Economic Impacts of the Massachusetts Turnpike Authority and the Central Artery/Third Harbor Tunnel Project

Executive Summary

February 2006
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Acknowledgements

This study was conducted by staff of Economic Development Research Group—Steven Landau, Glen Weisbrod, Susan Moses, Brett Piercy, Margaret Collins and Manisha Gupta.

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About the Authors
This report was researched and written by the Economic Development Research Group, Inc. (EDR Group). Founded in 1996, EDR Group is a Boston based consulting firm that focuses specifically on evaluating economic development performance, impacts and opportunities for public and private agencies throughout the United States, and internationally in Canada, Europe, Asia and Africa. The firm’s practice includes studies of the economic impacts of road, air, sea and railroad modes of travel, including economic benefits, development impacts and benefit/cost relationships.

The economic development work of EDR Group is organized in five areas: (1) forecasting economic change and needs, (2) opportunities assessment, (3) strategy development, (4) benefit-cost analysis, and (5) program evaluation. Related transportation analysis includes general research on investment benefit and productivity implications and planning studies that assess project impacts and opportunities. Glen Weisbrod, President of EDR Group, was appointed by the National Academies to Chair the TRB Committee on Transportation and Economic Development.

The findings of this study are the responsibility of EDR Group. Staff of EDR Group assembled and analyzed data from a variety of state, city, metropolitan and private sources and used standards of measurement that are referenced in the report.

Figure 1. Central Artery/Third Harbor Tunnel Project
Overview
This report documents the economic and transportation impacts of Massachusetts Turnpike Authority (MTA) facilities and services, and focuses on the ways in which the economy of Boston, its suburbs, communities throughout the state and the entire commonwealth have been affected by the various facilities and services that the MTA manages and operates.

Findings are reported in two volumes. Volume I describes the economic impact of the MTA as a transportation provider. This analysis includes the economic impacts of the Turnpike west of Boston and the impacts due to new transportation infrastructure and services in the city from the Central Artery/Third Harbor Tunnel Project, known collectively as the “Big Dig,” and ensuing changes in traffic volumes, traffic patterns and travel efficiencies. In addition, Volume I considers the contribution made by the Turnpike Authority as a business enterprise to the Massachusetts economy.

Volume II describes the physical transformation of Boston as a result of transportation improvements, beginning with the ten mile extension of the Turnpike from Route 128 into Boston’s Back Bay and ending with the “Big Dig.” The original Turnpike extension was built in the early 1960s and was intertwined with air rights development of the Prudential Center, which later led to the development of Copley Place and Back Bay as a high-end shopping, hotel, dining and office district. Volume II reviews this history and discusses parallels to current conditions 40 years later. Removal of the elevated Central Artery has opened up the long suppressed development potential of Boston’s waterfront as well as the Rose Fitzgerald Kennedy Greenway above the depressed highway, and is creating demand for office and residential development with waterfront views. (See Figure 1, left.)

The facilities that are the subject of this analysis were funded by federal transportation funds, the Commonwealth of Massachusetts, as well as by users of the Turnpike and related facilities through tolls. The Turnpike Authority is the final custodian of the Central Artery/Third Harbor Tunnel Project.

EXECUTIVE SUMMARY

Copley/Back Bay & South Boston Seaport District Development Timeline

Historically, transportation access provided by highway improvements in central Boston has led to a scale of private investment that has transformed Boston over the past 40 years. The list below, and on subsequent pages, shows how major private development projects have followed completion of the Turnpike extension and Central Artery/Third Harbor Tunnel Project in central Boston.

- 1880s
  Trinity Church and Boston Public Library define area.

- 1947
  John Hancock Building opens.

- 1956-7
  Prudential Insurance Company announces plans to purchase 128-acre Back Bay rail yards for new office and residential complex.

- 1957
  Massachusetts Turnpike opens from New York State border to Route 128 in Newton.

- 1957
  Prudential Insurance Company and Turnpike Authority reach deal to allow development on air rights above Turnpike extension.

- 1960
  Prudential Insurance Company announces that the Turnpike extension is critical to the success of their development.
Economic Impacts of the Massachusetts Turnpike Authority

Major Findings
The Turnpike Authority contributes to the economy of Massachusetts through its many roles, including those as a transportation agency, a business enterprise and as a developer of the most significant roadway projects in Massachusetts. These projects have, for 40 years, generated vast private investment along Boston’s coast line, the Back Bay, Copley Square, and the South End. At this writing, development of the Central Artery/Third Harbor Tunnel Project is sparking a renewal of the South Boston Seaport District.

The extension of the Massachusetts Turnpike from Route 128 into Boston was prompted in large part by a development proposal put forward by the Prudential Insurance Company in 1957. The Turnpike Authority and the company agreed on a plan that would allow the proposed Prudential Tower to be built on air rights over a Turnpike exit ramp. Development of the Prudential Tower in 1963, and subsequent development of Copley Place on Turnpike air rights 20 years later, proved to be the spark that created a prestigious hotel, office and condominium address and “high-end” shopping district in the Back Bay. Overall, starting with the development of the Prudential Center, about ten million square feet of office and retail space has been developed in the Back Bay area, and additional projects are still being proposed more than 40 years after the Prudential Center opened.1

Similar to the extension of the Turnpike into the Back Bay, and development of the Prudential Center and Copley Place, the removal of the elevated Central Artery infrastructure and construction of the Third Harbor Tunnel have enhanced development opportunities along the city’s waterfront and in the South Boston Seaport District. Initial effects of the project on development and land values are already evident, with about 8.5 million square feet of convention, office and retail space, 2,600 hotel rooms and 1,200 apartments/condominiums newly opened, in construction or in planning near the Rose Fitzgerald Kennedy Greenway and in the South Boston Seaport District. The far ranging impacts of the Central Artery/Third Harbor Tunnel Project are forecast to include 16 million to 21 million square feet of commercial and residential development.

The development and property value impacts in the Back Bay that derived from the Turnpike extension project are clearly being repeated in South Boston and along the Rose Fitzgerald Kennedy Greenway as a result of the Central Artery/Third Harbor Tunnel Project. Conditions present in both locations that helped spur development include:

- major highway infrastructure projects that created opportunities for air rights development,
- access improvements created by both new highways and new transit service,
- the removal of real and psychological barriers created by existing transportation infrastructure,
- the reconnection of Boston neighborhoods that had been isolated by the these barriers,
- the creation of large redevelopment parcels as a result of the removal of old transportation infrastructure and development of new parks, and
- the ability of developers to target development to new or unmet market niches.

The Central Artery/Third Harbor Tunnel Project has created locations for new development in some areas where the elevated highway structure formerly stood. In addition, the MTA has also created locations for new development on air rights above the Turnpike. Together, these projects

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1 Projects in planning stages include 776 Boylston Street as part of the Prudential Center, Millennium Tower, proposed as air rights over the Turnpike and The Clarendon rental units and condominiums. Also, redevelopment of the Hynes Convention Center is now under study.
have created opportunities to help knit together neighborhoods formerly split by highway corridors. Based on known projects developed, in construction or proposed, additional housing, office, retail and hotel development is projected to attract over $7 billion in private investment, providing a location for over 43,000 jobs. This includes projects along/adjacent to the I-93 corridor, as well as specific projects identified in the South Boston Seaport District.

While these commonalities help explain the parallels between development trends in the two study areas, several factors account for the more accelerated development impacts apparent in the South Boston Seaport District and along the Rose Fitzgerald Kennedy Greenway. In the early 1960s, Boston had not yet established itself as a world-class location able to compete for businesses and developers in a national or global market. Today, Boston is a premier, desirable address, and a shortage of land in the central city has constrained opportunities to attract businesses that seek a Boston location.

When the Turnpike extension was built, the national economy had not yet shifted to the financial and service sector, a shift that would subsequently play to Boston’s strengths and add to its attractiveness as a business location. In addition, changing demographics resulting from the aging of the baby boomers and decisions by younger adults to postpone or forego having children have created a new market for high-end, urban condominium development. The Central Artery/Third Harbor Tunnel Project also immediately followed the $3.9 billion2 Boston Harbor cleanup project, which restored the waterfront.3

The Central Artery/Third Harbor Tunnel Project opened up substantially more land for development than did the Turnpike extension. The Rose Fitzgerald Kennedy Greenway itself comprises as much land as the entire Turnpike project created in the Back Bay. And much of the land “created” or newly accessed by the Central Artery/Third Harbor Tunnel Project is located either along the waterfront.


### Development Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Groundbreaking for Turnpike extension from Newton to Boston.</td>
</tr>
<tr>
<td>1963</td>
<td>$200 million Prudential Center Tower opens with mix of office, residential and retail uses. 1,182,000 sq.ft.</td>
</tr>
<tr>
<td>1963</td>
<td>Municipal Auditorium (later the Hynes Convention Center) opens. 450,000 sq.ft.</td>
</tr>
<tr>
<td>1964</td>
<td>Sheraton Boston opens. 1,250 rooms.</td>
</tr>
<tr>
<td>1965</td>
<td>Turnpike extension opens from Newton to Boston.</td>
</tr>
<tr>
<td>1967</td>
<td>Boylston Apartment Tower, Fairfield Apartment Tower, and Gloucester Apartment Tower open as part of the Prudential Center. 781 units.</td>
</tr>
<tr>
<td>1969</td>
<td>John Hancock parking garage built over Turnpike.</td>
</tr>
<tr>
<td>1972</td>
<td>101 Huntington Avenue, part of the Prudential Center, opens. 550,000 sq.ft.</td>
</tr>
<tr>
<td>1975</td>
<td>John Hancock Tower opens. 1.6 million sq.ft.</td>
</tr>
</tbody>
</table>
or with water or park views, elements that generally increase the development potential and value of properties.

Over time, the resulting development patterns will transform the city by concentrating new activity in the South Boston Seaport District, revitalizing the waterfront, expanding the economic center of the City, and strengthening existing neighborhoods. Looking toward the future, the pattern of new development in the Back Bay originally derived from the Turnpike extension project is being repeated in South Boston and along the Rose Fitzgerald Kennedy Greenway as a result of the Central Artery/Third Harbor Tunnel Project.

### Potential Future Buildout of the South Boston Seaport District

**A. Potential Buildout by Square Feet**

<table>
<thead>
<tr>
<th></th>
<th>Low Estimate</th>
<th>High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>4,200,000</td>
<td>5,400,000</td>
</tr>
<tr>
<td>Hotel</td>
<td>6,000,000</td>
<td>6,000,000</td>
</tr>
<tr>
<td>Residential</td>
<td>5,000,000</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Retail</td>
<td>500,000</td>
<td>750,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>500,000</td>
<td>1,250,000</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>16,200,000</strong></td>
<td><strong>21,400,000</strong></td>
</tr>
</tbody>
</table>

**B. Potential Buildout Construction Costs (2005 dollars)**

<table>
<thead>
<tr>
<th></th>
<th>Low Estimate</th>
<th>High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>$1,033,200,000</td>
<td>$1,328,400,000</td>
</tr>
<tr>
<td>Hotel</td>
<td>$1,500,000,000</td>
<td>$1,500,000,000</td>
</tr>
<tr>
<td>Residential</td>
<td>$1,180,000,000</td>
<td>$1,888,000,000</td>
</tr>
<tr>
<td>Retail</td>
<td>$123,000,000</td>
<td>$184,500,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>$125,000,000</td>
<td>$312,500,000</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$3,961,200,000</strong></td>
<td><strong>$5,213,400,000</strong></td>
</tr>
</tbody>
</table>

**C. Potential Property Tax Revenues after Buildout (based on 2005 values)**

<table>
<thead>
<tr>
<th></th>
<th>Low Estimate</th>
<th>High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>$33,764,976</td>
<td>$43,412,112</td>
</tr>
<tr>
<td>Hotel</td>
<td>$49,020,000</td>
<td>$49,020,000</td>
</tr>
<tr>
<td>Residential</td>
<td>$8,532,580</td>
<td>$13,652,128</td>
</tr>
<tr>
<td>Retail</td>
<td>$4,019,640</td>
<td>$6,029,460</td>
</tr>
<tr>
<td>Industrial</td>
<td>$4,085,000</td>
<td>$10,212,500</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$99,422,196</strong></td>
<td><strong>$122,326,200</strong></td>
</tr>
</tbody>
</table>

Sources: Boston Redevelopment Authority, Seaport Public Realm Plan, interviews. See Volume II of the full report for details on calculations.
EXECUTIVE SUMMARY

At buildout, the estimated property tax revenues realized at the South Boston Seaport will be equivalent to 9% – 11% of Boston’s 2005 tax base.\(^4\) Wages paid to construction workers will yield an estimated $5 million – $6 million per year in state income tax and sales tax revenue, if a 20-year development timeframe is assumed.

**Transportation Services**

The Massachusetts Turnpike Authority owns and operates the Metropolitan Highway System. This network of highways, bridges and tunnels generate improved efficiencies that reduce travel time and time spent in congestion, benefiting the economy of Boston and its suburbs. These improvements are now providing approximately $167 million annually in time and cost savings for travelers. This includes $24 million of savings in vehicle operating cost plus a value of $143 million of time savings. Slightly over half of that time savings value ($73 million) is for work-related trips, and can be viewed as a reduction in the costs of doing business in Boston. For instance:

- Average travel times from the I-90/I-93 interchange to Logan Airport during peak periods have decreased between 42% and 74%, depending on direction and time of day.
- Average afternoon peak hour northbound travel time on I-93 through downtown has dropped from 19.5 minutes to 2.8 minutes.
- The opening of the I-90 connector to Logan International Airport has added 800,000 residents to the 1.7 million who can access the airport within a 40-minute drive of their home. *(See Figure 2, next page.)*

During the study period from 1996–2004, the Massachusetts Turnpike Authority has overseen three new projects affecting the 123-mile portion of the Turnpike between the New York state line and Route 128. These projects are: (1) a new interchange at Route 146 in Millbury, (2) rebuilding all eleven service

\(^4\) The buildout is based on estimates found in the Seaport Public Realm Plan, published by the Boston Redevelopment Authority. The FY 2005 Real Estate Taxable Recapitulation published by city’s Assessing Department reports a gross real estate tax of $1,133,185,122.
Figure 2. Extended Area Within 40 Minutes of Logan International Airport*

*Area with afternoon drive time to Logan International Airport under 40 minutes


Figure 3. Map of Turnpike Visitor Information and Service Plazas

Tourist Information Center  Service Plaza
plazas along the Turnpike Corridor, and (3) new noise barrier walls. In addition, the MTA has been funding three notable programs serving this area: (4) upgraded tourism information centers, (5) a local tourism grant program, and (6) a Park-N-Ride Program. The portion of the Turnpike west of Route 128 has been serving an increasing volume of travelers—now 101 million trips per year, up 38% since 1994, and the new Interchange 10A at Route 146 in the Millbury/Worcester area now serves over 2.7 million trips per year, and saves its users over $2 million per year in vehicle operating costs. Moreover:

- The expansion and reconstruction of all eleven service plazas has led to expanded use of those facilities, which are provided by the MTA as a service to users of the Turnpike. The service plazas now serve 10.6 million customers annually and generate business sales more than double (126% greater) than that occurring in 1994 after adjusting for inflation. (See Figure 3, left.)

- The upgraded tourism information centers on the Massachusetts Turnpike now serve over 616,000 customers annually, up from approximately 503,000 in 1994. The centers provide information on tourism attraction sites to visit, though no information is available on the exact dollar value of the additional tourist spending that they help to generate. (See Figure 3, left.)

- The “Fast Lane” automated vehicle identification program has also sped up toll payments for 49% of travelers on the Turnpike west of Route 128. Its use now exceeds 49.6 million payments annually on that portion of the Turnpike.

Altogether, MTA operations, facilities and project investments are having a broad range of travel and economic impacts for residents across the Commonwealth of Massachusetts. The economic contributions of the Turnpike Authority to Massachusetts has captured the nature of many of these impacts and many more are still unfolding.

Following is a series of photographs depicting the “before” and “after” of the Central/Artery Third Harbor Tunnel Project.
Economic Impacts of the Massachusetts Turnpike Authority

Sudbury Street looking south

Before
Development Timeline

- **2002**
  The Belvedere at Prudential opens. 65 condominiums.

- **2002**
  Boston Convention and Exhibition Center (BCEC) opens. 1.7 million sq.ft., including 600,000 sq.ft. of exhibition space.

- **2002**
  131 Dartmouth opens. 369,000 sq.ft. of office space.

- **2002**
  Ted Williams Tunnel is connected to I-90 Massachusetts Turnpike and opened to all traffic.

- **2003**
  I-93 Central Artery opens initial underground northbound and southbound lanes.

- **2003**
  World Trade Center West office building opens. 517,000 sq.ft. of Class A office space and 34,000 sq.ft. of retail space.
Economic Impacts of the Massachusetts Turnpike Authority

Computer generated graphic image based on design of the intersection of Milk Street and Surface Artery Southbound.

Milk Street looking east

Before
Development Timeline

- **2004**
  Developers selected for 12 acre “Core Parcel” Waterside Place. 1.2 million sq.ft., including 600,000 sq.ft. retail space, 276 condominiums, and a 457 room hotel.

- **2004**
  Manulife Headquarters opens. 420,000 sq.ft. of office space.

- **2004**
  Westin Hotel under construction. 790 rooms.

- **2005**
  I-93 Central Artery opens full use of all northbound & southbound lanes.

- **2005**
  Silver Line Transit opens service in South Boston Seaport District.

- **2005**
  Greenway Place at 199 State Street opens. 12 condominiums with view of Rose Fitzgerald Kennedy Greenway.

- **2005**
  Boston Harbor Residences on Northern Avenue under construction. 465 residential units in two phases.

- **2005**
  Channel Center Phase I opens. Phase II to include retail, office, and housing. 76 housing units.

- **2005**
  21 acre Fan Pier site sold. New mixed use development plan under review. 3 million sq.ft. of built space proposed.
Economic Impacts of the Massachusetts Turnpike Authority

Zakim Bridge  
Photo credit: ©Andy Ryan
Development Timeline

- **2006**
  Inter-Continental Boston and the Residences at the Inter-Continental to open. Project built around Artery Vent Building. 424 hotel rooms and 130 condominiums.

- **2006**
  Construction of the Allston Turn-Around serving the Copley/Prudential, South Boston Seaport District and Logan International Airport Exits.

- **2007**
  Rose Fitzgerald Kennedy Greenway scheduled to open. 30 acres of parks and open space.

- **2007**
  Residences at Mandarin Oriental expected to open. 50 condominiums.

  **Planned**
  - Columbus Center groundbreaking. 500 condominiums, 199 hotel rooms. 1.3 million sq.ft. First air rights development since Copley Square - approved.
  - Pier 4 site. 200 housing units, 225 hotel rooms, 385 Class A office space, and 35,000 sq.ft. of retail.
  - Russia Wharf adaptive reuse and new development. 50 loft housing units, 300 hotel rooms, 500,000 sq.ft. of Class A office space, 22,000 sq.ft. of retail.
  - 776 Boylston East building (part of Prudential Center) - approved.
  - 888 Boylston Street (part of Prudential Center) - proposed.
  - Millennium Tower condominiums over the Turnpike - proposed.
  - The Clarendon. 350 rental and homeownership housing units - approved.
Copley Square

Before

After

Photo courtesy of the Boston Public Library, Print Department.
Better Traffic Conditions
The original 1990 environmental projection was that the “Big Dig” would improve traffic flow by 40% by 2010. Today, the project exceeds that with a 62% improvement in traffic flow (Volume I, Page 22). This was accomplished while overall traffic volume grew by 23.5% since 1995 (Volume I, Page 20).

What does that mean for commuters?
- Before the project was built the average traffic speed on I-93 Northbound was 10 mph, today it is 43 mph (Volume I, Page 20) dropping the average peak travel time from 19 minutes to 2.8 (Volume I, Page 11)
- Speed for all harbor tunnels went from 13 mph to 36 mph (Volume I, page 20) cutting travel times from 42% and 74 % (Volume I, Page 14)
- Storrow Drive Eastbound to I-93 North improved from 4 mph to 21 mph (Volume I, Page 20) dropping afternoon peak hour travel times from 16 minutes to 3.1 minutes (Volume I page 19)
- The improved highway, bridge and tunnel network provides $168 million annually in time and cost saving for travelers (Volume I, Page 24)
- Getting to Logan International Airport is now easier for an added 800,000 Massachusetts residents who with the full opening of the I-90 connector to the Ted Williams Tunnel, now live within 40 minutes of the airport (Volume, Page 14). Today, 2.5 million residents live within 40 minutes of Logan International Airport.

Better Economic Opportunities
Building transportation networks is about economic growth. In 1983 Copley Place was built over the air rights of the Turnpike’s Boston extension and today commands the third highest Class A office rents in the country (Volume II, Page 8). In 2004, Copley Place took in $800 per square foot in annual sales compared to a national retail average of $356 (Volume II, Page 10). The Rose Fitzgerald Kennedy Greenway itself comprises as much property as the entire Turnpike created in the Back Bay. Just considering projects developed, under construction or in planning stages, the completion of the Central Artery/Third Harbor Tunnel Project means (Volume II, pages 13 and 14):
- $7 billion in private investment
- 7,700 new housing units
- 1,000 affordable housing units
- 10 million square feet of office and retail space
- 2,600 hotel rooms
- 43,000 jobs

Long-term, in the South Boston Seaport District alone, the Central Artery/Third Harbor Tunnel Project is expected to stimulate:
- 16–21 million square feet of commercial and residential development
- $100–$120 million in annual property tax revenues (Volume II, page 21)

Full reports can be found on the Massachusetts Turnpike Authority website at www.masspike.com