



UPR/MIT/TU Professional Development Program
Transportation Technology Transfer Center
University of Puerto Rico at Mayagüez
Mayagüez, P.R.



Executive Summary

“Efficient Transportation and Land-Use Planning in a Historical Center”

by

Michelle M. Laboy Toro
e-mail: michelle_laboy@hotmail.com
Civil Engineering Department
University of Puerto Rico at Mayagüez

Advisor
Dr. Nelson Irizarry
e-mail: nelson@rmce02.upr.clu.edu

Executive Summary

I. Introduction

Historical cities are part of a culture's legacy. Car traffic and modern life result in cities growing with limited space and environmental problems. This kind of development is detrimental for the traditional activities of a historical city: walking, commerce and socializing. The efficient planning and coordination of transportation and land-use could achieve the preservation of these traditional environments. A Transit-Oriented Development (TOD) could be a window to reach the balance between modern and traditional life styles. This project attempts to prove the feasibility of a TOD in Old San Juan (OSJ). In order to establish the need for this study, this report identifies the important facts that concern the OSJ area and how its urban and physical traits allow for this kind of development. The renovation strategies implemented in 11 cities were studied in order to establish a suggested path for OSJ based on the best and worst of them. This report presents a comparison between the selected cities and San Juan, as well an overview of the keys for their success. Furthermore, it presents the recommendations made for the renovation of the OSJ Area; and identifies how Tren Urbano could be useful to this goal.

Present situation in Old San Juan

In the past decades OSJ and Puerta de Tierra have experienced a dramatic decrease in population and commercial activity, consequently the abandonment and deterioration of buildings and streets are evident. The fast increase in car ownership has caused a serious congestion problem. Historic streets used for walking, social interaction, and commercial activity have been reduced to parking space and traffic congestion.

Recently, several projects have been proposed in the San Juan Bay Area: OSJ, the seaport, and Isla Grande. These projects include housing and mix-uses buildings, recreational parks and facilities, commercial centers, parking facilities, and a Convention Center. It is expected that the Municipality of San Juan will build 3,720 new parking spaces by October 2001, at a cost of \$63.4 million (Diaz, September 1999). More than 40% of the new parking spaces will be in Old San Juan and Puerta de Tierra. The Golden Triangle Plan on the San Juan Bay Area will generate additional traffic demand in OSJ. This plan includes a 6-lane tunnel from Isla Grande to the Isleta, which will increase the flow capacity of vehicles into the area. However, it will not improve the accessibility and mobility inside the historic district. Any increase in car space will reduce the pedestrian areas even more, and will make them more uncomfortable.

Problem Statement

- High traffic volumes increase the emissions of contaminants and particulate causing damage to the historic structures
- Emissions cause building deterioration, dirty streets, and higher temperatures: making the streets unpleasant to live or walk around

- Poor access, mobility, and reliability of the internal transit system (trolley) due to traffic congestion, narrow streets and parked cars near the intersections.
- Poor accessibility for pedestrians, handicaps, and bicycles due to excessive parking in the streets, car congestion, and narrow sidewalks.

Justification

A TOD provides people with alternatives around a transit system to promote its use. The TOD emphasizes on multi-modal use. Providing an enjoyable environment for pedestrians and bicycles is one of the first steps to achieve this kind of development. Significant improvements in the quality of the street environment and the pedestrian accessibility have been proven to achieve the preservation of a high-quality living environment (Wiedenhoeft 1981, pp.34-68). Similar cities in Europe have successfully implemented transit programs, mostly relying on: improvements on the transit system, fare policies, and improvements in pedestrian/bicycle access (Wiedenhoeft 1981, pp.188-220). The experience of these cities could be studied and adapted to OSJ.

The Master Plan of Tren Urbano is projecting a future extension to Puerta de Tierra and OSJ. The next expansion phase is still undetermined. The Old San Juan Corridor Study for the Tren Urbano Office evaluates different trail systems and alignments. Yet, it does not consider the new developments of the Golden Triangle Plan in terms of ridership estimates and connections. Due to the environmental impacts and risks of constructing this phase near the historic district (GMAEC, 1998), it is important to consider other modes that could be efficiently connected to the trail system and provide the service to this area. Furthermore, the tunnel plan will cause conflict with the streets directions in the historical district that are in the Municipality's jurisdiction. In order to successfully implement these plans it is mandatory to integrate them.

II. Objectives

This research attempts to prove the feasibility of a TOD in OSJ. The scope of the project is summarized as follows:

- Study and present cities with similar characteristics to Old San Juan that implemented successful transit programs with improved pedestrian access
- Evaluate how the studied strategies could be implemented in OSJ
- Recommend the necessary changes in the mobility issues of OSJ to achieve the integration of the historical district with the Tren Urbano system
- Evaluate the benefits of this system compared to the present transportation system

III. Project Phase I

The research plan of this phase consists of consists of literature review and interviews. The interviews arranged were with the Tren Urbano Transportation Planning Office and the San Juan Municipality. This phase also included the review and evaluation of the renovations plans in eleven case studies.

Case Studies

- Barcelona, Spain
- Bologna, Italy
- Copenhagen, Denmark
- Chattanooga, Tennessee
- Evora, Portugal
- Nancy, France
- Perugia, Italy
- Portland, Oregon
- San Francisco, California
- San Sebastian, Spain
- Sintra, Portugal

Selection Criteria

- Historical Character
- Urban Problems similar to OSJ
- Traffic conditions and street dimensions
- Implementation of "Transit-Supportive" and "Pedestrian-Oriented" Plans
- Train and/or Regional Bus Systems

General Description of the Selected Cases

- 9 Historic Centres
- 2 UNESCO World Heritage Cultural Landscape
- 3 Important Sea Ports
- 8 Train Systems
- 11 Intra-City Bus/Trolley Systems

Common Problems

The number in parenthesis indicates the percent of the 11 cities studied that considered this particular problem as a major concern.

- All of them had excessive traffic congestion and insufficient parking (100%)
- Decreasing ridership on the regional transit system (100%)
- Particulate emissions generated by traffic results in degradation of historical structures (buildings, pavement) (64%)
- The topography and street dimensions are a major restriction for the transit system (64%)
- Emissions and noise caused by traffic are reaching high levels (55%)
- Poor urban environment and quality of life reflected on the abandoned areas and buildings and decreasing population (45%)
- Inefficiency of the transit system due to conflicts with traffic congestion (36%)
- Lower economic activity and increasing unemployment (27%)
- Mobility demand of future developments (18%)

Physical Characteristics

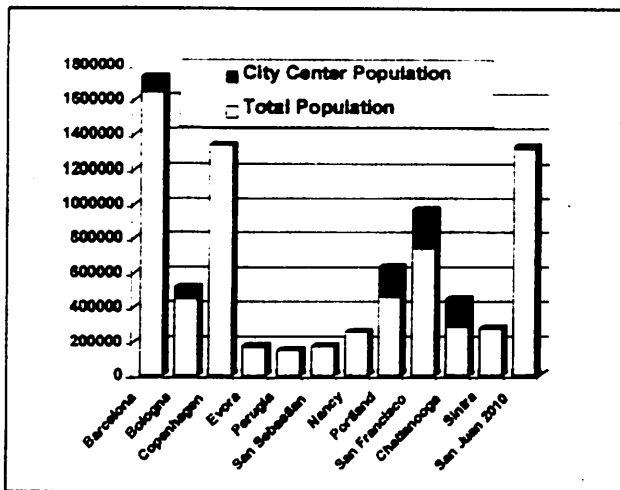


Figure 1: Population in the metropolitan region and in the city center

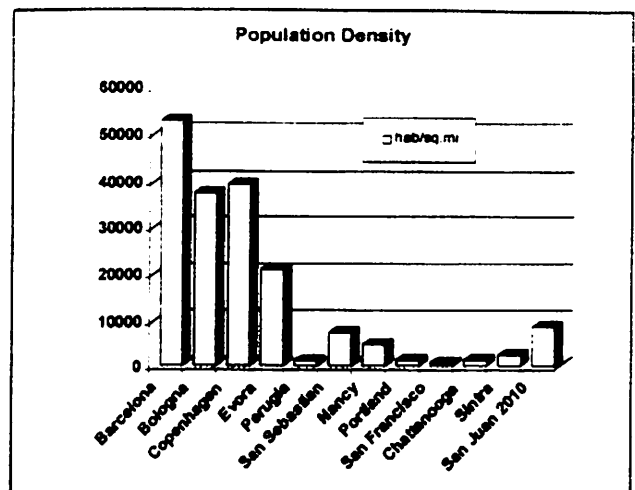


Figure 2: Population Density in the city center

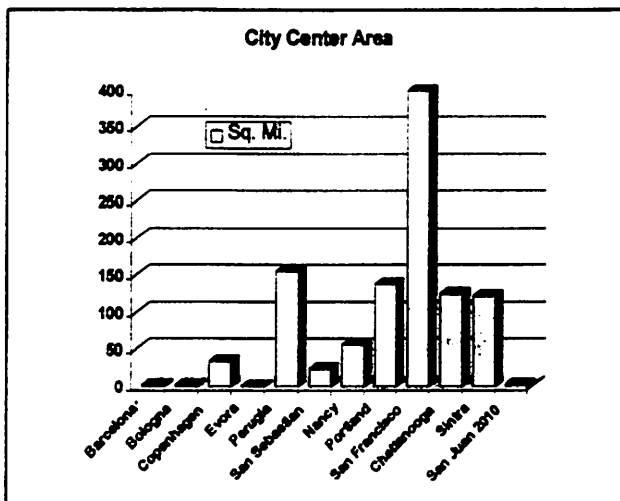


Figure 3: City Area in square miles

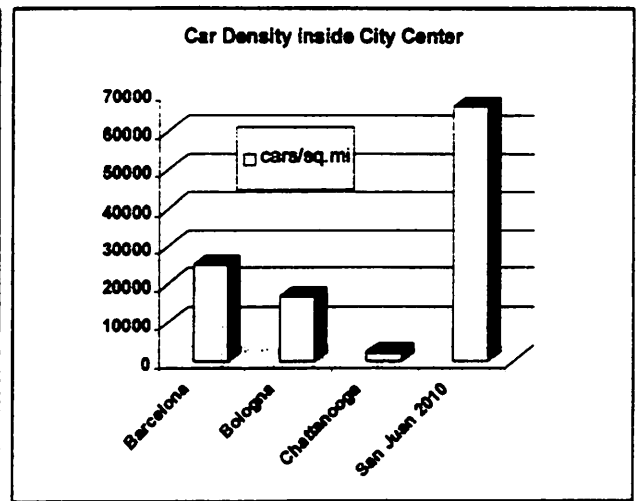


Figure 4: Car Density in some of the case studies compared to San Juan

IV. Preliminary Findings:

General strategy implemented in these cities

The general strategies identified in these 11 cases include 5 broad categories. These elements were keys for their success.

- Planning Integration:
 - Central Coordinating Agency that represents all the involved sectors
 - Active participation of the residents and business community
 - Integrate the Land Use Plans of the local government with the Transportation Plans of the Transit Agency
 - Integrate Land Use Planning with the Economic Development Plans

- Urban Environment Improvements
 - Create and improve the open public space, promoting
 - Quality
 - Diversity
 - Renovation of abandoned buildings and areas to improve safety perception
 - Landscaping and Green Space
 - Street Furniture
 - Illumination
 - Fountains
 - Street Sitting Areas
- Economic Revitalization
 - International Marketing of the city for business, investors and professionals
 - Promote Leisure and Business Tourism
 - Local public campaigns to attract people to the city center commerce
 - Maintain uniformity in the “pedestrian-oriented” character of the commercial areas
 - Ground Floor Retail use in parking lots and housing projects
 - Improve hotels quality
- Mobility
 - Transit Improvements
 - Appearance
 - Safety
 - Frequency, Speed, and Coverage
 - Environmental Technologies
 - Intermodal Connections
 - Local and Regional Systems
 - Fare integration
 - Transit Centers with multiple uses
 - Vehicular Traffic Restrictions
 - Provide Transit-exclusive streets and more pedestrian spaces
 - Peripheral “Park and Ride” facilities with local transit connections
 - Access permits System for residents and shop owners
 - Social, cultural and economic incentives and disincentives
 - Loading/Unloading hours
 - Pedestrian Networks
 - Transit Connections
 - Limited parking space
- Education and Community Participation
 - Cultural campaigns
 - Community Centers for information and suggestions
 - Education on the real cost of transportation, e.g. transit vs. private car
 - Instruct on Clean Fuel concern if the transit improvements include those

Barriers for Implementation:

The implementation of these strategies had a few conflicts that made their success difficult.

- Conflicts of interests between partners in the planning process
- Separation of Transit Planning and Town policies
- Lack of Collaboration from public and private sectors
- Opposition of business community
- Coordination of public and private transportation providers
- Lack of interest from the community

Solutions:

The barriers mentioned above were overcome by means of active participation, collaboration and coordination.

- Create a mixed public corporation that coordinates the different planning agencies
- Ensure the creation and follow-up of long term plans
- Establish a central agency that will evaluate all projects with a common mission and vision of the future of the city.
- Create campaigns of incentives for private inversion and participation
- Involve the business owners on the planning process from the beginning
- Create local initiatives to attract people to the center

Results of the Renovation Plans:

The cities that implemented these strategies achieved a number of improvements in their urban center.

- Increase in the number and diversity of economic activities
- Increase in population density and employment
- Historic conservation and preservation
- Increase in the market share of transit and walking modes
- Improvements in the speed, frequency and efficiency of the bus systems when the vehicular restrictions were implemented
- Increase in private inversion
- Reduction in emissions, noise and energy consumption

V. Preliminary Recommendations for Old San Juan:

The general strategy mentioned could be implemented in San Juan, given the following facts:

- 20% of the OSJ residents go to work walking
- 32% use the transit systems available
- 15% use the trolley
- Less than 50% own a car
- The new developments in the area will generate a traffic demand that the available roads could not tolerate (Parmegiani)
- The Tren Urbano System will reach the OSJ area or somewhere near

- The OSJ Community has a very active Residents Committee

Adaptation of the strategies to OSJ:

The strategies mentioned above could be adapted to the OSJ Area.

- Integration of the following agencies in the planning process
 - Tren Urbano and Puerto Rico Highway and Highway Authority
 - San Juan Municipality
 - Tourism Bureau
 - Community Residents and Shop Owners
 - Puerto Rico Institute of Culture
- Urban Environment Improvements
 - Renovation of buildings for new housing and commerce
 - Greenery around plazas and pedestrian network
- Economy
 - Transit Improvements near the future developments:
 - Convention Center and Waterfront Market Street
 - Join the cruise terminals and the local shops with pedestrian networks and transit, e.g. La Princesa
- Mobility
 - Trolley
 - Feeder to Tren Urbano
 - Extend routes to Puerta de Tierra using exclusive ROW
 - Use of environmental technologies
 - Pedestrian network around Plazas, Market Street, La Princesa
 - Car Traffic Restriction
 - Extend Weekend Control
 - Parking in Peripheral Lots
 - Transit Center
 - Tren Urbano
 - Trolley
 - AMA, Metrobus
 -

VI. Preliminary Conclusions and Future Research Activities

This plan could be implemented successfully in OSJ with commitment, collaboration, and follow-up.

A transit-oriented development is possible in San Juan to promote a pedestrian, recreational, and community-based area. The projects that will be implemented in Old San Juan provide the opportunity for this development. The new projects will be multi-use areas: housing, commercial, and recreational uses. They will be located near multi-modal services: the seaport, the Acuaexpreso terminal, and the trolley service. The accessibility to other modes of transportation, like Tren Urbano could increase the potential for a transit-oriented development. The pedestrian mobility in the area could be increased if the car traffic is reduced, and the environment is healthier and more enjoyable. Residential streets and limited car access have been implemented in Old San

Juan. As in the cities studied, the percent of exclusively pedestrian areas, and limited access to streets could be gradually increased if provided with reliable alternatives to the car.

The next phase of this research will analyze the mobility issues in OSJ, including the trolley service and the car traffic restrictions. Finally, the recommendations will be presented, as well as a conclusive statement on the feasibility of the TOD in OSJ.

VII. References

Conservation Law Foundation. 1998. City Routes, City Rights: Building Livable Neighborhoods and Environmental Justice by Fixing Transportation.

Diaz, Marian. Cuesta \$63.4 millones un alivio al parqueo. El Nuevo Dia. September 9, 1999. San Juan, P.R.

Graedel, Thomas E., Allenby, Braden R. 1998. Industrial Ecology and the Automobile. New Jersey. Prentice-Hall, Inc.

Transportation Research Board. June, 1995. An Evaluation of the Relationships Between Transit and Urban Form. Transit Cooperative Research Program. Research Results Digest .

Tren Urbano GMAEC. June, 1998. Old San Juan Corridor Study.

Wiedenhoeft, Ronald. 1981. Cities for People: Practical Measures for improving Urban Environments. Ontario. Van Nostrand Reinhold Company.