

CONTENTS

SECTION 1 – CONCEPT DESIGN DRAWINGS

- 1.1 Design Report
- 1.2 General Plans (Sheets 1-29)
- 1.3 Station and Layover Site Concept Plans (Sheets 30-43)
- 1.4 Typical Cross-Section (Sheet 44)
- 1.5 Standard Plans and Details (Sheets 45-47)

SECTION 2 – ENVIRONMENTAL RESOURCE GRAPHICS

- 2.1 Community Facilities (Sheets 1-12)
- 2.2 Median Household Income (Sheets 1-12)
- 2.3 Minority Population (Sheets 1-12)
- 2.4 Farmland Soils (Sheets 1-28)
- 2.5 Groundwater Quality (Sheets 1-11)
- 2.6 Hazardous Materials (Sheets 1-28)
- 2.7 Historic Resources (Sheets 1-28)
- 2.8 Flood Maps (Sheets 1-28)
- 2.9 Noise (Sheets 1-21)
- 2.10 Surface Water Quality (Sheets 1-12)
- 2.11 Wetlands and T&E Species (Sheets 1-28)

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1.1 Design Report

1.2 General Plans (Sheets 1-29)

1.3 Station and Layover Site Concept Plans (Sheets 30-43)

1.4 Typical Cross-Section (Sheet 44)

1.5 Standard Plans and Details (Sheets 45-47)

1.1 Design Report

**Connecticut Department of Transportation
New Haven-Hartford-Springfield Line
High Speed, Intercity Passenger and Regional Service
Draft Federal Environmental Assessment and
Draft Connecticut Environmental Impact Evaluation**

Design Report

Includes:

- Site Survey
- Track Improvements
- Stations
- Civil/Site Layout
- Roadway Layout
- Structural Layout (non-bridge structures)
- Utility Work (within RR ROW)
- Right-of-Way
- Track Improvements
- Design Coordination Meetings
- Base Mapping and Report Graphics
- Station Site Base Maps
- Report Graphics

Submitted by



Project # 104303
State Project # 170-2296

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TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	General Project Area Description	2
3.0	Design Elements	2
4.0	Impacts and Mitigation	2
4.1	Property	2
4.2	Site Drainage.....	5
4.3	Utilities.....	5
4.4	Wetlands.....	6
4.5	Hazardous Waste.....	6
5.0	Track Design.....	6
5.1	Clearances	6
5.2	Right-of-Way	6
6.0	Design Coordination	6
7.0	Station Narratives.....	7
7.1	New Haven-State Street	7
7.1.1	Summary of Station Design Elements.....	7
7.1.2	Basis for Selecting the Chosen Option.....	7
7.2	North Haven	8
7.2.1	Summary of Station Design Elements.....	8
7.2.2	Basis for Selecting the Chosen Option.....	8
7.3	Wallingford	8
7.3.1	Summary of Station Design Elements.....	8
7.3.2	Basis for Providing Alternate Options.....	9
7.4	Meriden	9
7.4.1	Summary of Station Design Elements.....	9
7.4.2	Basis for Selecting the Chosen Option.....	9
7.5	Berlin.....	10
7.5.1	Summary of Station Design Elements.....	10
7.5.2	Basis for Selecting the Chosen Option.....	10
7.6	Newington.....	10
7.6.1	Summary of Station Design Elements.....	10
7.6.2	Basis for Selecting the Chosen Option.....	10
7.7	West Hartford Station.....	10
7.7.1	Summary of Station Design Elements.....	10
7.7.2	Basis for Selecting the Chosen Option.....	11
7.8	Hartford Union Station.....	11
7.8.1	Summary of Station Design Elements.....	11
7.8.2	Basis for Selecting the Chosen Option.....	11
7.9	Windsor	11
7.9.1	Summary of Station Design Elements.....	11
7.9.2	Basis for Selecting the Chosen Option.....	12
7.10	Windsor Locks.....	12

7.10.1	Summary of Station Design Elements.....	12
7.10.2	Basis for Providing Alternate Options.....	12
7.11	Enfield	13
7.11.1	Summary of Station Design Elements.....	13
7.11.2	Basis for Selecting the Chosen Option.....	13
8.0	Construction Cost Estimates.....	13
9.0	Design Plans, Sections and Details.....	13

1.0 Introduction

As part of the New Haven-Hartford-Springfield Rail project, the following stations are anticipated for enhanced rail service:

- New Haven Union Station
- New Haven State Street Station
- North Haven
- Wallingford¹
- Meriden
- Berlin
- Newington
- West Hartford
- Hartford
- Windsor
- Windsor Locks¹
- Enfield
- Springfield

Of the thirteen sites outlined above, four are proposed new stations. These sites are North Haven, Newington, West Hartford and Enfield. These stations are intended to serve regional commuter train service between New Haven and Springfield.

A proposed layover maintenance site is also under consideration in Springfield to the east of Springfield Station.

The scope of work does not include station design improvements at New Haven Union and Springfield stations.

This Design Report summarizes station design elements and issues at each site and describes the basis for how each layout was determined. The report also summarizes the double tracking requirements to initiate additional rail service along the corridor.

This Design Report includes:

- Illustrations (included in the plan set as Sheet Numbers 30 through 43) of the various conceptual station and site configurations.
- Section 7.0 Station Narratives of this report describing the basis for selecting the chosen options. Other technical information related to the stations is included in the following:

¹ Two alternate sites currently under consideration for Wallingford and Windsor Locks Stations.

- Geotechnical information is presented in a Technical Paper previously reviewed and approved by CTDOT. The foundation and ground improvement for pavement for pavement requirements, based on that Technical Paper, are listed on Sheet Number 43.
- The bases for the capital cost of various elements of the project are included in Sections 4.1 and 8.0 of this Design Report.
- The order of magnitude of annual operating and maintenance cost is reported in Technical Papers previously reviewed and approved by CTDOT.
- The construction duration and impact on the operating railroads is reported in a Technical Paper previously reviewed and approved by CTDOT.
- The impacts on the surrounding areas are included in Section 4.0.
- The Preliminary Engineering cost estimate for each site is included in Section 8.0.

2.0 General Project Area Description

The study area limits for the project run along the 62-mile Springfield Line railroad corridor from the terminus in New Haven, CT the terminus in Springfield, MA, plus the area around nine existing stations and four proposed new stations.

3.0 Design Elements

A Design Criteria Manual was developed for this project and was used as a uniform set of guidelines for developing each station concept outlined herein. The Manual was used in conjunction with the Connecticut DOT Highway Design Manual, Connecticut DOT Drainage Manual, AASHTO and Amtrak requirements.

Additionally, several Technical Papers referenced throughout this Design Report have been developed which address design elements at each station including the number of parking spaces, bus spaces and bicycle and pedestrian amenities.

4.0 Impacts and Mitigation

4.1 Property

This section identifies the extent of properties to be impacted by the planned station construction and improvements at each site along the corridor, beyond the railroad right-of-way. Impacts range from temporary easements for construction to full property takes and building demolition for station and parking facilities.

Upon review of right-of-way mapping provided by Amtrak, it was determined that substantial property acquisition outside of the station areas would not be required for double tracking.

Property and right-of way information was obtained from the site survey at each station.

The following table lists the existing parcels at each station location and the potential impacts at each site.

Table 4-1 – Existing Parcels and Proposed Impacts¹

Town	Street	Parcel Number	Percentage of Property Impacted (est.)	Type of Acquisition
New Haven				
	State Street	225-0548-0080	N/A	Partial Take
North Haven				
	Devine Street	051-023	35%	Full Take
	Devine Street	051-021	<1%	Partial Take
Wallingford – Alternate Site 1				
	Ward Street	133-124	100%	Full Take/Displacement
	Ward Street	133-125	100%	Full Take/Displacement
	Ward Street	133-126	100%	Full Take
	Cherry Street	Judd Square	5%	Partial Take/Displacement
Wallingford – Alternate Site 2				
	North Colony Road	118-192	100%	Full Take
	North Colony Road	118-194	100%	Full Take/Displacement
	Parker St.	104-066	100%	Full Take
Meriden				
	State Street	0105-0021-2221-0000	100%	Full Take/Displacement
	State Street	City of Meriden	N/A	Partial Take
	State Street	0105-0025-0005-0000	100%	Full Take/Displacement
	State Street	0105-0025-0003-0004	35%	Partial Take
Berlin				
	Depot Road	9-1-76-83	100%	Full Take/Displacement
	Farmington Avenue	9-1-76-80	100%	Full Take/Displacement
	Farmington Avenue	9-1-76-81	100%	Full Take/Displacement
Newington				
	Francis Avenue	C0526800	95%	Full Take/Displacement
	Francis Avenue	C0526400	5%	Temporary Easement
	Francis Avenue	Town of Newington	N/A	Partial Take
	Francis Avenue	National RR Passenger Corporation	N/A	Partial Take

West Hartford				
	Newfield Avenue	3781-1-285-0001	100%	Full Take/Displacement
Hartford ²				
	-	Greater Hartford Transit District	N/A	N/A
Windsor				
	Mechanic Street	10758	20%	Partial Take/Modify Dog Pound
Windsor Locks – Alternate Site 1				
	River Street	49-133-10	25%	Temporary Easement
	-	Town of Windsor Locks	N/A	Partial Take
	-	National RR Passenger Corporation	N/A	Partial Take
Windsor Locks – Alternate Site 2				
	Main Street	29-138-2	100%	Full Take/Displacement
	Main Street	29-137-1	100%	Full Take
	Main Street	29-138-1	100%	Full Take
		National RR Passenger Corporation	N/A	Partial Take
Enfield				
	North River Street	0128-0001-0010	100%	Full Take
	North River Street	0149-0001-0010	100%	Full Take
	North River Street	0128-0001-0015	100%	Full Take
	Main Street	0149-0001-0015	<10%	Partial Take/Displacement
	Main Street	0128-0002-0020	<10%	Partial Take
Springfield Layover Site				
	Taylor Street	11430-0086	45%	Partial Take
	Armory Street	00645-0035	100%	Full Take/Displacement
	Taylor Street	11430-0087	100%	Full Take
		Consolidated Rail Corporation	50%	Partial Take

Sources: Site survey and town assessor mapping.

Notes:

(1) Impact on railroad right-of-way and state-owned property to construct parking, platforms and overpass structures is not included.

(2) All station development for passenger rail service will occur within existing air rights of Greater Hartford Transit District property.

To mitigate the acquisition of properties for station construction, affected owners would be afforded relocation assistance through the *Federal Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970*. ConnDOT is authorized to comply with this act and provide monetary and other relocation assistance to displaced property owners whose properties are acquired for the implementation of federally funded projects.

Where partial property takes are required, monetary compensation will be provided for the acquired land. Detailed dimensioning and quantities of ROW takes will be completed during final design.

For each acre of land purchased, unit costs were used based on an average cost of \$350,000 per acre of land. In addition to the costs for acquisition, it was estimated that each impacted business would receive \$750,000 for relocation costs.

4.2 Site Drainage

The introduction of new and expanded station facilities and parking areas naturally increases impervious surface areas and runoff into existing drainage systems and watershed areas. The station layouts include conceptual drainage improvements to facilitate stormwater runoff from parking areas, roadways and buildings.

The drainage concepts presented at each station are based on the Design Criteria Manual developed for this project as well as the requirements of the 2000 Connecticut DOT Drainage Manual and the 2004 Connecticut DEP Stormwater Quality Manual.

These concepts are at a preliminary engineering phase and are subject to detailed stormwater flow and drainage analysis. The concepts maximize the use of best-practice treatments to minimize increased runoff and prevent pollutants and sediment before flowing into adjacent watersheds. The potential treatments include, but are not limited.

- Deep-sump catch basins
- Uncurbed pavement edges
- Vegetated swales
- Rain gardens/landscaped areas
- Detention ponds
- Hydrodynamic particle separators

4.3 Utilities

Known existing utilities were identified on station site surveys and are shown on the concept plans. It is anticipated that some utilities will require relocation as a result of the proposed station improvements, both within and outside of the railroad right-of-way. Efforts were made to select station locations that minimize significant utility impacts and where appropriate, major utility structures were avoided. Site-specific locations are detailed in Section 7.0 and shown on station plans. Coordination with Amtrak and other utility owners will be required during final design.

4.4 Wetlands

Quantity and costs for wetland mitigation is included in the detailed cost estimate and earlier materials reviewed and approved by CTDOT.

4.5 Hazardous Waste

The existing railroad property is believed to contain hazardous waste that must be dealt with during construction. The mitigation requirements are included in Volume 1 of this document.

5.0 Track Design

5.1 Clearances

Typical horizontal and vertical track clearances are shown in the design plans. The Springfield Line is a part of the Strategic Rail Corridor Network (STRACNET); therefore all permanent structure clearances must meet STRACNET requirements of 6'-0" from the centerline of track. To accommodate the wider military cargo that may use the STRACNET corridor, the typical cross section at stations allows for one of the following:

- A gauntlet track allows trains to shift away from horizontal obstruction, such as a station platform. They are typically offset from the main track, but overlap so that only one pair of rails can be used at once.
- The cross-section shown in the plans also provides a detail for the possibility of a fold-up platform edge. This edge can be folded up to accommodate wider loads, thus negating the gauntlet track requirement.

5.2 Right-of-Way

Upon review of right-of-way mapping provided by Amtrak, it was determined that the minimum ROW width was 66 feet at locations where a second track is required. This width provides adequate width for a second track, utilities and signal equipment. The areas of required double tracking are shown in the design plans.

6.0 Design Coordination

During the environmental evaluation process, several meetings were held with CTDOT, Amtrak and local officials.

Input was sought from local officials regarding local development plans involving existing or proposed station sites. Officials from CTDOT and Amtrak were also provided input relative to station and track design standards. These standards are included in the Design Criteria Manual previously reviewed and approved by CTDOT.

7.0 Station Narratives

The following section provides a brief narrative of each station site including the station location, key features and the rationale behind site selection. Specific site details are shown on the station plans.

Station sites were developed in consultation with the local municipalities to determine whether any properties were particularly sensitive to either partial or full acquisition within the vicinity of the planned station site. Municipalities were also consulted relative to local redevelopment plans around each station to coordinate and minimize potential property impacts.

7.1 New Haven-State Street

7.1.1 Summary of Station Design Elements

The New Haven State Street site is an existing commuter station serving downtown New Haven. The station is currently served by Shore Line East and Metro North and is a natural station site for the proposed New Haven-Hartford-Springfield Service.

A new platform for the New Haven-Hartford-Springfield would be constructed on the westernmost track and would require a new walkway and stair/elevator tower adjacent to the existing structure. The existing station entrance would be modified to accommodate the new walkway.

The new platform is offset approximately 100 feet to the north to avoid an existing railroad utility structure. The platform, vertical transportation and elevated walkway would be built to avoid the existing traction power system.

7.1.2 Basis for Selecting the Chosen Option

The existing State Street Station that currently serves Metro North and Shore Line East commuters and is a convenient location for workers and residents in the downtown area. This location was, therefore, considered as the logical site for commuter station.

The general concepts were previously reviewed with the City of New Haven and were found to meet the City's planning and development goals.

7.2 North Haven

7.2.1 Summary of Station Design Elements

The North Haven Station is located adjacent to the intersection of Devine Street and State Street. The proposed station is at the site of an existing CTDOT park and ride facility and is easily accessible from the towns of Hamden and North Haven and by major roadways such as I-91 and Route 40. The station parking area is located on the western side of the rail line. The station will include two 180-foot platforms and a pedestrian overpass structure.

The existing park and ride lot will be utilized and an additional surface lot will be constructed on eastern side of the railroad tracks. This area is a vacant former chemical facility. Earthwork is anticipated to be minimal to construct surface parking at this facility. Hazardous material handling may be anticipated.

Railroad utility structures will require relocation to build the eastern platform.

7.2.2 Basis for Selecting the Chosen Option

The proposed station was selected because of its accessibility and its current use as a commuter park and ride facility. The general concepts were previously with the Town of North Haven were found to consistent with the Town's planning and development goals.

7.3 Wallingford

7.3.1 Summary of Station Design Elements

Currently, there are two alternate sites proposed for the expanded rail station in Wallingford: a southerly site at Ward Street and a northerly site at North Colony Street.

Ward Street/Judd Square Site

The Ward Street site is located approximately 1,800 feet south of the existing train station, adjacent to the Judd Square condominium complex. Access to the new station will be via Ward Street and South Cherry Street.

This site will accommodate two 500-foot platforms as required by Amtrak for their regional and inter-city service. The platforms will be connected by a pedestrian overpass structure. The site will also include a parking structure and bus access located on the west side of the rail line.

Railroad utility structures will require relocation to build the platforms.

North Colony Street/Parker Street Site

The North Colony Street site is located north of the existing train station. The proposed site features staggered platforms and two surface parking lots. The easternmost platform and surface lot is located approximately 1,200 feet north of the existing train station. Vehicular access will be via North Colony Street. The westernmost platform will be located to the north adjacent to Parker Street with access via North Cherry Street. The platforms will be connected via a pedestrian up-and-over structure.

7.3.2 Basis for Providing Alternate Options

CTDOT is in discussion with Town officials to determine the most suitable site for a new station in Wallingford. The Town has concerns that additional rail service may impact traffic and access due to additional grade crossing closures. CTDOT will continue to work with the Town during the EA and design process to determine the best possible solution.

The alternate proposals shown in these plans keeps the station as close to the downtown area as possible, consistent with transit oriented development policies.

7.4 Meriden

7.4.1 Summary of Station Design Elements

The proposed improvements at the Meriden Station are located approximately 100 feet north of the existing site. Located on State Street, the proposed improvements were developed in coordination with the City of Meriden's redevelopment plans which include retail and office space, a park, intermodal center and parking structure. The City's plan also involves the closure of Brook Street, thus eliminating the existing at-grade crossing.

The station plan shows how the proposed station and parking structure would fit within the City's redevelopment plans. The proposed 500-foot platforms at this station are per Amtrak's requirements for their regional service. The platforms will be connected by a pedestrian overpass structure. The existing platform would be removed.

Railroad utility structures will require relocation to build the new platforms.

7.4.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the Meriden and were found to meet the City's planning and development goals. The station location was selected because of its proximity to the existing Amtrak station and consistency with the City's redevelopment plans.

7.5 Berlin

7.5.1 Summary of Station Design Elements

The Berlin Station is located on Depot Road in the Kensington section of the town. The proposed improvements are located at the existing station site and do not impact the existing station building. The existing station building is being renovated through a town-sponsored project.

Improvements at Berlin include 500-foot platforms, pedestrian overpass and an expanded surface parking lot. The additional parking is located to the east of the current station. The site roadway is maintained for access to the station and the adjacent Berlin Steel Corporation.

7.5.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the Town of Berlin and were found to meet the Town's planning and development goals. The existing station site was considered as the most logical location for the proposed improvements.

7.6 Newington

7.6.1 Summary of Station Design Elements

The Newington Station is a proposed new station located at the intersection of Willard Avenue and Francis Avenue. The site is located across from the proposed New Britain-Hartford Busway Newington Station. The rail station design will provide a direct pedestrian connection between the busway and rail stations.

Key station elements include two 180-foot platforms with a pedestrian overpass structure. A surface parking lot will be located on the eastern side of the rail line with primary vehicular access via Francis Avenue.

7.6.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the Town of Newington and were found to meet the Town's planning and development goals. The proposed site was selected as a logical transfer point between the New Haven-Hartford-Springfield commuter rail service and the New Britain-Hartford busway service currently in final design.

7.7 West Hartford Station

7.7.1 Summary of Station Design Elements

The West Hartford Station is a proposed new station located at the intersection of Flatbush Avenue and Newfield Avenue on the site of a commercial property on the east side of the tracks. The site is located across from the New Britain-Hartford Busway Station. The rail station

design will provide a direct pedestrian connection between the busway and rail stations.

Key station elements include two 180-foot platforms with a pedestrian overpass structure. A surface parking lot will be located on the eastern side of the rail line with primary vehicular access via Newfield Avenue.

7.7.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the Town of West Hartford and were found to meet the Town's planning and development goals. The proposed site was selected as a logical transfer point between the New Haven-Hartford-Springfield commuter rail service and the New Britain-Hartford busway service currently in final design.

7.8 Hartford Union Station

7.8.1 Summary of Station Design Elements

The proposed enhanced rail service for Hartford will utilize the existing Union Station. The Station is located on Union Place and the existing track and platform is located on a viaduct structure. The existing viaduct structure will be maintained and a new high-level platform will be constructed atop the existing platform currently in service. This platform will be 500 feet in length per Amtrak's requirements for their regional and intercity service.

Access to the new platform will be via a reconstructed elevator and stairs providing access up from street level.

7.8.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the City of Hartford and were found to meet the City's planning and development goals. The existing station was considered as the most logical location for the proposed improvements as existing bus service and regional rail service is provided here.

Future plans beyond the scope of this EA may include reconstruction or relocation of Hartford Union Station.

7.9 Windsor

7.9.1 Summary of Station Design Elements

The Windsor Station site is located on Mechanic Street approximately 500 feet south of the existing station building.

The proposed station includes two 500-foot platforms, per Amtrak's requirements for regional service, connected by a pedestrian overpass

structure. The proposed station parking structure would be located on the east side of the tracks with access from Mechanic Street. The western platform would accommodate the Town's plans for a municipal parking structure behind Town Hall.

7.9.2 Basis for Selecting the Chosen Option

The general concepts were previously reviewed with the Town of Windsor. It was determined that the new station location would better suit the Town's development plans and to better accommodate projected parking demand.

7.10 Windsor Locks

7.10.1 Summary of Station Design Elements

Currently, there are two alternate sites proposed for the expanded rail station in Windsor Locks: the existing site and a northerly proposed site at Main Street.

Existing Site

The existing Windsor Locks Station is located on South Main Street (Route 159) adjacent to Interchange 42 of I-91. The proposed improvements at this site include expanded surface parking, two 500-foot platforms, per Amtrak's requirement for regional service, and a pedestrian overpass structure. The existing station platform would be removed.

Due to the compact nature of the site, an additional entrance is provided at this station to allow for bus circulation. The expanded surface lot is designed in a manner that avoids conflict with an existing pump house and cellular communications tower.

Proposed Site

As proposed by the Town of Windsor Locks, a relocated station would be approximately 1.5 miles north of the existing station on Main Street adjacent to the Central Business district. The site would include surface parking, two 500-foot platforms, per Amtrak's requirement for regional service, and a pedestrian overpass structure. The site would also provide a dedicated waiting area for airport terminal shuttles.

7.10.2 Basis for Providing Alternate Options

CTDOT is in discussion with Town officials to determine the most suitable site for a new station in Wallingford. The Town has concerns that additional rail service may impact traffic and access due to additional grade crossing closures. CTDOT will continue to work with the Town during the EA and design process to determine the best possible solution.

7.11 Enfield

7.11.1 Summary of Station Design Elements

The Enfield Station is a proposed new station located on North River Street located in the Thompsonville section of town. The proposal incorporates the Town's plans for an intermodal center and mixed-use development at the adjacent casket building. The station will include two 180-foot platforms with a pedestrian overpass structure.

Surface parking will be provided on the western and eastern sides of the tracks with a proposed reconfiguration of some of the existing Bigelow Commons parking.

7.11.2 Basis for Selecting the Chosen Option

The general concept plans were with the Town of Enfield and were found to be consistent with the Town's planning and development goals. The proposed station is an integral part of the Thompsonville Transit Oriented Development being pursued by the Town.

8.0 Construction Cost Estimates

The final construction cost estimate is presented in FTA format and includes all costs along with assumptions on contingencies, inflationary costs and professional services. Unless otherwise stated, the unit costs were derived from the Connecticut Department of Transportation's Preliminary Cost Estimating Guidelines and Amtrak unit cost estimates.

9.0 Design Plans, Sections and Details

The design plans, cross sections and typical standards are included in this Volume II document.