# East River Bridge Tolls

*Revenue, Traffic, Mobility and Equity Impacts*

Prepared for

Transportation Alternatives

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Schaller Consulting

94 Windsor Place, Brooklyn, NY

(718) 768-3487

schaller@schallerconsult.com

www.schallerconsult.com

# Summary

Transportation planners have long sought to toll the East River bridges to reduce traffic delays on the bridges and reduce traffic in neighborhoods near the bridges. Proposals to toll the bridges have recently come to the fore as a means of helping close the City's budget deficits by paying for the costly rebuilding and maintenance of the bridges and other components of the city's transportation infrastructure.

This report uses available data to assess the likely financial, traffic, mobility and equity impacts of tolling the East River bridges. This analysis synthesizes data covering traffic patterns, traffic speeds, characteristics of those who use the bridges, toll collection technologies and the traffic impacts of previous toll increases.

Based on this preliminary analysis, we conclude that tolling the bridges offers compelling benefits for New York as a source of City revenue and as a transportation measure. At the same time, the data and analysis presented here needs to be augmented before tolls can be implemented. Thus, in addition to the substantive findings, the report identifies issues needing further research.

# Summary - Revenues

- Tolls on the City-owned East River bridges would raise half a billion dollars in annual revenue for the City of New York.
  - $522 million in annual revenues if the City adopts current MTA toll charges.
  - $482 million if the City uses peak-period toll charges.
- Toll revenues to the Metropolitan Transportation Authority (MTA) would increase because motorists who currently use the City-owned bridges to avoid paying a toll would switch to the Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge.
  - $58 million annually in additional MTA toll revenues if the City adopts current MTA toll charges
  - $106 million annually if the City uses peak-period toll charges.

# Summary - Traffic Benefits

- Traffic on the East River bridges would be reduced by 24-26%, producing faster and more reliable travel times for both bridge users and other motorists in neighborhoods near the bridges.
- Traffic on streets leading into Downtown Brooklyn would be reduced by 12%. This means:
  - 1,300 fewer vehicles per day on Hicks Street
  - 1,400 fewer vehicles per day on Court Street
  - 1,000 fewer vehicles per day on Smith Street
  - 800 fewer vehicles per day on Clinton Street
- Traffic on streets leading into Long Island City would be reduced by 14%. This means:
  - 390 fewer vehicles on Thomson Avenue between 8-9 a.m.
  - 280 fewer vehicles on 21st Street between 8-9 a.m.
  - 180 fewer vehicles on Queens Blvd. between 8-9 a.m. (full daily counts are not available).

- In terms of toll collection, with the advent of E-ZPass electronic toll collection and London-style license plate readers (also used for red light enforcement in New York), tolls can be collected without creating car-clogged toll plazas at bridge approaches.
- In terms of impact on Brooklyn, Queens or Staten Island residents, East River bridge tolls would affect only 2.8% of all trips (by any mode) that originate in these boroughs.

# Summary - Further Analysis Needed

While this study provides a solid basis for debate and discussion about East River bridge tolls, much also needs to be learned to fully understand the effects of tolls. Major questions are:

- Economic effects on restaurants and other merchants in neighborhoods near the bridges.
- Quantification of travel time and air quality improvements.
- Whether toll payments should be capped, e.g., at 1-2 round trip tolls per day, to reduce the impact on plumbers, electricians, delivery vehicles and others who need to use the bridges repeatedly during the day.

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# I.
# WHY EAST RIVER BRIDGE TOLLS MAKE SENSE

# Tolls will address problems of congestion and lack of funding

Motorists are charged tolls to use all three Hudson River bridges and tunnels and three of the East River crossings that lead into Manhattan. Toll charges vary from $4 off-peak E-ZPass tolls on Hudson River crossings to $8 (round trip) for motorists paying in cash at the Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge.

The existing tolls, among the highest in the U.S., encourage use of the plentiful transit services into Manhattan, with substantial benefits for traffic congestion and air quality. A portion of toll revenues are also used to help fund subway, bus and commuter rail services in the New York area.

The four City-owned East River bridges, on the other hand, are untolled. Free passage on the Brooklyn, Manhattan, Williamsburg and Queensboro Bridges encourages people to use their cars for travel over the East River. The lack of tolls also encourages motorists to choose the free bridges in place of tolled bridges and tunnels, even when the tolled routes would be shorter and quicker. This contributes to traffic congestion on the bridges and their approaches in neighborhoods near the bridges.

Though generating no revenue, the City's East River bridges require substantial funds for repair and maintenance. Thus, unlike the MTA crossings, the City bridges are a drain on the City budget and provide no funds for other urgent transportation needs.

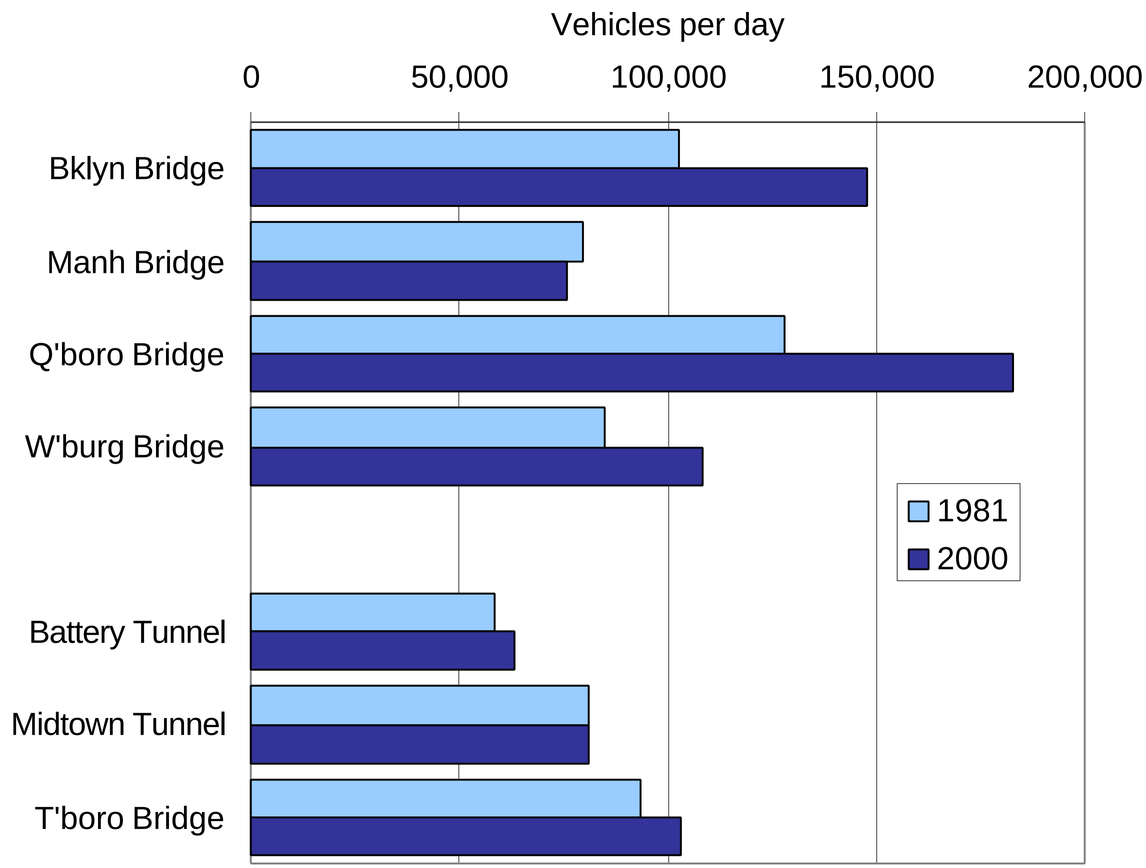
# The congestion problem

- Over the last two decades, motorists have flocked to the City bridges to avoid paying increasing tolls at the tolled crossings.  In the last 20 years, traffic on the City bridges increased 30% compared with a 6% increase for the Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge.  (See Figure 1 on next page.)
- Motorists drawn to the City-owned East River bridges clog the streets of Downtown Brooklyn and Long Island City.  As discussed below, during the morning rush hour, 43% of traffic entering Downtown Brooklyn is through traffic bound for the Brooklyn or Manhattan bridges.  Similarly, over one-half of the vehicles entering Long Island City are bound for the Queensboro Bridge.  (The proportions are similar during the middle of the day and evening commute times.)
- The bridges experience much heavier midday and evening traffic loads than the tolled crossings.  This traffic clogs neighborhood streets, pollutes the air and poses dangers to pedestrians throughout the day. Midday, 45% of traffic coming into Downtown Brooklyn is bound for the Brooklyn or Manhattan bridges.

# Figure 1. Growth in Bridge Traffic, 1981-2000

*Traffic up 30% on untolled City bridges*

*Traffic up 6% on tolled crossings*




Note that Manhattan Bridge traffic volumes are affected by an extensive bridge rehabilitation program.

# The “free” bridges are expensive to taxpayers

Maintaining and rebuilding the East River bridges requires enormous sums of scarce City funding. In the last decade the City has expended $1.62 billion on rebuilding the four East River bridges.[1]* Nearly one-half of this work was City funded.

Over the next decade, the City projects spending an additional $833 million on the East River bridges, most of which will be City funded.[2] This includes:

- $278 million for the Brooklyn Bridge
- $337 million for the Manhattan Bridge
- $23 million for the Williamsburg Bridge
- $195 million for the Queensboro Bridge.

In addition to these capital expenditures, the City spends $60 million annually on maintenance and operations for all City-owned bridges (a breakout for East River bridges is not available).[1]

# The solution: tolls

Tolling the City-owned bridges can be a practical and fair way to reduce traffic congestion on the bridges and in surrounding neighborhoods and pay for expensive rebuilding and maintenance of the bridges, thus freeing up funds for other vital City needs.

Our analysis concludes that a toll program should be comprised of the following elements:

- Identical toll charges on the East River bridges and MTA crossings, at least during peak periods.
- Peak period pricing, like that in place for the Holland and Lincoln tunnels and George Washington Bridge.
- High-speed toll collection using E-ZPass tags in combination with a London-style license plate system.

# The benefits: revenue and reduced traffic

- One-half billion dollars annually in additional revenue to help pay for bridge reconstruction and maintenance and for other vital transportation improvements.
  - $522 million in annual revenues if the City adopts current MTA toll charges
  - $482 million if the City uses peak-period toll charges.
- Additional toll revenues at the MTA crossings, as some motorists who currently use City-owned bridges to avoid tolls would switch to the MTA facilities. A portion of these funds are allocated to New York City's subway and bus system.
  - $58 million annually in additional MTA toll revenues if the City adopts current MTA toll charges.
  - $106 million annually if the City uses peak-period toll charges.
- 24-26% reduction in traffic on the City bridges, producing faster and more reliable travel times.
- 10-12% reduction in traffic through neighborhoods leading to the City bridges, producing faster and more reliable travel times for both bridge-bound and other motorists.

# II.
# FINDINGS

# 1. Effects on Bridge Traffic

# How tolls reduce bridge traffic

*Opponents of East River bridge tolls question whether tolls would reduce congestion on the bridges and surrounding streets. Yet it is a well-established fact that changes in the cost of travel affects the amount of travel. Witness, for example, the large increases in transit ridership that followed MetroCard fare discounts, as well as decreases in traffic on the Battery and Midtown tunnels and other tolled crossings that follow toll increases.*

*Tolls on East River bridges will produce particularly large improvements to traffic speeds because bridge tolls will eliminate the incentive for drivers to avoid the MTA crossings in favor of the free bridges. Thus, tolls will have a two-fold effect on traffic congestion -- a reduction in bridge traffic from pricing, and the effect from eliminating or at least reducing diversions from tolled crossings.*

*This section discusses both effects, thus showing how tolls would reduce traffic volumes.*

*The impact of tolls on vehicle speeds requires a detailed traffic analysis that is beyond the scope of this study.*

# Effects of toll increases on East River crossings

The relationship between tolls and traffic can be shown in two ways. Most simply, one can observe changes in traffic that occur after a toll increase.

- Traffic levels on the MTA's East river crossings declined by 5.3% after the MTA's March 1996 toll increase.(3)

This approach, however, fails to take into account many other factors such as economic growth (or contraction) that also affect traffic levels. Regression models provide a way of quantifying the impact of tolls separately from economic changes and other factors.

- A study conducted for the MTA in 2002 concluded that, holding other factors constant, each 10% increase in tolls (e.g., from $3.00 to $3.30) reduces traffic as follows:
  - 38.6% on the Brooklyn-Battery Tunnel
  - 20.8% on the Queens-Midtown Tunnel
  - 19.6% on the Triborough Bridge
  - 8.5% on the Throgs Neck and Bronx-Whitestone bridges.(4)
- The reductions are greater where motorists have other alternatives -- such as taking free bridges or using transit -- and smaller where motorists have few alternatives, as is the case at the Whitestone and Throgs Neck bridges.

# Numerous drivers use free bridges to avoid tolls

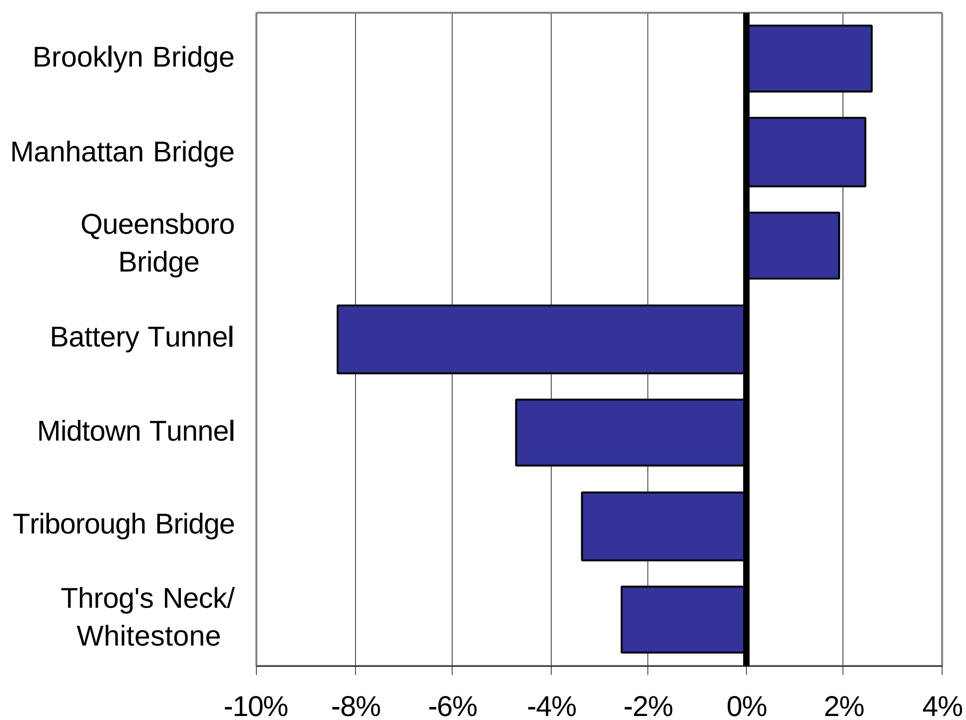
After each MTA toll increase, some additional number of drivers switched from using MTA crossings to using the untolled East River bridges. The extent of these diversions was illustrated after the MTA's 17% toll increase, from $3.00 to #3.50, in 1996.*

- Traffic volumes on the Whitestone and Throgs Neck Bridges, which are unaffected by diversion to free bridges, decreased by 2.6% from 1995 to 1996.(3)
- By contrast, Battery Tunnel traffic volume declined 8.3%.
  - The BBT decline partially accounts for a 2.5% increase in traffic volumes at the Brooklyn and Manhattan bridges between 1995 and 1996.
- Traffic volumes declined by 3.4% on the Triborough Bridge and 4.7% on the Queens Midtown Tunnel between 1995 and 1996.
  - Traffic on the untolled Queensboro Bridge increased by 1.9%.

(See Figure 2 on next page.)

*The May 2003 toll increase is likely to show similar diversions, although data are not yet available to quantify the effects.

# Figure 2. Change in Traffic Volumes After 1996 MTA Toll Increase




Change in 6 a.m. to 7 p.m. traffic volumes from fall 1995 to fall 1996.

Evening and overnight hours excluded to eliminate effects of construction work during those time periods. Williamsburg Bridge omitted due to daytime construction. Throg's Neck and Whitestone bridges combined to offset construction impacts as first one, then the other bridge underwent construction work.

# Drivers bypass tolled crossings to reach the free bridges

Information about the routes motorists travel confirms that many drivers bypass tolled crossings in favor of the free City bridges.

- A 1999 survey of Gowanus Expressway motorists found that 35% of Manhattan-bound drivers bypassed the Brooklyn Battery Tunnel and instead used the Brooklyn, Manhattan or Williamsburg Bridges during the morning peak period. Most of these diverted drivers used the Brooklyn Bridge.(5)

Diverting motorists substantially increase traffic on the East River bridges.

- Drivers bypassing the Brooklyn Battery Tunnel comprised one-third of Brooklyn Bridge traffic during the morning peak.(6)
- 12% of bridge users in 2000, from all four City-owned bridges, were "diverted" drivers, based on our analysis of traffic effects from toll increases on the MTA crossings.(7)

***In sum, tolls clearly reduce traffic volumes, and the presence of tolls on the MTA crossings but not the City bridges, increases traffic on the City bridges.***

# Peak hour tolls would reduce bridge traffic by 24%

***Using peak period pricing, East River bridge tolls would reduce traffic on the bridges by 24%, with the largest reductions at peak times when the bridges are most congested.***

We estimate traffic effects from two toll options. The first is **peak-hour toll charges**:

- $5 peak toll (6-9 a.m. and 4-7 p.m.) on both City bridges and MTA crossings.
- MTA tolls remain at $3.50 for off-peak periods.
- $2.50 off-peak tolls on the City bridges, $1 lower than at MTA crossings. Lower off-peak rate for City bridges is intended to reduce the impact of tolls on motorists traveling between boroughs for entertainment, dining and other social purposes.

This toll structure would produce a 24% overall reduction on East River bridges:

- 37% reduction in peak period traffic on the City-owned bridges.
- 18% reduction in off-peak traffic on the City bridges.
- MTA crossings would experience no increase in traffic volumes during the peak (due to higher peak-period tolls).
- 27% increase in off-peak traffic at MTA bridges as motorists who avoided the tolled MTA crossings no longer do so.

# Traffic impacts of using current MTA toll charges

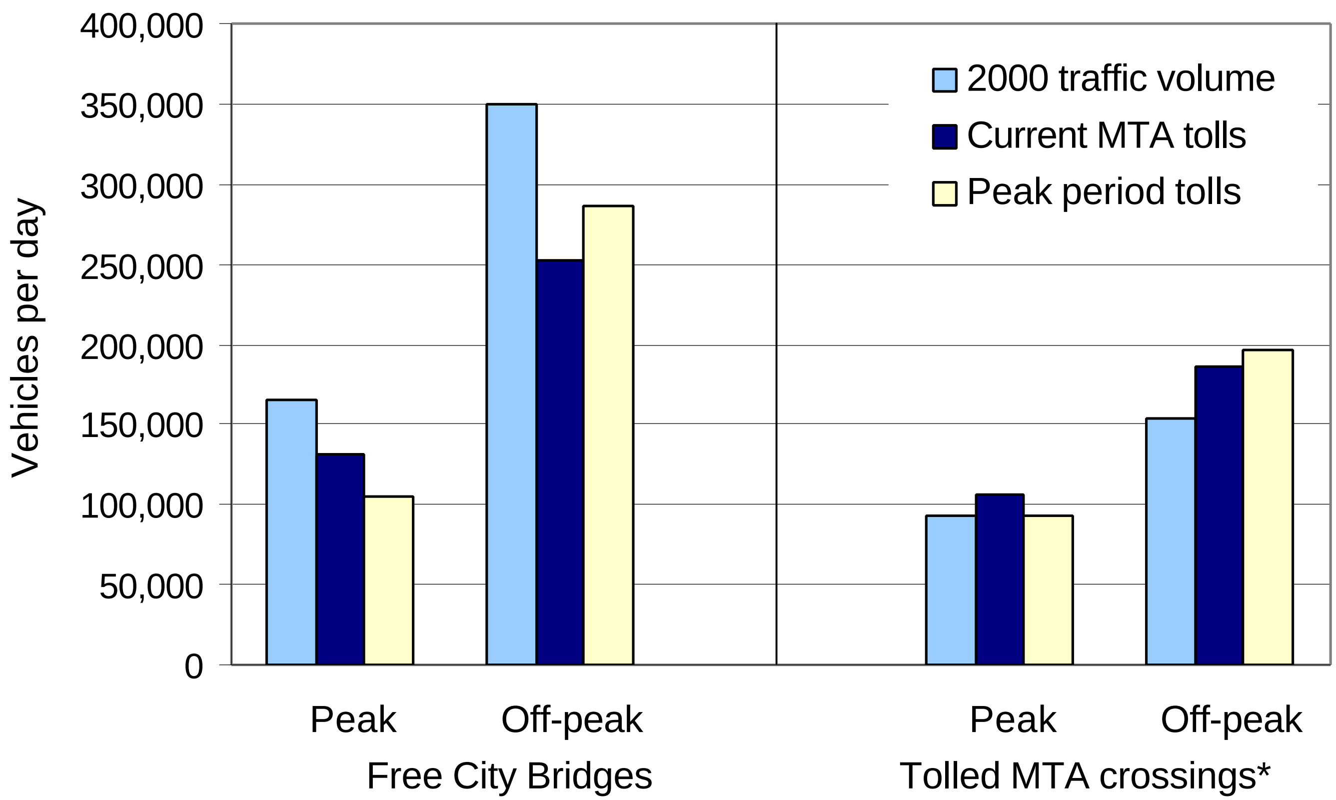
Placing **current MTA toll charges** ($3.50 for E-ZPass users) on the City bridges would produce:

- 26% reduction in traffic on the City bridges.
- 18% increase in traffic volumes on MTA crossings. Traffic volumes would increase on MTA crossings because motorists who now go out of their way to avoid a toll would no longer do so.
- Bridge traffic would decline somewhat more during off-peak than peak hours since off-peak motorists tend to be more sensitive to toll increases. (See Figure 3 and Table 1 on next two pages.)

Peak period pricing's advantages over the current MTA tolls are:

- Greater reduction in bridge traffic during the most congested time periods -- the morning and evening rush hours
- No increase in traffic on MTA crossings during the peak hours.

# Figure 3.
# Traffic Volumes, Year 2000 and With Bridge Tolls




*Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge.

# Table 1. Traffic Impacts of Tolls

**Peak-period tolls ($5 peak/$2.50 off-peak)**

| | 2000 traffic volume | Projected | Change |
|---|---|---|---|
| **East River bridges*** | | | |
| Peak | 165,080 | 104,587 | -37% |
| Off-peak | 349,687 | 286,202 | -18% |
| Total | 514,767 | 390,789 | -24% |
| **MTA East River crossings**** | | | |
| Peak | 93,558 | 93,287 | 0% |
| Off-peak | 153,642 | 195,619 | 27% |
| Total | 247,200 | 288,906 | 17% |
| **Grand Total** | **761,967** | **679,695** | **-11%** |

**MTA tolls ($3.50)**

| | 2000 traffic volume | Projected | Change |
|---|---|---|---|
| **East River bridges*** | | | |
| Peak | 165,080 | 131,331 | -20% |
| Off-peak | 349,687 | 251,909 | -28% |
| Total | 514,767 | 383,240 | -26% |
| **MTA East River crossings**** | | | |
| Peak | 93,558 | 105,626 | 13% |
| Off-peak | 153,642 | 186,287 | 21% |
| Total | 247,200 | 291,913 | 18% |
| **Grand Total** | **761,967** | **675,153** | **-11%** |

* Brooklyn, Manhattan, Williamsburgh and Queensboro bridges

**Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge

Tolls are for E-ZPass users; assume 50 cent higher for non-E-ZPass payment and continuation of current toll structure for trucks.

Peak period is 6-9 a.m. and 4-7 p.m., both directions.

# 2. Toll Collection Issues

# Toll collection need not cause traffic jams at the bridges

*Traffic impacts in neighborhoods surrounding the City-owned East River bridges is a key issue for implementation of bridge tolls. In discussions of tolls in the 1970s and 1980s, it was difficult to imagine implementing tolls for this reason alone. But proven technologies can remove this barrier. These technologies include E-ZPass electronic toll collection and license plate cameras that are being used in New York City's red light program and London's congestion charging scheme.*

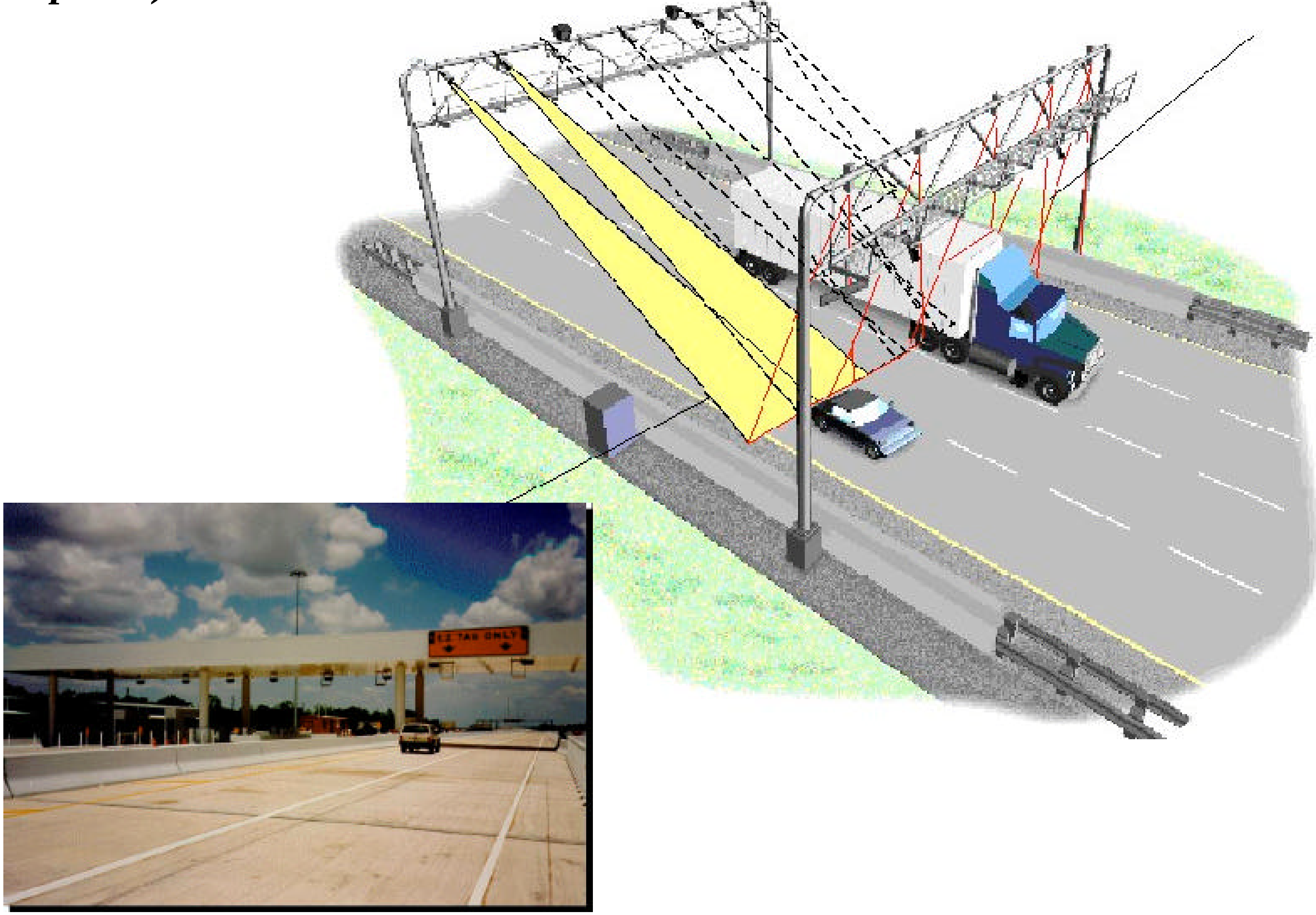
*A combination of E-ZPass, which has a high penetration among bridge users, and license plate cameras for non-E-ZPass motorists could be used to collect tolls.*

# Using E-ZPass on City bridges

The existing E-ZPass technology can be used for most of the toll collection on City bridges.

- E-ZPass toll collection technology can handle current traffic volumes on the East River bridges.
  - High-speed toll lanes, which are increasingly being used in the New York area, can handle 1,800[8] to 2,000[9] vehicles per hour. (See Figure 4.) This capacity exceeds 2000 traffic volumes of 1,600 vehicles per hour per lane on the Brooklyn Bridge and 800-900 vehicles per hour per lane on each of the other three City bridges.[10]
    - High-speed toll collection equipment is currently in operation at the Palisades Parkway approach to the George Washington Bridge.
    - New Jersey is installing high-speed toll collection at seven toll plazas on the New Jersey Turnpike, Garden State Parkway and Atlantic City Expressway between mid-2003 and the end of 2005, at a cost of $45 million. These lanes will process 2,000 vehicles per hour.[9]
  - Already, the MTA's toll collection booths process 900 to 1,000 vehicles per hour at dedicated E-ZPass toll lanes, despite the fact that vehicles must slow to a near-stop at the MTA's gated booths.[4]
- Based on E-ZPass usage at MTA crossings, we can expect that over 80% of motorists are likely to use E-ZPass at the East River bridges

***Figure 4. High-speed toll installations (currently in place in Florida, Illinois and other places)***



# License plate cameras

Both New York City and London have successfully used license plate cameras to identify vehicles for the purpose of assessing red light fines (in the case of NYC) and for congestion charges (in the case of London).

New York City's red light program demonstrates the practicality of license plate cameras.

- Violation notices are sent to vehicle owners whose vehicles are detected and photographed running red lights at selected intersections.
- The program has produced a 38% decrease in red light violations.[11]
- Cost per intersection for the system is $60,000.[12]

# License plate cameras in London

London's congestion charging program, implemented in February 2003, also shows the technical feasibility of license plate reader technology.

- Motorists can pay the congestion charge via the Internet, through a call center, at retail outlets or through mobile text messaging. License plates are checked against payment records.
- Those not paying are sent a Penalty Charge Notice (PCN).
- Vehicle owners who receive a PCN can either pay the charge or make a "representation" as to why they should not pay. Vehicle owners can appeal a denial of the representation.
- Transport for London's June 2003 evaluation of the program concluded that "the cameras, telecommunications and number plate reading systems are all working effectively." (13)

# Toll collection on City bridges

For toll collection on City bridges, the City can combine license plate cameras with E-ZPass. Motorists with E-ZPass could use their E-ZPass tags on the City bridges. Those without E-ZPass could utilize London-style payment options. There would be no need for toll plazas or cash lanes on the bridges.

- E-ZPass readers on each bridge would charge motorists' E-ZPass accounts. (This assumes that the City could link into the E-ZPass system.)
- License plate cameras would be installed in several locations on each bridge to generate multiple photos in case the first picture is unreadable. Motorists would pay the toll via the Internet, through a call center, at retail outlets or through mobile text messaging. Those not paying the charge within a day would face a penalty fee.

# The issue of round-trip versus each-way tolls

Currently, motorists pay a toll each time they use one of the MTA's East River crossings. By contrast, a round-trip toll which is paid coming into New York City is charged on Port Authority crossings.

Round-trip tolls are feasible only where there are no untolled alternatives. Thus, tolling the East River bridges offers the opportunity to convert MTA facilities to round-trip tolls.

Round-trip tolls, however, negate some of the benefits of peak period pricing. A round-trip toll collected from in-bound vehicles in the morning rush would not give any incentive to drivers to return home outside the evening peak period. Likewise, drivers entering Manhattan off-peak could return during peak times without paying a peak toll.

Peak period pricing thus makes it desirable to collect a toll both inbound to Manhattan and outbound.

Whether tolls are charged on a one-way or round-trip basis, the same policy should be applied to all East River crossings. This will necessitate coordination between City and MTA toll policies.

# 3. Neighborhood Impacts

# Tolls will reduce traffic congestion in Downtown Brooklyn

*A major benefit of bridge tolls is reducing traffic congestion on surrounding streets.  In both Downtown Brooklyn and Long Island City a substantial portion of traffic on neighborhood streets are vehicles using the bridges.  By reducing traffic volumes on the bridges, tolls will significantly reduce traffic congestion and increase traffic speeds in these neighborhoods.*

In Downtown Brooklyn:

- Bridge-bound traffic comprises 43% of all vehicles entering Downtown Brooklyn during the morning rush hour and 45% during midday.[14]
- The number of vehicles entering Downtown Brooklyn would be reduced by 12%.  This means:
  - 1,300 fewer vehicles per day on Hicks Street
  - 1,400 fewer vehicles per day on Court Street
  - 1,000 fewer vehicles per day on Smith Street
  - 800 fewer vehicles per day on Clinton Street
- Travel speeds on streets entering Downtown Brooklyn such as Hicks, Clinton and Smith Streets average 12-14 miles per hour.[15]  The projected 12% reduction in traffic would improve speeds, although without a detailed traffic analysis it is not possible to say by how much.

# Tolls will reduce traffic congestion in Long Island City

Similarly, in Long Island City* near the Queensboro Bridge:

- 57% of traffic entering the area during the morning peak hour is bound for the Queensboro Bridge.(16)
- Tolls would reduce the number of vehicles entering Long Island City during the morning peak by 14%. This means approximately:
  - 390 fewer vehicles on Thomson Avenue between 8-9 a.m.
  - 280 fewer vehicles on 21st Street between 8-9 a.m.
  - 180 fewer vehicles on Queens Blvd. between 8-9 a.m. (full daily traffic counts are not available).

*In this analysis Long Island City is defined as the area bounded by Skillman Avenue on the southeast, 11th and 13th Streets on the west and 41st Street on the north.

# Tolls will reduce truck traffic on Canal Street

Currently, many truckers avoid the one-way, Staten Island-bound toll on the Verrazano-Narrows Bridge by using the Manhattan Bridge instead. Trucks that divert to Manhattan add to severe traffic congestion on Canal Street, a heavily traveled commercial street in Chinatown, and at approaches to the Holland Tunnel.

Instituting tolls on the Manhattan and other East River bridges would reduce the incentive for truckers to avoid the Verrazano, and thus reduce traffic congestion and air pollution on Canal Street.

# How will tolls affect the economy of neighborhoods near the bridges?

Toll opponents fear that tolls would reduce patronage at restaurants and other retail establishments in neighborhoods such as Downtown Brooklyn and Chinatown in the area of the bridges.

Unfortunately, information to assess economic impacts does not currently exist. An analysis of how many current patrons use the City bridges and the effects of tolls on patronage is needed to address this important issue.

Notably, London's congestion pricing program is viewed positively by local businesses. In a survey of companies conducted by a London business organization, 49% said that they believe congestion charging is working, 35% remain undecided and 16% think it is not working. Regarding the economic impacts of congestion charging, 17% believe the impact on the overall London economy has been positive compared with 15% negative and 66% saying neutral or too early to tell.(17)

# 4. Effects on Drivers

# Tolls would have little impact on low-income New Yorkers

*Equity considerations are sometimes raised as an objection to bridge tolls. However, motorists crossing the bridges are skewed toward the upper income ranges. Lower income New Yorkers are far more likely to take transit -- and pay the recently increased subway and bus fare -- than to use the bridges. Thus, equity considerations support the argument that bridge users should, like transit riders, pay for what they use.*

- 8% of bridge users have household incomes under $25,000, compared with 16% of transit riders using the subway, bus or commuter rail to cross the East River.
- At the other end of the income scale, 21% of bridge users but only 16% of transit riders crossing the East River have incomes over $100,000.

(See Table 2 on next page.)

# Table 2. Household Income of Bridge Users and Transit Riders Crossing East River

| | **Trips across East River** | |
|---|---|---|
| | Using free bridges | Using transit |
| Under $25,000 | 8% | 16% |
| $25,000-$49,999 | 21% | 20% |
| $50,000-$75,000 | 17% | 17% |
| $75,000-$100,000 | 17% | 12% |
| Over $100,000 | 21% | 16% |
| Don't know/refused | 16% | 20% |
| Total | 100% | 100% |
| Base | 473 | 662 |

Source: 1997-98 Household Interview Survey conducted by NY Metropolitan Transportation Council and North Jersey Transportation Council.

Note that the frequency of toll payment was underreported in the survey. Survey results indicate that 18% of motorists traveling from Long Island to Manhattan paid a toll. The actual figure is likely to be substantially higher. As a result, some respondents who are classified as using a free bridge actually used a tolled crossing. The effect on the household income distribution of City bridge users shown above is uncertain but may somewhat skew the results to higher income levels. In other words, true City bridge users may in fact have a somewhat lower income distribution than shown above.

# Should New York City residents receive toll discounts?

*It has been suggested that tolls, if adopted, should be discounted for New York City residents. One precedent is the discount Staten Island residents can obtain for the Verrazano-Narrows Bridge.*

*While the appeal of this idea is understandable, discounts would undermine the benefits of bridge tolls because most bridge users are in fact New York City residents. Discounts would largely erase the revenue-raising goals of tolls and would reduce the congestion and traffic delay benefits.*

- 59% of bridge users are New York City residents, primarily living in Brooklyn and Queens.*(18)
- Non-residents are primarily Long Islanders (28%), from New Jersey (9%) or upstate New York (2%) and Connecticut (2%).

*The 59% figure most likely understates the true percentage of East River bridge users that live in the city. As indicated in Table 2, the frequency of toll payment was underreported in the survey. The effect is most likely to inflate the number of non-City residents using City bridges as compared with City residents.

# What are impacts on small businesses who must use the bridges repeatedly?

Another issue raised is the impact on plumbers, electricians, delivery vehicles and others who need to use the bridges repeatedly during the day as part of their work. Tolls could become a significant cost of doing business for such persons, who as a practical matter need to use a motor vehicle.

Unfortunately, data are not available to assess how many vehicles fit into this category or how often they use the bridges. Conceptually, however, the City could adopt a toll policy that charges a toll only for one to two round trips by each vehicle, with subsequent trips untolled. Thus, total toll payments for any one vehicle would be capped.

The revenue and traffic impacts of this issue need to be studied further.

# 5. Impact on Trip-Making in Brooklyn, Queens and Staten Island

# East River bridges account for a small share of travel in Brooklyn, Queens and Staten Island

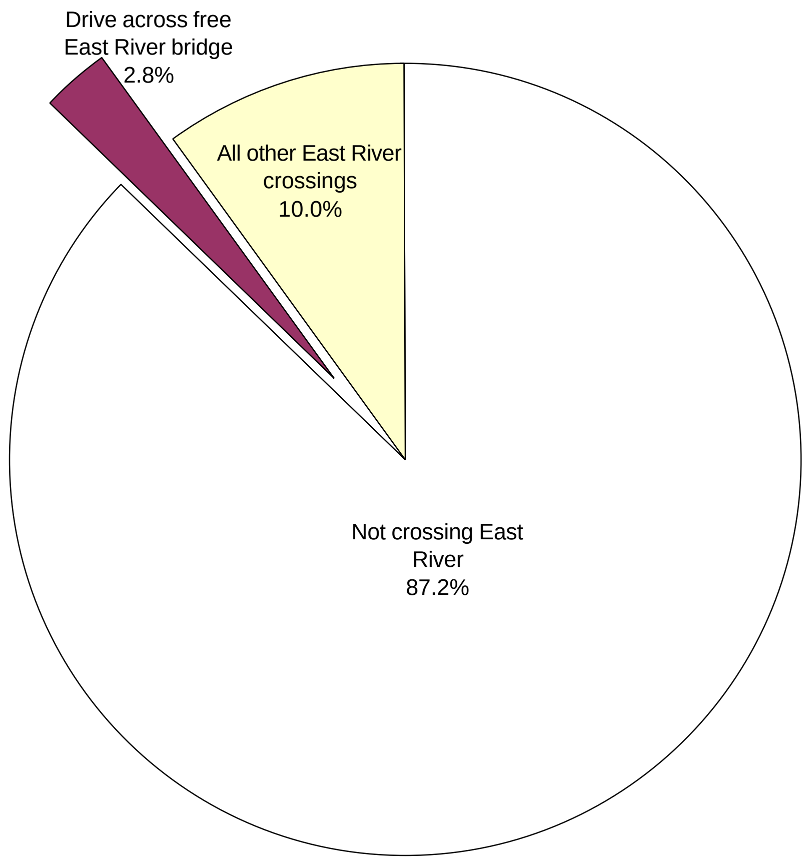
*The four East River bridges are an important and very prominent part of the transportation infrastructure. Yet despite their prominence, the East River bridges handle only a small fraction of travel that originates in Brooklyn, Queens and Staten Island. Thus, tolls would affect a tiny percentage of travel by Brooklyn, Queens and Staten Island residents.*

Of all trips (by any mode of travel) that originate in Brooklyn, Queens or Staten Island:

- 2.8% use one of the four East River bridges.
- 1.3% use one of the tolled East River crossings.
- 8.7% cross the East River by subway, bus, commuter rail, ferry or by foot.
- 87% do not involve crossing the East River (e.g., trips to Brooklyn, Queens, Staten Island or Long Island).

(See Figure 5 on next page.)

# Figure 5. Profile of Trips Originating in Bklyn, Qns and S.I.




Source: Analysis of New York Metropolitan Council, 1997-98 Household Interview Survey.

# 6. Toll Revenue

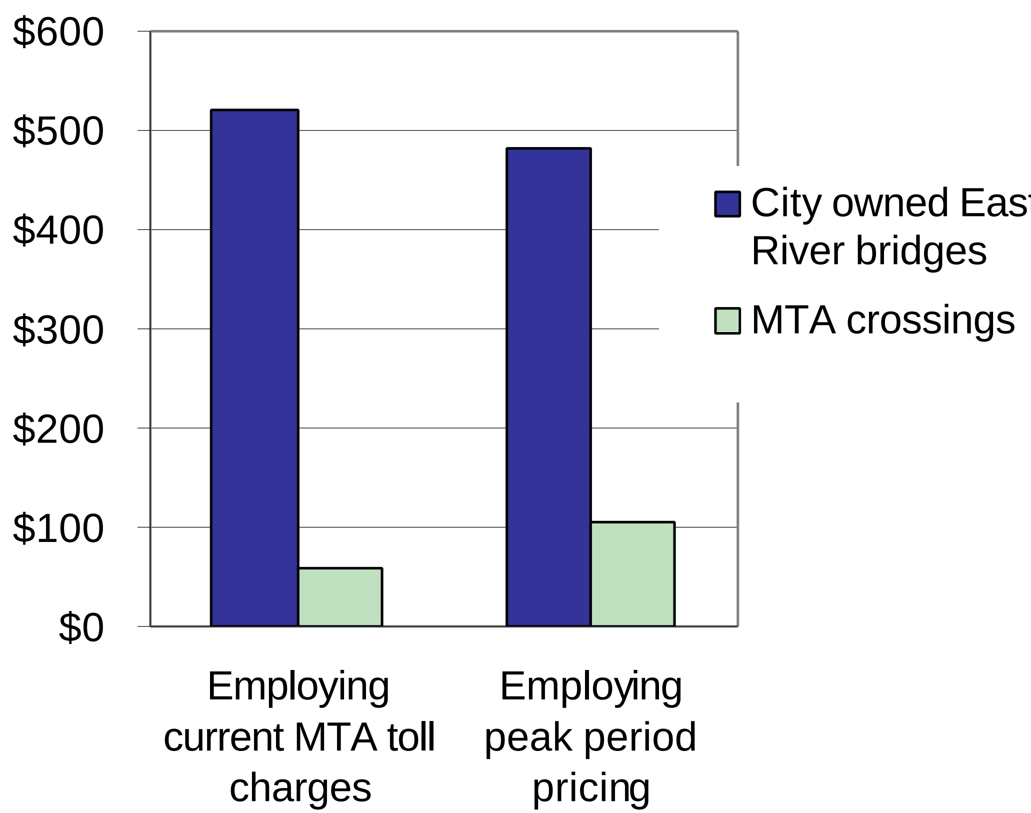
# Tolls would generate one-half billion dollars in revenues for the City

A primary objective of tolling the East River bridges is to generate revenue to pay for their own upkeep and rebuilding and for transportation improvements. We have estimated revenues from East River bridge tolls as follows, for each of two toll schedules:

- Using <u>current MTA toll charges</u> on the City bridges would raise $522 million in toll revenue at City-owned bridges and an additional $58 million in toll revenue at MTA crossings.
  - Current MTA toll level (effective in May 2003), i.e., $3.50 for cars with E-ZPass.
  - MTA toll revenue increases as some drivers switch from newly tolled East River bridges to the MTA bridges/tunnels.
- Using <u>peak period tolls</u> would raise $482 million in toll revenue at City-owned bridges and an additional $106 million in toll revenue at MTA crossings
  - Uses $5 toll each way on all East River crossings, during peak hours (6-9 a.m. and 4-7 p.m.).
  - $2.50 toll each way on the four East River bridges during off-peak. This assumes that the current $3.50 toll on the MTA crossings is maintained during the off-peak.

(See Figure 6 and Table 3 on next pages.)

# Figure 6.
# Toll Revenues From MTA and Peak Period Tolls



# Table 3. Toll Revenue

(In millions)

**Peak-period tolls ($5 peak/$2.50 off-peak)**

| | 2000 | Projected | Change |
|---|---|---|---|
| **East River bridges*** | | | |
| Peak | $0 | $203 | $203 |
| Off-peak | $0 | $278 | $278 |
| Total | $0 | $482 | $482 |
| **MTA East River crossings**** | | | |
| Peak | $121 | $173 | $52 |
| Off-peak | $199 | $254 | $54 |
| Total | $321 | $427 | $106 |
| **Grand Total** | **$321** | **$909** | **$588** |

**Toll set at current MTA level ($3.50)**

| | 2000 | Projected | Change |
|---|---|---|---|
| **East River bridges*** | | | |
| Peak | $0 | $179 | $179 |
| Off-peak | $0 | $343 | $343 |
| Total | $0 | $522 | $522 |
| **MTA East River crossings**** | | | |
| Peak | $121 | $137 | $16 |
| Off-peak | $199 | $242 | $42 |
| Total | $321 | $379 | $58 |
| **Grand Total** | **$321** | **$901** | **$580** |

* Brooklyn, Manhattan, Williamsburgh and Queensboro bridges
**Brooklyn Battery Tunnel, Queens Midtown Tunnel and Triborough Bridge

Tolls are for E-ZPass users; assume 50 cent higher for non-E-ZPass payment and continuation of current toll structure for trucks.

Peak period is 6-9 a.m. and 4-7 p.m., both directions.

# Revenue estimates take into account key factors

Our revenue estimates take into account key factors that influence how many motorists would continue to use the bridges and which East River crossings they would use.  We take into account:

- Reduction in bridge traffic from instituting tolls (pricing effect)
- Motorists switching back to MTA crossings once tolls are instituted (diversion effect).
- Shifting of some drivers from crossing the bridges at peak times to off-peak times, for the peak period pricing charges.

See the Appendix for a detailed description of the methodology.

# III. CONCLUSIONS

Tolling the East River bridges will:

- Raise over half a billion dollars in new government revenues that can be used to maintain and rebuild the East River bridges and fund other transportation needs.
- Reduce traffic on the bridges, producing faster and more reliable travel times across the East River.
- Reduce traffic and improve air quality in Downtown Brooklyn and Long Island City.

Recommended elements of a toll plan are:

- Higher peak period tolls in order to maximize benefits when motorists experience the worst delays.
- Toll collection in both directions (as currently on the MTA's tolled crossings), necessary for a peak period pricing structure.
- Combination of E-ZPass and London-style license plate cameras for toll collection.

# Issues Needing Further Study

Much also needs to be learned to fully understand the effects of East River bridge tolls. Major issues are:

- Economic effects on restaurants and other businesses in neighborhoods near the bridges.
- Quantification of travel time and air quality improvements.

Finally, key implementation issues need to be analyzed:

- Should total toll payments be capped, e.g., at 1-2 round trip tolls per day, to alleviate the impact on plumbers, electricians, delivery vehicles and others who need to use the bridges repeatedly during the day as part of their work?

# Sources

1 Independent Budget Office.

2 Mayor's Executive Budget, FY 2004. Available: http://www.nyc.gov/html/omb/pdf/mm4_03.pdf

3 New York City Department of Transportation, "New York City Bridge Traffic Volumes" and "Manhattan River Crossings," annual report series. These data are for the 6 a.m. to 7 p.m. time period to avoid effects of evening and late night construction.

4 URS Corporation, "History and Projection of Traffic, Toll Revenues and Expenses," prepared for the Triborough Bridge and Tunnel Authority, September 4, 2002, page 32.

5 Parsons Transportation Group, "Gowanus Expressway I-278 Project Travel Survey Report," prepared for NYS Department of Transportation, January 2001.

6 Based on travel patterns from Parsons Transportation Group, "Gowanus Expressway I-278 Project Travel Survey Report," prepared for NYS Department of Transportation, January 2001 and bridge volumes in New York City Department of Transportation, "New York City Bridge Traffic Volumes" and "Manhattan River Crossings," annual report series.

7 The diversion analysis is based on the difference in toll elasticities for situations where there are no free alternative crossings, and for the MTA's East River crossings. The URS report cited above found that toll elasticities are higher for crossings near the untolled City bridges, implying that some motorists switch from tolled to untolled crossings after a toll increase if an untolled bridge is nearby. For example, the elasticity for the Battery Tunnel is -0.386 (meaning that a 10% toll increase produces a 38.6% decline in traffic volumes), compared with -0.208 for the Midtown Tunnel, -0.196 for the Triborough Bridge and -0.085 for the Throgs Neck and Whitestone bridges. These differences are used to estimate the number of drivers diverting from tolled to untolled East River crossings.

# Sources (cont.)

8 Pietrzyk, Michael C. and Edward A. Mierzejewski, “Electronic Toll and Traffic Management (ETTM) Systems,” Transportation Research Board, NCHRP Synthesis 194, 1993, p. 12. Available: http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/5KN01!.PDF

9 Office of the Governor, “Governor McGreevey unveils high speed E-ZPass,” press release, October 30, 2003. Available: http://www.state.nj.us/transportation/press/2002releases/103002.htm.

10 New York City Department of Transportation, “New York City Bridge Traffic Volumes” and “Manhattan River Crossings,” annual report series.

11 Federal Highway Administration, “Synthesis and Evaluation of Red Light Running Automated Enforcement Programs in the United States,” Publication No. FHWA-IF-00-004, September 1999.

12 Office of the New York City Comptroller, “Hevesi Survey Reveals Motorists Run More Than 1 Million Red Lights Per Day in NYC,” May 20, 2001. Available: http://www.comptroller.nyc.gov/press/2001_releases/01-05-036.shtm

13 Transport for London, “Central London Congestion Charging Scheme - Three Months On.” June 2003. Available: http://www.londontransport.co.uk/tfl/pdfdocs/congestion_charging/cc-three-month-report.pdf

14 Based on traffic counts in AKRF, Inc., “330 Jay Street Final Supplemental Environmental Impact Statement,” prepared for City of New York Department of Citywide Administrative Services, October 29, 1999; and Ove Arup & Partners, “Downtown Brooklyn Traffic Calming Project Interim Data Collection Technical Memorandum, Supplement #1 Appendixes,” prepared for NYC Department of Transportation, November 1999.

# Sources (cont.)

15 Ove Arup & Partners, "Downtown Brooklyn Traffic Calming Project Interim Data Collection Technical Memorandum, Supplement #1," prepared for NYC Department of Transportation, November 1999, page 20. AM peak period northbound speeds were: Hicks Street, 11.7 mph; Clinton, 12.1 mph; Smith, 13.7 mph; 3rd Avenue, 11.4 mph and 4th Avenue, 12.5 mph. These speeds are for alternative routes between the Gowanus Expressway 38th Street off-ramp and an access point to either the Brooklyn or Manhattan bridge.

16 AKRF, Inc., "Long Island City Zoning Changes and Related Actions, Final Environmental Impact Statement," prepared for NYC Department of City Planning, May 2001.

17 London First, "London Businesses Still Back Congestion Charging," August 18, 2003. Available: http://www.london-first.co.uk/press_centre/newsreleasedetail.asp?L2=106&NewsReleaseId=2093

18 Based on analysis of New York Metropolitan Council, 1997-98 Household Interview Survey data.

# Appendix - Traffic and Revenue Model

Tables 1 and 3 show projected changes in East River bridge and tunnel traffic volumes and toll revenues. Projections are presented for two tolling schemes -- a flat toll of $3.50 and peak hour tolls of $5.00 with lower off-peak tolls ($2.50 on City bridges and $3.50 on MTA crossings).

Traffic and revenue projections are based on a spreadsheet model. This Appendix summarizes key inputs to the model and the traffic and revenue estimation procedure.

Key inputs are:

- 2000 traffic volumes and revenues are used as the base year. Recent data indicate that traffic volumes are near or at the 2000 volumes.

- Historical toll elasticities for MTA crossings of -0.39 for the Battery Tunnel and -0.20 for the Midtown Tunnel and Triborough Bridge are used in estimating current diversion to the City bridges. Source: URS Corporation, "History and Projection of Traffic, Toll Revenues and Expenses," prepared for the Triborough Bridge and Tunnel Authority, September 4, 2002, page 32.

- Once tolls are in place on all East River bridges, toll elasticities are assumed to be -0.12 for City bridges and -0.10 for MTA crossings. The slight difference is based on the larger number of non-work trips on the City bridges; non-work trips tend to be more sensitive to tolls than work trips. These elasticities are based on a review of the toll elasticity literature; see in particular T.H. Oum, W.G. Waters and Jong-Say Yong, "Concepts of Price Elasticities of Transport Demand and Recent Empirical Estimates," *Journal of Transport Economics and Policy*, May 1992; "Elasticity Handbook," prepared for the European Commission Directorate-General for Transport under the TRACE program and available on-line at europa.eu.int/comm/transport/extra/final_reports/road/Trace.pdf; and the "Online TDM Encyclopedia," Victoria Transport Policy Institute, and available on-line at http://www.vtpi.org/tdm/tdm11.htm. Note that the toll elasticity for the Throgs Neck Bridge and Bronx-Whitestone Bridge, for which there are no untolled alternatives, is -0.08, in line with estimates in the literature.

# Appendix (cont.)

- We assume that toll elasticities are slightly lower (in absolute value) for peak than for off-peak trips. This is well-established in the literature since peak-period trips are more heavily weighted to work trips. We assume that peak-period elasticities are 80% of the overall elasticity, and off-peak elasticities are 113% of the overall elasticity. These weights produce the overall elasticities cited above after weighting for the peak/off-peak split of traffic volume. For City bridges the peak period elasticity is -0.10 and off-peak is -0.136.
- Having higher tolls during the peak period causes 10% of motorists using MTA crossings and 15% of motorists using City bridges shift to the off-peak. These figures are based on a Port Authority finding that its $1 differential peak period tolls induced a shift of 5.5% to off-peak. We increase that 5.5% based on the larger percentage differences involved in our toll structure, and based on the higher incidence of non-work trips on East River bridges.
- The increase in Battery Tunnel traffic volumes is limited to about 9% during the AM and PM peak hour. This is based on capacity constraints at the tunnel during the peak.
- Average toll, including trucks and non-E-ZPass users, is 109.1% of the E-ZPass toll on MTA crossings and 111.1% on City bridges. These estimates are based on MTA revenue data and vehicle classification counts.
- Annual traffic volumes are 340 times the average weekday traffic on MTA crossings and 350 times average weekday traffic on City bridges. The MTA figure is based on MTA data; the City bridge figure is an estimate due to the lack of data on weekend traffic volumes on the bridges.

A three-stage traffic estimation procedure is employed in the spreadsheet model, as follows:

(1) Calculate time shifting of trips from peak to off-peak, using inputs cited above. The effect is to re-allocate existing traffic volumes; total volumes remain the same. This step is obviously applied to peak-period toll option only.

# Appendix (cont.)

(2) Calculate reduction in traffic volumes from pricing effect, using elasticities cited above. Where tolls remain the same as currently (e.g., MTA crossings except for peak period tolls), there is no change in traffic volume. For peak period tolls on the MTA crossings, the elasticity is applied to the increment from $3.50 to $5.00. For City bridges, the elasticity is applied to an assumed total cost of the trip, including parking and car usage. This is necessary since elasticities cannot be applied directly to trips with a base cost of zero. In this procedure, the elasticity is converted from the toll-only elasticity (e.g., -0.10) to the equivalent elasticity for total cost per trip. We assume a total cost per trip of about $10; this is fairly arbitrary but results are insensitive to the assumption. The elasticity for the total cost per trip is -0.24 in the case of a toll elasticity of -0.10. This "higher" elasticity is then applied to the increment in the total cost per trip, e.g., from $10 to $20 for peak-hour tolls of $5 ($10 for the round trip).

(3) Calculate diversion effects. The diversion is computed based on the difference in current elasticities and the elasticities assuming no difference in tolls between MTA crossings and City bridges. The largest effect is seen at the Battery Tunnel, where we calculate that traffic in the peak period would increase by 35% after some drivers, who currently avoid the BBT in favor of the City bridges, elect to use the tunnel. The switching is constrained as indicated earlier based on estimated capacity constraints of the BBT during the peak hour.

Revenues are then calculated based on the relationships between average tolls and E-ZPass tolls, and annual traffic volumes to average weekday volumes.