

MTA Metro-North Railroad – Beacon Line Feasibility Study

Executive Summary

Introduction

Study Overview

The Beacon Line Feasibility Study evaluates the physical, operational, and economic feasibility of reactivating rail passenger service on a 21-mile section of the Beacon Line between Hopewell Junction in Dutchess County, New York, and Brewster in Putnam County, New York, with peak period service running directly to Grand Central Terminal, and off-peak shuttle service between Hopewell Junction and Brewster North. Recent strong and sustained population growth in southern Dutchess County has stimulated interest in providing additional rail service from currently underserved areas along the Beacon Line in the south central portion of Dutchess County to Manhattan and White Plains, the largest out-of-county employment centers for Dutchess County residents.

Physical Characteristics of the Beacon Line

The 48-mile Beacon Line was completed in 1882 between Beacon, New York, on what is now Metro-North's Hudson Line, and Danbury, Connecticut, as a link between the Hudson River and the railroads of western Connecticut. From the Hudson Line at Beacon, the Beacon Line provides rail access to Metro-North's Harlem Line at Brewster, and from Danbury, railroad connections remain south to South Norwalk on Metro-North's Danbury Branch, east via the Housatonic Railroad's Maybrook Line to Derby on Metro-North's Waterbury Branch, and north via the Housatonic Railroad to Pittsfield, MA.

In the early 20th century, the Beacon Line from Hopewell Junction east into Connecticut became part of the New Haven Railroad's Maybrook Line, a significant freight artery across the now-burned Poughkeepsie Bridge. The 41-mile portion of the line from Beacon to the Connecticut state line was purchased by Metro-North in 1995. In addition, Metro-North has trackage rights on the portion of the line east of the Connecticut border, now owned by the Housatonic Railroad, as far east as Danbury. Scheduled passenger service has not run on the Beacon Line since 1927; apart from regular non-revenue Metro-North activity, freight movements are now rare.

The Beacon Line runs northeast from Beacon to Hopewell Junction and Beekman, south to Brewster, and then east to the New York/Connecticut state line and Danbury. Crossing several lines of hills between Beacon and Brewster, the Beacon Line passes through some of Metro-North's most rugged terrain, with the long, steep grades (approximately half the line within the study area is on a grade of at least 1 %) and tight curves typical of mountain railroading.

The Beacon Line is predominantly single track for the majority of its length within New York State, although the right-of-way between Hopewell Junction and Danbury was double-tracked at one time, and all structures remaining along this portion of the line have room for two tracks. The maximum speed on the Beacon Line is currently 25 miles per hour.

Study Organization

The study was divided into the following tasks:

Task 1	Demand Analysis
Task 2	Development of Conceptual Service Plan
Task 3	Storage Yard Planning
Task 4	Station and Parking Planning
Task 5	Right-of-Way Analysis, Physical Facilities Planning, and Trackage Analysis
Task 6	Cost Effectiveness
Task 7	Identification of Environmental and Community Concerns

Summary of Preliminary Capital and Operating Costs

Table 1 summarizes estimated capital and operating costs associated with reactivating scheduled passenger service on the Beacon Line. Preliminary capital and operations and maintenance ("O&M") costs were estimated in Year 2008 dollars to represent an approximate year-of-completion costs and are based on conceptual designs and service plans. (O&M costs were also estimated in Year 2000 dollars for input into cost effectiveness measures in Task 6.) These estimates do not include mitigation of any potential environmental impacts.

Table 1
Summary of Estimated Capital and Operating Costs of
Reactivated Beacon Line Service

Capital Cost Item	Y 2008 Cost (millions)	Study Task
Rolling Stock	\$25	2
Storage Yard Construction	\$9	3
Station Construction (includes parking)	\$54-72*	4
Track Rehabilitation/Reconstruction (21 miles)	\$30	5
Bridge Reconstruction (9 bridges)	\$18	5
At-Grade Crossing Upgrades	\$4	5
Signalling	\$19	5
Major Investment Study/Draft Environmental Impact Statement	\$4	Next phase (if recommended)
Contingency (@ 20 %)	\$33-36	
Preliminary Capital Costs Total	\$196-217	

* The range in station costs reflects access options at Taconic State Parkway Station, discussed in Task 4.

	Y 2008 Cost (millions)	Study Task
Preliminary Annual Operations and Maintenance Cost	\$10.5	2

Methodology

To develop 4-hour AM peak forecasts for Beacon Line ridership, 1990 2-hour AM Peak auto and transit trip data from NYMTC and MTA were used to provide the baseline for the model. Similar NYMTC and MTA projections for 2020 were originally proposed to be used to develop projections of conditions without the model.

However, these 2020 forecasts are focused on New York City-bound travel, and provide less reliable information on travel demand to destinations other than Manhattan, such as White Plains, when compared to available Census data, and have tended to underestimate Metro-North ridership growth from Dutchess County. As a result, other studies, such as MTA Long Island Rail Road East Side Access, have adopted the forecasts developed by Metro-North in developing estimates of regional travel behavior in Metro-North's service area.

The Metro-North model has provided the standard baseline data for all of Metro-North's capital planning activities since 1990, and provides a baseline which reflects the effects of all proposed Metro-North improvements to 2020. The model calculates future ridership based not only population growth and the physical conditions of the transportation network, but also on the likely effects of improvements to Metro-North services and facilities such as the introduction of regular passenger service on the Beacon Line. Therefore, the model results for this study will be consistent with those for the Metro-North Mid-Harlem Line Third Track EIS.

To accurately predict Beacon Line ridership, it was decided to use 1990 baseline auto and transit trip data from NYMTC and MTA, which tallied closely with Metro-North's internal data for that year, in combination with overall travel demand growth factors based on the results of Metro-North's own ridership model to produce forecasts for Dutchess County travel demand to White Plains and New York City.

The growth factors developed as a result of this adjustment preserved the auto and rail demand mode shares predicted by NYMTC and MTA, but expanded the demand itself according to Metro-North's projections. The projections produced from the 2-hour base data were then expanded based on observed Metro-North data for the 2-hour and 4-hour peak periods.

Forecast Results

Based on projected population growth and its impact on regional transportation conditions, combined with the Service Plan developed in Task 2 and described below, 2020 AM peak Beacon Line ridership is projected to be 1,060 trips. Total daily ridership on the Beacon Line is estimated to be 3,060 trips.

Table 2 presents projected AM peak Beacon Line ridership at four potential Beacon Line station locations, showing the number of Beacon Line riders who would drive without Beacon Line service, and the number of Beacon Line riders who already ride

Task 1 Demand Analysis

The demand model for this study projected potential Beacon Line ridership based on the demographic characteristics of the communities likely to be served by the Beacon Line, the service plan for the Beacon Line itself as compared to the service on other Metro-North lines used by Dutchess County residents, and the impact of population growth and increasing travel demand on the regional transportation network. Because the Beacon Line runs through the interior of southern Dutchess County, between the Hudson and Harlem Lines, the model focused on likely Beacon Line ridership by Dutchess County residents only. Because the Hudson and Harlem line services run up the eastern and western borders of the County, these lines are more convenient to riders from other counties and currently more attractive than Beacon Line service would be.

Background Demographics and Ridership

The strong economic growth of the New York metropolitan region has driven population growth in Dutchess County for the past ten years. Population forecasts produced by Dutchess County project that this growth will continue, with a 15% increase in County population in the next 20 years. Approximately 75% of this growth will occur in the southern portion of the County through which the Beacon Line runs. In areas with a likelihood of contributing riders to the Beacon Line, population will grow 25% in the next twenty years.

Today, approximately 2,200 Dutchess County residents use Metro-North during the peak period for travel to Grand Central Terminal, White Plains, and other destinations. By 2020, this ridership is projected by Metro-North to grow 61% to 3,400 riders even without reinstituting Beacon Line service. Approximately 91% of this ridership growth is projected to occur in southern Dutchess County towns, with the rest originating in northern Dutchess County.

Significantly, over one third of the Dutchess County residents currently traveling on the Harlem Line choose to board at Brewster North station in Putnam County, due to ease of accessibility via I-84 and better service frequencies than on the Dover Plains Branch. Although ridership by Dutchess County residents will increase substantially on the Dover Plains Branch over the next 20 years, Brewster North will remain attractive to Dutchess County Harlem Line riders, accounting for 20% of Harlem Line ridership in 2020.

Population growth is expected to drive a substantial portion of Metro-North's projected ridership increase, but planned service and parking improvements on Metro-North's Harlem and Hudson lines are also anticipated to attract more ridership, as they have since Metro-North began operations in 1984. As the regional population grows over the next 20 years, increasing regional highway congestion is also anticipated to enhance the attractiveness of commuting by Metro-North.

other Metro-North lines. Table 3 shows ridership by destination station, disaggregated by former mode.

Table 2
Beacon Line Ridership by Origin Station

Station	All Riders		New Riders (former drivers)			Riders Diverted from Other MNR Lines			
	Riders	% of total	New Riders	% of Total New Riders	% of Riders at Station	MNR Riders	Former MNR Line	% of Total Diversions	% of Riders at Station
Hopewell Junction	390	37%	175	67%	45%	215	<i>Hudson</i>	27%	55%
Taconic State Parkway	120	11%	15	6%	13%	105	<i>Hudson</i>	13%	88%
Green Haven	310	29%	50	19%	16%	260	<i>Harlem/DP</i>	33%	84%
West Pawling	240	23%	20	8%	8%	220	<i>Harlem/DP</i>	28%	92%
TOTAL	1,060		260		25%	800			75%

Table 3
Beacon Line Ridership by Destination Station

Destination	Former Mode	<i>Auto</i>	<i>Dover Plains Branch</i>	<i>Upper Harlem Line</i>	<i>Upper Hudson Line</i>	<i>TOTAL</i>
White Plains Station		230	120	50	40	440
Grand Central Terminal		30	230	90	270	620
TOTAL		260	350	140	310	1060

Projections do not include effects of population growth induced by introduction of Beacon Line service.

As shown in Table 2, the 260 former auto users new to Metro-North make up only 25 % of total ridership; the rest of the 1,060 AM peak period riders would be diverted from other lines. Table 3 indicates that the most significant market for riders of new Beacon Line service would be travelers from Dutchess County to White Plains. Of the 260 new Metro-North riders attracted by Beacon Line service, 230 or 87 % would be traveling to White Plains, and 30 or 67 % of all new riders would be boarding at Hopewell Junction.

In comparison, the Dover Plains Branch would carry 1,500 Dutchess County residents in the AM peak with no Beacon Line service, and the Hudson Line would carry 2,500 Dutchess County residents. The introduction of Beacon Line service would reduce AM Peak ridership on the Dover Plains Branch by nearly 20 % and would reduce Hudson Line ridership by 4 %

The poor performance of Beacon Line service in comparison with other Metro-North services is due primarily to the comparative attractiveness of Brewster North Station in Putnam County, which currently draws a significant number of Harlem Line riders who live in Dutchess County. Table 4 shows current and future travel times by Beacon Line, auto and bus for key segments served by the Beacon Line. These travel times are based on the improvements to the right-of-way discussed as part of this study and detailed in Task 5. As shown in Table 4, travel to Brewster North by auto will continue to be faster from Hopewell Junction and Taconic State Parkway stations than on Beacon Line service by a substantial margin, due to the ease of access to Brewster North Station via I-84. In 2020, service from Brewster North

Station will continue to run approximately twice as often as on the Beacon Line in both the peak and off-peak periods. These two factors significantly dampen the Beacon Line's ability to attract substantial numbers of new riders.

Table 4
Peak Period Average Travel Time Comparison
(in minutes)

Year	By Beacon Line		By Auto		By Bus	
	2000	2020	2000	2020*	2000	2020*
Hopewell Junction to Brewster North Station		35'	23'	26'	No	
Taconic Parkway Station to Brewster North	No	31'	18'	21'	Service	
Hopewell Junction to White Plains Station	Service	74'	75'	103'	78'	107'
Hopewell Junction to Grand Central Terminal		109'	134'	168'	No Service	

* 2020 Auto and Bus results reflect anticipated increases in roadway congestion

As Table 4 shows, rail is not competitive with auto for travel within Dutchess County, but becomes more attractive for travel to Westchester County and New York City, due to anticipated regional highway congestion south of Putnam County. Nevertheless, the attraction of better service for a shorter overall travel time via auto to Brewster North Station is a powerful damper of demand for Beacon Line service.

Task 2 Development of Conceptual Service Plan

In this task, a conceptual plan for Beacon Line service was developed using the 2020 Service Plan which serves as the basis for all of Metro-North's planning activities. In addition, preliminary Operations and Maintenance ("O&M") costs were developed for use in the Cost Effectiveness evaluation in Task 6.

To provide peak hour through train service on the Beacon Line to White Plains and Grand Central Terminal without placing additional demand on the operating capacity of the Harlem Line, three Upper Harlem trains originating at Brewster North Station in the 2020 Service Plan were extended to Hopewell Junction. Three additional peak period trains from Hopewell Junction would be shuttles to and from Brewster North Station, with connections to Upper Harlem trains bound for Grand Central Terminal. Similar service levels would be provided in the PM peak period. In the off-peak hours, and on weekends, service would be provided by hourly Beacon Line shuttles, whose arrival would coincide with Wassaic shuttles and Upper Harlem electric service to/from Grand Central Terminal to provide coordinated Dutchess County service. This service plan requires three passing sidings between Hopewell Junction and Brewster North to support shuttle service.

The capital cost of the rolling stock required to support this service plan would be \$25 million in year 2008 dollars. This cost includes only the two shuttles which would operate exclusively on the Beacon Line. It does not include the three through trains to Grand Central Terminal, which are extensions of Upper Harlem Line trains;

these trains would operate even if there were no service on the Beacon Line, and therefore additional rolling stock would not need to be purchased for these trains in Beacon Line service.

The annual O&M cost of operating daily and weekend Beacon Line Service as outlined above was developed by applying current Metro-North O&M costs for similar Metro-North services and facilities to the services and facilities proposed for Beacon Line service in Tasks 2, 3, and 4. The O&M cost of this Beacon Line service would be approximately \$9 million annually, in year 2008 dollars, as itemized in Table 5. (Year 2000 dollars were also produced for input into the Cost Effectiveness models used in Task 6.)

Table 5
Itemized Beacon Line Operations and Maintenance Cost

Cost Item	Cost in Year 2008 Dollars
Train and Engine Costs	\$ 4.1 million
Propulsion Cost	\$ 0.9 million
Maintenance of Equipment	\$ 2.1 million
Maintenance of Way	\$ 3.3 million
Maintenance of Stations	\$ 0.1 million
Total Operations and Maintenance Costs	\$ 10.5 million

Task 3 Storage Yard Planning

The provision of new service on the Beacon Line would require a new storage yard, comprised of three 700-foot single ended yard tracks and one 800-foot track to hold the three seven-coach trains and three two-coach shuttle sets.

Four potential yard sites were evaluated for their ability to meet the following requirements:

- Ability to provide a double ended yard
- Proximity to the end of the line to minimize non-revenue mileage
- Ability to provide:
 - fueling
 - standby power
 - brake inspections
 - potable water
 - fire hydrants
 - toilet dumping
 - adequate employee parking
- Good access to local roads.

Two sites in Hopewell Junction were evaluated for suitability for further analysis and rejected. The abandoned yard site along the south side of the Beacon Line right-of-way southeast of the Route 82 overpass and on the northeast side of the Williams lumberyard was rejected due to its proximity to residential properties to the north. The Deer Run Holdings Associates site along the former Maybrook Line right-of-way was eliminated because of its proximity to residential properties on Bridge Street (Route 376) and because it would require a grade crossing at Bridge Street with crossing protection.

Two remaining sites were retained for further analysis.

- Hopewell Junction – south of the Williams Lumber Yard and southwest of the Beacon Line right-of-way, adjacent to town athletic fields
- Taconic State Parkway – on the west side of the Parkway and the south side of the Beacon Line right-of-way

Neither the Hopewell Junction site nor the Taconic State Parkway site provides ideal conditions. The space required for a double-ended yard is not available due to community impacts at Hopewell Junction and wetlands impacts at Taconic State Parkway. Site constraints at Hopewell Junction would require a backup move from the platform to access the yard. The Taconic State Parkway site would require a deadhead move of approximately 2 miles to Hopewell Junction. In addition, the space constraints at the Taconic State Parkway site severely limit the ability to expand the yard beyond 2020.

Costs for capital investments outlined in Tasks 3, 4, and 5 were estimated for the year 2008, when the rehabilitation of the Beacon Line would be complete and service would open. The total cost of a storage yard at either location would be \$9 million in 2008 dollars, including land acquisition.

Task 4 Conceptual Stations and Parking Planning

Seven potential station locations were evaluated for suitability based on the following criteria:

- Potential ability to attract new riders
- Historical use of site as station location
- Proximity to an existing highway or major road
- Topography and terrain
- Parcel size and availability
- Operational impacts
- Transportation benefits
- Land use, zoning, and potential impacts to surrounding community
- Potential traffic impacts

Three of the seven potential station locations were eliminated from consideration. A Stormville station site at Route 216 was found to be incompatible with residential zoning. A Poughquag station site at Depot Hill Road is on difficult topography, with a 1 % grade making the starting and stopping of trains difficult, and steep and sharply curved roads would provide sub-optimal vehicular sight distances for automobiles entering and exiting the station. A Holmes station site at White Rock Road/Route 292 was eliminated due to the limited land area available within a tight valley surrounded by wetlands, incompatibility with the established residential land use surrounding the site, and potential traffic impacts to Route 292.

Four station locations were retained for further analysis based on their comparative ability to meet the station criteria:

- Hopewell Junction
- Taconic State Parkway
- Green Haven at Route 8
- West Pawling at Route 292

Conceptual station and parking plans and cost estimates for these stations include four-car high level platforms with a canopy and shelter, and parking appropriate to meet projected 2020 demand with additional capacity where possible to accommodate additional post-2020 demand. Property acquisition would be required at all sites and is included in the cost estimates, which are in 2008 dollars based on the estimated year of opening of Beacon Line service.

At Hopewell Junction, the preferred location for the Station is at the south end of the existing Williams Lumber Yard, where 370 parking spaces would be built. Although this site is located as far away as possible from residential uses, potential impacts associated with this station site would include increased downtown auto traffic and proximity to the town's recreational field. The estimated cost of this station would be \$14 million in Year 2008 dollars.

The Taconic State Parkway Station site is surrounded by wetlands, which could impact the feasibility of this site. 160 parking spaces would be provided at this site in 2020, with the potential to add more. This station was envisioned to tap the market potential of Taconic State Parkway users. There would be no local road access to the site, and access to the Station from the Parkway would require an undesirable grade crossing. The provision of flyovers to avoid at-grade crossing of the railroad would consume wetlands and add approximately \$18 million to the cost of the station, nearly doubling its cost in 2008 dollars from \$19 million to \$37 million.

At Green Haven, the Station would be located at the intersection of Route 8 (Green Haven Road), south of the Green Haven Correctional Facility. With 370 parking spaces, the cost of the station would be \$11 million in 2008 dollars.

The West Pawling Station would be located at the intersection of Route 292, with good access to Route 55. The land available at this site cannot accommodate the projected demand for parking, requiring acquisition of adjacent land. The proximity of wetlands would likely require mitigation, the cost of which is included in the \$10 million cost of the station in 2008 dollars.

Total costs for the four stations on the Beacon Line would be \$54 - \$72 million in year 2008 dollars, depending on the option chosen at the Taconic State Parkway Station.

Task 5 Right-of-Way, Physical Facilities, and Trackage

The Beacon Line's single track is currently able to support a maximum speed of only 25 mph. When the Study began, the maximum speed on the Beacon Line was 30 mph and this speed provided the basis for calculations of potential improvements evaluated in this chapter.

To determine the extent of improvements needed to operate commuter rail service on the Beacon Line with a maximum speed of 59 miles per hour ("mph") and conform to the Federal Railroad Administration's standard for "Class 3" passenger operations, the track and its supporting structures were thoroughly examined, and several strategies were evaluated for their ability to increase average speed and thereby decrease travel time in order to make Beacon Line service as attractive as possible. The results of this analysis provided the basis for the travel time calculations which were a key input into the Task 1 ridership forecast.

Four strategies for rehabilitation of the Beacon Line's trackage were evaluated for their potential to improve travel times between Hopewell Junction and Brewster North Station against a goal of a maximum speed of 59 mph:

- Alternative 1, a baseline alternative in which the current single track would be rebuilt in its current alignment with wood ties and continuous welded rail;
- Alternative 2, which would rebuild the track as in Alternative 1 and superelevate curves wherever possible to increase speeds to 59 mph;
- Alternative 3, which would rebuild the track with superelevation, but take advantage of the Beacon Line's two-track right-of-way to reduce curvature wherever possible within the right-of-way; and
- Alternative 4, which would disregard right-of-way constraints and require property acquisition in those cases where speed cannot be improved to 59 mph in order to achieve that speed for the length of the line.

Table 6 shows the comparative costs of these strategies, estimated in 2008 dollars, along with their cost per minute saved against Alternative 1. These costs include all necessary trackwork, including the three passing sidings required for operation of shuttle service on a single-track railroad, as discussed in Task 2.

Table 6
Comparative Costs of Right-of-Way Improvement Strategies

	Travel Time (minutes)	Travel Time Change (minutes)	Y2008 Cost (millions)	Cost/ Minute Saved (millions)
Alternative 1 – Baseline – Only rebuild track	42:03	--	\$29.3	--
Alternative 2 – Superelevate within alignment	31:40	10:23	\$29.8	\$0.05
Alternative 3 – Superelevate within right-of-way	30:21	11:42	\$190.1	\$13.74
Alternative 4 – Disregard right-of-way constraints	28:20	13:43	\$324.2	\$21.50

Alternative 2 would provide the most improvement at the lowest cost, and was therefore used to develop travel times for Tasks 1 and 2 as well as the final cost estimates for the project. The significantly higher costs of Alternatives 3 and 4 were due to the significant amounts of earthwork which would be required within the right-of-way in Alternative 3, and the tunnel which would be required in Alternative 4 to attain a uniform 59 mph maximum speed.

All alternatives would require nine bridges between Hopewell Junction and Brewster North to be rebuilt, at a total cost in 2008 dollars of \$18 million. Installation of gates and flashers at 13 grade crossings along the Beacon Line would cost approximately \$4 million, and a CTC signal system would cost \$19 million, including an upgrade of CP155, the interlocking which connects the Beacon Line to the Harlem Line north of Brewster North.

The total cost to improve the Beacon Line's right-of-way, with Alternative 2 chosen for speed improvement, would be \$71 million in 2008 dollars.

Task 6 Cost Effectiveness

The cost effectiveness of reinstituting regular Metro-North passenger service on the Beacon Line was measured using Metro-North's Fare Operating Ratio, MTA's Benefit/Cost Ratio and FTA's Cost Effectiveness Index.

Inputs for these measures include projected annual revenue, which is developed in this task by combining projected ridership developed in Task 1 with current Metro-North fare structures for Dutchess County stations, the O&M costs developed in Task 2, and capital costs developed in Tasks 3, 4, and 5.

The revenue projections developed in this task took into account the fact that the majority of Beacon Line riders transfer from other Metro-North services by subtracting the revenue lost from those stations from the revenue generated at Beacon Line stations. The result is an incremental annual rail revenue of \$1.3 million in year 2000 dollars; this result was extrapolated for input into the Fare Operating Ratio analysis to the year 2008, producing an estimated incremental annual revenue at start of service in 2008 of \$1.6 million.

The three standard measures of cost-effectiveness used in this study indicate that reactivation of service on the Beacon Line would not be cost-effective, as shown in Table 7, which summarizes the criteria and results of these evaluations.

Table 7
Cost Effectiveness Evaluation

<u>Standard</u>	<u>Source Agency</u>	<u>Typical Average/ Favorability Standard</u>	<u>Beacon Line Performance</u>
Fare Operating Ratio	MTA Metro-North	55 % or better	14 %
Benefit/Cost Ratio	MTA Planning	1.0 or better	0.58
Cost Effectiveness Index	FTA	\$11.43 per new annual trip	\$100.99 per new annual trip

The Fare Operating Ratio, the ratio of projected operating revenue to projected operating cost, is 15 % for Beacon Line service; this is less than one-third of Metro-North's 1999 system average of 55 %, and indicates that new ridership on the Beacon Line would need to more than triple for it to meet Metro-North's current goals for this measure.

MTA's Benefit/Cost Ratio measures the ratio of the social and financial benefits of the project against the capital and operating costs of the project; a ratio of 1.0 or higher is a positive rating because it indicates that a project's benefits outweigh its costs. The Benefit/Cost ratio of this project is only 0.58, indicating that the costs of the project outweigh its social and financial benefits by nearly two to one.

The FTA's Cost-Effectiveness Index is the ratio of incremental change in annualized capital and O&M costs to the incremental change in annual trips generated by the project, calculated according to FTA's *Technical Guidance on Section 5309 New Starts Criteria*; the average Cost-Effectiveness Index for projects included in FTA's FY 2000 New Starts Report to Congress is \$11.43 for each new trip per year. The Beacon Line's Cost-Effectiveness Index of \$100.99 represents a cost per new annual trip which is roughly nine times that of the average approved New Starts project.

When evaluated in comparison with similar projects or alternative strategies, the reactivation of Beacon Line passenger service does not perform well. The raw capital cost per new rider is in the range of \$0.7 – 0.8 million, which is twice the cost per new rider of Metro-North's recently-opened Wassaic Extension. The approximately \$200 million capital cost is significantly greater than the cost of providing the Beacon Line's 1,195 proposed parking spaces at those existing stations which would lose ridership to the Beacon Line; even if a new parking structure were to be built, the approximately \$40 million cost of the additional parking spaces is only one fifth that of rehabilitating the Beacon Line and constructing four new stations and a yard.

Task 7 Identification of Environmental and Community Concerns

The reactivation of service on the Beacon Line has the potential to effect the surrounding environment and communities. At Hopewell Junction, the station would potentially result in increased traffic activity and may have an effect on existing nearby land uses, as may activities associated with train storage and maintenance in off-peak hours.

At the Taconic State Parkway station site, the construction of access ramp flyovers to eliminate grade crossings is likely to impinge on adjacent wetlands, with effects which may not be easily mitigable; similar effects on wetlands may also occur at West Pawling. Because the Parkway is a historic resource, careful consideration would need to be given to the effects of construction of new exits for a potential Beacon Line Station.

Environmental and community concerns would be investigated in greater detail were this project to move forward.

Recommendations and Next Steps

Based on the results of Tasks 1 through 7, the following recommendations are made:

- Reactivation of passenger service on the Beacon Line should not be pursued at this time due to its projected inability to meet basic cost-effectiveness standards.
- The Beacon Line should continue to be used and maintained in its present condition, as it remains a useful link in the Metro-North network for non-revenue activities, and should not be lost to other uses in the event that travel demand growth outstrips current projections.
- Monitoring of Dutchess County population growth and Metro-North commutation trends should continue in the event that potential Metro-North passenger service on the Beacon Line becomes substantially more attractive in comparison to other commutation modes.

It is also recommended that an expansion of facilities at Brewster North Station be explored to support its substantial share of Harlem Line commutation from Dutchess County. Such a strategy can consist of a major parking expansion, access improvements, and other station improvements. In addition, where possible, the purchase of additional land for parking expansion at existing stations used by Dutchess County commuters should be investigated.

