Memorandum

To: David Lowin, Brooklyn Bridge Park Corporation
From: Daniel Schack, AICP, PTP
Date: April 1, 2015
Re: Brooklyn Bridge Park Pier 5/6 Loop Road Traffic Study
Project No: 14-01-2407

At the request of Brooklyn Bridge Park Corporation (BBP), Sam Schwartz Engineering (SSE) has conducted a traffic study of the roadway in the southern end of the park (Loop Road), along Pier 5 and Pier 6. BBP commissioned this study to address operational issues currently occurring along the Loop Road, where high visitor activity at certain times results in conflicts between various user groups, including pedestrians, personal vehicles, transit buses, and bicycles. These conditions were expected to be exacerbated in the future when two residential buildings are constructed on the south end of the park, near Atlantic Avenue. To evaluate current operations of the Loop Road, SSE gathered information through a variety of methods.

This began with a series of site visits during peak visitation times in summer 2014. Qualitative observations of vehicle, pedestrian, and bicycle activity in the area were conducted by SSE staff on the following dates:

- Sunday, July 13, 2014
- Saturday, July 19, 2014
- Tuesday, July 22, 2014

Information sessions were also held with various park stakeholder to assess long-term issues within the park and discuss preliminary ideas for improvements in summer/fall 2014 with the following groups:

- Community Advisory Committee (CAC)
- Residents of One Brooklyn Bridge Park (1 BBP)
- New York City Department of Transportation (NYCDOT)
- Metropolitan Transportation Authority (MTA)
- Fire Department of New York (FDNY)

In addition, park planning documents and development proposals for the two planned residential buildings were reviewed to inform the site plans, specifically the locations of pedestrian and vehicle access points.

The findings of these site visits, stakeholder meetings, and plan reviews were used to develop an improvement plan for the Loop Road that is proposed to be implemented in phases before and after summer 2015. The findings of this study and the proposed improvements are discussed in detail in this memorandum.
Existing Conditions

SSE prepared an existing condition assessment through qualitative observations of Loop Road operations and interviews with park stakeholders. The findings of this assessment are below. Existing conditions are also shown in Figure 1.

Vehicular Circulation and Parking

BBP’s Loop Road is a two-way roadway with one lane in each direction; travel lanes range from twelve- to fifteen-feet wide. At the south end, Loop Road intersects with Atlantic Avenue and is near the Atlantic Avenue entrance and exit of the Brooklyn-Queens Expressway (BQE). At the north end, the roadway connects to Furman Street, a two-way truck route, and Joralemon Street, a one-way westbound roadway connecting to Brooklyn Heights.

Public parking within the park is limited, with only one privately-operated garage, located at 1 BBP with capacity for 312 vehicles. In addition, there are 19 meter-parking spaces on the west and south sides of 1 BBP.

The 1 BBP garage, on the south side of Loop Road, experiences long queues of entering vehicles during peak visitation times, especially weekend afternoons. The garage is valet-controlled and has one entry lane and one exit lane, which slows the flow of entering vehicles. On busy weekends, entrance queues at the garage were typically 4-5 vehicles long but exceeded 12 vehicles at certain times and reached Atlantic Avenue during midday on the weekends when traffic was observed. Attendants were observed directing some vehicles to form a second queue lane, lining up in between the garage entrance and exit lanes and encroaching on the southbound travel lane, and attendants also directed patrons to check their cars on street, leaving the first 4-5 vehicles in the queue without drivers and making the queue take longer to clear. Vehicles, including buses and fire trucks, heading northbound on Loop Road typically drove into the southbound travel lane to get around the garage queue.

Photos 1 & 2: Two queue lanes for 1 BBP garage; 1 BBP garage queue extends to Atlantic Avenue

At the northwest corner of Loop Road, a stop sign controls vehicles in both directions with a crosswalk for pedestrians walking between the park and the sidewalk in front of 1 BBP. Both are placed at the center of the roadway curve where moving vehicles and crossing pedestrians have limited visibility of each other.

On the west side of Loop Road, adjacent to Pier 5, frequent double parking and idling occurs. Vehicles appeared to consist of a combination of those waiting for a metered parking space to become available and
park patrons unloading passengers and goods at the picnic area and sports fields. These vehicles often block the flow of through traffic, forcing other vehicles to move into the opposing travel lane to continue through.

Photos 3 & 4: Double parked cars force vehicles into opposing lane; Passenger drop-off at northwest corner

At the northeast end of the Loop Road, where it intersects with Furman Street, the current striping pattern leaves it unclear to vehicles if there are one or two eastbound travel lanes or where vehicles should stop at red signals, with the stop bar before lane designation arrows (typically lane designations are before the stop bar).

On the north side of the Loop Road, vehicles frequently idle for long periods within the striped area in front of the 1 BBP loading dock, blocking the designated pedestrian path.

Photos 5 & 6: Pavement markings at Loop Road approaching Furman Street; Northwest corner crosswalk

Bicycle Network Connections
The Brooklyn waterfront greenway traverses the park from Pier 1 to Pier 6, continuing farther south on Columbia Street. Through the park, there is little delineation between the greenway and pedestrian pathways, with sporadic posts indicating the bike and pedestrian lanes; pedestrians and cyclists frequently were observed using the wrong lanes. The greenway segment on Pier 6 is shared by bicycles and pedestrians; however, pedestrian volumes are high at this location and bicycles often use the Loop Road to bypass this segment. On the north side of the Loop Road, sharrows from the former, temporary greenway path still remain and incorrectly direct cyclists.
Pedestrian Circulation
On the north side of the Loop Road, the south sidewalk runs along the north side of 1 BBP between Furman Street and the 1 BBP loading dock. West of the loading dock, the sidewalk jogs approximately 30 feet north around a planted area. The awkward configuration across the loading dock does not align with the pedestrian desire line into/out of the park and pedestrians frequently cross the Loop Road diagonally at this location, outside of the crosswalk, or walk in the street along the vehicle lanes.

Two crosswalks on Loop Road were observed to be frequently blocked by vehicles. The east/west crosswalk in front of the parking garage is often blocked by vehicles in the queue for the garage. The crosswalk on the northern bend of the loop road, between Furman Street and Atlantic Avenue, is also frequently blocked by vehicles dropping-off for long periods of time.

Transit Operations
The B63 bus, which travels between Fort Hamilton and BBP via Fourth Avenue and Atlantic Avenue, terminates at BBP on the south side of Loop Road, along the “elbow” area where the buses layover. On busy summer weekends, when garage queues peak, the often bypass the queues by traveling in the opposing traffic lane to reach their final stop/layover area.
Photos 11 & 12: BBP garage queue forces B63 bus into opposing lane; B63 bus stop and layover area
Figure 1: Existing Conditions

- Unclear pedestrian/cyclist delineation
- Poor sight distance between drivers and pedestrians
- Confusing pavement markings for vehicles and cyclists
- Short signal phase for pedestrians crossing Furman Street
- Long pedestrian crossing while turn radius shown high vehicle speeds
- Vehicle pick-up/drop-off activity
- Sidewalk and crosswalk not aligned with pedestrian desire line
- Long vehicle queues for garage
- Crosswalk often blocked by garage queues
- Sidewalk and crosswalk not aligned with pedestrian desire line
- Bus activity impeded by garage queues
- Limited sight distance and storage space for pedestrians
- Narrow sidewalks
- Confusing pavement markings for vehicles and cyclists
- Loop Road Study

Brooklyn Bridge Park Pier 5/6 Loop Road Study

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Sam Schwartz Engineering D.F.G.
Proposed Recommendations

Based on the observations, stakeholder interviews, and coordination with BBP, a preferred improvement plan has been developed. The primary change proposed would be to convert the Loop Road from two-way to one-way operations, in addition to multiple other design changes. The proposed one-way configuration would operate clockwise, with all vehicles entering the Loop Road at Atlantic Avenue and exiting at Furman Street. The primary benefit of one-way operation is that it would simplify operations along the roadway, reduce conflicts between crossing pedestrians and vehicles, double-parkers and through drivers, and alleviate a choke point at the 1 BBP parking garage. In addition, all vehicle access would be directed through Atlantic Avenue, discouraging park visitors that drive from using Joralemon Street through Brooklyn Heights to reach the park.

Pilot Program: Convert Loop Road to One-Way with Minimal Construction

These changes would be tested before final implementation by conducting a pilot program in spring/summer 2015 wherein striping and signage changes that can be installed relatively quickly and at low cost would be implemented first. The pilot program would consist of the following changes, also shown in Figure 2:

- Convert the two-way Loop Road to one-way northbound, between the MTA bus turnaround (referred to as the "elbow road") and Joralemon Street.
  - Northbound circulation is favorable since most drivers arrive to BBP via Atlantic Avenue, a major arterial, and it eliminates vehicle access from Joralemon Street to reduce traffic through Brooklyn Heights.
  - Provision of two travel lanes to provide a passing lane for buses and other vehicles to safely maneuver around garage queues or double parked vehicles along the west side of the Loop Road.
- Convert the existing on-street metered parking on the west side of the Loop Road to a pick-up/drop-off zone.
  - Pick-up/drop-off spaces would require enforcement, but should reduce double parking and idling and would provide a designated area for visitors to drop-off passengers and goods at the Pier 5 picnic area and playing fields.
- Relocate the crosswalk/stop sign at the northwest curve of Loop Road to a straight section to provide better sight distance between drivers and pedestrians.
- Install a painted pedestrian walkway in the eastbound curb lane, at the north most section of Loop Road.
  - This walkway would provide pedestrians a safe path along the pedestrian desire line.
- Remove residual bicycle pavement markings and install a designated shuttle bus area.

These measures would then be monitored through the summer when park visitation is highest to assess if circulation improves and if any adjustments to the plan are needed. Transportation planners and traffic engineers from SSE will evaluate the pilot throughout the summer by observing operations during both peak and off-peak visitation times and qualitatively assessing overall vehicle congestion on the Loop Road, particularly: pedestrian-vehicle conflicts, double-parking, vehicle speeds, operations of the private garage access point on the north side of 1 BBP, loading dock operations, and the impacts of garage queues on the B63 and through traffic. SSE will coordinate closely with BBP throughout the evaluation period and, if needed, changes will be made to the plan to better accommodate park operations and inform the long-term plan.
**Long-Term Recommendation: Convert Loop Road to One-Way and Close Elbow Road**

Following the evaluation of the pilot program, SSE will work with BBP, NYCDOT, and the MTA to finalize plans for long-term changes on the roadway. These plans will incorporate information gathered during observations of the pilot program and any adjustments that are needed. Concerns that were expressed by 1 BBP residents when the preliminary plans were presented will be specifically evaluated to inform the final design, including potential congestion from diverting all traffic on the Loop Road to one direction, additional travel distance required to reach the private garage, and operations of trucks at the 1 BBP loading docks.

The Long-Term plan is proposed to maintain one-way circulation and make other adjustments to enhance the pedestrian and bicycle environment along the roadway, calm vehicle traffic, and provide additional park space. Currently, the plan is proposed to include the following measures, as shown in Figure 3:

- Maintain a one-way northbound Loop Road between the elbow road and Joralemon Street.
- Close the elbow road to vehicular traffic and convert it to park space, which would
  - prove approximately 0.25 acres of additional park space and
  - permit the greenway to be shifted along the former alignment of the elbow road to follow a more direct route to Atlantic Avenue and provide separation of the bike path from the pedestrian path on Pier 6.
- Install additional greenway signage and ground markings to clearly delineate pedestrian and bicycle paths.
- Install raised intersections at all Loop Road crossings to ease pedestrian crossings, slow vehicle speeds (similar to a speed hump), and increase drivers’ awareness of pedestrians as they traverse the Loop Road.
- Maintain the previously proposed pick-up/drop-off zone on the west segment of Loop Road to accommodate vehicle drop-offs and prevent these vehicles from impeding through traffic.
- Relocate the crosswalk/stop sign at the northwest curve of Loop Road to a straight section to provide better sight distance between drivers and pedestrians.
- Straighten the west and north segments of Loop Road to increase visibility for all road users, and align the sidewalks on the north segment of Loop Road with the pedestrian sight line.
- Provide an additional pick-up/drop-off lay-by lane on the north side of the realigned north segment of Loop Road to provide additional capacity and accommodate vehicles dropping-off at new sections of the park, while removing them from the main roadway to prevent them from impeding through traffic.
- Widen the south sidewalk of the north segment of the road. Normalize the intersections of Atlantic Avenue and Furman Street, and Atlantic Avenue and Columbia Street to increase visibility, shorten pedestrian crossings, and slow turning vehicles.
- Widen the north sidewalk on Atlantic Avenue, between Furman Street and Loop Road, to provide a straight pedestrian path into the park and shorten the pedestrian crossing lengths across Atlantic Avenue.
- Extend the curbs on both sides of Joralemon Street, at Furman Street, to shorten the pedestrian crossing length across Joralemon Street.

To inform the long-term Loop Road design, SSE also reviewed the Pier 6 residential development proposals submitted to BBP in summer 2014 and made recommendations for pedestrian and vehicle access points.

For the eastern parcel, it is recommended that both resident access and vehicle access (to parking or loading) be provided along the Loop Road, on the west side of the parcel. Locating both access points on the Loop Road would reduce the likelihood of resident pick-up/drop-off activity occurring along the Furman Street curb lane, which has a four-foot wide shoulder that cannot accommodate a stopped
vehicle without encroaching on the adjacent travel lane. In addition, Furman Street is a designated truck route, and NYCDOT typically does not permit curb cuts on arterial truck routes.

For the western parcel, it is recommended that vehicle access (to parking or loading) be located on the north side of the parcel, opposite 1 BBP. This would place vehicle activity associated with the building away from the eastern parcel vehicle activity and the 1 BBP parking garage queues. Resident access could be located on the north or east side of the parcel.
Alternative Configuration: Close Section of Loop Road

An alternative configuration was also explored in which the entire western section of the Loop Road would be closed to vehicles, where the park would connect directly with 1 BBP. For this configuration, the following changes were considered:

- Close the west segment of Loop Road, between the elbow road and the 1 BBP loading dock, which would provide approximately 0.6 acres of additional park space. In this configuration, the elbow road would remain open to provide an outlet for vehicles and maintain B63 operations.
- Straighten the north segment of Loop Road, as in the preferred long-term configuration, to increase visibility between vehicles and pedestrians.
- Provide pick-up/drop-off space in a small section of the road on the north side to accommodate park patrons dropping off passengers and materials and preventing them from blocking through traffic.
- Convert the Loop Road, at the south side, to one-way northbound for the block approaching the 1 BBP parking garage, to provide a passing lane around garage queues.
- Install raised crosswalks at all Loop Road crossings to slow drivers and increase drivers’ awareness of pedestrians.

While this configuration would provide additional park space, it would also substantially limit the space available for vehicle pick-up/drop-off which led to concerns about congestion on the south end of the Loop Road that would significantly impede B63 bus operations and hinder access to the 1 BBP parking facility. In addition, the north side of the Loop Road would have to terminate in a dead end, which would hinder truck access to 1 BBP. Because of these potential congestion and operational issues, this configuration was not pursued.

Conclusion

Based on frequent observations of operations during peak visitor times, discussions with stakeholder groups and public agencies, and a review of proposed development plans at Pier 6, a one-way configuration of the park Loop Road and the other changes described above are recommended to enhance the pedestrian and bicycle environments in this section of the park while reducing vehicle conflicts and better accommodating pick-up/drop-off activity. These changes would be tested as a pilot program in spring 2015, through striping and signage changes. Following installation, operations on the roadway will be observed and assessed by SSE, BBP, and various Park stakeholders and public agencies, with adjustments made to the design as needed. If the pilot changes improve operations, the one-way configuration and other associated changes will be incorporated into the final design of the south side of the Park.