



A New Port Authority Bus Terminal in New York

First Steps in a Long Journey

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The Port Authority Bus Terminal (PABT) in Manhattan is the busiest bus terminal in the world and is a major contributor to the economies of New York and New Jersey. On a typical weekday, a quarter of a million commuters and intercity passengers arrive or depart via 8,000 buses—some 620 buses depart during the afternoon peak hour. The terminal is convenient to employment centers in Midtown Manhattan, to the burgeoning Hudson Yards—an enormous, mixed-use, high-rise development to the south and west of the terminal—and to 11 subway lines (see Figure 1, next page).

Exclusive ramps connect the terminal to the busy Lincoln Tunnel, which features reversible bus lanes to and from New Jersey, connecting to an exclusive busway west of the tunnel. According to forecasts,

the already cramped and congested terminal will serve approximately 337,000 people and 9,000 buses per day by 2040.

Ageing Facility

For many, the terminal is beloved, like an old pair of shoes. Its status is iconic, and its service efficient, drawing on the ingenuity, experience, and depth of knowledge of its operators, whose teamwork is most evident in a crisis—for example, when a crash blocks the tunnel as a blizzard approaches the city.

(Above:) Ramps that connect the Port Authority Bus Terminal (PABT) with the Lincoln Tunnel are deteriorating and unable to support longer, heavier modern buses.



Lincoln Tunnel's reversible bus lane helps speed the flow of traffic during peak commuting hours.

But the PABT is also the source of endless traveler and operator complaints, reflecting the challenges of adapting an ancient facility to today's needs. As with that old pair of shoes, its importance suggests that a new facility is urgently needed and that the challenge is in finding the right fit.

The aging terminal is overcrowded, obsolete, and deteriorating; the space cannot accommodate the projected growth. The option of doing nothing is not feasible, because the building is nearing the end of its functional life. The ramps and loading bays cannot serve modern double-deck or articulated buses, and the building is poorly equipped to adapt to technological advances.

The old terminal fails to take advantage of the potential that its prime location offers for commercial real estate development. The need to rebuild or reconstruct is unquestioned, but the challenge is

FIGURE 1 Map of vicinity of Port Authority Bus Terminal.



enormous. Located in the heart of Manhattan, the terminal is adjacent to dense and historical residential communities that do not consider the world's busiest bus terminal an ideal neighbor.

Design Competition

Recognizing that the PABT is a facility of great complexity and that its possible replacement affects many stakeholders who hold vigorously competing values, the Port Authority of New York and New Jersey recently conducted an International Design and Deliverability Competition. The goal was to assemble and present ideas to the Board of the Port Authority of New York and New Jersey and stakeholders to consider in a planning process now in the early stages.

The Port Authority awarded cash prizes for the most outstanding entries, but made no commitment to adopt or build a facility based on the winning entry. Instead, the Port Authority owns the intellectual property created by the competitors and may consider designs that combine the best ideas from all the entries.

The competition concepts that were submitted have not yet been subjected to detailed design or engineering analyses, to the required environmental impact assessment, or to formal technical review by the many public agencies and private stakeholders affected. The hope is that the concepts will inspire and inform the long process now starting. The Port Authority's capital budget for the coming decade reflects the project as under way but still in the planning and design phases.

The competition emphasized deliverability—it was not an architectural competition to be decided on aesthetics or design criteria. Efficient transportation operations and the logistics of building a terminal in a densely developed metropolis were also central considerations. The complexity of the competition is apparent in the 14 objectives that the entrants were asked to address (see box, page 5).

Jury Review

The Port Authority invited an international panel of experts to evaluate, compare, and analyze competition concepts (see jury list, page 9). The jury reviewed the 15 preliminary submissions received in response to Phase I of the competition in the context of the design and deliverability objectives. The panel selected the proposals of five entrants, who were invited to develop their concepts more fully in Phase II.

The five finalist teams received detailed instructions from an interdepartmental group of Port Authority staff. In parallel with the competition, the Port Authority engaged an independent consul-

tant team to conduct a Trans-Hudson Commuting Capacity Study; the finalists and the panel received the consultant's interim findings, prepared as draft technical memoranda, about interstate bus network operations and emerging technologies.

The panel convened frequently by teleconference and webinar. At two in-person meetings over several days, members observed the PABT facility and its operations; received in-depth briefings from staff familiar with terminal operations and capital planning; toured the surrounding communities; reviewed media reports about the PABT; considered written submissions, including addenda in response to requests for more information or for clarification; viewed video presentations and examined 3-D depictions of each submitted concept; and formally interviewed representatives from each team. The jurors carefully considered public and stakeholder comments via a competition website, along with letters from local community boards and other stakeholders.

The panel conducted a comparative analysis of the submissions, considering all 14 design and deliverability objectives, and advised the board on the findings. The panel identified three major challenges for the concepts:

1. The ability to support bus operations that are more complex and more numerous than at any similar facility in the world;



PHOTO: PORT AUTHORITY OF NEW YORK AND NEW JERSEY

2. The capital and operating costs involved and the risk of cost escalation; and

3. The impacts on the surrounding communities, including the maximized use of properties owned by the Port Authority and a minimized need to acquire private real estate.

The panel concentrated on the technical and operational challenges and was protected from contact with the political debate surrounding the Port Authority and its capital plan and from sensational media coverage of local and regional politics.

In building a new facility, the Port Authority of New York and New Jersey seeks to maintain the advantages afforded by the current location of PABT but also to overcome access, cost, and other challenges.

Design and Deliverability Objectives

1. Meets current and projected bus passenger traffic demand with an appropriate level of service, recognizing the role of a new bus terminal in the interstate transportation network, addressing both the commuter and long-distance markets and compatibility with other trans-Hudson transportation operations and investments;
2. Advances a functional and practical transportation solution, reflecting an effective operation for the passengers and bus carriers that rely on the terminal and its services, including appropriate pedestrian connections to mass transit in the vicinity of the new terminal;
3. Minimizes traffic impacts to the surrounding local streets;
4. Provides functionality for bus parking and staging;
5. Considers the potential for other bus storage facilities in alternative locations;
6. Provides a cost-effective solution that takes into account both the capital and future operating costs as an element of "deliverability," given limited financial resources and the history of significant operating losses at the existing facility;
7. Permits scalable and modular solutions that may be phased as needs and standards for the bus terminal evolve;
8. Takes future constructability into account;
9. Sustains the Port Authority's interest in safety and security in terms of design, operations, and site location;
10. Utilizes currently owned Port Authority real estate where possible, minimizing the acquisition of private real estate;
11. Encourages attention of private capital as an element of the project's deliverability, including leveraging the Port Authority's real estate development rights associated with the bus terminal and surrounding area, and potential public-private partnership options as a means of delivering the future project;
12. Takes into account the concerns of the local community, including construction impacts, requirements for non-Port Authority property, bus operation impacts, and a conceptual design that considers the fabric of the surrounding neighborhood;
13. Utilizes sustainable design principles; and
14. Embodies the excitement and dynamism of the New York and New Jersey metropolitan area.

The customer service of the future bus terminal must ensure safety and ease of travel.



PHOTO: PORT AUTHORITY OF NEW YORK AND NEW JERSEY

Challenges and Trade-Offs

The challenges facing a new bus terminal involve critical trade-offs. Satisfying one objective can make satisfying others more difficult. Some of the most important challenges, trade-offs, and limitations reflected in the submissions are as follows:

- ◆ **Balancing the building's footprint and height.**

A large building footprint is desirable to maximize the efficiency of bus operations, but a small footprint is desirable to minimize disruption to the community. A small footprint requires a taller building, which leads to longer vertical climbs for buses on ramps, circuitous bus movements, and the vertical movement of passengers across many floors to get to and from gates. Restricting bus operations to two or three levels requires a facility that covers greater land area; this has an impact on the surrounding

Some competition submissions grappled with the bus terminal's access to subways and other transit options that are not under the control of the Port Authority.

neighborhoods and may sacrifice opportunities for real estate development.

- ◆ **The importance of operational flexibility.** The current bus terminal performs surprisingly well, despite being obsolete and serving more than its intended capacity. The ingenious staff is able to shift operations in unusual situations or in response to disruptive events. This flexibility derives in part from the current terminal's design, which includes multiple exclusive ramps, street access, and direct tunnel access. The new terminal should be equally flexible for daily operations.

- ◆ **Achieving proximity to traveler origins and destinations.** To maximize access to the origins and destinations of travelers, the future facility should be located as close as possible to the site of the current terminal. That proximity, however, could prove disruptive to nearby residences, businesses, and institutions that for decades have experienced the intrusions of buses and the visual impacts of ramp structures.

- ◆ **Realistically welcoming technological change.** During the decade or more for completing the construction of a new terminal, advances in technology and vehicle designs—from electronically connected vehicles and automated buses to dynamic gate assignment—could completely transform bus operations. Yet the trajectory of technological change is uncertain, and relying too heavily on expected changes that may not eventuate—or that may take longer to realize than their proponents predict—would be irresponsible.

- ◆ **Improving the customer experience.** Pleasant customer experiences will be essential to the success of the future bus terminal. Many factors influence



PHOTO: EVERETT BARNES, FLICKR

good service, including location near transit connections and popular destinations north and east of the current site; terminal ramp designs and gate configurations that allow reliable and efficient travel times to and from the Lincoln Tunnel; in-terminal pedestrian access time from the street to the bus gates; adequacy of vertical circulation paths for pedestrians; ease of wayfinding and availability of real-time traveler information; passenger circulation on concourses; gate areas that allow smooth, safe, and secure movements and comfortable queuing; terminal amenities; and a passenger environment that is pleasant and in compliance with codes and standards.

◆ **Realistically addressing access improvements by other agencies.** As part of a regional transportation network, the PABT cannot function in isolation. The efficiency of bus operations also depends on actions by other agencies, and these are difficult to predict. For example, building an expensive new subway station at West 41st Street and 10th Avenue for access to Subway Line 7 was central to the success of several submissions, but the decision about the project is not under the control of the Port Authority.

◆ **Treating city streets as an asset while respecting communities.** The City of New York and the residents and businesses in the surrounding communities would prefer designs that minimize bus movements and parking on city streets. Today's terminal has struggled to be a good neighbor as constraints on terminal capacity have choked ramps and internal circulation. Future terminal designs that minimize bus traffic on city streets may have to balance the prospect of a new location and a smaller footprint for ramp infrastructure with the potential for expensive reconfiguration of the Lincoln Tunnel ramps and for a possible major modernization of the tunnel.

◆ **Bus parking and staging.** Bus parking and staging are critical, because the PABT peak-hour operations require hundreds of buses that are not used between the peaks. Parking and staging proximate to the new terminal can increase the efficiency of bus operations but also can increase the size and cost of the terminal complex. Staging and storing buses elsewhere in Manhattan increases cost, increases bus movement on crowded streets and through sensitive communities, and could diminish the reliability of tunnel operations. Storing buses in New Jersey increases travel time, consumes valuable movement capacity in the Lincoln Tunnel, affects traffic flow, and impinges on local communities that find no benefit from acres of parked buses.

◆ **Intercity and commuter bus operations—**



PHOTO: STEPHEN WERNER, FLICKR

complementarities and conflicts. The privately operated intercity bus market is growing, and curbside bus operations in Manhattan are becoming a major source of traffic congestion. A future intercity bus terminal could consolidate the intercity operations now at the PABT with others. For example, a larger intercity bus terminal could be located away from the commuter terminal and could accommodate PABT's intercity bus operations efficiently. Separating intercity bus operations from a new commuter bus terminal, however, would add the investment costs of two or more Manhattan bus terminals. Depending on their locations, the new intercity bus terminals could add to city street congestion or could decrease the congestion currently caused by curbside loading and unloading.

Congestion around PABT is exacerbated by the confluence of pedestrians, bicyclists, private vehicles, and curbside bus and taxi operations.

A new bus terminal at the current site would require flexibility to reroute buses when normal operations are disrupted.

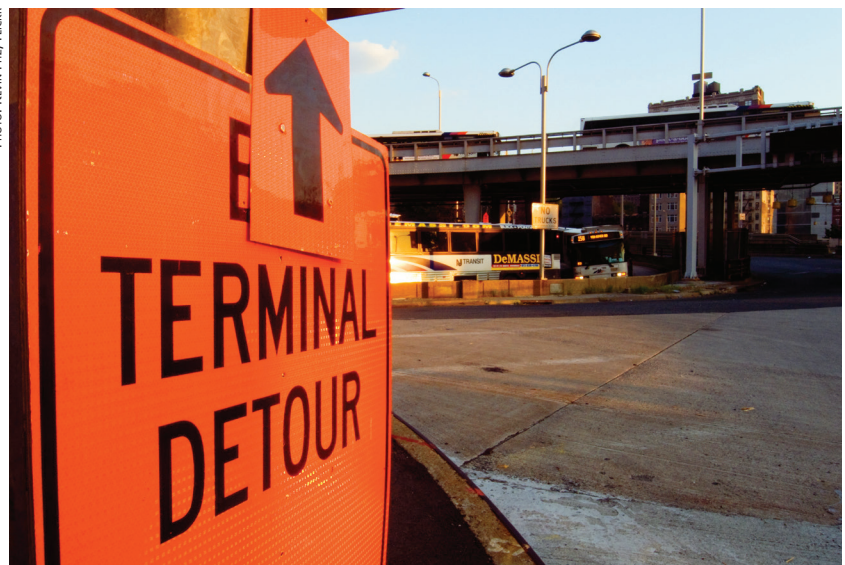


PHOTO: KEVIN FITZ, FLICKR



Located a few blocks from PABT, the Jacob K. Javits Convention Center was proposed as a new terminal site.

◆ **Safety, security, and sustainability.** Travelers and visitors to the terminal must feel safe and secure from petty crime and possible terrorist intrusions. The new terminal must be designed to be easily policed and to discourage and resist potential terrorist activity. The facility also should conserve resources and be energy efficient.

◆ **Minimizing capital costs and cost escalation.** The Port Authority’s capital budget for the coming decade is constrained, with many competing needs. Investment in a new bus terminal is essential, yet the sources for the needed revenue are uncertain and subject to change.

◆ **Real estate.** Activity at a new bus terminal will create incentives for new real estate development. Financial returns from development that can occur on Port Authority land can help finance the high costs associated with the new terminal project.

No Clear Winner

The submissions showed that all entrants had carefully considered all of the criteria but had addressed them in different ways. The variations, however, can



PHOTO: JASON SMITH, FLICKR

PABT’s facilities have accommodated many changes and adaptations but are nearing the end of their functional life.

inform scoping during the planning process.

At the same time, the panel found that none of the submitted entries was ideal. Addressing some of the criteria well could mean accepting weaknesses in meeting others.

As planning moves forward, a deeper analysis and a more detailed consideration of bus operations inside and outside the terminal are especially important. The submissions addressed alternative operating regimes for buses, alternative gate arrangements, ramp designs, and circulation plans and included bus storage and staging submissions, but all of these were preliminary and would require in-depth analysis and refinements in the next phases of planning.

One entry proposed building the new terminal entirely underground, another proposed repurposing the Javits Convention Center on 34th Street and 11th Avenue as the new bus terminal, and yet another proposed separate terminals to accommodate commuter and intercity operations. Several entrants envisioned new terminals adjacent to the current terminal, but others proposed locations farther west and south.

The panel found all of the submissions stimulating, but no clear winner emerged. At the panel’s recommendation, the Port Authority Board of Commissioners awarded three of the submissions equal shares of the first-place honorarium. The three awardees were uniquely creative and had responded to the major criteria in different ways.

Panel’s Observations

The panel also offered the Port Authority the following observations derived from a careful consideration of all the entries and from the panel’s extended deliberations:

◆ **Building new bus parking and staging facilities can precede a new bus terminal.** Bus parking and staging are among the most pressing problems in operating the PABT. All of the entries addressed bus staging and parking—within the new terminal, on sites near the proposed terminals, in existing buildings, on proposed decks over other land uses, and on sites in New Jersey. In all likelihood, a combination of bus storage and staging locations will be needed to accommodate demand, and the development of new parking and staging facilities could increase the efficiency of operations at the current bus terminal long before completion of a new terminal.

◆ **Serious consideration should be given to separate terminals for commuting and intercity travel.** The submissions indicated that a combined terminal to meet future bus traffic forecasts would

be massive. Because accommodating future growth in intercity and commuter bus travel would result in a huge terminal structure, a plan to separate these functions has merit. The Port Authority should consider two or more separate facilities with attention to a careful transition. A new commuter bus terminal, for example, could allow the current terminal to serve some intercity operations while a second new terminal is completed. Including a portion of the intercity bus operations in a combined terminal, however, can maximize the use of gates that are busy only during the afternoon–evening rush—that is, a total of 15 hours a week. Moreover, locations away from the current site would take less advantage of the exclusive bus lanes in the Lincoln Tunnel and of the exclusive ramps into the current PABT.

◆ **Consider terminal designs that include underground levels.** Some of the options included structures that were too tall for efficient bus operations; moreover, tall structures would be likely to meet opposition from community stakeholders. The panel therefore suggested consideration of a terminal design that combines above- and below-ground levels. This approach may lower the cost in comparison with that for a terminal entirely underground and may simplify bus operations in comparison with a design that requires buses to climb ramps to six or seven levels above grade.

◆ **Explore the acquisition of private property.** Although the panel and the entrants emphasized minimal or no acquisition of private property, the Port Authority may want to consider private property that may be available for purchase near the current terminal. This could allow for a larger terminal footprint and would lessen the impacts on the community and the resulting objections.

◆ **Rooftop treatments are not a necessity.** Several of the concepts incorporated a “green” roof, featuring gardens and public spaces, as well as rainfall capture. The new terminal should be sustainable in heating and cooling, in the use of energy for transportation purposes, and in the capture and recycling of water. Achieving these goals, however, does not require that the terminal include a park for public use. A proposed park on the roof of the structure raised questions about accessibility via elevators and escalators, security, safety, and the operating, policing, and maintaining of a park on terminal premises. Planners of a future terminal should prioritize sustainability over recreational opportunities.

Complex of Challenges

The review of the five finalists’ creative submissions for a new terminal revealed the complexity and challenges of the project. The panel found great merit in



PHOTO: CHRIS MERRIO, FLICKR

each submission but noted drawbacks in each, the result of the complexity inherent in achieving a bus terminal design that allows for substantial growth in traffic, has a minimal footprint, requires little or no acquisition of private property, has limited negative impacts on the community, and enhances operational efficiency.

Although the entries could not resolve the political, environmental, and functional challenges in creating a new terminal, they presented those challenges for all to see as the planning for a new terminal gets under way.

Ramp bridges serving the PABT connectors to the Lincoln Tunnel.

Design and Development Competition Jury

Martin Wachs, Distinguished Professor Emeritus of Civil and Environmental Engineering and of City and Regional Planning at the University of California, *Jury Chair*

Gail Benjamin, Land Use Director (*retired*), New York City Council

Tilly Chang, Executive Director, San Francisco County Transportation Authority

Robert Paaswell, Distinguished Professor, Grove School of Engineering, City College of New York

Robert Puentes, President and Chief Executive Officer, Eno Center for Transportation

Dana Skelley, Director of Asset Management, Surface Transport, Transport for London

Phillip Washington, Chief Executive Officer, Los Angeles Metropolitan Transportation Authority