

Transportation Division
The Department of City Planning
City of New York

VERRAZANO
PEDESTRIAN/BICYCLE ACCESS:
PLANNING/DESIGN INVESTIGATION

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Introduction

As part of the proposed 350-mile New York City Greenway, the Department of City Planning has undertaken a feasibility assessment of providing access between Brooklyn and Staten Island for pedestrians and cyclists to encourage a pollution-free commuting alternative for and to improve recreational opportunities. Currently, cyclists and pedestrians must make this link via the Staten Island Ferry to or from Manhattan for Staten Island-Brooklyn trips.

The objectives for providing this link include ensuring safety for pedestrians and cyclists, ensuring that vehicular traffic is not impacted, linking to existing and proposed pedestrian paths and bike routes, and investigating the most cost-effective alternatives.

Four alternatives were assessed for reestablishing this bicycle and pedestrian access between Brooklyn and Staten Island: 1) bike on bus, 2) ferry, 3) an on-lane path, 4) a new and separate path across the bridge.

Three of these alternatives propose the use of the Verrazano-Narrows Bridge. The bridge is both long, nearly 2½ miles including the approaches and high, thus requiring steep climbs and a significant trip by foot or bike. The configuration of six lanes on each of the bridge's two levels does not allow for a new path on the roadway without eliminating one lane of traffic. High speed truck traffic discourages biking and walking along or beside the traffic lanes without a significant barrier. Suspension bridges are symmetrically balanced, making it probable that any new path on one side of the bridge would have to be equally loaded on the other side of the bridge. Traffic conditions are characterized as good. The fourth alternative addresses various ferry locations.

The study found that:

- ▶ This segment of the Greenway is critical to the success of the East Coast Greenway, as the link between Long Island, New York, New Jersey, and New England.
- ▶ Any proposed access alternative would be well used given the growing commuter market between Staten Island and Brooklyn, the need for access between the Brooklyn and Staten Island Gateway National Recreation Area, other significant visitor attractions and major employers.
- ▶ All four alternatives are found to be feasible, ranging widely in costs and benefits. All alternatives could be safe, secure, linked to other Greenways and would not impact vehicular traffic.

The preferred alternative for pedestrian/bicycle access between Brooklyn and Staten Island is a bike-on-bus system for existing New York City Transit Buses S53 and S79, which currently cross the Verrazano Bridge. This alternative is the safest, most cost-effective, and provides both a positive first step in the provision of access between the two boroughs and a method to assess the user demand for the inter-borough access. The total cost, including an advertizing campaign, is \$25,000.

Bus

Using new or existing buses and bus routes has proven to be an effective and inexpensive way to bridge gaps in Seattle and Phoenix and other municipal and regional bikeway systems, providing cyclists with new and expanded opportunities in commutation and recreation. Several bus options are possible, including bike-on-bus, shuttle buses, and franchise buses.

The bike-on-bus system involves installing an external bike rack to the front of the 21 buses currently used for existing New York City Transit Buses S53 and S79 which currently cross the Verrazano Bridge. Installation and maintenance costs are modest and no passenger space is lost inside the bus. Front mount racks offer the cyclist the greatest amount of safety since the loading and unloading are performed in full view of the bus driver.

Racks are relatively easy to use. Cyclists can load or unload a bike in less than 30 seconds, without the help of the driver or other individual, ensuring that buses will not be delayed in their routes. Once loaded, the bike is secure. The risk of damage to the bike or the bus is minimal, during loading, unloading or while in transit. There is also no compromise of safety to the bus riders or motorists who share the road. Even though the system is simple to use, most bus operators use some form of publicity to educate cyclists about proper use.

The "Line-Haul" option permits cyclists to board anywhere along the bus route, giving cyclists more flexibility making bike trips or commutes and attracting more users to the service. This may be particularly true of less experienced cyclists, who might like to make more ambitious trips but are uncertain about the exact length they could manage. The length of the bike portion of their trip can be reduced to fit their ability level and desire, using the service for greater distances either to and/or from their destination.

It is recommended that ten additional racks be purchased, two to be used for demonstrations and eight to be used at the discretion of the Transit Authority to equip back-up buses in case of breakdowns or to equip additional buses should S53 or S79 service be expanded.

Other bus options include a point-to-point system on the S53 and S79, a dedicated bike shuttle route, or the use of racks on franchise buses. The point-to-point system would allow bicycle loading and unloading from a designated point on either side of the bridge. The advantage of this system is that it specifically moves cyclists between the two boroughs. Those who cycle to the loading/unloading stops know that they are assured of getting across the bridge unless other cyclists arrive at the stop first (the capacity of most front mounted racks is two). A dedicated bike shuttle, which runs a continuous loop route service, can accommodate more bikers. Lastly, franchise buses could be equipped with bike racks and serve the commuting bikers. Requiring franchise buses to provide bike racks would increase the availability of buses crossing the bridge and thereby lessen the bikers waiting time.

The MTA New York City Transit (NYCT) has recently assessed the potential of bikes-on-buses. It concluded that a traditional bike-one-bus is not operationally practical. However, the NYCT suggested that operation may be appropriate for a private operator under contract to the City or to an agency with recreational facilities accessible via the bridge such as the National Parks Service in Fort Wadsworth in Staten Island and John Jay Park in Brooklyn.

The preferred alternative for pedestrian/bicycle access between Brooklyn and Staten Island is a bike-on-bus system for existing New York City Transit Buses S53 and S79 which currently cross the Verrazano Bridge.

Advantages

- ◆ Cost of outfitting buses is minimal.
- ◆ First test of a line haul service with bike racks.
- ◆ Simple to implement and operate.
- ◆ If demand is low, loss is minimal.
- ◆ Good intermediate step, when market demand increases, then next steps can be assessed.
- ◆ All-weather access across harbor.
- ◆ 24-hour access across harbor.
- ◆ Allows for access across bridge without the rigor of walking or riding 2 ½ miles with relatively steep grades.

Disadvantages

- ◆ Will not serve the market, there are not enough buses to meet the demand.
- ◆ Only two bikes/bicycles at a time. Therefore a family of three or four would have to split up, some waiting for as much as a half an hour to catch the next bus.
- ◆ Buses will be delayed by cyclists putting bikes on the racks.
- ◆ Racks may make buses operationally infeasible, as turning ratios may increase with a rack beyond the size of narrow urban streets.
- ◆ Buses are not dedicated to a specific line. At the end of rush hour, buses are distributed to various parts of the city; thereby putting bike racks all over the city on routes that are not approved for that purpose.
- ◆ Typically, cyclists would be required to wait for the bus.
- ◆ Limited hours of bus operation and limited users during off-peak times.
- ◆ Unless subsidized, it is anticipated that there would be a poor economic return for a shuttle service.

Although the costs, maintenance, access hours and ease of implementation rate well, there may be some increased operational concerns for the Metropolitan Transformation Authority (MTA), New York City Transit (NYCT).

Ferry

A ferry has the potential to provide transportation between Brooklyn and Staten Island for both pedestrians and cyclists who do not have access to a car. This would "link" portions of the Greenway in both boroughs, Shore Parkway in Brooklyn and Father Capodanno Boulevard in Staten Island. It would avoid having to take the Staten Island ferry to Lower Manhattan to connect between the two boroughs. Signage along the Greenway would provide information about the available ferry service on both sides of the Narrows.

Fort Wadsworth's Battery Weed is the preferred ferry docking site in Staten Island. Fort Wadsworth came under the jurisdiction of the National Park Service in September 1995. At this time, the National

Park Service is proposing a passenger ferry service between Battery Weed and other Gateway National Recreation Area units, and possibly Harbor Park.

Denyse Wharf is located in the Fort Hamilton section of Brooklyn, adjacent to the southeast foot of the Verrazano-Narrows Bridge. It is currently under the jurisdiction of the Department of the Army and is in a general state of disrepair. The fenced-off wharf is not accessible to the public. It was estimated in 1991 that renovating the wharf for use as a fishing pier would cost approximately \$125,000. The wharf sits on a 20 acre site, 16 acres of which are under water.

The 69th Street Pier is located in the Bay Ridge section of Brooklyn. It is under the jurisdiction of the New York City Department of Transportation. A commuter ferry operated by Express Navigation runs between Pier 11 in Manhattan and Atlantic Highlands in New Jersey with, until recently, a stop at the 69th Street pier in both directions. Bicycles are permitted on board for an extra three dollars. The 69th Street Pier is undergoing repair at the current time.

Advantages

- ◆ Ferries are an appealing mode of transport.
- ◆ Easy on and off.
- ◆ Easy access to Brooklyn's Shore Parkway Esplanade and Staten Islands bike routes on Bay Street and Father Capodanno Greenways.
- ◆ Recreational users will be well served.
- ◆ All-weather alternative.
- ◆ Safe.
- ◆ Secure.

Disadvantages

- ◆ To make this alternative economically feasible the cost to the user may be high.
- ◆ Waiting time may discourage users.
- ◆ Limited hours due of ferry operation and limited users during off-peak times.

Although this alternative rates well on user quality and safety, it is difficult to assess its market feasibility. As waterborne transportation grows, some profitable commuter ferry operation may want to serve recreational users during off-peak periods.

On-Lane

Creating the opportunity for cyclists and pedestrians to travel directly between Staten Island and Brooklyn could be achieved by establishing an on-lane path replacing one of the twelve vehicular lanes on the bridge. This alternative has the advantage of supporting two-way traffic for pedestrians and cyclists in one 12-foot wide path, thereby reducing costs. All other bridge alternatives require two paths because of the symmetrical loading needs of a suspension bridge.

There are two on-lane options, one on the northern-most lane of the lower level and another alternative

on the southern-most lane of the upper level. On the lower level, the northern-most lane is the least costly of the two on-lane options and requires no significant structures to be built. This option uses existing approach ramps — the westbound 92nd Street on-ramp on the Brooklyn side, and the westbound off ramp to School Street on the Staten Island side. The second option, on the south side of the upper level, uses the existing eastbound 92nd Street exit to Dalgren and proposes a ramp structure on the Staten Island side leading to New York Avenue or Major Avenue. This upper level option has the advantage of being open to the sky and the views and is without the noise and shading factors of the lower level option.

Overall, with five lanes of traffic, an LOS of C could be maintained during the morning peak hours and an LOS of D during the evening peak hours. The change in level of service is not significantly different between east- and west-bound traffic. Therefore, the focus of analyzing which lane could be closed with the least impact to vehicular traffic shifts to other determinants, such as access and egress from the bridge. The length, grade and transition from the bridge into the local street system have been assessed as important factors. Approach lengths approximate 1½ miles. Grades vary, but do not exceed 4 percent. Connections can be made to public parks, or preferably, to public streets with 24-hour access.

Another factor is the one-way toll, with only west-bound traffic stopping to pay the toll. Queuing for toll payment has rarely been a problem, and the recent installation of an electronic fare card system should further expedite vehicular traffic. The “E-Z Pass” allows motorists to slow down through the toll plaza as the electronic camera reads the pass displayed in the windshield, rather than coming to a full stop.

Moving from the bridge to the local streets should be a safe, efficient transition for cyclists and pedestrians, without any conflict with vehicular traffic. Traveling west-bound and exiting off the bridge, there are two possible pedestrian/cyclist routes which avoid vehicular lane crossings. The first is a maintenance road used only by the Metropolitan Transit Authority (MTA) Bridges & Tunnels vehicles. Entry to this road may be made before the toll plaza by a switch-back turn that follows back along the bridge anchorage and leads to Fort Wadsworth or Major Avenue. This road and the adjacent shoulder widths are sufficient to support a separate path. The second exit ramp, located after the toll plaza, leads to School Road, which provides a smooth transition onto local streets. Traveling east-bound, the 92nd Street off-ramp provides the most acceptable choice for bicycle and pedestrian use. The off-ramp is striped for one lane with about a ten-foot striped shoulder. This exit terminates directly in the vicinity of Fort Hamilton at Dalgren Place and could be connected to the Shore Parkway section of the Greenway along the Brooklyn waterfront.

To separate vehicular traffic from cyclists and pedestrians, jersey barriers could be placed between the traffic lane and the bicycle/pedestrian lane. The cost is approximately \$5.8 million.

Advantages

- ◆ A path would have 24-hour access.
- ◆ Minimum maintenance would be required.
- ◆ Access on and off the path would be easy for cyclists.

- ◆ Good connections to the Greenway Network.
- ◆ One path across the bridge rather than two, which is necessary for a new and separate path.
- ◆ Less costly alternative than a new and separate path.

Disadvantages

- ◆ Loss of one lane of traffic is an opportunity cost for future use of the bridge.
- ◆ Pathway is adjacent to traffic and subject to roadway noise and fumes.
- ◆ Fewer traffic lanes may inconvenience motorists.
- ◆ Modification of sidewalk requires closure of one traffic lane during construction.

A New and Separate Path

A new and separate path for pedestrians/cyclists could be constructed on the Verrazano-Narrows Bridge. The Department of City Planning selected a consultant, Ammann and Whitney, to assess any potential impact on the structure of the bridge.

Five alternative routes were developed and assessed across the main span of the bridge. Two basic route concepts have been evaluated for connection of the upper and lower level pathway locations across the main span. The first concept proposes a ramp structure to be built adjacent to the anchorages. The second concept proposes a pathway which generally follows the alignment of the existing approach roadways and maintains a maximum grade of 5 percent.

All of the approach alternatives evaluated require construction of new ramps and structures and/or modification of the existing structure to accommodate the bicycle/pedestrian pathways. Other alternatives such as stair towers were not evaluated due to the overall height of 90 to 140 feet. Elevators were not considered to be a viable option due to the costs of operation, security, and the need for a back-up means of egress.

The preferred alternative for a pedestrian/bicycle pathway across the Verrazano-Narrows Bridge combines the path between the suspender ropes on the main bridge with the pathway at existing sidewalks on the Brooklyn Approach and the new pathway structures at the Staten Island Approach. Two separate paths are recommended, the one on the north side of the bridge for pedestrians and the one on the south side for bicyclists. The path is proposed to be 10 feet wide with a horizontal clearance of 7'-11" at suspender rope locations, occurring approximately every 50 feet. The location of the paths on the main bridge at the upper level between suspender ropes provides advantages in structural considerations, ease of construction and costs. The whole life cost (for 50 years) is estimated at \$26.5 million.

The MTA prefers another scheme outboard of the lower level, maintaining that the continuous 10-foot path is safer, easier to maintain and less of a security risk to the facility. MTA is concerned about the safety and liability inherent in any strategy that introduces pedestrian and bicycle access to the Verrazano-Narrows Bridge.

Advantages

- ◆ A new and separate path would have 24-hour access.
- ◆ This path separates pedestrians/cyclists from automobile traffic.
- ◆ Separate bike and pedestrian paths improve safety.
- ◆ Path location offers unrestricted views.
- ◆ Suspender ropes provide a feeling of containment without blocking vistas, thereby providing a sense of security.
- ◆ Minimum structural reinforcement required.
- ◆ Good connection to public transportation.
- ◆ Pathway visible from roadway, providing one degree of security.

Disadvantages

- ◆ Two Paths are required to provide for balanced loading of bridge structural elements.
- ◆ Minimum width of 8-feet for two-way bikeway cannot be met where suspender ropes interrupt 10-foot width of path.
- ◆ Construction costs for new path are expensive
- ◆ Path is adjacent to suspender ropes and accessibility to the structural members poses a security concern.