1 Introduction

Since the Tappan Zee Bridge/I-287 Environmental Review began in 2002, one of the most critical focuses of the study has been on the development of transit solutions to accommodate future growth in the corridor (from Suffern in Rockland County to Port Chester in Westchester County) with a reasonable degree of dependability and without dependence on the automobile as the sole means of travel within the corridor. Improving the mobility of people, goods, and services for travel markets served by the Tappan Zee Bridge/I-287 Corridor is part of the project's purpose and need.

The study of transit alternatives and options has been conducted in several stages, culminating in this report, which determines the transit mode or modes to be analyzed in detail in the draft environmental impact statement (DEIS) being prepared pursuant to the National Environmental Policy Act (NEPA) and the New York State Environmental Quality Review Act (SEQRA). This introductory chapter describes the multi-step analytic process, which has included significant public involvement, as well as travel patterns in the study area that affect the modes and extent of possible transit solutions.

In accordance with this process, this report describes the results of the analyses of transit modes that have been conducted in order to select a feasible transit mode or modes to carry forward into the DEIS. The methodology adopted for this analysis was to:

- Conduct sufficient engineering to determine suitable, cost-efficient alignment options, possible station locations, right-of-way (ROW) acquisition requirements, roadway design requirements, major structural requirements, and construction costs.
- Conduct sufficient service planning to determine routes, headways, possible stations, travel times, equipment requirements, and operating costs.
- Incorporate the resulting network and service decisions into the recalibrated Best Practice Model (BPM) model and test for the year 2035, using New York Metropolitan Transportation Council (NYMTC) population and employment forecasts as the basis for the tests. Adjust costs to reflect 2012 values and incorporate all budgeted capital improvements expected to be completed by 2035.
- Test each alternative/option using the BPM and analyze the results.
- Conduct the environmental analysis at the level of detail sufficient to permit comparison among, and determine any possible fatal flaws of, the alternatives/options.

1.1 Background

1.1.1 Project Study Area

The study area consists of a linear 30-mile corridor that extends from the I-87/I-287 Interchange in Rockland County to the I-287/I-95 Interchange in Westchester County and includes the Tappan Zee Bridge (Figure 1-1). The corridor is an important part of a regional transportation system, and transportation implications extend beyond the immediate roadway system to Poughkeepsie in Dutchess County to the north, Stamford, Connecticut to the east, the five New York City boroughs to the south, and parts of Orange County, New York, and Bergen County, New Jersey to the west.

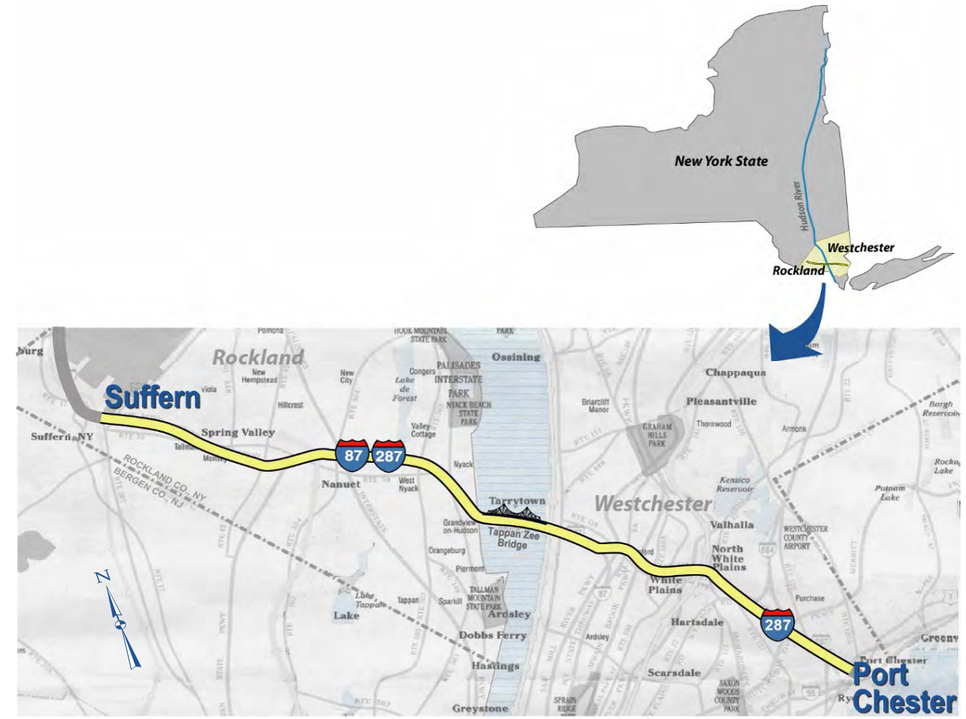


Figure 1-1 Tappan Zee Bridge/I-287 Corridor

Many of these counties have seen rapid urbanization over the past several decades. In Rockland County, which lies just west of the Hudson River, the population has more than tripled, from 89,276 in 1950 to 286,753 in 2000. In Westchester County, which is just east of the Hudson River, the population has had a more modest increase, from 625,816 in 1950 to 808,991 in 2000. However, Westchester County saw a major increase in commercial development in the 1950s and 1960s with the completion of interstate highways I-95, I-87, I-287, and I-684. This led to a surge in corporate headquarter relocations to the area, resulting in the Platinum Mile section of I-287 in the Town of Harrison.

According to the New York Metropolitan Transportation Council (NYMTC) – the Metropolitan Planning Organization (MPO) for New York City, Long Island and the Lower Hudson Valley – outlying counties of the region are expected to have significant increases in both population and employment over the next 20 years. Between 2000 and 2025, New York City Metropolitan area regional household population, as defined by the US 2000 Census, is expected to grow by 12 percent, while Rockland County is expected to grow by 18 percent and Orange County by 27 percent. Westchester, the most-developed county in the study area, is projected to have a more stable population, with growth at only four percent. In addition to population growth, employment is also projected to increase within the corridor. All three counties are expected to exceed the forecasted New York City Metropolitan area regional employment growth of 17 percent: Westchester will grow by 19 percent, Rockland by 29 percent and Orange by 35

percent. This increase in population and employment will continue to place demands on the Tappan Zee Bridge//I-287 Corridor.

1.1.2 Purpose and Need

Studies have shown that several transportation improvements, including mobility, transit options, and safety, are needed in order to meet the growing travel demands of the corridor. The corridor experiences significant delays due to congestion and is often operating at or near capacity, particularly in the vicinity of the Tappan Zee Bridge. Rockland County is one of the fastest-growing communities in the Metropolitan Region, and Westchester County is experiencing employment growth in areas around White Plains and the Platinum Mile. The Tappan Zee Bridge and the corridor provide an important link between these communities, as well as to the overall regional transportation network. In addition to the capacity constraints of the corridor, the Tappan Zee Bridge is aging and in need of a regular and extensive maintenance program. As the region grows, travel demand will increase on an already-strained roadway network. The following needs have been identified for the corridor:

- Preserve the existing river crossing as a vital link in the regional and national transportation network.
- Provide a river crossing that has structural integrity, meets current design criteria and standards, and accommodates transit.
- Improve highway safety, mobility, and capacity throughout the corridor.
- Improve transit mobility and capacity throughout the corridor and travel connections to the existing north-south and east-west transit network.

In order to meet project needs, the following five goals have been established to address the bridge, highway and transit needs of the corridor.

Improve the mobility of people, goods and services for travel markets served by the Tappan Zee/I-287 Corridor:

- Reduce traffic congestion levels.
- Improve travel times for local trips.
- Improve travel times for regional trips.
- Provide modal travel alternatives not subject to roadway congestion.
- Increase the share of travel demand accommodated by transit and ridesharing.
- Provide a non-motorized means of travel, such as bicycle and pedestrian, across the Hudson River.

Maximize the flexibility and adaptability of new transportation infrastructure to accommodate changing long-term demand:

- Maximize the ability to accommodate increases in travel demand.
- Minimize constraints to serving future travel patterns and markets.

Maintain and preserve vital elements of the transportation infrastructure:

- Assure that the corridor's transportation infrastructure meets applicable standards for structural design and integrity.

Improve the safety and security of the transportation system:

- Reduce motor-vehicle-accident severity and rates.
- Improve roadway geometrics to current standards.
- Improve the likelihood that the Bridge would withstand a severe natural or manmade event.

Avoid, minimize and/or mitigate any significant adverse environmental impacts caused by feasible and prudent corridor improvements:

- Minimize community disruption, displacements, and relocations; as well as adverse impacts to public parks, visual resources. and aesthetics resulting from mobility improvements in the corridor.
- Implement mitigation measures that are feasible, constructible, innovative, sustainable, cost-effective and that address regulatory requirements.

1.1.3 Notice of Intent and Alternatives Analysis

On December 23, 2002, the Notice of Intent (NOI) to prepare an Alternatives Analysis (AA) and an Environmental Impact Statement (EIS) for the I-287 Corridor between Suffern, New York (Rockland County) and Port Chester, New York (Westchester County) was published in the *Federal Register* (Volume 67, No. 246). A series of scoping meetings was then held in January 2003 and preparation of the AA commenced.

Two levels of screening analyses were conducted in the AA process. In the Level 1 screening, 150 elements – or building blocks of corridor transportation solutions – were evaluated. These 150 elements included transit, river crossing, highway, and transportation demand management/transportation system (TDM/TSM) measures. The result of this first level of screening was the elimination of roughly half of the 150 elements based on a set of transportation, environmental, engineering, and cost screening criteria that were developed with public input. The remaining elements were combined into 16 scenarios for testing to optimize their effectiveness in improving mobility within the corridor (Figure 1-2), as follows:

- No Build.
- Rehabilitation of the bridge with TDM/TSM measures.
- A highway-improvement scenario with a replacement bridge.
- Seven single-mode transit scenarios consisting of full-corridor bus rapid transit (BRT), light rail transit (LRT), or commuter rail transit (CRT) options along with a variety of river-crossing options.
- Six multi-modal scenarios that combined various transit elements with a variety of river-crossing and highway-improvement elements.

These 16 scenarios were subjected to Level 2 screening analyses using the transportation, environmental, engineering, and cost screening criteria, which resulted in the selection of six alternatives for further consideration in the DEIS. For a detailed description of each scenario and the related screening processes, see the *Alternatives Analysis Report* (January 2006). The six alternatives were Alternative 1 (No Build), Alternative 2 (Bridge Rehabilitation), and Alternatives 3 (BRT), 4A (CRT), 4B (CRT/LRT), and 4C (CRT/BRT).

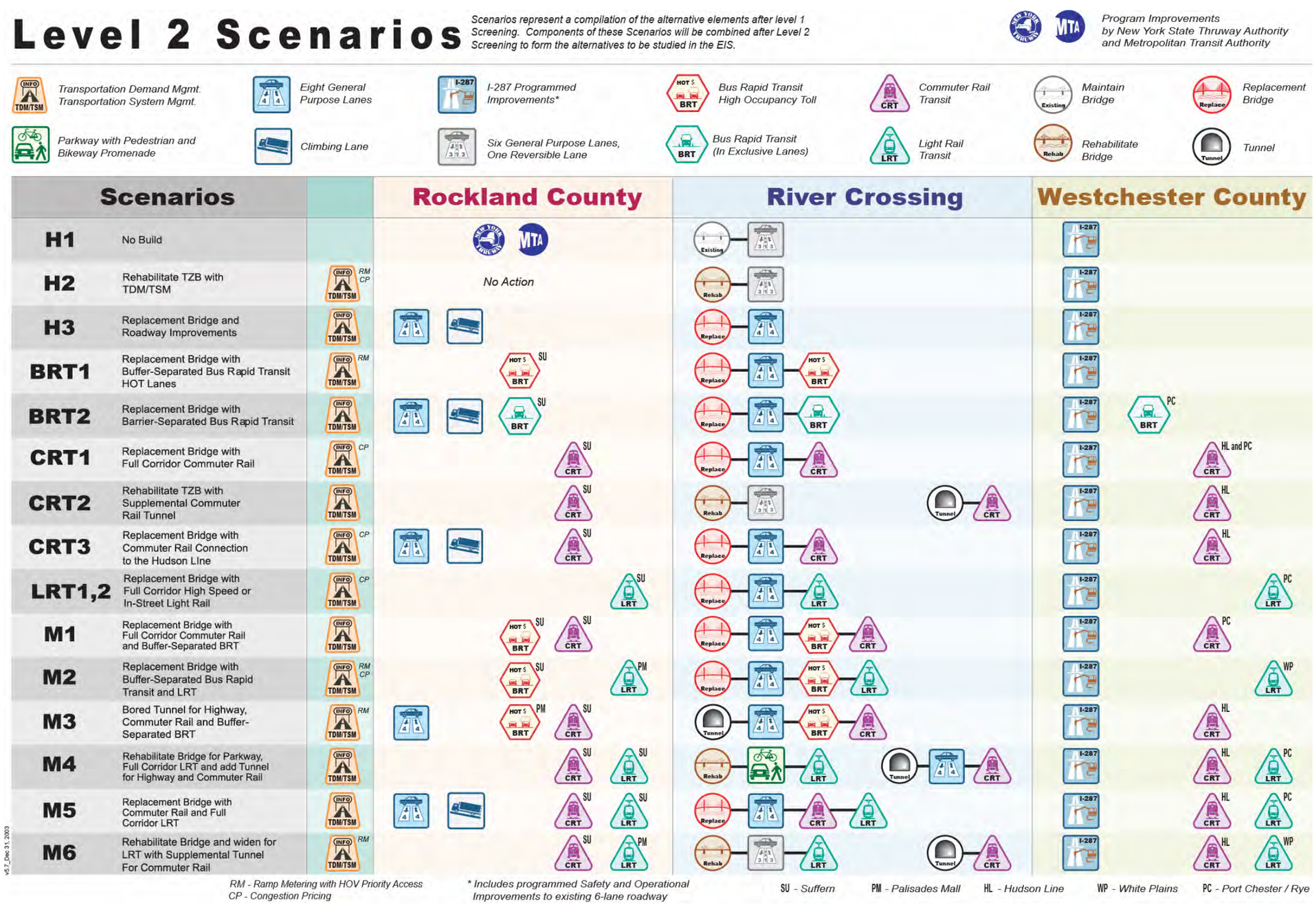


Figure 1-2 Corridor-Wide Scenarios

1.1.4 Revised Notice of Intent

Although extensive scoping, AA, and public involvement activities have been conducted since publication of the original NOI, because of New York State Department of Transportation's (NYSDOT) increased involvement and the new provisions of the recently enacted (August 2005) Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), it was deemed appropriate by the lead agencies to prepare a revised NOI, which was published in the *Federal Register* in February 2008. The lead agencies are the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), NYSDOT, the NYS Thruway Authority (NYSTA), and Metro-North Railroad. These agencies constitute the project team.

The purpose of the revised NOI was to define the realignment of project management, including the addition of NYSDOT to the project team; to acknowledge adherence to the provisions of SAFETEA-LU Section 6002; and to update interested parties regarding the plan to prepare an EIS. The revised NOI also presented the opportunity for the public and agencies to review and comment on project purpose and need; the range of alternatives; the *Public and Agency Coordination Plan*; and evaluation methodologies.

The revised NOI provided the public with updated information on the proposed project, its purpose and need, and the range of alternatives. As part of the provisions of SAFETEA-LU (Section 6002), the public was also re-invited to participate in the NEPA process, which included providing comments on the refined scope of the EIS proposed in the revised NOI. Scoping update meetings were conducted in February 2008 that offered information on the project and its new direction.

1.1.5 Tiered Analysis Approach

The project team also refined the approach to the environmental review process. The Tappan Zee Bridge/I-287 Corridor project is multimodal in nature with proposed bridge, highway, and transit improvements. To expedite the delivery of integrated, multimodal transportation improvements in a way that allows each project component to advance at its own appropriate pace, the EIS will be conducted using a tiered analysis approach. Thus, two levels of analysis will be conducted in the DEIS:

- The **Tier 1 transit** analysis will be at a planning level of detail, providing transportation and environmental analyses appropriate to a planning study and related decisions regarding transit mode(s), transit alignments, and logical termini. While proposed station locations are identified in this report, and will be analyzed at a planning level in the DEIS, it is important to note that these will form the basis for a corridor-level decision and, together with supportive infrastructure, will be subject to further studies as part of the Tier 2 transit analysis.

- The study of **highway and bridge at a Tier 2 level** will be based on detailed engineering for those components of the project and will provide transportation and environmental analyses so that a decision can be made on preferred highway and bridge alternatives. The highway and bridge engineering will include appropriate accommodations for the transit mode, alignments, termini, and stations identified in Tier 1 transit.

This tiered process will allow the project to focus the environmental review process and progress work that has been conducted to date. Following this EIS/Record of Decision (ROD) there will be a Tier 2 transit phase in which details of transit alternatives will be further studied in separate environmental document(s) and be consistent with the Tier 1 transit and Tier 2 highway/bridge studies and decisions.

1.1.6 Level 3 Screening

One of the outcomes of the decision to pursue a tiered analysis approach to preparation of the DEIS was the decision to conduct a third level of screening with respect to transit modes in order to narrow the range of transit modes being analyzed to a mode or modes that would best meet the transportation demands of the corridor. The transit mode analyses were conducted to (1) enable comparisons among the modes based on selective criteria; (2) determine whether there are significant differentiators among them; and (3) determine whether there were any major issues associated with any mode. The transit-mode selection analysis presented here is based on several principles:

- It builds upon the existing AA work with additional data and analyses.

- It uses a set of transportation, environmental, and cost criteria (comparable to those used in the two levels of screening in the AA for consistency) to determine if there are critical differences and/or benefits among transit modes.

- It uses a series of quantitative and qualitative measures to support the evaluation criteria. For example, if environmental impacts to wetlands were found to be a differentiator, that determination would be based upon the significance of the wetlands as well as on the numeric difference between the total area of wetlands involved in each mode.

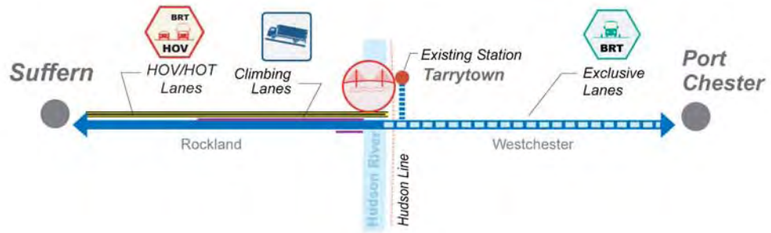
In order to assess the impacts of the various transit modes, the following transportation, environmental, and cost criteria were used (see Chapters 5, 6, and 7 for detailed descriptions of the criteria):

- Transportation:
  - Transit Ridership.
  - Transit Travel Time.
  - Transit Capacity.
  - Roadway Congestion.
- Cost:
  - Capital cost.
  - Annual operating costs.
  - Fare revenue.
  - Net cost per passenger and passenger-mile.
  - Transit travel-time benefits.
- Environmental:
  - Consistency with land use plans.
  - Residential and commercial acquisitions/displacements.
  - Transit-oriented development (TOD) potential.
  - Wetlands.
  - Parklands.
  - Historic and archaeological resources.
  - Hudson River habitat disturbance.
  - Air quality.
  - Energy/greenhouse gases.

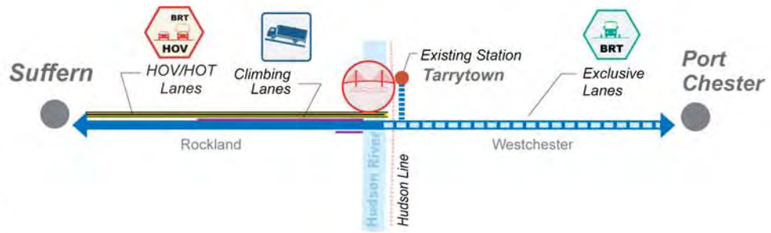
1.1.7 Mode Alternatives/Options Under Study

In the course of further evaluation of the six DEIS alternatives that had been developed in the AA Report, three variations of the alternatives were developed based on comments received from the public, the results of a project BRT Workshop, and other analyses; these are referred to as Options 3A, 3B, and 4D, and are described below. In addition, two other options were reconsidered based on public input: 4A without a Hudson Line connection (designated as 4A-X) and a full-corridor LRT. These variations are also included in this transit-mode selection analysis (Figure 1-3).

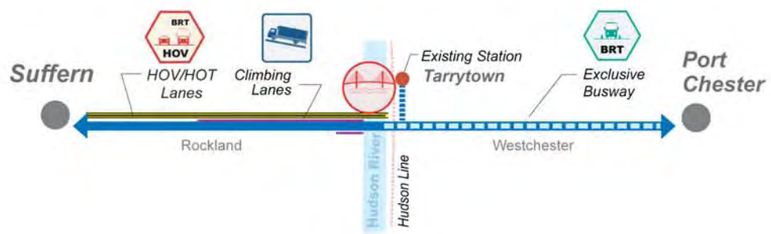
Alternative 3
Full Corridor BRT



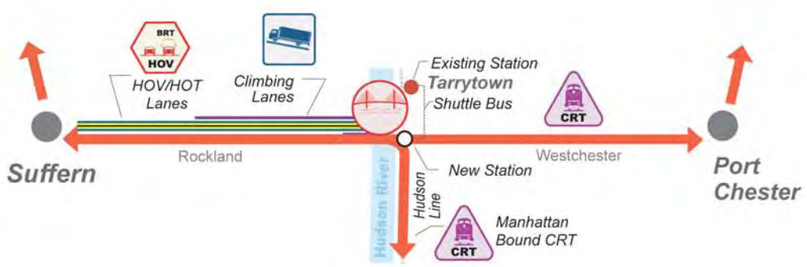
Option 3A
Full Corridor BRT
With an enhanced service plan additional stations, extended bus lanes on Westchester Ave., and connection to Port Chester Station



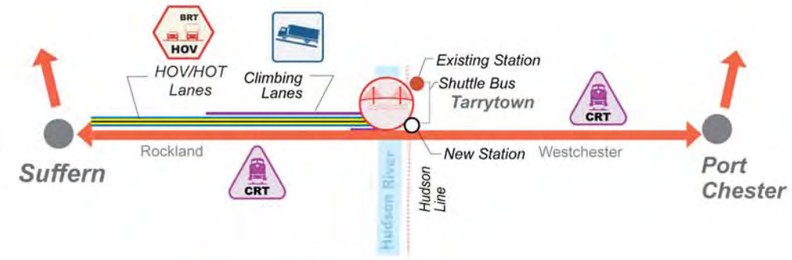
Option 3B
Full Corridor BRT
High occupancy toll (HOV/HOT) lanes in Rockland and a dedicated busway in Westchester



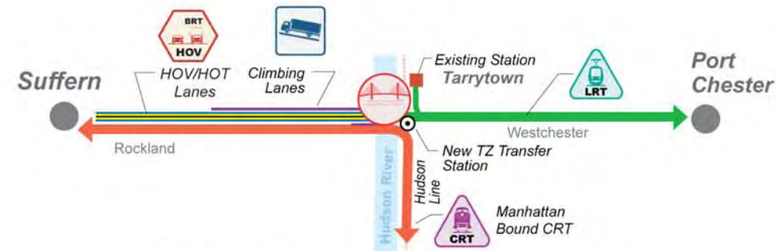
Alternative 4A
Full Corridor CRT



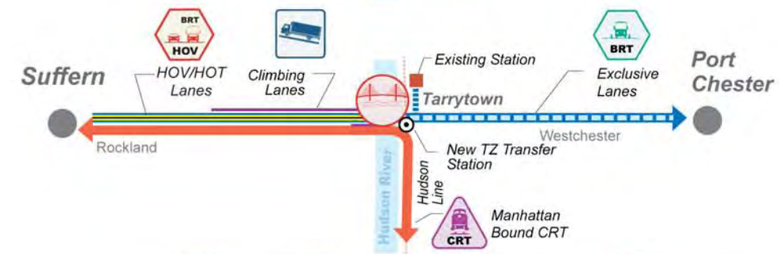
Option 4A-X
Full Corridor CRT
With no direct connection to the Hudson Line



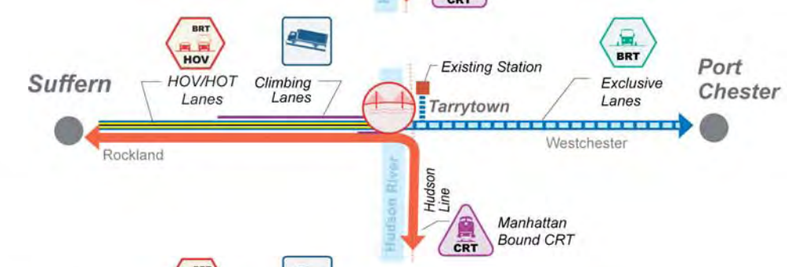
Alternative 4B
Manhattan-Bound CRT with LRT in Westchester



Alternative 4C
Manhattan-Bound CRT with BRT in Westchester



Option 4D
Manhattan-Bound CRT with full corridor BRT (as in Alt 3A) but with no Airmont or Tappan Zee CRT Stations



Full Corridor LRT
With new TZ station and cross platform transfer to Manhattan-Bound CRT

Figure 1-3 Alternatives/Options

Thus, the alternatives/options subjected to Level 3 screening analyses include some of the original AA alternatives (4A, 4B, 4C), several new options (3A, 3B, 4A-X, 4D) developed for this study, and a full-corridor LRT (Alternatives 1 and 2 have no transit component[1]), as follows:

No Build – Alternative 1 is used as the baseline to measure impacts, where appropriate.

Bus Rapid Transit

- **Option 3A** (Full-Corridor BRT) – Alternative 3 (full-corridor BRT in high-occupancy toll [HOT] lanes in Rockland County) but with an enhanced service plan (including additional stations), extended dedicated bus lanes on Westchester Avenue, and connection to Port Chester Station. Option 3A includes both dedicated bus lanes as well as busways. The dedicated bus lanes use lane segments of existing roadways, such as Route 119 and Westchester Ave. The busways are new lanes in exclusive ROWs.

- **Option 3B** (Full-Corridor BRT) – combined HOT and BRT lanes in Rockland and a dedicated grade-separated busway across Westchester.

Commuter Rail Transit

- **Alternative 4A** (Full-Corridor CRT) - as developed to date for the project, with a direct connection to the Hudson Line.

- **Option 4A-X** (Full-Corridor CRT) - as developed to date for the project, but without a direct connection to the Hudson Line. A new local Tarrytown Station at the Tappan Zee Bridge is assumed, with a shuttle bus connection to the existing Tarrytown Station.

- **Alternative 4B** (CRT/LRT) - as developed to date for the project, with CRT in Rockland with a direct CRT connection to the Hudson Line and LRT in Westchester.

- **Alternative 4C** (CRT/BRT) - as developed to date for the project, with CRT in Rockland with a direct CRT connection to the Hudson Line and BRT in Westchester.

- **Option 4D** (CRT/BRT) – CRT from Suffern with a direct connection to the Hudson Line and full-corridor BRT as per Option 3A above. However, the Airmont and Tappan Zee CRT Stations of Alternatives 4A, 4B, and 4C are eliminated.

Light Rail Transit

- This is the hybrid of the LRT developed in the AA, with a cross-platform transfer to a Hudson Line connection at a new Tappan Zee Station. LRT is in both exclusive ROWs and dedicated in-street lanes.

[1] While Alternative 2 has no transit component, and is thus not included in the analyses presented here, it should be noted that bridge rehabilitation concepts have been advanced that provide transit functionality comparable to that of replacement bridges. Thus, the analyses presented in this report are independent of whether the Tappan Zee Bridge is replaced or rehabilitated. The subject of whether to rehabilitate or replace the bridge is the subject of a separate report (*Alternatives Analysis, Rehabilitation or Replacement of the Tappan Zee Bridge Report*), the recommendations of which will be included in the Scoping Summary Report for the project.

1.2 Public Involvement Process

A robust public participation process has been carried out throughout the study, and has included briefings, meetings, creation of Stakeholder Advisory Working Groups (SAWGs), development of a project web site, community outreach centers, and scoping meetings, as described below.

1.2.1 Briefings and Meetings

Briefings and meetings were held with public officials, agencies and interest groups throughout the corridor and region – some at our request, some at theirs. Each presentation was tailored to the audience's interest, and was followed by a question-and-answer period. Numerous meetings were held between the completion of the Alternatives Analysis and the preparation of this report. Major public meetings included:

- Open House Pre-Scoping Meeting (October 2001).
- First Public Scoping Meeting (January 2003).
- Public Workshop 1 - Introduction of Level 1 Elements (April 2003).
- Public Workshop 2 - Introduction of Level 2 Scenarios (July 2003).
- Public Workshop 3– Results of the AA Process (December 2005).
- Project Update and Development of Alternatives/Options (February 2007).
- Second Scoping Meeting (February 2008).

Meetings were also held with such entities as:

- **The Inter-Metropolitan Planning Organization (IMPO).** IMPO was created to provide continuous and comprehensive input into the study. The IMPO committee is chaired by NYSDOT. It includes members such as the FHWA, FTA, and county planning organizations. Meeting regularly since 2002, IMPO assists the FHWA, FTA, and the project sponsors – NYSDOT, NYSTA and Metro-North – in identifying key regional issues and proposed solutions, and provides technical review of project materials.

- **Westchester Rockland Tappan Zee Futures Task Force.** In 2005, the county executives of Westchester and Rockland Counties established an inter-county task force to raise the awareness of the Tappan Zee Bridge/I-287 Environmental Review, engage key groups and the public in the process, and provide guidance to the project team on presentation materials and outreach activities.

- **Environmental and Regulatory Agencies**. A central element in the outreach program has been communication with various federal, state, and local agencies that will be involved in the project's environmental review process, such as the US Coast Guard, US Army Corps of Engineers, National Oceanographic and Atmospheric Administration – Fisheries, US Environmental Protection Agency, US Fish and Wildlife Service, NYS Department of Environmental Conservation, NYS State Historic Preservation Office, and the NYS Department of State.

- **County and Local Agencies**. The project team held meetings with municipal representatives throughout the corridor to gain understanding of local perspectives on project-related issues. These agencies included Rockland, Westchester and Orange County planning departments, and representatives of localities such as Clarkstown, Orangetown, Spring Valley, New Hempstead, the City of White Plains, the Town of Greenburgh, the Town of Ramapo, and the villages of Suffern, Montebello, and Sloatsburg.

- **Non-Governmental Organizations.** The project team met with individual organizational members of the Stakeholder Committee and other organizations, such as the East-West Rail Coalition, the Palisades Mall, the Regional Plan Association, the Tri-State Transportation Campaign, and Riverkeeper, to engage in more-detailed discussions of particular areas of interest.

The public provided input on a variety of factors, including the screening criteria used to assess alternatives/options, the alternatives being studied (e.g., public input led to the analysis of three new options [3A, 3B, and 4D] as described earlier), and on the scope of environmental studies to be conducted.

1.2.2 Project Web Site

A project web site (www.tzbsite.com) has been developed where the public can learn about the project. Visitors can sign up for the mailing list on the web site and submit comments via e-mail, which are directed to team members. The site is updated regularly and includes many project reports and meeting materials.

1.2.3 Community Outreach Centers

Community outreach centers in Westchester and Rockland Counties were established in 2003 to serve as local meeting places and to provide opportunities for community groups and individuals to obtain study information and provide feedback. The sites are equipped with copies of handouts and materials and with high-speed Internet access to the project's web site. Knowledgeable staff is on hand to answer questions. Community outreach centers are located at the following locations:

- 660 White Plains Road, Suite 340, Tarrytown, New York 10591
  Telephone: (914) 358-0612; Fax: (914) 524-0288
  Hours: Monday through Friday 9:00 a.m. – 5:00 p.m.

- 203 Main Street, Nyack, New York 10960
  Telephone: (845) 348-7714; Fax: (845) 348-7768
  Hours: Wednesday and Thursday 4:00 p.m. – 8:00 p.m.
  Saturday 11:00 a.m. – 4:00 p.m.

1.2.4 Stakeholder Advisory Working Groups (SAWGs)

Stakeholders had been identified during the AA process, and regular stakeholder meetings were held throughout that process, during which information and results were presented. It was later decided that stakeholders should be separated into working groups based on their particular areas of interest, and that meetings should be held regularly with each group. Four SAWGs were created: bridge; environmental; land use; and traffic and transit.

Seven rounds of meetings have been held since the inception of this concept. Each of the SAWG meetings has concentrated on a single topic, and meeting results have been disseminated to the public through timely publication of meeting minutes that include copies of the presentations (including posting in the project website).

The Traffic and Transit SAWG has held meetings that concentrated on:

- Existing Conditions.
- The Forecasting Process.
- High-Occupancy Toll (HOT) Lanes.
- BRT.
- CRT.
- LRT.

Both the existing conditions and the forecasting process were also presented to the Land Use SAWG. Meetings will continue into the future on other transportation topics.

1.2.5 Scoping Meetings

In mid-January 2003, three public scoping meetings were held, one each in Westchester, Rockland, and Orange Counties, to invite public comment on the scope of the study, including its purpose and need and goals and objectives. Some 282 persons attended the three scoping meetings. In addition, the public was asked to submit their suggestions for improvements to the corridor. By the close of the scoping period in March 2003, the Tappan Zee Bridge project team had received more than 150 ideas for improvements to the corridor as part of this process.

The project has updated its scoping process as a result of the re-publication of a NOI in the *Federal Register* on February 14, 2008. Based on this NOI, a new public comment period was opened, a scoping update packet was widely distributed, and three public scoping update meetings were held in Westchester, Rockland and Orange Counties (February 2008). The public comment period concluded on March 31, 2008 and the project is now in the process of closing scoping. Comments were received from 299 agencies, groups, and individuals, reflecting about 509 comment entries. A total of 47 comments were provided and transcribed in the open house forums and 252 were submitted via email, postal mail, or by hand on project comment forms.

The comments given addressed a wide range of issues about the project, the scoping document, the proposed alternatives, and community concern. However, the largest number of comments fell into four major categories: transit mode, river crossing, process, and public involvement. Specifically, 145 comments were received with respect to a specific transit mode:

- About 68 percent of specific transit-mode-related comments advocate CRT across the corridor and/or a one-seat ride to NYC (Alternative 4A or Option 4D).

- About 18 percent of specific transit-mode-related comments advocate LRT. These are split between support for Full-Corridor LRT and those who advocate Alternative 4B.

- About 14 percent of specific transit-mode-related comments advocate BRT service in the corridor.

1.3 Existing Travel Patterns

Prior to introducing modal descriptions in Chapters 2, 3, and 4 and the analyses presented in Chapters 5, 6, and 7, it is useful for the reader to understand existing travel patterns in the corridor.

1.3.1 Journey-to-Work Patterns of Rockland County Residents

The majority of Rockland County residents work within Rockland. However, large numbers also travel to New York City, New Jersey, and Westchester (Table 1-1; note that in this and subsequent tables, percentages may not total to 100 percent due to rounding). Of these, Westchester, Connecticut, and most Bronx-bound trips are served exclusively by the corridor and are concentrated at the Tappan Zee Bridge. Trips to Manhattan can be served by the corridor, though they may also be served by the George Washington Bridge, Lincoln Tunnel, the tunnels into Penn Station, or Port Authority Trans-Hudson (PATH) tunnels. Trips between Rockland and New Jersey would, for the most part, not be served by the corridor. Finally it should be noted that although intra-Rockland trips account for the highest percentage of all Rockland trips, most of these are north-south trips and would not be particularly well-served by a cross-corridor line-haul transit service. A majority of Rockland resident trips are auto trips. The transit share to Manhattan (34 percent) and the rest of NYC (13 percent) are worth noting.

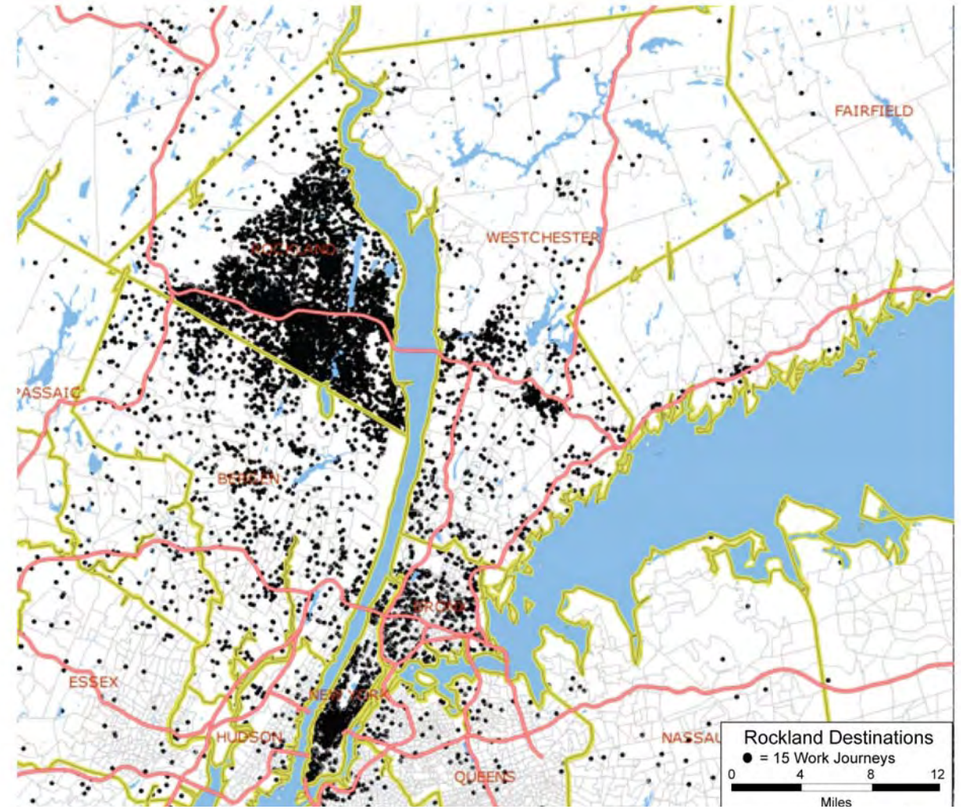
Table 1-1

Work Destinations of Rockland Residents

Destination	Subtotal	Percent by Destination	Total	Auto	Transit	Other*
				Mode Share		
Rockland			**72,000**	85%	4%	12%
Manhattan	17,000	13%		66%	34%	0%
Bronx	6,300	5%		97%	2%	1%
Rest of NYC and Long Island	4,000	3%		85%	13%	3%
Total Cross-Hudson South			**27,300**	76%	24%	0%
Westchester	11,000	8%		98%	1%	0%
Putnam & Dutchess	1,000	1%		100%	0%	0%
Connecticut	1,170	1%		98%	1%	1%
Total Cross-Hudson, N. of NYC			**13,170**	98%	1%	0%
Bergen	12,700	10%		97%	2%	1%
Rest of NJ	4,800	4%		94%	5%	1%
Total NJ			**17,500**	96%	3%	1%
Orange	1,700	1%		98%	2%	0%
Ulster & Sullivan	400	0%		88%	8%	5%
Total West-of-Hudson, North			**2,100**	98%	3%	0%
Total			**132,070**	86%	7%	7%

Note: * Includes Walk/Bike/Work from Home.
Source: 2000 Census Journey-to-Work Data.

With respect to Rockland to East-of-Hudson journeys, Figure 1-4 shows work destinations of all Rockland County residents. Examining the destinations outside Rockland, it shows relatively dense concentrations in White Plains, in the areas along Route 9A north of Elmsford, and along the Broadway corridor in Tarrytown. The substantial Bronx-bound market can also be observed. The Manhattan-bound journeys are distributed relatively evenly, not considering the valley district (between Midtown and Downtown), with Midtown West capturing a higher number of journeys ,as indicated in Table 1-2. A sizeable percentage of Rockland residents work on the East Side, since they have relatively good access to the Hudson Line.



Source: 2000 Census Journey-to-Work Data.

Figure 1-4 Work Destinations of Rockland Residents

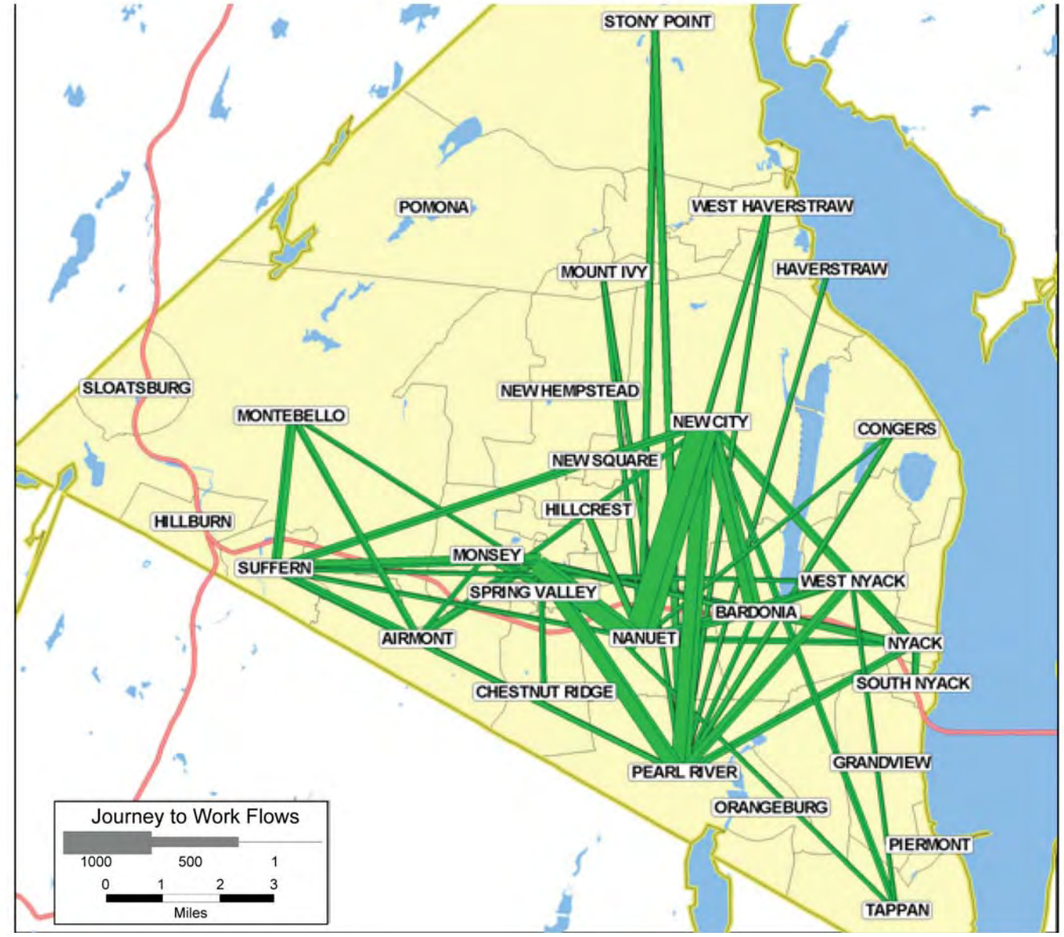
Table 1-2

Distribution of Manhattan-Bound Work Journeys of Rockland Residents

Lower Manhattan	Valley	Midtown East	Midtown West	Uptown
20%	13%	20%	25%	23%
Source: 2000 Census Journey-to-Work Data.				

Relatively small numbers of people currently travel from Rockland to Connecticut, though most destinations are concentrated in Stamford. A goal of any regional transit service plan, therefore, would be to serve these areas with concentrations of trip ends, either directly with a stop along a trunk line; by means of a route that comes off the trunk line to directly serve these perpendicular corridors; or by providing easy transfers to another route that serves these corridors.

Most intra-Rockland journeys would not easily be served by transit service across the corridor. The majority do not even come near the corridor. A Geographic Information System (GIS)-based analysis shows that about 34,000 (or 47 percent) of all intra-Rockland trips follow paths that intersect or come within half a mile of the corridor. However, even among these trips, many are either very short (e.g., from Monsey to Monsey), not likely to be served by any sort of line-haul transit service, or cross the corridor along a north-south axis (such as that between New City and Pearl River), rather than travel along the corridor. Figure 1-5 illustrates that north-south movements predominate over east-west movements. Note that work trips that stay within a single town are not shown. Table 1-3 lists such trips, and highlights in bold those trip pairs that have the greatest potential to be served by a cross-corridor transit service for at least a portion of the trip.



Note: Trips within a single town are not shown.
Source: 2000 Census Journey-to-Work Data.

Figure 1-5 Major Intra-Rockland Work Journeys Crossing the I-287 Corridor

Table 1-3

Major Intra-Rockland Work Journeys Crossing the I-287 Corridor

From	To	Journeys
Monsey	Monsey	1,200
Spring Valley	Spring Valley	1,130
New City	Nanuet	930
Nanuet	Nanuet	910
Spring Valley	**Nanuet**	**760**
New City	Pearl River	620
Suffern	Suffern	600
Spring Valley	**Pearl River**	**590**
West Nyack	West Nyack	550
New City	Bardonia	460
Nanuet	New City	450
New City	**West Nyack**	**410**
Spring Valley	**West Nyack**	**360**
West Nyack	**New City**	**360**
Bardonia	Bardonia	340
Spring Valley	**Nyack**	**330**
Spring Valley	**Suffern**	**330**
Stony Point	Pearl River	310
West Nyack	**Pearl River**	**300**
Bardonia	New City	290
Hillcrest	Nanuet	290
Airmont	Airmont	280
Suffern	Montebello	280
New City	**Nyack**	**280**
Monsey	**Nanuet**	**270**
Pearl River	New City	270
Stony Point	Nanuet	270
Spring Valley	**Airmont**	**260**

Source: 2000 Census Journey-to-Work Data.

1.3.2 Journey-to-Work Patterns of Westchester County Residents

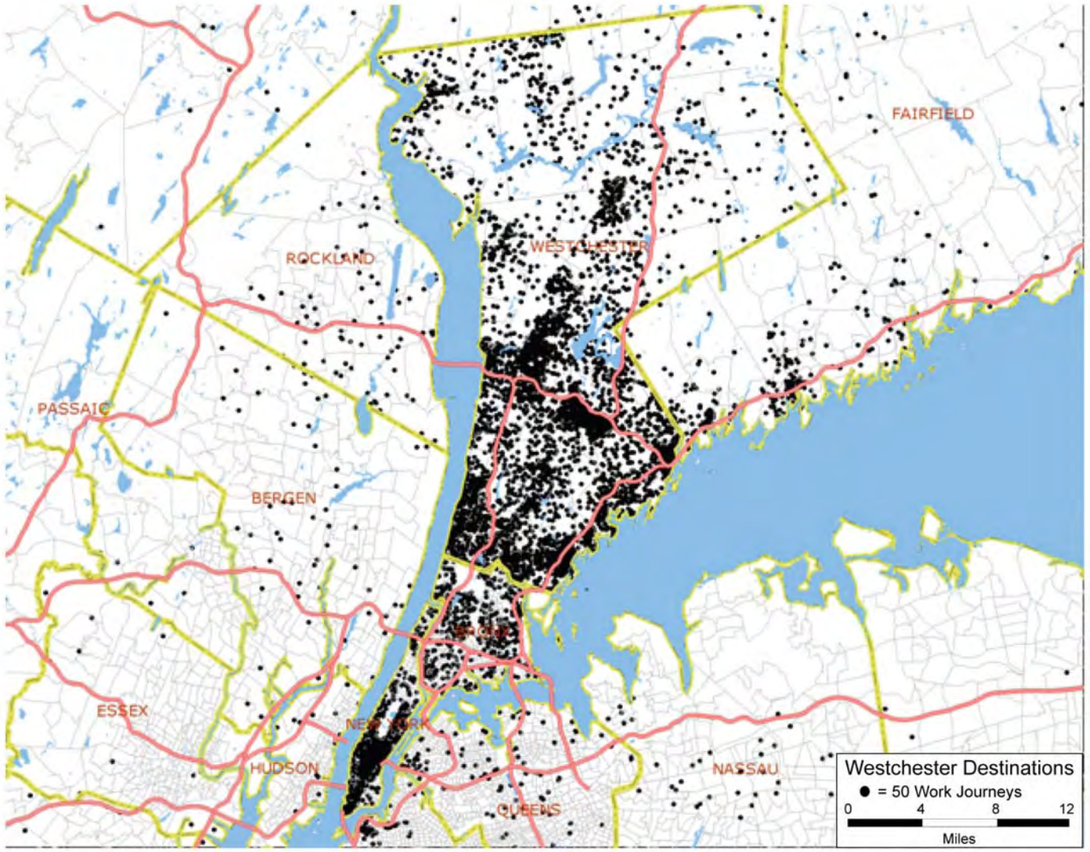
As is the case with Rockland County, the majority of Westchester County residents work within Westchester, with large numbers also traveling to Manhattan and the Bronx (Table 1-4). The transit share, especially to Manhattan (71 percent), is significant due to the robust transit network east of the Hudson. Figure 1-6 illustrates destinations of Westchester residents at the census-tract level. The majority (57 percent) of Manhattan-bound journeys are destined to midtown (Table 1-5). The largest percentage of Manhattan-bound Westchester residents work in Midtown East (31 percent). This trend can be explained by the superior access to Grand Central Terminal (GCT) from the Hudson, Harlem and New Haven lines. Even though the Metro-North trains are destined to GCT, there are several opportunities for passengers to transfer to subways at points north of 125th Street, making Midtown West almost as attractive (26 percent).

Table 1-4

Work Destinations of Westchester Residents

Destination	Total	Percent by Destination	Auto	Transit	Other
			Mode Share		
Westchester	267,000	63	79%	8%	12%
Manhattan	79,600	19	29%	71%	0%
Bronx	27,100	6	91%	7%	1%
Rest of NYC and Long Island	13,800	3	76%	22%	1%
Rockland and Orange	4,900	1	96%	2%	2%
Putnam and Dutchess	3,800	1	95%	2%	3%
Fairfield, CT	18,200	4	93%	5%	1%
NJ	6,200	1	91%	8%	1%
Rest of Upstate NY	1,200	0	83%	11%	6%
Rest of CT	700	0	93%	7%	0%
Total	422,500	100	72%	20%	8%

Note: * Walk/Bike/Work from Home.
Source: 2000 Census Journey-to-Work Data.



Source: 2000 Census Journey-to-Work Data.

Figure 1-6 Work Destinations of Westchester Residents

Table 1-5

Distribution of Manhattan-Bound Work Journeys of Westchester Residents

Lower Manhattan	Valley	Midtown East	Midtown West	Uptown
15%	12%	31%	26%	16%
Source: 2000 Census Journey-to-Work Data.				

As with Rockland, most intra-Westchester journeys do not involve the corridor. Roughly 100,000 (about 37 percent) of the 267,000 intra-Westchester trips have one or both ends in municipalities along the corridor. The largest of these movements are listed in Table 1-6 and illustrated in Figure 1-7. As expected, shorter-distance trips within a single municipality, such as White Plains-to-White Plains or Port Chester-to-Port Chester, are at the top of the list. Among mid-distance trips across municipalities, White Plains emerges as the major destination along the corridor, with Harrison (which includes the Platinum Mile) the second-leading destination. On intra-Westchester trips, more workers are traveling into the corridor than out of it; for example, the Yonkers-to-White Plains move far outnumbers the White Plains-to-Yonkers move.

Table 1-6

Leading Intra-Westchester Work Journeys within the I-287 Corridor

From	To	Journeys
White Plains	White Plains	7,420
Yonkers	**White Plains**	**5,420**
Port Chester	Port Chester	3,010
Mount Vernon	White Plains	2,790
New Rochelle	White Plains	1,890
Harrison	Harrison	1,730
Yonkers	**Harrison**	**1,430**
White Plains	**Harrison**	**1,350**
Harrison	**White Plains**	**1,180**
Yorktown	**White Plains**	**1,180**
Yonkers	**Greenburgh**	**1,130**
Tarrytown	Tarrytown	1,050
Rye	Rye	960
Port Chester	**White Plains**	**940**
Mamaroneck	White Plains	900
Greenburgh	**White Plains**	**870**
White Plains	**Yonkers**	**850**
New Rochelle	Harrison	850
Yonkers	Tarrytown	780
Cortlandt	White Plains	770
Ossining	**White Plains**	**730**
White Plains	Mt Pleasant	720
Port Chester	**Harrison**	**710**
Source: 2000 Census Journey-to-Work Data.		

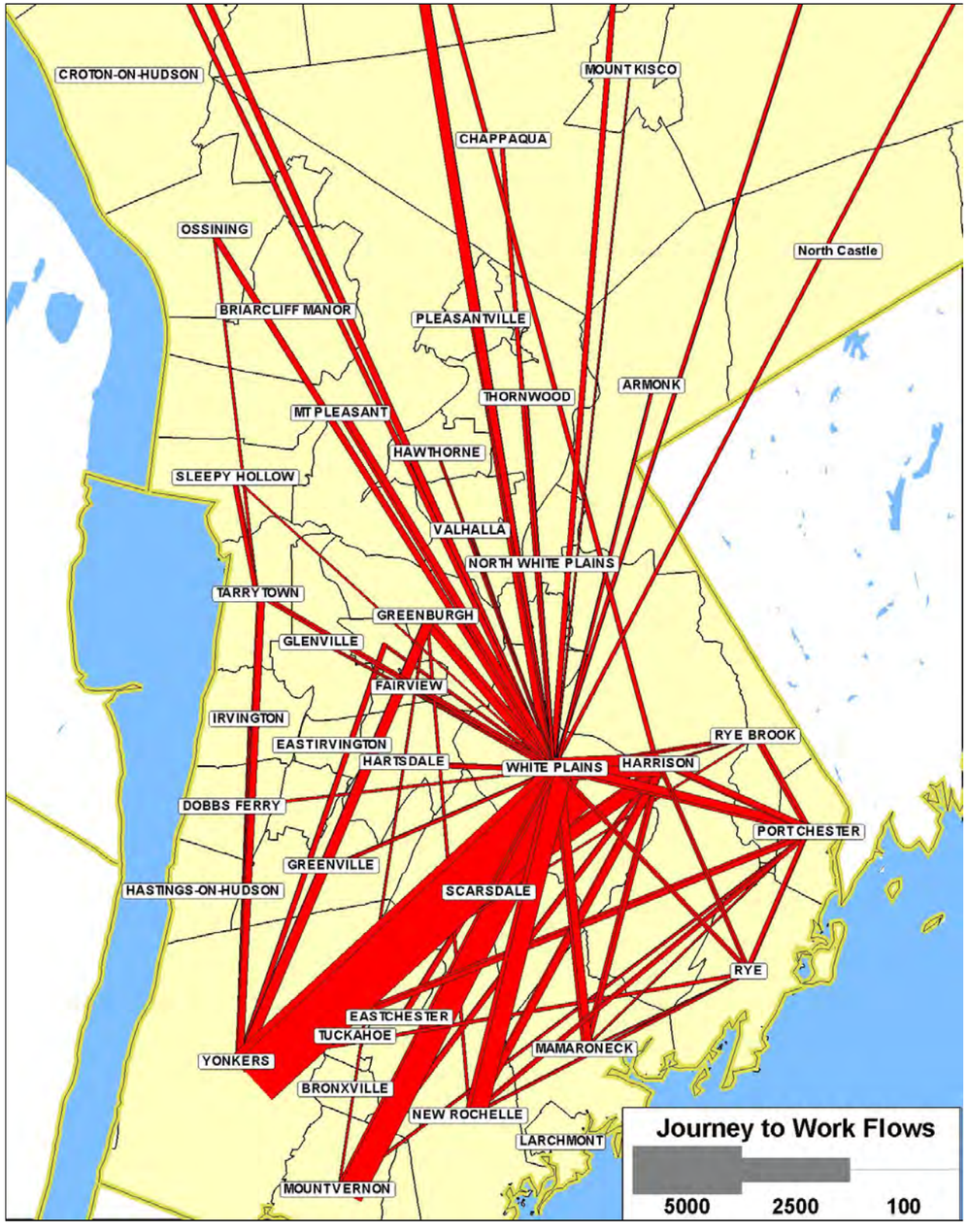
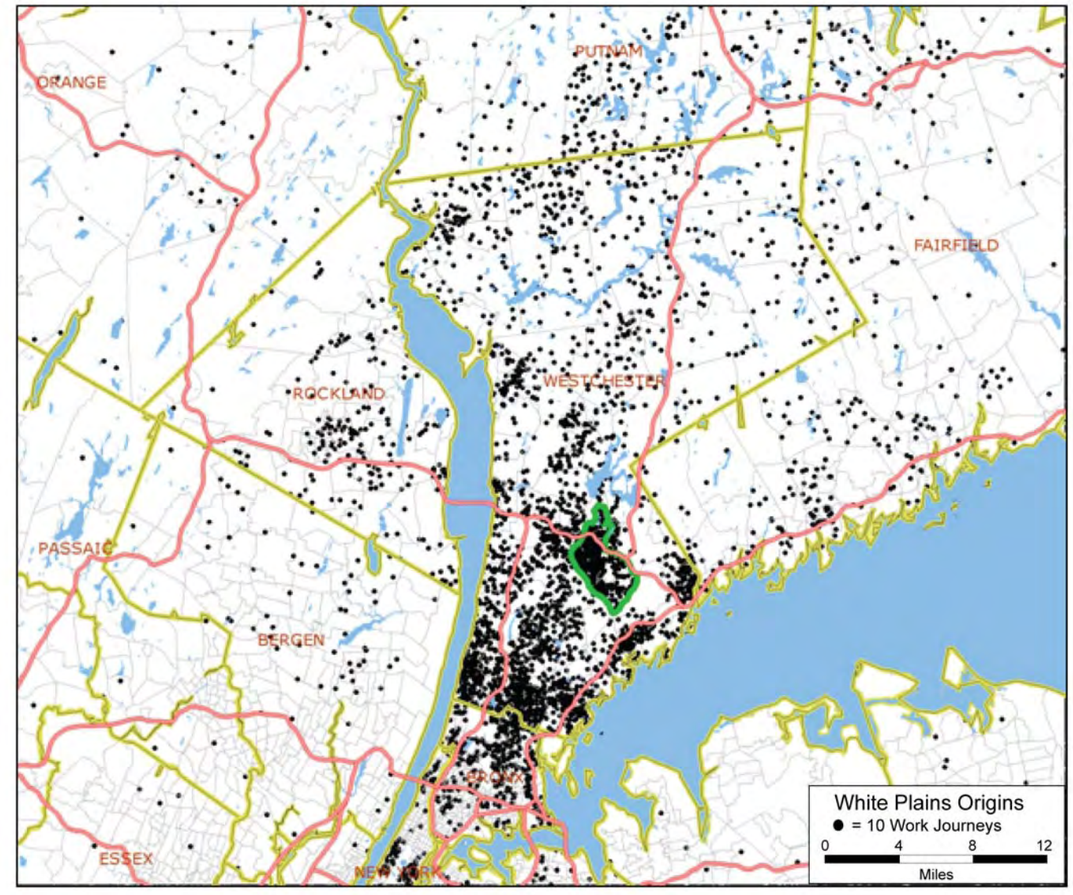


Figure 1-7 Major Intra-Westchester Work Journeys within the I-287 Corridor

Figure 1-8 and Table 1-7 isolate the origins of White Plains workers, and illustrate that movements from the south dominate, particularly from Yonkers and the Central Avenue corridor. White Plains also attracts a significant number of workers from the Bronx and Connecticut.



Note: White Plains Boundary Shown in Green.
Source: 2000 Census Journey-to-Work Data.

Figure 1-8 Residential Origins of White Plains Workers

Table 1-7

Residential Origins of White Plains Workers

Origin	Journeys	Percent
Westchester	35,600	65
Bronx	4,300	8
Connecticut	3,900	7
Putnam and Dutchess	3,500	6
Brooklyn, Queens, Staten Is. & Long Is.	2,400	4
Rockland	1,900	3
Manhattan	1,300	2
New Jersey	1,100	2
Orange	700	1
Other Upstate	100	0
Total	54,800	100
Source: 2000 Census Journey-to-Work Data.		

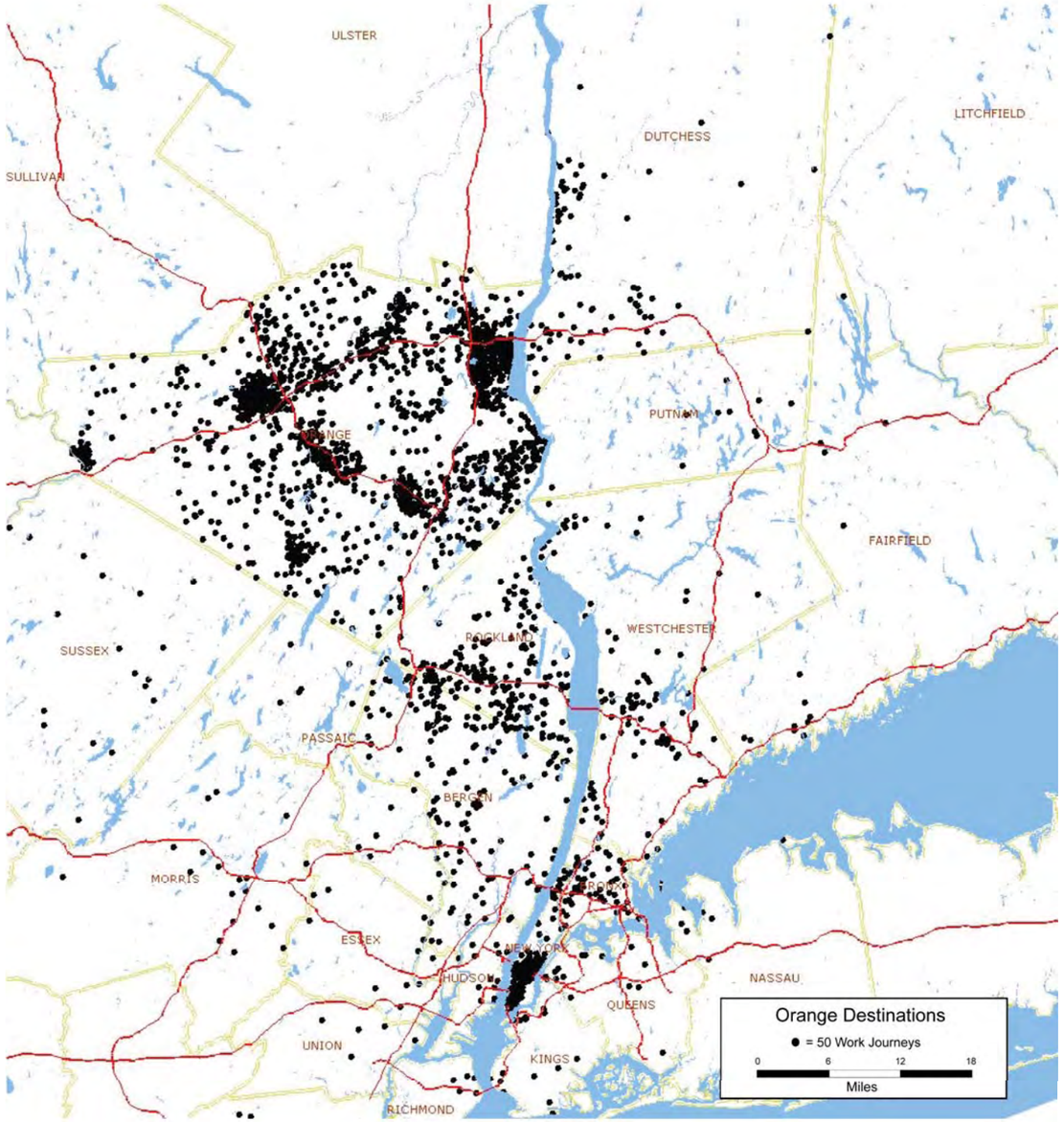
1.3.3 Journey-to-Work Patterns of Orange County Residents

The majority of work journeys in Orange County are destined for locations within the county, as indicated in Table 1-8. Rockland County and Manhattan attract the largest numbers of Orange workers, outside of Orange County itself. Orange County resident trips are predominantly auto trips. Although the magnitude of Orange residents bound for Manhattan is not large, the transit share to Manhattan (44 percent) is significant. Figure 1-9 illustrates destinations of Orange County workers. While the journeys to Rockland and within Orange are scattered, the majority of Manhattan-bound trips (51 percent) are concentrated in Lower Manhattan and Midtown West, as indicated in Table 1-9. This trend can be attributed to the relatively good transportation access to the two districts from Orange County. Bergen, Westchester, and Dutchess attract a sizeable number of Orange residents.

Table 1-8

Work Destinations of Orange Residents

Destination	Total	Percent	Auto	Transit	Other
Orange	99,900	68	88%	1%	11%
Manhattan	9,600	7	55%	44%	1%
Bronx	2,400	2	96%	4%	0%
Connecticut	600	0.4	100%	0%	0%
Rest of NYC	2,200	1	77%	23%	0%
Bergen	7,300	5	100%	0%	0%
Rest of New Jersey	4,000	3	98%	2%	0%
Rockland	9,700	7	99%	1%	0%
Westchester	5,600	4	96%	2%	2%
Dutchess	5,100	3	100%	0%	0%
Putnam	500	0.3	100%	0%	0%
Total	146,900				
Source: 2000 Census Journey-to-Work Data.					



Source: 2000 Census Journey-to-Work Data.

Figure 1-9 Work Destinations of Orange Residents

Table 1-9

Distribution of Manhattan-Bound Work Journeys of Orange Residents

Lower Manhattan	Valley	Midtown East	Midtown West	Uptown
24%	16%	16%	27%	18%
Source: 2000 Census Journey-to-Work Data.				

1.3.4 Key Corridor Markets

Table 1-10 illustrates key markets that use the Tappan Zee corridor and their transit patronage. The Manhattan, Bronx, and Westchester markets from both Rockland and Orange are relatively large, with the Manhattan-bound journeys capturing the largest transit shares. There is potential to increase transit usage with a cross-corridor transit system that serves markets such as Westchester to Connecticut, Connecticut to Westchester, and Rockland-Orange to Westchester, as shown in the transit share column of Table 1-10.

Table 1-10

Specific Markets Served by the Tappan Zee Corridor Based on 2000 Journey-to-Work

Markets	Total Daily Journeys	Transit Share
Rockland – Westchester	11,000	1.4%
Rockland – Manhattan	17,000	33.7%
Rockland – Bronx	6,300	1.4%
Orange – Westchester	5,600	1.7%
Orange – Manhattan	9,600	44.1%
Orange – Bronx	2,400	3.5%
Bergen and Passaic – Westchester	4,200	0.4%
Westchester – Connecticut	18,200	5.4%
Connecticut- Westchester	18,400	1.2%
Westchester-Westchester	267,000	7.8%
Rockland-Rockland	72,000	3.8%
Source: 2000 Census Journey-to-Work Data.		