1. Project Purpose and Need

1.1. Introduction

The Federal Transit Administration (FTA) and the Connecticut Department of Transportation (CTDOT) are preparing a combined Environmental Assessment (EA), Section 4(f) Evaluation, and Environmental Impact Evaluation (EIE) to evaluate proposed improvements to the New Haven Line railroad bridge over the Norwalk River (the Walk Bridge – Bridge No. 04288R) in Norwalk, Connecticut. Figure 1-1 shows the location of the Walk Bridge and approximate project limits. This document has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), Title 42 of the United States Code (USC) Section 4321 et seq. and the Connecticut Environmental Policy Act (CEPA), Sections 22a-1a through 22a-1h of the Connecticut General Statutes (CGS), along with the joint Federal Highway Administration/FTA Environmental Impact and Related Procedures (23 Code of Federal Regulations [CFR] 771), and Section 22a-1a-1 through 22a-1a-12 of the Regulations of Connecticut State Agencies (RCSA). This document also complies with the requirements of Title 49 USC Section 303 (referred to as Section 4(f) of the U.S. Department of Transportation Act of 1966).

This chapter describes the existing bridge and its use, as well as the purpose of the project and the deficiencies, or needs, which the project will address.

1.2. Project Background

Walk Bridge, constructed in 1896, is a four-span swing bridge that spans 564 feet over the Norwalk River. Walk Bridge consists of a deck truss swing span and three fixed approach spans; two fixed approach spans to the west of the swing span and one fixed approach span to the east of the swing span, as shown in Figure 1-2, a photograph of the existing bridge.

The fixed spans consist of eight 15-feet deep Warren trusses, two per track; and the swing span consists of three planes of double intersection Warren trusses with stringers and floor beams. Power for the trains is supplied by an overhead contact system (OCS). High towers are located on both sides of the Norwalk River. These towers support overhead power transmission lines owned by Eversource Energy and Metro-North Railroad (Metro-North) power and communication lines.

Walk Bridge carries four tracks of the New Haven Line (NHL) of Metro-North commuter service and also is used for intercity and high-speed passenger service by Amtrak[1] on the Northeast Corridor (NEC). Walk Bridge also is used for freight service by the Providence & Worcester Railroad. Currently, Metro-North operates 113 daily trains over Walk Bridge between East Norwalk and Grand Central Terminal in New York City. Amtrak operates 42 intercity trains (21 round trips) over Walk Bridge via the NHL. According to a 2013 report, the NHL, one of three main lines of Metro-North, was the busiest single commuter rail line in the United States.[2] In 2014, the NHL had 39.61 million riders, an increase of 1.6 percent from 2013.[3] Over the 30 year period from 1984 to 2014, total NHL ridership has increased by more than 72 percent.[4]

[1] National Railroad Passenger Corporation
[2] Northeast Corridor Infrastructure and Operations Advisory Commission, *Critical Infrastructure Needs on the Northeast Corridor*, January 2013.
[3] Metropolitan Transportation Authority, "2014 Ridership Report, Metro North Railroad Executive Summary," excerpt from Joint Metro-North and Long Island Committees, April 2015.
[4] Ibid.

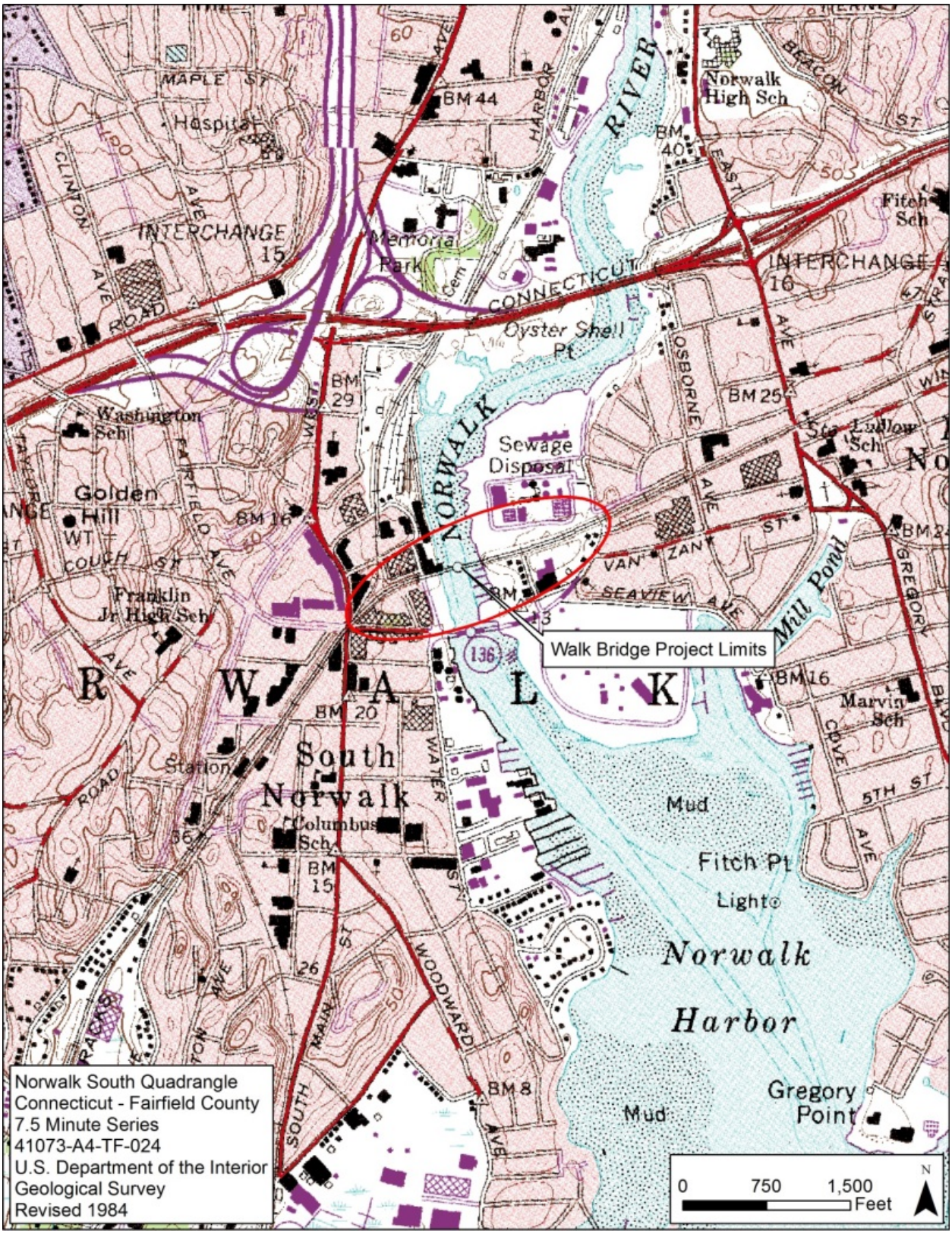

Figure 1-1—Project Location

Walk Bridge is located over the Norwalk River, which is a navigable waterway used for both recreational and commercial marine traffic. It is the northern boundary of the Norwalk Harbor. As designated by the U.S. Army Corps of Engineers (USACE), Norwalk Harbor is a recreational and small commercial harbor, with a federal channel of varying width and access to industrial and recreational facilities located north of Walk Bridge. There are over 1,800 berthing spaces and over 500 mooring locations in the Norwalk Harbor. The Norwalk Harbor Management Commission estimates that there are between 2,000 and 3,000 commercial vessel trips per year to and from Norwalk Harbor's port facilities.[5]

The deteriorating condition of Walk Bridge has been extensively documented over the years.[6] A detailed fatigue analysis was completed in 2005, and it indicated that major portions of the bridge have exceeded their fatigue life and require replacement. CTDOT performs maintenance and repairs on the bridge's structural, mechanical, and electrical systems on regular basis.

Figure 1-2—View of Walk Bridge, looking northeast

In response to recent bridge movement failures in May and June 2014, CTDOT established a Short Term Action Team (STAT) to determine the cause of operation failures and determine repairs to improve the system's reliability. The STAT determined that the failures of the Walk Bridge were due to a combination of factors: the operating system being close to its maximum limit, the age of the structure, the age of the operating system components, the existing condition of the structure, and the attempt to use existing worn operating systems with new rail joint systems.[7] In an emergency action in July 2014, the United States Coast Guard (USCG) issued a temporary deviation from the Walk Bridge operating schedule to allow the

[5] Norwalk Harbor Management Commission, *Norwalk Management Plan, 2009 Plan Amendments*, adopted August 11, 2009.
[6] Documentation of the deteriorating condition of Walk Bridge includes the Transportation Strategy Board, "Strategic Framework for Investing in Connecticut's Transportation Infrastructure: Economic Growth – Infrastructure Preservation – Sustainable Communities," January 2011; CTDOT, Accelerated Bridge Construction Study, March 2014 (draft).
[7] Connecticut Department of Transportation (CTDOT) Short Team Action Team, *Emergency Repair and Reliability Report*, CTDOT Br. No. 04288R, July 17, 2014 (Final).

bridge to open only after an eight-hour advance notice under a revised operating schedule.[8] The USCG subsequently changed this schedule in January 2015 to reduce the advanced notice time required to two hours. Also in July 2014, the Commissioner of CTDOT issued an Emergency Declaration for the Walk Bridge.[9]

CTDOT plans to implement a permanent solution to these growing problems and, along with FTA, will consider the findings of this document, public reviews, and other evaluations in reaching its project decision.

1.3. Project Purpose

The purpose of the Walk Bridge Project is to restore or replace the existing deteriorated bridge with a resilient bridge structure which will enhance the safety and reliability of rail service, offer operational flexibility and ease of maintenance, and provide for increased capacity and efficiencies of rail transportation along the New Haven Line/ Northeast Corridor, while maintaining or improving navigational capacity and dependability for marine traffic in the Norwalk River**.** Upgrades to the Walk Bridge, through rehabilitation or replacement, are needed to increase bridge reliability, incorporate bridge redundancy, and provide a sustainable bridge for significant weather events, thereby accommodating current and future rail and marine traffic.

1.4. Project Needs

CTDOT and FTA are undertaking the project to address the following needs, or deficiencies, of the existing Walk Bridge.

1.4.1. Structure Age and Deterioration

The existing bridge is approximately 120 years old and has deteriorated. Section loss (loss of original structural material) due to corrosion has been observed in some locations and to varying extents and indicates that the structure is nearing the limit of its design life. Cumulative fatigue damage (damage due to repetitive train loadings) of the main load carrying elements of the bridge has occurred. The electrical systems are generally obsolete. Existing and projected deterioration and wear of mechanical systems are key elements which affect the reliability of the bridge.

1.4.2. Decreasing Reliability

In 2011, Walk Bridge failed 12 times out of 138 openings, and in 2013, the bridge failed 16 times out of 271 openings. Failure means that the bridge fails to open or close properly in a timely manner. Failures have occurred in both the opened and closed positions. When failure occurs in the opened position, train traffic cannot cross the bridge until the bridge is completely closed and locked. If the bridge fails in the closed position, marine traffic taller than the vertical clearance under the bridge cannot pass under the bridge. When the bridge fails by only partially opening or closing, both train and marine traffic are stopped. Without action to rehabilitate or replace the bridge, failures are expected to increase.

Closing the bridge after a failure can take up to two hours. In May and June 2014, in two separate but similar incidents within a two-week time span, Walk Bridge failed to properly close. The failures prevented trains from crossing the bridge for extended periods of time, and impacted thousands of passengers.

[8] 79 Federal Register 41644 (July 17, 2014).
[9] CTDOT, *Emergency Declaration Railroad Swing Bridge No. 04288R, Norwalk, Connecticut,* July 8, 2014.

1.4.3. Lack of Resiliency

System resiliency for Walk Bridge is described as the ability to return the bridge to use, either partially or completely, in a relatively short period of time in the aftermath of a compromising event. It also refers to minimizing the vulnerability of critical elements of the bridge to facilitate its return to use.

The existing bridge is not designed to current standards for flooding events or storm events. In its current condition, the bridge is highly vulnerable to damage from a storm surge or high wind event, and it is also at risk for malfunction due to extreme temperatures.[10] The bridge also does not meet current standards with regard to its ability to withstand the magnitude of seismic forces and frequency of seismic events for this geographic area.

1.4.4. Safety Standards

The existing bridge does not meet current design standards which reflect improved safety aspects compared to when the bridge was originally designed and built. Minimum requirements (loading, safety margins, etc.) for the design of railroad bridges have evolved throughout the twentieth century to reflect increases in demands on the infrastructure and advances in materials, methods, and technology. Current train loads used for design are commonly-accepted loads representing modern-day freight rail traffic in the United States. These design loads are significantly heavier than design loads used over a hundred years ago. As a result, structures designed to pre-1900 standards do not typically provide the same margin of safety as bridges designed in accordance with current practice.

1.4.5. Lack of Redundancy

Operational redundancy for Walk Bridge is described as the ability to maintain train service on a limited number of tracks following an event that would have otherwise rendered all tracks inoperable. A failure of the existing bridge results in all four tracks being out of service, affecting train traffic in both directions and with far reaching effects on the NEC.

1.4.6. Limited Operational Flexibility

Existing operational constraints include the curvature of the track on the west end, narrow track centers, and miter rails on the movable span, all of which force trains traversing Walk Bridge to reduce their speed.

1.4.7. Difficulty of Maintenance

Some maintenance activities require opening the structure, and therefore require the bridge to be closed and all four tracks be taken out of service which presents logistical challenges for both maintenance and rail mobility.

1.4.8. Reduced Rail Capacity and Efficiency

Failures of the bridge opening/closing cause reduced efficiency of train service in terms of increased delays and reduced on-time performance (OTP) of Metro-North and Amtrak passenger trains. This reduced efficiency can in turn reduce the line capacity of the rail lines.

[10] "*Replacement of Norwalk Bridge on the Northeast Corridor*," prepared for the 2014 Hurricane Sandy Competitive Resilience Program.

1.4.9. Reduced Dependability and Capacity for Marine Traffic

As previously noted, when the bridge fails in the closed or partially opened position, some or all marine traffic cannot pass under the bridge and renders navigation unreliable and unpredictable. The existing vertical clearance also limits vessel passage in the bridge closed position, which affects navigation capacity.

1.4.10. Lack of Sustainability

The existing bridge is not sustainable as continued deterioration will cause bridge failures. Increased routine bridge maintenance will not extend the useful life of the bridge, so without major rehabilitation or replacement, the existing bridge will cease to function and result in more frequent train delays or even full shut-downs of the bridge, adversely affecting both rail and marine traffic. Increasing routine and major maintenance costs, combined with the cost associated with correcting a bridge failure, result in high life cycle costs to operate this bridge.

1.5. Other Transportation-related Goals and Objectives

In addition to the project's purpose to address and remedy the specific needs previously described, the project is intended to satisfy other transportation-related objectives and provide benefits related to the regional economy and environmental quality.

1.5.1. Regional Economy

A properly functioning Walk Bridge is important to both the local and regional economy. Walk Bridge is a vital link in the NEC, which connects Washington, DC to Boston, MA and includes major cities such as Philadelphia and New York City. Amtrak operates intercity and high speed passenger rail service on the NEC and serves more intercity travelers within the Northeast than all airlines combined. Metro-North provides commuter rail service to New York City from Connecticut communities as far north as New Haven, Waterbury, and Danbury. CTDOT's Shoreline East provides commuter rail service from New London to New Haven, with service connections on Metro-North trains to Grand Central Terminal. According to the NEC Commission,[11] the NEC carries more than 700,000 passengers per day for business, recreation, and personal purposes. The NEC carries a workforce that contributes $50 billion annually to the national gross domestic product. An unexpected loss of all NEC service for one day alone could cost the nation nearly $100 million in added highway congestion, productivity losses, and other transportation impacts.

1.5.2. Environmental Quality

The Walk Bridge project should preserve the scenic, aesthetic, and historic values of the surrounding area. Project designs should be sensitive to, and compatible with the surrounding area whenever possible. Providing reliable train service and therefore reducing reliance on automobile and truck travel will produce air quality benefits and reduce greenhouse gas emissions. For example, the passenger rail service provides a viable and dependable alternative to highway travel on the congested Interstate Route 95 (I-95), which serves the same corridor as the NEC along its complete route between Florida and Maine. A long-term failure of one of four movable bridges on the NHL, including Walk Bridge, would result in an additional 125,000 daily commuters to I-95[12] contributing to added vehicle emissions. Additionally, failure of Walk Bridge would result in additional truck traffic to replace the existing freight service using the bridge.

[11] NEC Commission. *Northeast Corridor Five-year Capital Plan, Fiscal Years 2016-2020*. April 2015
[12] Connecticut DOT. *LetsGoCT! Fact Sheet*. March 2015