

Integrating Light Rail Transit into Development Projects on the Hudson River Waterfront

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The New Jersey Department of Transportation (NJDOT), in cooperation with NJ Transit, recently completed a conceptual engineering study for a combined bus/light rail transit (LRT) system on the Hudson River waterfront in Hudson and Bergen counties. The project is unique in that the area is undergoing rapid redevelopment. The pace of development is so fast that NJ Transit was faced with the possible loss of desperately needed transportation rights-of-way if quick action was not taken. In addition, the environmental permit review process required for waterfront development in New Jersey offered the opportunity for the state to dedicate transit easements and require developers to provide these easements as a mitigation measure for the heavy

traffic congestion that development is expected to cause. To take advantage of this opportunity, NJDOT entered into negotiations with developers. Because this process began before completion of an UMTA alternatives analysis and draft environmental impact statement, several bus and LRT modes had to be considered in formulating easement agreements so as not to preclude future federal funding. Because developers retained air rights above the easements, NJDOT and NJ Transit had to provide information to developers and approve air rights construction without a final transitway design in place. The process used to define the appropriate easement envelopes and negotiate transit easements with developers is described.

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REAL ESTATE DEVELOPERS OPERATE in a risky, highly competitive world where fortunes can be made or lost in an instant. To be successful they must quickly find and seize development opportunities; acquire parcels and assemble sites; deal with architects, engineers, and municipal officials; locate prospective tenants; market their projects; and raise capital to make development a reality. They must alternate between total secrecy, to prevent a competitor from getting an edge, and total hype, to convince prospective financiers and tenants that today's barren, rubble-strewn site will be tomorrow's shining waterfront. To real estate developers, time is always of the essence. Delays can mean lost tenants, heavy finance costs, lost profit, and forfeited opportunities.

When a transportation agency proposes a new transportation system directly through a developer's property, extreme reactions seem to occur. If a developer has a serious access problem and site development plans are not too far along, he or she may welcome the proposal. No one is asking for money yet and the site, on which the developer may hold only an option, is not a major liability or negative cash-flow generator. The developer may see the transportation system as a boon to the project. Perhaps it is the solution to access problems, a possible source of government funds for the project, or a good source of publicity. Most often, the transportation agency receives a different kind of reaction, a negative one.

On learning of the proposal, the developer may object, protesting that transit is something not necessary or desirable or worthy of discussion. The developer may view transit as a design constraint, a consumer of valuable land, out of keeping with the aesthetics of the project, or, most important, something that will cost money and keep the project from moving forward. The further along the developer's plans are, the stronger is the objection. Many decisions have been made, space requirements have been calculated, and much has been spent on architect and engineer design fees. Redoing plans to accommodate transit is an expense that the developer had not anticipated.

Thus, it is often an inhospitable environment in which the transportation planner begins negotiations with developers. The process may be long and fraught with difficulties, but offers much to transit system designers to justify the time and the effort.

WATERFRONT DEVELOPMENT ENVIRONMENT

New Jersey's Hudson River waterfront spans eight municipalities and 17 mi along the Hudson River across from Manhattan. Until the late 1950s, it was the site of major maritime commerce and housed large freight and passenger

railroad terminals and yards for as many as nine major competing railroads. Over the last 30 years, much of the rail freight traffic has been diverted to trucks and other modes, driving most of the railroads into bankruptcy and leaving the rail yards and warehouses abandoned and deteriorating on the waterfront.

In recent years, booming growth in the financial and service industries in the metropolitan New York/New Jersey area led to major building expansions and a demand for more office space and housing units. Developers began to acquire and assemble large tracts of former railroad land on the waterfront with magnificent views of the Manhattan skyline. Development was aided by local municipalities eager to replace jobs and residents lost to the decline in manufacturing, maritime, and railroad activities. Developers received municipal tax abatements and, in some cases, grants to promote redevelopment. In all, about 35 million ft² of new office space, 36,000 new dwelling units, and 3.2 million ft² of retail space as well as marinas, hotels, restaurants, and major tourist attractions are being promoted for the New Jersey waterfront.

Recently, the Newport Development Company in Jersey City opened a 1 million-ft² shopping mall and four high-rise apartment buildings. Owned by two of the largest developers in the country, Newport will eventually build 4.3 million ft² of office space, 9,000 dwelling units, 1.5 million ft² of retail space, a hotel, a marina, and possibly an aquarium. The 400-acre site, formerly an Erie Railroad (later Erie Lackawanna, then Conrail) yard, is located astride the Holland Tunnel, one of three vehicular crossings between Manhattan and New Jersey. Development of Newport was aided by a federal Housing and Urban Development (HUD) block grant, and other considerations from state and local governments. The multiuse Newport project, in the heart of the waterfront project area, is typical of the developments through which the state is seeking to preserve a transit corridor.

WATERFRONT TRANSPORTATION PLAN

Planning for the Hudson River waterfront transportation needs began in 1984 and culminated in the preparation of a draft transportation plan. Released by the governor of New Jersey in 1985, the plan identified a need for a north-south transportation corridor to support the economic revitalization of Hudson County. Because developers were proposing to consume most of the developable land and seeking site plan approvals, the New Jersey Department of Transportation (NJDOT) and NJ Transit recognized the need to act quickly to preserve right-of-way for a transit corridor.

A conceptual engineering study was commissioned in 1985 to define alternative alignments and physical layout concepts for the corridor. These alignments and design concepts were to serve as the basis for:

- Determining right-of-way requirements,
- Discussing easements with developers,
- Defining the scope of the system as a basis for budgeting, and
- Providing input for environmental studies.

The conceptual engineering study developed plans, profiles, and typical sections for the transportation system. Working papers were produced documenting alternative alignments, design criteria, and cost estimates.

The overall transportation plan for the Hudson River waterfront is shown in Figure 1. Included in the plan are an 11-mi Waterfront Boulevard (a four-lane arterial roadway) and 9 mi of exclusive busway (including a connection to the Lincoln Tunnel and the Port Authority Bus Terminal in Manhattan to serve trans-Hudson commuters). Also included is a waterfront transit spine, currently conceived as a 13-mi light rail transit (LRT) line, collocated with the busway for 6 mi north of Hoboken Terminal. The portions of the system jointly used by bus and LRT are termed "transitway" in Figure 1.

North of Hoboken, the system would be located largely on or adjacent to an existing railroad right-of-way slated for acquisition by the state. South of Hoboken, the transit spine system would be located largely on land owned by developers. Figure 2 shows the extent of system right-of-way on or adjacent to major development projects.

PRESERVATION OF OPTIONS

The waterfront transportation plan examined a number of modes for the waterfront transitway spine and settled on LRT as a logical candidate to serve as a benchmark for concept development. However, it was recognized that the transit mode would be selected on the basis of cost-effectiveness and other criteria. For example, if development buildouts fall short of forecasts and travel demand is reduced, buses may be more cost-effective than LRT.

For this reason, design criteria were drawn up that would permit deployment of bus and/or LRT. Figures 3 through 7 show typical sections for the LRT and busway technologies that are being considered. The typical sections and the corresponding space requirement for the transit elements were developed on the basis of vehicle characteristics and operating conditions that established the preliminary design criteria for the system. The criteria are quite general at this time in order to encompass a broad range of options for vehicles and operating conditions. The design elements used for the LRT and bus technologies are shown in Tables 1 through 3. These criteria were developed by the consultant as part of the conceptual engineering study.

In general the criteria for LRT govern such items as curvature, grades, and station lengths (based on providing for a three-car LRT consist). The width of

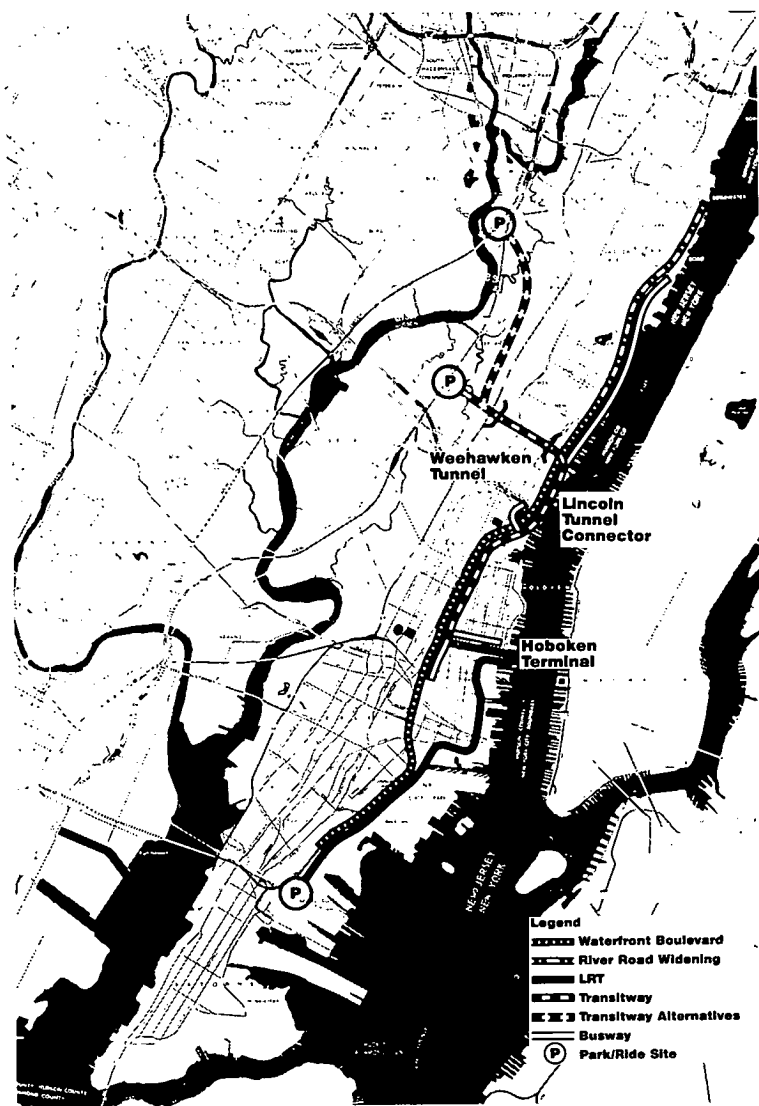


FIGURE 1 Transportation plan for Hudson River waterfront.

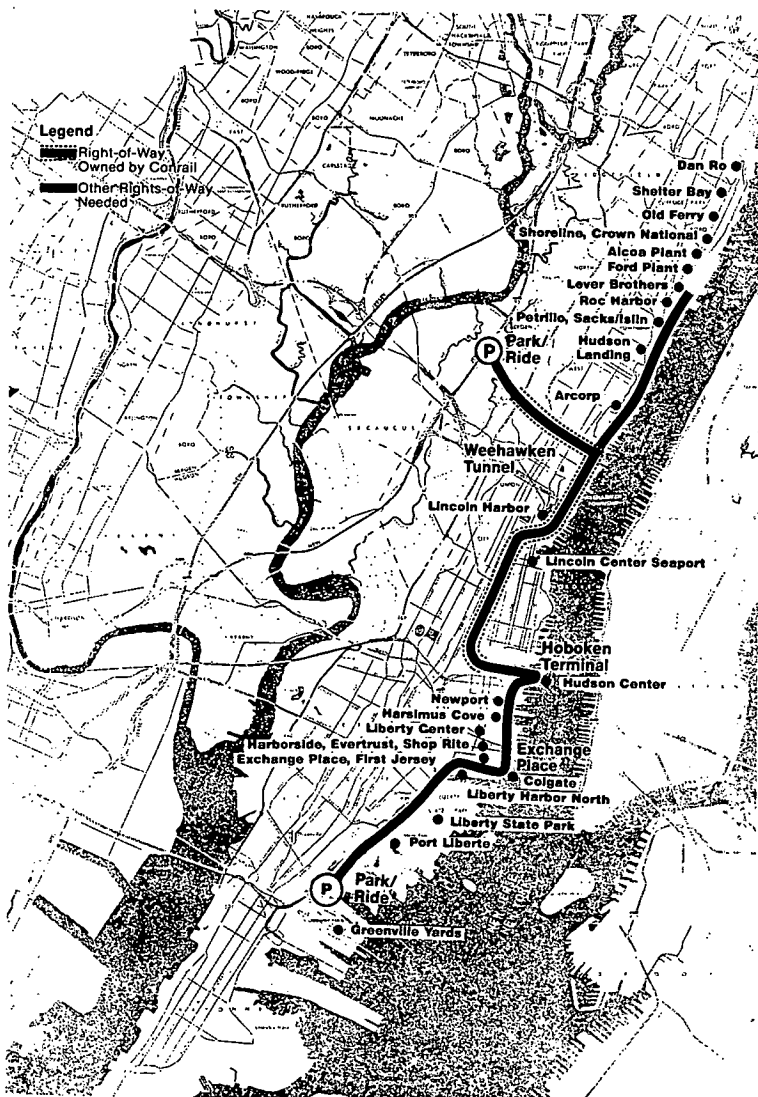


FIGURE 2 Waterfront transitway system.

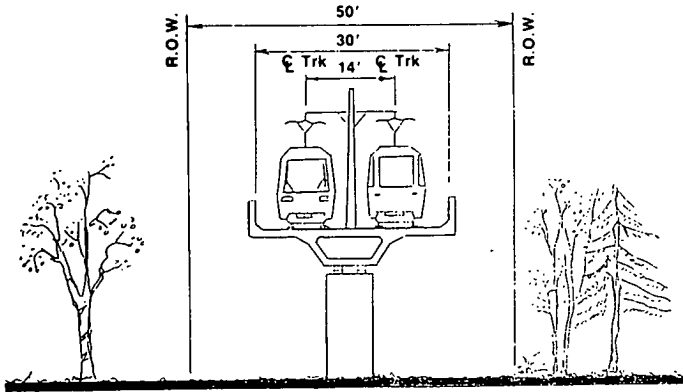


FIGURE 3 Typical section for LRT on structure.

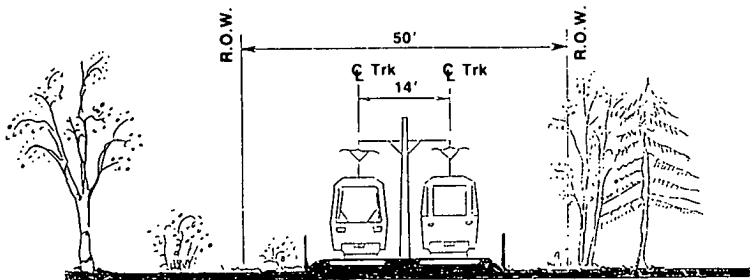


FIGURE 4 Typical section for LRT in separate right-of-way.

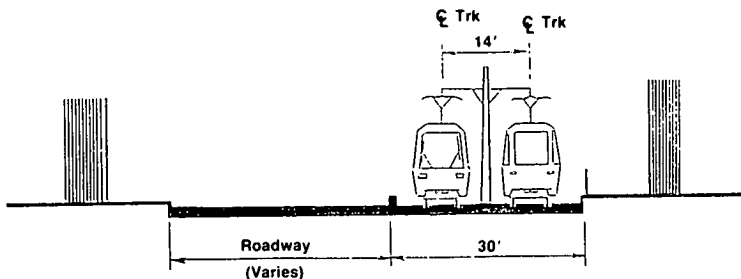


FIGURE 5 Typical section for in-street, two-direction LRT.

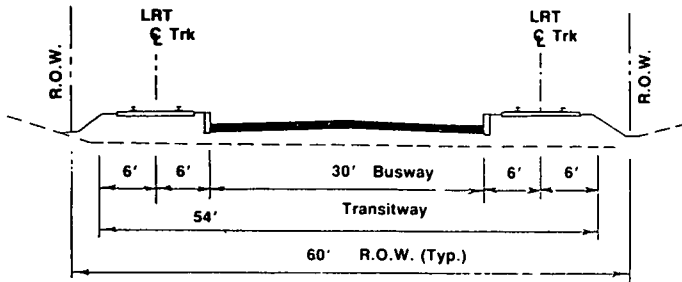


FIGURE 6 Typical section for transitway.

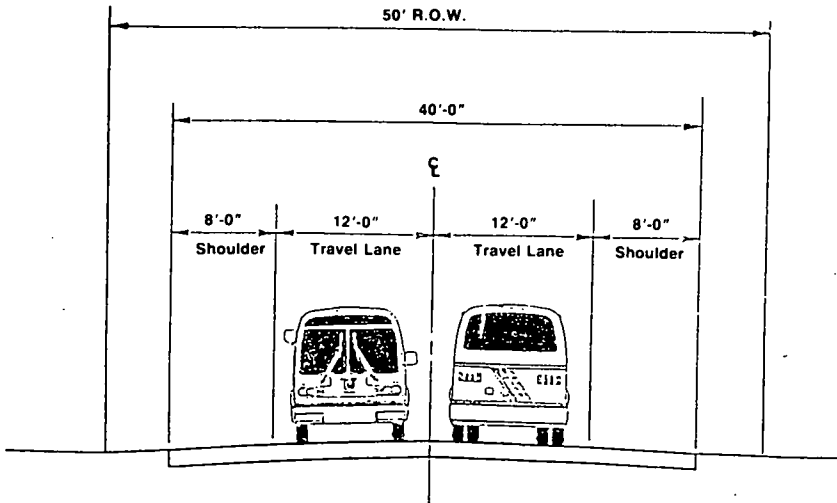


FIGURE 7 Typical section for at-grade busway.

some stations, however, is governed by bus operating requirements since bypass lanes may be needed for express buses.

TRANSIT EASEMENTS

Based on the needs for operating, maintaining, and constructing the transit system, rights-of-way and easements were defined in terms of horizontal and vertical space requirements. The easements include the following:

- The permanent operating easement will provide for the necessary clearances, drainage, and utilities. It will be 50 ft wide and 18 ft high in the areas

TABLE 1 LIGHT RAIL DESIGN ELEMENTS

| Criterion | Description |
|--|-----------------------------------|
| Vehicles | |
| Dimensions | |
| Length (ft) | 89 (max.) |
| Width (ft) | 8–10 |
| Height (with pantograph at lowest operating height) (ft) | 13 |
| Operating speed ^a (mph) | 15–35 |
| Passenger capacity | |
| Seated | 73 |
| Standing (normal/crush) | 115/144 |
| Doors (double) (no. and location on vehicle) | Four on each side |
| Fare collection ^b | |
| Major station | Off vehicle |
| Minor station | On vehicle |
| Guideways | |
| Operating speed (mph) | 15–35 |
| Horizontal clearance (from track centerline) | |
| From obstructions (ft) | 7.5 (min.) |
| Between tracks (at-grade) (ft) | 13.0 (min.) |
| Vertical clearance (from top of rail) | |
| Mixed traffic (ft) | 18.0 (min.) |
| Exclusive right-of-way (ft) | 18.0 (min.) |
| Alignment (mainline track) | |
| Horizontal radius (ft) | 400 (min. desirable) ^c |
| Vertical grade (%) | 4 (max. desirable) |
| Stations | |
| Platform length (ft) | 300 |
| Side platform width (ft) | 10 (min.) |

^aVehicles capable of 55 mph maximum under appropriate operating conditions.

^bA "proof of payment" system is also being considered to allow patrons to purchase tickets at stations and present them on demand to roving inspectors.

^cMinimum allowable radius of 100 ft in yards and under extreme conditions.

where the transitway is at ground level. To the extent that the easement is elevated, it will not be more than 38 ft from the ground, nor more than 18 ft above the running surface of the transitway.

- The permanent maintenance easement will be 10 ft wide and located on the same side of the permanent operating easement from street intersection to street intersection. A developer may locate a service road on the permanent maintenance easement, which will not exceed the height of the adjacent permanent operating easement.

- The temporary construction easement will be located parallel and adjacent to the permanent operating easement on the side that the developer designates, as long as all portions of the easement are located in a manner that is reasonably usable. In those areas where the transitway is to be elevated, the

TABLE 2 BUS DESIGN ELEMENT: VEHICLES

| Criterion | Description | | |
|--------------------|-------------|--------------|-------------------|
| | Transit | MCI Commuter | Articulated |
| Dimension | | | |
| Length (ft) | 40 | 40 | 60 |
| Width (in.) | 96 or 102 | 96 | 96 or 102 |
| Height (in.) | 120 | 144 | 129 |
| Turning radius | | | |
| Outside (ft/in.) | 43 10 | 50 7 | 39 6 ^a |
| Inside (ft/in.) | 37 3 | 27 9 | 21 4 |
| Top speed (mph) | 60 | 70 | 70 |
| Passenger capacity | | | |
| Seated | 47 | 47 | 67 or 64 |
| Standing | 23 | 19 | 32 |
| Axles | Two | Three | Three |
| Doors | Two | One | Two or three |
| Fare collection | On board | On board | On board |

^aCan sweep an additional 11 ft 4 in.

TABLE 3 BUS DESIGN ELEMENTS: GUIDEWAYS

| Criterion | Description |
|----------------------------|-------------|
| Maximum speed (mph) | 55 |
| Operating speed (mph) | 15-45 |
| Horizontal clearance (ft) | |
| Travel lane | 12 |
| Shoulder lane | 3.75 |
| Vertical clearance (ft) | 15.5 |
| Maximum vertical grade (%) | |
| Travel lane | 6 |
| Ramp | 8 |

temporary construction easement will be 40 ft wide (measured from the adjacent edge of the permanent operating easement). In those areas where the transitway is to be at grade, the temporary construction easement will be 30 ft wide. The temporary construction easement will not exceed the height of the adjacent permanent operating and permanent maintenance easements.

Based on the established design criteria and the requirements imposed by the uses of the easements described above, a set of review guidelines was prepared. The objective of the review guidelines was to provide a mechanism for a mutual understanding with the developers of the potential impacts of the transit system on the planned development and of the development on the

transit system. Because in most instances the development will be completed before the transit system is constructed, negotiations with the developers must be held to accommodate the needs of the transit system, including such items as:

- Provisions for stations,
- Pedestrian access and circulation,
- Foundations for transit structures,
- Utilities, and
- Power substations, signals, and communications.

The review guidelines covered a number of items, including access, clearances, sight lines, structures, buildings, utilities, mechanical systems, fire protection, traction power, communications, and ventilation.

DEVELOPER NEGOTIATIONS

Land use decisions in New Jersey lie mainly with municipal governments. With eight municipalities on the Hudson River waterfront, development approvals were based primarily on the expected benefits and impacts on the host community with little consideration for effects on the region. In the absence of an adopted regional transportation plan, site plan reviews considered only local roadway improvements and parking/floorspace ratios. In some cases, developers proposed improvements to existing transit—such as station and pedestrian facility enhancements—and, in one case, even a new bus garage to justify reductions in expected automobile traffic.

Until the state-sponsored waterfront transportation study, no one had collectively assessed the traffic impacts of all waterfront development on the regional highway system. Once that traffic assessment was made, it became apparent that the already congested waterfront roadways would be gridlocked by development-generated traffic by the year 2000. Additional transportation capacity would be needed.

The waterfront transportation draft plan was released in November 1985. That plan stressed mass transit as the main element in the solution to the waterfront traffic problem. By distributing the plan the NJDOT brought a regional perspective to solving traffic problems created by development of the waterfront.

In recent years New Jersey has become increasingly involved in regulating waterfront development. Under state statutes, the Department of Environmental Protection (NJDEP), Division of Coastal Resources, is empowered to review and approve permit applications for major waterfront developments.

As part of that review, NJDEP studies the environmental impact of proposed development, including new traffic generation. NJDEP is aided in the traffic review by the NJDOT. It was NJDOT's involvement that led to the requirement that waterfront developers provide easements for the LRT spine through their properties as a means of mitigating traffic impacts.

In some waterfront locales, municipal and county planning and engineering staffs have also begun to require provision of the LRT easements as a condition for site plan approval. Thus, it is the regulatory powers of state and local governments that are being used to gain developer participation in the transit project.

Developers of large projects who had already retained traffic consultants also began to understand the benefits that transit could bring to their projects. First, the provision of an LRT system gave them an opportunity to reduce parking requirements. In most instances, developers proposed a parking ratio of 1 space/1,000 ft² of commercial development, far less than the 4 spaces typically required by local zoning. By arguing that LRT would carry a large share of their traffic, developers were able to convince local zoning and planning boards that parking could be reduced at considerable savings to their projects.

Second, developers were able to use the projected diversion of automobile trips to LRT as a means to lessen the expected traffic impact on local streets. This also led to cost savings in both on-site and off-site roadway improvements that otherwise might have been mandated by local officials. Third, it was recognized that air rights development was possible above the easements granted for the LRT line and stations. Thus, the actual loss in developable land was reduced. When coupled with the reduction in parking, this gave developers more buildable space.

NEGOTIATION PROCESS

An initial meeting was held with developers to brief them on the LRT project and obtain site plans for the proposed development project. These initial meetings produced the kind of mixed reactions mentioned earlier. Because of the regulatory process, however, developers were willing to continue negotiations to expedite approval of their waterfront permits.

A series of meetings was necessary to define the alignments needed for an ultimate agreement. It was useful to work from an array of alternatives towards a consensus on a preferred alignment. Frequently there were several alignment options that worked reasonably well from a transit perspective. Rarely was there only one alignment alternative available. Alignment negotiations were conducted primarily with the architectural consultants for the developers, but developers often brought their attorneys as well.

Once an understanding was reached on the physical alignment for the LRT, it was necessary to formalize the agreement. This, in its ultimate form, would constitute a deed of easement for the transit right-of-way. In the time available, however, neither the LRT system planners nor the developers had enough data to define the easement with the precision needed for a metes and bounds description. The LRT planners needed to keep open technology options and grade separation options, whereas developers were often re-designing their plans to reflect changes in the market. Both sides felt the need to reach an agreement quickly, but still retain some flexibility.

Consequently, an agreement for grant of easements was used as the instrument to preserve the right-of-way prior to the actual grant of easement. This document established a preliminary LRT easement shown on a 1 in.:100 ft scale development site plan. The preliminary easement was shown to scale in the approximate location without benefit of a survey, but within the accuracy available at that scale.

The developers wished to continue with development in the vicinity of the preliminary LRT alignment, so a review zone was established to provide NJ Transit the right to review and approve any development plans within a specific distance from the centerline of the preliminary easement path. This distance varied depending on the level of accuracy of the developer's plans available at the time the agreement was signed. A multiyear period was established for finalizing the actual easement so the plan could be developed in segments. Currently, work is progressing on 30 scale drawings to develop the easement. Several proposed building plans are under review by the state.

KEY ISSUES

Some decided developer preferences were observed in the negotiations process. They were far more supportive of LRT than of bus technology. They preferred midblock or roadway median alignments to roadside alignments. Midblock alignments seemed to be preferred by developers who did not view the system as aesthetically pleasing. Mostly, they preferred LRT alignments that traversed the commercial, rather than residential, portions of their sites. They worried about the aesthetics of the system and its impact on marketability of residential units. Their desire for rectangular building parcels led to pressure for sharper turns than denoted in the design guidelines.

Traffic and building access proved to be an important consideration. In one instance, the alignment preferred by the developer required crossing a busy street. Analysis by his traffic engineer indicated the probable need for a grade separation. The issue was settled when the developer agreed to share the additional costs of the grade separation structure.

CONCLUSION

Dealing with developers requires a combination of firmness and flexibility. In New Jersey, the power of the state to regulate waterfront development got the developers to the negotiating table and paved the way for the granting of no-cost easements for LRT. At the same time, it was necessary to create a "win-win" atmosphere for negotiations. The developers needed to see that good transit benefited them in a way that affected their bottom line positively. Through the use of the preliminary easement path, it was possible to reach agreement quickly on locating LRT on development sites, deferring the expensive and time-consuming surveys and engineering. The process of defining the easements for the Hudson River waterfront transit system continues, but it is believed that the methods discussed herein will continue to be successful in obtaining a transitway alignment at relatively little or no cost to the state.