



Connection Options to Port Jervis Line at Suffern

Figure 3-12

The alignment curvature required to cross above Route 59 and sweep below the I-87/I-287 structures would limit the maximum speed at this location to 30 mph. With this configuration, a Suffern North Station is contemplated at a location between 4th Street and the Route 59 bridge crossing above the tracks.

To provide operational flexibility and facilitate transfers, the station would be arranged with three tracks and two center platforms. The station building, parking, and circulation would be located to the east side of the Port Jervis Line, at a site currently occupied by several commercial buildings, with vehicular access/egress to Route 59.

East of Suffern

East of the Route 59 crossing in Suffern, the commuter rail alignment would be parallel to and for the most part within the I-87/I-287 right-of-way, specifically along the south side between the roadway and the right-of-way line. Profile considerations for the commuter rail east of Suffern would require a combination of retained cuts, retained fills, and viaduct sections. Hemion Road would be carried on structure above the commuter rail line. Approaching Airmont Road, the CRT would be on viaduct to avoid conflict with the existing Interchange 14B ramps. Overall, the Airmont Road viaduct would be approximately 2,000 feet long. The track would be electrified from Suffern to Port Chester and to the Hudson Line via third rail.

Just east of Airmont Road, a commuter rail station would be constructed between I-87/I-287 and the Piermont Line right-of-way, the site of the Millennium Paper Recycling commercial site. The station

complex is assumed to occupy an overall footprint of seven acres, requiring acquisition/displacement of the Millennium Paper Recycling facility.

East of the Airmont Station, the alignment would cross above Spook Rock Road, below College Road, and below Route 59 (Nyack Turnpike), which is essentially at the highest elevation of I-87/I-287 within Rockland County. East of the Route 59 crossing near Monsey, the CRT would cross above the Piermont Line on structure.

Spring Valley/Nanuet

East of the Piermont Line, the CRT would be carried on two 1,000-foot-long viaducts. Beyond the viaduct over Saddle River Road, the CRT would enter an extended length of retained cut (nearly a mile and a half long), crossing beneath Hungry Hollow Road and Route 45. Approaching the Garden State Parkway (GSP), the alignment would enter a 1,200-foot-long tunnel, passing beneath Scotland Hill Road and the GSP mainline, then daylighting in retained cut, with two GSP ramps (Interchange 14A) carried on structure above.

East of the Garden State Parkway, the CRT would be carried on a 1,600-foot-long viaduct over Pascack Road and the Pascack Brook, then return to retained cut and pass beneath Route 59 and the ramps of Interchange 14. East of Interchange 14, a commuter rail station/intermodal center (Interchange 14/PVL) is being considered that would include transfer capability to the Pascack Valley Line. The overall footprint for the station complex is assumed to encompass seven acres, and would require acquisition/displacement of a Home Depot retail outlet. Vehicular access/egress for the commuter rail station would be from Route 59.

In addition to the transfer facility, a direct connection to the Pascack Valley Line was included in CRT1. Direct connection of the Pascack Valley Line to the new line would require a rail structure above the I-87/I-287 roadway. A second track would be installed within the Pascack Valley Line right-of-way (east of Forman Drive, approximately 0.5 miles west of the Thruway crossing) along the north side of the existing single track. Approaching the Thruway right-of-way, the new track would align on a curved structure, crossing above the highway and then proceeding parallel to the CRT1 alignment. The new track would continue eastward on a downgrade until achieving track elevation consistent with CRT1.

After a 1,200-foot-long viaduct over the Naurauschaun Brook, the CRT would enter a 2-mile-long retained cut, passing beneath North Middletown Road, Route 304, and the Palisades Interstate Parkway (Interchange 13).

West Nyack (Including Palisades Mall)

As the CRT alignment descends toward the Hackensack River valley at a 2 percent grade, the retained cut section would transition to a long viaduct. This viaduct, more than a mile and a half long, extends from west of Strawtown Road to east of Route 303, crossing above Strawtown Road, the Hackensack River, the CSX West Shore Line, Palisades Center Drive, Interchange 12 ramps, and Route 303.

Just east of the CSX West Shore Line, the existing park-and-ride (west of Palisades Mall, referred to as Parking Lot J) is being considered as a prime location for a commuter rail station and intermodal center. The commuter rail alignment on viaduct at this location would require station platforms approximately 45 feet above the I-87/I-287 pavement and approximately 30 feet above the existing park-and-ride surface. The rail station/intermodal center would require an overall footprint of about ten acres.

East of Route 303, the viaduct section would transition into a retained cut before entering the portal for a tunnel section. The commuter rail profile cannot achieve the 3 percent uphill grade of I-87/I-287 in this location and, therefore, must enter a tunnel for the approach to the Hudson River. The western portal would be located on the hillside, east of Route 303.

Nyack

The combination of a steep I-87/I-287 profile in South Nyack and the grade constraints for commuter rail would require that the rail line be in tunnel passing below the Thruway. With a replacement bridge north of the existing Tappan Zee Bridge, the rail tunnel would daylight onto a viaduct as it transitions onto the proposed replacement bridge. The rail tunnel from east of Route 303 to the portal near the Hudson River shoreline would be approximately 2 miles long.

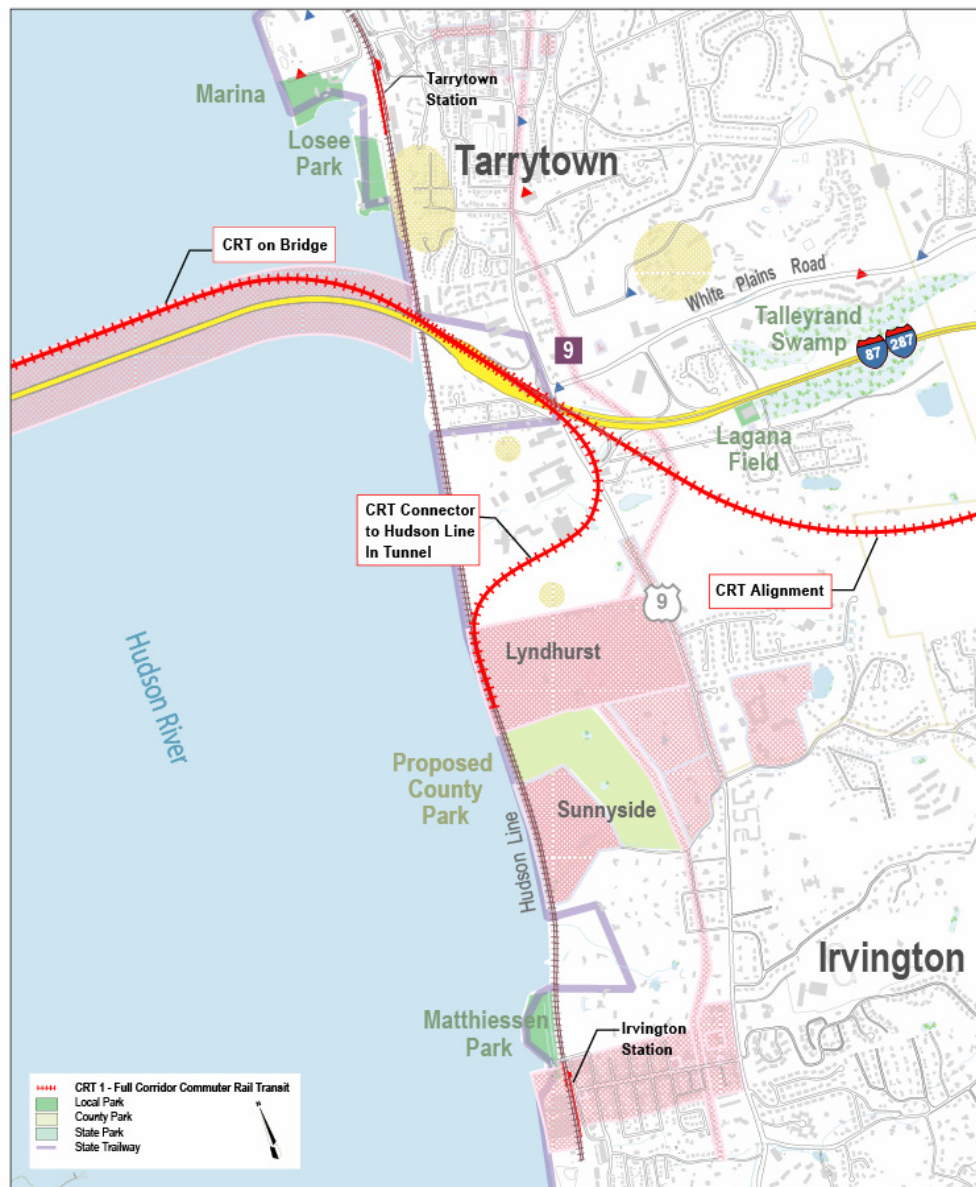
Tarrytown

In combination with a replacement highway bridge structure accommodating the CRT line, alignments at the Westchester shoreline were investigated that would carry the commuter rail from the bridge into a tunnel that would continue to descend at a 2 percent grade. The descending rail tunnel would essentially follow an ‘S’ configuration to the east and south, ultimately leading under and then up to the Hudson Line to meet existing top of rail elevation between the express tracks (with the four-track mainline realigned to accommodate introduction of the connecting two-track commuter line).

The ‘S’ configuration of the connecting rail tunnel was originally considered with a design speed of 60 mph. However, the 60 mph configuration would align beneath the northwest corner of the Lyndhurst property, requiring an underground easement. The design speed was later reduced to 45 mph, thus avoiding the Lyndhurst property (Figure 3-13). Additionally, a stub track would be incorporated in the immediate vicinity of the Hudson Line connection to accommodate storage of a “rescue locomotive.”

The ‘S’ configuration rail tunnel described above would begin as a diverge from the through tracks extending eastward for the cross-corridor commuter line. Beyond the diverge for the Hudson Line connections, the profile would transition from the 2 percent downgrade, allowing the through-track tunnel to rise and ultimately daylight east of Interchange 8. The profile transition beyond the diverge location would also permit the accommodation of underground commuter platforms to create a new ‘Tappan Zee’ Station just north of the intersection of Route 119 and Broadway. Consideration for this station would be focused on the Tarrytown to Stamford and Tarrytown to Suffern trips, but would also provide a second Tarrytown area station for service to Grand Central Terminal and divert traffic from the existing Tarrytown Station. The existing Tarrytown Station would remain, specific to the Hudson Line service.

East of Broadway, the CRT tunnel would follow a sweeping horizontal curve to the south of the I-87/I-287 right-of-way, avoiding potential conflict with the Talleyrand Swamp and the recently reconstructed and reconfigured Interchange 8. The curved tunnel section between Broadway and Interchange 8 would pass beneath undeveloped lands of the steep hillside south of the Talleyrand Swamp. Overall, the rail tunnel extending from the Hudson River shoreline to Interchange 8 would be approximately 2 miles long.



CRT Connection to Hudson Line and/or to Westchester

Figure 3-13

Greenburgh/Elmsford

East of the tunnel described above, the CRT would run along the south side of I-287/CWE, proceeding for about one-half mile in retained cut/retained fill sections before rising onto a viaduct. The 3,500-foot-long viaduct would carry the CRT alignment over the Saw Mill River Parkway, the Saw Mill River, and Central Avenue. East of the viaduct, a 3,000-foot-long tunnel would carry the alignment beneath the Sprain Brook Parkway. The tunnel would daylight west of Knollwood Road, in the vicinity of the location for the Greenburgh Station. The station location considered at the existing commercial/retail site (occupied by Syms and Bed, Bath and Beyond) is assumed to require a footprint of 7 acres. East of Knollwood Road, the CRT would rise on another 2,200-foot viaduct over Manhattan Avenue, near a low income community. Beyond the viaduct, the profile would descend in retained cut beneath Hillside

Avenue before entering the west portal of the proposed rail tunnel that would be constructed beneath White Plains to avoid land use and traffic impacts in the densely developed city.

White Plains

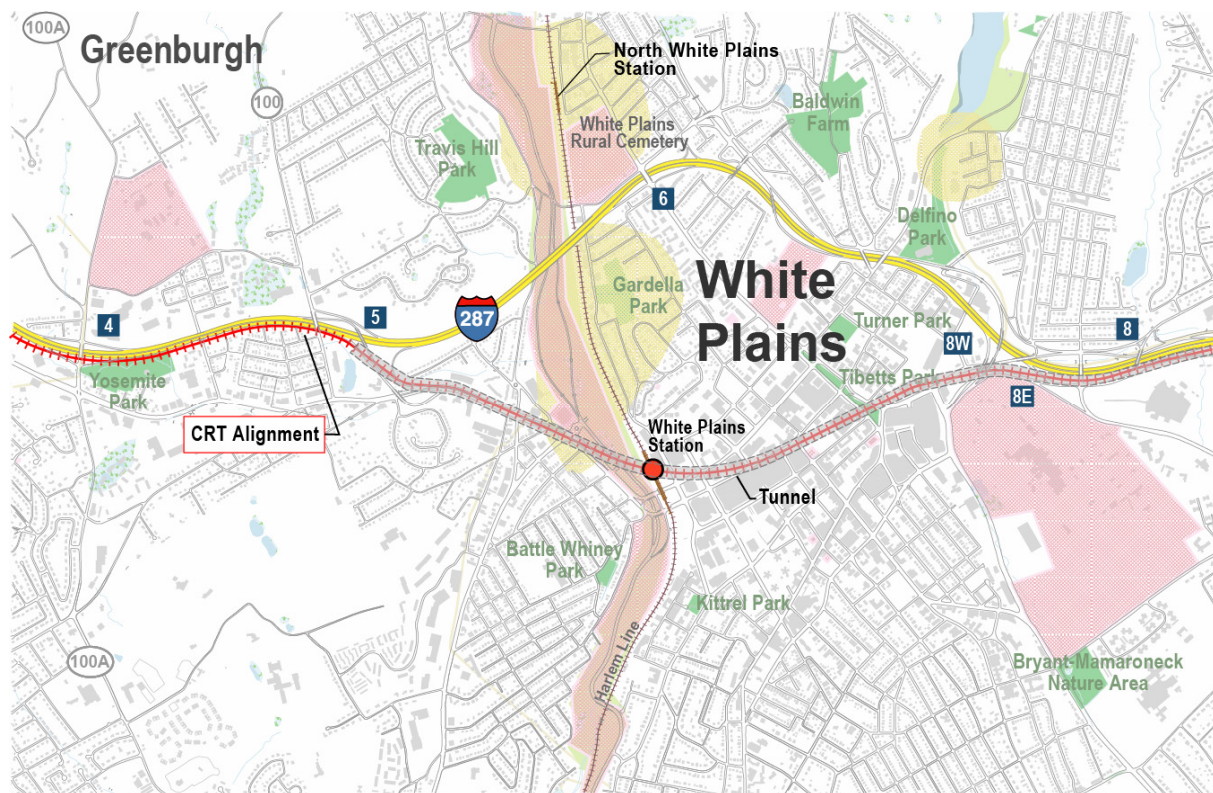
The rail tunnel alignment would depart from the I-287 right-of-way and proceed to the southeast beneath Route 119 en route to the White Plains TransCenter (Figure 3-14). To enhance access, an underground station would be located on Route 119 at the County Center, just east of Old Kensico Road. The CRT would cross beneath the Bronx River Parkway and the Metro-North Harlem Line, with provision for passenger platforms and a transfer facility at the existing White Plains TransCenter. Beyond the White Plains Station and transfer location, the CRT would proceed to the east, following Hamilton Avenue. To the east, an additional underground station is proposed at the Westchester Mall. After crossing beneath Route 22 (North Broadway), the CRT alignment would re-enter the I-287 Corridor, but would remain in tunnel for a considerable distance before daylighting to the east of the I-684 Interchange. The total length of the proposed White Plains rail tunnel would be approximately 4 miles. West of the Hutchinson River Parkway, a station is proposed at Corporate Park Drive, near the I-287/CWE overpass.

Harrison

After emerging from the White Plains tunnel, the CRT alignment would continue eastward for a little more than a mile and a half in retained cut/retained fill, located between I-287 and eastbound Westchester Avenue. East of the Hutchinson River Parkway crossing, a commuter rail station has been considered in the vicinity of Kenilworth Road. The Purchase Station is assumed to require a footprint of 7 acres. To the east, as Westchester Avenue departs from the I-287 right-of-way, the CRT alignment would remain along the south side of I-287 and cross over eastbound Westchester Avenue on a viaduct approximately 1,500 feet long.

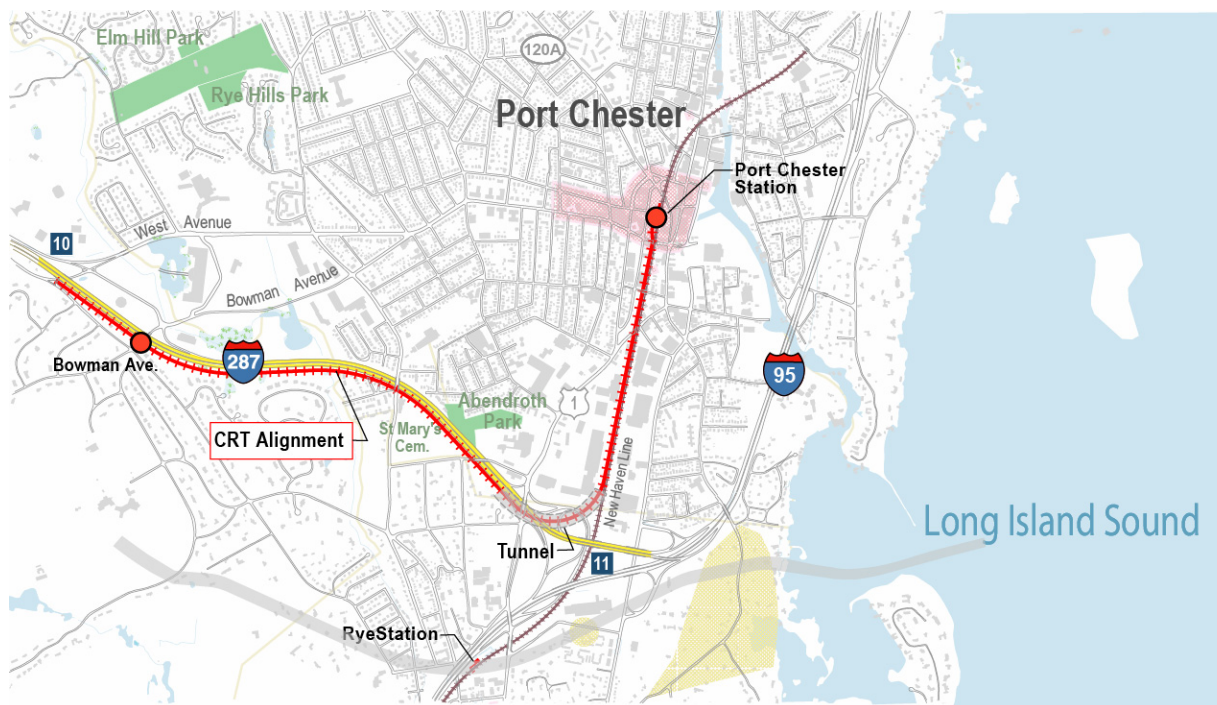
Rye/Port Chester

East of the Westchester Avenue viaduct, the CRT alignment would proceed for a little more than a mile in retained cut/retained fill sections before entering a tunnel beneath Boston Post Road and the I-95 Interchange (Figure 3-15). The 3,000-foot-long tunnel would daylight at the north side of the interchange, at the southeast corner of the Port Chester shopping center. Beyond the tunnel, direct connection at grade would be achieved with the New Haven Line southbound local track. For connection to the New Haven Line northbound local track, the eastbound CRT would be carried in a tunnel beneath all four tracks of the New Haven Line, and then ascend along the east side to meet existing grade for connection to the northbound local track. To the north, the CRT would platform at Port Chester Station from the local tracks.



CRT Alignment - White Plains Area

Figure 3-14



CRT Alignment – Port Chester Area

Figure 3-15

Rail Storage and Maintenance Facility

Rail fleet for CRT1 would require a storage yard and maintenance facility. Planning considerations for additional rail storage include a potential new storage yard near Suffern (i.e., north of the Suffern North Station) and expanded capacity at the existing Port Jervis Yard.

The new yard would require at least 12 tracks, each approximately 1,000 feet long, and a 10-acre maintenance facility. The total storage and maintenance yard footprint would be 22 acres. Expanded storage capacity for the Port Jervis Yard would require approximately eight additional tracks of approximately 1,000 feet (each with provision to accommodate two trains consisting of one locomotive and five coaches).

Further investigation of the requirements and location for the rail storage yard/maintenance facility would be advanced as part of the EIS process, depending on the specific requirements of the potential alternatives to be considered.

3.1.4.2 Operating Characteristics

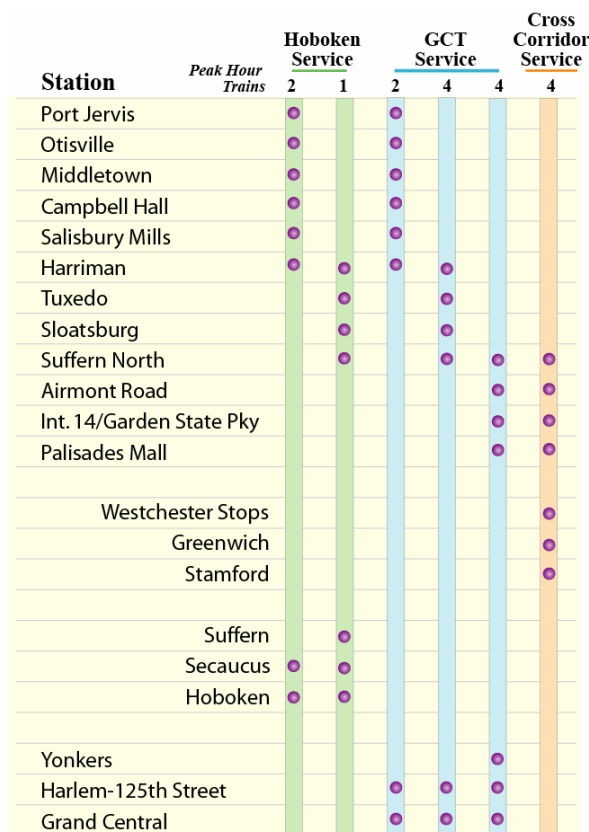
Service Plan Assumptions (Year 2025)

Figure 3-16 graphically depicts the service pattern for CRT1, and includes the following services:

- Cross-Corridor Service** – Cross-corridor service would be electric operating between Suffern North and Stamford (at 15-minute headways during peak hours and 20-minute headways on the shoulders of the peak periods), making stops at Airmont Road, Interchange 14/PVL, and the Palisades Mall in Rockland County, and Tappan Zee, Greenburgh, Elmsford East, White Plains, Westchester Mall, Corporate Park Drive, Purchase, Port Chester, Greenwich, and Stamford in Westchester County.

Travelers boarding at stations on the Port Jervis Line between Harriman and Sloatsburg would transfer at Suffern North via a convenient cross-platform transfer. Travelers on the upper Port Jervis Line (i.e., between Port Jervis and Harriman) would need to transfer twice for cross-corridor service, once at Harriman and again at Suffern North.

This was subsequently changed to include cross-corridor thru service originating at Port Jervis (see Chapter 6).



CRT Service Plan
Figure 3-16

- **Manhattan-Bound Service** – Service to Grand Central Terminal would be provided from Harriman on the Port Jervis Line (at 15-minute headways in peak hours and 30-minute headways during the shoulders of the peak period), making stops at Tuxedo, Sloatsburg, Suffern North, and 125th Street. Dual-mode trains would be used, operating in diesel mode on the Port Jervis Line and electric mode in the Park Avenue Tunnel and in tunnel sections (e.g., shoulder tunnels) of the new cross-Hudson River alignment, if required. Travelers on the northern portion of the Port Jervis Line en route to GCT would be served by trains operating express from Harriman at 30-minute headways (during peak hours and on the shoulders of the peak), making stops at Port Jervis, Otisville, Middletown, Campbell Hall, Salisbury Mills, Harriman, and 125th Street. More frequent service to GCT would be available via a transfer at Harriman.

In addition, electric service to Grand Central Terminal would be provided from Suffern North (at 15-minute headways in peak hours and 30-minute headways during the shoulders of the peak periods), making stops at Airmont Road, Interchange 14/PVL, Palisades Mall, Yonkers, and 125th Street.

- **Port Jervis-Secaucus/Hoboken Service** – Service on the Port Jervis/Main/Bergen Lines to the Secaucus Junction Facility (for connecting trains to New York’s Penn Station) and Hoboken would be increased over today’s schedule (six trains) to eight trains operating during peak periods (at 20-minute headways during peak hours and 45-minute headways on the shoulders of the peak). Additional services are limited by the capacity of the Hoboken tunnels.

Feeder Bus Operating Plan

Provision of frequent and direct commuter rail service to both Manhattan and White Plains would allow for the elimination of the current Tappan Zee Express (TZX) and Cross Rockland Express (CRX) services. The Orange-Westchester Link (OWL) would be truncated at Suffern, where passengers could transfer to commuter rail service to White Plains or to Manhattan. The I-Bus service from Stamford to White Plains would also be discontinued, since the cross-Westchester commuter rail service would continue to Stamford.

In Rockland County, most of the Transit of Rockland (TOR) and Clarkstown Mini Trans routes would be modified to serve as feeder routes to one (or more) of the new commuter rail stations, while continuing the intra-county service that they currently provide. Headways would be improved on many of the routes, especially during peak periods, to provide more attractive service.

In Westchester County, minor routing changes would connect existing bus routes to the new station in Tarrytown. The Bee-Line shuttle loop routes that service the office parks from the White Plains Transportation Center would be expanded: service frequencies on existing routes would be increased to meet scheduled trains and new service would be implemented at new stations in Westchester.

Travel Times

Running times were developed based on the conceptual drawings by calculating average speeds over the lengths of the alignments and accounting for speed restrictions (at curves and interlockings). The following average speeds were assumed based on the alignment developed:

- Across Rockland County – 80 mph (speeds range from 35 mph to 100 mph).

- New bridge – 80 mph (design speed).
- Across Westchester County – 70 mph (speeds range from 45 mph to 100 mph).
- Tunnel connection to the Hudson Line – 60 mph, later reduced to 45 mph (design speed).

In addition, an average station stop time of 2 minutes was assumed for diesel service and 1.5 minutes for electric services to account for deceleration, dwell time, and acceleration. Figure 3-17 contains estimated travel times for selected origin-destination pairs. These were subsequently revised with the addition of a new Tappan Zee Station (see Chapter 6).

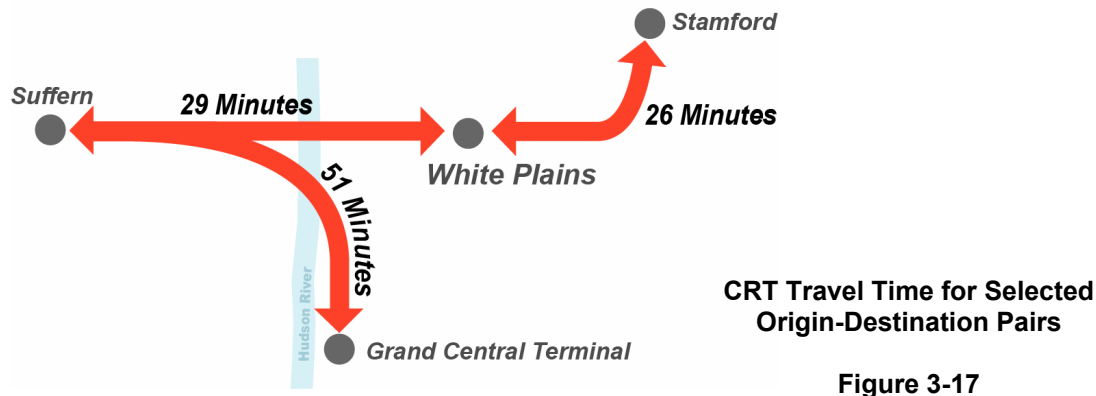


Figure 3-17

Fares

Fares at the new stations were calculated based on a distance-based formula assuming the same fare structure as Metro-North's east-of-Hudson service. For example, the fare between Airmont Station and Grand Central Terminal is comparable to the fare between Mount Kisco and Grand Central Terminal, a similar distance. The same formula Metro-North uses for East-of-Hudson was used for intermediate trips. All fares are in 1996 dollars (the year to which BPM is calibrated; see Subchapter 3.3).

3.1.5 Manhattan-Bound Commuter Rail (CRT2 and CRT3)

The intent of these scenarios was to test Manhattan-bound CRT against the goals and objectives established for the study, with and without the highway improvements. CRT2 was tested without highway improvements in Rockland County (as described for H3), but with a supplemental tunnel for commuter rail and a rehabilitated bridge (see Subchapter 3.2). CRT3 assumed that commuter rail and a widened roadway would be accommodated on a new bridge to the south of the existing bridge (see Subchapter 3.2). Congestion pricing was tested as part of CRT3 (see Subchapter 3.1.2). In addition to the fundamental difference in service compared to CRT1 (i.e., there would be no cross-corridor component), several horizontal and vertical alignments were tested in CRT2 and 3. Figures 3-18 and 3-19 depict schematics of the alignments for CRT2 and 3, respectively.

3.1.5.1 CRT Alignments

Table 3-2 contains overall construction requirements for CRT2 and 3.

Table 3-2
Overall Construction Requirements for CRT2 and 3

Type of Structure	CRT2 in Rockland County Lineal Feet	CRT3 in Rockland County Lineal Feet
Viaduct	17,100	22,300
Retained Cuts/Retained Fills/At-Grade	43,700	49,500
Tunnel	23,200	12,200

Both scenarios would link three existing north-south rail lines in the corridor by providing either a direct connection (Port Jervis and Hudson) or a transfer facility (Pascack Valley). Each scenario contains the same four new stations/park-and-rides in Rockland County:

- Suffern North.
- Airmont.
- Interchange 14/PVL.
- Palisades Mall.

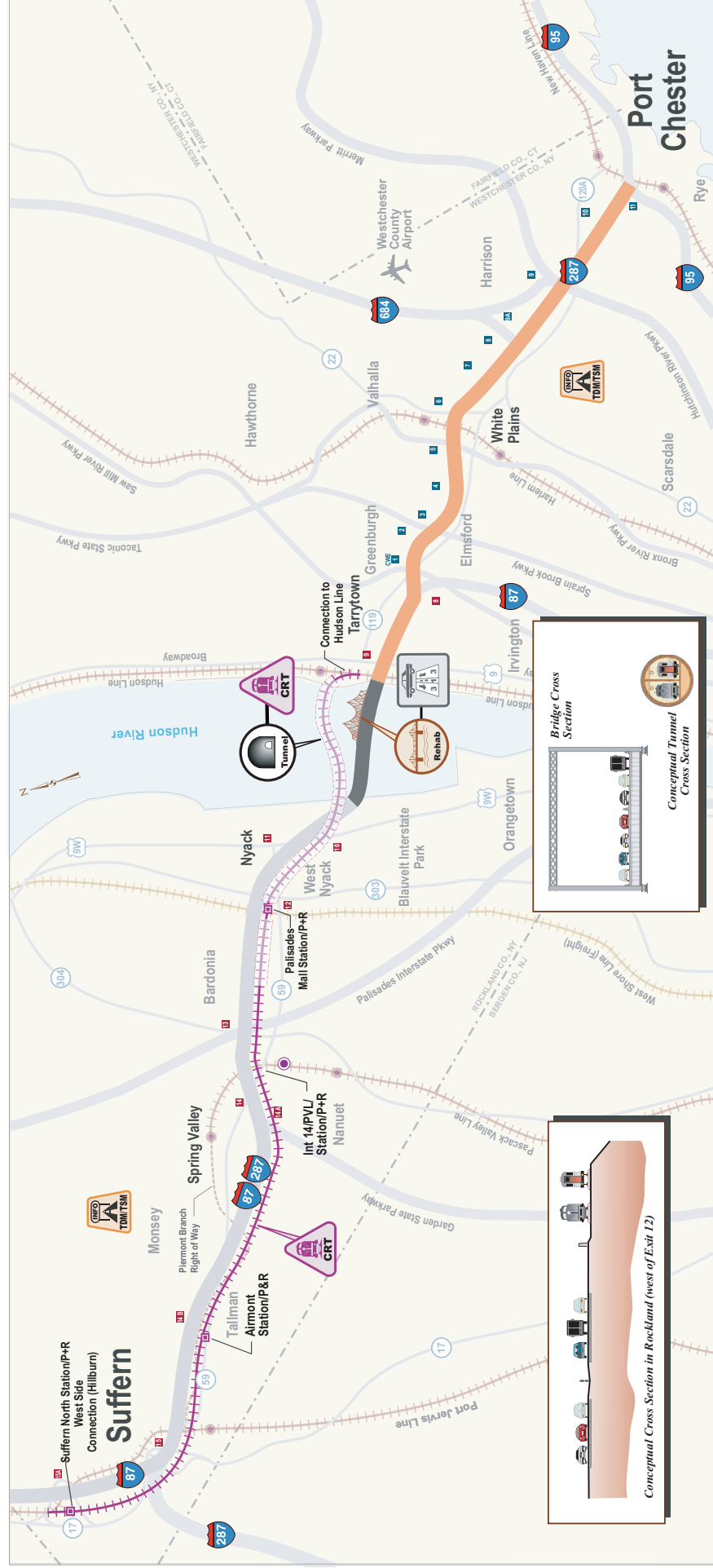
Suffern

For CRT2, connection to the Port Jervis Line in the vicinity of Suffern would follow a configuration referred to as the Hillburn Option. North and west of Interchange 15A, the alignment would diverge from the Port Jervis Line, cross above the existing highway on a flyover structure, and curve to the south to align along the west side of the Thruway. Before crossing Old Route 17, the CRT would be on a viaduct, with a proposed commuter rail station (Suffern North) located west of the Port Jervis Line and northwest of Old Route 17. The rail station is assumed to require 7 acres, with vehicular access/egress from Old Route 17.

South of the station, the CRT would continue on viaduct west of the Thruway, bowing out near Interchange 15 before crossing over the existing Port Jervis Line, Route 59, and the Piermont Branch. The alignment would affect some residential properties of the Hillburn community in the vicinity of the 4th Street crossing. The viaduct from Old Route 17 to east of Route 59 would extend approximately 1.7 miles (see Figure 3-12).

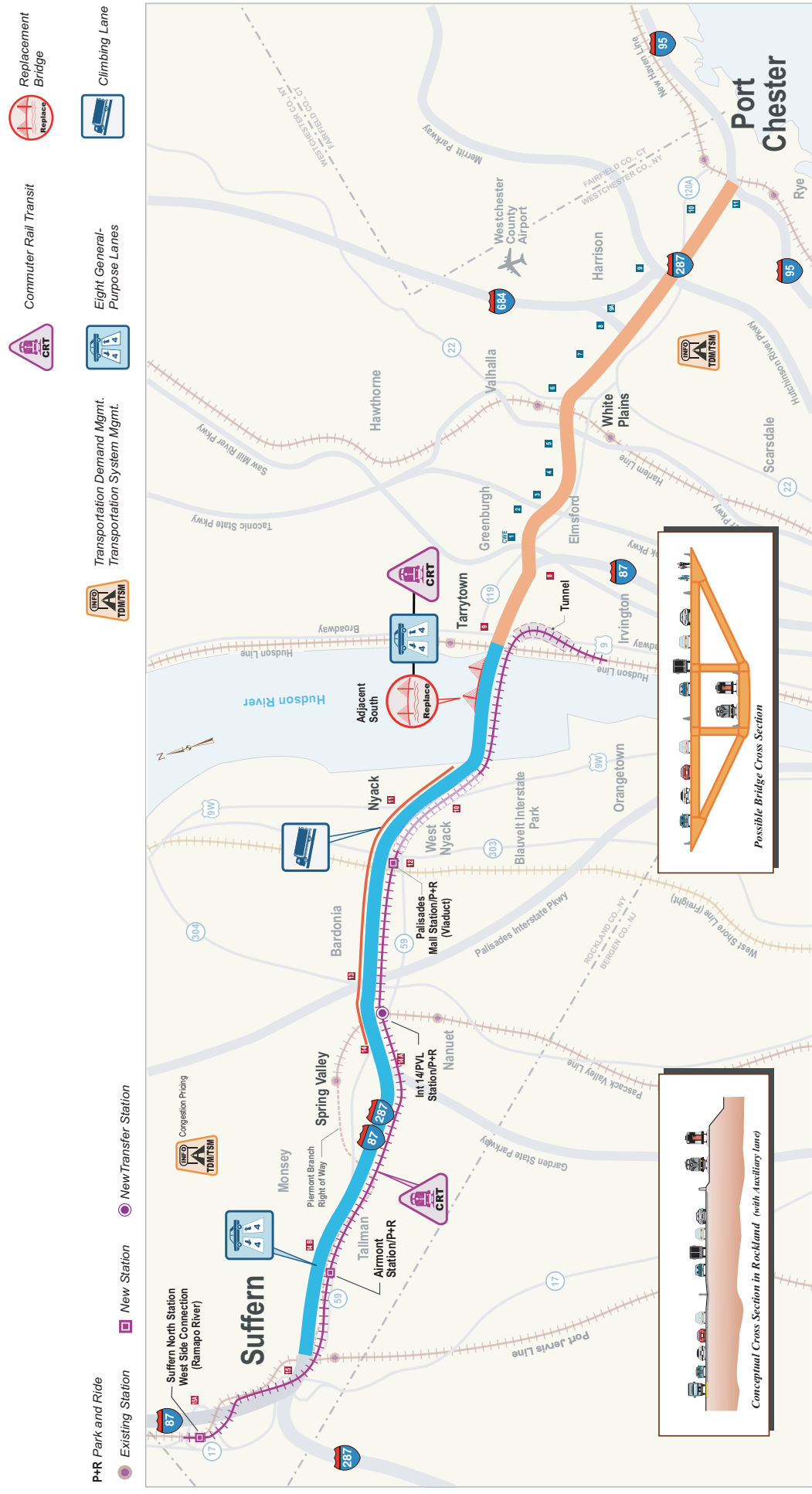
For CRT3, connection to the Port Jervis Line in the vicinity of Suffern follows a configuration referred to as the Ramapo Option. North and west of Interchange 15A, the alignment is the same as described for CRT2, including the proposed Suffern North commuter rail station.

South of the station, the CRT alignment would continue on viaduct west of the Thruway, and cross over the Thruway on a flyover structure. After crossing the Thruway, the CRT alignment would be along the east side of the Thruway, west of the Ramapo River. Approaching Interchange 15, the CRT3 profile would pass beneath the existing Thruway, thread between the existing I-287 ramp structures, and curve to the east before crossing over the existing Port Jervis Line, Route 59, and the Piermont Branch.



Scenario CRT2 - Rehabilitate Tappan Zee Bridge with Supplemental Commuter Rail Tunnel

Figure 3-18



Scenario CRT3 - Replacement Bridge with Commuter Rail to Hudson Line

Figure 3-19

East of Suffern

East of the 7-mile-long viaduct, CRT2 would be in a 1,500-foot-long section of retained fill/retained cut before the profile would proceed onto a viaduct over Wayne Avenue and the Mahwah River. Proceeding eastward from this viaduct to Interchange 14/Route 59 in Nanuet, the CRT2 alignment and profile configuration would be the same as for CRT1.

East of the Route 59 crossing in Suffern, the CRT3 alignment would be within the I-87/I-287 right-of-way, proceeding onto a viaduct over Wayne Avenue and the Mahwah River. Proceeding eastward from this viaduct, CRT3 would be the same as CRT1, up to and including the Hudson River crossing on a replacement bridge.

Spring Valley/Nanuet

The CRT2 alignment and profile would be the same as CRT1 until the vicinity of Interchange 14/Route 59. At this location, the CRT2 profile would descend on a 2 percent grade before entering a tunnel west of Middletown Road. The 2-mile-long tunnel would continue to descend eastward, passing beneath Route 304 and the Palisades Interstate Parkway. East of Interchange 14, the commuter rail station/transfer facility (Interchange 14/PVL) would be the same as for CRT1. The CRT3 alignment would be the same as that described for CRT1.

West Nyack (Including Palisades Mall)

In contrast to the 1.7-mile-long viaduct at this location for CRT1, the CRT2 alignment would follow a configuration of at-grade/retained cut/retained fill/individual bridges across the Hackensack River valley and past the Palisades Mall. At the crossing of the CSX West Shore Line, the CRT2 profile would be below the existing rail line. At the Palisades Mall park-and-ride, the proposed commuter rail station/intermodal center would require vertical circulation elements for passengers, since the platforms would be at a lower elevation than the existing park-and-ride pavement. East of Route 303, the CRT2 profile would transition into a retained cut before entering the portal for a tunnel under South Nyack. Because the CRT2 river crossing is a supplemental rail tunnel, this tunnel profile is set at a deeper elevation than for the CRT1 profile. The CRT3 alignment would be the same as CRT1.

Nyack/South Nyack

The tunnel alignment for CRT2 would essentially follow the I-87/I-287 right-of-way before curving to the north of the existing Tappan Zee Bridge at the Rockland shoreline. The CRT3 alignment would be the same as CRT1.

Tarrytown

For CRT2, commuter rail in a supplemental tunnel would allow the Hudson Line connection to shift further to the north than it does under CRT1.

For CRT3, the alignment at the Westchester shoreline would be the same as for CRT1 except that the connecting rail tunnel from the new bridge to the Hudson Line would provide a design speed of 45 mph. The 45 mph configuration would enter the Hudson Line right-of-way to the north of the Lyndhurst property, thus eliminating the need for the underground easement required under CRT1.

Rail Storage and Maintenance Facility

Requirements for rail fleet storage at Suffern and at Port Jervis and requirements for a maintenance complex near Suffern would be similar to those described for CRT1. However, without the inclusion of Suffern-to-Stamford service, the storage requirements at Suffern would be reduced and specific elements for the maintenance complex near Suffern would be modified to accommodate the Harlem/Hudson-style electric fleet.

3.1.5.2 Operating Characteristics

Service Plan and Run Times

The service plan assumptions and run times would be nearly identical to those described for the Manhattan-bound service under CRT1. The only difference would be in the Hoboken-bound service originating at Harriman, which would only stop at the existing Suffern Station since the Suffern North Station would not be located on the Port Jervis Line with either of the west side connections (i.e., the Hillburn or Ramapo connections). Hence, this service would be approximately 2 minutes faster than CRT1 due to the reduced number of station stops.

Bus Operating Plan

Provision of direct rail service from Orange and Rockland Counties to Manhattan would eliminate the need for the TZX service to Tarrytown Station on the Hudson Line. However, express bus service to White Plains would be continued and enhanced. Therefore, the bus operating plan for both CRT2 and CRT3 would restructure TZX and CRX service to provide more frequent and direct service to White Plains. The plan would include the following set of peak period routes:

- Spring Valley –Palisades Mall – White Plains.
- Suffern – Airmont Road – Palisades Mall – White Plains.
- Haverstraw – Palisades Mall - Nyack – White Plains (this converts the current TOR91X route into a through route instead of a feeder).

Each of the three routes would operate every 30 minutes, resulting in a trunk headway of 10 minutes between Palisades Mall and White Plains. During off-peak hours, a single route would operate hourly, with stops in Suffern, Airmont Road, Spring Valley, Palisades Mall, and Nyack.

As in CRT1, in Rockland County most of the TOR and Clarkstown Mini Trans routes would be restructured to serve as feeder routes. Headways would be improved on many of the routes.

Fares

The same fare structure used in CRT1 was applied to these scenarios.