A. BACKGROUND

In 2014/5, the Brooklyn Bridge Park Corporation (BBP) commissioned a study to identify existing traffic and pedestrian circulation issues related to the Loop Road located within the upland of Pier 5 and Pier 6, bordering the 360 Furman Street mixed-use building on three of its frontages (see Exhibit A: BBP Pier 5/6 Loop Road Traffic Study—Pilot Program Evaluation memorandum prepared by Sam Schwartz Engineering ("SSE"), September 2015). The findings of this study were discussed with various stakeholders to develop a preferred improvement plan that would address those circulation issues. Subsequent to this study, in the summer of 2015, BBP put into effect on a pilot basis some of the design changes recommended in the study, described below, which have remained in place since that time. Based on the success of this pilot, BBP is now proposing to implement these improvements and proceed with the construction necessary to reconfigure the Loop Road, along with several other related improvements as described in Section D below.

B. PRE-PILOT LOOP ROAD CONDITIONS AND PLANNING

The Loop Road is located within the upland of Pier 5 and Pier 6 and connects to the north with Furman Street at its intersection with Joralemon Street and to the south with Atlantic Avenue just west of Furman Street. In addition to providing vehicle access to Pier 5 and Pier 6, the Loop Road provides access to 360 Furman Street and serves the public parking garage on its southern end, as well as the Metropolitan Transportation Authority (MTA) New York City Transit (NYCT) B63 local bus route. Prior to the summer-2015 implementation of the pilot project, the Loop Road operated as a two-way roadway along its entire length, with generally one travel lane in each direction (see Figure 1 in Exhibit A). Ever since then, it has operated as a one-way northbound roadway from its first (southeastern) intersection with the Loop Road elbow (a segment of the Loop Road that lies between development Parcel A and open spaces to the south and west) to the Joralemon/Furman Street intersection (see Figure 2 in Exhibit A).

TRAFFIC AND PEDESTRIAN CIRCULATION ISSUES

The SSE study prepared in 2014/5 identified several Loop Road circulation issues and areas of conflict between vehicles, buses, pedestrians, and bicyclists, as outlined below.

- Vehicular traffic flow, circulation of the B63 buses, and pedestrian crossing on the southern part of the Loop Road were observed during peak visitation periods to be impeded by the overflow of queues from the 360 Furman Street parking garage;
- Motorists frequently double-parked while waiting for available metered parking spots on the western side of the Loop Road and while picking up or dropping off passengers along the north side of the Loop Road near Pier 5;
- Bikeway delineation and pavement markings were unclear and incorrect; and

- Some pedestrian crossing locations were awkward, had bad sightlines, and were misaligned with pedestrian desire lines.

RECOMMENDED IMPROVEMENT STRATEGIES

In consultation with stakeholders, which included the Brooklyn Bridge Park Community Advisory Council (CAC), residents of 360 Furman Street, the New York City Department of Transportation (DOT), MTA NYCT, and the New York City Fire Department (FDNY), BBP developed an improvement plan to address the identified circulation issues. This plan included:

- Converting the two-way Loop Road to one-way northbound (clockwise) operation between the southeastern intersection with the Loop Road elbow and Furman Street;
- Maintaining width for two travel lanes along the length of the Loop Road;
- Converting on-street metered parking to a pick-up/drop-off zone;
- Correcting bike path markings; and
- Relocating and modifying crosswalks and pedestrian pathways.

PIER 6 UPLAND

Independent of the Loop Road project, BBP has approved a residential development with up to 300 units on the Pier 6 upland. Construction of that project is expected to require the temporary closing to traffic of the Loop Road elbow so that it can be used for construction equipment and staging. Following construction of the residential development, BBP will consider the future use of the "elbow."

C. LOOP ROAD PILOT RESULTS

In the summer of 2015, BBP implemented a pilot program to assess the proposed circulation improvement plan, as described above. The results of this pilot project are described in a September 2015 report from SSE (see Exhibit A).

As described in that report, since most vehicles access Pier 5, Pier 6, and 360 Furman Street via Atlantic Avenue, the one-way conversion of the Loop Road was aligned with prevailing travel patterns and resulted in a minimal diversion of traffic. As illustrated by traffic volume data collected after the inception of the Loop Road pilot, the amount of traffic entering and exiting the upland area represents a small portion of the overall traffic volumes on the adjacent access roadways—Atlantic Avenue and Furman Street. By converting the Loop Road to a one-way clockwise operation, turning movements at adjacent intersections were simplified, resulting in an overall benefit to the traffic flow along the Loop Road while not adversely affecting operations of the adjacent roadways. It also provided opportunities to better delineate bicycle and pedestrians paths and enhance safety of pedestrian flow and crossings via improved sidewalks and crosswalks, and to eliminate traffic bottlenecks.

D. PROPOSED LOOP ROAD MODIFICATIONS

Given the success of the Loop Road pilot, BBP is now seeking to implement the foregoing improvement strategies and proceed with the construction necessary to reconfigure the Loop Road, which include the following.

- Maintaining the one-way northbound (clockwise) operation between the southeastern intersection with the Loop Road elbow and the intersection of the Loop Road with Furman Street;
- Providing appropriate pick-up/drop-off areas—along the western side of the Loop Road where there are 14 metered parking spaces, and the northern side of the Loop Road—to suit the existing curbside activities. The 14 metered parking spaces along the western side of the Loop Road have been used as a pick-off/drop-off zone since the pilot program, and would remain so under the proposed modifications. The displaced demand from these parking spaces is assumed to be distributed to other public parking facilities in the area;
- Installing additional greenway signage and ground markings to clearly delineate bicycle and pedestrian paths; and
- Building out pedestrian sidewalks and improving crosswalk locations to suit pedestrian desire lines and improve traffic sight lines.

E. DETAILED TRAFFIC ANALYSIS

To assess the potential impacts of the proposed Loop Road modifications, a detailed traffic analysis was conducted pursuant to the methodologies prescribed in the *CEQR Technical Manual*, for the nearby intersections of Furman Street and Joralemon Street and Furman Street and Atlantic Avenue. These two intersections are signalized, except for the Furman Street southbound approach right-turn movement onto Atlantic Avenue, which is stop sign controlled (unsignalized). Although the Loop Road modifications are anticipated to be complete in 2017, this analysis conservatively analyzed traffic conditions in 2019 in order to account for trips generated by the completion of the Pier 6 upland development.

TRANSPORTATION ANALYSIS METHODOLOGIES

The operation of the signalized intersections and unsignalized intersection in the study area were assessed using methodologies presented in the *2000 Highway Capacity Manual (HCM)* using the *Highway Capacity Software (HCS+ 5.5)*. The *HCM* procedure evaluates the levels of service (LOS) for signalized and unsignalized intersections using average stop control delay, in seconds per vehicle, as described below. Traffic LOS is a measure of service based on the average time it takes a vehicle to proceed from the end of the queue at the intersection through the intersection.

SIGNALIZED INTERSECTIONS

The average control delay per vehicle is the basis for LOS determination for individual lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersection. The levels of service are defined in **Table 1**.

Table 1
Level of Service Criteria for Signalized Intersections

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

Although the HCM methodology calculates a volume-to-capacity (v/c) ratio, there is no strict relationship between v/c ratios and LOS as defined in the *HCM*. A high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay actually represents the most efficient condition in terms of traffic engineering standards, where an approach or the whole intersection processes traffic close to its theoretical maximum capacity with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, progression, and green time. LOS A and B indicate good operating conditions with minimal delay. At LOS C, the number of vehicles stopping is higher, but congestion is still fairly light. LOS D describes a condition where congestion levels are more noticeable and individual cycle failures (a condition where motorists may have to wait for more than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels, and cycle breakdowns are frequent. The *HCM* methodology also provides for a summary of the total intersection operating conditions. The analysis chooses the two critical movements (the worst case from each roadway) and calculates a summary critical v/c ratio. The overall intersection delay, which determines the intersection's LOS, is based on a weighted average of control delays of the individual lane groups. Within New York City, the midpoint of LOS D (45 seconds of delay) is generally considered as the threshold between acceptable and unacceptable operations.

UNSIGNALIZED INTERSECTIONS

For unsignalized intersections, the average control delay is defined as the total elapsed time from which a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue to the first-in-queue position. The average control delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. The LOS criteria for unsignalized intersections are summarized in **Table 2**.

Table 2
Level of Service Criteria for Unsignalized Intersections

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

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

2019 WITH ACTION CONDITION

Existing traffic conditions at the two analysis intersections were established based on updated traffic and pedestrian counts conducted in October 2016, over an unseasonably warm weekend with a full slate of Park programing. A comparison of the October 2016 traffic volumes at the two analyzed intersections to August 2015 volumes included in the September 2015 SSE report indicated that weekday traffic volumes are generally comparable; Saturday traffic levels are higher in October 2016; and the Sunday traffic levels are lower in October 2016. The lower Sunday traffic levels in October 2016 were likely the result of Smorgasburg no longer being held at Pier 5 in the Park on Sundays. Inventories of roadway geometry, traffic controls, bus stops, and parking regulations/activities were recorded to provide appropriate inputs for the operational analyses. Official signal timings were also obtained from NYCDOT for use in the analysis of the study area signalized intersections.

Based on the September 2015 SSE study, the peak hours for the study area were determined to be 8:45 AM to 9:45 AM, 1:00 PM to 2:00 PM, and 5:00 PM to 6:00 PM on weekdays; 11:45 AM to 12:45 PM on Saturdays; and 2:30 PM to 3:30 PM on Sundays.

Future No Action volumes were developed by increasing existing (2016) traffic levels by the expected growth in overall travel through and within the study area. As per *CEQR Technical Manual* guidelines, an annual background growth rate of 0.50 percent per year was used. It was determined that the background growth rate will also account for the increase in traffic and pedestrian levels for development projects in the study area. The study area development projects that are expected to be completed before the Proposed Project’s build year are either small enough that their trip generation is covered by the background growth rate or located in areas where their estimated incremental vehicle trips are not expected to traverse the two analysis intersections.

As described above, independent of the Loop Road project, BBP has approved a residential development with up to 300 units on the Pier 6 upland. The estimated number of weekday additional person and vehicle trips expected to be generated by the proposed development were previously presented in the June 2016 BBP Pier 6 Upland Technical Memorandum Update. For the purposes of assessing the proposed Loop Road modification, Saturday and Sunday peak hour incremental person and vehicle trips for the Pier 6 upland development were also estimated based on the travel demand assumptions from established sources and approved studies used in developing the trip estimates presented in the June 2016 Technical Memorandum Update. In addition, the Sunday travel demand assumptions were assumed to be the same as those for Saturday. As summarized in **Table 3**, the additional person trips generated by the Pier 6 upland development would be 250, 260, and 348 for the weekday peak hours; 327 for the Saturday peak hour, and 327 for the Sunday peak hour. The incremental vehicle trips would be 31, 42, and 42 for the weekday peak hours; 39 for the Saturday peak hour, and 39 for the Sunday peak hour.

Table 3
Trip Generation Summary: Pier 6 Upland Development

Peak Hour	In/Out	Person Trip						Vehicle Trip			
		Auto	Taxi	Subway	Bus	Walk	Total	Auto	Taxi	Delivery	Total
AM	In	6	1	27	1	12	47	4	4	2	10
	Out	18	4	142	4	35	203	15	4	2	21
	Total	24	5	169	5	47	250	19	8	4	31
Midday	In	33	6	47	6	61	153	17	5	2	24
	Out	20	3	44	3	37	107	11	5	2	18
	Total	53	9	91	9	98	260	28	10	4	42
PM	In	32	7	128	7	59	233	21	5	0	26
	Out	16	3	63	3	30	115	11	5	0	16
	Total	48	10	191	10	89	348	32	10	0	42
Saturday	In	29	5	88	5	55	182	17	4	0	21
	Out	21	4	78	4	38	145	14	4	0	18
	Total	50	9	166	9	93	327	31	8	0	39
Sunday	In	29	5	88	5	55	182	17	4	0	21
	Out	21	4	78	4	38	145	14	4	0	18
	Total	50	9	166	9	93	327	31	8	0	39

The Brooklyn Bridge Park Pier 6 Upland Technical Memorandum and the subsequent update dated June 2016 concluded that the Pier 6 upland development would not have the potential to result in new significant adverse traffic impacts.

The Pier 6 upland development's project-generated vehicle trips summarized in **Table 3** above were accounted for in the future 2019 Loop Road modification With Action traffic volumes. **Tables 4** and **5** present the 2019 With Action condition during the weekday AM, midday, PM, Saturday, and Sunday peak hours for the signalized and unsignalized study area intersections, respectively. As presented, the two intersections of Furman Street at Joralemon Street and Furman Street at Atlantic Avenue would operate at acceptable LOS in the 2019 With Action condition. Therefore, the proposed Loop Road modification would not result in the potential for any significant adverse traffic impacts.

Table 4
2019 With Action Condition Level of Service Analysis
Signalized Intersections

	Weekday AM				Weekday Midday				Weekday PM				Saturday				Sunday			
Int.	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
Furman Street and Joralemon Street																				
EB	L	0.06	31.1	C	L	0.05	19.9	B	L	0.06	31.2	C	L	0.12	25.4	C	L	0.18	26.4	C
	R	0.08	31.6	C	R	0.04	19.8	B	R	0.28	35.8	D	R	0.16	26.0	C	R	0.23	27.5	C
WB	LR	0.26	34.8	C	LR	0.18	21.6	C	LR	0.43	40.0	D	LR	0.20	26.6	C	LR	0.19	26.6	C
NB	T	0.26	10.7	B	T	0.18	10.5	B	T	0.13	9.5	A	T	0.25	15.2	B	T	0.28	15.5	B
SB	T	0.12	9.3	A	T	0.22	11.2	B	T	0.53	14.5	B	T	0.46	18.5	B	T	0.22	14.5	B
	Intersection		15.4	B	Intersection		13.4	B	Intersection		18.3	B	Intersection		18.9	B	Intersection		18.4	B
Furman Street and Atlantic Avenue																				
EB	LT	0.05	13.1	B	LT	0.06	9.7	A	LT	0.07	24.2	C	LT	0.07	24.2	C	LT	0.06	24.1	C
WB	T	0.08	13.4	B	T	0.09	10.0	B	T	0.19	26.0	C	T	0.14	25.3	C	T	0.19	25.9	A
	R	0.22	0.4	A	R	0.11	0.2	A	R	0.12	0.2	A	R	0.19	0.3	A	R	0.20	0.4	A
SB	LT	0.29	27.5	C	LT	0.40	24.6	C	LT	0.70	24.5	C	LT	0.49	19.0	B	LT	0.22	14.9	B
	Intersection		11.3	B	Intersection		13.4	B	Intersection		21.0	C	Intersection		15.0	B	Intersection		12.3	B

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection

Table 5
2019 With Action Condition Level of Service Analysis
Unsignalized Intersections

	Weekday AM				Weekday Midday				Weekday PM				Saturday				Sunday			
Int.	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
Furman Street and Atlantic Avenue																				
SB	R	0.03	8.6	A	R	0.04	8.6	A	R	0.07	8.8	A	R	0.07	8.8	A	R	0.17	14.1	B

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection

F. CONCLUSION

The Loop Road modification would not result in any environmental effects, except for transportation. As described above and demonstrated by the successful pilot project, the proposed Loop Road modifications would result in an overall improvement in access, circulation, and safety for vehicular, bicycle, and pedestrian traffic using the Loop Road. Because the resulting service conditions show that both intersections would operate at acceptable LOS, the proposed Loop Road modifications would not result in the potential for any significant adverse impacts and therefore do not require preparation of an SEIS.

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