ARC Alternative Transit Project:
Examining Cross-Hudson Transit Options in the Wake of the ARC Failure

Photo: secondavenuesagas.com
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Executive Summary

After careful research, our group proposes a number 7 line subway extension to Hoboken, New Jersey as a suitable trans-Hudson transportation option meant to address some of the issues originally acknowledged by the failed Access to the Region’s Core Project. This report includes information on innovative funding mechanisms which can be leveraged to underwrite the costly project. The proposal is less expensive than a new build option because, in part, it utilizes existing infrastructure. It should be noted that finance is not the only factor that should be taken into consideration for the large-scale project. The need for strong partnerships among New York and New Jersey transportation agencies and political support from representatives of both states is equally as important. However, in the end, we learned about the delicate balance and orchestration of these factors in building a major transit link to be a huge regional planning concern especially since more than eighteen months after it was cancelled, no clear path has emerged. Without this infrastructure, sustaining the region’s economic development is at risk.

Introduction

Our studio sought an alternative transportation option to the cancelled Access to the Region’s Core (ARC) Project. The terminated project offered a trans-Hudson transportation alternative for New Jersey commuters, providing a one-seat ride for those travelling into New York City’s Penn Station.

The importance of the project addressed the expected increase in ridership from New Jersey into New York City over the next twenty years. As shown in the graph below, ridership percentages will grow across many major transportation arteries during this time.

1 Access to the Region’s Core FEIS
The growth in ridership into Manhattan can be observed geographically. All of the New Jersey counties show an increase of people commuting into Manhattan. This includes those riding in Sussex County, Passaic County, Bergen County, Essex County, Hudson County, Somerset County, Middlesex County, and Monmouth County.²

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The cancelled ARC project would have alleviated the current strain on the New York metropolitan area transportation system by providing the following advantages:

- Trans-Hudson peak hour trains would have increased from 23 trains to 48 trains
- Peak hour passenger capacity would have increased by 35%
- An additional 32,500 daily trans-Hudson transit trips would be generated by 2030
- Passenger transfers would have declined by 97%
- An average of 23 minutes of travel time savings

Problems with addressing ridership capacity will continue to worsen in the near future. The result will strain New Jersey and New York City transportation resources which creates a severe need for a major transit project.

**Methodology**

**Project Plan**

In order to evaluate the alternatives to ARC in an organized manner, we devised a project plan. First, we defined our problem statement. Then, we developed goals and objectives to tackle our problem statement. Subsequently, we began an extensive data inventory to identify current and expected conditions. We then analyzed the existing proposed alternatives. And finally, we selected our preferred alternative and developed innovative funding strategies that can be utilized when implementing this preferred alternative.

**Problem Statement**

Our problem statement was defined as follows: With the current and peak hour commuter capacity constraints and the cancellation of the ARC project, a replacement is required to ensure the economic growth of both New York and New Jersey and to address the rapidly growing ridership into Manhattan. Viable political partnerships, innovative funding mechanisms, and timely implementation are needed to comprehensively address this problem.

**Goals and Objectives**

We attempted to tackle our problem statement through the following goals: achieve the expansion of trans-Hudson capacity, create travel time savings, increase connectivity and access throughout the region, promote economic development, find a politically viable partnership, and pursue innovative funding.

**Data Inventory**

Our data inventory included in-depth research and interviews with our client, the NYC DCP, and our technical advisory committee which consisted of representatives from Amtrak, HYDC, IRUM, MTA, NJ Transit, NYMTC, NJTPA, Parsons Brinkerhoff, RPA, and PANYNJ, detailed in our acknowledgements section. At every meeting, these regional stakeholders emphasized that at the end of the process, our solution must be “more than just lines on a map” and that building political coalitions and agency partnerships are really the key ingredients to reaching a successful agreement.4

**Outcomes Matrix**

4 Discussion with Richard Roberts, Chief Planner Capital Planning and Programs, NJ Transit, at Columbia University, February 2012.
As part of the standard practice in transportation planning projects, we created an outcomes matrix in order to focus on the list of possible alternatives to the original ARC project. The development and use of an outcomes matrix is standard practice for all types of transportation projects no matter the scale. The United States Department of Transportation recommends the use of an outcomes matrix for the decision process in any transportation project in their guidebook, *Systems Engineering for Intelligent Transportation Systems*. Following standard transportation practices, we created and used an outcomes matrix to aid in our decision making process. The original ARC plan, the Hudson-Bergen Light Rail Extension, and the no. 7 line subway extension project into Far West Midtown Manhattan all used outcomes matrices to determine their preferred projects.

In this step of the planning process the economic, political, and technical portions of each alternative are assessed. Our matrix includes a list of twelve criteria that are favorable feasibility measures for an ARC alternative project: three primary criteria (project cost, current funding source, and current partnerships backing the project) and nine secondary criteria (connectivity, frequency, capacity, speed, travel time, one-seat ride, ride cost, operational cost, and completion date). The primary criteria should be weighed more heavily because without these criteria being met, it would be impossible to move forward in the planning process.

After researching each of the proposed alternatives, the relevant data was entered into the outcomes matrix. In order to simplify and quantify the data, we devised a color coded scoring system. Dark blue was used to signify the most favored alternative in a particular category, medium blue as neutral, and light blue as an unfavorable score for a particular category. The outcomes matrix was one factor used to evaluate the proposed alternatives. Other components of our assessment of the alternatives included funding mechanisms, and the location of the commuter population and where job growth is occurring.

![Figure 2](image-url)

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6 Ibid.
Regional Transportation History

In order to better understand the particular context for cross-Hudson travel today, we need to be aware of how transportation has developed and evolved on the west side of Manhattan over the years.

As the New York metropolitan area grew in population and commerce during the late nineteenth and early twentieth centuries, the movement of goods and people became an ever increasing, complex array of ships, passenger ferries, and railroad car floats that crisscrossed the New York waterways. The western shore of Manhattan became the gateway for interstate commuters traveling from New Jersey into Midtown Manhattan. Crossings were only possible by ferries until the completion of the first subaqueous tunnel under the Hudson River in the early 1900s. Technological innovation in engineering allowed for the construction of tunnels and bridges that linked western Manhattan with New Jersey. Initially, these were rail tunnels. The first were the Hudson Tubes, built in 1908 and 1909, which are currently used by PANYNJ for Port Authority Trans-Hudson (PATH) Trains. The second were the North River Tunnels, built in 1910, which are now shared by NJ Transit and Amtrak, and connect New Jersey to New York City’s Penn Station.7

These over one-hundred year old structures are still the only cross-Hudson rail tunnels in operation today. The shift in popularity from rail to passenger vehicles brought more transportation infrastructure to the west side of Manhattan in the form of the Holland Tunnel in 1927, the George Washington Bridge in 1931, and the Lincoln Tunnel in 1937. Although there have been upgrades and additions to these three structures over the years, there has not been any major infrastructure project to address cross-Hudson travel since 1962 when the lower deck of the George Washington Bridge was opened.8

Based on existing infrastructure and constantly growing commuter trends, what we do know is that current cross-Hudson transportation infrastructure is reaching full capacity. Higher paying jobs in Manhattan will continue to attract commuters from New Jersey, which has the dual effect of stimulating economic growth on both sides of the Hudson River. There is no denying that the transportation decisions of the past have direct consequences on the commutes of workers nearly every single day.

The Dissolution of the ARC Project

In 2010, the position of the New Jersey State Governor changed hands from Jon Corzine to Chris Christie. At first, Christie declared his support for the ARC Project to United States Secretary of Transportation Ray LaHood, but in October 2010, the Governor took an about-face and officially cancelled the project.9 Christie’s reason for stopping the project was the continuing fiscal crisis facing the state of New Jersey coupled with the potential cost overruns of the ARC Project. These cost overruns were supposedly to be the responsibility of New Jersey. But in a document prepared in March 2012 by the U.S. Government Accountability Office, “Commuter Rail: Potential Impacts and Cost Estimate for the Cancelled Hudson River Tunnel Project,” it was found that there were no final arrangements made between the Federal Transit Administration (FTA) and the State of New Jersey concerning who would be responsible for the potential cost overruns.10 This puts some question as to the real reason, or reasons, behind Christie’s decision to halt the project. Nonetheless, even though it is

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8 Ibid.
10 Ibid.
convenient to lay blame on one actor or on one particular element, in actuality there were multiple reasons why the project was doomed to fail. The interplay of multiple factors resulted in a significantly weakened scenario that eventually collapsed the process. In the case of the ARC Project, there are three key components that made this happen: cost overruns and federal government funding limitations, lack of partnerships, and politics.

Cost Overruns and Federal Government Funding Limitations

Cost overruns are a continuing threat that can bring project stakeholders into heated debate as to how they can, and must, be handled. As Alan Altshuler and David Luberoff point out in their book, *Mega-Projects: The Changing Politics of Urban Public Investment*, the recent concept of “do no harm” and other environmental mitigation strategies have led to a dramatic increase in the costs associated with large infrastructure projects. Although a necessary element to ensure the protection and conservation of our wildlife and natural resources, this protracted process has the result of making building and construction costs much higher than were previously experienced in American history. As Altshuler and Luberoff observed, highway construction costs per mile in the 1980s and 1990s rose more than 600 percent from the previous decade.\(^\text{11}\) A more current scenario that witnessed a dramatic cost increase over the course of its construction life was Boston’s Big Dig. The initial cost estimate for this project was around 2.8 billion dollars but ended up costing more than fifteen billion dollars. However, the troubles continue to this day as Massachusetts is still heavily in debt from the project. The state owes more than 400 million dollars annually on debt service from bonds – but that amount doesn’t include over three billion dollars in debt also incurred by the now defunct Massachusetts Turnpike Authority and the Massachusetts Bay Transportation Authority.\(^\text{12}\) Given the fact that there is not much money available for large mega-projects and that escalating costs go hand in hand with project implementation, it is no wonder that the threat of incurring so much debt can hinder projects like the ARC Project.

![Figure 3](image-url)

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From these cost estimates it is apparent that the costs were increasing in a manner not unlike the Big Dig. Although a very different project, the comparison between the two does not go without merit.

Initially, when the project was put on hold, the FTA and NJ Transit mapped out rigid cost-cutting measures that brought the projected cost to somewhere between 9.8 and 12.4 billion dollars. But eventually, questions regarding the ability of New Jersey to pay for the cost overruns were determined by Governor Christie to be too much of a potential burden that the State of New Jersey would not be able to afford.

Even though the ARC Project was awarded one of the largest federal sums ever, this anomaly belies the current state of federal funding, which has protracted time constraints and other hurdles that put potential partner agencies in conflict with one another for these scarce funds. First, federal funding requires a lengthy environmental review process. In the case of the aborted ARC Project, this alone took approximately six years to complete. During this time period, inflation costs soared seventeen percent. Secondly, in FTA Region Two, which encompasses New York and New Jersey, transit construction costs tend to be higher. This in turn results in federal funding levels that are only able to cover thirty percent or less of the total costs of most mega-projects in the region.

Also, federal funding currently operates on a continued extension of the 2005 SAFETEA-LU Bill which, given inflation, means that there is less money available today than when Congress passed the legislation. In essence, the current funding levels are based on fiscal year 2003, with no adjustment for inflation. This sad fact further complicates the already limited resources that are allocated to public transportation by the federal government.

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13 Ibid.
Current transit finance is drastically under-budget, with only fifty to sixty billion dollars allocated for all nationwide projects in total. A study by the National Surface Transportation Policy and Revenue Study Commission found that 225 billion dollars is needed for public transportation annually for each of the next fifty years in order to accommodate the baseline projected growth for the United States.\(^\text{15}\)

**Lack of Partnerships**

Another major factor in the dissolution of the ARC Project was the lack of interagency and interstate cooperation. For a project that would have benefited the entire New York metropolitan area, there seems to have been minimal interaction and cooperation amongst stakeholders. It was this lack of support from the various levels of governments such as New York City, New York State, and New Jersey and transportation agencies that assisted the ARC project’s downfall. As previously pointed out, the Major Investment Study, for what would become the ARC Project, began in 1995 and was undertaken by three different agencies: NJ Transit, PANYNJ, and the MTA. Hence, PANYNJ was obligated to contribute three billion dollars to the ARC Project. Other than contributing to the ARC project financially, the PANYNJ was by no means committed to ensure that the project was completed. With many complicated projects underway, the PANYNJ was merely providing funds and was not capable of taking full interest in the actual implementation of the plan. The MTA, also under considerable strain from its own infrastructure projects, quickly jettisoned itself from any further investment in the ARC Project.

Soon the project was only a partnership between two agencies – NJ Transit and the FTA.

Also, considering the necessary interstate cooperation needed to move the project along, there was virtually no communication and cooperation between key figureheads – both the New York and the New Jersey Governor as well as the Mayor of New York City. In their book on New York metropolitan governments, *Regionalism and Realism: A Study of Governments in the New York Metropolitan Area*, Gerald Benjamin and Richard P. Nathan provide significant evidence that it is not only beneficial, but necessary that strong political leadership be present in order to get tasks accomplished. Strong leadership helps move political walls, fosters public support, and facilitates real action to get large, complicated projects done.\(^\text{16}\) Without strong political leadership, there is either very limited success or no success at all; in the case of the ARC Project, it is evident that the latter occurred.

**The Role of Metropolitan Planning Organizations: A Special Lack of Partnerships**

Metropolitan Planning Organizations (MPOs) perform vital services for their constituents. Principally among them, they serve as conduits for federal funding. MPOs also operate as a means of regional project coordination and prioritization and perform vital data collection services; however, MPOs in the New York metropolitan area, such as the NYMTC and the NJTPA, have a history of minimal regional coordination with mega-transportation planning projects. The MPOs merely record these projects in their transportation improvement program (TIP) for federal funding.

In the New York metropolitan area, NYMTC serves as the MPO for the twelve southern counties of New York State and NJTPA represents the thirteen northern and central New Jersey counties. Each MPO creates three major documents: The TIP, which is a five year program identifying all projects that receive federal dollars; the Regional Transportation Plan (RTP), which identifies all the major needs and their funding sources as part of a thirty year plan, updated every four years; and the Unified Planning Work Programs, a federally required report based on the RTP. These reports are accompanied by a host of data collection and smaller reports released annually. All three reports offer a snapshot of the current local transportation environment and establish priorities for projects based on where they are most


needed. Both NYMTC and NJTPA placed the former ARC Project at or near the top of the TIP
document.17

MPOs have great potential for facilitating regional partnerships, but transportation agencies are
not required to plan through MPOs so many agencies in the New York metropolitan area do not. As a
result, MPOs have largely become organizations dedicated to distributing federal funds for
independently planned projects. Also, because they have no policy-making procedures, this makes their
ability to facilitate regional cooperation extremely limited. Although very supportive of the ARC project,
the regional MPOs had no decision making power regarding the project.

In the case of the New York metropolitan area, NYMTC and NJTPA must begin working together,
bringing transportation planners from both sides of the Hudson River under one roof to discuss an ARC
alternative project. MPOs have not been serving to their full extent of being leaders for coordination,
comprehensive plans, and cooperation. An ARC alternative project offers an opportunity for agencies
on both sides of the Hudson River back into close working relationships to develop a solution that
benefits both New York and New Jersey. Among the major incentives to developing an ARC alternative
project are jobs, the ability for private sector funding, the dire need to expand capacity and create
better regional connectivity, and regional economic development. With such a comprehensive list,
coordination and communication should be among the chief priorities of these MPOs. But based on the
limitations of MPOs’ legal structure, this makes their role as a regional facilitator an extremely difficult
one.18

Politics

Politics always play a drastically important role in mega-projects like an ARC alternative, and it is
very easy to point fingers at current and preceding administrations for either questionable political
maneuverings, lack of foresight, budgeting failures, or an inability to see important projects through.
One of the major dilemmas of our current political system in the United States is the rapid turnover of
politicians in office, which has the effect of further complicating the time-consuming processes that are
inherent in mega-projects. No politician wants to be responsible for another politician’s success or
failure. Also, politicians are fearful for their own ability to be re-elected. These conundrums continue to
haunt what we as a nation are able to accomplish.

Regardless of the political quagmires that ARC found itself involved in, what the failure of the
ARC Project boils down to was best said by US Secretary of Transportation Ray LaHood:

“\(\text{I am extremely disappointed in Governor Christie’s decision to abandon the ARC Project, which is} \)
\(\text{a devastating blow to thousands of workers, millions of} \)
\(\text{commuters and the state’s economic future. The Governor’s decision to stop} \)
\(\text{this project means commuters – who would have saved 45 minutes each day,} \)
\(\text{thanks to the ARC Tunnel – will instead see no end to the congestion and ever-}
\(\text{longer wait times on train platforms.}^{19}\)

http://www.njtpa.org/Plan/LRP2035/default.aspx
18 Lapp, Floyd. “Reflections on Tri-State and NYMTC and my role at City Planning.” Council Contact, NYMTC (Fall/Winter 2000)
Volume 15, Number 1.
19 Frassinelli, Mike. “Transportation Secretary Ray LaHood ‘disappointed’ in decision to scrap Hudson River tunnel project.”
Transit Works in Progress

Currently there are four transit works in progress that will have an effect on cross-Hudson travel. These works in progress also illustrate that, despite the failure of ARC, new transit projects are capable of getting completed although in some instances later than planned and, as a result, at greater expense. It is important to look at these projects to better understand how they might affect the overall transit scenario as well as how they can be incorporated into different plans meant to address the capacity issues of cross-Hudson travel.

Moynihan Station

One transit work project in progress is the expansion of New York City’s Penn Station into the neighboring James Farley Post Office, to be called Moynihan Station. The lead agency undertaking this project is Amtrak. Penn Station is currently at capacity with 600,000 daily train passengers. Moynihan Station will allow all 30,000 inter-city Amtrak passengers to move to Moynihan Station, leaving 570,000 daily commuters at Penn Station.²⁰ However, Moynihan Station will not provide any additional train capacity as it shares the same tracks as Penn. It will only provide additional passenger waiting areas and commercial spaces.²¹

Photo 1: Moynihan Station

Phase One of the project, began in October of 2010 and includes the construction of new platform entrances as well as the extension and upgrading of existing platforms and other necessary infrastructure. This 267 million dollar phase is almost fully funded, and will be completed by 2016. Phase Two, which incorporates the construction of commercial spaces and the fully renovated train hall, will cost 1.5 billion dollars and its funding source and completion date are currently unknown. Amtrak hopes to turn the landmarked building into both a transportation and commercial hub.²²

²⁰ Kimmelman, Michael, “Restore a Gateway to Dignity.” The New York Times (February 8, 2012)
²² “What is Moynihan Station?” Friends of Moynihan Station Online, Regional Plan Association. <http://www.moynihanstation.org/newsite/>
Another transit work project in progress is East Side Access by the MTA and Long Island Railroad (LIRR). As a result of this project, new tracks are being constructed from Sunnyside, Queens to Grand Central Terminal, providing LIRR passengers more destination options in New York City. Currently 210,000 daily commuters take the LIRR to and from Penn Station, its only Manhattan station, daily. It is anticipated that when East Side Access opens in 2018, over 140,000 of these commuters will use the new East Side Access route instead, leaving less than 90,000 daily LIRR commuters in Penn Station.23

Added to the 30,000 Amtrak passengers moved to Moynihan Station, there will only be 470,000 commuters using Penn Station daily by 2018, a twenty-eight percent decrease clearly removing the current burden on the Station.24

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Hudson-Bergen Light Rail

The Hudson Bergen Light Rail system is owned by NJ Transit and currently operated by 21st Century Rail Corporation under a fifteen year Design-Build-Operate-Maintain (DBOM) contract. Contrary to its name, it only runs through Hudson County, New Jersey. The current Hudson-Bergen Light Rail Line is 20.6 miles, with a southern terminus station at 8th Street in Bayonne and a northern terminus at Tonnelle Avenue Station in North Bergen.

Contrary to its name, it only runs through Hudson County, New Jersey. The current Hudson-Bergen Light Rail Line is 20.6 miles, with a southern terminus station at 8th Street in Bayonne and a northern terminus at Tonnelle Avenue Station in North Bergen.

NJ Transit is currently working to extend the Hudson-Bergen Light Rail line to the northern Bergen County town of Tenafly. This is a very important extension project because Bergen County has one of the highest numbers of Manhattan-bound commuters. However, due to the fact that Bergen County has little connectivity to the region’s public transit systems, currently only seventeen percent of the county’s residents take public transit to work. NJ Transit’s preferred alternative for the extension of the Hudson-Bergen Light Rail line would add an additional twelve miles of service. The additional track would begin at the current terminus station for the Hudson-Bergen Light Rail, the Tonnelle Avenue

Station, and extend north through the town centers of both Englewood and Tenafly, adding eleven new station stops along the way.\textsuperscript{30}

NJ Transit recently completed the public review phase of the Hudson-Bergen Light rail extension project. The public review period for the light rail extension project began on January 6, 2012 and lasted for 45 days, ending on February 21, 2012.\textsuperscript{31} This extension will greatly increase the number of transit riding commuters in Bergen County. According to the Draft Environmental Impact Statement for the Hudson-Bergen Light Rail extension project, NJ Transit expects an addition of approximately 11,900 passengers to take the light rail every day, which amounts to 23,800 trips. The plan is currently expected to cost a total of 866 million dollars.\textsuperscript{32} The Hudson-Bergen Light Rail extension, running north-south, could prove to be a new feeder system into any of the proposed trans-Hudson east-west mobility options and capture those commuters currently not using public transportation.

\textit{No. 7 Line Subway Extension}

The last relevant transit work in progress is the no. 7 line subway extension. The MTA began construction of a new no. 7 line subway station to expand the line to Hudson Yards in Far West Midtown Manhattan. The new station will be located at 34\textsuperscript{th} Street and 11\textsuperscript{th} Avenue.

\begin{map}
\centering
\includegraphics[width=\textwidth]{current_7_line_subway_extension}
\caption{Map 6}
\end{map}


Construction for the no. 7 line subway extension broke ground in December 2007 and the expected completion date is December 2013.\textsuperscript{33} The extension project will be funded through the development of Hudson Yards, explained in the Financial Case Studies section.

**Proposed Alternatives**

Recently, several alternatives to the cancelled ARC Project have been proposed by regional agencies.

*The Gateway Project*

The first proposed alternative is Amtrak’s Gateway Project. Amtrak, a government-owned corporation since 1971, operates trains throughout the United States. The Northeast Corridor, which extends from Washington, DC through New Jersey and New York and into the City to Boston, is its busiest route, only profitable itinerary, and the focus of the nation’s first anticipated high-speed rail system. However, the Northeast Corridor faces some major problems as the section between Newark, New Jersey and New York City is currently operating at full capacity during peak hours. This means that one cross-Hudson operational failure (whether Amtrak or NJ Transit, as the two entities share much of the infrastructure; or Amtrak or LIRR, as the two entities share the dispatching lead in New York City’s Penn Station) leads to rail delays throughout the entire Northeast Corridor. The additional infrastructure promised by the cancelled ARC Project would have helped to ameliorate these conditions. Now, without the ARC Project the region faces a serious transportation crisis.\textsuperscript{34}

The Gateway Project, proposed in February of 2011, is another attempt seeking to remedy the bottleneck in New York and New Jersey as well as lay the groundwork for the incorporation of high-speed rail. The project includes renovations of existing track and outdated bridges in New Jersey in addition to the construction of new cross-Hudson tunnels and the expansion of New York City’s Penn Station. Initially these endeavors are estimated to include 720 million dollars for the immediate replacement of the one-hundred year-old Portal Bridge North in New Jersey, to be completed in 2017, and 188 million dollars for the preliminary environmental and engineering studies for new cross-Hudson tunnels, to be completed by 2015. Amtrak also recommends the extension of the no. 7 line subway five acres south to the new transportation and commercial hub of Penn Station instead of the proposed five mile extension west to Secaucus, which Amtrak believes will only provide minimal improvements to regional transportation issues.\textsuperscript{35}


\textsuperscript{34} Discussion with Drew Galloway, Assistant Vice President of Northeast Corridor Infrastructure and Development at Amtrak, Columbia University, January 26, 2011.

\textsuperscript{35} Amtrak. “Amtrak Seeks $1.3 Billion for Gateway Project and Next-Generation High-Speed Rail on NEC.” Report, April 4, 2011.
By 2030, Amtrak expects commuter travel demand in the New York/New Jersey area to have doubled, which poses significant problems since the current infrastructure is at capacity, with 1,248 trains moving through Penn Station on a weekly basis and 600,000 people daily. The Gateway Project would improve this capacity by 100 percent under the Hudson and by 48 percent in Penn Station, including access to Penn Station for Metro North trains, increasing the maximum amount of train traffic per hour from 62 to 92 (eight new Amtrak trains; two new Empire Corridor trains; thirteen new NJ Transit trains; one new LIRR train; and six new Metro North trains anticipated in this improvement) and greatly expanding the passenger waiting areas. Moreover, the new infrastructure would provide flexibility in the regional rail operations, meaning that one failure will not shut down the entire system from Washington to Boston and Western New Jersey to Eastern Long Island.

Amtrak anticipates the completion of the comprehensive Gateway Project by 2020 at a cost of $13.5 billion and has already taken the lead in securing funding for the project from state and federal governments, local agencies, and private investors. In 2011, the United States Department of Transportation selected the Northeast Corridor to be the nation’s first high-speed rail system, meaning that Amtrak can apply directly to the federal government for some of the Gateway funding. Drew Galloway, Assistant Vice President of Northeast Corridor Infrastructure and Development at Amtrak, articulated the need for all regional stakeholders to fund and guide the new project, as it appears to be one of the only widespread solutions emerging in the wake of the ARC termination. Galloway emphasized that this inter-agency cooperation is essential in order to have the new project meet the needs of the greatest amount of people and avoid another ARC-like failure.

The collaboration outlined by Galloway has already begun, with New Jersey Senators Frank Lautenberg and Robert Menendez and New York Senator Charles Schumer all endorsing the Gateway Project in 2011 as a critical first step in addressing the cross-Hudson transportation crisis. Amtrak

Discussion with Drew Galloway, Assistant Vice President of Northeast Corridor Infrastructure and Development at Amtrak, Columbia University, January 26, 2011.
believes that its Gateway Project is imperative in alleviating the bottleneck in the New York/New Jersey area, as well as setting a foundation for high-speed rail service in the United States, and hopes that involved stakeholders will jump on board to support the project in order to maintain the region’s worldwide status and economic viability well into the twenty-first century. Nevertheless, the expensive project cost and current lack of funding sources create major obstacles for feasible implementation of Amtrak’s Gateway Project.

No. 7 Line Subway Extension

The New York City DCP has proposed another alternative which is a no. 7 line subway extension from Far West Midtown in Manhattan to Secaucus in the Meadowlands of New Jersey. After Governor Chris Christie cancelled support of the ARC Project in October 2010, Mayor Michael Bloomberg’s Administration began creating alternative proposals to run the no. 7 line subway under the Hudson River. The proposed no. 7 line subway extension will connect New Jersey to New York City, first through the 34th Street and 11th Avenue Station in Manhattan’s Hudson Yards, currently under construction, and then through midtown Manhattan and into Queens on the existing no. 7 line subway.

In 2001, DCP published a report titled “Far West Midtown: A Framework for Development” which promoted the redevelopment of far west midtown Manhattan. To incentivize this redevelopment, the City decided to bring mass transit into the area through the extension of the no. 7 line subway. The report noted that subway stations should increase entrances and exits and widen stairways, while bus services should increase the number of routes and service. It was also recommended that roadway infrastructure improvements should be required for vehicles and some other parking and pedestrian circulation should also be changed by physical street improvements. The Hudson Yards Redevelopment Project was to be connected to the ARC.

The following figures depict four proposed options of the no. 7 line subway extension into New Jersey. Only the first option was proposed by DCP; the other options were proposed by regional transportation agencies as a result of their own research. The first option, proposed by the DCP, would extend the no. 7 line from its 2013 terminus station of 34th Street and 11th Avenue to Secaucus Junction in New Jersey.


As stated in the description of the current no. 7 line extension project, there is an option to add an additional subway station at 41st Street and 10th Avenue in the future. An additional feature of the proposed no. 7 line extensions described above is to include a bus transit route at Secaucus Junction to transport people to nearby places of residence and employment.
Although not proposed by the DCP, three other options for the no.7 line extension are:

Map 9: Two no. 7 line stations in Manhattan traveling west to Secaucus Junction

Map 10: The 34th St/11th Ave proposed no. 7 subway station to Hoboken and on to existing infrastructure

Map 11: Two no. 7 line stations in Manhattan to Hoboken and on to Secaucus Junction
Of the four options, the first route is preferred by New York City officials, with the no. 7 line going straight to Secaucus Junction from 34th Street and 11th Avenue. In this case, the extension of the no. 7 line subway would cost 5.3 billion dollars, estimated by HYDC, almost half of the proposed cost of the original ARC Project. However, the funding source is not yet established for this proposed alternative.

Each train of the no. 7 line subway extension would have eleven cars, and they would run every two or three minutes like the current operating subway system. In the peak period, 33,000 passengers per hour can be carried on this subway line for the comparatively inexpensive price of $2.25. This proposed alternative establishes high connectivity between New York and New Jersey, as it has the potential to tie into other public transportation routes like the Hudson-Bergen Light Rail. Travel time is another advantage as it will take only twenty minutes to travel between Secaucus Junction and the Port Authority Bus Terminal (PABT) and twenty-five minutes between Secaucus Junction and Grand Central Terminal.

Finally, an additional station could be constructed at 41st Street and 10th Avenue to provide more access for Far West Midtown residents and workers. This station would cost 800 million dollars to construct today, a number that could easily inflate to one billion dollars in the near future. Should the existing convention center be demolished and new development occur in its place, the need for the second station will become more apparent, according to the Hudson Yards Development Corporation.

**Hoboken – Penn Line**

IRUM is a New York State non-profit established in 1997 to study and promote innovative transportation reforms in the New York City metropolitan region. IRUM has proposed a commuter rail link between Hoboken Terminal and Penn Station. This rail line would use existing rail tracks to connect Hoboken Terminal to Secaucus Junction as well as the existing rail infrastructure of Hoboken Terminal and Penn Station.

The Hoboken-Penn proposal would route a 2.8 mile tunnel from Hoboken Terminal in New Jersey under the Hudson River and into Penn Station. Arriving at East 10th Street, the new tunnels would connect into the existing configuration of the tracks west of Penn Station.

The Hoboken-Penn route uses the existing transit network more efficiently, relying on the expansion of existing facilities and minimal tunnel construction bringing significant cost savings when compared to the original ARC Project. The Hoboken-Penn proposal eliminates seventy percent of the costs associated with the original ARC Project, doing away with the inclusion of the Portal Bridge replacement, an eight billion dollar endeavor which is included in Amtrak’s Gateway Project. This alternative avoids construction in the environmentally sensitive Meadowlands, putting to rest potential complications and delays arising from these concerns.

The Hoboken-Penn line would provide an additional twenty-three trains per hour, carrying approximately 135,000 passengers per day. The ride cost is inexpensive at two to four dollars, compared to Amtrak although more than the no. 7 extension to Secaucus. With the creation of a new transit hub at Hoboken Terminal, innovative financing mechanisms could be used to finance the

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42 Metropolitan Transportation Authority, [http://www.mta.info](http://www.mta.info)
43 Discussion with Sandy Hornick, Director of Strategic Planning in Department of City Planning, Columbia University, January 26, 2012.
45 Discussion with Sandy Hornick, Director of Strategic Planning in Department of City Planning, Columbia University, January 26, 2012
Hoboken-Penn proposal. For a further extension to Secaucus Junction, the cost of track construction would involve the renovation of existing rail tracks.

However, there are some drawbacks to this proposed alternative. First, no agency has been designated for the DBOM aspects of this proposed alternative. Redundancies in the linkages of this proposed alternative with existing PATH lines provide more flexibility for cross-Hudson transit, but not necessarily new routes. This proposal does not provide access to Midtown East, where many of the high paying jobs sought by New Jersey residents.

Second Exclusive Bus Lane (XBL)

It is evident from the numerous studies conducted by the different agencies that the number of daily commuters to Midtown and Lower Manhattan is steadily increasing. Flexible and efficient systems need to be added to the current transit options in order to avoid congestion and various other problems in the future. At present for Midtown, the primary transit connection is the XBL system which provides preferential access to the Lincoln Tunnel, travelling directly into the Port Authority Bus Terminal (PABT). This was the first and busiest exclusive bus lane in the nation and it saves commuters twenty to thirty minutes each day compared with commuter automobile riders.47

Manhattan and New Jersey are connected by three major highways, the Lincoln Tunnel, the Holland Tunnel and the George Washington Bridge. All these are owned and operated by the PANYNJ. Since the inception of the XBL more than forty years ago, the demand for bus service across the Hudson has increased. The graph below depicts the number of total daily trans-Hudson bus and auto passengers.

PANYNJ operates a 2.5 mile contra flow lane which travels along New Jersey Route 495, leading from the New Jersey Turnpike to the Lincoln Tunnel. It operates during the weekday morning peak period which is approximately between 6 A.M. to 10 A.M.  

The graph above clearly represents forty years of XBL growth. At present, the XBL carries about 62,000 daily passengers. But, at 700 buses per hour capacity, the lane can potentially carry 150,000 people. So, additional buses and passengers can be accommodated in the existing lane itself. But, there are major shortcomings that need to be acknowledged. Even though the calculations show that 1000 more buses can be added, the Lincoln Tunnel and the Port Authority Bus Terminal are already

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48 Ibid.
49 Ibid; Ernst, Michelle, Kate Slevin and Veronica Vanterpool. “Express Route to Better Bus Service; Tri-State Campaign”, May 2009.
50 Ernst, Michelle, Kate Slevin and Veronica Vanterpool. “Express Route to Better Bus Service; Tri-State Campaign”, May 2009.
facing capacity constraints. The Lincoln Tunnel has limited capacity which will hinder the to and fro access to Manhattan. Limited storage and staging spaces are a huge problem. There are 232 bus gates at the PABT but only about 180 of them are being used.\textsuperscript{51}

To accommodate the increasing number of bus passengers, the PANYNJ has been working on a proposal to add a second exclusive contra-flow bus lane. The redesign includes eighteen new bus gates and upgrades to the existing gates at the terminal allowing for an additional seventy buses, carrying about 3,000 passengers to travel through during peak commuting hours.\textsuperscript{52} The projected ridership increase is about 211,000 by the year 2030.\textsuperscript{53} However, the additional passengers from the second XBL still do not add up to fulfill the projected ridership increase in the future (approximately 211,000 by the year 2030).

As previously mentioned, the existing infrastructure that supports the current XBL service is not being efficiently used and hence it is in dire need of an upgrade. However, there is still a pressing need to address the issue of bus congestion even at the current level of XBL capacity. To accommodate the growing number of buses, the PANYNJ has already considered these sites shown below as potential sites for staging and parking in Manhattan.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{potential_bus_staging_sites.png}
\caption{Potential Bus Staging Sites}
\end{figure}

These sites offer a set of complexities that have to be addressed. The structures would have to be built on platforms, which further complicates the structure and design aspects of such a development site. Large areas required for ventilation infrastructure over the tunnel areas would also limit the total space available for buses on these sites. Cost and funding techniques are major issues as well. Even though the total construction costs are less when compared to the other alternatives that we

\textsuperscript{51} PANYNJ official website, <www.panynj.gov>; Conversation with Mark Muriello, Assistant Director, TB&T at PANYNJ.
\textsuperscript{52} Ernst, Michelle, Kate Slevin and Veronica Vanterpool. “Express Route to Better Bus Service; Tri-State Campaign”, May 2009.
\textsuperscript{53} Access to the Regions Core, EIS Report, 2007.
have looked at, there are no funding mechanisms in place that will aid this project. However, the agency does already own the air rights above these two sites.

Since the capacity of the existing XBL grew gradually over four decades, we can assume that the second lane will take just about the same amount of time to reach the desired capacity. However, even if this alternative can reach full capacity, it will still not be able to accommodate the projected number of riders. The political process to designate an XBL is extensive and plagued with difficulties. Also, because of the recent growth of development in the Hudson Yards, this has resulted in a diminishing number of bus storage sites in Far West Midtown.

We concluded that even though the second XBL lane was not chosen as the preferred alternative, we recommend the agency add buses into the trans-Hudson network and increase its investment in the current XBL contraflow lane as it does play a significant role in making the overall system extremely efficient.\(^5^4\)

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Outcomes Matrix

Our final outcomes matrix helped us to quantitatively and qualitatively evaluate the proposed alternatives. The outcomes matrix was an important part of our decision process. The outcomes matrix shows the strengths and weaknesses of each proposed alternative, illustrating the pattern of expensive project costs, generally unknown funding sources, and lack of regional partnerships of all four proposed alternatives. As noted before, these three primary criteria need to be met in order for a project to be feasible; the non-favored markings in the majority of these categories presents a grim outlook on the future of these four proposed alternatives.

Preferred Alternatives Analysis

Solving the coming capacity crisis of trans-Hudson mobility between New Jersey and New York necessitates an approach that is politically and fiscally viable. There is no question as to the need for such a project, if New Jersey workers cannot efficiently get to the high paying jobs the Manhattan Central Business District (CBD) provides, those employers will move to markets that can provide easy access. With that scenario, the New York metropolitan region would return to the decades of the 1970s and 1980s, twenty years marred by both job and population losses, which reached a point to where the entire region was seen as in decline. Given our recent history, New Jersey, New York State, and the City
of New York need to foster a working relationship based on one goal: maintain the economic competitiveness of a region that is currently unmatched in the United States.

Given the current political stalemate between the executive branch of New Jersey state government and their counterparts in New York State and New York City, we approached ARC Alternative(s) which are incremental and subdivided into two categories: interim and long-term. As discussed above, we determined that the XBL did not qualify as an interim solution. We were then able to narrow our alternatives down to two possible extensions of the no. 7 line subway from its terminus at 34th and 11th Avenue. We narrowed a multitude of possible routes to an extension of the no. 7 line subway in order to provide eastside access for New Jersey commuters. Eastside access was a big part of our alternatives because so many of the jobs are there, for instance, the MTA’s current project providing LIRR passengers with direct access to Grand Central Terminal is going to reduce the number of riders going to Penn Station by nearly 75 percent. Therefore, we made sure to choose an alternative that would route passengers directly to Midtown East; a no. 7 line subway extension into New Jersey would reduce the number of transfers a commuter would have to make.

**Alternative #1 – Extension to Secaucus Junction**

One route would run between 34th Street and 11th Avenue and end at Secaucus Junction, a total distance of approximately 4.40 miles (23,200 feet); 2.65 miles (14,000 feet) of this route would be tunnel. The rest of the route would run parallel to the current Amtrak and NJ Transit route.\(^{55}\)

The station at Secaucus Junction is designed to support an additional elevated rail line, and the route would be closest to the original ARC route. This route would provide Manhattan bound commuters with access to Midtown East who currently have to switch to the New York City subway system in order to get to the eastside of Manhattan.

However, the Secaucus ARC alternative has its disadvantages, first, it would be rather expensive to build and with high-costs being the rationale for ARC’s cancellation by New Jersey Governor Chris Christie, it is unlikely that this route would be built. The Secaucus route would run through the

\(^{55}\) Approximate calculations by Chris Velasco, Google Maps.
environmentally sensitive Meadowlands, and would have to increase the width of the current rail-right-of-way to allow Amtrak’s Gateway project. There would be a need for an additional EIS(s) and likely opposition from conservation groups.

*Alternative #2 – Extension to Hoboken Terminal*

The second alternative would extend the no. 7 line subway from the under construction tail tracks at 26th Street and 11th Avenue and go under the Hudson River and come above grade at Hoboken Terminal. This route would necessitate approximately 1.6 miles (8,450 feet) of new tunnel construction. A no. 7 line subway line linkage from Hoboken Terminal to Secaucus Junction could run on existing rail-right-of-way between the two stations since ridership on the NJ Transit lines is low on this portion of the route. However, the track would have to be realigned in accordance with New York City MTA train gauges. It would create a new transit hub at Hoboken Terminal, connecting seven NJ Transit rail lines, PATH, and the Hudson-Bergen Light Rail in one station. This alternative would use the existing transportation network more efficiently, since only the portion between the tail tracks at 26th Street and 11th Avenue and Hoboken Terminal would require construction. PATH enters from the Hudson River into Manhattan at Christopher Street, it then keeps going east until the Avenue of the Americas (6th Avenue). The proposed Hoboken alternative route should enter Manhattan at 23rd and 11th Avenue, therefore, posing no threat to the existing PATH tunnel.

According to a study recently published by New York University, Passaic County, Hudson County, and Essex County lead the New York metropolitan area in the percentage increases of workers commuting into Manhattan. These counties have NJ Transit rail lines that go directly into Hoboken Terminal. Given increases of over twenty-five percent in the years between 2002 and 2009 included two years of a severe recession, one can only imagine that the trend will only strengthen in the years to come. NJ Transit has proposed doubling the length of the Hudson-Bergen Light Rail into the northern Bergen County town of Tenafly. Bergen County leads the state of New Jersey in the numbers of its

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56 Ibid.
residents commuting outside the state for work, yet, only seventeen percent of its residents make this trip by rail, seventy percent drive. Therefore, the Hoboken Alternative would likely capture many of these residents currently making their trip into Manhattan by car.  

The most advantageous feature of this alternative is the potential to use innovative funding mechanisms to support the construction of this linkage. The Hudson-Bergen light rail network runs parallel to the Jersey City CBD. This area is much like Far West Midtown in the fact that there are numerous in-fall development sites and low densities. Unlike Far West Midtown, there is already an extensive transit network in the area. Therefore, the use of Value-Capture, explained in the Private Funding Options section, could be instituted in the area parallel to the Jersey City CBD, as it is located within close proximity to Hoboken Terminal. Additionally, the air rights over the five acres that encompass Hoboken Terminal could be sold for development. Land values along the seven NJ Transit lines that end at Hoboken Terminal would likely rise, as residents would have a two-transfer linkage to Midtown East. The Meadowlands Development Commission (MDC) through the increased property tax revenue could capture this increase and new construction along these lines could generate an increase in the Vehicles Miles Traveled Development (VMT) Fee, which is already in place. However, the geographic reach of the MDC would need to be expanded, and a new economic development corporation with jurisdiction over the Jersey City CBD area would need to be created, requiring action from the New Jersey State Legislature and Governor in order to approve such a proposal. Additionally, no agency has been identified, or interested in the Hoboken Alternative, which at the current moment makes this ARC Alternative a mere proposal. Megaprojects can no longer rely on the federal government for funding. By using an approach to megaprojects in the existing network more efficiently, innovative funding mechanisms such as VMT or Value-Capture may be, in a time of austerity, the only way to effectively construct such projects.

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Financing The Preferred Alternative

Federal funding for transit, as previously stated, has proven inefficient, costly, and simply not enough for projects of this size. The length of time required for the federal Environmental Review Process adds significantly to the cost of the project. Federal funding is helpful toward getting many projects off the ground, but with the pressing need for a new Hudson River Tunnel, we cannot afford to wait six years for another EIS and in the end have insufficient amounts of capital as a result of poor project estimates or inflation from the time spent with the regulatory review process.

There are plenty of alternative financing methods that have been studied and applied in real world situations. These include local level funding, value capture, user fees, transportation districts and taxes. These have all been employed for projects across the United States and globally to build major infrastructure. Closer to New York, the HYDC and the New Jersey Meadowlands Commission stand out as public entities employing innovative techniques to finance billions of dollars worth of infrastructure at a time when most public agencies are struggling financially.

The following section will elaborate on alternatives, further examine these case studies, and assess the political feasibilities of each in replacing the ARC Project. It is important that a variety of innovative funding is applied to this project so that costs are spread out and the state and agency share can be reduced.

Financial Case Studies

Hudson Yards

The Hudson Yards Area is on the far west side of midtown Manhattan and is bounded by West 43rd Street on the north, 8th Avenue on the east from West 43rd Street south to West 33rd Street, 7th Avenue between West 33rd Street and West 30th Street on the east and West 30th Street and West 28th Street on the south, and the Hudson River on the west. The extension of the no. 7 line subway from the Times Square Station to its new terminus station at West 34th Street and 11th Avenue will ensure that almost the entire Hudson Yards area is within a ten minute walk to a subway station.

The DCP and the MTA proposed a comprehensive transit oriented development plan that would bring transit access to the Far West Side of Manhattan to redevelop the area. This multi-pronged approach not only connects this area of Manhattan to New York City’s vast transit network, but also included major amendments to New York City’s zoning code to allow for high-density residential and commercial development. The first plan for transit extension and redevelopment in Far West Midtown was proposed by the MTA in 1988. Then, in 1993, DCP released a study on the Hudson Yards Area and identified it as an essential area for expansion of the midtown CBD. The study determined that high density as of right zoning was necessary to accommodate the growing demand for office space and proposed the extension of the no. 7 line subway into the Hudson Yards area. In 1999, the DCP secured funding to undertake a feasibility study for extending the no. 7 line subway into Hudson Yards. This study concluded that there needed to be some type of self-financing mechanism in place to extend the...
no. 7 line subway. By 2003, the Preferred Direction Plan for Hudson Yards was released.\textsuperscript{61} The initial EIS was released for public review, and construction began in 2007.\textsuperscript{62}

In 2004, the no. 7 line subway extension and new terminus station at 34th Street and 11th Avenue will be able to accommodate the new passenger demand that will result from the development of Hudson Yards. The station will have a capacity for more than 30,000 peak hour passengers. The Hudson Yards Area was rezoned to allow for as-of-right zoning to create high density mixed use developments in the area. Rezoning of Hudson Yards occurred in 2005 and 2009. These rezonings of the area allows the Hudson Yards district to accommodate an additional twenty-five million square feet of new office development, 20,000 new housing units, two million square feet of new retail development, and three million square feet of new hotel development.\textsuperscript{63}

In order to manage this new development area, New York City created two public entities to oversee the development and finances of Hudson Yards. The Hudson Yards Infrastructure Corporation (HYIC) was created in 2004. The HYIC oversees the project costs and financing to ensure that costs do not exceed the financing of the project. The HYDC was created in 2005 and is in charge of implementing the Hudson Yards Development program, which is outlined in DCP’s Hudson Yards Development Plan. Currently, the no. 7 line subway extension project is fully funded with three billion dollars from Hudson Yard Project bonds that have been sold. Additionally, in order to increase density and collect more revenue, the HYIC receives non-recurring revenue from developers. Aside from the as-of-right zoning, both commercial and residential developers receive a number of building bonuses in exchange for payments to the HYIC. Commercial developers receive a District Improvement Bonus (DIB) for paying into the District Improvement Fund; they can also acquire Transferable Development Rights (TDRs) from the Eastern Rail Yards, which is owned by the MTA, by paying the HYIC. Residential developers can also increase their building’s density through a number of increased density allowances. Like commercial developers, they also get a DIB and an additional Housing Bonus DIB, and if the developer includes affordable housing in the building there is also an inclusionary housing bonus. These revenues will be used to pay off the bonds sold by the HYIC. In order to incentivize development in the Hudson Yards area, there is a Uniform Tax Exemption Policy for the area.\textsuperscript{64}

\textit{Meadowlands}

Another interesting example of a transportation financing initiative is the Hackensack Meadowlands Transportation Act. Enacted in 2004, it established the New Jersey Meadowlands Commission. They prepared the Meadowlands District Transportation Plan for 2030, which identified the improvements needed on existing transportation infrastructure in the district to support expected future development in the area.

In order to pay for these transportation improvements, the New Jersey Meadowlands Commission will assess fees on future development in the district based on an analysis of future development and how it will impact the transportation system. Fees will be paid by private developers to finance new transportation network development within the district that is outlined in the Meadowlands District Transportation Plan 2030.

The New Jersey Meadowlands Commission calculates the fee for developers by looking at their development project and estimates the cost per vehicle mile traveled for the expected number of

\textsuperscript{62} No. 7 Line Extension–Hudson Yards Rezoning and Development Program Final Generic Environmental Impact Statement: Executive Summary.
\textsuperscript{64} Ibid.
morning and evening peak hour vehicle miles generated from people living in and working at these new developments. Using this metric, the commission found that forty percent of future roadway improvements, 52 percent of future bicycle and pedestrian improvements, and 78 percent of future transit improvements will be attributed to private development of the district.

Both the HYDC and the New Jersey Meadowlands Transportation Commission provide important examples within the New York region of the alternative funding methods that could be used as examples of how to possibly fund an ARC alternative project.

**Government Funding Options**

Dedicated government funding is used to pay for nearly all transit projects. The current system encourages states and agencies to apply for federal funding and match grants by dedicating a portion of their own funding. However, given the current fiscal constraints and gridlock at all levels, this source is increasingly called into question. The unreliability of government funding is a major drawback and needs to be addressed carefully.

**Federal Funding**

Most current transit projects receive a majority of their funding through federal sources. For many projects, it is impossible to start without federal funding. The current FTA budget of 10.8 billion dollars can support large shares of many projects and is distributed through several grant programs, including Urban Area Formula Funding, New Starts and Fixed Guideway Modernization.

However, given current fiscal challenges faced by all levels of government and the time cost of acquiring federal funding as previously elaborated, an ARC alternative project cannot rely on federal sources.

**State and Agency Funding**

State and agency funding present more localized sources of investment. For the fiscal year of 2012, New York State appropriated 4.2 billion dollars towards non-MTA transportation capital projects, with the majority of that will be going toward highway funds. New Jersey, for the same period, appropriated 1.035 billion dollars towards highway projects, also with the majority going toward highway projects. The MTA capital budget is approximately twenty-three billion dollars for the 2010-2014 year period, supported by federal and state budgets. That works out to approximately 5.75 billion dollars a year. The PANYNJ capital projects 3.66 billion dollars for 2012 would work out to approximately 14.6 billion dollars over the same timeframe as the MTA’s capital budget. However, it is important to note that the PANYNJ does not receive state or federal subsidies and is geared towards all kinds of infrastructure.

Even given the scope and size of these projects, the list of transportation needs has consistently exceeded the states’ and agencies’ ability to cover them. The PANYNJ is constantly pulled toward roadway projects, particularly given the age of many of the regions bridges. The MTA has had to deal

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with budget losses and continual cuts from New York State and is currently struggling to maintain an operation budget without cutting its capital program.

The program will be renewed in 2014 and will likely face severe cuts. The PANYNJ did dedicate a portion of its funding to the ARC project, three billion dollars over several years, but it is unlikely they will dedicate a similar number again. While state and agency funding will likely need to make up a share of the funding sources, the project cannot rely on them to cover the cost of the entire project, so other alternatives need to be examined.

**Taxes and Fees**

Taxes and fees are one way of getting users to pay for using transportation provided by the government. By taxing specific groups of users, such as automobile drivers, the government can retrieve some of the cost for building a highway. However, many taxes are very unpopular. Given the economic climate, many Americans feel that new taxes are not only unfair, but unjust assessments on their little remaining personal wealth. The political reality is that it is difficult to levy a new tax, even to support services that are vital.

**Sales Tax**

Sales taxes to support transportation are one option to add additional funding. One of the more recent examples is Los Angeles County’s Measure R. Measure R was approved in a 2008 referendum and changed the county sales tax from 8.25 percent to 8.75 percent. The measure is expected to raise forty billion dollars over thirty years for roadway and transit repair. 69 The estimated cost per person is about twenty five dollars per year, effectively decentralizing the cost over millions of people. More recently, the sales tax has been applied to Los Angeles' West Side Subway Extension project and derived approximately four billion dollars to support the project. 70

New York City’s sales tax is already 8.875 percent, with relatively similar tax rates in surrounding Westchester and Nassau counties.71 New Jersey’s sales tax is slightly lower, at seven percent.72 However, it should be noted that each requires state legislature approval to adjust the tax rate, making even raising local level taxes difficult.

**Highway Use Tax**

Highway use taxes are derived from user fees, paid mostly by trucks and other large automobiles. This system already exists in New York State and is applied to motor carriers operating certain motor vehicles on New York State public highways.73 It is computed at a rate determined by the weight of the motor vehicle and the method that you choose to report the tax. New Jersey operates a

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similar system, called the motor fuels use tax, levied on large automobiles that use state highways.\textsuperscript{74} These aggregate funds are intended for maintenance on highways.\textsuperscript{75}

These taxes are already levied in both New York and New Jersey. While a small, proportional highway use tax could help raise some part of the project, once again it would require approval of state legislatures. Given that trucks travelling through New Jersey and New York State have few alternative routes and are generally bound for the large market concentrations within those states, the demand is inelastic. That means an additional tax, if approved, would not result in significantly less truck travel. However, it could also mean that freight shipping will push these increased prices upon consumers. This alternative should be explored further.

\textit{Licenses and Fees}

Through most state Department of Motor Vehicles, user fees are assessed to support transportation infrastructure. In New York, these fees range from twenty-six dollars to 104 dollars depending on weight and class of the vehicle.\textsuperscript{76} An additional fee is also assessed for residents of New York City as a vehicle use tax between fifteen and thirty dollars. New Jersey fees range from thirty-five dollars to 84 dollars for vehicle registration for passenger vehicles.\textsuperscript{77}

In New York, for example, from fiscal year 1993 through fiscal year 2009 these fees in aggregate totaled twenty billion dollars.\textsuperscript{78} These fees are collected by the New York State Department of Transportation and used to support highway funding. These funding sources are already allocated.

New York City already has a surcharge for residents who drive, intended to support transportation use. Levying additional fees at either state DMV could be a difficult political issue. For one, that requires state legislature approval, which will mean the vast majority of votes on the subject will be from representatives and senators outside the affected district. Furthermore, in the current economic crisis and political climate, raising fees for car transportation could become a very touchy political issue.

\textit{Gas Tax}

Gas taxes are an excise tax on the sale of fuel. Both the federal government and states collect gas taxes and they are usually considered a user fee. The federal gasoline tax averaged 18.4 cents per gallon and 24.4 cents per gallon for diesel fuel in January 2012.\textsuperscript{79} New York State’s gasoline tax is eight cents per gallon motor and diesel fuel excise motor fuel tax,\textsuperscript{80} already one of the highest in the nation. New Jersey assesses four cents per gallon.\textsuperscript{81} The gas tax is used to support general transportation funds, including the Highway Trust Fund at the federal level, which separates into three separate funds.

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\item \textsuperscript{74} State of New Jersey 208th Legislature. (1998). \textit{S351 Bassano (Highway Use Tax)}. Retrieved March 2012, from \url{http://www.njleg.state.nj.us/9899/Bills/s0500/351_i1.pdf}.
\item \textsuperscript{75} Ibid; New York State Department of Taxation and Finance. \textit{Highway Use Tax (HUT)}, 2012. Retrieved March 2012, from \url{http://www.tax.ny.gov/bus/hut/huidx.htm}.
\item \textsuperscript{76} New York State Department of Motor Vehicles. (2012). \textit{Registration Fees, Vehicle Use Taxes and Supplemental Fees for Passenger Vehicles}. Retrieved March 2012, from \url{http://www.dmv.ny.gov/regfee.htm}.
\item \textsuperscript{77} State of New Jersey Motor Vehicle Commission. (2012). \textit{Registration and Title Fees}. Retrieved March 2012, from \url{http://www.state.nj.us/mvc/Vehicle/Fees.htm}.
\item \textsuperscript{78} New York State Comptroller. \textit{The Dedicated Highway and Bridge Trust Fund: Where Did the Money Go?} October 2009. Retrieved March 2012, from \url{http://www.osc.state.ny.us/reports/trans/dhbtf102809.pdf}.
\item \textsuperscript{81} Ibid.
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supporting highway construction, mass transit and a Leaking Underground Storage Tank Trust Fund. At the state level, most gas tax revenues go towards funding highway projects.

The gas tax has become a national political issue in the 2012 election. It has been apparent for a decade that Congress has little willpower to raise the gas tax, even if it means better transportation services. It is important to note that the federal government is actively searching for alternatives to the gas tax. Even on the local level, any proposal to raise a gas tax would garner media coverage and would likely earn a negative public opinion.

**Vehicle Miles Travelled Tax (VMT)**

VMT is a means of taxing motorists based on the amount of miles they have travelled. It is a way to assess users of the same infrastructure based on their consumption patterns. Oregon instituted a pilot program in a zone around Portland 2007 and quantified it as “The VMT for each road section is calculated by multiplying the average daily traffic (ADT) by the length of the road section and the length of the time period. Those section VMTs are summed to calculate the VMT for a road or road system.” The Oregon DOT determined that concept is viable and can be phased in statewide as a mileage fee.

Neither New York nor New Jersey uses a VMT, though there is an area of New Jersey that has instituted a type of VMT, the New Jersey Meadowlands Commission, previously discussed. VMT can be difficult to calculate but, as seen above in the Oregon example, it is possible to create a taxation formula. VMT taxes are more difficult to institute at a larger level but could work on a zone model offered by Oregon and the New Jersey Meadowlands Commission, especially when applied to only to new developments. This issue should be explored further.

**Private Funding Options**

Private sector involvement in transportation promises to quickly allow access to capital financing in exchange for long term leases or guaranteed revenue sharing. There are several ways of acquiring that financing, ranging from the private entity operating infrastructure to harnessing land value increases pay for projects.

**Public-Private Partnerships**

A public-private partnership is a project that is jointly funded or operated by government and private entities. These partnerships have been used by almost every level and department of government to leverage limited financing. For infrastructure projects, it allows the government to gain fast access to capital while guaranteeing long term revenue sources to pay it back.

In San Francisco, a 1.1 billion dollar replacement for a 1.5 mile stretch of the Presidio Parkway has been partly financed by a private company, Golden Link Partners. The company will design, build and maintain the parkway for three decades before handing control back to the state. In return, the state will pay 173 million dollars upon completion and 28.5 million dollars annually. This deal allows the state to split the cost of the parkway over time into more feasible payments while accomplishes all the major goals of the project.

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Public private partnerships do raise important political questions. Financing projects through private funding or leases still leaves all the risk to the public sector while requiring a higher bonding rate than normal state or local bonds. Furthermore, the debt burden for the project falls upon taxpayers, raising important social equity questions.

The private sector offers significant advantages. They are able to build more quickly, particularly by harnessing the design-build method.\textsuperscript{86} There is a large amount of private capital available, but significant revenue streams have to be generated by a transportation project for repayment. Private sector partnerships have been championed by Republicans, like Governor Christie, and a well thought out proposal could garner his support. Additionally, given budget issues and cost cutting in both states, a model involving private sector finance could gain support. This model represents a feasible path forward and should be further explored.

\textit{Value Capture}

Transportation and land value is closely related. A study published by the American Journal of Economics and Sociology analyzing over one hundred articles on the subject found a direct and consistent link between new transit infrastructure and higher land values.\textsuperscript{87} Additionally, a study of the Midtown Direct Service on NJ Transit by Juliette Dellecker Michaelson found that the link, which saved commuters twenty to forty minutes, resulted in a higher increase of land values near stations than further away. Specifically, properties within a half mile of Midtown Direct stations increased by 113 percent over a ten year period, as opposed to less than 82 percent for properties further away.\textsuperscript{88}

A report by the University of Minnesota’s Center for Transportation Research outlined various value capture techniques. They range from land value taxes, tax increment financing, special assessments, transportation and development impact fees, joint developments and air rights.\textsuperscript{89} The report states that value capture helps close the loop between the improvement, increased accessibility, higher land values and funding for additional improvements and maintenance. They offer several criteria for evaluating potential outcomes, including efficiency, equity, sustainability and feasibility. Value capture is an important funding technique that should be utilized in transportation funding, though particular attention needs to be paid to which contributor a project is taxing, over what time and for what amount.

Value capture represents a diverse set of potential funding sources that help capture some of the increased land value to pay for transportation improvements. One example discussed in detail below is the Hudson Yards project that financed the no. 7 line subway extension in New York City.

Value capture represents a means of involving the private sector with limited risk. Given the positive relationship between land values and new transportation, it is possible to capture a significant portion of these values over a projected amount of time, usually around thirty years. A combination of value capture strategies can garner a significant portion of a projects budget. In the Hudson Yards example, the development corporation was able to raise 2.4 billion dollars within a relatively limited district. This technique should be explored further for applications in northern New Jersey and parts of New York.

\textsuperscript{89} Center for Transportation Studies, University of Minnesota. “Harness Value for Transportation Investment”. Report, June 2009.
Agency to Lead the Preferred Alternative

The PANYNJ, as its name suggests, is a bi-state authority that operates in the greater New York and New Jersey region within a radius of approximately sixty miles around the Statue of Liberty. The aim of the agency is to promote and protect the commerce of the area and to undertake projects which would not likely to be financed by private agencies or that would not be attempted by either state individually.

The agency is jointly headed by the governors of New York and New Jersey. With the approval of the state senate, each Governor appoints six members to the Board of Commissioners, who serve overlapping six-year terms without compensation. The meetings of the Board of Commissioners are public and the Members of the Board of Commissioners are typically influential people who maintain close relationships with their respective Governors.

The PANYNJ is authorized to manage and maintain infrastructure critical to the New York and New Jersey region’s trade and transportation network—many of the region’s airports, the New York and New Jersey seaport, the PATH rail transit system, six tunnels and bridges between New York and New Jersey, the PABT in Manhattan and The World Trade Center site. The Port Authority has no power to tax and does not receive tax money from any local or state governments. Instead, it operates on the revenues it makes from its rents, tolls, fees, and facilities.

Because of the PANYNJ’s bi-state authority and experience overseeing interstate transportation infrastructure, we believe that the agency would be ideally suited to act as the lead agency during the implementation of our preferred alternative.

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