



Interstate 84/Route 8
Interchange Reconstruction

Appendix F: FHWA Planning and Environmental Linkages (PEL) Questionnaire

JULY 2025

Prepared for:



Connecticut Department of
Transportation

Prepared by:



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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FHWA PEL Questionnaire

This Federal Highway Administration (FHWA) Planning and Environmental Linkage (PEL) questionnaire is intended to function as a summary of the planning process and ease the transition from the PEL study phase to a National Environmental Policy Act (NEPA) analysis. This questionnaire is consistent with 23 CFR 450 (Planning regulations) and other FHWA policies on the PEL process.

Listed in the following sections are responses to the FHWA PEL Questionnaire for the Interstate 84/Route 8 Interchange Reconstruction PEL Study. The responses and information were developed by the PEL Study team throughout the planning process and summarizes the approach used for the PEL Study.

1. Background:

a. Who is the sponsor of the PEL Study? (state DOT, Local Agency, Other)

Sponsor: Connecticut Department of Transportation (CTDOT)

b. What is the name of the PEL Study document and other identifying project information (e.g., sub-account or STIP numbers, long-range plan, or transportation improvement program years)?

PEL Study Document: Interstate 84/CT Route 8 Interchange Reconstruction Planning and Environmental Linkages (PEL) Study Report

State Project (SP) No. 151-331

c. Who was included on the study team (Name and title of agency representatives, consultants, etc.)?

The study leadership team consisted of CTDOT and the project consultants, as follows:

- CTDOT, Division of Highway Design, Major Highways
- CTDOT, Bureau of Policy and Planning
- Consultant team:
 - HNTB Corporation
 - AECOM
 - BL Companies, Inc.
 - Survey Solutions, Inc.
 - Mintz + Hoke
 - GM2 Associates (GM2)
 - Keville Enterprises, Inc.

d. Provide a description of the existing transportation facility within the corridor, including project limits, modes, functional classification, number of lanes, shoulder width, access control and type of surrounding environment (urban vs. rural, residential vs. commercial, etc.)

PEL Study Area Limits: The PEL Study Area limits are presented in Figure 1. The PEL Study Area involves the Interstate 84/CT Route 8 Interchange, informally known as the Mixmaster, and extends approximately four miles on Interstate 84 (I-84) and approximately two miles on CT Route 8 (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 Exit 17 to 23; on Route 8 the corridor limits extend just outside Exits 30 and 35.

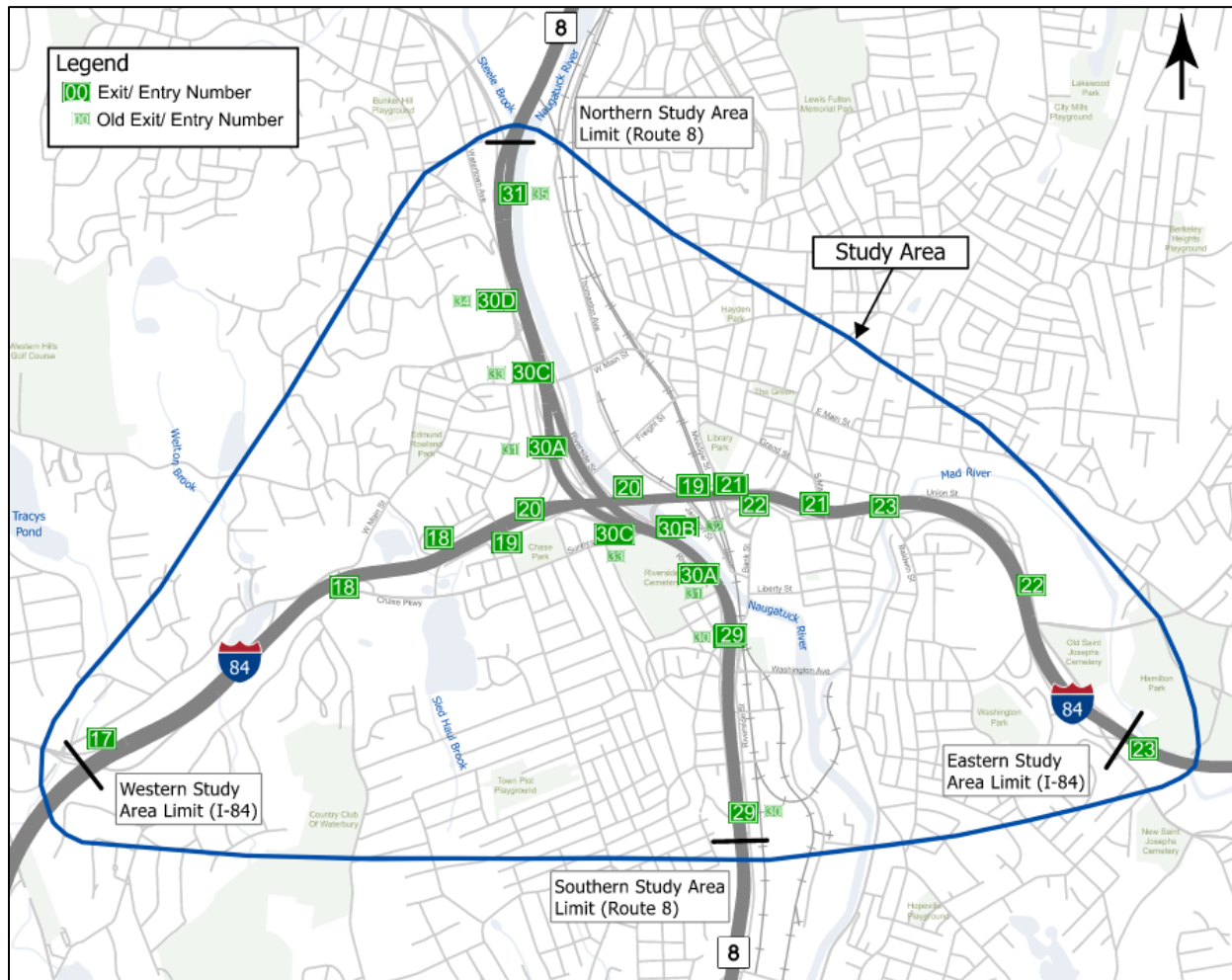


Figure 1 PEL Study Area

Description of I-84 through the Study Area:

- **Transportation Modes** – Vehicular and Freight Traffic
- **Functional Classification** – I-84 is classified as an east/west Urban Interstate Principal Arterial (Urban Freeway) in a suburban/intermediate built-up area with a 50-55 mile per hour (mph) design speed.
- **Lane Configuration** – West of the Route 8 SB to I-84 eastbound (EB) on-ramp, I-84 EB has two 12-foot-wide through lanes, with a 12-foot-wide auxiliary lane as needed. I-84 EB east of the Route 8 SB to I-84 EB on-ramp and I-84 westbound (WB) through the project area have three 12-foot-wide through lanes, with 12-foot-wide auxiliary lane(s), as needed.
- **Shoulder Configurations** – The right shoulder width, generally 10-foot-wide, is reduced to 3 feet-11 inches for a majority of Bridge 03191A (I-84 EB) and the entirety of Bridge 03191B (I-84 WB). The left shoulder width varies from 3 feet-11 inches to 5 feet.
- **System Ramps** – Exits 19 and 20.
- **Service Ramps** – Exits 17, 18, 21, 22 and 23.

Description of Route 8 through the Study Area:

- **Transportation Modes** – Vehicular and Freight Traffic
- **Functional Classification** – Route 8 is classified as a north/south Urban Expressway Principal Arterial (Urban Freeway) with a design speed of 50-55 mph through the core of the Mixmaster.
- **Lane Configuration** – Route 8 has two 12-foot-wide through lanes, with a 12-foot-wide auxiliary lane as needed.
- **Shoulder Configuration** – Through the Route 8 corridor along the stacked portion south of I-84 (Bridges 03190A and 03190B), the shoulder widths are 3-foot 11-inches. The right shoulders are generally 10-feet-wide while the left shoulders are generally 4-feet-wide for the remainder of Route 8.
- **System Ramps** – Exits 31 and 33.
- **Service Ramps** Exits 30, 32, 34 and 35.

All existing through lanes and auxiliary lanes through the corridor meet the minimum design standard of 12 feet for left/right shoulder widths. The shoulder widths, however, are substandard in all locations through the I-84 corridor.

Description of Transportation Facilities: Within Connecticut, I-84 serves as a critical east-west transportation link between New York and Massachusetts. In the city of Waterbury, I-84 is located just south of the city's greater downtown area. The Mixmaster is an elevated, full system interchange located where I-84 and Route 8 cross. It is a full diamond configuration with four vertical levels.

The Waterbury area has a robust fixed-route transit network serviced by CTtransit Waterbury for local service; CTtransit New Haven and CTtransit Hartford for express service; and North East Transportation (NET) operating paratransit and dial-a-ride services through the Greater Waterbury Transit District. However, while the transit services in the Waterbury area are extensive, there is little direct impact of these services on the day-to-day traffic of the Mixmaster. None of the local CTtransit Waterbury buses operating throughout the Waterbury area operate directly through the Mixmaster interchange. Two CTtransit Express bus routes (routes 925 and 928) provide express service from Waterbury to Hartford with all boardings occurring in downtown Waterbury.

Regarding rail service, Waterbury is serviced by the Metro-North Railroad Waterbury Branch Line (WBL), a 27.1-mile-long railroad that provides commuter rail service at six stations from Waterbury to Bridgeport for rail connections to the New Haven Line (NHL) and Grand Central Terminal (GCT) in New York. Overall ridership on the WBL accommodates diverse user groups within the region through weekday and weekend rail and transit services with connections to urban, suburban and rural areas around the Mixmaster. Service on the WBL is limited by the lack of signalization and passing sidings, which prevent the operation of more than one trainset on the line at a time.

Description of Local Road Network of the PEL Study Area:

The following is a summary of the local road network's major roadways with number of lanes and functional roadway class.

- Two major local north-south roadways exist through Waterbury on the west side of the Naugatuck River: **Riverside Street** (two lane Major Collector; NB and SB are Minor Arterial) and **Highland Avenue** (two lane Minor Arterial).
- To the east of the Naugatuck River, the following four streets traverse north to south connecting with the city center located to the northeast of the core of the interchange: **Jackson Street** (two lane Local); **Meadow Street/Bank Street** (two lane Minor Arterial); **South Main Street/South Elm Street** (two lane Other Principal Arterial); and **Baldwin Street** (two lane Minor Arterial).

- The Naugatuck River has four east/west local road crossings within the vicinity of the study area. Starting south and moving north, these local crossings are: **Washington Avenue** (two lane Minor Arterial/ Local); **Bank Street** (two lane Minor Arterial), **Freight Street** (two lane Minor Arterial), and **West Main Street** (four lane Other Principal Arterial).
- Other major local roads include the following five roads: **Chase Parkway** (two lane Minor Arterial); **Sunnyside Avenue** (two lane Major Collector / Local); **Grand Street** (two lane Other Principal Arterial); **Union Street** (four / two lane Other Principal Arterial / Minor Arterial); and **East/West Main Street** (two lane Minor Arterial).

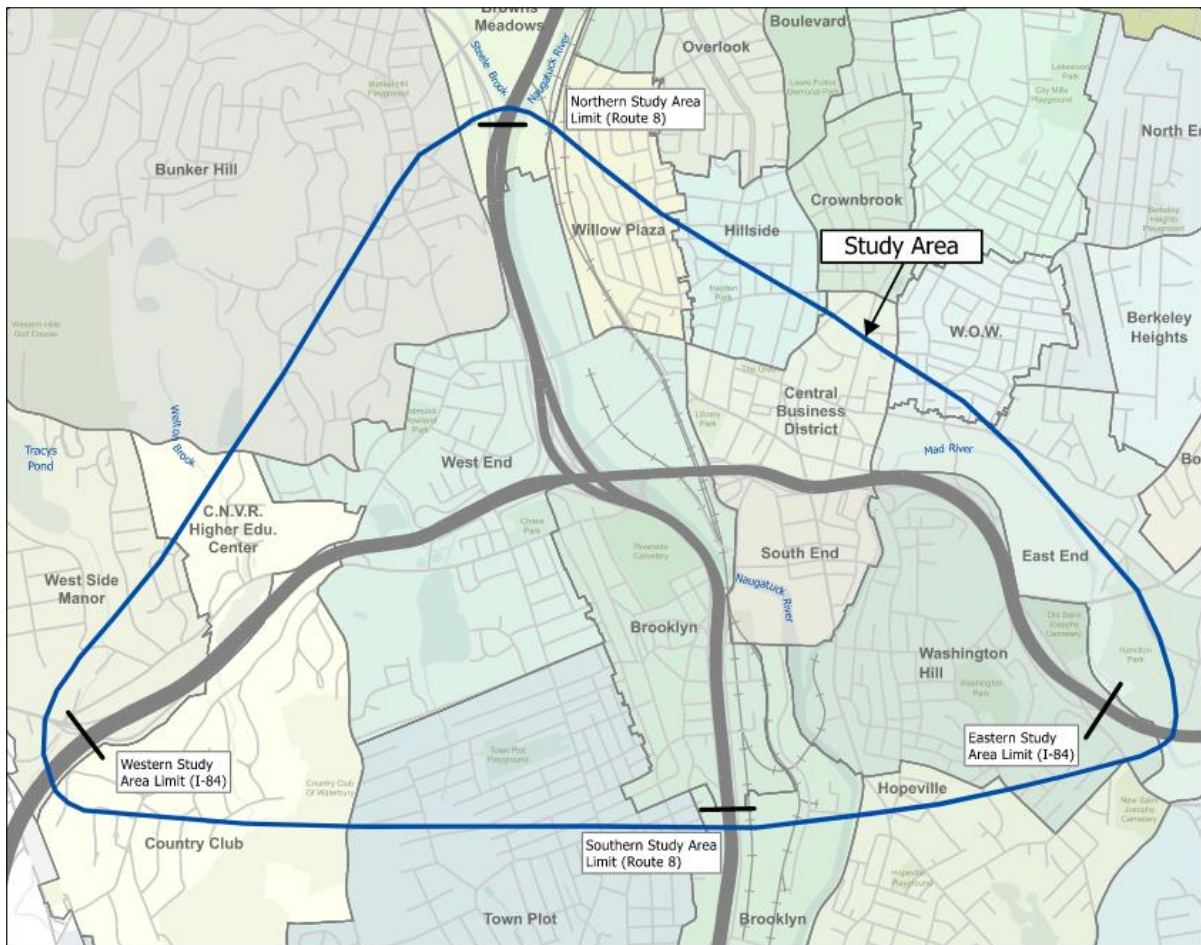


Figure 2 PEL Study Area Limits with Neighborhoods

Surrounding Environment: The city of Waterbury is a major employment center in Connecticut and the governmental, institutional, and cultural center of the Naugatuck River Valley. The four neighborhoods immediately abutting the core of the Mixmaster consist of the:

- Central Business District, an historical downtown with a park and public and community buildings;
- South End, a small neighborhood with a mix of big box retail, light industry, and single-family residential land uses;
- Brooklyn, primarily high- and middle-density, single-family residential, with a light industrial zoned area; and
- West End, with mostly single-family residential land uses.

Every neighborhood that abuts the core of the Mixmaster contains block groups with large populations of people who are either low-income, identify as a person of color, have limited English proficiency (LEP), or some combination of all three characteristics.

Resources within the PEL Study Area include the Naugatuck River, 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 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 Central Business District. The Waterbury Green, where the existing bus transit hub is operated around, and the Waterbury Train Station are located in the Central Business District.

e. Provide a brief chronology of the planning activities (PEL Study) including the year(s) the studies were completed.

In 2018, CTDOT began to analyze whether another major rehabilitation project of the interchange, scheduled for 2045 (the 2045 Rehabilitation Analysis), would be a cost-effective way to extend the Mixmaster's serviceable lifespan and address functionality issues. The analysis showed that a rehabilitation in 2045 would not substantially improve the interchange's functionality, it would not extend its lifespan significantly relative to the cost of a full replacement, and it would not address operational and safety standards that have evolved since the interchange's original design and construction. As a result, CTDOT identified the PEL Study approach as a means to create a master plan / vision for the I-84/Route 8 Interchange Reconstruction, informally referenced as the "New Mix".

Figure 3 presents a schematic of the PEL Study timeline and Table 1 presents a chronology of the PEL Study planning activities and documents.¹ Additionally, multiple interim technical memoranda were prepared for these major planning documents.

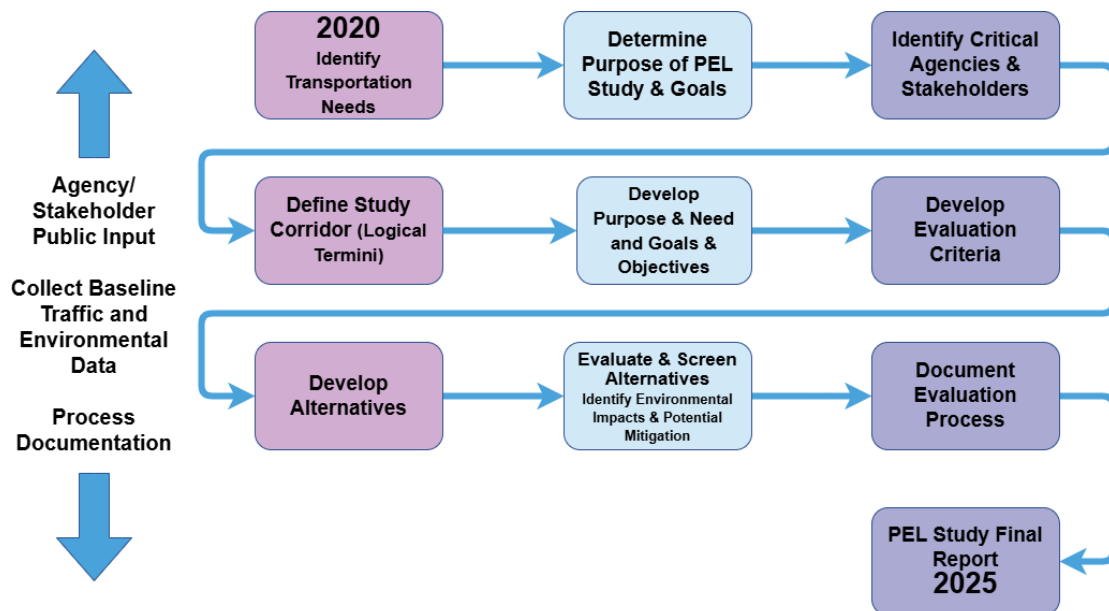


Figure 3 PEL Study Timeline

¹ The substantial completion date is presented. The planning documents were updated in 2023/2024 to incorporate the mobility analysis and in 2025 for the PEL Study completion/finalization.

Table 1 Chronology of the PEL Study Planning Activities and Documents

Planning Activity/Study Document	Summary Description	Substantial Completion Date
PEL Study Initiation	Initiated analysis of whether a major rehabilitation scheduled for 2045 would be a cost-effective way to extend the serviceable lifespan and address the functionality issues of the Mixmaster. CTDOT opted to use the PEL approach to create a master plan for the reconstruction of the Mixmaster.	2018
Analysis, Needs, and Deficiencies Report	Summarized the results of studies performed as part of CTDOT's planning process for the Mixmaster Interchange, to identify the existing (2017) transportation network's deficiencies and to predict its future (2045) deficiencies in a hypothetical "no build" scenario, used as a benchmark condition for comparison and evaluation of improvement alternatives.	2020; Finalized August 2023
PEL Process Framework and Methodology	Formalized the scope, schedule, and deliverables for the Mixmaster PEL process.	2021
Public Involvement Plan	Presented a roadmap for public involvement and agency coordination for the Mixmaster PEL Study.	2021; revised June 2022
Preliminary Purpose and Need Statement	Established the purpose of the Program, summarized transportation needs, and identified other transportation related goals and objectives. Intended to be refined throughout the PEL process. Used for the development of the master plan, forming the basis of the refined NEPA Purpose and Need Statement.	March 2023; revised June 2024
PEL Process Alternative Screening Methodology	Defined the sequential process used during the PEL Study as a decision-making tool for evaluating Project alternative solutions and included a three-tiered screening process.	May 2021; revised February 2024
Level 1 Conceptual Alternatives and Screening Report	Presented the Universe of Alternatives and documented the Level 1 conceptual alternatives' screening process that resulted in the Initial Alternatives that were advanced to Level 2.	April 2023
Level 2 Initial Alternatives and Screening Report	Documented the Level 2 screening of the Initial Alternatives, which resulted in the Preliminary Alternatives that were advanced to Level 3.	August 2023; revised August 2024;
Mobility Analysis Memorandum	Documents the methodology and analysis performed to identify and index transportation mobility issues within the PEL Study Area, and subsequently identified opportunities for improvement to the transportation system in Waterbury.	May 2024;
Level 3 Preliminary Alternatives and Screening Report	Documented the Level 3 screening of the Preliminary Alternatives, which resulted in a Range of Reasonable Alternatives to be advanced for subsequent NEPA evaluations.	June 2024
PEL Report	Incorporated the results of the PEL planning process and summarized the potential funding and project phasing opportunities, including a project management and financial plan.	October 2024;

f. Are there recent, current, or near future planning studies or projects in the vicinity? What is the relationship of this project to those studies/projects?

The PEL Study builds on previous CTDOT reports and studies that have addressed the long-term transportation needs of the I-84 and Route 8 corridors, as well as local and regional studies of transportation needs and issues in the PEL Study Area, such as aging infrastructure, recurring congestion and delay, and high crash rates.

CTDOT Studies

- Needs and Deficiencies Analysis in the I-84 Corridor Waterbury to Southington, 1995
- I-84 West of Waterbury (WOW) Needs and Deficiencies Study, 2001
- Waterbury Interchange Needs Study (WINS), 2010
- 2045 Rehabilitation Analysis, 2018

Local and Regional Studies

- Central Naugatuck Valley Regional Plan of Conservation and Development, 1998
- City of Waterbury Downtown Strategic Plan, 2015
- City of Waterbury Plan of Conservation and Development (POCD) 2015- 2025
- City of Waterbury Freight Street Redevelopment Strategy, 2018
- Naugatuck Valley Council of Governments Waterbury West Main Street Corridor Study, 2022

Table 2 identifies recent and ongoing state and local projects that pertain to the PEL Study Area.

Table 2 State and Local Projects in the PEL Study Area

State Project #	Project Name	Dates	Connection to PEL Study Area
151-273	CTDOT I-84 Waterbury Widening	Completed 2018	Upgrades to a 2.7-mile segment of I-84 located between the PEL Study's eastern study limit and Pierpont Road; consisting of realignment of I-84 in the vicinity of Harpers Ferry Road; interchange ramp reconfiguration; State and local road construction; and relocation of the Mad River and Beaver Pond Brook. State & local road reconstructions included: Hamilton Avenue, Harpers Ferry Road, Scott Road, Plank Road, Reidville Drive, Plank Road East, and East Main Street.
151- 326, 151-312, 151- 313	CTDOT Route 8/I-84 Mixmaster Rehabilitation Project: Route 8 Northbound (Bridge #03190A); Route 8 Southbound (Bridge #03190B); I-84 Eastbound (Bridge #03191A) and I-84 Westbound Bridge (#03191B)	Completed 2024	Rehabilitation of several major bridges within the PEL Study Area, including deck repairs and replacements, steel repairs, substructure repairs to provide a 25-year service life to structures. Required construction of a temporary bypass consisting of three temporary bridges to carry Route 8 northbound traffic through interchange.

State Project #	Project Name	Dates	Connection to PEL Study Area
-----	City of Waterbury, Naugatuck River Greenway Project	Ongoing	Ongoing greenway project to construct a 44-mile-long multi-use trail along the Naugatuck River from Torrington to Derby, CT. The City's portion consists of a 7.1-mile-long corridor with access points and linkages to downtown, the future Intermodal Transportation Center, and adjacent neighborhoods. The greenway incorporates interim connections to accommodate the future I-84/Route 8 Reconstruction Project.
-----	City of Waterbury, Waterbury Active Transportation and Economic Resurgence (W.A.T.E.R.) Project	Phase II Ongoing	Ongoing Complete Streets project with multiple components within the PEL Study Area, including construction of Phase II of the City of Waterbury's section of the Naugatuck River Greenway Trail, (approximately 2.3 miles); West Main Street renovation and streetscaping Improvements; and the addition of electrical vehicle charging stations at the downtown Waterbury Train Station.
-----	City of Waterbury Plan of Conservation and Development, 2015-2035 Projects	Adopted 2015	Multiple revitalization projects in Waterbury, including Waterbury Next, a downtown revitalization project; downtown Gateways; brownfield developments; Mad River Greenway extension; redevelopment of the Freight Street District; and other downtown renovation projects.

2. Methodology used:

a. What was the scope of the PEL Study and the reason for completing it?

CTDOT's scope of the PEL Study was to establish a master plan for the phased implementation of improvements to address deficiencies at the I-84/Route 8 Interchange, in coordination with key federal, state, regional and local agencies, including the FHWA, the City of Waterbury, and the Naugatuck Valley Council of Governments (NVCOG). CTDOT used the PEL approach to link planning for the Mixmaster to the NEPA review process. By working with identified stakeholders to discern the transportation and community needs, incorporating early stakeholder involvement, and evaluating alternatives relative to transportation needs and key environmental and community resources, CTDOT intended for the PEL Study to be a resource for future NEPA documentation that would avoid the duplication of effort, streamline the environmental review process, and reduce delays in project implementation.

The PEL Study scope included the following objectives as a precursor and compliment to the NEPA process:

- Establish the Preliminary Purpose and Need Statement, including goals and objectives;
- Identify key environmental and community resources and constraints;
- Develop and screen alternatives;
- Establish a reasonable range of alternatives to bring into NEPA (including potential class of action);
- Develop potential mitigation strategies; and
- Provide recommendations for Breakout Projects with independent utility, logical termini, and considered to be unconnected single actions.

b. Did you use NEPA-like language? Why or why not?

NEPA-like language was used throughout the PEL process. CTDOT determined that the purpose of PEL was to conduct a planning process with procedures and documentation that were aligned with and acceptable for use in future NEPA studies, thereby avoiding document duplication and streamlining the NEPA process.

c. What were the actual terms used and how did you define them? (Provide examples or list)

The following terms were used in the PEL Study; their definitions are the same as those used in NEPA:

- Project Study Area;
- Purpose and Need Statement, described as the PEL Study Preliminary Purpose and Need Statement, including project purpose, project needs, and transportation-related goals and objectives;
- Alternatives, including the No-Build Alternative, Build alternatives, Range of Reasonable Alternatives and Alternatives Analysis;
- Impacts including effects and mitigation;
- Logical termini and independent utility, including unconnected single action and connected action;
- Environmental Document including Class Of Action, Environmental Impact Statement, Environmental Assessment, and Categorical Exclusion;
- Title VI, including minority populations, low-income populations, and LEP populations.

Additionally, the PEL documents referenced federal regulatory requirements that are related to NEPA, including Sections 401 and 404 of the Clean Water Act, Section 4(f) of the U.S. Department of Transportation Act, and Section 6(f) of the Land and Water Conservation Fund Act., and Section 106 of the National Historic Preservation Act.

d. How do you see these terms being used in NEPA documents?

These terms are consistent with NEPA terminology and will continue to be used in future NEPA documents in the same manner as in the PEL Study and in accordance with FHWA's Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*.

e. What were the key steps and coordination points in the PEL decision-making process? Who were the decision-makers and who else participated in those key steps? For example, for the corridor vision, the decision was made by state DOT and the local agency, with buy-in from FHWA, the USACE, and USFWS and other resource/regulatory agencies.

Figure 4 identifies key steps and coordination points of the PEL process. PEL Study decision-makers included the following, which is documented in the *PEL Report*:

FHWA. FHWA coordination points occurred as follows: identification of transportation needs, development of the Preliminary Purpose and Need Statement, development of the Universe of Alternatives and Level 1 screening criteria, and the elimination of alternatives. A final FHWA coordination point will occur for the *PEL Report*.

State Project No. 151-331: Reconstruction of Interstate 84/CT Route 8 Interchange
Planning and Environmental Linkages Study Process/Product Flow Chart

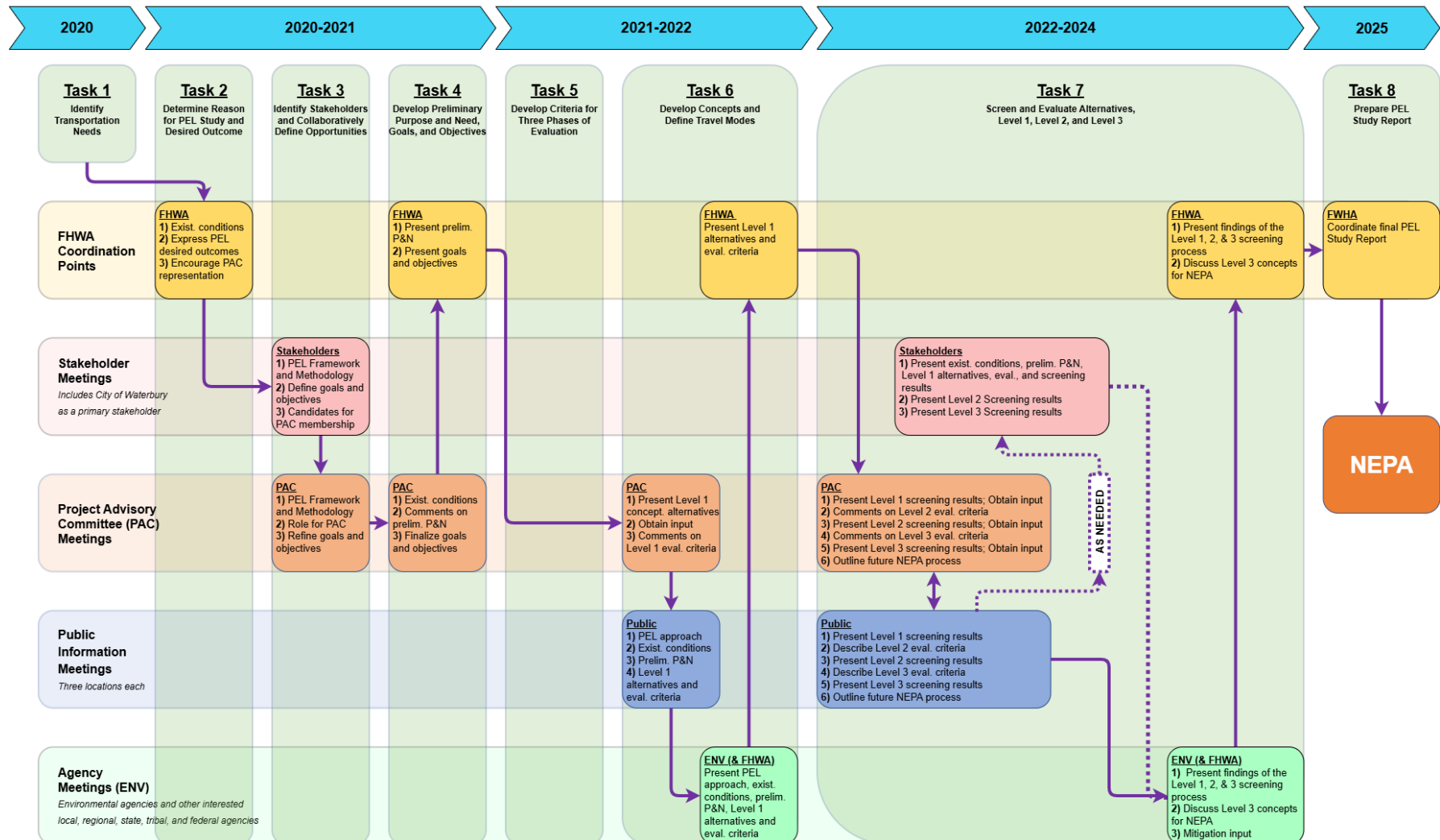


Figure 4 PEL Process Key Steps and Coordination

Stakeholders. Stakeholders included the City of Waterbury; NVCOG; large employers, immediate abutters; community and neighborhood groups; Title VI- and other related community organizations; emergency service providers; environmental and historic groups; and transportation, trucking and commuter groups. CTDOT met with stakeholders at strategic points to define the Program goals and objectives, and to present the results of the Levels 1, 2, and 3 screenings.

Project Advisory Committee (PAC). The PAC included representation from all stakeholder groups. A total of thirteen meetings were held with the PAC over the course of six PEL Study milestones; the meetings included a 15-day comment period in which to incorporate and/or respond to comments.

Public. Four meetings, each with at least two sessions, were held with the public to provide information and solicit input at key milestones, including identifying transportation needs and project goals, providing the evaluation criteria and results of the Levels 1, 2, and 3 screenings, and the *PEL Report* conclusions and recommendations. The meetings included a 15-day comment period in which to incorporate and/or respond to comments.

Agencies. Agencies included federal, state, and local agencies. A total of two meetings were held at major milestones and other meetings were provided as needed. The following agencies were requested to provide comment regarding the PEL Study: CT State Historic Preservation Office, CT Department of Energy and Environmental Protection, CT Office of Policy and Management, CT Department of Economic and Community Development, Delaware Tribe of Indians, Federal Transit Administration, Federal Rail Administration, Mashantucket Pequot Tribal Nation, Mohegan Tribal Council, Narragansett Indian Tribe, National Marine Fisheries Service (NMFS), US Army Corps of Engineers (USACE), US Environmental Protection Agency, US Fish and Wildlife Service (USFWS), US Department of Housing and Urban Development, and the National Park Service. PEL analyses and documents were presented to the agencies and comments were solicited.

f. How should the PEL information be presented in NEPA?

The PEL information and reports may be incorporated as appendices, referenced in text, and/or included in the program record of the NEPA analysis, as applicable. Data used in the PEL Study is considered to be reliable, reasonably current, and uses accepted methodologies to facilitate its integration into NEPA as consistent with Planning Regulations 23 CFR 450.212(a)-(c) and 450.318(a)-(d). Any data used in the PEL Study will be updated, as necessary, during the NEPA process. The PEL documentation was prepared to be consistent with NEPA requirements and allows for future use during the NEPA process. CTDOT intends for the information produced and decisions made in the PEL Study to serve as a starting point for more detailed analyses in NEPA.

3. Agency coordination:

a. Provide a synopsis of coordination with federal, tribal, state and local environmental, regulatory and resource agencies. Describe their level of participation and how you coordinated with them.

The *New Mix Plan for Public Involvement* and the *PEL Process Framework and Methodology Report* describe the coordination with federal, state, and local agencies and tribes throughout the PEL Study process. As described in the response to Question 2e and visualized in Figure 4, CTDOT conducted meetings with regulatory and resource agencies at key project milestones to solicit technical input and feedback and to incorporate agency jurisdictional concerns. Federal and state regulatory agencies and Tribal Historic Preservation Officers listed in the response to Question 2e were invited to attend the July 2022 and July 2024 agency coordination meetings. Following the meetings, invitees were provided

a copy of the presentation and an electronic link to the New Mix website document library to access and comment upon program documents, including the *Analysis, Needs and Deficiencies Report*, draft *Preliminary Purpose and Need Statement*, and draft *PEL Questionnaire*.

b. What transportation agencies (e.g., for adjacent jurisdictions) did you coordinate with or were involved in the PEL Study?

Through stakeholder meetings with NVCOG, CTDOT coordinated with public officials in the following jurisdictions adjacent to the Program: Cheshire, Middlebury, Naugatuck, Plymouth, Prospect, Watertown, and Wolcott. Additionally, CTDOT conducted stakeholder meetings with the following transportation, trucking, and commuter entities: Greater Waterbury Transit District; Connecticut Association for Community Transportation (CACT); CTtransit Waterbury; Metropolitan Transportation Authority, Metro- North Railroad: Waterbury Union Station; and Motor Transportation Association of Connecticut (MTAC).

c. What steps will need to be taken with each agency during NEPA scoping?

CTDOT will continue to engage with the agencies involved in the PEL Study during the NEPA process. In coordination with FHWA, CTDOT will identify cooperating and participating agencies and invite their participation in the NEPA process. The PEL Study, including the *Preliminary Purpose and Need Statement*, will be used as a guide and reference to streamline the NEPA scoping process and review periods. CTDOT will coordinate with regulatory and resource agencies to discuss project details, determine needs for new or refreshed data, review analyses needed for environmental resources, and explore topics that were not included in the PEL process, such as mitigation measures. CTDOT will continue to engage with agencies and stakeholder groups throughout the NEPA process until its conclusion.

4. Public coordination:

a. Provide a synopsis of your coordination efforts with the public and stakeholders.

CTDOT developed the *New Mix Plan for Public Involvement* (PIP) to outline the public involvement campaign for engaging specific stakeholder groups and the general public in the Mixmaster PEL Study. The PIP outlined how federal, state, and local agencies, as well as Native American Tribes, would be included in the PEL process to address potential design, environmental, or other issues early on and create a path for an efficient NEPA review. The PIP identified the following to maximize opportunities for public involvement: stakeholder group meetings, interviews and focus groups, the Project Advisory Committee (PAC); public meetings; and dissemination of informational materials through the Program website and social media. Additionally, CTDOT utilized the Public Involvement Management Application (PIMA) to track, evaluate, and document the public involvement campaign.

Stakeholder Group Meetings. CTDOT conducted stakeholder group meetings to meet with affinity groups to learn about the groups' perspectives and macro-level design and construction concerns. CTDOT identified the City of Waterbury as a key stakeholder and conducted meetings with the Mayor's Office; and the departments of Planning, Engineering, Public Works, Economic Development, Police, and Fire.

Public Meetings. CTDOT conducted meetings with the public during the PEL Study at key decision points, as visualized in Figure 4. The public meetings (each with at least two sessions) were held in-person or via Zoom (or similar virtual meeting platform) and included real-time translation services in Spanish and Portuguese. Post-presentation question and answer sessions occurred at each meeting. Outreach to the public included outreach to LEP populations.

Additionally, CTDOT conducted a conceptual public information/scoping meetings in March, October, and November 2023 to present an update of the Program and different types of Breakout Projects. The in-person meetings included a presentation and open house. They were live streamed and included real-time translation service in Spanish.

Dissemination of Information. Key informational materials such as factsheets, meeting notices, presentations, and email blasts were distributed in English, Spanish, and Portuguese. Additionally, these materials included a statement offering translation of said documents into Albanian, Arabic, and Haitian/French Creole; the statement was provided in all three languages. These informational materials are available on the New Mix website at <https://newmixwaterbury.com>.

Project Advisory Committee (PAC). CTDOT formed a PAC in November 2021 to provide input and feedback on the key Mixmaster PEL Study decisions, including the Preliminary Purpose and Need, Transportation-related Goals and Objectives, and conceptual alternatives. The PAC consisted of representatives from the City of Waterbury, local community organizations, neighborhood groups, local businesses, state and local elected officials, interstate freight groups and motor carriers, NVCOG, and FHWA. CTDOT conducted 13 meetings with the PAC over the course of six PEL Study milestones.

Expanded Outreach Activities. Expanded public outreach activities were performed within the community in order to foster meaningful public engagement. These activities generally included in-person outreach that were designed to provide public information and feedback opportunities for hard-to-reach populations in the PEL Study Area. Expanded outreach included pop-up events, tabling at fairs and festivals, and community surveys and meeting sessions, among other activities. These expanded outreach activities with the public will also be held following the completion of the PEL Study and continue through the NEPA process.

5. Purpose and Need for the PEL Study:

a. What was the scope of the PEL Study and the reason for completing it?

The scope of the PEL Study was to establish a master plan for the phased implementation of improvements to address deficiencies at the I-84/Route 8 Interchange, in coordination with key federal, state, regional and local agencies, including FHWA, the City of Waterbury, and NVCOG. CTDOT used the PEL approach to link planning for the I-84/Route 8 Interchange Reconstruction to the NEPA process, and thereby avoid the duplication of effort, streamline the environmental review process, and reduce delays in project implementation that may arise due to the complexity of the interchange system, the age of the facilities, and the overall costs to implement the Program.

b. Provide the purpose and need statement, or the corridor vision and transportation goals and objectives to realize that vision.

The PEL Study Preliminary Purpose and Need Statement is as follows:

Purpose: The purpose of the PEL Study is to improve the existing structural, geometric, and operational deficiencies of the I-84 and Route 8 Interchange to meet current and future traffic needs and enhance mobility for all transportation users within the associated transportation system. These improvements are expected to improve system performance, improve air quality by reducing congestion, reduce the crash rate, maintain critical system linkages in Connecticut and the Northeast, and facilitate connectivity and mobility within Waterbury through the local road and multimodal network, thereby contributing to the economic vitality of the Greater Waterbury area.

Needs: The needs of the I-84/Route 8 Interchange, expressed as existing deficiencies (problems), have been identified as follows:

- Structural and Functional Bridge Deficiencies;
- Structural and Functional Geometric Deficiencies;
- Operational Deficiencies (including Congestion);
- Roadway Crash Rate/Safety

Other Transportation-Related Goals and Objectives: Transportation-related goals and objectives identify other outcomes that the PEL Study intends to achieve beyond the transportation issues identified in the Purpose Statement, and include the following:

- Enhance connectivity 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 trips.
 - Enhance mobility for bicyclists and pedestrians by connecting facilities north/south (across I-84) and east/west (across Route 8).
 - Improve access from the Mixmaster to downtown Waterbury (the Central Business District) and key destinations.
 - 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.
 - 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 Business District, and other funded projects.
- Improve or maintain the safety of all transportation users.
 - Address the deficiencies of the Mixmaster 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 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 historic and archaeological resources, to the extent practicable.

In addition to the Preliminary Purpose and Need Statement, CTDOT identified the following guiding principles (overall vision) that influenced the development of the PEL Study:

- 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
- Recommend a project(s) that is perceived as an enduring community enhancement.

c. What steps will need to be taken during the NEPA process to make this a project-level purpose and need statement?

As documented in the Framework Methodology, the goal of the Preliminary Purpose and Need Statement is to connect the PEL planning process with, and form the basis for subsequent, and potentially refined, NEPA project Purpose and Need statement. In coordination with project stakeholders, CTDOT proposes to use the results of the PEL Study to identify near-term and long-term projects within the PEL Study Area, each with their own refined project-specific Purpose and Need that builds on the PEL Preliminary Purpose and Need Statement.

6. Range of alternatives:

a. What types of alternatives were looked at? (Provide a one or two sentence summary and reference document.)

Alternatives were investigated in a screened process. In all levels of screening, the No-Build Alternative was retained as it represents a baseline condition for the PEL Study. 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.

Instead of being dismissed for infeasibility, the No-Build Alternative was carried forward to serve as a comparison benchmark for other alternatives to be evaluated against during the PEL Study process. Refer to the *PEL Report* for the complete summary of the alternatives' development and screening process.

Level 1 Alternatives: Level 1 consisted of the development of the Conceptual Alternatives that comprise the Universe of Alternatives. In addition to the No-Build Alternative, the Universe of Alternatives included 23 Conceptual Alternatives grouped into three broad categories: Rehabilitation Alternatives, Replacement Alternatives, and Other Travel Modes. The Rehabilitation Alternatives focused on the replacement of the I-84 Decks while the Replacement Alternatives included those that included the full reconstruction of the interchange. Both Rehabilitation and Replacement Alternatives categories of Conceptual Alternatives evaluated unstacking the existing stacked structures. Refer to the *Level 1 Conceptual Alternatives and Screening Report*.

Level 2 Alternatives: Level 2 consisted of Initial Alternatives (Alternatives that passed the Level 1 screening) in addition to the No-Build Alternative. The Initial Alternatives included nine alternatives that were determined to not have any apparent fatal flaws and met the Level 1 criteria developed from

the draft *Preliminary Purpose and Need Statement*. Refer to the *Level 2 Initial Alternatives and Screening Report*.

Level 3 Alternatives: Level 3 consisted of Preliminary Alternatives (Alternatives that passed the Level 2 screening), in addition to the No Build Alternative. The alternatives remaining at Level 3 are considered to be the Range of Reasonable Alternatives. The Range of Reasonable Alternatives are for further design development and advancement in future NEPA processes. Refer to the *Level 3 Preliminary Alternatives and Screening Report*.

b. How did you select the screening criteria and screening process?

The alternatives screening criteria and process is documented in the *PEL Process Alternative Screening Methodology*. Figure 5 presents a graphic of the screening process used for the PEL Study, which shows that the PEL Study alternative screening and evaluation framework and process is similar to a funnel. The screening process included a multi-step filtering (funnel) process; the number of alternatives to be examined reduced while the evaluation detail increased with each level of screening. The screening and evaluation criteria for the PEL Study are based on the Preliminary Purpose and Need, including the transportation-related goals and objectives, and other criteria that assess an alternative's practicability and degree of potential impacts on the community as well as natural and human environments. The PEL Study team identified the screening criteria and process which was then refined through outreach to stakeholders, the PAC, the general public, regional, state and federal agencies, and tribal nations.

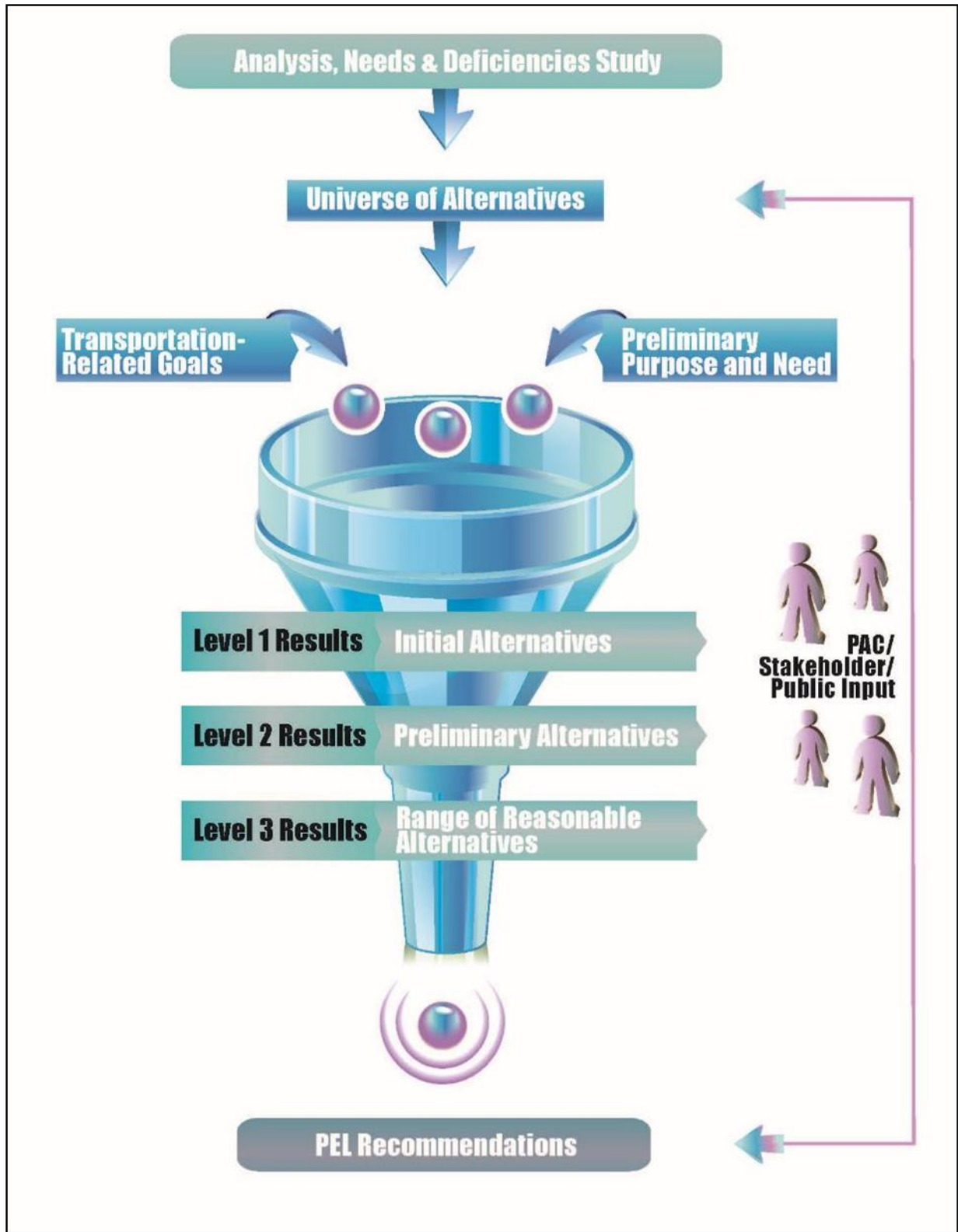


Figure 5 Alternatives Development and Evaluation Process

Level 1 screening criteria: Evaluation criteria for the Level 1 screening were derived from the PEL Study's draft Preliminary Purpose and Need. Level 1 assessed each alternative's ability to meet the Preliminary Purpose and Need and determined whether they contained fatal flaws related to cost (financial resources can reasonably be made available for the alternative) and feasibility (the alternative is technically and logistically achievable). A 'pass' rating at Level 1 indicated that the alternative met the criteria at the conceptual level of design to move beyond the initial screening. A 'fail' rating at Level 1 indicated that the alternative did not meet the criteria.

Level 2 screening criteria: Evaluation criteria for the Level 2 screening incorporated the other transportation-related goals and objectives identified with input from the public outreach process. Level 2 consisted of a primarily qualitative screening with some quantitative analysis. Level 2 assessed each alternative relative to the goals and objectives of the PEL Study and evaluated 36 different measures grouped into four evaluation categories:

- Transportation - evaluated 20 measures relative to whether the alternative improved system performance, improved safety, and enhanced the mobility and connectivity of I-84 and Route 8;
- Environmental/Community - evaluated 12 measures relative to whether the alternative supported economic development and revitalization and avoided/minimized impacts to the human and natural environment;
- Cost - evaluated one measure relative to whether financial resources could reasonably be made available for the alternative;
- Constructability - evaluated three measures relative to the alternative's potential for offline construction, complexity of construction phasing, and construction impacts to the traveling public during future maintenance requirements.

To ensure consistent scoring with the PEL Study goals, scores were weighted to align with public input and CTDOT objectives. For an explanation of the scoring criteria and methodology, please refer to the *Level 2 Initial Alternatives and Screening Report*.

Level 3 screening criteria: Level 3 consisted of the highest development of detail prior to NEPA and a primarily quantitative evaluation of the Preliminary Alternatives. Using the results of the Level 2 screening, Level 3 further identified and assessed measures within the four broad evaluation criteria established in Level 2. Level 3 quantified potential impacts for criteria found to be differentiators that would likely influence the screening selection. Differentiating criteria are defined as the measures that were evaluated in Level 2 screening that displayed a difference in the results among alternatives. Additionally, a comprehensive assessment of traffic operations, including traffic simulations, and evaluation of capital and life-cycle costs occur during Level 3. Level 3 evaluated 41 different measures grouped into four evaluation categories:

- Transportation - evaluated 15 measures within transportation related to local streets and arterials, including assessment of intersection level of service (LOS) and pedestrian/bicycle connectivity; LOS related to mainlines, and system and service ramps; and overall system performance, including system vehicle miles traveled (VMT) and system vehicle hours traveled (VHT);
- Environmental/Community - evaluated 22 measures relative to whether the alternative minimized impacts to the community, human, and natural environment, including assessment of direct impacts to natural resources and refined to assess potential impacts to low income, minority and LEP populations;

- Cost - evaluated three measures related to capital and life-cycle costs, ROW acquisition costs, life-cycle costs, and total program costs;
- Constructability - evaluated one measure related to minimizing construction impacts, consisting of traffic operation impacts (user costs) during construction;

Qualitative analysis yielded numerical values associated with each measure, giving the measures a quantifiable score. Preliminary Alternatives were then compared against one another, using the quantifiable scores for each measure to determine which Preliminary Alternative best addressed the measures.

c. For alternative(s) that were screened out, briefly summarize the reasons for eliminating the alternative(s). (During the initial screenings, this generally will focus on fatal flaws)

Level 1 screening results: The alternatives that were eliminated contained at least one fatal flaw of not generally supporting the Program's needs or not meeting the practicability criteria (cost and feasibility). Reasons for elimination included major constructability issues, adverse effects (such as worsened congestion and/or not meeting traffic operational needs), and inability to meet CTDOT and American Association of State Highway Transportation Officials (AASHTO) design standards. In addition to the No Build Alternative, nine conceptual alternatives passed the Level 1 screening.

Level 2 screening results: Level 2 alternatives that were eliminated did not meet the intended outcomes of the PEL Study in a satisfactory way or were determined to be fatally flawed after their conceptual design was advanced. Reasons for elimination included substantial impacts to the environmental and community (considered to be unacceptable levels of impacts) and the presence of fatal flaws as identified in the Level 1 screening (e.g., traffic operations and capacity). In addition to the No-Build Alternative, two Alternatives advanced to the Level 3 evaluation and screening level because they generally supported the Preliminary Purpose and Need and the Goals and Objectives, and they were determined to be practical in terms of cost and feasibility.

Additionally, complementary features, associated with certain aspects of the Preliminary Alternatives that support the study goals, are compatible with the advancing alternatives. The ultimate locations of these complementary features are dependent on the advancing alternative and were therefore identified for further analysis in Level 3. The following complementary features were identified: east/west frontage road system(s) and cap/tunnel/overbuild opportunities.

Level 3 screening results: After completing the Level 3 screening evaluations, it was apparent that the remaining Preliminary Alternatives provide similar improvements to the transportation system as well as comparable impacts and benefits to the environment and community. None of the Preliminary Alternatives resulted in a determination of infeasibility nor were they determined to be unreasonable in terms of cost and constructability due to the lack of meaningful differentiation in the results of the analyses. Therefore, all Preliminary Alternatives were determined to be reasonable and will advance to NEPA for additional analysis. The alternatives that were evaluated passed the Level 3 screening and were identified as the Range of Reasonable Alternatives. The Range of Reasonable Alternatives are provided for further design development and advancement into NEPA.

d. Which alternatives should be brought forward into NEPA and why?

The Modern Crossover Interchange Alternative and Naugatuck River Shift Alternative are the PEL Study's Range of Reasonable Alternatives that advanced for further design development and advancement in the NEPA process. The Range of Reasonable Alternatives performed well in all transportation measures which evaluated mobility and access. Both the Modern Crossover Interchange

and Naugatuck River Shift Alternatives would reduce the potential for crashes along the mainline and would include substantial benefits for the surrounding community while minimizing impacts to the environmental/community resources. These alternatives also include the complementary features identified in Level 2. The NEPA Class of Action and environmental document for the identified Range of Reasonable Alternatives is anticipated to be an Environmental Impact Statement. The following is a summary description:

- 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, I-84 would be unstacked and located just south of the existing alignment, while Route 8 would be unstacked and 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.
- Naugatuck River Shift Interchange. The Naugatuck River Shift 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 Naugatuck River Shift 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, I-84 would be unstacked and located just south of the existing alignment, while Route 8 would be unstacked and remain on the west side of the Naugatuck River. The Naugatuck River would be shifted easterly south of I-84 to allow the unstacking of Route 8.
- Complementary Features included in the Range of Reasonable Alternatives. Complementary features are aspects of the Range of Reasonable Alternatives that address the PEL Study goals and objectives. Complementary 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 Alternative and cannot be considered to be Breakout Projects. The following Complementary Features have been included as part of the Range of Reasonable Alternatives for further evaluation in the NEPA process and early design phases:
 - East/West Frontage Road System. This feature involves the creation of 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.
 - Cap/Tunnel/Overbuild. This feature entails the “capping” of portions of the I-84 mainline. Where geography allows, the mainline would be tunneled and capped. This feature would increase the potential ability to create open space and allow for increased connectivity across the highway. The ultimate location of this “cap” is dependent upon the selection of the Preferred Alternative and should therefore be evaluated as part of the future environmental document.
- The 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. The No-Build Alternative will be carried into the NEPA process as a representation of the baseline conditions against which the Range of Reasonable Alternatives will be compared. Despite being determined to be infeasible, the advancement of the No-Build Alternative is a requirement for NEPA analyses.

In addition to the Range of Reasonable Alternatives, CTDOT identified a Breakout Projects, a set of recommendations and an implementation plan, which will be used to identify funding for further project development, design, and implementation for the I-84/Route 8 Reconstruction Project over time as funding becomes available. Breakout Projects were identified at a high level and have logical termini, independent utility, and do not automatically trigger other actions, can proceed without other projects and are independent of the Range of Reasonable Alternatives being carried forward into the anticipated EIS.

Breakout Projects, also described as Early Action Projects and Near-Term Projects, were identified concurrently with the PEL Study as part of establishing the master plan for the Mixmaster. These Breakout Projects are envisioned as transportation projects for the local roadway network and other travel modes (to be potentially implemented by CTDOT or other government agencies like the city of Waterbury/NVCOG, or other public/private partners); and service interchanges and highway improvements (to be potentially implemented by CTDOT). All Breakout Projects are intended to improve traffic operations, and safety. Breakout Projects would not rely on other proposed interchange reconstruction projects to provide a benefit to the traveling public. Breakout Projects would not preclude or bias the future selection of a Preferred Alternative, and each project would be further explored in a separate NEPA process. The *PEL Report* identifies Breakout Projects in three general categories: Alternate Travel Modes; Local Roadways, including ramp termini; and I-84 or Route 8 mainline. Breakout Projects include the following:

- 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 a regional bus rapid transit system, a Transit Hub Improvement Project, and WBL improvements.
- Local Road Improvements. Improvements to the local road network surrounding the Mixmaster are possible actions that may be considered by other parties. These improvements include new local road crossings of the Naugatuck River, local road rerouting, incorporating traffic calming measures, and multi-modal 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.
- I-84 and Route 8 Mainline Improvements. Improvements to the mainline 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. These Breakout Projects are located on the south, west, and east approaches to the Mixmaster.

e. Did the public, stakeholders, and agencies have an opportunity to comment during this process?

The public, stakeholders, and agencies provided input during the alternatives screening process, as well as through the entire PEL process. The evaluation criteria used in the four broad evaluation categories identified in Level 2 and Level 3 screening were developed through outreach with the PEL Study stakeholders, the PAC, the public, regional, state, and federal agencies, and applicable tribal nations, as described in response to Question 4a.

f. Were there unresolved issues with the public, stakeholders and/or agencies?

There were no unresolved issues with the public, stakeholders, or agencies, in that the PEL Study process is intended to identify issues at a high-level approach. The response to Question 13 identifies future focus issues as the I-84/Route 8 Reconstruction Project advances into NEPA.

7. Planning assumptions and analytical methods:

a. What is the forecast year used in the PEL Study?

The forecast year used in the PEL Study is 2045.

b. What method was used for forecasting traffic volumes?

The PEL Study developed 2045 trip information by using the Travel Demand Model developed under 2017 existing conditions along with CTDOT's 2045 Traffic Demand Model to establish a new 2045 Traffic Demand Forecasting Model. The 2045 "No Build condition" models were developed by updating the calibrated existing conditions models to reflect future conditions.

The traffic volume forecasting models are detailed in the *Analysis, Needs, and Deficiency Report*, and are summarized as follows:

Travel Demand Model: Evaluates traffic flow as a whole, taking trip generation, trip distribution, mode choice and travel assignment into consideration to forecast future population, employment, and land use changes over large regions. The PEL Study team refined and reran the CTDOT statewide travel demand forecasting model to forecast trips within and outside of defined areas, truck trips, single occupant vehicles, and high occupancy vehicles.

Hybrid Simulation Model: Simulates the movement of individual vehicles based on traffic flow equations to further refine forecasted travel patterns and travel time compared to a travel demand model.

Traffic Simulation Model: Uses driver behavior characteristics to simulate the interaction of vehicles in the network, including real-world traffic interactions such as weaving, lane use, and queuing. Using VISSIM software, the PEL Study team developed the Traffic Simulation Model calibrated to existing conditions (2017) for the Interstate 84/Route 8 interchange. The PEL Study team verified the VISSIM model using methods outlined in the Transportation Research Board's Highway Capacity Manual (HCM) 2010 using Highway Capacity Software (HCS) 2010.

c. Are the planning assumptions and the corridor vision/purpose and need statement consistent with each other and with the long-range transportation plan? Are the assumptions still valid?

The PEL Study's Preliminary Purpose and Need Statement is consistent with *Connecticut's Statewide Long-Range Transportation Plan* (CTLRTP) (March 2018). Improvement of the existing structural, geometric, and operational deficiencies of the I-84 and Route 8 interchange supports the planning factors identified in the CTLRTP per 23 CFR 450.306, especially the following: support economic vitality in areas of critical importance, increase the safety of the transportation system for motorized and non-motorized users, and enhance the integration and connectivity of the transportation system.

d. What were the future year policy and/or data assumptions used in the transportation planning process related to land use, economic development, transportation costs and network expansion?

Future year policy and/or data assumptions used in the PEL Study were based on City of Waterbury planning documents, as described in the *Analysis, Needs, and Deficiency Report*. Future land use

assumptions and economic development data were based on the City of Waterbury's POCD 2015-2025, which identified ongoing and planned initiatives and projects for revitalizing the city's urban core, which is located within the PEL Study Area.

8. Environmental resources (wetlands, cultural, etc.) reviewed. For each resource or group of resources reviewed, provide the following:

a. In the PEL Study, at what level of detail was the resource reviewed and what was the method of review?

Resources were identified through a desktop review of federal and state databases, which is documented in the *Analysis, Needs and Deficiencies Report*.

b. Is this resource present in the area and what is the existing environmental condition for this resource?

Table 3 identifies the resources and existing conditions in the PEL Study Area. As detailed in the response to Question 1d, the PEL Study Area extends approximately four miles on I-84 and approximately two miles on Route 8. The PEL Study Area encompasses the surrounding area within these distances, to include and consider city neighborhoods and populations, city streets, city land uses, and environmental and cultural resources. Environmental resource delineation in the PEL Study Area was limited to 300-feet from the edge of existing roadways, which includes Route 8, I-84, on- and off-ramps (also referred to as the Project Study Corridor). Further documentation is provided in the *Analysis, Needs and Deficiencies Report*.

Table 3 PEL Study Area Environmental Resources and Conditions

Resource	Summary of Existing Resources and Conditions
Floodplains and Floodways	The Federal Emergency Management Agency (FEMA) floodway and 100-year and 500-year floodplains are within the PEL Study Area.
Wetlands and Waters of the U.S.	The Naugatuck River and several small rivers and brooks, including Mad River, Great Brook, Sled Haul Brook, Welton Brook, and Wooster Brook, and unnamed tributaries are in the Study area. Potential wetlands including vernal pools are located in the PEL Study Area. While the wetlands are predominately located adjacent to the existing watercourses, two potential vernal pools were identified as potentially located within the PEL Study Area: one within the gore area between the I-84 EB Exit 23 off-ramp and Washington Street, and a potentially isolated wetland that may also function as a vernal pool in the westernmost portion of the existing alignment, south of the I-84 EB Exit 17 on-ramp.
Sole Source Aquifers	None; no aquifer protection areas.
Hazardous/ Contaminated Sites	48 potentially contaminated or hazardous waste sites are within the PEL Study Area. Six environmental use restrictions (EUR) sites and one National Priority List site are within the PEL Study Area.
Prime and Unique Farmland	Prime Farmland Soils and Statewide Important Farmland Soils are mapped within the Project Study Corridor. These soils are largely concentrated on the western side of Route 8, north and south of I-84 and in the easternmost portion of the existing alignment, north of I-84 westbound Exit 23. All prime and unique farmland soils in

Resource	Summary of Existing Resources and Conditions
	the Project Study Corridor have already been developed or are within CTDOT ROW and no longer qualify as Prime or Unique Farmland Soils.
Endangered Species and Vegetation/Critical Habitats	No federally listed species or critical habitats are known to occur within the PEL Study Area.; however, there are areas designated by the CTDEEP Natural Diversity Database (NDDDB). Further consultation for Section 7 Endangered Species Act and NDDDB areas must occur. No known Northern Long-eared Bat (NLEB) hibernacula or roost trees are located in the PEL Study Area, however other candidate species may be present and therefore consultation must occur during NEPA. The Peregrine Falcon (a State listed Threatened Species) is known to nest in the PEL Study Area.
Historic/Archaeological Resources	Three historic districts and many historic places/properties (including Riverside Cemetery) are partially located within the Project Study Corridor and are listed in the National Register of Historic Places (NRHP) or the Connecticut Register of Historic Places (CTRHP). Other smaller resources include cultural resource buildings, sites, and structures in the vicinity, but are outside of the Project Study Corridor. One known archaeological site is within the PEL Study Area.
Community Populations	Within the PEL Study Area, approximately 46% of households have income that is considered low-income and approximately 63% of the population are people of color. All 23 affected census tracts within the PEL Study Area have greater than 5% LEP population for Spanish speakers. Tract 3515 contains a substantial portion of Portuguese/Portuguese Creole speakers, and Tract 3527.01 contains a substantial portion of "Other Indo-European Languages."
ROW and Land Use	Land use within the PEL Study Area includes residential, ROW, vacant land, open space, institutional, commercial, and industrial uses. The Modern Crossover Interchange alternative was identified to have approximately 13.0 acres of direct impacts to ROW, while the Naugatuck River Shift alternative was identified to have approximately 12.5 acres of direct impacts to ROW. Direct ROW impacts are composed of total and partial parcel acquisitions and temporary construction easements. Land use also included utility/infrastructure constraints.
Traffic Noise	Sensitive noise receptors identified along the Project Study Corridor (within 300 feet of the proposed Range of Reasonable Alternative alignments) included 292 receptors in low income, LEP, and minority communities.
Public Parks and Open Space	Five municipal, public parks and open space areas are in the PEL Study Area: Waterbury Green, Library Park, Chase Park, Hamilton Park, and Washington Park.
Community Resources	Community resources include ten neighborhoods, five parks, the Metro-North Railroad Waterbury Branch Line, CTtransit and CTfastrak fixed routes, intercity bus service routes, the Naugatuck River Greenway, ten major employers, and the proposed (future) Freight Street District.

c. What are the issues that need to be considered during NEPA, including potential resource impacts and potential mitigation requirements (if known)?

The Level 3 screening indicated that all of the Preliminary Alternatives are anticipated to have some level of impacts to the human and natural resources within the community. Table 4 identifies whether the Range of Reasonable Alternatives would result in potential resource impacts, indicating the issues to be considered during NEPA. Project-specific determinations regarding the roadway design, exact

location of ramps and interchanges, and project funding will be analyzed through the NEPA process. CTDOT's focus will be to refine and modify the design to avoid and/or minimize impacts to the extent practicable and to mitigate where avoidance is not possible. For example, in-depth hydraulic modeling has yet to occur in regard to the Naugatuck River Shift alternative, but the intent is to maintain both banks of the Naugatuck River to contain its flow and floodplain capacity in the event of realignment.

Table 4 Environmental Resources and Issues to be Considered during NEPA

Resource	Potential Impacts and Benefits	NEPA Considerations
Floodplains and Floodways	<p>Potential direct impacts to floodplain and floodway are expected and should be further evaluated.</p> <p>Strategies to avoid, minimize, and/or mitigate impact to floodplains and floodways including an alternative's ability to maintain or restore The Naugatuck River's floodplain capacity should be explored.</p>	Floodplain evaluation to be completed during conceptual design for compliance with municipal regulations, state standards, and the provisions of the National Flood Insurance Program. Permit requirements include CTDEEP Flood Management Certification including the potential need for an Exemption Request.
Wetlands and Waters of the U.S.	<p>Potential direct impacts to wetland systems and surface waters are expected and should be further evaluated.</p> <p>Opportunities to avoid, minimize, or mitigate impacts to wetlands and waters of the US through the creation, restoration, and enhancement of these resources through implementing strategies like: riverfront recapture; daylighting of piped streams (e.g., Great Brook and Mad River); Stormwater, water quality, and resilience enhancements through the use of green infrastructure; invasive species removal; and fish habitat restoration should be further explored and coordinated through CTDEEP and the USACE.</p>	Anticipated permit requirements include CTDEEP Inland Wetland Permit and Section 401 Water Quality Certificate; Section 404 Permit from USACE.
Sole Source Aquifers	No potential impacts to sole source aquifers are expected.	No further evaluation required.
Hazardous/ Contaminated Sites	<p>Potential direct impacts to potentially hazardous/ contaminated are expected and should be evaluated.</p> <p>Opportunities to avoid and/or minimize disturbance to these sites should be explored.</p>	Environmental site assessments will be required.

Resource	Potential Impacts and Benefits	NEPA Considerations
Prime and Unique Farmland	No potential impacts are expected. Soils are previously developed or within DOT ROW and therefore do not qualify as Farmland Soils.	No further consideration required.
Endangered Species and Vegetation/Critical Habitats	Potential impacts to listed or candidate species potentially located in the PEL Study Area are unknown at this time. Time of Year restrictions or other best management practices should be explored and coordinated through the consultation process.	Field surveys, agency coordination, and a Biological Resources Report will document the biological/ecological resources in the PEL Study Area. Further coordination with CTDEEP and the USFWS regarding state and federally listed species of concern must occur.
Historic/Archaeological Sites and Archaeological Sensitive Soils	Potential direct impacts to sites and soils with high chance of archaeological sensitivity are expected and should be further evaluated. Visual/ aesthetic mitigation could be coordinated such that impacts to the viewshed and historic district(s) are avoided, minimized, and/or mitigated.	Compliance with Section 106 of the National Historic Preservation Act will be required, potentially including Phase 1 and 2 assessments.
Land Use/Parcels	Potential impacts to residential and commercial parcels are expected and should be further evaluated. Alternatives could enhance connectivity between residential and commercial parcels. Efforts should be made to minimize commercial and residential acquisitions/displacements.	CTDOT will follow the federal Uniform Relocation Assistance and Real Property Acquisition Act and the Connecticut Uniform Relocation Assistance Act regarding residential and commercial acquisitions/ displacements.
Traffic Noise	Potential impacts to noise sensitive land uses/receptors are expected and should be further evaluated. Noise abatement measures may be considered.	Noise impact analysis will be required.
Public Parks and Open Space	Potential direct impacts to public parks and open space are expected and should be further evaluated. Alternatives could enhance connectivity between communities and existing open spaces.	Section 4(f) and 6(f) evaluations will be required, along with planning/documentation to avoid, minimize, or mitigate impacts to public parks and open spaces.

Resource	Potential Impacts and Benefits	NEPA Considerations
Community Resources	<p>Potential direct impacts to community resources are expected and should be evaluated.</p> <p>Alternatives could enhance connectivity between community resources. Opportunities for the identification of additional community enhancements should occur.</p>	Detailed assessments of impacts to community resources will be required.
Community Populations	<p>Potential residential and commercial displacements; potential disruptions during construction, the potential for disproportionate adverse impacts to populations should be further evaluated.</p> <p>Alternatives may enhance community connectivity, reduce proximity to transportation-related pollutants, increase access to public transportation, and provide opportunities for open space near communities.</p>	Detailed assessments of impacts to populations will be required.

d. How will the planning data provided need to be supplemented during NEPA?

In general, for all resources, the level of analysis will be greater during NEPA. The PEL Study involved a streamlined and high-level assessment of environmental resources and potential impacts. Table 4 identifies requirements for supplemental data during the NEPA process. Certain datasets, such as traffic studies/analyses, will need to be updated during the NEPA process as well. Resource evaluations will be supplemented in the NEPA process through on-site field work and detailed impact analysis based on further design. CTDOT will coordinate with federal and state regulatory agencies to identify supplemental analyses and design modifications to avoid and/or minimize impacts and to develop mitigation where required

9. List the environmental resources you are aware of that were not reviewed in the PEL Study and why. Indicate whether or not they will need to be reviewed in NEPA and explain why.

The PEL Study's high-level assessment of environmental resources and potential impacts facilitated the screening of alternatives and did not include the detailed analysis of certain environmental resources due to the information available and level of detail determined necessary for the PEL Study analysis. During the NEPA phase, impact analyses are required in accordance with FHWA's NEPA regulations, as well as applicable Federal and state regulations. In addition to the resources identified in Table 4, the following environmental resources will be analyzed during NEPA:

- Air quality;
- Visual/aesthetic considerations;
- Socio-economic considerations;

- Geology, soils, and topography
- Water quality and stormwater management;
- Indirect and cumulative effects; and
- Resiliency

10. Were cumulative impacts considered in the PEL Study? If yes, provide the information or reference where the analysis can be found.

Cumulative effects were not considered in the PEL Study. Design and project details needed to identify and assess cumulative effects are anticipated to be developed during NEPA. The Modern Crossover Interchange Alternative and Naugatuck River Shift Alternative will be evaluated in a single Environmental Impact Statement for the selection of a Preferred Alternative; therefore, a cumulative effects analysis was determined to be not necessary for this PEL Study.

11. Describe any mitigation strategies discussed at the planning level that should be analyzed during NEPA.

A prioritized list of improvements that could occur were identified and could be utilized as mitigation strategies as they reduce barriers, facilitate safe active transportation, and enhance the user experience of the transportation network as a whole. The NEPA process will continue and advance this analysis. Other mitigation strategies discussed at the planning level were presented in Table 4 and include:

- Floodplain/floodway capacity enhancement and Naugatuck River streambed and riverbanks restoration for a more natural condition;
- Daylighting of culverted watercourses, such as Mad River and Great Brook;
- Open space creation;
- Reducing impacts of infrastructure on communities;
- Stormwater, water quality, and resilience enhancements through the use of green infrastructure;
- Wetland/watercourse restoration and invasive species removal;
- Visual/aesthetic mitigation considerations of the proposed interchange structure(s) impacts to the viewshed and historic district(s); and
- Bus stop, sidewalk, bike lane, and rail facility enhancements.

12. What needs to be done during NEPA to make information from the PEL Study available to the agencies and the public? Are there PEL Study products which can be used or provided to agencies or the public during the NEPA scoping process?

CTDOT has provided and will continue to provide the PEL Study determinations, including the study reports to applicable agencies and the public. As indicated in the response to Question 3a, PEL Study products, including the Preliminary Purpose and Need Statement, will serve as a basis for the NEPA study. The results of the PEL Study and documentation may be incorporated into the NEPA process by reference and become part of the administrative record and history of the decision-making process. CTDOT has and will continue to provide the PEL Study documents on the New Mix website at <https://newmixwaterbury.com>.

13. Are there any other issues a future project team should be aware of?

- a. **Examples: Controversy, utility problems, access or ROW issues, encroachments into ROW, problematic landowners and/or groups, contact information for stakeholders, special or unique resources in the area, etc.**

The PEL Study team has not identified substantive issues that should be described to a future project team. CTDOT has identified the following focus areas for the future NEPA process(es):

- Updating and refinement of the Purpose and Need;
- Continued public involvement;
- Updating traffic modeling;
- Preparing detailed constructability and staging plans;
- Refining ROW impacts, including residential and commercial displacements;
- Minimizing potential impacts to low income, people of color, and LEP populations;
- Section 106 evaluations and Section 4(f) determinations;
- Coordination with ongoing and proposed City of Waterbury projects;
- Integration in the LRTP, Transportation Improvements Plan (TIP), and the State Transportation Improvement Program (STIP);
- Project funding, including developing project management and financial plans; and
- Project phasing, including identification of Breakout Projects and their appropriate NEPA documentation (as noted in response to Question 6.d).