

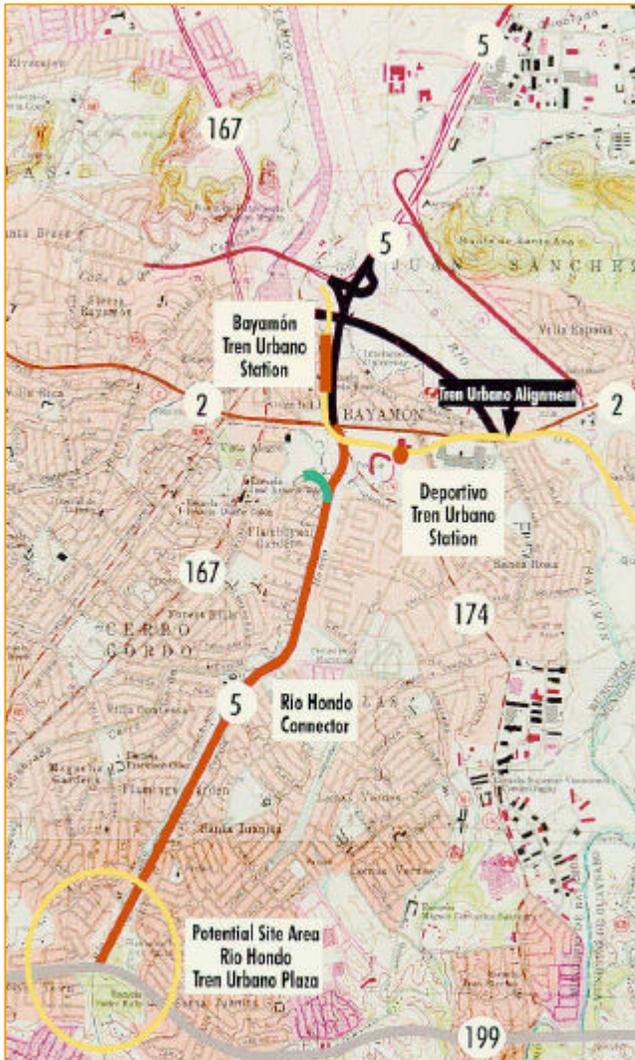


U.S. Department  
of Transportation



## Federal Transit Administration Bus Rapid Transit Demonstration Program

### *PUERTO RICO HIGHWAY AND TRANSPORTATION AUTHORITY RIO HONDO CONNECTOR*



#### 1. Project Description

- **Type of Project**

The Río Hondo Connector Bus Rapid Transit project entails high-speed bus shuttle service between the Tren Urbano rapid transit line and intermodal transfer facilities. It is conceived as a project to enhance the ridership of Tren Urbano and to promote the use of public transportation in the San Juan Metropolitan Region. The project has been developed as part of the Tren Urbano plazas concept. Tren Urbano plazas will be park-and-ride facilities located near major highways on the outskirts of the urban core, served by high-speed bus transit shuttles to take commuters to the nearest Tren Urbano station. Shuttles will bypass expressway auto congestion by using special highway lanes, and will use various intelligent transportation system (ITS) elements to speed their travel.

The Río Hondo Connector project will entail construction of a plaza at the end of the Río Hondo Connector highway in the western area of the San Juan region. The plaza will have an initial capacity of 500 vehicles and will be connected to HOV lanes on the expressway. Shuttle buses will take passengers non-stop from the plaza to the Bayamón Centro Tren Urbano station.

- **Method of Operation**

Motorists will arrive at the Río Hondo plaza using adjacent highways and streets. The plaza will be constructed at the junction of PR 199 and PR 5-the Río Hondo Connector. PR 199 is a heavily used highway. The Río Hondo Connector is a 2.5-mile length of highway currently under construction, extending PR 5 to PR 199. The Connector will be a divided, limited-access highway with six traffic lanes, including one lane in each direction to be reserved for high-occupancy vehicles.

Shuttle buses will travel from the plaza to the Bayamón Centro Tren Urbano station. The buses will use the HOV lanes and will also make use of ITS technology to increase travel speeds.

The plaza will be an integral part of the Tren Urbano system. Arrival at the Plaza will be treated as arrival into the Tren Urbano system. Tren Urbano graphics will be used including Tren Urbano information displays and systems and Tren Urbano will provide security. Standard Tren Urbano ticket vending machines will be used to facilitate the intermodal connection at the rail station. The shuttle services to the rail station will accept Tren Urbano fare media, and fares and parking fees will be integrated with the Tren Urbano fare structure.

The shuttle services from the plazas may be operated directly by Tren Urbano or by contracted operators. It is possible that the private sector could provide or support some services in conjunction with joint commercial development at the plaza.

- **Service Levels**

At this time, it is planned that service will be provided at 10-minute intervals during peak periods and 20-minute intervals during the off-peak period from 5:00 a.m. to 1:00 a.m. on weekdays.

- **Estimated Time Savings**

The travel time from the plaza to the Tren Urbano station is expected to be 5-8 minutes. All travelers in the corridor will experience travel time savings with the construction of the Río Hondo Connector, although no current travel time estimates currently are available for travelers in general purpose lanes. Bus rapid transit (BRT) passengers will experience additional time savings by using uncongested high-occupancy vehicle (HOV) lanes, and through signal priority and other ITS applications.

- **Number and Type of Vehicles Providing Service**

Minivans will be used initially on the project. The vehicles will accommodate 21 passengers and are capable of carrying two wheelchairs. Larger vehicles may be used in the future, if demand warrants.

- **Fare Collection and Boarding**

The fare collection system used will be integrated with the Tren Urbano fare collection system. Tren Urbano stored value magnetic fare media will be used. Fare media will be available at the rail stations and will also be sold at ticket vending machines in the plaza. Media will need to be passed through a reader on board the vehicle to use the service. Off-vehicle fare collection is not considered practical in this case, since it would be difficult to enforce and one of the main advantages to off-vehicle fare collection (ability to use multiple doors for entry) is not possible with single door minibuses. As an alternative method to speed the boarding process, a one-way fare (paid upon boarding the inbound trip at the plaza) is being considered to reduce boarding times at the rail station.

- **Use of ITS Capabilities**

The Río Hondo Connector BRT project will make full use of available appropriate ITS technology including automated vehicle location/computer-aided dispatching (AVL/CAD) systems, traffic signal priority for shuttle buses, and a vehicle monitoring system (VMS) for approaches to the Tren Urbano Plazas and in the Plaza assembly areas. For fare collection, the same stored value magnetic fare media that are proposed for Tren Urbano are planned for use for parking and bus access.

- **Traffic Engineering and Infrastructure**

The primary infrastructure involved in the project will be the plaza itself and the HOV lanes in the Río Hondo highway. The HOV lanes have been designed as standard highway lanes separated from general traffic by concrete barriers. The traffic engineering challenges for the project lie in the need for good access and egress at the plaza by motorists, and smooth and speedy access and egress for the bus at both the plaza and the Tren Urbano station. Initial traffic engineering studies have been undertaken to identify problem areas and to propose technological and/or low-cost design solutions.

## **2. Problems Addressed by the Project**

The San Juan Metropolitan Region (SJMR) has developed in a way that is highly dependent upon private automobiles to provide mobility for residents. Over the decades, the geographic expansion of the metropolis has fostered significant expansions of the road network and an even more impressive expansion in the rate of car ownership. In recent years, traffic congestion has increased dramatically, with the consequent negative impacts on travel time and on the general quality of life.

A timely recognition of these problems by the Puerto Rico Department of Transportation and Public Works (PRDTOP) and the Puerto Rico Highway and Transportation Authority (PRHTA) has led to various efforts to improve mobility and access over the past 20 years. These planning efforts culminated in a decision to undertake a new heavy rail mass transit system, known as Tren Urbano.

Tren Urbano is one element of a coordinated and multifaceted program to improve and upgrade the mobility of residents of the SJMR implemented by PRHTA. The objective of this program is to endow the Region with a transport system that is functional, efficient, cost effective, socially and environmentally responsible and which enhances the Region's overall development. PRHTA is carrying out a series of significant investment projects that are outlined in the Capital Improvement Program, and which are coordinated with the other relevant agencies such as the Puerto Rico Planning Board, the Metropolitan Bus Authority, the relevant municipal administrations, and the Puerto Rico Ports Authority. Among the significant initiatives being implemented are the following:

- Extension and expansion of urban roadways
- Construction of new roads and highways
- Improvement of intersections
- Replacement of deficient bridge structures
- Construction of Tren Urbano
- Reorganization and improvement of bus operations
- Creation of a network of 12 transit centers

PRHTA considers the Bus Rapid Transit concept to have valid application to the transportation problems of the Metropolitan Region. In particular, when linked to other transport modes, BRT will provide a much needed integration of a variety of transport systems, services and routes. The Río Hondo plaza/BRT project will help achieve these goals.

### **3. Implementation and Operations Schedule**

The Río Hondo Connector is scheduled to be completed the period 1999-2000. The plaza and BRT operations would begin with the opening of Tren Urbano Phase I system in 2002. Construction of the Tren Urbano Plaza is estimated to take from 6 to 8 months. This would include the time necessary for the procurement and installation of needed equipment and for the selection of the contract operator of the shuttle bus service.

#### **4. Funding Plan**

Most project costs are already funded as part of larger projects: Tren Urbano and the Río Hondo Connector. Substantial capital investments are already being made in the Bayamón Centro Station and in the Río Hondo Connector HOV lanes that will make Río Hondo plaza/BRT service possible. The Río Hondo Connector is currently under construction at a cost of approximately \$62.5 million. The costs for the facilities of the Tren Urbano Bayamón Centro Station are included in the \$1.55 billion estimate for the Phase I development of the Tren Urbano System. Additional investment costs for non-funded elements of the Tren Urbano Plaza project at Río Hondo are estimated at \$1.6 million, and annual operating costs, including the contract shuttle bus service, facility maintenance and operation personnel, are conservatively estimated at \$550,000.

The plaza at Río Hondo will consist of a 500-space parking lot with fencing, lighting, security, telephones, bus shelters, information displays, and ticket vending machines. Detailed site-specific costs have yet to be developed, but the cost of such a facility would typically be about \$800,000. Direct capital costs associated with the shuttle service would be minimal, since it is expected that the operating contract would require that the contractor provide the vehicles. Some capital cost would be associated with ITS and fare collection equipment. Approximate cost for ITS equipment is estimated at \$800,000.

Operating costs would include the service contract, plaza security, plaza maintenance, and operation of the ticket vending machines. The service contract for two vehicles during the day and one at night on weekdays is projected to cost approximately \$310,000 annually. Costs for security, maintenance and operations are estimated at \$240,000 per year. Revenues may be used to offset some of these costs.

The Connector will be constructed using PRHTA highway construction funds. The Tren Urbano project is being financed using a blend of federal and local funds. Innovative financing techniques were used for the Tren Urbano including the leveraging of federal source funds. This method is available for the Tren Urbano Plaza program; however, the most attractive means of financing this additional investment has not yet been determined.

PRHTA proposes to use public private partnerships for the shuttle bus and the Tren Urbano Plaza program. The objective is to offset public costs and stimulate private investment.

#### **5. Issues of Concern re: planning, design, implementation and/or operations**

The project presents several challenges. The primary technical challenges are associated with traffic engineering. Good travel speeds for the buses will be critical to the success of the project, so it will be very important to develop design and ITS solutions which best serve the bus operations.

Tren Urbano will bring a new transportation mode to Puerto Rico. There is no actual experience with rider behavior to use as a basis for forecasting ridership and sensitivities for the plaza/bus rapid transit project. We believe that it is most important to provide fast,

frequent bus service from the plazas to the Tren. Fares and service levels are also operations issues which are likely to affect demand for the service. Further study will be needed to determine the effect of these factors, and to set the fare and service levels accordingly.

Fares will provide a portion of the operating budget for the plaza/bus rapid transit operations. Further work will be required to explore public/private partnership opportunities, and other approaches to offsetting operating costs.

## **6. Current Status**

Work is continuing on project planning. Discussions have also been held with the design consultant for the Río Hondo Connector highway project, regarding access to the plaza from PR 199 and PR 5. These efforts will continue, and will address project issues in greater depth and detail. Preliminary engineering will be started later in 1999.

## **7. Contacts**

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