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Interstate 84/Route 8 Interchange Reconstruction

Planning and Environmental Linkages (PEL) Report

AUGUST 2025

Prepared for:

CTDOT
CONNECTICUT DEPARTMENT OF TRANSPORTATION

Connecticut Department of Transportation

Prepared by:

HNTB

The Connecticut Department of Transportation may adopt or incorporate Planning Products from this PEL Study into a federal or state environmental review process, pursuant to Title 23 U.S.C. § 168(d)(4).

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1 Introduction

In the Spring of 2025, the Connecticut Department of Transportation (CTDOT) completed a Planning and Environmental Linkages (PEL) Study of the Interstate 84 (I-84) and Route 8 Interchange, informally known as the Mixmaster. Through this PEL Study, the CTDOT developed a vision, or master plan, for the interchange that addresses and balances the regional importance of the Mixmaster for commuter traffic and motor freight users, while also improving multimodal services, local connections, and livability within the city of Waterbury to enhance and support social equity and economic vitality.

Figure 1-1 Waterbury Public Art Intersection of Field Street and Meadow Street

The overarching purpose of the PEL Study was to develop a clear and supported plan of action for addressing deficiencies at the I-84/Route 8 Interchange. This plan of action is also called the Mixmaster Reconstruction Program, or simply the Program.

CTDOT utilized the PEL process to define the Mixmaster Reconstruction Program and to link master planning with the National Environmental Policy Act (NEPA) review process. Through the PEL process, CTDOT worked with partners (stakeholders, funding and regulatory authorities, local government, and general public) to discern the transportation and community needs, identify potential alternatives, develop a preliminary alternatives analysis process, incorporate early stakeholder involvement, and evaluate identified alternatives relative to transportation needs and key environmental and community resources. This PEL Study will be a resource for future NEPA documentation; it aims to avoid duplication of effort, streamline the environmental review process, and reduce delays in project implementation.

This document presents an overview of the PEL Study, supplemented by several appendices documenting the detailed analyses completed throughout the PEL process.

- **Appendix A: *PEL Process Framework and Methodology***

  Includes a detailed outline of the PEL Study activities and formalizes the scope, schedule and expected outcomes for the PEL process.

- **Appendix B: *Analysis, Needs and Deficiencies Report***

  Includes documentation of the primary existing and future conditions of the PEL Study Area that contribute to transportation deficiencies and includes conclusions and summary data from supporting technical analyses. It also documents certain secondary needs, such as existing social, economic, and environmental conditions, which are typically considered during an environmental review process.

- **Appendix C: *Preliminary Purpose and Need Statement***

  Includes the PEL Study's Preliminary Purpose and Need Statement, the intended outcomes of the Range of Reasonable Alternatives, and other transportation-related goals and objectives. It provides supporting information for the development and identification of the Range of Reasonable Alternatives.

- **Appendix D:** ***Public Involvement Activities and Agency Coordination***

  Summarizes and documents the public and agency involvement efforts that have taken place over the course of the PEL Study.

- **Appendix E:** ***The Universe of Alternatives and Levels 1, 2, and 3 Screening Methodologies and Results***
  - **Appendix E-1:** ***Alternatives Screening Methodology***

    Describes the sequential process that was used during the PEL Study as a decision- making tool for evaluating concepts and consequently narrowing the "Universe of Alternatives" to a "Range of Reasonable Alternatives."
  - **Appendix E-2:** ***Conceptual Alternatives and Level 1 Screening Report***

    Introduces the Conceptual Alternatives that comprise the Universe of Alternatives and the Level 1 screening process. This report also presents the results of the Level 1 screening and the alternatives advanced to Level 2, called Initial Alternatives.
  - **Appendix E-3:** ***Initial Alternatives and Level 2 Screening Report***

    Presents the Initial Alternatives, the methods used to evaluate the alternatives, the results of the Level 2 screening, and the alternatives advanced to Level 3, called Preliminary Alternatives.
  - **Appendix E-4:** ***Preliminary Alternatives and Level 3 Screening Report***

    Presents the Preliminary Alternatives, the methods used to evaluate the alternatives, and the results of the Level 3 screening process, identifying the Range of Reasonable Alternatives advancing to NEPA.

- **Appendix F:** ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire***

  Presents the activities of the PEL Study which will be utilized by the Federal Highway Administration (FHWA) to ensure that planning information and decisions are properly documented to be utilized in NEPA. The PEL Questionnaire also summarizes the planning process to ease the transition from the PEL Study to a NEPA process.

2 PEL Study Background

2.1 WHAT IS A PEL STUDY?

Developed by the FHWA, the PEL process considers and incorporates environmental, community, and economic goals in the very early planning and design phases of transportation projects or programs. When PEL is used, it occurs concurrently with the early conceptual design process. This master planning process is linked with the NEPA review process, which occurs after the PEL Study is complete.

When transportation projects are approached in this collaborative, multi-disciplined manner in the early planning phases, potential issues with design options are more likely to be discovered early on, and before the NEPA review process is initiated. Through the PEL process, these issues may be able to be resolved; if they cannot be resolved, then those design options can be removed from consideration prior to the NEPA review.

The number of design options that are then considered during the NEPA review are both narrowed and more thoroughly vetted; therefore, the options are less likely to need to be revisited, saving both time and money. Additionally, by including community and economic development goals in the early planning phases of a given transportation program, the PEL Study provides the opportunity for transportation projects to be designed in context with their environment and aligned with both community and economic development goals.

Figure 2-1 Superstructure and Substructure of the Mixmaster Interchange while Undergoing Rehabilitation Activities

The goal of the PEL approach is to create a collaborative and integrated decision-making process that minimizes the duplication of effort, promotes environmental stewardship, and reduces delay from planning through project implementation.[1] This PEL study was completed in accordance with the available federal guidance and formalized regulations.

[1] FHWA. 2016. *Planning and Environmental Linkages – Questions and Answers*.

2.2 WHY A PEL STUDY FOR THE MIXMASTER?

In 2018, CTDOT began to analyze whether another major rehabilitation project —to occur in 2045 and referred to as the 2045 Rehabilitation Analysis— would be a cost-effective way to extend the Mixmaster's serviceable lifespan and address functionality issues. The Rehabilitation Analysis showed that another rehabilitation in 2045 would not substantially improve the interchange's functionality, nor would it address the structural needs relative to the cost of a full replacement. Therefore, the CTDOT initiated a plan to analyze the full scope of the Mixmaster's needs, kicking off the planning process for the future of the Mixmaster.

Why PEL?

The PEL process considers and incorporates environmental, community, and economic goals in the very early planning and design phases of transportation projects or programs. The PEL approach, facilitates communication and coordination between agencies, enhances community involvement, and assists in project delivery (FHWA PEL Fact Sheet, 2021)

CTDOT utilized the PEL approach for planning and advancing design concepts that created a master plan or vision for the reconstruction of the Mixmaster, informally referred to as the New Mix. Through the PEL process, working relationships have been developed among CTDOT and key agencies, including the FHWA, the City of Waterbury (the City), the Naugatuck Valley Council of Governments (NVCOG), the Metropolitan Planning Organization for the PEL Study Area, and the community to define the PEL Study Preliminary Purpose and Need Statement including the other transportation related goals and objectives. Input and comments from all groups were documented. Following this, CTDOT worked with the community to review various early conceptual design options for the reconstruction of the Mixmaster, measuring each against the PEL Study's established Preliminary Purpose & Need Statement.

Public involvement during the PEL Study process was multi-faceted and included meetings with stakeholder groups and the general public and also included the formation of a Project Advisory Committee (PAC). Additional information regarding the PAC, including a list of all member organizations, is detailed in **Section 4, Public and Agency Involvement**. The PEL Study PAC was assembled to allow for constructive dialogue from various perspectives and invited broad community representation, including but not limited to: "immediate abutters" which are residential and business districts located in or nearby the interchange; emergency service providers; Waterbury's Mayor and Board of Alders; various Waterbury department heads including Engineering, Public Works, and City Planning; and the Chamber of Commerce and large employers with commuters who travel the interchange daily. PAC membership was also intended to include individuals of diverse ethnicities, genders, abilities, income levels, ages, and those with limited English proficiency.

The PEL Study approach was used to produce wide ranging analyses and decisions for review, consideration, and potential adoption by FHWA during the NEPA review process for the future project for the reconstruction of the I-84/Route 8 Interchange. The following were the outcomes of the PEL process:

- Identified the transportation needs;
- Identified stakeholders;
- Defined and refined the travel corridor (including logical termini);
- Developed the preliminary purpose and need, and goals and objectives;
- Developed performance measures for alternatives;
- Developed alternatives and defined modes of travel;
- Screened and evaluated alternatives in an iterative process;
- Identified potential community benefits and impacts;
- Identified potential environmental impacts and mitigation strategies/priorities;
- Documented the PEL process in a PEL Study Report; and
- Established and documented a PEL-to-NEPA transition process.

Figure 2-2 Downtown Waterbury, Bisected by I-84, with the Mixmaster Interchange in the Distance

3 The Mixmaster Reconstruction PEL Study

3.1 WHAT IS THE PEL STUDY AREA?

Figure 3-1 indicates the location of the PEL Study Area in relation to the rest of the state. Within Connecticut, I-84 serves as a critical east-west transportation link between Massachusetts and I-90 to the east, and New York and beyond to the west. In Waterbury, I-84 runs through the greater downtown area and is located just south of the City's Central Business District. Connecticut Route 8 extends from Bridgeport and the I-95 corridor on the south coast, north to the Massachusetts state line. In Waterbury, Route 8 parallels the Naugatuck River.

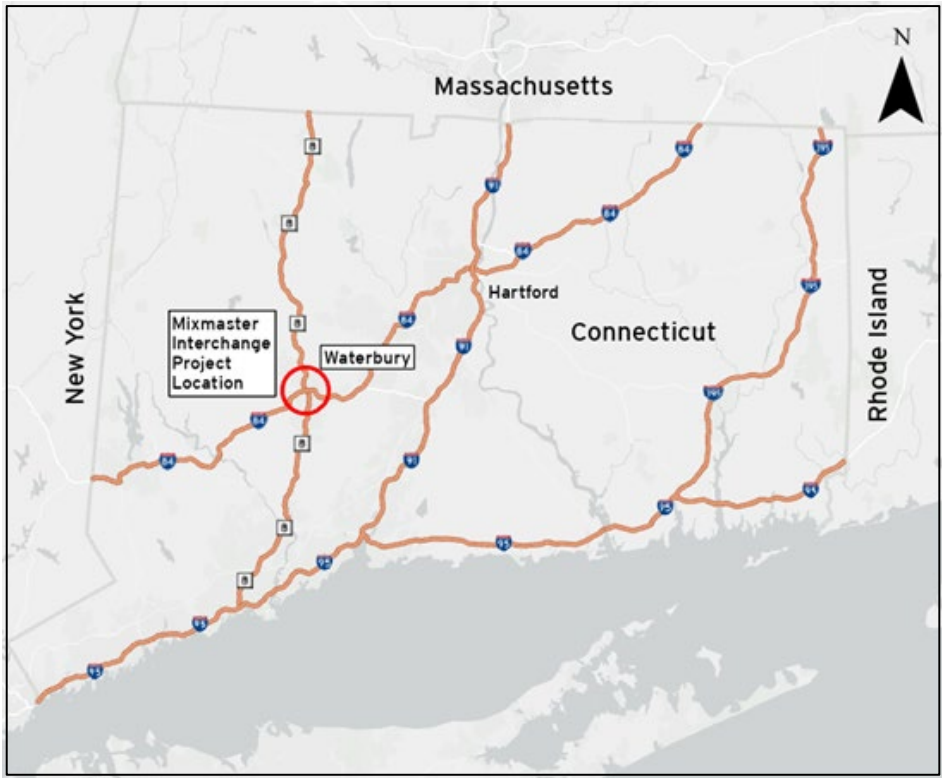

Figure 3-1 Mixmaster Reconstruction Project Location

The PEL Study Area (**Figure 3-2**) extends approximately four miles on I-84 and approximately two miles on Route 8 and is roughly defined by numbered exits on the I-84 and Route 8 highways. On I-84, the corridor limits extend from Exits 17 to 23; on Route 8 the corridor limits extend just outside Exits 30 and 35. The PEL Study Area was deliberately defined for the purposes of evaluating the deficiencies of the transportation network and to consider the needs of city neighborhoods and populations, city streets, city land uses, and environmental and cultural resources within the Program vicinity. It includes more than 5-miles of highway, 65 studied intersections, 62 bridges (including culverts) with a combined deck area exceeding 1,000,000 square feet (the equivalent of 23 acres), and over 100,000 square feet of retaining walls. In addition to the Naugatuck River, the PEL Study Area includes the Mad River, several brooks and unnamed tributaries, most of the Waterbury Central Business District , ten neighborhoods, five parks, three historic districts, many historic places/properties (including Riverside Cemetery), the Metro-North Railroad Waterbury Branch Line, CT*transit* and C*tfastrak* fixed routes, intercity bus service routes, the Naugatuck River Greenway, ten major employers, and the proposed (future) Freight Street District. The Freight Street

District is a 60-acre area of low-cost developable or under-developed commercial property located on the western edge of Waterbury's downtown area. The Waterbury Travel Center (intercity bus station) and the Waterbury Train Station are located in the Central Business District.

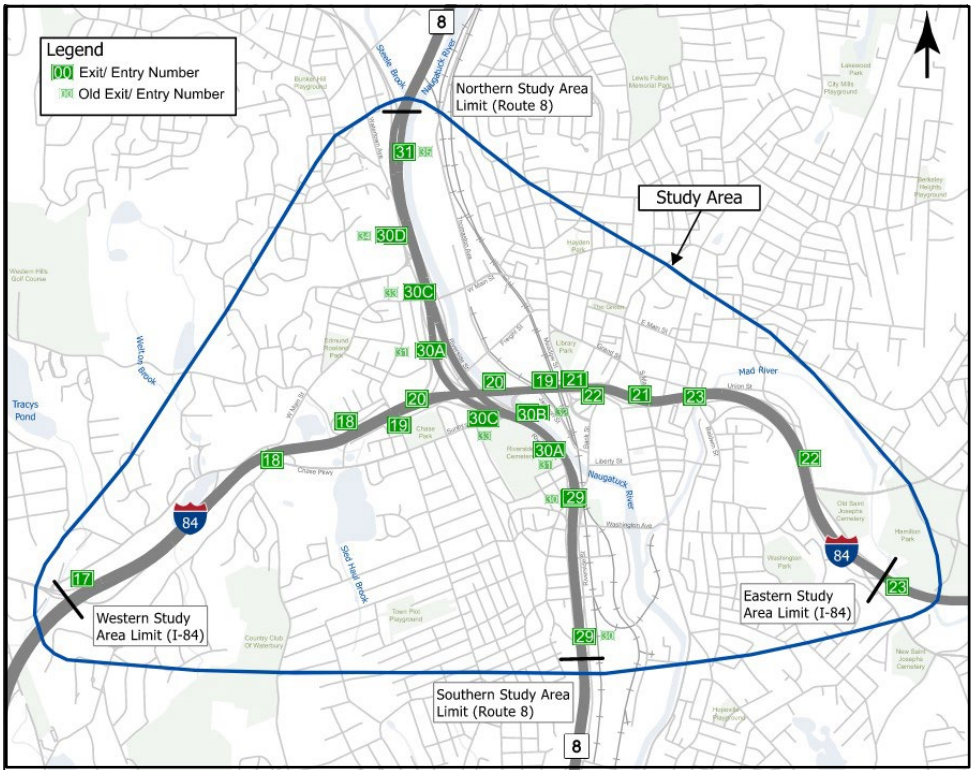

Figure 3-2 PEL Study Area

3.2 ENVIRONMENTAL AND COMMUNITY CONTEXT

The environmental and community resources were examined as part of the PEL Study to establish a baseline context and generally describe the existing conditions within the PEL Study Area. The information was also utilized during the screening process to broadly assess the potential impacts associated with each of the alternatives.

The existing conditions and environmental constraints for the following social, economic, cultural, and environmental resources located within the PEL Study Area were analyzed and documented in the ***Analysis, Needs, and Deficiencies Report*** **(Appendix B):**

- Infrastructure Constraints;
    - Utilities and Railroads;
- Socioeconomics/Demographics;
- Land Use;
- Public Parks and Open Space;
- Historical and Archaeological Resources;
- Community and Cultural Resources;
- Natural Resources;
    - Waters of the U.S., including Wetlands;
    - Listed Species and Critical Habitats;
    - Topographic Constraints;
- Traffic Noise Receptors; and
- Hazardous Materials.

The information contained within the ***Analysis, Needs, and Deficiencies Report*** was used throughout the development and screening of the alternatives.

Waterbury's Environmental and Community Context

As the geographic center of the Naugatuck River Valley, the city of Waterbury serves as the economic, cultural and population center of the area. Additionally, Waterbury is host to various natural and cultural resources, such as watercourses, wetlands, forests, protected species, and an abundance of historical resources, all of which play an important role in Waterbury's character.

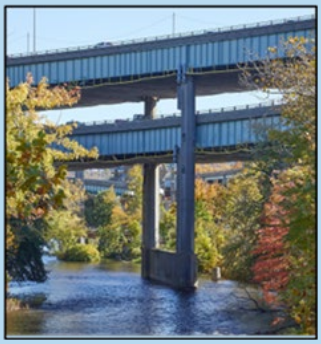

Figure 3-3 Naugatuck River Beneath the Stacked I-84 from Freight Street Facing South

Figure 3-4 Replica Moai Statue in Front of Timexpo Museum near I-84

3.3 PREVIOUSLY PERFORMED STUDIES

This PEL Study built upon the results of previously performed planning studies that were completed and provide background on the PEL Study Area.

The CTDOT, City of Waterbury, and the NVCOG [and its predecessor, the Council of Governments of the Central Naugatuck Valley] have contemplated a means to address the long-term transportation needs of the I-84 and Route 8 corridors through Waterbury since at least 1995. Prior reports and studies which are pertinent to the PEL Study include:

- CTDOT Needs and Deficiencies Analysis in the I-84 Corridor Waterbury to Southington, 1995
- Central Naugatuck Valley Regional Plan of Conservation and Development, 1998
- CTDOT I-84 West of Waterbury (WOW) Needs and Deficiencies Study, 2001
- CTDOT Waterbury Interchange Needs Study, 2010
- City of Waterbury Downtown Strategic Plan, 2015
- City of Waterbury Plan of Conservation and Development [2] (POCD) 2015-2025
- City of Waterbury Freight Street Redevelopment Strategy, 2018
- NVCOG Route 8 & Waterbury Branch Line Corridor Transit-Oriented Development & Alternate Travel Modes Study, 2019
- NVCOG Waterbury West Main Street Corridor Study, 2022

The studies performed prior to 2019 are described in detail within the ***Analysis, Needs, and Deficiencies Report*** (**Appendix B**).

Figure 3-5 The Opening of the Mixmaster in 1968

[2] The POCD outlines policy priorities for the physical, economic, and social future of Waterbury and establishes goals for future land use, development, and natural resources.

3.4 PEL STUDY PRELIMINARY PURPOSE AND NEED STATEMENT

A ***Preliminary Purpose and Need Statement*** was developed for the PEL Study with agency and public input and will connect this master plan with, and form the basis of, the subsequent refined NEPA Purpose and Need Statement.[3]

What is a Purpose and Need Statement?

The Purpose and Need Statement is essentially the foundation of NEPA and the transportation decision-making process. The Purpose and Need statement briefly states the fundamental reasons for why a project is being proposed and is expressed as a desired transportation outcome.

This PEL Study uses a *Preliminary Purpose and Need Statement* in the same way so it can be utilized or referenced in the subsequent NEPA process for the long-term project.

A NEPA Purpose and Need Statement is comprised of three parts:

1) The Purpose, which is a concise statement of why a project is proposed (expressed as desired transportation outcome) and the primary goals and objectives that are intended to be met;
2) The Need, which identifies the major transportation deficiencies including factual and quantifiable data to substantiate the deficiencies; and
3) The other transportation-related goals and objectives that a Project intends to meet.

The Purpose and Need Statement is essential to establish a basis for the development of the range of reasonable alternatives required for a NEPA evaluation and assists with the identification and eventual selection of a preferred alternative.

[3] AASHTO. 2016. *Defining the Purpose and Need and Determining the Range of Reasonable Alternatives for Transportation Projects*.

3.4.1 Purpose and Need

A ***Preliminary Purpose and Need Statement*** was developed for the PEL Study with agency and public/stakeholder input. **Appendix C** includes the ***Preliminary Purpose and Need Statement*** which details the conditions of the PEL Study Area and data to support the need for major transportation improvements. A summary is provided in **Table 3.4-1.**

Table 3.4-1 PEL Study Preliminary Purpose and Need Statement Summary

Needs (problems)	Purpose (solutions)
Structural and Functional Bridge Deficiencies: • 60% of bridges[4] in the PEL Study Area are in overall poor condition. • The I-84 bridge structures are anticipated to meet the end of their serviceable life in 2045. • The original concrete decks of the I-84 bridge decks require replacement.	To improve the existing I-84 and Route 8 Bridge conditions and functional ratings to meet current and future traffic needs.
Structural and Functional Geometric Deficiencies: • Insufficient speeds and deficient horizontal curves, substandard shoulder widths, and inadequate stopping sight distance (SSD).	To improve the existing I-84 and Route 8 roadway conditions and functional ratings to meet current and future traffic needs.
Operational (Traffic) Deficiencies (including congestion): • Expected increase of operationally deficient highway segments and roadway intersections by 2045. • Inadequate merging distances and interchange spacing affecting congestion and safety. • Operationally deficient intersections with local roadways in the 2045 condition for AM/PM peak hours are anticipated to be 10% and 27% respectively, affecting congestion.	To improve the existing I-84 and Route 8 operational conditions to improve system performance and mobility on I-84 and Route 8 by providing comprehensive solutions that: • Improve travel speed and travel time reliability (reduce congestion and improve air quality) through Waterbury and to downtown Waterbury; • Facilitate connectivity within Waterbury through the local road network, including multimodal travel; and • Maintain critical system linkages in Connecticut and the northeast.
Roadway Crash Rate/Safety: • The existing crash rate on I-84 is approximately 30% higher than the state average for all roadways. Congestion and roadway geometry are the leading causes of the high crash rate.	To improve travel safety within and across the I-84/Route 8 Interchange by eliminating and/or improving substandard structural, geometric, and operational design features to relieve congestion and reduce the potential crash severity rate.

[4] Weighted by total deck area.

Following is an additional breakdown of the Preliminary Purpose and Need Statement.

Improve System Performance and Reduce Congestion

- Improve system performance and reduce congestion thereby improving air quality by improving travel speeds and travel time reliability through Waterbury by providing adequate capacity based on current traffic and future traffic forecasts on the mainlines, system ramps and service ramps.

Reduce Crash Rate and Improve Safety

- Reduce crash rate within and across the I-84/Route 8 Interchange by eliminating and/or improving substandard structural, geometric, and operational design features to reduce the potential crash severity rate.

Maintain Critical Linkages

- Maintain critical system linkages in Connecticut and the Northeast by providing system ramp connections directly between I-84 and Route 8 for high-volume movements and indirectly for lower volume movements.

Facilitate Connectivity and Mobility

- Facilitate connectivity and mobility through the local road and multimodal network, prioritizing the people of Waterbury by incorporating new or improved pedestrian and bicycle facilities to improve intermodal connections and facilities; incorporating resilient, green infrastructure; and incorporating safety countermeasures[5] into high crash/high traveled locations.

3.4.2 Other Transportation-Related Goals and Objectives

The PEL Study Preliminary Purpose and Need Statement includes other transportation-related goals and objectives informed through outreach to stakeholders, the PAC, the general public, and regional, state, and federal agencies.[6] These transportation-related goals and objectives identify other outcomes that the PEL Study intends to achieve beyond the transportation issues identified in the Purpose and Need.

The following transportation-related goals and objectives (listed in no particular order) have been identified by the PEL Study Team and informed by the PEL Study's PAC members and stakeholder/public input.

[5] Safety countermeasures include incorporating new or improved crosswalks, warning signs, pedestrian crossing signals, and/or lighting, and more where feasible. For a comprehensive list of strategies, go to the Federal Highway Administration's (FHWA's) *Proven Safety Countermeasures* webpage at https://highways.dot.gov/safety/proven-safety-countermeasures.

[6] Agency (local, state, and federal) input was obtained through a series of coordination meetings; public input was gathered through public meetings held August 2021.

These other goals and objectives focus on transportation improvements and opportunities in the city of Waterbury.

Enhance connectivity and mobility within Waterbury for motorized and non-motorized travel

- Allow for connections and access to and over the Naugatuck River.
- Allow for connections and access to the Naugatuck River Greenway.
- Improve the local roadway network associated with the Mixmaster for intra-city travel.
- Improve access to/from the I-84/Route 8 Interchange to downtown Waterbury (the Central Business District) and key destinations.[7]
- Enhance mobility for bicyclists and pedestrians by connecting facilities north/south (across I-84) and east/west (across Route 8).
- Reduce interchange complexity.

Enhance modal interrelationships including non-motorized travel

- Improve motorized and non-motorized access to transit and rail facilities in downtown Waterbury.

Support economic development and revitalization opportunities within Waterbury

- Strengthen the role of the surrounding neighborhoods as gateways to Waterbury, particularly the Central Business District.
- Support the City of Waterbury's goal of revitalizing the Central Business District through mixed use development, such as the Freight Street District Redevelopment.

Connectivity within Waterbury

The city of Waterbury is divided by both natural and built features. The regional railroad, the mainlines of I-84 and Route 8, as well as the Naugatuck River contribute to the splitting of the city into essentially four quadrants. Few travel modes provide local access across these major dividers and there are no connections to the Naugatuck River, one of Waterbury's prominent natural features. Addressing the disconnection of Waterbury's communities and the transportation network as a whole was considered to be an important goal and objective for the PEL Study.

Figure 3-6 Riverside Street and Route 8 Underpass Facing North from Riverside Cemetery

Figure 3-7 South Main Street and I-84 Underpass Facing North

[7] Key destinations identified by the Program Team and informed through public involvement are further outlined in the PEL Study's *Analysis Needs and Deficiencies Report* and the *Context Sensitive Features Report*.

- Integrate with ongoing City of Waterbury projects, such as the Waterbury Active Transportation and Economic Resurgence (W.A.T.E.R.) Complete Streets Project, including projects associated with the Freight Street District, and other funded projects.

Improve or maintain the safety of all transportation users

- Address the deficiencies of the I-84/Route 8 Interchange to improve the geometric and operational deficiencies contributing to the crash rate (i.e., reducing the complexity of the interchange through the reduction of left-hand entrance and exit ramps, increase in ramp spacing, and provision of adequate signage).
- Improve bicycle, pedestrian, and transit facilities, by providing safe routes and complete streets[8] between neighborhoods and Waterbury's Central Business District, surrounding key destinations including existing and future recreational areas and open spaces.

Avoid, minimize, or mitigate potential project consequences to the human and natural environment including communities and historic and archaeological resources.

- Avoid, minimize, or mitigate potential Project consequences to the human and natural environment, including historic and archaeological resources, to the extent practicable.

3.4.3 Guiding Principles

Guiding principles were identified and steered the overall PEL Study. These principles include the following (listed in no particular order):

- Accelerate Program Delivery;
- Maximize practicality in terms of cost and feasibility;
- Provide Context Sensitive Design/Solutions/aesthetically pleasing facility;
- Minimize the real, perceived, and visual barrier of the freeway;
- Integrate with the community and preserve environmental, scenic, aesthetic, historic, and natural resource values in the area;
- Incorporate design and construction provisions to minimize community disruption;
- Coordinate with local, state, tribal, and federal agencies, as applicable;
- Provide an open public participation process with early communication and coordination;
- Support Local, Regional, and Statewide Transportation Plans; and
- Develop a project(s) that is perceived as an enduring community enhancement.

[8] Defined by the CTDOT, *Policy No. EX.O.-31* Subject: Complete Streets, signed October 23, 2014; and includes reference to FHWA's *Safe System Approach*, https://highways.dot.gov/safety.

4 Public and Agency Involvement

The PEL Study included a multi-pronged public outreach and engagement plan that actively engaged the public, agencies, and stakeholders through the entire PEL process. The ***New Mix Plan for Public Involvement*** (**Appendix D-2**) was prepared prior to the initiation of the PEL Study, and outlined the various strategies and activities for agency, stakeholder, and public involvement. These activities are summarized in the following sections:

4.1 AGENCY OUTREACH

Early in the planning process, the PEL Study Team identified applicable local, state, and federal agencies to serve as guiding resources during the PEL process in an effort to identify and address potential issues early on, creating a path for an efficient future NEPA review. The CTDOT invited environmental regulatory and resource agencies that are typically involved during a NEPA study to participate. Two (2) meetings were held at major milestones and other meetings were provided as needed. PEL analyses and documents were presented to the agencies and comments were solicited. Responses to agency comments were completed by the PEL Study Team and are presented in the ***Report Documenting Public Involvement and Agency Coordination*** (**Appendix D-1**).

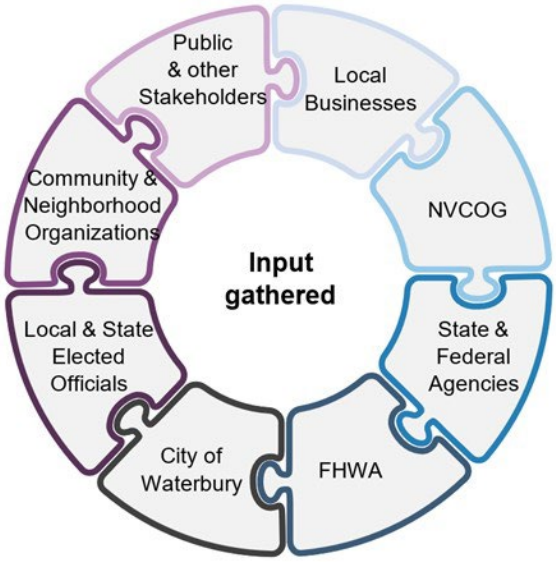

Figure 4-1 The PEL Study Team Gathered Input from Agencies, Stakeholders, and the Public

4.2 STAKEHOLDER OUTREACH

Stakeholder group meetings provided opportunities for the PEL Study Team to meet with affinity groups for the purposes of learning about each groups' perspective and macro-level concerns about the Mixmaster's design and construction. Stakeholder groups[9] included:

- Community based organizations and Title VI-related groups;
- Elected and government officials;
- Immediate abutters (neighborhoods and businesses);
- Large employers;
- Environmental advocacy groups/organizations;
- Historical societies; and
- Transportation, trucking, and commuter groups.

[9] A complete list of stakeholder groups is included within Appendix D.

4.3 PROJECT ADVISORY COMMITTEE

The PAC was formed for members to provide feedback on the PEL Study's draft *Preliminary Purpose and Need Statement*, draft goals and objectives, and design concepts. Two-way communication between the PAC and PEL Study Team began early in the planning process and continued throughout concept refinement and the identification of the Range of Reasonable Alternatives. PAC membership was intended to represent a cross section of interests including groups that will be directly impacted by the program. The PAC was assembled to allow for constructive dialogue from various perspectives including those who live near the PEL Study Area, highway users and commuters, local government officials, and large employers. PAC membership was also intended to include individuals of diverse ethnicities, genders, abilities, income levels, ages, and those limited in English proficiency. The PEL Study's PAC included, but was not limited to: "immediate abutters", which are residential and business districts located in or nearby the interchange; emergency service providers; Waterbury's Mayor and Board of Alders; various Waterbury department heads including Engineering, Public Works, and City Planning; the Chamber of Commerce; and large employers with commuters who travel the interchange daily. The invited PAC member organizations are presented in **Figure 4-2**.

New Mix PAC Members

All Saints/ Todos los Santos Parish

Bender Plumbing

City of Waterbury:
- Bureau of Engineering
- City Planning & Inland Wetlands
- Department of Economic Development
- Department of Public Works
- Fire Department
- Office of the Mayor
- Police Department
- Public Schools

Connecticut Association for Community Transportation (CACT)

Connecticut Coalition for Environmental Justice (CCEJ)

CT transit

Federal Highway Administration (FHWA)

Greater Waterbury Transit District

Hispanic Coalition of Greater Waterbury/ Waterbury Working Cities Challenge

Holy Trinity Greek Orthodox Church

Housatonic Valley Association

Main Street Waterbury

Metro-North Railroad

Motor Transport Association of Connecticut (MTAC)

National Association for the Advancement of Colored People (NAACP) of Greater Waterbury

Naugatuck Valley Community College

Naugatuck Valley Council of Governments (NVCOG)

Palace Theater

Police Activity League (PAL) River Brigade

Riverside Cemetery

Saint Mary's Hospital

University of Connecticut (UCONN) Waterbury Branch

Waterbury Bridge to Success

Waterbury Development Corporation

Waterbury Hospital

Waterbury Neighborhood Associations: Waterbury & Waterville

Waterbury Regional Chamber

Figure 4-2 PAC Members

PAC meetings were held prior to any corresponding public meetings covering the same subject matter which provided the PEL Study Team an opportunity to consider, address, and incorporate PAC members' questions and refine the presentation of concepts prior to meeting with the larger public.

The PAC meetings were held as a mix of virtual and in-person meetings. All PAC meetings included a minimum 15-day official comment period from the day of the meeting. All comments received during and after the meeting were responded to by the PEL Study Team and included within the PAC meeting summaries. These summaries are included in the ***Report Documenting Public Involvement and Agency Coordination*** (**Appendix D-1**).

Thirteen (13) meetings were held with the PAC over the course of six (6) PEL Study milestones as displayed in **Figure 4-3** PEL Study PAC Meetings Occurrence:

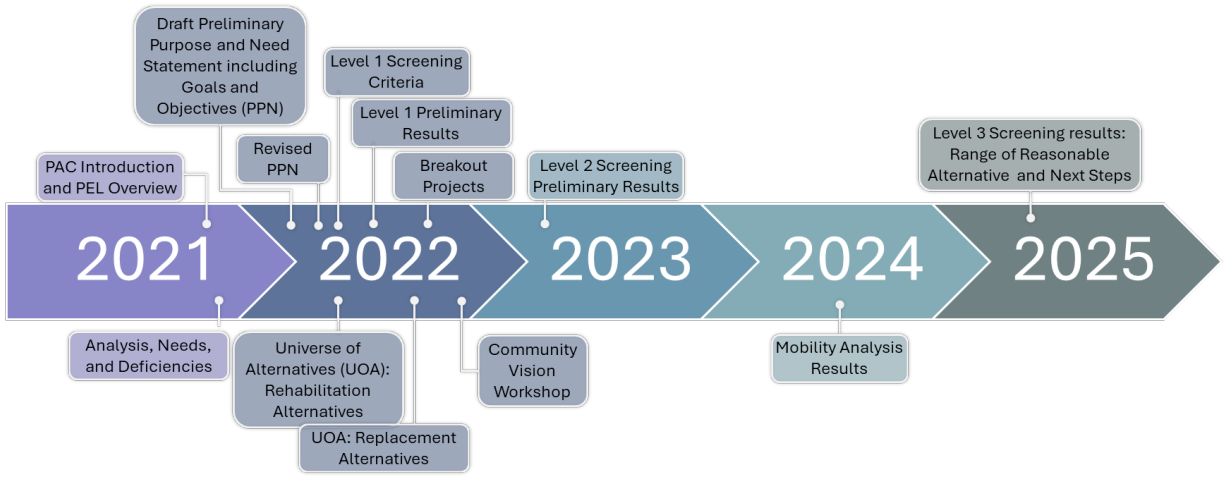

Figure 4-3 PEL Study PAC Meetings Occurrence

4.4 PUBLIC OUTREACH

4.4.1 Public Meeting Series

Four (4) public meetings were held to provide a forum where the public could obtain information and provide feedback on the transportation needs and possible solutions in the PEL Study Area. These meetings are summarized as follows:

Public Meeting #1

Held as a series of two virtual meetings in August 2021. This meeting series introduced the PEL Study process, presented the draft Preliminary Purpose and Need Statement, and obtained input from the public on the identification of problems (needs) and goals for the reconstruction of the Mixmaster.

Public Meeting #2

Held as a series of two virtual meetings in September 2022. This meeting series presented the Universe of Alternatives along with the evaluation criteria for the Level 1 Screening.

Public Meeting #3

Held as a series of two virtual meetings in January 2023. This meeting series presented the results of the Level 1 Screening along with an overview of the evaluation criteria for the Level 2 and Level 3 screenings.

Public Meeting #4

Held as a series of two in-person, open house style public information meetings and one virtual meeting in March and April of 2025. This meeting series presented the results of the Level 2 and Level 3 screening processes, including a presentation of the Range of Reasonable Alternatives. The next steps to be carried out in the NEPA process were also presented.

All public informational meetings included a 15-day official comment period from the day of the public meeting. All comments received during the meeting were responded to by the PEL Study Team and included within the public meeting summaries. All comments received after the meeting were included as an attachment to the public meeting summaries. These summaries are included in the ***Report Documenting Public Involvement and Agency Coordination*** (**Appendix D-1**).

4.4.2 Other Outreach Activities

In order to foster meaningful involvement from the public, public outreach activities were performed in addition to the PAC and public informational meetings. These methods generally included in-person activities that are designed to provide equitable public information and feedback opportunities for hard-to-reach populations in the PEL Study Area. These activities included printed informational materials, polls/surveys, and conversations with the public. Many of these activities were initiated as a part of the mobility analysis conducted after the performance of the Level 2 screening and evaluation and before the Level 3 screening and evaluation during the PEL Study, with reference to USDOT's public outreach strategic guide published in 2022 titled, *Promising Practices for Meaningful Public Involvement in Transportation Decision-Making*. A detailed description of these other outreach activities and summaries are included in the ***Report Documenting Public Involvement and Agency Coordination*** (**Appendix D-1**) and the ***Mobility Analysis Technical Memorandum*** (**Appendix E-4**).

Figure 4-4 Collage of Photos from PEL Study Public Involvement Activities

5 The Universe of Alternatives, Alternative Screening Process, and Screening Results

5.1 ALTERNATIVE DEVELOPMENT

The Universe of Alternatives includes the identified possible solutions for the PEL Study Area's major transportation deficiencies. These possible solutions, also called alternatives, were developed to varying degrees of detail, as needed, to allow for their evaluation during the PEL Study. The majority of the alternatives were identified by the PEL Study Team during an early series of technical workshops. Previous studies were reviewed to assist in the development of the alternatives, with the most notable of these being the 2010 *CTDOT Waterbury Interchange Needs Study (WINS)*. Additionally, alternatives were identified later during the PEL Study process based on feedback from stakeholders (e.g., a Stacked I-84 alternative).

The Universe of Alternatives contains a broad range of Conceptual Alternatives with various highway layouts, interchange configurations, urban planning aspects, and local road network access points. The alternatives within the Universe of Alternatives can be grouped into three general categories: Rehabilitation Alternatives, Replacement Alternatives, and Other Travel Modes. These alternative categories, as well as the No-Build Alternative, are described in the subsequent sections. The complete list of individual alternatives that were identified can be found in **Table 5.2-1**.

5.1.1 No-Build Alternative

The No-Build Alternative includes the preservation of the existing transportation network as well as any previously programmed projects in Connecticut's Statewide Transportation Improvement Plan that are reasonably expected to occur regardless of the outcome of the PEL Study.

5.1.2 Rehabilitation Alternatives

Rehabilitation Alternatives are conceptual alternatives that focus on the major rehabilitation of the existing stacked I-84 structures over the Naugatuck River. These include strategies for replacement of the concrete decks of the I-84 mainline structures, which are original from the time of initial construction, as a means of fixing the interchange's structural deficiencies. These Rehabilitation Alternatives include a combination of structure replacement and rehabilitation, and the construction of temporary structures to facilitate traffic during construction activities.

5.1.3 Replacement Alternatives

Replacement Alternatives are conceptual alternatives that include the complete replacement of the stacked Route 8 and I-84 structures. Where appropriate, replacement alternatives incorporated elements from previous CTDOT transportation planning efforts such as the 2010 *WINS*. The replacement alternatives category has been further organized into five descriptive categories to aid in the analysis, which include: in-place reconstruction, full system interchanges, partial system interchanges, ground level options, and bypass alignments.

5.1.4 Travel Modes

Travel Modes are high-level considerations of whether "other" modes of travel (such as transit, pedestrian, bicycle, or transportation system and demand management) could serve as a standalone solution for the Purpose and Need. The PEL Study Team reviewed the recommendations outlined in the Naugatuck Valley Council of Government's *Waterbury Area Transit Study (WATS)*, 2017 and CTDOT's *WINS*, 2010.

5.2 ALTERNATIVES IDENTIFIED

The Universe of Alternatives for the PEL Study included a total of 23 potential Reconstruction Alternatives and the No-Build Alternative. Each of these alternatives is described in more detail within the ***Universe of Alternatives and Level 1 Screening Report*** (**Appendix E-2**).

The 23 Alternatives were grouped into categories based on the nature of the alternative. The alternatives are presented within **Table 5.2-1**:

Table 5.2-1 Universe of Alternatives

Alternative Category	**Alternative Name**
No-Build Alternative	• No-Build Alternative
Rehabilitation Alternatives	• I-84 and Route 8 True Rehabilitation • I-84 Westbound Bridge Rehabilitation with Construction of New I-84 Eastbound Mainline • I-84 Bridge Rehabilitation with Bypass Repurposed as Frontage Road • I-84 Bridge Rehabilitation with Widening to Facilitate Staging
Replacement Alternatives	
In-Place Reconstruction	• I-84 Reconstruction in Place
Full System Interchanges	• Interchange Shifted East • Interchange Shifted East with Inner Loop Ramp • Combined System Connections • Modern Crossover Interchange • Modern Crossover Interchange with Route 8 Split to the South • Keeping Route 8 Stacked • Naugatuck River Shift • Stacked I-84
Partial System Interchanges	• Partial System Crossover Interchange • Partial System Interchange with Freight Street Interchange • Modified Diverging Diamond • Half Diverging Diamond
Ground Level Options	• At Grade System Connections • Route 8 Boulevard
Bypass Alignments	• Washington Street Bypass • South City Bypass • Tunnel
Alternate Travel Modes	• Travel Modes

5.3 SCREENING PROCESS FOR THE ALTERNATIVES

A process was developed to systematically evaluate and screen the PEL Study alternatives with an overall objective of identifying a Range of Reasonable Alternatives to be carried into the NEPA process where they will be evaluated further. This process is defined in the PEL Study's Alternatives Screening Methodology document and can be visualized as a funnel which includes three levels of alternatives development, evaluation, and screening (**Figure 5-1**). The three-level screening process blended various strategies, corridor needs, and goals to produce a set of transportation alternative solutions at the PEL Study's conclusion. The evaluation methodology assessed alternatives based on the ***Preliminary Purpose and Need Statement***, local street and arterial mobility, multimodal travel, constructability, other transportation-related goals and objectives, and costs. Potential impacts and benefits to the community and to the natural and human environments were also evaluated.

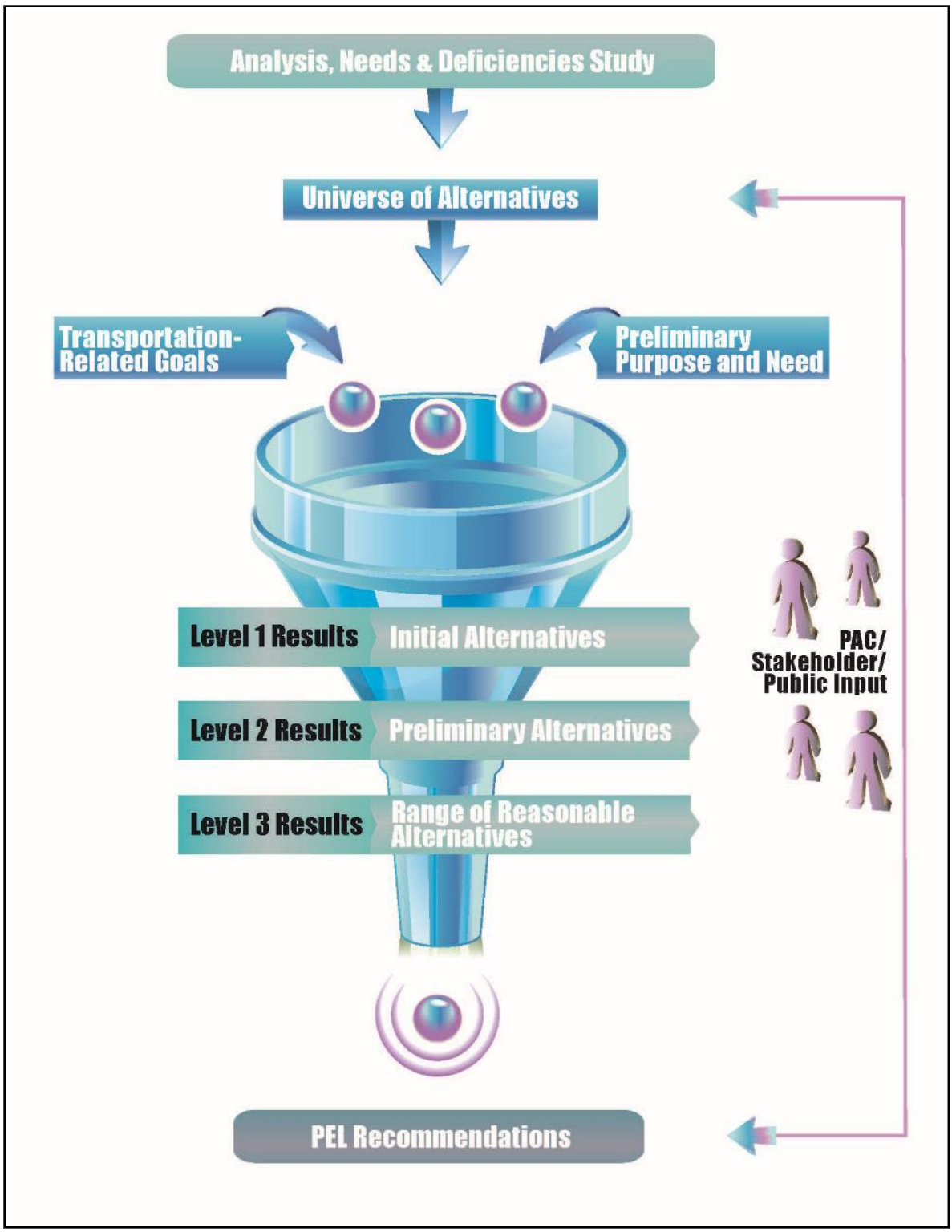

Figure 5-1 Alternatives Development and Evaluation Process

Alternatives that did not satisfy the evaluation criteria of a given level were eliminated from further study (screened out), while successful alternatives were refined and moved to the next level of screening. As the PEL Study progressed, more data became available, which allowed for more detailed analyses.

- Level 1 included the development of Conceptual Alternatives and an initial qualitative evaluation of fatal flaws. Evaluation criteria for this first level of screening were derived from the PEL Study's draft Preliminary Purpose and Need. The evaluation criteria were established from the PEL Study's Needs identified for the structural, geometric, and operational conditions of the I-84 and Route 8 mainlines, as outlined in the ***Preliminary Purpose and Need Statement***. Not meeting the needs of the PEL Study was considered to be a "fatal flaw." Additionally, the Level 1 evaluation criteria contained in this report also included other "fatal flaws" related to practicability: cost and feasibility. Not meeting the needs of the PEL Study, including practicability, indicated that a conceptual alternative was fatally flawed, and ultimately resulted in it being dismissed from further evaluation. The alternatives that passed the Level 1 screening process were called Initial Alternatives and were advanced to the Level 2 screening process.
- Level 2 included the continued development of the Initial Alternatives. The evaluation criteria at this level incorporated the other transportation-related goals and objectives that were developed with input from the public outreach. Criteria related to enhancing mobility and multimodal travel, maximizing ease of construction, and minimizing potential impacts to community, natural, and human environments were evaluated in this level. The evaluations in this level of screening were primarily qualitative, with some quantitative evaluations. The Initial Alternatives that passed the Level 2 screening process were called Preliminary Alternatives and were advanced to the Level 3 screening process.
- Level 3 included the highest development of detail prior to NEPA and a primarily quantitative evaluation of the Preliminary Alternatives. The assessments at this level further evaluated criteria identified as differentiators among the alternatives in Level 2. Additionally, a comprehensive assessment of traffic operations, including detailed traffic modeling, and evaluations of capital, life-cycle, and user costs were conducted.

Alternatives that remained after the final level of screening are recognized as the Range of Reasonable Alternatives. The Range of Reasonable Alternatives are advanced for further design development and advancement in future NEPA processes.

This three-level screening process is summarized in **Table 5.3-1** and presented in greater detail within the ***Universe of Alternatives and Level 1 Screening Report*** (**Appendix E-2**), ***Initial Alternatives and Level 2 Screening Report*** (**Appendix E-3**), and ***Preliminary Alternatives and Level 3 Screening Report*** (**Appendix E-4**).

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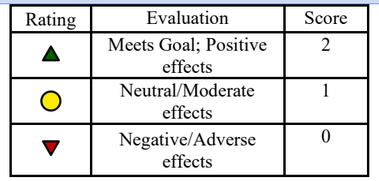
Table 5.3-1 I-84/Route 8 Interchange Reconstruction PEL Study Screening Process Summary

Description	Level 1	Level 2	Level 3
Screening Type	Qualitative – Fatal Flaw	Primarily Qualitative (some Quantitative)	Primarily Quantitative (some Qualitative)
Screening Criteria	Purpose and Need; Practicality (feasibility and Cost)[10]	PEL Study Goals and Objectives	PEL Study Goals and Objectives
Screening Measures	***Universe of Alternatives and Level 1 Screening Report*** **(Appendix E-2)**	***Initial Alternatives and Level 2 Screening Report*** **(Appendix E-3)**	***Preliminary Alternatives and Level 3 Screening Report*** **(Appendix E-4)**
Rating System	Pass/Fail		Quantification by unit of measure
Screening Process	• Universe of Alternatives was individually screened against criteria derived from the Purpose and Need as well as practicability criteria. • A pass was required for each criterion for an alternative to advance to Level 2. • Resulted in Initial Alternatives; **Figure 5-2** presents a graphical representation of Level 1 Screening.	• Initial Alternatives screened individually against the PEL Study goals. • Rating based on transportation, environmental/community, cost, and constructability assumptions identified by the PEL Study Team subject matter experts. • GIS spatial analysis using Alternative's general footprint for evaluating environmental/community measures. • Resulted in Preliminary Alternatives; **Figure 5-3** presents a graphical representation of Level 2 Screening.	• Preliminary Alternatives[11] grouped with Complementary Features[12] were screened individually against goals and objectives criteria. • Micro-simulation models (VISSIM) for evaluating transportation measures. • More detailed schematics developed for evaluating cost and constructability measures. • GIS spatial analysis of more detailed schematics for evaluating environmental/community measures with regard to potential impacts for measures that were determined to be differentiating among the Preliminary Alternatives. • Resulted in the Range of Reasonable Alternatives; **Figure 5-4** presents a graphical representation of Level 3 Screening.
Reasons for Alternatives Screened Out (Eliminated for Further Evaluation)	• Did not meet Purpose and Need; and/or • Impractical based on cost or feasibility.	• Initial Alternatives did not adequately address the PEL Study goals due to negative environmental impacts, costs, and/or difficulties from an engineering standpoint. • Initial Alternatives that scored ≤ 69 points were screened out and not advanced to Level 3.	• Alternatives that best address the PEL Study goals from an overall standpoint (transportation, environmental/community, cost and constructability), were identified as the Range of Reasonable Alternatives.
Technical Report with Detailed Screening Analysis	***Universe of Alternatives and Level 1 Screening Report*** **(Appendix E-2)**	***Initial Alternatives and Level 2 Screening Report*** **(Appendix E-3)**	***Preliminary Alternatives and Level 3 Screening Report*** **(Appendix E-4)**

Rating	Evaluation	Score
▲	Meets Goal; Positive effects	2
○	Neutral/Moderate effects	1
▼	Negative/Adverse effects	0

Source: Levels 1, 2, and 3 Alternative Evaluation and Screening Reports (**Appendix E-2** through **E-4)**

[10] For transportation projects, generally, an alternative is practicable if it: 1) meets the purpose and need; 2) is available and capable of being done (i.e., it can be accomplished within the financial resources that could reasonably be made available, and it is feasible from the standpoint of technology and logistics); and 3) will not create other unacceptable impacts such as severe operation or safety problems, or serious socioeconomic or environmental impacts. The evaluation of alternatives must consider a reasonable range of options that could fulfill the project sponsor's purpose and need. Reasonable Alternatives include those that are practical or feasible from the technical and economic standpoint, rather than simply desirable from the standpoint of the applicant. Practical, as defined by 23 CFR 777.2, "means available and capable of being done after taking into consideration cost, existing technology, and logistics, in light of overall project purposes."

[11] Preliminary - Considered to have the potential to substantially address the PEL Study goals and objectives as a stand-alone alternative.

[12] Complementary Features - Concepts that when combined with the Preliminary Alternatives, address the PEL Study goals and objectives. While these features are shared by all Preliminary Alternatives, their ultimate location(s) are alternative dependent.

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5.4 LEVEL 1 SCREENING RESULTS

Figure 5-2 is a graphical depiction of the Level 1 Screening.

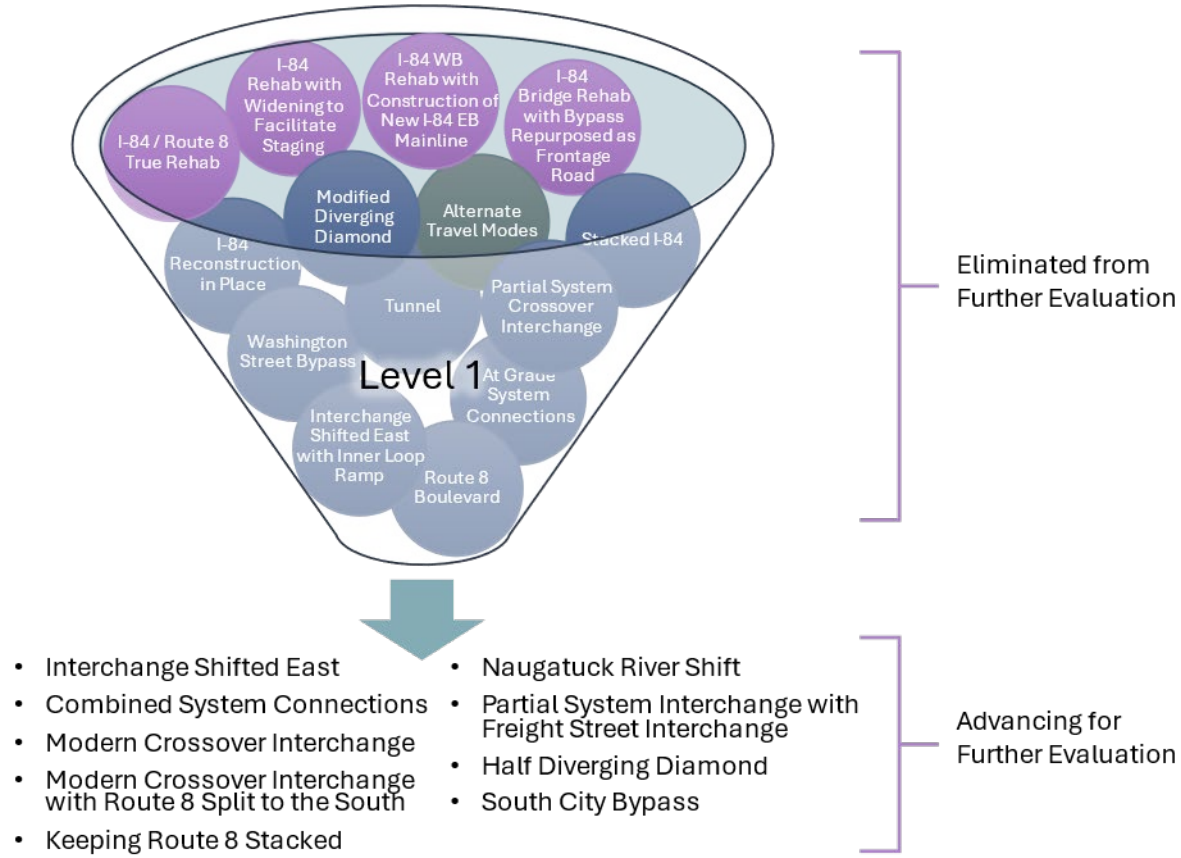

Figure 5-2 Graphical Depiction of the Level 1 Screening

The alternatives listed within **Table 5.4-1** were screened out and eliminated from further consideration during the Level 1 screening process:

Table 5.4-1 Level 1 Screening Results

Alternative Category	Alternative Name	Reason for Elimination
Rehabilitation Alternatives	• I-84 and Route 8 True Rehabilitation • I-84 Westbound Bridge Rehabilitation with Construction of New I-84 Eastbound Mainline • I-84 Bridge Rehabilitation with Bypass Repurposed as Frontage Road • I-84 Bridge Rehabilitation with Widening to Facilitate Staging	• The 2045 Rehabilitation Analysis showed that despite a cost of approximately $1 billion (2017 dollars), another rehabilitation in 2045 would not substantially improve the interchange's functionality, nor would it extend its lifespan relative to the cost of a full replacement. • The 2045 Rehabilitation Analysis also found that continued rehabilitation would not be able to address operational and safety standards. These standards include roadway geometry, standard shoulders or shoulder widths, spacing of interchanges and ramps, and left-hand entrances and exits.
Replacement Alternatives		
In-Place Reconstruction	I-84 Reconstruction in Place	This alternative would likely cause major constructability issues associated with maintaining traffic during reconstruction of I-84.
Full System Interchange	Interchange Shifted East with Inner Loop Ramp	This alternative would likely worsen congestion as a result of the geometry of the inner loop ramp that would not meet current CTDOT and AASHTO design standards.
	Stacked I-84	This alternative would require the use of poor functioning left-hand system ramps that would adversely affect traffic operations and safety
Partial System Interchange	Partial System Crossover Interchange	This alternative would require indirect connections outside of the highway system, requiring the use of the local road network at levels it would be unable to handle.
	Modified Diverging Diamond	This alternative would be unable to meet current CTDOT and AASHTO design standards and would result in multiple system movements that are unable to function adequately due to geometric deficiencies and heavy traffic volumes.

Alternative Category	Alternative Name	Reason for Elimination
Ground Level Options	At Grade System Connections	This alternative would be unable to meet current CTDOT and AASHTO design standards and would not be achievable due to topographic site constraints.
	Route 8 Boulevard	This alternative would require at-grade signalized intersections that would result in reduced travel speeds, increased travel times and congestions, and would require substantial disruption to Route 8 traffic.
Bypass Alignments	Washington Street Bypass	This alternative would not meet current CTDOT and AASHTO design standards as a result of the geometric challenges in the vicinity of the Waterbury Branch Railroad crossing of Washington Avenue and inadequate weave distances.
	Tunnel	This alternative would result in a structure where the projected construction and maintenance costs would be considered unreasonable and impractical due to the length of tunnel needed to construct a functioning interchange. The area's topographic constraints also present constructability limitations due to the depth the tunnel must be constructed at.
Alternate Travel Modes	Travel Modes	This alternative grouping would not address the structural and geometric deficiencies of the existing bridges as a stand-alone solution. Additionally, this group of conceptual alternatives would be unable to feasibly replace the movement of people and freight that the I-84 and Route 8 corridors carry.

The alternatives that were advanced from the Level 1 screening process are referred to as Initial Alternatives. These included three Full System Interchange alternatives, two Partial System Interchange alternatives, and one Bypass Alignment alternative. While Alternate Travel Modes was dismissed in Level 1, each option in the Range of Reasonable Alternatives includes multimodal aspects as complementary measures.

5.5 LEVEL 2 SCREENING RESULTS

Figure 5-3 is a graphical depiction of the Level 2 Screening.

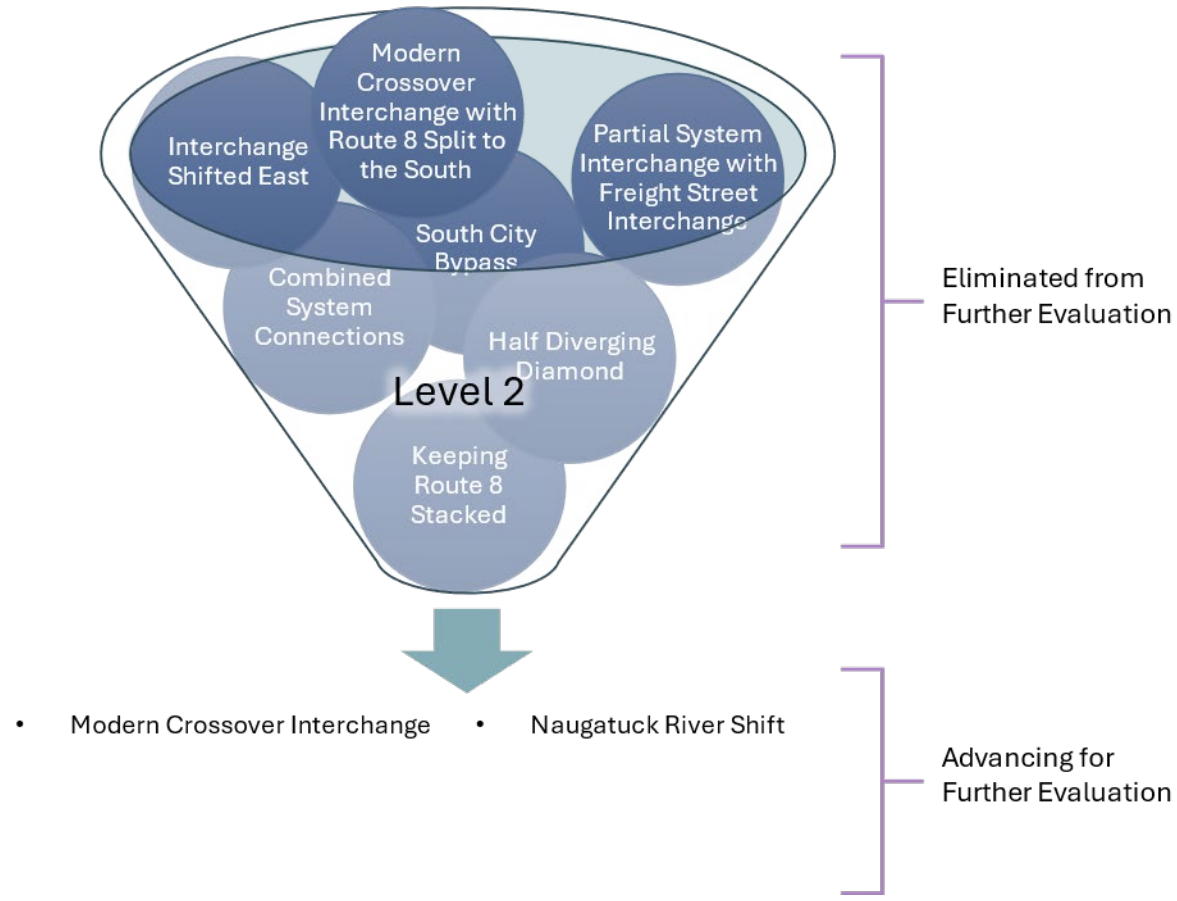

Figure 5-3 Graphical Depiction of the Level 2 Screening

Table 5.5-1 displays the alternatives that were screened out and eliminated from further consideration during the Level 2 screening. These alternatives were unable to address the goals of the PEL Study to a reasonable threshold, only meeting a marginal amount of the goals when compared to the baseline condition and other Initial Alternatives.

Table 5.5-1 Level 2 Screening Results

Alternative Category	Alternative Name	Reason for Elimination
Full System Interchange	Interchange Shifted East	This alternative would require potential substantial adverse impacts to the environment and community resulting from moving the core of the interchange to the vicinity of the Freight Street District, contradicting the PEL Study goals.
	Combined System Connections	This alternative would require additional roadways within the city which would intensify the perceived disconnection/barriers and would reduce access to key areas, contradicting the PEL Study goals and objectives.
	Modern Crossover Interchange with Route 8 Split to the South	This alternative would result in potential substantial environmental and community impact and would also preclude access to the Naugatuck River due to the bifurcation of Route 8 south of I-84, contradicting the PEL Study goals.
	Keeping Route 8 Stacked	This alternative would require substantially complex construction methodologies and a longer total construction duration, leading to challenging future maintenance activities and increased traffic impacts.
Partial System Interchange	Partial System Interchange with Freight Street Interchange	Design advancements identified a fatal flaw pertaining to traffic capacity due to the use of indirect connection on the local roadway network.
	Half Diverging Diamond	Design advancements identified a fatal flaw pertaining to traffic capacity due to the indirect system connections that would be required.
Bypass Alignment	South City Bypass	This alternative would result in potential substantial impacts to the environment and community due to the construction of an entirely new highway facility through an existing utility corridor and potentially unreasonable costs, contradicting the PEL Study goals.

The alternatives that advanced from the Level 2 Screening process are referred to as Preliminary Alternatives. Both of Preliminary Alternatives that advanced into the Level 3 Screening were all Full System Interchange alternatives.

5.6 LEVEL 3 SCREENING RESULTS

Figure 5-4 is a graphical depiction of the Level 3 Screening.

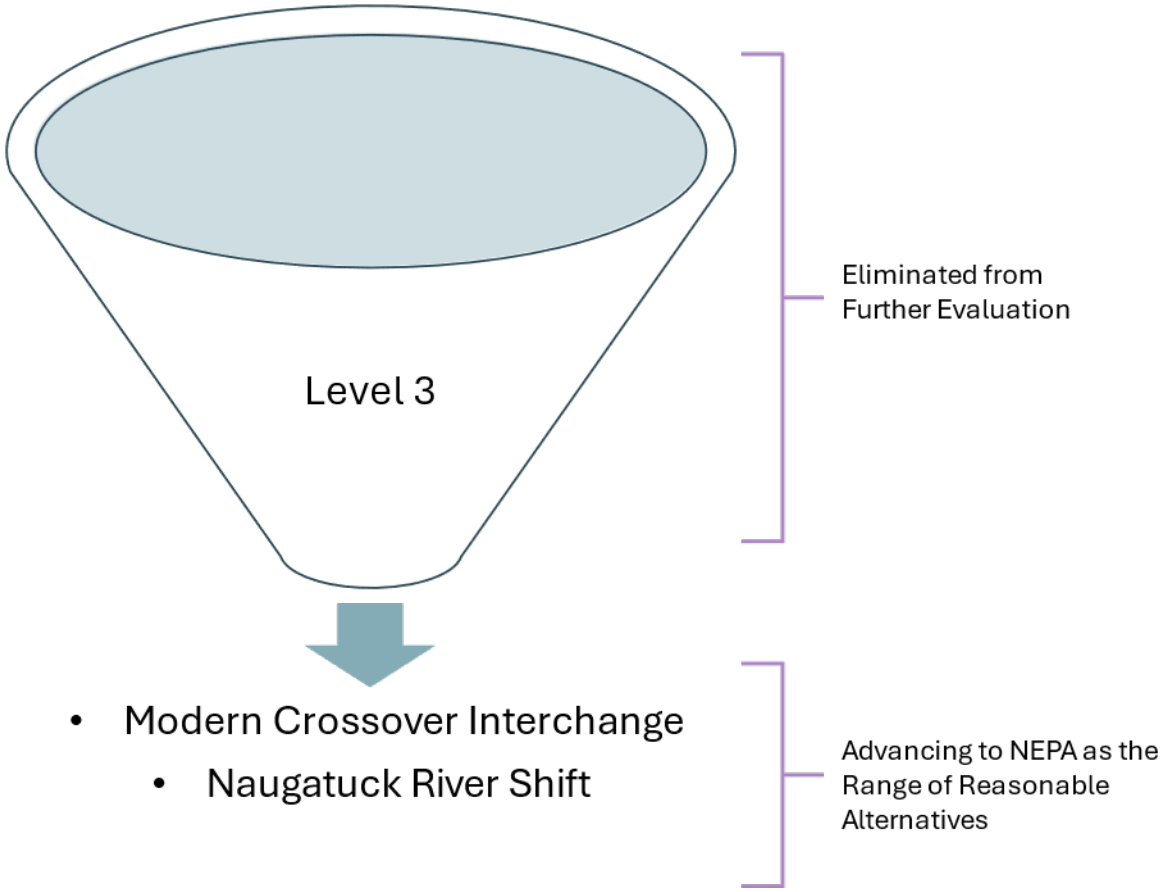

Figure 5-4 Graphical Depiction of the Level 3 Screening

Table 5.6-1 presents the results of the Level 3 Screening.

Table 5.6-1 Level 3 Screening Results

Alternative Category	Alternative Name	Result
Replacement Alternatives		
Full System Interchange	Modern Crossover Interchange	The Modern Crossover Interchange Alternative will advance to the NEPA phase as part of the Range of Reasonable Alternatives.
	Naugatuck River Shift	The Naugatuck River Shift Alternative will advance to the NEPA phase as part of the Range of Reasonable Alternatives.

5.7 RANGE OF REASONABLE ALTERNATIVES

Based on the results of the three levels of screening, both of the Preliminary Alternatives were identified as being able to be feasibly constructed based on technical, economic, environmental, and operational factors, and are therefore considered reasonable. These alternatives are referred to as the Range of Reasonable Alternatives. Of all the alternatives that were evaluated, these alternatives would best address the PEL Study's ***Preliminary Purpose and Need Statement*** and meet the PEL Study's other transportation-related goals and objectives. The *Modern Crossover Interchange* and *Naugatuck River Shift* alternatives will be further evaluated in NEPA as the Range of Reasonable Alternatives.

The *Modern Crossover Interchange* alternative results in a configuration that addresses the needs of the interchange and support the goals and objectives of the PEL Study. This alternative performed well in all transportation measures which evaluated mobility and access. It would reduce the potential for crashes along the mainline and would include substantial benefits for the surrounding community while minimizing impacts to environmental/community resources. This alternative would allow for riverfront access along both riverbanks of the Naugatuck River.

The *Naugatuck River Shift* alternative would address the needs of the interchange and support the goals and objectives of the PEL Study. The Naugatuck River would be shifted east to a more favorable position for the Route 8 roadway. This alternative would allow for more opportunities for riverfront access along the eastern riverbank and performed similarly to the *Modern Crossover Interchange* in terms of benefits and impacts to transportation, safety, and environmental/community resources.

The *Modern Crossover Interchange* (**Figure 5-5**) and *Naugatuck River Shift* (**Figure 5-6**) alternatives are recommended for advancement into NEPA for further evaluation and are described in greater detail in the following section. At the completion of this PEL Study, the Range of Reasonable Alternatives are still conceptual in nature and will require additional analysis and investigation within NEPA. Project-specific determinations, such as roadway designs, exact locations of ramps and interchanges, and project funding, would be analyzed and decided through the NEPA process. The NEPA Class of Action for the reconstruction of the Mixmaster is anticipated to be an Environmental Impact Statement. Issues/design refinements and features to be determined during NEPA are further detailed in the ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire*** (**Appendix F**).

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FIGURE 5-5 MODERN CROSSOVER INTERCHANGE

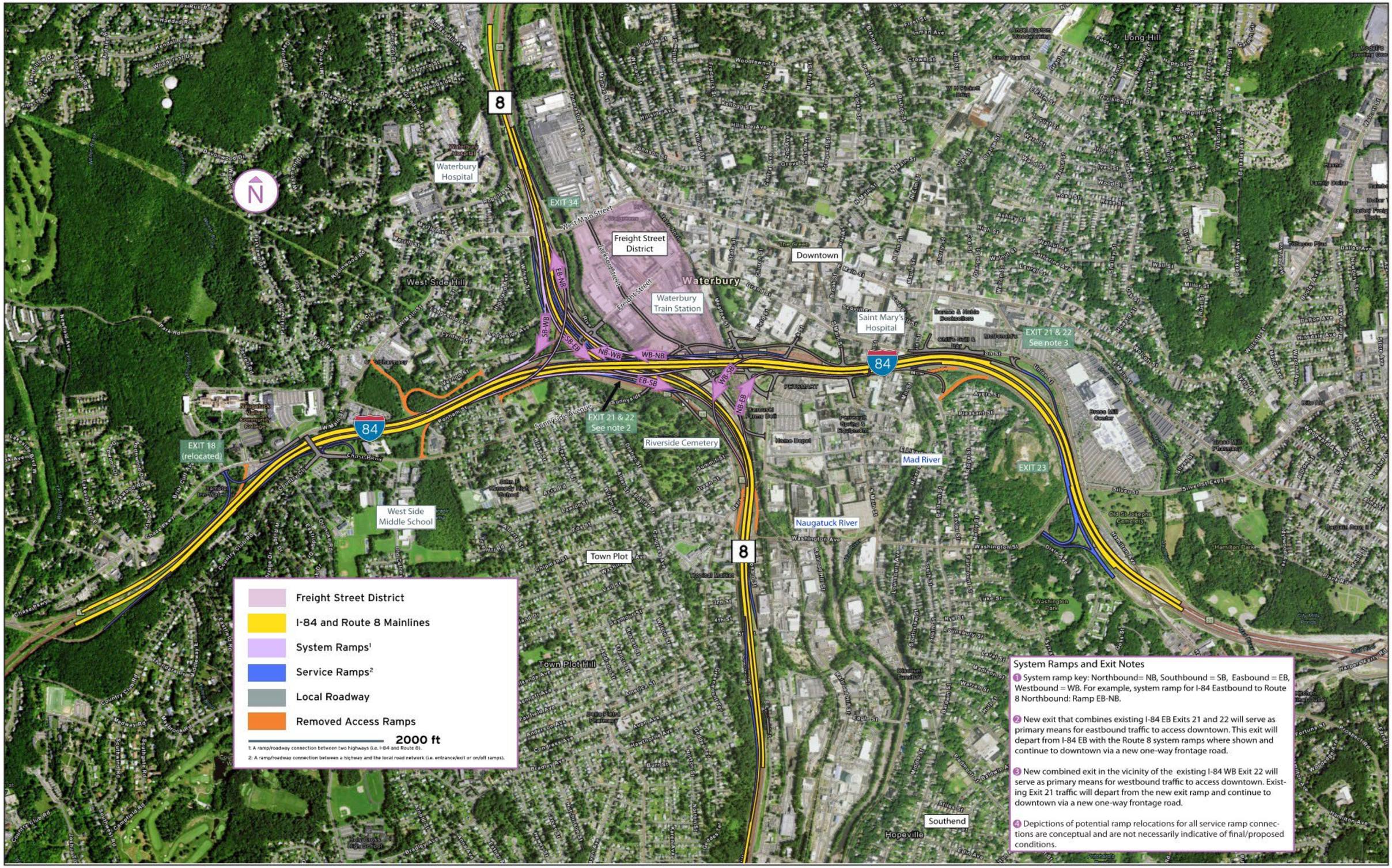
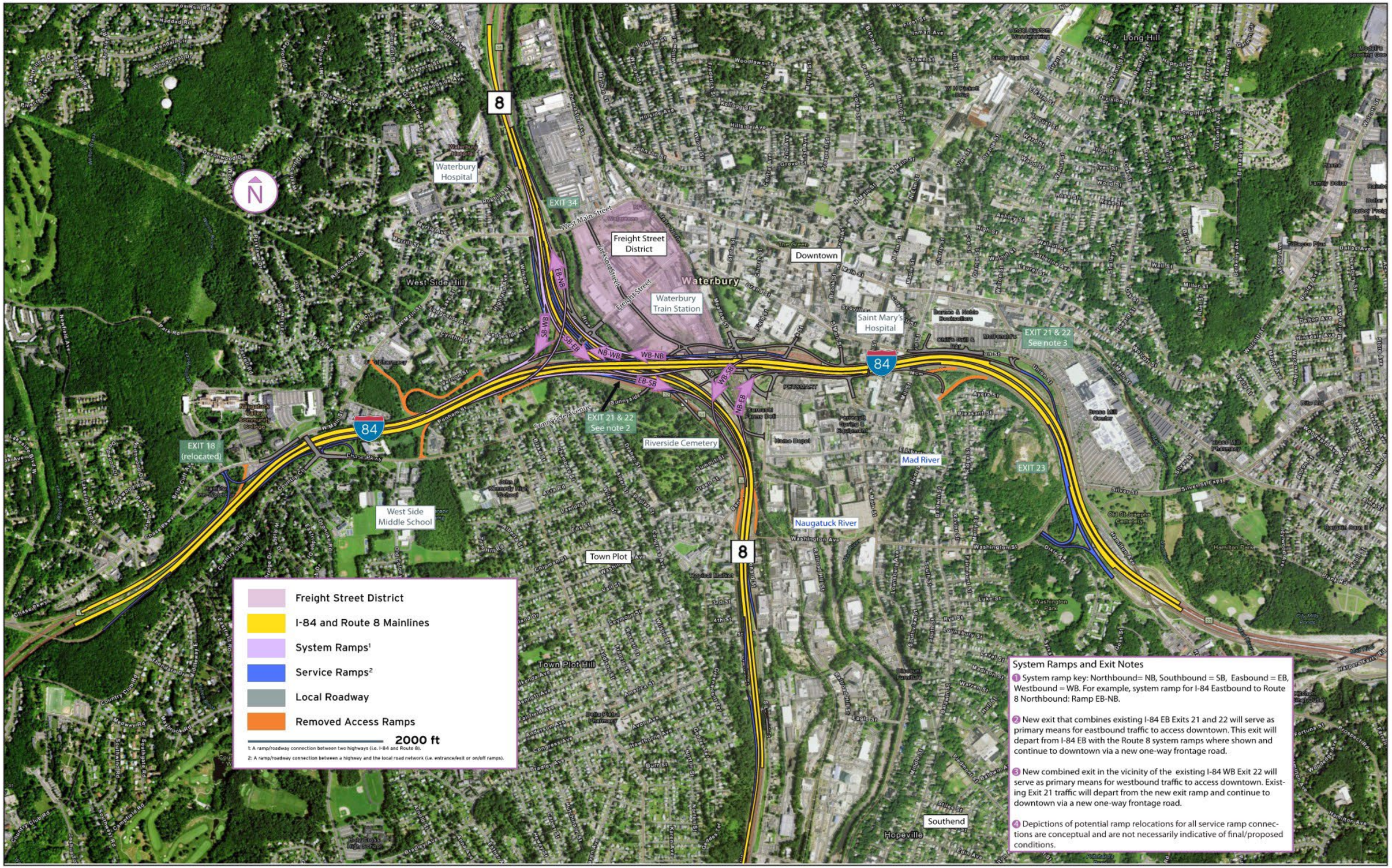


FIGURE 5-6 NAUGATUCK RIVER SHIFT



6 Range of Reasonable Alternatives Advancing into NEPA

6.1 MODERN CROSSOVER INTERCHANGE

The *Modern Crossover Interchange* alternative would result in a configuration that addresses the needs of the interchange and supports the goals and objectives of the PEL Study. The *Modern Crossover Interchange* alternative would replace the Mixmaster with a full system interchange, using elevated structures which "cross-over" (or under) one another to make connections for the system movements. The system movements provided with this alternative would be direct connections, with some using combined ramps. Near the interchange core, Interstate 84 would be located just south of the existing alignment, while Route 8 would be relocated east of the existing alignment, and east of the Naugatuck River, just south of I-84. Route 8 would remain on the west side of the Naugatuck River north of I-84.

6.2 NAUGATUCK RIVER SHIFT

The *Naugatuck River Shift* alternative would replace the Mixmaster with a full system interchange that would be built in an unstacked configuration. The system movements under this Preliminary Alternative would be direct connections, with some using combined ramps. Interstate 84 would be located just south of the existing alignment near the interchange core and Route 8 would be reconstructed on the west bank of the Naugatuck River. To accommodate the unstacked Route 8 configuration, the Naugatuck River would require partial relocation. The width, river flow, and capacity of the shifted portion would be maintained in the final condition.

6.3 ENVIRONMENTAL / COMMUNITY IMPACTS OF THE RANGE OF REASONABLE ALTERNATIVES

Potential environmental impacts associated with the implementation of the Range of Reasonable Alternatives is provided within this section. The impacts to environmental/community resources that must be further analyzed and studied are detailed in the ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire*** (**Appendix F**). Environmental Constraints Maps are also presented within this section.

6.3.1 ROW

Modern Crossover Interchange

The *Modern Crossover Interchange* alternative was identified to have approximately 13.0 acres of direct impacts to ROW in the PEL Study Area, resulting in three (3) total parcel acquisitions, 17 partial parcel acquisitions, along with seven (7) temporary construction easements. Additionally, seven (7) of the partial parcel acquisitions would occur to business parcels located in areas zoned as Central Business District.

Naugatuck River Shift

The Naugatuck River Shift alternative was identified to have approximately 12.5 acres of direct impacts to ROW in the PEL Study Area, resulting in three (3) total parcel acquisitions, 12 partial parcel acquisitions, and seven (7) temporary construction easements. Additionally, three (3) of the identified partial parcel acquisitions would occur to business parcels located in areas zoned as Central Business District.

6.3.2 Socio-economic

Various schools and public facilities are located within the PEL Study Area. These public facilities, such as churches, schools, and daycares, often function to facilitate community interaction and unite community spirit. The Range of Reasonable Alternatives are not likely to substantially nor adversely impact these facilities. The PEL process took into consideration community needs and stakeholder input; however, more detailed design approaches and solutions would be determined during the NEPA phase of project development where more detailed analysis of community impacts would be performed. Additionally, in accordance with Title VI, consideration of populations in relation to age, gender, and disability is included in the assessment of potential community impacts. A detailed assessment of potential impacts to these populations would be included during future phases of project development.

Modern Crossover Interchange

Modern Crossover Interchange is anticipated to include one (1) residential parcel impact that would result in displacement within communities where English is not their primary language. Within areas of pervasive low-income or areas with substantial populations of people of color, one (1) residential parcel and two (2) commercial parcels would result in displacement. There were 292 traffic noise sensitive receptors (residential properties, recreational areas, medical facilities, places of worship, schools, etc.) within such areas which were identified to be within 300 feet of the proposed alignment for this alternative, along with 203 traffic noise sensitive receptors in communities where English is not their primary language. This is not a large deviation from existing conditions, as the proposed alignment for the *Modern Crossover Interchange* alternative typically replicates the existing alignment of the interchange where most noise sensitive rectors are located. It is assumed that increases in traffic noise could be mitigated with applicable noise abatement measures, which will be investigated during the NEPA process.

Naugatuck River Shift

For *Naugatuck River Shift*, approximately one (1) displacement was identified to occur to a residential parcel located within an area identified as a community where English is not their primary language. One (1) residential parcel and two (2) commercial parcel acquisitions are anticipated to occur in areas of pervasive low-income or areas with substantial populations of people of color. There were 292 traffic noise sensitive receptors (residential properties, recreational areas, medical facilities, places of worship, schools, etc.) identified within such areas that were identified to be within 300 feet of the proposed alignment for this alternative, along with 203 traffic noise sensitive receptors in communities where English is not their primary language. Similar to *Modern Crossover Interchange*, this is not a substantial deviation from existing conditions as the proposed alignment for the *Naugatuck River Shift* alternative typically replicates the existing alignment of the interchange where most noise sensitive receptors are located. It is assumed that increases in traffic noise could be mitigated with applicable noise abatement measures, which will be investigated in NEPA.

6.3.3 Cultural Resources

While there are many historic sites and districts within the PEL Study Area, no sites, structures, properties, or districts listed within the National Register of Historic Places (NRHP) are expected to be directly impacted by the Range of Reasonable Alternatives. A detailed historic structures evaluation and archaeological study will occur during NEPA to assess impacts on cultural resources and identify mitigation measures to preserve architectural and archaeological integrity of the PEL Study Area. Additionally, a number of parks are located within the PEL Study Area. Determination of Section 4(f) applicability would

be performed during the NEPA process. None of the potentially impacted parks were purchased or improved with Land and Water Conservation Funds, therefore Section 6(f) would not apply.

Modern Crossover Interchange

There are anticipated impacts to archaeological resources in the PEL Study Area, consisting of impacts at the Dog's Nest[13] archaeological site near Jackson Street, which was previously inventoried and studied, and impacts to soils that were identified to have a potential of high archaeological sensitivity. Temporary impact is anticipated at Chase Park for a construction easement. It is not anticipated that this activity will have any substantial effects on the park; however, its potential use must be evaluated during NEPA.

Naugatuck River Shift

Similar to *Modern Crossover Interchange*, impacts to archaeological resources in the PEL Study Area, consisting of impacts at Dog's Nest archeological site and impacts to soils that were identified to have a potential of high archaeological sensitivity, will occur. Chase Park will be temporarily impacted for a construction easement. It is not anticipated that this activity will have any substantial effects on the park; however, its potential use must be evaluated during NEPA.

6.3.4 Surface Water Crossings, Wetlands, and Wildlife Habitat

In addition to the Naugatuck River, the PEL Study Area includes a number of surface water resources in the form of perennial streams and brooks such as the Mad River and unnamed tributaries. Additionally, many of these rivers and streams have wetland systems associated with them. Due to the urbanized environment of the PEL Study Area, there is limited opportunity for wildlife habitat use of the forested/shrub wetlands and maintained herbaceous vegetated areas that are located immediately adjacent to or between existing roadways. The majority of the streams through the PEL Study Area are maintained and contain limited riparian vegetation. Impacts to critical habitats are not anticipated to occur. All alternatives will have impacts in Connecticut Department of Energy and Environmental Protection (CTDEEP) Natural Diversity Database (NDDB) Areas already intersected by the Mixmaster. Wetlands delineation to determine the boundaries of regulated wetlands and watercourses, permitting determination, and protected habitat/species consultation would be completed during the NEPA phase of project development.

Modern Crossover Interchange

There is a total of approximately 4.5 acres of proposed bridge structure that would cross over surface waters in the PEL Study Area. Impacts to surface waters are assumed to occur wherever there are bridge structures that cross these surface waters due to the construction activities that would occur in and above these freshwater resources. The surface waters that were identified to have potential impacts due to construction include the Naugatuck River, Mad River (currently culverted), Welton Brook, and Sled Haul Brook. Additionally, one (1) wetland system is anticipated to be impacted. These impacts would occur to a wetland associated with the Welton Brook. Additionally, there is expected to be approximately 5.5 acres of ground disturbance within Federal Emergency Management Agency (FEMA) designated 100-year floodplains and regulatory floodways. Although construction activities would occur within FEMA floodplains and floodways, revisions to the National Flood Hazard Mapping are not anticipated.

[13] For additional information regarding the Jackson Street Neighborhood (Dog's Nest) archaeological site, please visit the Cultural Resources page on the CTDOT website at https://portal.ct.gov/dot/bureaus/policy-and-planning/environmental-planning/cultural-resources?language=en_US.

Naugatuck River Shift

There is a total of approximately 6.5 acres of proposed bridge structure that would cross over surface waters in the project area. Impacts to surface waters are assumed to occur wherever there are bridge structures that cross these surface waters due to the construction activities that would occur in and above these freshwater resources. The surface waters that were identified to have potential impacts due to construction include the Naugatuck River, Mad River (currently culverted), Welton Brook, and Sled Haul Brook. One (1) wetland system is anticipated to be impacted; these impacts would occur to the wetland associated with Welton Brook. Additionally, this alternative is anticipated to have 9.5 acres of ground disturbance within FEMA designated 100-year floodplains and regulatory floodways. Due to the nature of the construction activities that would occur within FEMA floodplains and floodways, revisions to the National Flood hazard Mapping may be required.

6.3.5 Hazardous Materials

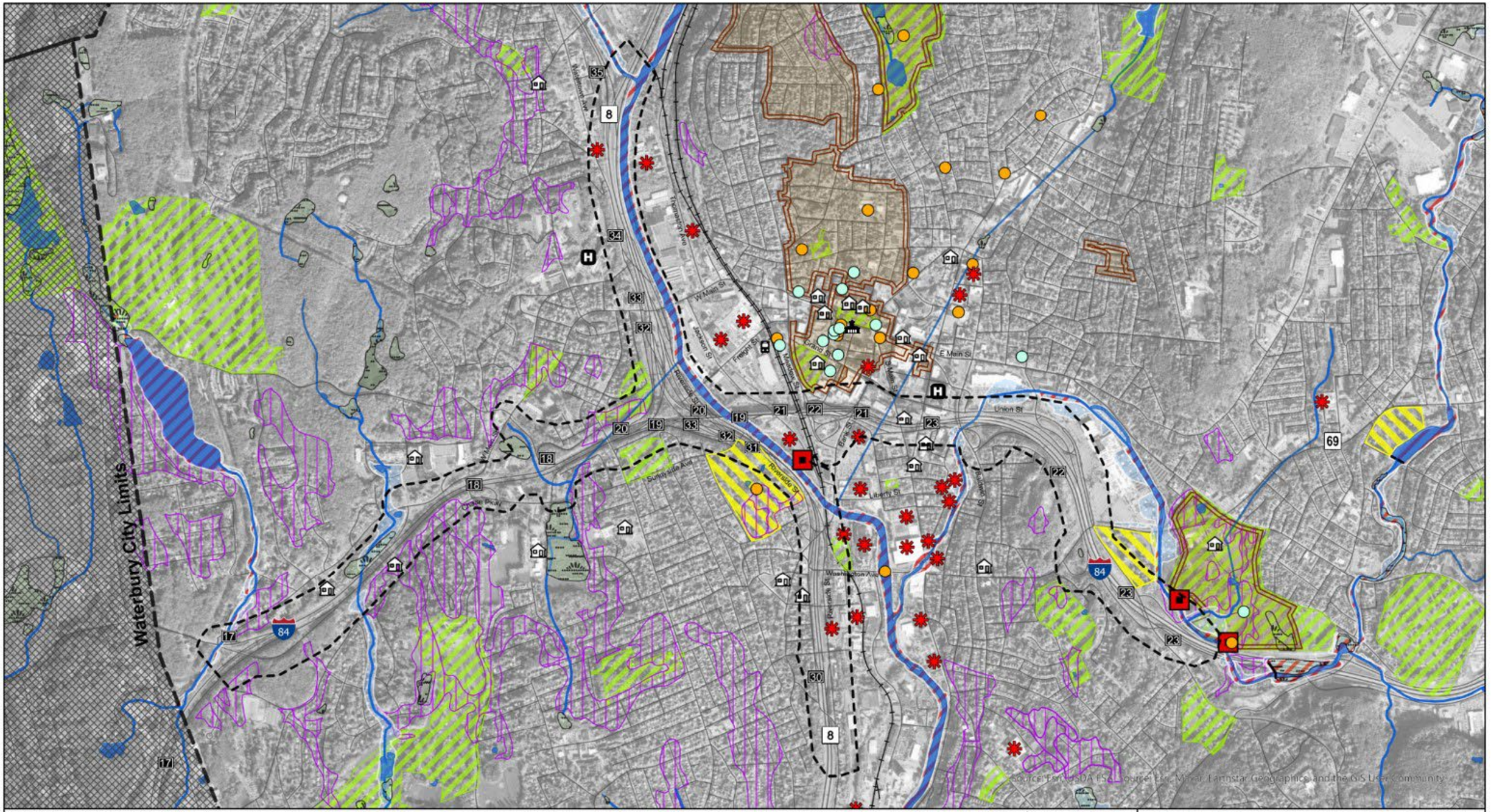
Contaminated sites in the context of this PEL Study are properties that are listed on the Environmental Protection Agency's (EPA's) Toxic Release Inventory, the EPA's Superfund Enterprise Management System (SEMS) database, brownfield sites listed in the CTDEEP brownfield inventory, and sites that have received Environmental Use Restrictions (EUR) by the state of Connecticut. Impacts were identified by whether alternative footprints would encroach on parcels containing these properties and all alternatives will impact two of these sites (the same sites for all alternatives).

Modern Crossover Interchange

Two potentially contaminated/hazardous sites would be impacted, one of which is a Superfund site as found on the EPA's Superfund Enterprise Management System (SEMS) database and the other being a site with an EUR totaling approximately 3.5 acres of impacts.

Naugatuck River Shift

Two potentially contaminated/hazardous sites would be impacted. One site is a Superfund site per the EPA SEMS, while the other has a CT EUR totaling approximately 4.0 acres of impacts.



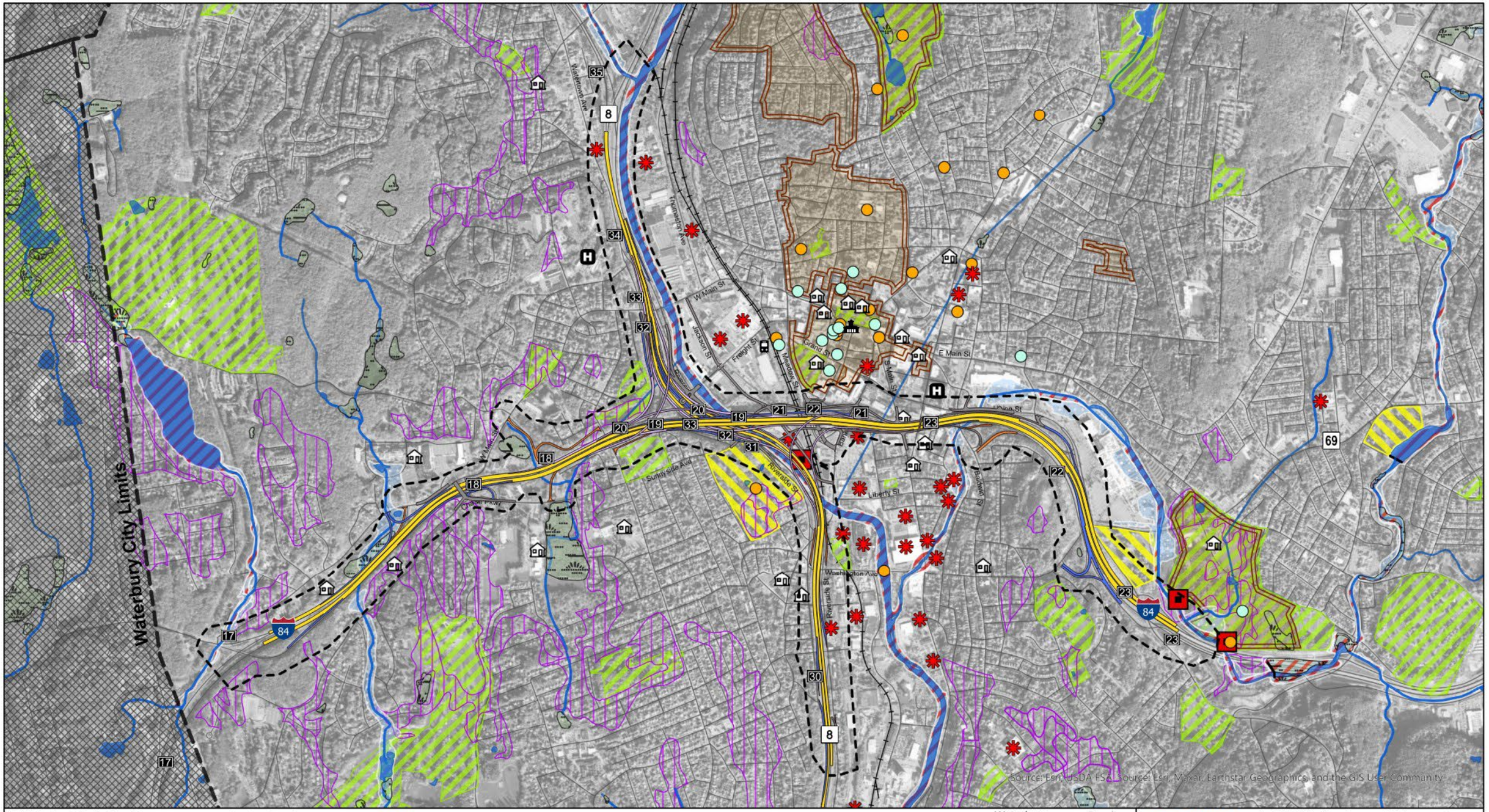
84new mix

I-84 Waterbury Mixmaster Reconstruction Project

HNTB

Environmental Constraints Map
Existing Conditions

Date: 2024 | Figure 6-1



- Project Study Corridor
- State Register of Historic Places Listed Sites, Landmarks, or Structures
- National Register of Historic Places Listed Sites, Landmarks, or Structures
- Archaeological Sites
- Schools, Churches, Daycares, and Libraries
- Potentially Contaminated / Hazardous Sites
- High Predicted Archaeological Soils Sensitivity
- Historic Districts
- Cemeteries
- Public Parks / Open Space
- Freshwater Ponds, Lakes, and Rivers
- Freshwater Wetland
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Cutsheets

Modern Crossover Interchange Alternative

- I-84 & Route 8 Mainlines
- System Ramps
- Service Ramps
- Removed Access Ramps
- Local Roads

- Waterbury City Limits
- Hospital
- City Hall
- Train Station
- Roads
- Railroad
- Exit

N

0 0.25 0.5 0.75 1 Miles

84 new mix

I-84 Waterbury Mixmaster Reconstruction Project

HNTB

Environmental Constraints Map w/ Modern Crossover Interchange

Date: 2025 | Figure 6-2

Project Study Corridor
State Register of Historic Places Listed Sites, Landmarks, or Structures
National Register of Historic Places Listed Sites, Landmarks, or Structures
Archaeological Sites

Schools, Churches, Daycares, and Libraries
Potentially Contaminated / Hazardous Sites
High Predicted Archaeological Soils Sensitivity
Historic Districts
Cemeteries

Public Parks / Open Space
Freshwater Ponds, Lakes, and Rivers
Freshwater Wetland
1% Annual Chance Flood Hazard
Regulatory Floodway
Cutsheets

Naugatuck River Shift Alternative
I-84 & Route 8 Mainlines
System Ramps
Service Ramps
Removed Access Ramps
Local Roads

Waterbury City Limits
Hospital
City Hall
Train Station
Roads
Railroad
Exit

0 0.25 0.5 0.75 1 Miles
N

84 new mix

I-84 Waterbury Mixmaster Reconstruction Project

HNTB

Environmental Constraints Map w/ Naugatuck River Shift

Date: 2025

Figure 6-3

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6.4 COMPLEMENTARY FEATURES

Complementary Features are individual aspects of the Preliminary Alternatives that are intended to support the goals and objectives of the PEL Study when paired with the reconstruction of I-84/ Route 8. These features are compatible with all of the Range of Reasonable Alternatives and are considered to be connected actions as their final location is dependent upon the selection of a "Preferred Alternative" which will occur during NEPA. As a result, the identified complementary features must be evaluated alongside the Range of Reasonable Alternatives in a single Environmental Document (an Environmental Impact Statement). The following Complementary Features discussed within this section have been identified as possible enhancements and are recommended to be advanced for additional analysis during the subsequent NEPA phase.

6.4.1 East/West Frontage Road

New east/west frontage road system with downtown access and complete streets. This includes an extension of Sunnyside Avenue, forming a fifth crossing of the Naugatuck River. The ultimate termini and alignment of the east/west frontage road system is dependent upon the selection of the Preferred Alternative and should therefore be evaluated as part of the future environmental document.

Figure 6-4 Precedent for a Complete Street (New York, NY)

6.4.2 Cap/Tunnel/Overbuild

This feature entails the "capping" of portions of the I-84 mainline where the topography would allow for the mainline to be below grade of the surrounding area in the vicinity of Baldwin Street and South Elm Street. The mainline would essentially have a "cap" built over top. This "cap" would allow for increased open space opportunities. This would also provide enhanced connectivity north/south of I-84.

Figure 6-5 Precedent for a Highway Overbuild (Boston, MA)

6.5 BREAKOUT PROJECTS

Breakout Projects, also discussed as Early Action and Near-Term Projects, were identified concurrent to the PEL Study as part of establishing the master plan. Breakout Projects are potential projects that were identified during the PEL Study that do not rely on other proposed projects to provide a benefit to the traveling public, have logical termini, a lack of connected actions, independent utility as stand-alone projects, and will be evaluated in a separate NEPA process if advanced for further design. These Breakout Projects are considered to be disconnected from the Range of Reasonable Alternatives and therefore will not preclude nor bias the future selection of a Preferred Alternative during the NEPA process.

These Breakout Projects are envisioned as transportation projects for other Travel Modes and the local roadway network, to be potentially implemented by CTDOT or other government agencies like the city of Waterbury/NVCOG, or other public/private partners. Service interchanges, or highway projects, would be implemented by CTDOT. All Breakout Projects are intended to improve traffic operations, safety, or constructability. Since these projects are conceptual in nature, they will require additional analysis and investigation within NEPA. Project-specific determinations, such as roadway designs, exact locations of ramps and interchanges, and project funding will be analyzed through individual NEPA processes for each project. The anticipated NEPA Class of Action for these Breakout Projects are likely Categorical Exclusions for those that involve minimal changes to existing conditions (e.g., complete streets upgrades) or Environmental Assessments for larger projects that may have the potential to result in significant impacts such as mainline or ramp reconfigurations. A NEPA Class of Action would be determined for all Breakout Projects in conjunction with the lead federal agency.

Breakout Projects have been identified in three general categories: Alternate Travel Modes, Local Roadways (including ramp termini), and I-84 or Route 8 Mainlines.

6.5.1 Alternate Travel Modes

Alternate travel modes include active transportation (pedestrian and bicycle) improvements and public transportation (transit and rail) improvements. Additionally, this Breakout Project group also recommends investigating other alternate travel modes such as the regional bus rapid transit system, a Transit Hub Improvement Project, and Waterbury Branch Line improvements.

Bicycle / Pedestrian Improvements

Figure 6-6 Separated Shared-use Path Along Freight Street (Waterbury, CT)

Bicycle and pedestrian projects are aimed at providing increased connections across existing barriers of travel. Specifically, along the new and improved frontage roads, these roads would be designed with dedicated bicycle and pedestrian infrastructure to facilitate safe active transportation in Waterbury and may incorporate traffic calming measures to further increase bicycle and pedestrian safety. Accessibility improvements will also be implemented as a part of these projects.

Within the PEL Study Area, Route 8, the Naugatuck River, and I-84 divide the city in the east-west and north-south directions, thereby creating four quadrants of approximately equal size. These quadrants, referred to as Northeast, Northwest, Southeast, and Southwest, were used to identify general areas of potential improvements. Locations for the recommended improvements are detailed within the ***Mobility Analysis Technical Memorandum*** (**Appendix E-4**).

The following are examples of potential bicycle and pedestrian Breakout Projects:

- General improvements to sidewalks and intersections within the Northeast, Northwest, Southeast and Southwest Mobility Analysis Study Area quadrants.
- Bicycle facility implementation and/or upgrades along the following corridors: South/North Main Street, West Main Street Corridor, Willow Street/Meadow Street, North Baldwin

Street/Cherry Street, Grand Street/Union Street, North Elm Street, East Main Street, Washington Street, Chase Parkway/Sunnyside Avenue, Charles Street/South Leonard Street, Highland Avenue, Thomaston Avenue, and West Main Street west of the Naugatuck River.

- Improvements to existing north/south frontage roads along Charles Street, South Leonard Street, and Riverside Street. This includes making Riverside Street bi-directional, which allows for the development of a linear park along the relocated Naugatuck River Greenway.

Transit and Rail Improvements

Transit and rail improvements include enhancing amenities at bus stops, expanded service along the busiest transit routes, consolidating low volume transit stops to improve service times, implementing transit signal priorities along heavily frequented transit routes, and a transit hub improvement project.

The following are examples of transit and rail improvements:

- Enhancing bus stop amenities such as bus shelters, benches, and improved signage (within 0.5 miles from Rail Station);

Figure 6-7 New East Main Street Corridor Transit Stop Amenities (Waterbury, CT)

- Transit Hub Improvement Project (The Waterbury Green);
- Examination of consolidating bus stops within 0.5 miles of Rail Station with less than 10 riders per day; and
- Transit Signal Priority (West Main Street and Highland Avenue).

6.5.2 Local Roadway

Breakout Projects at the local roadway level include improvements to the local road network surrounding the Mixmaster. These are possible actions that may be considered by CTDOT and other parties during the NEPA process, such as the City or NVCOG. These improvements include local road rerouting, incorporating traffic calming measures, and multimodal considerations and infrastructure improvements such as creating safe routes and complete streets. This Breakout Project group also includes improvements at ramp termini to be potentially implemented by CTDOT. The identified Local Roadway Breakout Projects are listed in **Table 6.5-1**.

Table 6.5-1 List of Local Roadway Breakout Projects

List of Local Roadway Breakout Projects		***Project Status***
Local Roadway	West Main Street at Thomaston Avenue	Conceptual Design
	Grand/Union Streets at South Main Street	Conceptual Design
	Sunnyside Avenue at Riverside Street	Conceptual Design
	Silver Street (Route 69) at East Main Street	Conceptual Design
	Grand Street Traffic Calming	Conceptual Design
	Chase Parkway at I-84 EB On-Ramp	Conceptual Design

Local Roadway Intersections with On- or Off--Ramps	Union Street at Brass Mills Drive/I-84 Exit 22 WB Off-Ramp	Conceptual Design
	Route 8 NB Exit 32 Off Ramp at NB Riverside Street	Constructed
	Realigned Route 8 SB Exit 35 On Ramp, Realigned Exit 34 Off Ramp at Watertown Ave and Robbins St	Conceptual Design
	Route 8 Exit 35 Interchange at Rudy Ave and Aurora St	Conceptual Design
	Route 8 NB Exit 36 Off Ramp at Huntingdon Ave	Conceptual Design

6.5.3 I-84 or Route 8 Mainlines

This group of identified Breakout Projects include improvements to the mainline and approaches to the Mixmaster. These improvements differ from the reconstruction of the interchange itself and do not preclude nor bias the future selection of a Preferred Alternative during the NEPA process. These potential projects have been identified, at a high level, as also having logical termini, independent utility, are considered to be disconnected single actions, and will be evaluated in a separate NEPA process from the reconstruction of the core of the interchange if advanced for further design. These improvements are intended to minimize interim improvement infrastructure that would need to be reconstructed following the selection of a Preferred Alternative in the NEPA process.

Table 6.5-2 lists the potential I-84 or Route 8 Mainline Breakout Projects grouped by their location along the approaches to the Mixmaster interchange.

Table 6.5-2 List of I-84 or Route 8 Mainline Breakout Projects

List of I-84 or Route 8 Mainline Breakout Projects		***Project Status***
I-84 or Route 8 Mainline	Closure of I-84 EB Exit 21 Off-Ramp	Preliminary Design
	I-84 EB Exit 21 and 22 Weave Improvements from Route 8 SB	Conceptual Design
	Highland Avenue On-Ramp (I-84 EB Exit 18 On Ramp)	Conceptual Design
	I-84 EB Auxiliary Lane at Interchange 17	Preliminary Design
	I-84 WB On-Ramp from Union St - Auxiliary Lane	Constructed
South Approach	Route 8 Exit 30 Interchange Reconfiguration	Conceptual Design
	Charles and South Leonard Complete Streets	Conceptual Design
West Approach	I-84 Exit 18 Service Interchange Reconfiguration	Conceptual Design
	Reconstruction of Highland Avenue Bridge over I-84	Conceptual Design
	West Approach Highway Work	Conceptual Design
East Approach	I-84 Eastbound McMahon Street On-Ramp	Conceptual Design
	Reconstruction of South Elm Street Bridge over I-84	Conceptual Design
	I-84 East Approach Highway Work	Conceptual Design

7 Next Steps

With the completion of the PEL Study, CTDOT has a documented set of recommendations for the Mixmaster Reconstruction Project, which will be used to identify funding for further project development, design, and implementation. The "Range of Reasonable Alternatives" serve as a list of improvements that are recommended to be implemented for the Mixmaster Reconstruction Program over time as funding becomes available. The Breakout Projects will likely be implemented first, but the goal is to eventually implement all of the recommendations identified in the PEL Study as conditions warrant and as funding becomes available. Possible funding programs for Breakout Projects are summarized in **Section 7.1, Program Funding and Phasing.** Details and recommendations with regard to the transition from planning to a NEPA analysis are included within the ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire*** (**Appendix F**).

Figure 7-1 Major Elements of Project Development in NEPA

7.1 PROGRAM FUNDING AND PHASING

The Range of Reasonable Alternatives are anticipated to cost between $3-5 Billion ($USD 2022). To implement the Range of Reasonable Alternatives in a manner that allows for the program to be funded, a funding and phasing approach must be identified as it is unlikely that the entire set of recommendations will be funded as a single project. The identification of a project funding and phasing plan is a key activity within project planning. During the NEPA process, the NEPA project team will further evaluate the Alternatives and develop an implementation schedule for the identified improvements based on the priorities tied to the Purpose and Need Statement and associated Goals and Objectives. As the design of the NEPA preferred alternative is advanced and cost estimates are refined, the NEPA project team will identify the set of "most likely improvements," which will form the basis for the construction phasing plan of the interchange. Operational modeling of the NEPA preferred alternative during the NEPA phase will provide relevant information needed in the determination of the "most likely improvements." Based on the modeling and coordination, a project phasing plan of the NEPA preferred alternative will be prepared and included in the NEPA environmental documentation, such as the Environmental Impact Statement.

7.1.1 Project Management Plan and Financial Plan

Projects with an estimated total cost of $500M or more and a recipient of federal financial assistance require the development of a Project Management Plan (PMP), Financial Plan, and Annual Updates to the Financial Plan.[14] The PMP establishes the framework for the management of a major project and the methodology for organizing, directing, and coordinating the resources required for the project. The goal of the PMP is to document mechanisms for control of scope, budget, schedule, and quality. The Financial Plan ensures that the necessary financial resources are identified, available, and managed throughout the life of the project. An Annual Financial Plan is a comprehensive document that reflects the project scope, schedule, cost

[14] 23 USC Sec. 106

estimate, and funding structure to provide reasonable assurance that there will be sufficient funding available to implement and complete the entire project, or a fundable phase of the project, as planned. A PMP and Financial Plan will be prepared for the proposed project during the NEPA phase of project development. These plans may begin as part of the pre-Notice of Intent activities for the Environmental Impact Statement.

7.1.2 Funding Opportunities: Discretionary Federal Grants

The Bipartisan Infrastructure Law authorized several discretionary federal grant programs that are potentially well-aligned with elements of the New Mix Program's Breakout Projects. The most relevant program for which funding remains is the Better Utilizing Investments to Leverage Development (BUILD), formerly RAISE and TIGER program.

BUILD provides federal awards of up to $25 million that can be combined with other federal funding sources, such as formula allocations, to support up to 80% of the cost of multimodal projects. Many of the proposed Breakout Projects have costs such that CTDOT could achieve a majority federal share from a successful BUILD grant.

A Notice of Funding Opportunity (NOFO) for FY2026 RAISE funds is expected to be released in 2025. Although the timing of the FY2026 NOFO and specific changes to merit criteria are uncertain at this time, it is not too early to identify which projects or combinations of projects are ready to advance to construction before a BUILD obligation deadline of September 30, 2030, for FY2026 funds and could complete construction expenditures by September 30, 2035.

7.2 PROJECT-SPECIFIC DETERMINATIONS

Project-specific determinations regarding the roadway design, location of ramps and interchanges, and project funding will be analyzed and decided through the NEPA process. The anticipated issues and design features to be determined during the NEPA process are further detailed in the ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire*** (**Appendix F**).

7.3 PEL QUESTIONNAIRE

The ***Interstate 84/Route 8 Interchange Reconstruction PEL Questionnaire*** (**Appendix F**) provides a summary, in the format of questions and answers, of the steps completed and the methodology utilized during this PEL process. The PEL Questionnaire provides details summarizing the transition from planning to a NEPA process. Additionally, FHWA will use the PEL Questionnaire to assist it in determining if the PEL Study meets the requirements of the FHWA Planning Regulations.[15]

[15] 23 CFR Sec. 450.212 or Sec. 450.318

8 References

23 C.F.R. § 777.2 (2017).

23 C.F.R. § 450.212 (2017).

23 C.F.R. § 450.318 (2017).

23 U.S.C. § 106 (2012)

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9 Detailed List of Appendices

Appendix A: PEL Process Framework and Methodology

Appendix B: Analysis, Needs, and Deficiencies Report

Appendix C: Preliminary Purpose and Need Statement

Appendix D: Public Involvement Activities and Agency Coordination

- Appendix D - 1: Report Documenting Public Involvement and Agency Coordination
- Appendix D - 2: New Mix Public Involvement Plan

Appendix E: The Universe of Alternatives and Levels 1, 2, and 3 Screening Methodologies and Results

- Appendix E - 1: Alternatives Screening Methodology
- Appendix E - 2: Universe of Alternatives and Level 1 Screening Report
- Appendix E - 3: Initial Alternatives and Level 2 Screening Report
- Appendix E - 4: Preliminary Alternatives and Level 3 Screening Report and Mobility Analysis Technical Memorandum

Appendix F: Interstate 84/Route 8 Interchange Reconstruction FHWA PEL Questionnaire