

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 5

ENVIRONMENTAL TECHNICAL MEMORANDUM IMPACTS ANALYSIS

STATE PROJECT 302-008



SECTION 5: BIOLOGICAL DIVERSITY

JANUARY 2012

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METHODOLOGY

In simple terms, biological diversity (biodiversity) – or the number of different life forms - stems from the availability of life-supporting resources which allow plants and animals to live, reproduce, and proliferate. Life-supporting resources occur within areas defined as habitat. Generally, areas with many different habitats support higher biodiversity than areas with fewer habitats, and larger-sized habitats support higher biodiversity than smaller-sized habitats. However, not all habitats are important for maintaining biodiversity. Those that are important for maintaining biodiversity tend to be those that provide unique and rare features and those that provide bountiful life-supporting resources, enough for many species to share. These important habitats are sometimes called key habitats or ecologically sensitive habitats. Project impacts on biological diversity were thus evaluated based on impacts to the key habitats in the Danbury Branch corridor.

Key Habitats – Ecologically Sensitive Habitats

Important terrestrial and aquatic habitats for biodiversity in the study corridor were identified and mapped as “Key Habitats” in Technical Memorandum 1 (Existing Conditions, Tech Memo 1). Where this Technical Memorandum 2 (Impacts Analysis, Tech Memo 2) refers to “mapped” habitats, it is referring to the Key Habitats maps created for Tech Memo 1. These were identified primarily from the “key habitats” in *Connecticut’s Comprehensive Wildlife Conservation Strategy (Strategy)* compiled by the Connecticut Department of Energy and Environmental Protection (DEEP 2005). Habitats are commonly defined based on vegetative structure. Vegetation communities contain assemblages of characteristic plants and also provide habitat for animals. The characteristic plants and animals potentially occurring within these habitats are detailed in the Tech Memo 1 appendices. The key habitats and sub-habitats (i.e., a specific variation of the key habitat) that were observed in the corridor and mapped (in Tech Memo 1) for the purposes of this analysis included the following:

- Forest (called Upland Forest in the *Strategy*)
- Riparian Zones along Large River (a sub-habitat of the *Strategy’s* Freshwater Aquatic key habitat)
- Non-Riparian Forested Wetlands (called Forested Inland Wetland in the *Strategy*) – also designated “Forested Wetlands” in this Tech Memo
- Shrub Inland Wetlands
- Freshwater Marshes (a sub-habitat of the *Strategy’s* Herbaceous Inland Wetland key habitat)
- Wet Meadow (a sub-habitat of the *Strategy’s* Intensively Managed key habitat)
- Cold Water Habitats (a sub-habitat of the *Strategy’s* Freshwater Aquatic key habitat)
- Lakes/Ponds (a sub-habitat of the *Strategy’s* Freshwater Aquatic key habitat)
- Rivers/Streams (called Free-Flowing Streams in the *Strategy*, a sub-habitat of the Freshwater Aquatic key habitat)

An additional category of forest – Forest Blocks Greater Than 100 Acres – was added to the habitat mapping. Large forest blocks such as these support species that require large contiguous acreages of unfragmented forest (sometimes called forest interior) for their survival and are increasingly rare. This habitat is therefore important for maintaining biodiversity in the state. Forest interior species include many migratory songbirds such as least flycatcher (*Empidonax minimus*), wood thrush (*Hylocichla mustelina*), American redstart (*Setophaga ruticilla*), and ovenbird (*Seiurus aurocapillus*), as well as large predatory mammals such as black bear (*Ursus americanus*).

Much of the study area does not contain ecologically sensitive habitats due to the predominance of suburban and urban development patterns. These human-made areas characterize not only much of the corridor but also much of the state. These development patterns have eliminated native habitat over vast areas, have created barriers to dispersal, and have left habitat fragments which are often too small to support wild populations of plants and animals. Suburban and urban areas do support some species of native vegetation and wildlife; however, they are typically species that are common across the state and are therefore not ecologically sensitive. Exceptions, where unique or rare species are present within developed areas, do sometimes occur. The exceptions in the study corridor were identified through coordination with the DEEP based on Natural Diversity Database (NDDDB) records; the T&E species and locations of concern were assessed for potential effects from the proposed improvements within the Threatened and Endangered (T&E) Species Tech Memo 2. Where a T&E species concern overlaps with key habitats affected by the project improvements, they are noted in this Tech Memo since the T&E records reinforce or heighten the ecological value of those habitats. For the full and detailed analyses of T&E species impacts, refer to the T&E Species Tech Memo 2

The December 2010 NDDDB data used as a basis for the T&E species coordination with DEEP showed locations of critical habitat not previously included in the DEEP GIS data. Two areas of critical habitat occur within the study corridor. These coincide with key habitats mapped in Tech Memo 1 located along the Still River in northern Brookfield and southern New Milford. As defined by the [Connecticut Critical Habitats Resource Guide](http://www.cteco.uconn.edu/) (available online at <http://www.cteco.uconn.edu/>), critical habitats are the “most rare, unique, and threatened habitats” in the state. They are a subset of the “key habitats of greatest conservation need” identified in the DEEP *Strategy*. The stated purpose of the Connecticut critical habitats information is to “highlight ecologically significant areas and target areas of species diversity for land conservation and protection”. Where critical habitats could be affected by the Danbury Branch improvements, they are so noted.

Since many of the ecologically sensitive habitats in the corridor are wetland habitats, some references are made to wetland impacts as described in the Wetlands Tech Memo 2. However, the more complete and detailed analyses of wetland impacts are provided by the Wetlands Tech Memo 2.

Impact Assessment

To estimate impacts to biodiversity, the locations of improvements under the various Alternatives were compared with the GIS base-mapping of Key Habitats (ecologically sensitive

habitats) identified in Tech Memo 1 and described above. Permanent impacts to habitat, and thus biodiversity, were considered possible from activities that would physically overlap and thus disrupt these sensitive habitats. These activities could include: clearing of vegetation, excavation of soils, and/or placement of structures and fill within undeveloped lands or waters; spillage or leakage of contaminants; and other alterations of land or water. Temporary impacts could result from vegetation clearing, construction vehicle access, temporary water handling, material laydown areas, and equipment staging areas. Indirect impacts were assessed by considering the potential for off-site or delayed effects, such as new barriers to wildlife movement or degradation of habitats over time (e.g., through erosion and sedimentation of soils or invasive species invasions).

Ecologically sensitive habitats, like any habitat, vary in their ability to harbor diverse species: an acre of land will support vastly different types of plants and animals and also vastly different number of species, varying with soil types, sun exposure, topography, water sources, proximity to other habitats, and many other factors. Due to the lack of comprehensive statewide inventories of plants and animals, the number of species and exact species that may be affected at a particular location cannot be determined and have not been predicted for this analysis. This impact analysis is rather a qualitative analysis.

One of the challenges in assessing biodiversity in any specific location is that important life-supporting resources are not distributed evenly over a habitat area and sometimes a combination of special features is what is most valuable to a particular species. Many of these relationships are invisible to the human observer. Where variations in habitat quality and/or features were observed at the proposed improvement site within the Danbury Branch corridor, they were considered during the impact analysis, in weighing the relative value of the affected habitat compared to the larger surrounding habitat. Where the affected habitat was observed to be relatively homogenous, the impact analysis used a basic assumption that the larger the area affected, the greater the potential impact. Additionally, sites noted by the DEEP to be of concern relative to T&E species were deemed more important for biodiversity than sites with no T&E species concerns, since preserving even small pockets of T&E species is important for maintaining biodiversity at the broader corridor, regional, and state scales.

With these considerations in mind, a relative rating scheme was developed for the qualitative assessment of biodiversity impacts. Potential impacts from the improvements within ecologically sensitive habitats were rated Low, Moderate, or High:

Low: the anticipated impacts on habitat are very small and are not estimated to effectively (or functionally) diminish the availability of ecologically sensitive habitat. Any slight effects on habitat would be very unlikely to jeopardize the survival of any species, to change species composition, or to reduce biodiversity at any landscape scale (e.g., near the improvement site, within the study corridor, or within the state).

Moderate: the effects on habitat would likely diminish the availability of ecologically sensitive habitat for one or more species. Effects are not expected to directly or immediately cause a reduction in biodiversity at any landscape scale but the diminished quality or quantity of habitat may change the overall size or reproductive rates of some

populations which could contribute to future species declines. This rating indicates a potential for cumulative impacts rather than immediate effects.

High: the effects on habitat would almost certainly diminish the availability of ecologically sensitive habitat for one or more species. This designation has been used where the improvement would impact a relatively large portion of ecologically sensitive habitat and may or may not also be located within a critical habitat or NDDDB record of concern to DEEP (as identified in the T&E Tech Memo 2). Loss or reduction of habitat could directly and/or immediately cause a reduction in biodiversity at one or more landscape scales.

IMPACTS

For each alternative, the potential for direct and indirect impacts to biodiversity can be attributed to the construction of the following major project elements:

- New or improved (existing) passenger stations
- Rail reconstruction
- Structures and bridges
- Traction power systems (electrification)
- Track reconfigurations, sidings, and connections
- Storage, maintenance yards

The types and locations of specific improvements with potential impacts to biodiversity are discussed in more detail below. Improvement sites that are not within or adjacent to ecologically sensitive habitats were deemed to have no potential to impact biodiversity, as described in the Methodology section, and are not individually discussed below. Tables 1, 2, and 3 include a listing of the proposed improvements for the build alternatives (Alternative C, D, and E respectively) and the detailed tabulated results for each improvement.

It is important to note the following relative to this impact assessment:

- Since this impact assessment was based on conceptual design, many details of site layout and construction, such as the locations of equipment staging and material stockpiles, have not yet been identified. During further design stages, all Danbury Branch Improvements and associated construction activities will be located and designed to the extent possible to avoid and minimize impacts on ecologically sensitive habitats, T&E species, wetlands, 100-year floodplains, floodways, sensitive cultural resources, and other regulated areas.
- For any improvement site with T&E species concerns, further coordination with DEEP will be necessary if the improvement is selected to go forward, even if suitable habitats were not observed. Further coordination will confirm and clarify impacts (or lack of impacts), determine the detailed scope of any required surveys, establish protection measures to be taken during construction, and identify particular mitigation measures. These coordination steps will be integral to further design and permitting of the improvements.

Alternative A - No Build

The No Build Alternative would not directly or indirectly impact biological diversity as no new construction would take place as part of this alternative.

Alternative B - Transportation System Management (TSM)

The TSM Alternative would not directly or indirectly impact biological diversity as no new construction would take place as part of this alternative.

Alternative C - South Norwalk to Danbury Improvements

Alternative C would provide infrastructure and service improvements between South Norwalk and Danbury on the existing Branch. Improvements would include upgrading track to 60 mile per hour maximum speed; expanding parking and improving access at stations; upgrading 15 bridges from an older open deck structure to modern ballast deck bridges; upgrading the rail yard and providing a new maintenance facility at Danbury Yard; and electrifying the rail line. New rolling stock would be added to allow for expanded service or for the electric trains. Potential impacts to ecologically sensitive habitats were assessed to occur from the improvements described below. See Table 1 for the full impact assessment of all improvements.

Passenger Stations (Existing Stations)

Under this alternative, improvements are planned at five of the existing stations located along the Danbury Branch rail corridor: Merritt 7 (Norwalk); Cannondale (Wilton); Branchville (Ridgefield); Redding; and Bethel. Impacts to ecologically sensitive habitats are assessed to be possible at the two stations listed below.

- **Redding:** Improvements to the existing Redding passenger station include an expanded parking lot that will result in filling approximately 0.03 ac of Forested Wetlands and additional surrounding forest along Hawley Brook (a tributary to the Saugatuck River). The location of these forests and their multi-layered vegetative structure indicate that they provide food, water, cover and breeding opportunities for wildlife, as well a wildlife travel corridor. Construction of the station would require removal of vegetation from the approximately 150-foot wide wildlife travel corridor would be reduced in width through the clearing of vegetation; its width would be reduced by 25-50 percent when combined with the impacts of Redding electrical substation discussed in the section on *Traction Power System – Electrification*. The loss of habitat, although small, combined with the narrowing of the wildlife travel corridor would have an adverse effect on available life-support resources for wildlife. There are no direct impacts to open water or fisheries, but indirect effects to the receiving Saugatuck River (a Cold Water Habitat) over time from stormwater runoff (from increased pavement) are possible. Potential impacts to wildlife and fish biodiversity are thus assessed to be Moderate at this site.
- **Bethel:** Improvements to the existing Bethel passenger station include an expanded parking lot that will fill approximately 0.1 ac of Forested Wetlands and a greater area of

upland forest within a previously fragmented setting. There would be no direct impacts to open water or fisheries, and no high quality watercourses occur next to the station which would be impacted indirectly by stormwater. The impact area is at the southern end of existing fragmented forest habitat and adjacent to existing development; it does not serve as a wildlife movement corridor. The potential for impacts to biodiversity here is assessed as Low.

Structures and Bridges

There are improvements involving undergrade and overhead bridges included with Alternative C.

Undergrade (UG) bridges (railroad goes over a road or stream): There are 18 UG bridges where work is planned in Alternative C. Seven of these are over roadways and 11 are over waterways.

The UG bridges over roadways include a new bridge at MP 0 in Norwalk over Washington and South Main Streets and six replacement bridges at Norwalk MP 0.1, Norwalk MP 0.2, Wilton MP 11.01, Redding MP 14.16, Redding MP 14.8, and Bethel MP 19.64. Two of these bridges are adjacent to ecologically sensitive habitat: Redding MP 14.16 has Forested Wetlands near the southeast corner of the bridge; and Bethel MP 19.64 has Forested Wetlands on the south sides and the northeast side of the bridge. However, based on conceptual design, both bridge replacements would be on the existing rail alignment and utilize non-intrusive construction methodology. Under this scenario, the existing bridge deck would be removed and the new bridge deck would be lifted into place onto the existing abutments. Construction is anticipated to occur from the existing disturbed and maintained rail rights-of-way (ROWs). Drainage upgrades would be incorporated into the bridge designs. Appropriate erosion and sedimentation (E&S) controls would be maintained during construction to prevent disruption beyond the existing disturbed ROWs, and other best management practices (BMPs) would be implemented. Given this non-intrusive scenario, impacts to adjacent habitats (vegetation, wildlife, fish) would not be anticipated, and direct or indirect impacts on biodiversity would not occur, or at most would have Low potential for impacts.

The 11 UG bridges over water are by definition adjacent to the key habitat, Rivers/Streams. All of the proposed bridges are single-span structures with no piers in the water. Nine of these bridges are replacement bridges on the existing rail alignment:

- Norwalk (MP 5.12) over tributary to Norwalk River
- Norwalk (MP 6.43) over Norwalk River
- Wilton (MP 8.7) over Norwalk River
- Wilton (MP 9.42) over Norwalk River
- Wilton (MP 11.55) over Norwalk River
- Wilton (MP 12.17) at Factory Pond (Norwalk River)
- Redding (MP 16.4) over Umpawaug Pond Brook
- Redding (MP 17.1) over Saugatuck River

- Bethel (MP 21.41) over Sympaug Brook

As described for the UG bridges over roadways, replacement bridges (over water) on the existing rail alignment would be constructed using non-intrusive methods to the greatest extent possible; construction would occur from previously disturbed rail ROW and the new bridge deck would use the existing bridge's support structures (e.g., piers and abutments) to the extent possible. Construction work is not anticipated in the water except for existing pier removal at Wilton MP 11.55 (see below discussion), so that aquatic habitats around the bridges would not be directly affected.

The existing Wilton MP 11.55 bridge over the Norwalk River has two piers in the water. During installation of the replacement structure (161-foot long single-span deck with no piers in the water), the existing piers would either be removed or cut below the mud line. This work would result in direct impacts in the water. The potential disturbance of river bottom and/or water quality (depending on removal technique) would be limited to the vicinity of the existing piers and would be temporary; there could be temporary turbidity effects and fish avoidance around the piers. However, post-construction conditions are anticipated to be similar to existing conditions; no long-term adverse effects on habitat conditions or populations would be expected. Overall, the proposed work at this bridge is assessed to have Low potential for impacts on biodiversity.

Relative to all of these bridge replacements, if the bridge abutments are determined to require major repairs or replacement based on future engineering and hydraulic studies, or if areas beyond the existing disturbed ROW (not currently anticipated) are required for some aspect of construction, direct impacts to River/Stream aquatic habitat would be possible at all of these bridges. In addition, construction may require soils/rock excavation and equipment access around the bridge structures which could impact adjacent habitats. Adjacent key habitats could be affected at the following bridges: Norwalk MP 5.12 (Forest along the west side of tracks, Forested Wetlands on the east side); Wilton MP 8.7 (Riparian Zone along Large River around all four corners of the bridge); Wilton MP 9.42 (Riparian Zone along Large River around all four corners of bridge); Wilton MP 12.17 (Forested Wetlands on northeast corner of the bridge); Redding MP 16.4 (Forested Wetlands on both sides of the bridge); and Bethel MP 21.4 (Forested Wetlands on all sides of the bridge).

In the past, a rail-mounted snooper has been used to access the sides and undersides of bridges for minor repairs along the Danbury Branch. Where possible, this method would be used for repairs to bridge abutments to avoid disturbance of banks and avoid direct impacts to wetlands and other habitats. In addition, every effort would be made to locate temporary material laydown areas and construction access outside of ecologically sensitive habitats (including wetlands), floodplains, cultural resources, and other regulated areas. Temporary disturbance areas would be restored to pre-construction conditions. Indirect impacts to these habitats would be minimized to the greatest extent possible through proper implementation of construction BMPs and stormwater management measures.

Due to the low likelihood of short-term and/or long-term adverse effects on ecologically sensitive areas, the UG bridge replacements on existing alignments over water are assessed to have Low potential for impacts on biodiversity. In the event that bridge abutments

require major repairs or replacements and/or construction staging and material laydown areas cannot feasibly be located outside of ecologically sensitive habitats, potential impacts on biodiversity may be Low to Moderate, depending on the specific location and extent of the construction.

Two of the UG bridges over water are slightly or totally off the existing rail alignment: Norwalk MP 3.2 over the Norwalk River and Norwalk MP 6.64 over the Norwalk River. Their potential effects on biodiversity are discussed below.

- **Bridge at MP 3.2 over the Norwalk River:** This would be a new long-span bridge on a revised track alignment (Curves 3A and 3B) south of the current alignment (and existing bridge). To minimize encroachment on the very broad Norwalk River floodway in this location, conceptual design calls for a long (160 feet) single-span bridge to avoid piers or work in the water. Based on conceptual plans, no work in the river channel would be required. The bridge site is located on high cliffs above the river channel and some blasting of rock will be required. This bridge is located between the urban development of Norwalk to the south and the highway infrastructure and ramps of Routes 7 and 15 to the north and west. Other than the river, there are no ecologically sensitive habitats in the vicinity of this site. Given these considerations, the potential for impacts on biodiversity from this new bridge construction is assessed to be Low.
- **Bridge MP 6.64 over the Norwalk River:** This bridge is associated with the realignment of Curve 6B. This curve is offset east of the existing rail alignment by approximately three feet near the southeast corner of the bridge and ties into the existing alignment on the north side of the bridge. A new 60-foot single-span structure over the Norwalk River is proposed at this location to accommodate the new alignment. The proposed replacement would be conducted from the railroad ROW (e.g. by rail-mounted equipment) to the extent possible and the new bridge deck would use the existing abutments if possible. No work is anticipated to be needed in the water. However, the temporary and permanent impact zone on the southeast side of the bridge may extend approximately three (3) feet beyond the existing disturbed ROW; this area would be permanently stabilized as railroad embankment. Given the existing width (approximately 15') of stable and previously disturbed rail embankment here and the very slight alignment shift, there may be options at this bridge to contain the construction work within the existing disturbed areas to avoid encroachment on adjacent ecologically sensitive habitat along the river bank. The habitat called Riparian Zone along Large River occurs on all sides of the bridge. This habitat includes forested wetlands with excellent quality habitat for wildlife and additionally serves to stabilize the river banks and provide overarching branches/shade for aquatic species.

If vegetation clearing and other habitat alterations can be avoided, impacts to ecologically sensitive habitat from this bridge replacement would be avoided. If vegetation would be cleared, fill materials used, and/or other disruptions required that result in permanent loss of well-developed riparian forest structure,

approximately 0.02 ac of Riparian Zone would be affected by the bridge construction and Curve 6B combined. This area would be mitigated through a comprehensive wetland mitigation plan. However, due to the slight shrinking of this very ecologically rich habitat type, Moderate impacts to biodiversity could be expected.

Overhead (OH) bridges (railroad goes under a road or in a tunnel): There is one OH bridge replacement in Alternative C: the Route 7 Bridge in Wilton at MP 7.87. There is Riparian Zone along Large River mapped on the west side of the bridge/rail crossing. Based on conceptual design, the existing bridge would be replaced by a slightly longer bridge to accommodate the track's slight shift in alignment (4-8 feet to the west) for Curve 7E. The finished bridge would be a two-lane roadway bridge of the same width as the existing bridge. However, the northern bridge abutment requires reconstruction to accommodate Curve 7E, so there would be ground disturbance in the vicinity of this abutment on the northwest side. The conceptual footprint of the abutment lies within previously disturbed slopes and embankments around the roadway and construction and staging areas would be located to the extent possible on previously disturbed rail and roadway ROWs adjacent to Route 7. However, if construction activities extend beyond these previously disturbed lands, there could be direct impacts to the Riparian Zone (approximately 0.02 ac). In addition, there is a state-listed species of special concern in this vicinity: an unnamed ground beetle (*Bembidion lacunarium*).

If habitat outside the existing disturbed ROW can be avoided, as determined by future design, potential effects on biodiversity at this site would be Low. If habitat outside the existing disturbed ROW cannot be avoided, the potential effects on biodiversity at this site would be Moderate. Relative to the beetle, the DEEP recommends that a field survey be conducted of the project site to record the presence/absence of the species, to map its extent, and to identify measures for protection (see T&E Species Tech Memo 2 for more details).

Traction Power System - Electrification

Facilities associated with the proposed Traction Power System (facilities for electrification) extend from approximately MP 1.1 in Norwalk to MP 23.9 in Danbury. Facilities include electrical substations, the smaller remote terminal units (RTUs), and catenary and support structures.

Substations and remote terminal units (RTUs): Substations and RTUs proposed by this alternative will occupy relatively small trackside areas along the project study corridor. The substations proposed at Norwalk, Wilton, and Ridgefield, and the RTU proposed in Norwalk have been located on previously disturbed ground and will not disrupt ecologically sensitive habitats or affect biodiversity. The substation in Redding could affect biodiversity, as follows:

- **Redding Substation (SUB-RED):** Based on the conceptual layout, this substation located north of the Redding passenger station would permanently impact approximately 0.02 ac of Forested Wetlands and would incur additional impacts

to surrounding forest habitat along Hawley Brook, a tributary of the Saugatuck River. The impact is associated with the west side of the substation housing and the surrounding gravel apron. In addition, there are additional temporary impacts anticipated during construction. This temporary impact area would be restored as wetlands, but there would likely be an impairment of functions for some duration after restoration, due to the many years required to restore forested wetlands to their former complexity and structure. The approximately 150-foot wide wildlife travel corridor would be reduced in width through the clearing of vegetation; its width would be reduced by 25-50 percent when combined with the impacts of the Redding Station improvements. The loss of habitat, although relatively small, combined with the narrowing of the wildlife travel corridor, would diminish the availability of cover, food, and movement-corridor resources for wildlife. Potential impacts to wildlife biodiversity are thus assessed to be Moderate from this improvement.

Catenary and support structures: Catenary structures will be installed in railroad ballast/gravel and may also occur within the edges of adjacent habitats, where these habitats abut and/or encroach upon the disturbed rail ROW. The Alternative C track passes next to urban and suburban residential lands, cleared industrial properties, upland forest, forested wetlands, and open water ponds. No poles are anticipated in water, but some slight impacts to Forested Wetlands are expected. Permanent wetland impacts from these structures are estimated to include 280 SF (less than 0.01 ac) of Forested Wetlands, with additional temporary impacts.

The potential impacts to biodiversity from the catenary installation would likely be Low because the installations are along edges where disturbance is already common and the permanent impact areas at each pole are very small (approximately 20 SF). Existing (unused) catenary poles will be removed throughout the length of this alternative, further reducing the potential for net loss of habitat. The installation of catenary structures would not cause additional barrier effects to wildlife movements; the existing rail bed and tracks form an existing and extensive barrier to east-west movements. Impacts to ecologically sensitive habitats are most likely where the track will be offset from its existing alignment and poles are proposed outside the previously maintained rail bed. Those locations are described further under the curve realignments.

Track Reconfigurations, Sidings and Connections

There are many track reconfigurations proposed under Alternative C to improve rail operations and/or speed. There are approximately 23 curve reconfigurations plus a reconfiguration to improve the branch connection with the New Haven mainline in South Norwalk, designated as CP241. There are no passing or storage sidings proposed by Alternative C.

Track curve reconfigurations: The track curve reconfigurations are locations where existing curves would be redesigned to flatten out sharp curves; this would allow greater train speeds. Each reconfiguration involves changes to one or more curves. The amount of the proposed flattening or shift of the track (to the inside of the curve) varies from 1 foot to 40

feet for different curves. Where a proposed shift is only one or two feet from the existing track, no changes to the existing rail bed are anticipated. This is because the rails can simply be moved within the existing track bed. Where a proposed shift is three feet or greater from the existing track, new fill (or an excavation) would be placed alongside the existing rail bed on the side of the track shift (east or west of the existing track) to support the track in its new location. In these cases, the toe of slope for the new rail bed embankment would extend beyond its current location by the same distance as the track shift (since the rail and the rail bed are shifting together). Hence, the direct impact zone for each curve with a shift of 3 feet or more would be approximately the same width as the proposed track shift. For example, if a particular curve shift is 16' (feet) east of the current track (centerline) at its farthest point, the estimated impact zone on lands adjacent to the rail bed is 16' wide at its greatest width. The shape of each impact zone is like a crescent, with the broadest impact zone in the middle of the curve; the impact zone narrows down where the ends of curve connect to the existing track. Impacts to ecologically sensitive habitats in these curve footprints would be permanent impacts.

Curve reconfiguration work is anticipated to be conducted from the existing rail (e.g. from rail-mounted equipment) and within the existing disturbed rail bed, so few if any temporary impacts would be expected.

Where the proposed track realignment totally diverges from the existing alignment, the new alignment footprint is 30' wide centered on the new track. Direct impacts to ecologically sensitive habitats within the new alignment envelope would be permanent. All efforts would be made to construct the new alignments from areas within the permanent impact footprint to avoid temporary impacts outside the permanent footprint. Sections of former track (not part of the new curves) would be removed. The ground surface within the former track footprint would be stabilized and planted to establish vegetative cover consistent with the ROW wherever possible.

Potential impacts to ecologically sensitive habitats were assessed to occur from the track realignments listed below (see Table 1 for evaluation of all curves and the extent of the track shifts from the existing track center line under Alternative C). Note that a single realignment sometimes consists of several curves. In cases where two or more curves are lumped together as one improvement, it means that the curves are interdependent (i.e., one curve would not be constructed without the others in the group).

- **Curve 6B:** Realignment of Curve 6B in Wilton, south of the proposed replacement bridge at MP 6.64, will impact the habitat called Riparian Zone Along Large River on the east side of the tracks. Approximately 0.02 acres may be affected by this slight (3' maximum) shift of the track. Although the impact area would be small, the riparian habitat which surrounds the rail in this location not only provides high quality habitat directly for diverse wildlife species, but it helps to preserve the Cold Water Habitat designated in this stretch of the Norwalk River. Riparian forest vegetation and diverse wildlife species depend upon riverine habitat for travel, forage, cover and breeding purposes would be slightly impacted. Indirect deterioration of aquatic habitat from removal of some shade-

producing canopy and their vegetative inputs to the riverine system could occur. The potential for impacts on biodiversity from this curve is thus assessed as Moderate.

- **Curve 7E [reconfiguration includes Curves 7E & 8]:** Curve 7E is offset up to 8' west from the existing track centerline and triggers the need for the overhead Route 7 Bridge replacement (MP 7.87). There is Riparian Zone Along Large River mapped on the west side of the tracks in this location. Where the offset begins to reach 3 feet or more (and thus may cause physical impacts beyond the existing disturbed rail bed), the track moves toward the abutments of the overhead Route 7 roadway bridge and toward the back yards of residential and commercial properties fronting on Route 7. The area is characterized by disturbed soils with a mix of upland deciduous trees and shrubs. However, as noted in the discussion of the Route 7 Bridge in the *Overhead Bridges* section, if construction activities extend beyond these previously disturbed lands, there could be direct impacts to the Riparian Zone (approximately 0.02 ac). In addition, there would be potential impacts to a state-listed species of special concern in this vicinity: an unnamed ground beetle (*Bembidion lacunarium*). In that case, the DEEP recommends that a field survey be conducted of the project site to record the presence/absence of the species, to map its extent, and to identify measures for protection (see T&E Species Tech Memo 2 for more details).

Similar to the Route 7 Bridge, if habitat outside the existing disturbed lands and ROW can be avoided, as determined by future design, potential effects on biodiversity at this site would be Low. If habitat outside the existing disturbed lands cannot be avoided, the potential effects on biodiversity at this site would be Moderate.

- **Curve 9C:** Curve 9C in Wilton involves an offset of up to 42' west of the existing track. The habitat called Riparian Zone Along Large River lies off to the west of the existing rail alignment. Curve 9C is estimated to impact approximately 0.12 ac of this habitat, which includes wetland and floodplain forests. This habitat encompasses the Norwalk River, which has been designated Cold Water Habitat in this vicinity. This undeveloped area may be utilized by wildlife for travel, forage, cover and breeding purposes. The Norwalk River is close to the existing tracks through this stretch (approximately 100-200 feet away), so this curve shift would reduce the vegetated buffer/habitat along the river for approximately 0.3 miles – by half its width in some places -- and diminish the usefulness of the wildlife movement corridor. Indirect deterioration of aquatic habitat from removal of some shade-producing canopy trees and their vegetative inputs to the riverine system could result. Due to the great importance of wide vegetated buffers along rivers to biodiversity, the potential for impacts on biodiversity from this curve is assessed as High.
- **Curve 13B:** Realignment of Curve 13B in Redding 12' east of the existing rail centerline will remove undeveloped forested land within a Forest Block Greater

Than 100 Acres east of the existing track. (Forest Block 2 on Tech Memo 1 mapping). Approximately 3,400 SF (0.08 ac) of this forest would be impacted in a linear strip along the rail line. The impact area is within the southernmost projection of the forest block, which is a relatively narrow projection surrounded by development on three sides and therefore already partially fragmented. The narrow reduction of forest in this area is assessed to have Low potential impacts on biodiversity.

- **Curve 14B [reconfiguration includes Curves 14B, 14C, 14D & 15A]:** Realignment of Curve 14B in Redding 13' west of the existing rail centerline will remove undeveloped forest within Forest Habitat. Approximately 33,000 SF (0.76 ac) of this forest would be impacted. The impacts would occur as a relatively narrow strip along the edge of the rail. This forest area may be utilized by wildlife for travel, forage, cover and breeding purposes. The T&E Tech Memo 2 determined that the direct loss of deciduous (hardwood) forest at this site could result in impacts to habitat of a state-listed threatened butterfly, the Appalachian blue (*Celastrina neglectamajor*). Based on the DEEP recommendations for invertebrates, a field survey would be needed of the project site to record the presence/absence of the species, to map its extent, and to identify measures for protection (see T&E Species Tech Memo 2 for more details). Potential impacts on biodiversity from this curve are assessed as High from this curve.
- **Curve 15C [reconfiguration includes Curves 15B & 15C]:** Curve 15C would shift the track up to 23 feet east of its existing alignment. All of the impact zone of this reconfiguration consists of Pond (Umpawaug Pond) and Shrub Inland Wetlands. Approximately 0.08 ac of open water and 0.3 ac of Shrub Inland Wetlands would be filled by this curve. The pond and wetlands have high quality wildlife habitat and fish and shellfish habitat. In addition, the T&E Tech Memo 2 identified potential impacts on one state-listed plant and seven state-listed invertebrate species associated with wetlands and water: water marigold (*Megalodonta beckii*); sedge skipper (*Euphyes dion*); Bronze copper butterfly (*Lycaena hyllus*); Newman's brocade moth (*Meropleon ambifuscum*); Harris' checkerspot butterfly (*Chlosyne harrisii*); two unnamed ground beetles (*Badister transverse* and *Bembidion pseudocautum*), and a lymnaeid snail (*Fossaria rustica*). Based on the DEEP recommendations for invertebrates, field surveys of the project site would be needed to record the presence/absence of the species, to map their extent, and to identify measures for protection (see T&E Species Tech Memo 2 for more details). The potential for impacts to biodiversity is assessed to be High at this location, particularly related to aquatic and wetland plant and wildlife species.
- **Curves 16A [reconfiguration includes Curves 16A & 16B]:** Realignment of Curve 16A will impact a Forest Block Greater Than 100 Acres (Forest Block 3 on Tech Memo 1 mapping) and Forested Wetlands. Curve 16A would be shifted up to 22' east of the current track centerline, moving it closer to the parallel Simpaug Turnpike, which is approximately 50 feet from the existing rail alignment. The

impacted area would be a strip of almost 5 acres, including approximately 0.25 ac of Forested Wetlands with high wildlife habitat value. The T&E Tech Memo 2 identified potential impacts from this curve on the state-listed Appalachian blue butterfly and a lymnaeid snail (*Fossaria rustica*). Based on the DEEP recommendations for invertebrates, a field survey would be needed of the project site to record the presence/absence of the species, to map their extent, and to identify measures for protection (see T&E Species Tech Memo 2 for more details). There is High potential for impacts to biodiversity from this curve.

- **Curve 17A** in Redding will shift the track up to 6' to the west, potentially filling approximately 0.01 ac of Forested Wetlands. One of the primary functions associated with these wetlands is wildlife habitat. The small size of the affected strip and its location next to a village development – signifying prior fragmentation -- indicate Low potential for biodiversity impacts.
- **Curve 17B** in Redding will shift the track up to 11' to the east, potentially filling approximately 0.002 ac of Forested Wetlands and approximately 0.25 ac of additional Forest Habitat. The primary functions and values associated with the wetlands are wildlife habitat and sediment/toxicant retention and transformation. The affected forests are part of the Bogus Mountain Brook stream corridor and are thus likely important as habitat as well as for wildlife movement. The potential for impacts to biodiversity from this curve is assessed as Moderate.
- **Curve 17C:** Realignment of Curve 17C in Redding 15' west of the existing track centerline would remove approximately 27,000 SF (0.6 ac) of a Forest Block Greater Than 100 Acres (Forest Block 5 on the Tech Memo 1 mapping). This relatively small habitat loss compared to the size of the forest block would be unlikely to immediately and directly cause a decline in species but this forest is a high quality relatively intact forest in an otherwise very developed portion of the corridor. The potential biodiversity effects have therefore been assessed as Moderate.

Additional branch connection at CP 241: The construction of the additional branch connection at CP 241 from MP 0 to MP 0.3 in Norwalk will occur within the very urban lands of downtown Norwalk. The site is not located within ecologically sensitive habitats; therefore no impacts to biological diversity are anticipated.

Storage and Maintenance Yards

The proposed work at the Danbury Yard is within the level, urban-industrialized existing rail yard. Improvements planned at the Danbury yard in Danbury (MP 23) are not within ecologically sensitive habitats and would not affect the channelized Still River which runs through the site. Therefore impacts to biological diversity are not anticipated.

Alternative D - Extension from Danbury to New Milford

Alternative D would extend existing Danbury Branch passenger service 14.7 miles from Danbury to New Milford. This includes replacing the existing freight track by constructing new track along the same alignment to accommodate speeds up to 60 miles per hour, adding new stations and parking facilities at Danbury North, Brookfield and New Milford, and adding new rolling stock. A new maintenance facility and storage yard would also be built in the vicinity of New Milford. The results of the impact analysis for biodiversity from the Alternative D improvements are described further below. See Table 2 for the full impact assessment of all improvements.

Rail Reconstruction

Alternative D calls for reconstruction of the entire 14.7 miles of track from Danbury to New Milford. This work would provide a higher quality of rail on new ties in order to accommodate train speeds up to 60 miles per hour. This work would essentially replace the existing rail in place and therefore would not change track profiles or ground elevations. The track in most locations is centered within level ground stabilized by ballast and gravel. The replacement work will be done in short segments by rail-mounted equipment, take place in level areas of gravel and ballast fill, and will be stabilized as soon as the replacement section is in place. Therefore this work would have no direct or indirect effects on biodiversity. The construction of track curve reconfigurations, where the rail would be installed on slightly different alignments, is discussed in the section on *Track Reconfigurations, Sidings and Connections* below.

Passenger Stations (New)

Improvements from Danbury to New Milford under Alternative D will involve the construction of two new passenger stations: Brookfield and New Milford. Both new stations will involve the construction of passing sidings, 300-foot long high-level platforms with canopies, new passenger waiting shelters, and new surface parking lots with a capacity of approximately 100 vehicles. The New Milford Station and passing siding are located on previously disturbed developed lands and would not impact biodiversity. The Brookfield Station and siding are partially located on undeveloped lands and were assessed to have potential for impacts.

- **Brookfield Station and Siding:** The Station site is located in a historical settlement area of Brookfield, so there have been various developments. However, a narrow Riparian Zone Along Large River (Still River) exists along the west side of the Station site and Forest Habitat occurs in the vicinity of the proposed siding. [Note: these habitats were observed during field visits for Tech Memo 2; they were too small/narrow to be mapped in Tech Memo 1.] Five T&E species were noted by the DEEP in proximity to this site: Bush's sedge (*Carex bushii*); northern slimy salamander (*Plethodon glutinosus*); eastern box turtle (*Terrapene carolina*); wood turtle (*Glyptemys insculpta*); and the eastern hognose snake (*Heterodon platirhinos*).

The Riparian Zone is a rectangular strip of approximately 1.2 acres on the west side of the tracks, extending northerly from the existing historic train station building and

located between the tracks and a dirt driveway. It supports deciduous trees along the banks of the Still River, which lies at a distance of 25 to 100 feet from the conceptual footprint of the station development. The station development would clear deciduous trees along the banks of the Still River and pave over approximately 1.2 ac within this remnant Riparian Zone. River-side vegetation is extremely important on a daily basis for wildlife feeding, roosting, dispersal, and access to water. It is also important for providing shade to the river and providing terrestrial sources of food and nutrients to the aquatic environment. The T&E Tech Memo 2 noted that the impacted forested habitat includes preferred habitat for the northern slimy salamander and the wood turtle. If present in this location, these species would likely be affected by loss of habitat and/or direct mortality. In addition, there would also be a loss of habitat connectivity along the river bank because the existing forested strip would be greatly reduced in width (from 25-100 feet to less than half of that), diminishing the available food and cover resources and exposing wildlife to human activity. The potential for biodiversity impacts from the station have thus been assessed as High.

Construction of the siding would occur on the east side of the tracks opposite the station development, between the powerlines and the existing track. This is a lightly wooded deciduous upland bordered by residential properties to the east of the powerlines; the impacted area is approximately 2 acres. The T&E Tech Memo 2 assessed that the area impacted by the siding includes preferred habitat for Bush's sedge, eastern box turtle, and the eastern hognose snake and that these species could be impacted by loss of habitat and/or direct mortality. In addition, the new siding would increase the barriers to east-west movements for these wildlife species, in an area where movements have already been compromised. The potential for biodiversity impacts from the siding have thus been assessed as High.

To minimize harm on all of the potentially affected T&E species, the DEEP recommends avoiding habitat areas. Further coordination with DEEP would be necessary for these improvements relative to the need for surveys and development of protective measures (see T&E Species Tech Memo 2 for more details).

Structures and Bridges

There are six undergrade (UG) bridge replacements (on existing track alignments) proposed by Alternative D. All of the overhead bridge replacements are triggered by the electrification option and are reported as Bridge Raisings in the section on *Traction Power System – Electrification*.

Undergrade (UG) bridges (railroad goes over a road or stream): Three of the UG bridges are over roadways and are not in the vicinity of ecologically sensitive habitats. One of the bridges over a roadway (Brookfield MP 29.9 over Farm Pass) is surrounded by Forested Wetlands. However, construction methods and general disturbance from construction of this bridge replacement would be the same as described under Alternative C for the UG bridges on existing alignments. Existing bridge abutments are proposed to be used to support the new structure and construction is anticipated to occur from the rail and roadway rights of way (ROWs). Impacts to adjacent habitats are thus not anticipated.

The other two UG bridges are over the Still River and by definition have potential to affect River habitat. They also have other adjacent ecologically sensitive habitats. Their potential for biodiversity impacts are the following:

- **Bridge over the Still River in Danbury at MP 26.6:** Based on conceptual design, the existing bridge over the Still River would be replaced with a 207-foot long two-span ballast deck on the existing rail alignment. The replacement bridge would require a new pier in the Still River that would have a direct footprint impact of approximately 300 SF (0.007 ac). The two piers of the existing bridge in the water would either be removed or cut-off below the mud line. If the existing bridge abutments require repair, rehabilitation or replacement, there could be additional direct impacts to wetlands and water resources at this crossing.

Additional temporary impacts in the water are expected during construction, associated with the installation of the pier. Short-term disruption of bottom sediments and turbidity may occur during construction. Use of flotation dams at the perimeter of in-water work areas and other appropriate measures will be implemented to contain the work area and minimize turbidity and other temporary water quality effects during construction. Fish and wildlife would likely avoid the area during construction. Given the temporary nature of the work and the minor change in bridge pier configuration, adverse effects on River habitat are not expected and potential biodiversity effects are assessed to be Low.

On the land side, construction methods are proposed to be as non-intrusive as possible, similar to the other UG bridges. The new bridge deck would be installed on existing abutments, avoiding changes in rail bed, rail embankments, and adjacent landscape features. If areas beyond the existing abutments and the existing disturbed ROW can be avoided by the construction, potential impacts on biodiversity would be Low from this improvement. However, if the bridge abutments are determined to require major repairs or replacement based on future engineering and hydraulic studies, or if areas beyond the existing disturbed ROW are required for some aspect of construction, direct impacts to the Riparian Zone Along Large River would be possible at this bridge. The Riparian Zone is located along the north side of the river on both sides of the bridge and includes a mix of upland and wetland forests. In this situation, impacts on biodiversity could be Low or Moderate, depending on the specific location and extent of construction.

- **Bridge MP35.1 over the Still River in New Milford.** The existing bridge would be replaced with a 102-foot long single span proposed to be placed upon the existing bridge abutments. If areas beyond the existing abutments and the existing disturbed ROW can be avoided by the construction, potential impacts on biodiversity would be Low from this improvement. If, however, the bridge abutments require major repairs or replacement based on future engineering and hydraulic studies, or if areas beyond the existing disturbed ROW are required for some aspect of construction, direct impacts to Forest Habitat along the east side of

the rail bed would be possible. Under that scenario, impacts on biodiversity could be Low or Moderate, depending on the specific location and extent of construction.

Traction Power System - Electrification

Electrification is an option under Alternative D, extending from approximately MP 23.9 in Danbury to MP 39 in New Milford. Facilities required for electrification include catenary and support structures and two electrical substations, one in Brookfield and one in New Milford. There are no RTUs in this alternative. Seven (7) overhead (OH) bridges would need to be raised to provide enough clearance for the catenary wires to pass under them. The substation sites are not located within key habitats; they are on existing disturbed and previously developed lands and would not affect biodiversity. The catenary structures and two of the bridge raisings are located in areas with key habitats, as described below.

Catenary and support structures: The catenary structures will be installed in railroad ballast/gravel and may also occur within the edges of vegetated habitats, where these habitats abut and/or encroach upon the disturbed rail ROW. The track passes next to urban and suburban lands, cleared industrial properties, upland forest, forested wetlands, river banks, and open water ponds. No poles are anticipated in water, but some slight impacts to Forested Wetlands are expected. Permanent wetland impacts from these structures are estimated to affect approximately 0.01 ac of Forested Wetlands, with additional temporary impacts.

The potential impacts to biodiversity from catenary installation are anticipated to be Low because the installations are along edges where disturbance is already common and the permanent impact areas at each pole are very small (20 SF). The installation of catenary structures would not cause indirect barrier effects to wildlife movements. Impacts to ecologically sensitive habitats are most likely where the track will be offset from its existing alignment and poles are proposed outside the previously maintained rail bed. Those locations are described further under the curve realignments.

Bridge Raisings: Two of the seven bridge raisings may affect ecologically sensitive habitats.

- **New Milford (MP 33.9) Old Pumpkin Hill Road Bridge:** There are ecologically sensitive habitats close to this bridge site. There are Forested Wetlands near the northeast and southeast sides of the bridge and a Forest Block Greater Than 100 Acres (Forest Block 7 on the Tech Memo 1 mapping) off to the southeast side of the bridge. Old Pumpkin Hill Road meets Aldrich Road at a “T” close to where the west end of the bridge touches down. To the west of Aldrich Road in this location is another Forest Block Greater Than 100 Acres (Forest Block 6 on the Tech Memo 1 mapping) which is coincident with a DEEP designated critical habitat. This site is in an area of concern for two state-listed threatened species: the northern slimy salamander (*Plethodon glutinosus*) and the purple martin (*Progne subis*).

Construction methods call for the bridge raising to be constructed primarily by equipment staged on the roadway (during a road closure). However, there would be construction work and physical changes at the bridge ends (abutments), and there may be a need for temporary construction access along the sides of the bridge. Based on conceptual design, the bridge footprint and temporary construction zones would not extend far enough from the road to encroach upon the Forested Wetlands or Forest Block east of the bridge. To the west, construction would not extend farther than the existing pavement of Aldrich Road, so there would be no anticipated impacts to the Forest Block and critical habitat on the west side of Aldrich Road.

The impacted areas around the bridge have a variety of vegetation but do not include key habitats. They include: narrow deciduous forest strips between the tracks and Aldrich Road to the west of the bridge; cultivated open fields on the southeast corner of the bridge; and upland sapling-shrub cover adjacent to recent residential development on the northeast corner. The Tech Memo 2 on T&E Species notes that these areas do not contain steep moist rocky slopes preferred by the slimy salamander, so impacts to this species are not anticipated. Disturbance of a narrow edge of open fields at the southeast corner of the bridge, however, could impact preferred habitat of the purple martin. As recommended by the DEEP, if purple martins are observed to be nesting on site, construction work should be conducted August-March to avoid nesting season. Further coordination with the DEEP would be necessary to identify known locations of this bird and impact avoidance measures. Protective measures include retaining undisturbed buffers around the nesting colony (see T&E Species Tech Memo 2 for more details). Given the very small, if any, encroachment on purple martin habitat and the implementation of protective measures if birds are present in this habitat, the potential for biodiversity is assessed to be Low at this bridge site.

- **New Milford (MP 34.74) Erickson Road Bridge:** This bridge is located almost a mile north of the Old Pumpkin Hill Road crossing. Similar to Old Pumpkin Hill Road bridge, construction methods call for the bridge raising to be constructed primarily from the road itself, with additional work around the abutments and temporary construction access along the sides of the bridge.

At this site, there is a Riparian Zone Along Large River, which includes upland and wetland forests, on the west side of the bridge and Forested Wetlands on the east side. The forests on the west side of the bridge (west side of Erickson Road) are associated with the Still River and are within a DEEP designated critical habitat area. These wetlands provide excellent quality habitat, with high potential for plant and wildlife diversity. The habitat on the east side of the bridge is more fragmented, with wetland and upland forest patches constricted between Erickson Road and the tracks on the south side of the bridge and between Erickson Road and houses on the north side of the bridge. There is a state-listed endangered species in the vicinity of this site – the sharp-shinned hawk (*Accipiter striatus*).

Approximately 0.04 ac of Riparian Zone west of the bridge, including 0.02 ac of Forested Wetlands and a similar area of adjacent uplands (0.02 ac) could be permanently impacted by this bridge raising. Temporary impacts may result from construction access, which could amount to approximately 0.1 ac of additional disturbance to upland and wetland forests.

Permanent impacts to wetlands would be mitigated as close to the site as possible. The permanent impacts would be a very minor loss of forested habitat along an existing habitat edge between the road and a golf course; it would be unlikely to immediately affect the viability of any plant or animal populations, including sharp-shinned hawks. The temporary impact areas would be restored, but there would likely be an impairment of habitat for some time after restoration, due to the many years required to restore forested habitats to their former complexity and structure. These forest areas are important vegetated buffers contributing to the health of the riverine (aquatic) habitat. Given the recognized importance of this habitat area for biodiversity, potential impacts at this site are assessed to be Moderate.

The Tech Memo 2 on T&E Species notes that impacts to sharp-shinned hawk habitat would not be likely at this site. However, further coordination with the DEEP would be conducted to identify avoidance and protective measures, which may include a survey for nesting birds near the construction area and avoiding construction during nesting season (see T&E Species Tech Memo 2 for more details).

Track Reconfigurations, Sidings and Connections

There are five track curve reconfigurations proposed under Alternative D to improve rail operations and/or speed. See Table 2 for their locations by MP. Crossover connections at the Danbury Yard and at MP 26.96, approximately 2.6 miles north of Danbury Yard, are planned for operational improvements. One storage siding spanning Danbury and Brookfield at MP 27.24 - 27.58 is proposed.

None of these improvements are located within or adjacent to ecologically sensitive habitats. These improvements are therefore not anticipated to affect biodiversity.

Storage and Maintenance Yards

There are no ecologically sensitive habitats affected by the New Milford Storage and Maintenance Yard; therefore no impacts to biological diversity are anticipated.

Alternative E - Improvements from South Norwalk to Wilton

Alternative E is being considered at the direction of the State of Connecticut's Transportation Strategy Board. It would provide partial electrification of the Danbury Branch, from South Norwalk to Wilton, from approximately MP 1.1 to MP 7.5. It would also involve improvements

to the Merritt 7 Station, track curve reconfigurations, and bridge improvements from MP 0 to MP 7.5. Impacts from this alternative are therefore a subset of the impacts of Alternative C and are described below. See Table 3 for the full impact assessment of all improvements.

Passenger Stations (Existing Station Upgrades)

The Merritt 7 Station in Norwalk is the only improved station under this alternative. The improvements are on existing developed properties and will not affect any ecologically sensitive habitats. No impacts to biological diversity are anticipated.

Structures and Bridges

There are three undergrade (UG) bridge replacements over roadways and four UG bridge replacements over water proposed by Alternative E. There are no overhead bridge replacements.

There are no ecologically sensitive habitats in the vicinity of the bridges over roadways and thus no potential for biodiversity impacts. The four bridges over water are a subset of the bridges discussed under Alternative C. The potential impacts as summarized from that discussion are the following:

- **Norwalk (MP 3.2) over the Norwalk River:** This would be a new long-span bridge on a revised track alignment (Curves 3A and 3B). Based on conceptual plans, work in the river channel can be avoided by construction, since the crossing site is located on high cliffs above the river channel. Other than the river, there are no ecologically sensitive habitats in the vicinity of this site. The potential for impacts on biodiversity from this new bridge construction is therefore assessed to be Low.
- **Norwalk (MP 5.12) over tributary to Norwalk River:** This bridge replacement on existing alignment is assessed to have Low potential for impacts on biodiversity. If the bridge abutments are determined to require major repairs or replacement based on future engineering and hydraulic studies, or if areas beyond the existing disturbed ROW (not currently anticipated) are required for some aspect of construction, direct impacts to ecologically sensitive aquatic habitat would be possible at this bridge, in addition to Forest along the west side of tracks and Forested Wetlands on the east side of the tracks. In that situation, impacts could be Low or Moderate, depending on the extent of the construction.
- **Norwalk (MP 6.43) over Norwalk River:** This bridge replacement on existing alignment is assessed to have Low potential for impacts on biodiversity. If the bridge abutments are determined to require major repairs or replacement based on future engineering and hydraulic studies, or if areas beyond the existing disturbed ROW (not currently anticipated) are required for some aspect of construction, direct impacts to River (aquatic) habitat would be possible at this bridge, which could result in Low or Moderate impacts on biodiversity, depending on the extent of the construction. There are no adjacent terrestrial key habitats at this bridge.
- **Norwalk (MP 6.64) over the Norwalk River:** If vegetation clearing and other habitat alterations can be avoided, impacts to ecologically sensitive habitat from this bridge replacement would be avoided and potential effects on biodiversity would be

Low. If vegetation would be cleared, fill materials used, and/or other disruptions required that result in permanent loss of well-developed riparian forest structure, approximately 0.02 ac of Riparian Zone would be affected by the bridge construction and Curve 6B combined. This area would be mitigated through a comprehensive wetland mitigation plan. However, due to the slight shrinking of this very ecologically rich habitat type, Moderate impacts to biodiversity could be expected.

Traction Power System - Electrification

For Alternative E, electrification facilities would extend from approximately MP 1.1 in Norwalk to MP 7.5 in Wilton. Facilities include one electrical substation, one RTU, and catenary and support structures. Catenary poles may occur along the edges of habitat areas; none of the other electrification facilities would affect ecologically sensitive habitats or biodiversity.

Catenary and support structures: The catenary structures will be installed in railroad ballast/gravel and may also occur within the edges of adjacent habitats where they abut the disturbed rail ROW. The track passes next to urban and suburban lands, cleared industrial properties, upland forest, forested wetlands, and river banks. No poles are anticipated in water or wetlands within the Alternative E study area, and the rails in this area are lined by dense industry or residential neighborhoods of Norwalk on both sides. Based on these conditions, impacts to biodiversity from the installation of catenary in this alternative are considered very unlikely; at worst, the potential for impacts would be Low.

Track Reconfigurations, Sidings and Connections

For Alternative E, there are approximately seven (7) curve reconfigurations plus a reconfiguration to improve the branch connection with the New Haven mainline in South Norwalk (CP241). There are no passing or storage sidings proposed by Alternative E.

Track curve reconfigurations: One of the track realignments within Alternative E could impact biological diversity. This is Curve 6B, described above under the UG bridge replacements (Bridge at MP 6.64 over the Norwalk River). Approximately 0.02 acres of Riparian Zone along Large River, on the east side of the tracks, may be affected by this slight (3' maximum) shift of the track. Although the impact area would be small, the riparian habitat which surrounds the rail in this location not only provides high quality habitat directly for diverse wildlife species, but helps to preserve the Cold Water Habitat designated in this stretch of the Norwalk River. The potential for impacts on biodiversity from this curve is thus assessed as Moderate.

Additional branch connection at CP 241: The construction of the additional branch connection at CP 241 from MP 0 to MP 0.3 in Norwalk will occur within previously disturbed land and within the existing rail property; no ecologically sensitive habitats are present. Therefore, no impacts to biological diversity are anticipated.

EXECUTIVE ORDER ON INVASIVE SPECIES

The project will include all efforts to adhere to Executive Order 13112 – Invasive Species. This federal order outlines approaches to minimize the effects of invasive species on the ecosystems of the United States. A key portion of the order is the establishment and enforcement of the National Invasive Species Management Plan (NISMP) by the Invasive Species Council (ISC). The NISMP establishes five strategic goals to prevent and mitigate for the spread of invasive plant and animal species:

- Prevention – halt introduction and establishment
- Early Detection and Rapid Response – identify, report, and respond
- Control and Management – contain and reduce spread
- Restoration – rebuild high value ecosystems
- Organizational Collaboration – efficient coordination with international, federal & state entities

Each strategic goal has objectives and implementation tasks to guide best practices, and each includes performance standards. The methods outlined in Executive Order 13112 will be incorporated into invasive species prevention, management and mitigation approaches for the Danbury Branch Improvement Program.

MITIGATION

Alternatives A and B would have no impacts and would therefore not require mitigation. Alternatives C and D would both cause direct loss of key habitats which provide for biodiversity as well as indirect cumulative effects on biodiversity. Alternative E has a much smaller potential for impacts to biodiversity, with less potential for indirect cumulative effects.

Most impacts from the build alternatives (C, D, and E) occur within the key habitats of Riparian Zone Along Large River, Forested Wetlands, and Forest Habitat. As mitigation is developed for project-wide impacts to wetlands, watercourses, floodplains, and T&E species, there will be opportunities to address the losses and/or degradation of habitats which support biodiversity. For impacts within these terrestrial habitats, mitigation would be oriented toward replacing the vegetative structure and ecological functions of the affected habitats.

For impacts within aquatic habitats, mitigation for any loss of open water and/or length of stream bank, such as from fill in water bodies and waterways, would be required. Mitigation would take the form of shoreline reestablishment and open water area replacement, at a minimum. Additional measures to compensate for any impacted ecological values may be required, such as creation of fish habitat, establishment of native plants on fill slopes and enhancements of adjacent shoreline or aquatic habitats.

Given the presence of undeveloped lands combined with previously disturbed areas in the study corridor, there appear to be ample opportunities for habitat mitigation in the study corridor. Potential mitigation measures include (but are not limited to) the following:

- Restoration or enhancement of habitat
- Restoration or enhancement of habitat connectivity in locations of at-risk wildlife populations; e.g., by installing culverts adapted for wildlife passage or removing physical barriers
- Preservation of high quality existing habitats at risk of development; e.g., through purchase or acquisition of development rights
- Monitoring studies of wildlife or plant populations
- Additional measures (to be determined) as developed in coordination with DEEP relative to the protection of state-listed species

If preservation is pursued, priorities for the preservation strategy will include the acquisition and/or protection of land exhibiting one or more of the following characteristics:

- Contiguous with existing preserved areas
- Adjacent to areas with low potential for development
- Probability for sustained ecological and biological diversity value for the foreseeable future (e.g. low probability for future degradation from development of surrounding land)
- Connects two or more preserved areas
- Habitat blocks under imminent threat from development
- Contains important wetlands: riparian areas, vernal pools, high-value wetlands (e.g. significant in maintaining water quality, stream flow and aquatic habitat in a contiguous or downstream watercourse)
- Contains habitat, or has the potential for creation of habitat, for any endangered species determined to be impacted by the project based on the biological surveys
- Combination of the above to promote the creation of an ecological preserve

Table 1: Alternative C Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiveristy
		From	To					
Existing Stations (Upgrades)								
Merritt 7	Norwalk	3.6	3.6	New 200-space parking lot on new property w. of Glover Ave; pedestrian bridge over tracks from new parking to platform; replace low-level platform with high-level platform; new canopy, ramps, bike lockers.	No	-	-	-
Cannondale	Wilton	8.85	8.85	Extend high-level platform; expand parking lot by 50 spaces to a total of 190; provide bike lockers.	No	-	-	-
Branchville	Ridgefield	12.65	12.65	Revise access to parking by relocating Portland Ave to south on new bridge over Norwalk River; reconstruct Depot Rd with new bridge over river (eliminates at-grade xing); expand parking to south and acquire property for addit parking across river along Rt 7. Pedestrian bridge over river from new parking to station. Provide bike lockers.	River (Norwalk River)	-	Station and roadway improvements not anticipated in river, which is channelized through site.	Unlikely
Redding	Redding	17.1	17.1	Concept plan shows expanded parking lot by 100 spaces for total 180 spaces; reconfigure drop-off area; provide bike lockers. If parking is scaled back by removing one row on south side, 75 added spaces are provided rather than 100 (adequate for demand) - Impacts are based on 75 added spaces. No platform work.	Forested Wetlands	-	Direct loss of 0.03 ac Forested Wetlands and additional forest habitat along watercourse; narrowing of movement corridor; possible indirect decline of downstream Cold Water habitat quality	Moderate
Bethel	Bethel	21	21	Expand parking lot by 160 for total 350 spaces; provide bike lockers. No platform work.	Forested Wetlands	-	Direct loss of forest habitat in previously fragmented setting	Low
Undergrade Bridges (Rail goes over Road or Water)								
Washington & South Main St.	Norwalk	0.0	0.0	New (additional) single track truss bridge 240' span on added parallel track alignment. Includes concrete retaining walls on spread footings. Form liners used to simulate stone blocks on face of concrete walls.	No	-	-	-
Marshall St.	Norwalk	0.1	0.1	Replace historic bridge with 120' span ballast deck structure on existing alignment and raise to provide clearance.	No	-	-	-
Ann St.	Norwalk	0.2	0.2	Replace with 57' long span ballast deck structure on existing alignment.	No	-	-	-
Norwalk River	Norwalk	3.2	3.2	New 160' long ballast deck span bridge on totally new alignment of Curves 3A and 3B. Bridge ends skewed and alignment nearly parallel to the river to minimize impacts.	Over River (Norwalk River)	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Small stream	Norwalk	5.12	5.12	Replace 15' span ballast deck on existing alignment.	Over Stream; Forested Wetlands; Forest Habitat	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Small stream	Norwalk	6.43	6.43	Replace 40' long span ballast deck on existing alignment.	Over Stream	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Norwalk River	Wilton	6.64	6.64	Replace with ballast deck type, 65' span structure on revised alignment of Curve 6B. North side of span on existing alignment; south side offset 3' easterly from existing alignment.	Over River (Norwalk River); Riparian Zone Along Large River	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Moderate

Table 1: Alternative C Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiveristy
		From	To					
Norwalk River	Wilton	8.7	8.7	Replace with ballast deck type, 86' span structure on existing alignment.	Over River (Norwalk River); Riparian Zone Along Large River	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Norwalk River	Wilton	9.42	9.42	Replace with ballast deck type, 86' span structure on existing alignment.	Over River (Norwalk River); Riparian Zone Along Large River	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Old Mill Rd.	Wilton	11.01	11.01	Replace with ballast deck type, 32' span structure on existing realignment.	No	-	-	-
Norwalk River	Wilton	11.55	11.55	Replace with ballast deck type, 161' single-span structure on existing alignment. No new structures (no piers) in water but two existing piers at this crossing would be removed or cut below water line.	Over River (Norwalk River)	-	Existing bridge has two piers in water to be removed or cut off; temporary water quality effects	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Factory Pond	Wilton	12.17	12.17	Replace with ballast deck type, 49' span structure on existing alignment.	Over River (Norwalk River); Forested Wetlands	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Old Redding Rd.	Redding	14.16	14.16	Replace with ballast deck type, 28' span structure on existing alignment.	Forested Wetlands	-	Based on concept design, work zone limited to existing bridge abutments and existing disturbed ROW	Low
Simpaug Tpke.	Redding	14.8	14.8	Replace with ballast deck type, 60' span structure on Curve 14D (realignment). Curve 14D located up to 14' west of existing centerline.	No	-	-	-
Umpawaug Pond Brook	Redding	16.4	16.4	Replace with ballast deck type, 49' span structure on existing alignment.	Over Stream; Forested Wetlands	Northern metalmark butterfly (Calephelis borealis); Appalachian blue butterfly (Celastrina neglectamajor)	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Moderate
Saugatuck River	Redding	17.1	17.1	Replace with ballast deck type, 41' span structure on existing alignment.	Over River (Saugatuck River)	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Grassy Plains Rd. (Rt. 53)	Bethel	19.64	19.64	Replace with ballast deck type, 29' span structure on existing alignment.	Forested Wetlands	Northern metalmark butterfly (Calephelis borealis)	Based on concept design, work zone limited to existing bridge abutments and existing disturbed ROW	Low if construction can be contained within previously disturbed ROW; otherwise Moderate
Sympaug Brook	Bethel	21.4	21.4	Replace with ballast deck type, 22' span structure on existing alignment.	Over Stream; Forested Wetlands	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Overhead Bridges (Rail goes under Road)								
Route 7	Wilton	7.87	7.87	Replace with longer span 50' structure to accommodate track realignment Curve 7E.	Riparian Zone Along Large River Norwalk River	Unnamed ground beetle (Bembidion lacunarium)	Up to 0.02 ac impact if construction extends beyond disturbed ROW	Low if construction can be contained within previously disturbed ROW; otherwise Moderate
Traction Power System - Electrification								
Catenary and support structures	Norwalk to Danbury	1.1	23.9	New catenary poles located within 12 feet of track centerline; existing poles removed along corridor.	Forested Wetlands	To be determined through coordination with DEEP during design placement of poles	Direct loss of small areas at edges of habitat	Low
RTU (CP401)	Norwalk	0.63	0.63	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-

Table 1: Alternative C Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiveristy
		From	To					
Substation (SUB-41D)	Norwalk	1.62	1.62	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Substation (SUB-170D)	Wilton	7.25	7.25	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Substation (SUB-305D)	Ridgefield	13	13	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Substation (SUB-RED)	Redding	17.2	17.2	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	Forested Wetlands	-	Direct loss of 0.02 ac Forested Wetlands and additional forest habitat along watercourse; narrowing of movement corridor; possible indirect decline of downstream Cold Water habitat quality	Moderate
RTU (CP421)	Bethel	20.22	20.22	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Substation (SUB-560D)	Danbury	23.3	23.3	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Track Reconfigurations								
CP 241	Norwalk	0	0.3	New parallel 2nd track and extension of existing Norwalk passing siding in urban developed setting. Requires property acquisitions on North Main Street.	No	-	-	-
Curves 0E, 1A & 1B	Norwalk	1	1.7	Major realignment of track to west away from Norwalk River. Property acquisitions.	No	-	-	-
Curves 2B, 3A, 3B & 3C (incl. Bridge MP 3.2)	Norwalk	2.7	4	Curve 2B is offset only 2'. 3A & 3B have large off-sets (new alignments assoc with Bridge 3.2).	No	-	-	-
Curve 3D	Norwalk	3.82	3.96	Curve 3D is offset by 4' from existing centerline.	No	-	-	-
Curve 4C	Wilton	4.8	4.97	Curve 4C is offset by 6' from existing centerline.	No	-	-	-
Curve 5	Wilton	5.75	5.83	Curve shift is only 1' - no work outside disturbed ROW	No	-	-	-
Curve 6A	Wilton	6.07	6.24	Curve shift is only 2' - no work outside disturbed ROW	No	-	-	-
Curve 6B (incl. Bridge MP 6.64)	Wilton	6.53	6.68	Curve shift for Curve 6B is 3' - includes replacement Bridge 6.64 on this curve.	Riparian Zone along Large River (Norwalk River)	-	Direct loss of 0.02 ac of forest in riparian zone; slightly reduced movement corridor; indirect decline of aquatic habitat quality	Moderate
Curves 7E & 8	Wilton	7.71	8.47	7E curve shift is 8' off centerline to west. Curve 8 is only 1' shift.	Riparian Zone along Large River (Norwalk River)	Unnamed ground beetle (Bembidion lacunarium)	Potential direct loss of 0.02 ac of forest in riparian zone	Low if construction can be contained within previously disturbed ROW; otherwise Moderate
Curve 9C	Wilton	9.53	9.84	Curve 9C has shift up to 42' west of existing track (ROW acquisition).	Riparian Zone along Large River (Norwalk River)	-	Direct loss of forested wetlands in riparian zone; reduction of already-narrow buffer along river; indirect decline of aquatic habitat quality	High
Curves 10B & 11A	Wilton	11	11.47	Shifts up to 25' off existing - ROW required. Curve 11A includes retaining wall to minimize encroachment on forested floodplain of Norwalk River.	No	-	-	-
Curve 12A	Wilton	12.21	12.33	Curve 12 A shift is 12' to the east.	No	-	-	-
Curve 12B	Wilton/ Ridgefield	12.42	12.57	12B max curve shift is 8' off centerline to East.	No	-	-	-

Table 1: Alternative C Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiveristy
		From	To					
Curve 13B	Redding	13.25	13.4	13B max curve shift is 12' off centerline to East. Includes retaining wall to minimize excavation of abutting slope and keep work within existing ROW.	Forest Block Greater than 100 Acres (#2)	-	Direct loss of 0.08 ac of upland deciduous forest at edge of development	Low
Curve 13C	Redding	13.46	13.59	West.	No	-	-	-
Curve 13D	Redding	13.63	13.7	Curve shift is only 1' - no work outside disturbed ROW	No	-	-	-
Curve 14A	Redding	13.97	14.1	Curve 14 A shift is 13' to the east. Includes retaining wall to minimize excavation of abutting slope and keep work within existing ROW.	No	-	-	-
Curves 14B, 14C, 14D & 15A	Redding	14.24	15.14	14B shifts 13' to the west; 14C is 36' west and includes retaining wall to avoid parallel private drive and keep work within existing ROW. 14D is 14' east with new bridge over Simpaug Tpk. Curve 15A shift is 2'.	Curve 14B - Forest Habitat	Appalachian blue butterfly (<i>Celastrina neglectamajor</i>)	Direct loss of 0.76 ac of upland deciduous forest	High
Curves 15B & 15C	Redding	15.26	15.77	15B shifts 14' to West; 15C shifts 23' to East.	Curve 15C - Pond (Umpawaug Pond); Shrub Inland Wetland	Water marigold (<i>Megalodonta beckii</i>); sedge skipper (<i>Euphyes dion</i>); Bronze copper butterfly (<i>Lycaena hylus</i>); Newman's brocade moth (<i>Meropleon ambifuscum</i>); Harris' checkerspot butterfly (<i>Chlosyne harrisii</i>); two unnamed ground beetles (<i>Badister transverse</i> and <i>Bembidion pseudocautum</i>), and a lymnaeid snail (<i>Fossaria rustica</i>)	Direct loss of 0.08 ac open water and 0.3 ac of Shrub Inland Wetlands	High
Curves 16A & 16B	Redding	16.58	16.89	16A shifts 22' to East. 16B is less than 1'.	16A - Forested Wetlands within Forest Block Greater than 100 Acres (#3)	Appalachian blue (<i>Celastrina neglectamajor</i>); lymnaeid snail (<i>Fossaria rustica</i>)	Direct loss of approx. 5 ac of deciduous forest including 0.25 ac Forested Wetlands	High
Curve 17A	Redding	17.25	17.45	17A shifts 6' to West.	Forested Wetlands	-	Direct loss of 0.01 ac of Forested Wetlands and upland deciduous forest	Low
Curve 17B	Redding	17.57	17.72	17B shifts 11' to East.	Forested Wetlands; Forest Habitat	-	Direct loss of 0.002 ac Forested Wetland and 0.25 ac Forest (upland deciduous) along Bogus Brook stream corridor.	Moderate
Curve 17C	Redding	17.83	18.01	17C shifts 15' to West	Forest Block Greater than 100 Acres (#5)	-	Direct loss of 0.6 ac of upland deciduous forest within intact forest at edge of development	Moderate
Curve 19A	Bethel	19.07	19.18	19A shifts 4' to West	No	-	-	-
Rail Storage and Maintenance Yards								
Danbury Yard	Danbury	23	24	Realign existing and add tracks to provide 8 storage tracks with paved service aisles between every other track; 3,000 SF single-story building; 3,000 SF outdoor storage. Property acquisition required within existing urban setting.	River (Still River)	-	Yard improvements not anticipated in river, which is channelized through site.	Unlikely

Table 2: Alternative D Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiversity
		From	To					
Rail Reconstruction								
Reconstruct Track	Danbury to New Milford	23.9	39.16	Replace existing tracks with higher grade of rail on new ties. Work accomplished by rail-mounted equipment within existing gravel/ballast ROW.	No	-	-	-
Proposed Stations								
Brookfield Station	Brookfield	31.5	31.5	New 300' long high level platform with canopy, shelter, ramps, bike lockers; 100-space parking lot and drop-off area; sidewalk from station to Rt 202 on north side of Rt 25. Property acquisition required.	Riparian Zone Along Major River (Still River)	Bush's sedge (<i>Carex bushii</i>); northern slimy salamander (<i>Plethodon glutinosus</i>); eastern box turtle (<i>Terrapene carolina</i>); wood turtle (<i>Glyptemys insculpta</i>); eastern hognose snake (<i>Heterodon platirhinos</i>)	Direct loss of approx. 1.2 ac of deciduous forest along river; loss of habitat connectivity along river; indirect decline in aquatic habitat quality	High
Brookfield Passing Siding at Station	Brookfield	31.46	31.96	Parallel siding for overwidth freight to be located east of the commuter rail track at the new station.	Forest Habitat	Bush's sedge (<i>Carex bushii</i>); northern slimy salamander (<i>Plethodon glutinosus</i>); eastern box turtle (<i>Terrapene carolina</i>); wood turtle (<i>Glyptemys insculpta</i>); and the eastern hognose snake (<i>Heterodon platirhinos</i>)	Direct loss of approx. 2 ac of deciduous forest surrounded by development	High
New Milford Station	New Milford	38.35	38.35	New 300' long high level platform with canopy, shelter, ramps, bike lockers; 110-space parking lot and drop-off area. Property acquisition required.	No	-	-	-
New Milford Passing Siding at Station	New Milford	38.0	38.46	Parallel siding for overwidth freight to be located west of the commuter rail track at the new station.	No	-	-	-
Undergrade Bridges (Rail goes over Road or Water)								
Still River	Danbury	26.6	26.6	Replace with 207' two-span ballast deck on existing alignment. One new pier of approximately 30' x10' in Still River. Existing two piers to be removed or cut below water line.	Over River (Still River); Riparian Zone Along Large River	-	Direct loss of small area (0.007 ac) of benthic habitat for new pier; temporary water quality reduction	Low if land-side construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Junction Rd. (Rt. 133)	Brookfield	29.47	29.47	Replace with 45' single span ballast deck on existing alignment.	No	-	-	-
Farm Pass	Brookfield	29.9	29.9	Replace or fill (close bridge).	Forested Wetlands	-	Based on concept design, work zone limited to existing bridge abutments and existing disturbed ROW	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Old Middle Rd.	Brookfield	33.07	33.07	Replace with 33' single span ballast deck on existing alignment.	No	-	-	-
Still River	New Milford	35.1	35.1	Replace with 102' single span ballast deck on existing alignment.	Over River (Still River); Forest Habitat	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Housatonic Ave.	New Milford	38.62	38.62	Replace with 39' single span ballast deck on existing alignment.	No	-	-	-
Traction Power System - Electrification								
Catenary and support structures	Danbury to New Milford	23.9	39.0 +/-	New catenary poles located within 12 feet of track centerline; existing poles removed along corridor.	Forested Wetlands	To be determined through coordination with DEEP during design placement of poles	Direct loss of small areas at edges of habitat	Low
Raise Bridge - White St.	Danbury	24.33	24.33	Replace with 49' single-span multi-girder bridge on existing alignment to allow greater vertical clearance.	No	-	-	-

Table 2: Alternative D Potential Impacts to Biological Diversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiversity
		From	To					
Raise Bridge - I-84	Danbury	26.2	26.2	Replace existing I-84 Eastbound bridge to provide clearance for catenary; 292' five-span steel multigirder bridge.	No	-	-	-
Raise Bridge - I-84	Danbury	26.2	26.2	Replace existing I-84 Westbound bridge to provide clearance for catenary; 292' five-span steel multigirder bridge.	No	-	-	-
Substation (SUB-BRK)	Brookfield	29.5	29.5	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Raise Bridge - Silvermine Rd.	Brookfield	30.2	30.2	Raise to provide vertical clearance for catenary.	No	-	-	-
Raise Bridge - Whisconier Rd. (Rt. 25)	Brookfield	31.26	31.26	Raise to provide vertical clearance for catenary.	No	-	-	-
Raise Bridge - Old Pumpkin Hill Rd.	New Milford	33.9	33.9	Raise to provide vertical clearance for catenary.	Forested Wetlands; Forest Block Greater Than 100 Acres (#7)	Northern slimy salamander (Plethodon glutinosus); purple marten (Progne subis)	Work zone around bridge not anticipated to extend far enough to impact Key Habitats	Low
Raise Bridge - Erickson Rd.	New Milford	34.74	34.74	Raise to provide vertical clearance for catenary.	Riparian Zone along Large River; Forested Wetlands	Sharp-shinned hawk (Accipiter striatus)	Direct loss of approx. 0.04 ac of Riparian Zone, including 0.02 ac of Forested Wetlands, plus additional temporary impacts; minor reduction of vegetated buffer along river; potential indirect decline of aquatic habitat quality	Moderate
Substation	New Milford	39.0 +/-	39.0 +/-	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Track Reconfigurations								
Curve 1A	Brookfield	28.22	28.43	Curve 1A shifts track 16' to West	No	-	-	-
Curve 1B	Brookfield	28.72	28.82	Curve shift is only 2' to the West	No	-	-	-
Curve 6A	New Milford	33.2	33.35	Curve 6A shifts track 3' to the West	No	-	-	-
Curve 8A	New Milford	33.53	35.6	Curve shift is only 1' to the East	No	-	-	-
Curve 9A	New Milford	35.96	36.12	Curve shift is less than 1'	No	-	-	-
Storage Sidings								
Storage Siding	Danbury/Brookfield	27.24	27.58	Parallel storage siding east of existing track, within large railroad ROW.	No	-	-	-
Rail Storage and Maintenance Yards								
New Milford Yard	New Milford	39.0 +/-	39.0 +/-	8 storage tracks with paved service aisles between every other track; 3,000 SF single-story building; 3,000 SF outdoor storage. Property acquisition required of prior industrial property.	No	-	-	-

Table 3: Alternative E Potential Impacts to Biodiversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiversity
		From	To					
Existing Stations (Upgrades)								
Merritt 7	Norwalk	3.6	3.6	New 200-space parking lot on new property w. of Glover Ave; pedestrian bridge over tracks from new parking to platform; replace low-level platform with high-level platform; new canopy, ramps, bike lockers.	No	-	-	-
Undergrade Bridges (Rail goes over Road or Water)								
Washington & South Main St.	Norwalk	0.0	0.0	New (additional) single track truss bridge 240' span on added parallel track alignment. Includes concrete retaining walls on spread footings. Form liners used to simulate stone blocks on face of concrete walls.	No	-	-	-
Marshall St.	Norwalk	0.1	0.1	Replace historic bridge with 120' span ballast deck structure on existing alignment and raise to provide clearance.	No	-	-	-
Ann St.	Norwalk	0.2	0.2	Replace with 57' long span ballast deck structure on existing alignment.	No	-	-	-
Norwalk River	Norwalk	3.2	3.2	New 160' long ballast deck span bridge on totally new alignment of Curves 3A and 3B. Bridge ends skewed and alignment nearly parallel to the river to minimize impacts. No work in river channel.	Over River (Norwalk River)	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Small stream	Norwalk	5.12	5.12	Replace 15' span ballast deck on existing alignment.	Over Stream; Forested Wetlands; Forest Habitat	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Small stream	Norwalk	6.43	6.43	Replace 40' long span ballast deck on existing alignment.	Over Stream	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Low or Moderate
Norwalk River	Wilton	6.64	6.64	Replace with ballast deck type, 65' span structure on revised alignment of Curve 6B. North side of span on existing alignment; south side offset 3' easterly from existing alignment. Temporary impacts for 50'x100' construction staging/laydown to be located near bridge.	Over River (Norwalk River); Riparian Zone Along Large River	-	Based on concept design, work in water is avoided; land-side construction limited to previously disturbed ROW to extent possible.	Low if construction can be contained within previously disturbed ROW; otherwise Moderate
Traction Power System - Electrification								
Catenary and support structures	Norwalk to Danbury	1.1	7.5	New catenary poles located within 12 feet of track centerline; existing poles removed along corridor.	Not anticipated	To be determined through coordination with DEEP during design placement of poles	-	Unlikely or Low
RTU (CP401)	Norwalk	0.63	0.63	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-

Table 3: Alternative E Potential Impacts to Biodiversity

Improvement Type	Location	Study Milepost (MP)		Work Description	Within or Adjacent to Key Habitat	T&E Species of Concern to DEEP Within Key Habitat	Impact Description	Potential Effects on Biodiveristy
		From	To					
Substation (SUB-170D)	Wilton	7.25	7.25	New facility (metal enclosure on concrete walls or columns) surrounded by crushed stone.	No	-	-	-
Track Reconfigurations								
CP 241	Norwalk	0	0.3	New parallel 2nd track and extension of existing Norwalk passing siding in urban developed setting. Requires property acquisitions on North Main Street. No impacts to adjacent undisturbed areas.	No	-	-	-
Curves 0E, 1A & 1B	Norwalk	1	1.7	Major realignment of track to west away from Norwalk River. Property acquisitions.	No	-	-	-
Curves 2B, 3A, 3B & 3C (incl. Bridge MP 3.2)	Norwalk	2.7	4	Curve 2B is offset only 2'. 3A & 3B have large off-sets (new alignments assoc with Bridge 3.2).	No	-	-	-
Curve 3D	Norwalk	3.82	3.96	Curve 3D is offset by 4' from existing centerline.	No	-	-	-
Curve 4C	Wilton	4.8	4.97	Curve 4C is offset by 6' from existing centerline.	No	-	-	-
Curve 5	Wilton	5.75	5.83	Curve shift is only 1' - no work outside disturbed ROW	No	-	-	-
Curve 6A	Wilton	6.07	6.24	Curve shift is only 2' - no work outside disturbed ROW	No	-	-	-
Curve 6B (incl. Bridge MP 6.64)	Wilton	6.53	6.68	Curve shift for Curve 6B is 3' - includes replacement Bridge 6.64 on this curve.	6B - Riparian Zone along Large River (Norwalk River)	-	Direct loss of 0.02 ac of forest in riparian zone; slightly reduced movement corridor; indirect decline of aquatic habitat quality	Moderate