality and emissions trends; parking; and Project revenue. Data will be collected in advance and after implementation of the Project. A formal report on the effects of the Project will be issued one year after implementation and then every two years. In addition, a reporting website will make data, analysis, and visualizations available in open data format to the greatest extent possible. Updates will be provided on at least a bi-annual basis as data becomes available and analysis is completed.</td></tr>
</table>