CAMBRIDGE CITY COUNCIL

Minka vanBeuzekom
City Councillor

April 1, 2013

TO: Donna Lopez
Interim City Clerk

SUBJECT: Massachusetts DOT Task Force Study on the Safety of Ethanol Transport

Please place the following documents on Communications and Reports from other City Officers for the April 1st City Council meeting.

- ✓ Report on the Safety Impact of Ethanol Transportation by Rail through Boston, Cambridge, Chelsea, Everett, Somerville and Revere - *Draft dated 3-14-13*
- ✓ Appendix to report - *dated 3-15-2013*

This report was created partially in response to Policy Order #10 dated March 19, 2012 requesting a report on how Ethanol Trains will impact Cambridge. The draft report contains specific & detailed references for two possible routes through Cambridge: one route on the Grand Junction Line and the second on the Fitchburg line through North Cambridge and Porter Square. Among other recommendations, it includes recommendations to improve safety at several Cambridge on-grade crossings, increase the supply of alcohol resistant foam locally and require the discontinuance of a specific ethanol tanker car prone to puncture.

While I have been a member of the Task Force since its initial public meeting in January, I do not agree with the narrow findings of the report. This dense, urban region should not be required to bear the risks of a unlikely catastrophic ethanol incident for the benefit of possible cost savings to Global Oil. Their ethanol should continue to arrive into the region by barge as does the ethanol for ExxonMobil.

Your attention to this matter is appreciated.

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Report on the Safety Impacts of Ethanol Transportation by Rail

through Boston, Cambridge, Chelsea, Everett, Somerville, & Revere

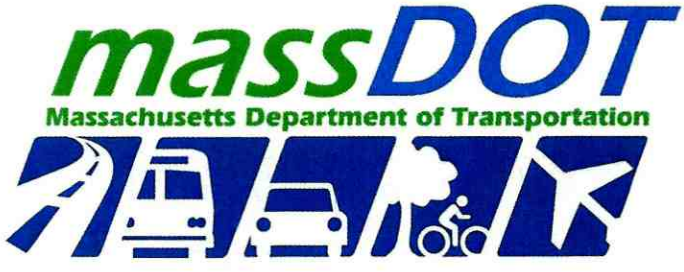
DRAFT REPORT

March 14, 2013

Prepared by:

Massachusetts Department of Transportation

Office of Transportation Planning



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Chapter 1: Background Information and Civic Engagement Plan

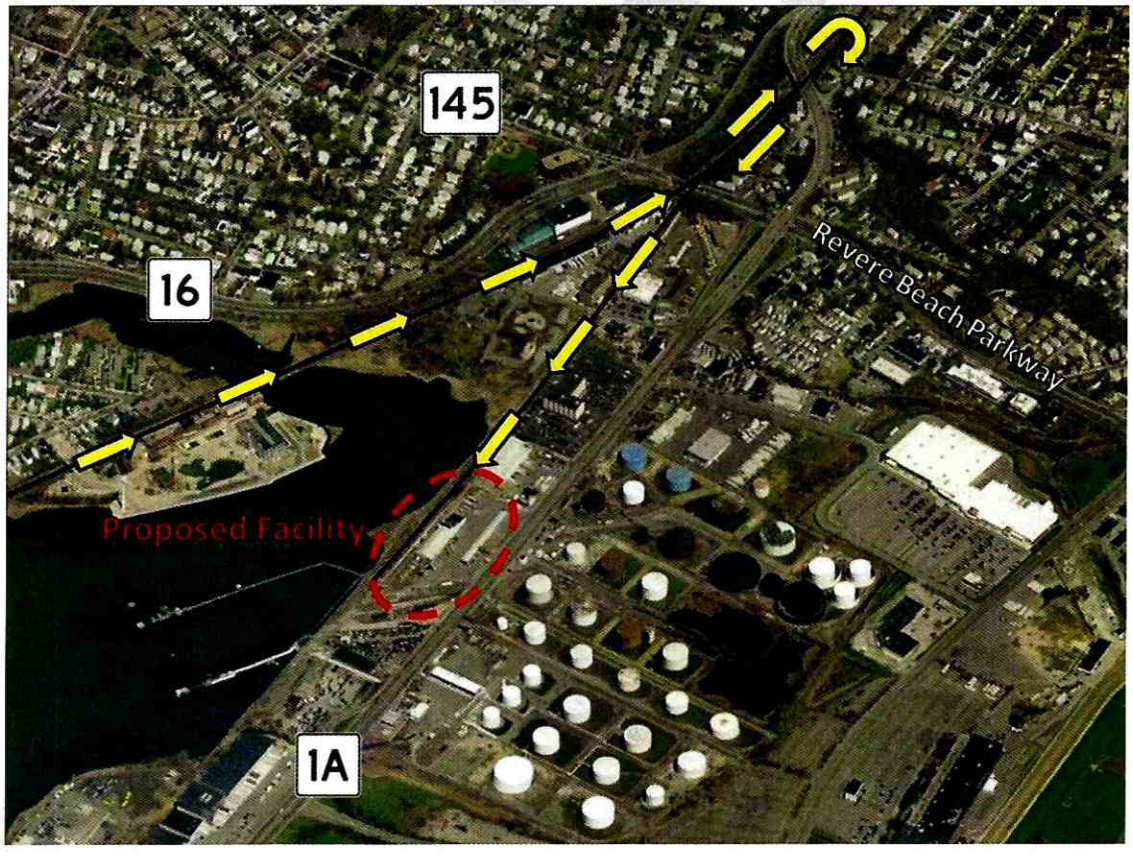
1.1 Summary of the Global Terminal Project History

Global Partners, LP (Global) operates a bulk petroleum storage terminal located on Route 1A (Lee Burbank Highway) in Revere, Massachusetts. At this facility, Global stores and mixes gasoline, ethanol, and other fuels for distribution to the New England market. The ethanol shipped to and stored at the facility is primarily used to mix with gasoline, as required by the Clean Air Act Amendments of 1990, in order to reduce carbon monoxide emissions and other impacts of gasoline.

Global intends to upgrade and modernize the existing railcar unloading facility at its Revere terminal. These site improvements will be made in coordination with a project by Pan Am Southern Railroad to upgrade the rail line spur that connects to the facility; these improvements would allow Global to receive ethanol by railcar. The proposed delivery of ethanol by rail would supplement and possibly replace existing deliveries by barge and truck.

The rail deliveries of ethanol would principally originate in the Midwest and be moved through Western Massachusetts and ultimately to the Revere location. It is expected that the rail deliveries will primarily be unit trains, a term for a freight train consisting of railcars hauling only one dedicated commodity.

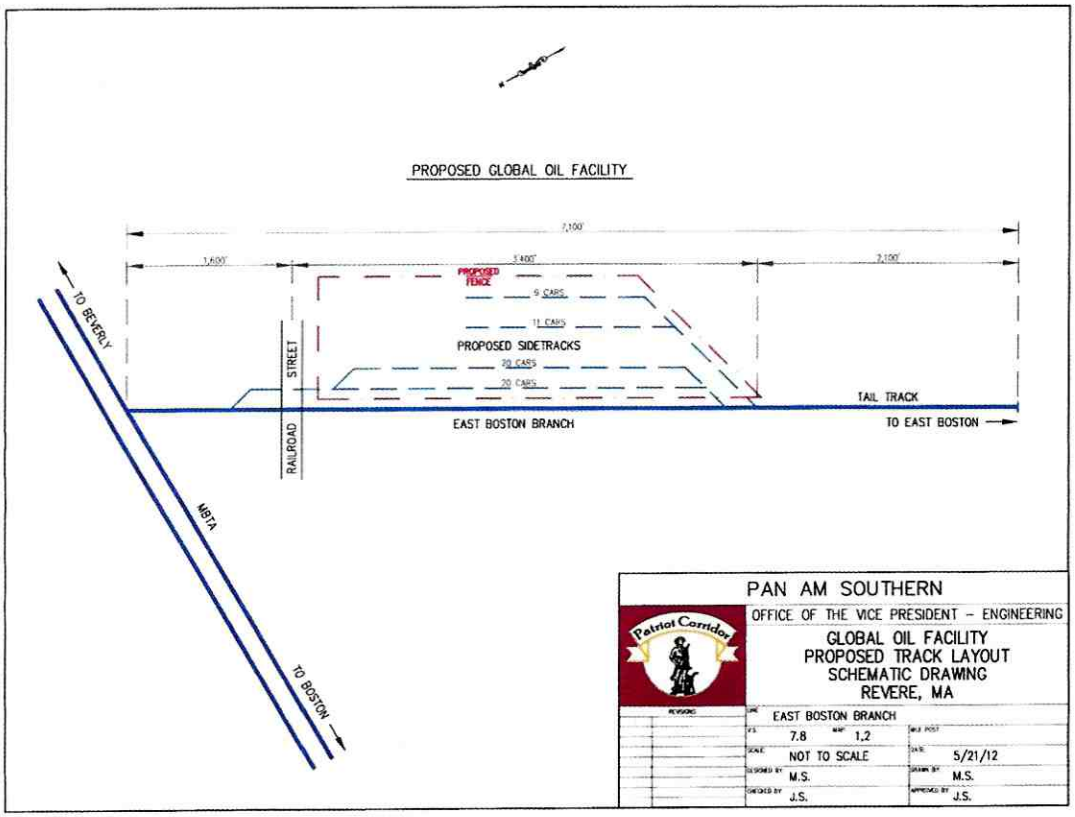
Figure 1-1: Rail Route to the Global Facility in Revere



As shown in Figure 1-1, the Global terminal is adjacent to rail lines owned by the Massachusetts Bay Transportation Authority (MBTA) and the terminal has an existing rail spur that connects the Global terminal to those rail lines. In order to modernize the existing off-loading facility on the terminal so that it can accommodate ethanol unit trains, Global's proposed project would split the existing rail spur into two adjacent tracks, each designed to hold a total of 20 rail cars at one time for unloading. The proposed modernization project includes installation of an upgraded drainage trench system running the length of the off-loading facility. This drainage trench system would be connected to the terminal's existing oil-water separator. In addition, a new impervious containment system would be installed to comply with U.S. EPA's current spill prevention, containment and countermeasures (SPCC) requirements. The pumps for the off-loading facility would be placed on the existing concrete pad adjacent to the spur and associated piping would be installed along the spur. In addition, a new vapor recovery system would also be installed on the existing concrete pad adjacent to the spur.

Simultaneously with the proposed modernization of Global's existing rail off-loading facility, Pan Am Southern Railroad plans to perform maintenance and upgrades to the rail lines outside the terminal, reducing the number of tracks outside the terminal from five tracks to three. Additional railcars would be stored adjacent to the terminal in a fenced-in, secured access area on a portion of the rail lines. A full schematic of the proposed railroad infrastructure is shown in Figure 1-2.

Figure 1-2: Track Schematic of Proposed Improvements Adjacent to the Global Facility in Revere



1.2 Summary of Massachusetts Legislation

Ethanol, like gasoline, is a flammable liquid. Residents of the communities near the Global terminal have expressed concerns about the safety of transporting ethanol unit trains through their cities. In response to these concerns, the Massachusetts Legislature included Section 24 in Chapter 242 of the Acts of 2012. This provision charges the Massachusetts Department of Transportation (MassDOT) with executing a study on the potential public safety issues associated with ethanol transportation by rail through the cities of Boston, Cambridge, Chelsea, Everett, and Revere. The text of Section 24 is shown below.

> *Section 24. Notwithstanding any general law or special law or rule or regulation to the contrary, the Massachusetts Department of Transportation shall commission a study to determine the impact on the public safety of transporting ethanol by train through the cities of Boston, Cambridge, Chelsea, Everett and Revere. Public safety issues to be studied shall include, but not be limited to, the proximity to residences, elderly housing complexes, schools, hospitals, health care facilities and other population and demographic characteristics and emergency response capabilities. The report shall be completed not later than 6 months after the effective date of this act, and copies of the report shall be provided to the house and senate committees on ways and means, the executive office of public safety and security and the department of environmental protection. The department of environmental protection shall not issue a license under chapter 91 of the General Laws for the transportation of ethanol through the cities of Boston, Cambridge, Chelsea, Everett and Revere until it has received the report.*

At the request of the City of Somerville and the study's Technical Advisory Group, the study area was expanded to include Somerville. It is included in this report, despite the geographic restrictions in the legislation, because it is essentially surrounded by the other cities listed in the legislation; all of the potential ethanol rail routes also pass through Somerville; and it has population density and development patterns that are similar to those of the other cities listed in the legislation.

With the addition of the City of Somerville, MassDOT has issued this report to evaluate the potential safety impacts of transporting ethanol by train through the cities of Boston, Cambridge, Chelsea, Everett, Somerville, and Revere. The remainder of Chapter 1 of this report outlines the relevant regulations governing the transportation of ethanol by rail and provides a description of the civic engagement process utilized to inform the public about this report. Chapter 2 of this report identifies the rail corridors within the study area communities that may be used to transport ethanol and evaluates the current physical and operational conditions along those corridors. Chapter 3 evaluates the public safety impacts of transporting ethanol by rail by identifying the potential safety risks (based on rail crash histories and an assessment of potentially exposed populations) and comparing them to the existing safety procedures and emergency response capabilities of the cities, railroads and terminal operators. This is followed by Chapter 4, which summarizes the findings of this study.

1.3 Review of Relevant Regulations

Regulations Pertaining to Global Facility's Proposed Project

Global plans to upgrade the track and sidings along its property to accommodate storage and unloading of the ethanol unit trains. Because the facility is located in a Designated Port Area (DPA), these changes are subject to Chapter 91 of the Massachusetts General Laws, which governs activities on Massachusetts' waterfronts, including filled tidelands and Designated Port Areas. As a result, Global needs a Chapter 91 license from the Massachusetts Department of Environmental Protection (DEP) in order to make improvements in this area. The license is not related to the transportation of ethanol by railroad, only to the physical changes at the Global facility. DEP has held a public hearing on the proposed project, but has withheld the issuance of the Chapter 91 license at the direction of the Legislature through Section 24 of the Transportation Bond Bill outlined above.

The proposed improvements are also subject to regulation under the Massachusetts Wetlands Protection Act because they are within 200 feet of Chelsea Creek and within the 100-year floodplain. Global filed a notice of intent with DEP on February 22, 2011 and was issued an order of conditions on May 4, 2011. The order of conditions includes instructions from DEP and the City of Revere's Conservation Commission that Global must follow to ensure protection of the wetlands and riverfront areas within the project limits.

Regulations Pertaining to the Transport of Ethanol by Train to the Global Facility

The rail lines that will carry the proposed ethanol unit trains within the study area communities are owned by the MBTA as part of the commuter rail system that serves eastern Massachusetts. The MBTA commuter rail system comprises 270 miles of railroad right-of-way and related rail properties. These rail properties are operated pursuant to agreements that govern the relative rights and obligations of the MBTA and the railroad companies that sold the rail lines to the Commonwealth of Massachusetts or the MBTA. These agreements address the parties' roles in the operation and maintenance of freight only, passenger only, and shared use rail lines.

When the rail lines were sold to the MBTA or the Commonwealth for passenger rail operations, the selling railroad generally retained the right to operate freight service over those lines. Such an agreement is in place between CSX and MassDOT for one of the five the rail lines that could potentially carry ethanol trains through the study area, the Grand Junction railroad through Boston and Cambridge. The remaining four of the five lines that could potentially carry ethanol trains through the study area (the Fitchburg Line, the Lowell Line, the Haverhill Line, and the Newburyport/Rockport Line) were acquired from the Boston & Maine Railroad in 1976 and are subject to an exclusive easement to provide rail freight transportation service benefiting the Boston & Maine Railroad. Pan Am Railways, as the successor to the Boston & Maine Railroad, owns this exclusive easement to provide rail freight transportation service along its rail lines.

Railroads are regulated almost exclusively at the federal level. Railroad operations are under the jurisdiction of the Surface Transportation Board (STB), while railroad safety standards are governed by

the Federal Railroad Administration (FRA) and railroads are required to work with the federal Department of Homeland Security (DHS) on security issues.

Under STB rules, state or local laws and regulations are preempted for railroad operations in order to ensure uniform regulation of railroad operations and to safeguard the Interstate Commerce clause of the U.S. Constitution. The federal preemption provision is contained in 49 U.S.C. 10501(b), as broadened by the Interstate Commerce Commission (ICC) Termination Act of 1995, Pub. L. No. 104-88, 109 Stat. 803 (1995) (ICCTA).

These laws shield railroad operations that are subject to the STB's jurisdiction from the application of many state and local laws, including local zoning and permitting laws and laws that would have the effect of managing or governing rail transportation. This preemption, therefore, limits state or local actions from blocking or regulating the rail transportation of ethanol, or any other railroad activity that is regulated at the federal level.

1.4 Technical Advisory Group (TAG) Meetings

Working with city staff, elected officials, and neighborhood groups, MassDOT collaboratively developed a technical advisory group made up of more than 25 key stakeholders to reflect the community interests in the study area. In addition to staff from MassDOT's Office of Transportation Planning (OTP) and its Rail and Transit Division, the stakeholders include officials from the Massachusetts Executive Office of Public Safety and Security, the Massachusetts Department of Public Health, the Massachusetts Department of Environmental Protection, the Massachusetts Department of Fire Services, the City of Boston, the City of Cambridge, the City of Chelsea, the City of Everett, the City of Somerville, the City of Revere, Alternatives for Community & Environment, Inc., the Chelsea Collaborative, Global Partners, LP, Renewable Fuels of America, and representatives of the communities.

MassDOT held a series of technical advisory group meetings as part of each study task to solicit feedback and ensure full understanding of the study process and products.

1st Technical Advisory Group Meeting

The first technical advisory group meeting was held on January 10, 2013 at the conference room of the MassDOT Office of Transportation Planning located at 10 Park Plaza in Boston. The primary topics of the meeting were: (1) a review of the Transportation Bond Bill legislation and the proposed scope of work and schedule for the study; (2) the findings to date related to Task 1, which included a summary of the proposed Global project and the regulations related to the transportation of ethanol by rail; and (3) the potential rail routes for ethanol transportation. A full meeting summary is available in the appendix of this report.

2nd Technical Advisory Group Meeting

The second technical advisory group meeting was held on January 24, 2013 at the city council chambers of the Revere City Hall located at 281 Broadway in Revere. The primary topics of the meeting were: (1) a review of the comments from the first meeting on January 10, 2013; (2) the findings to date related to

Study Task 2, which included a summary of the physical and operation conditions along the rail corridors in the study area;, and (3) the findings to date related to Study Task 3, which included a review of ethanol train crashes and derailments and distribution of maps showing the populations that could be exposed to safety risks associated with ethanol in the case of an accident. A full meeting summary is available in the appendix of this report.

3rd Technical Advisory Group Meeting

The third technical advisory group meeting was held on February 7, 2013 at The Chelsea Collaborative, located at 318 Broadway in Chelsea. The primary topics of the meeting were: (1) a review of the new project schedule, as the legislature had recently pushed back the deadline of the report's due date to March 23rd; (2) comments from a public meeting at East Boston High School and additional meetings with other interested parties, i.e. the Chelsea Public Schools and New England Produce Center ; and (3) the findings to date related to Study Task 3, which included a review of national ethanol train crashes and derailments, crashes in Massachusetts from 2006 to 2012, distribution of maps showing the populations potentially exposed to ethanol during rail shipment and emergency response capabilities of the communities in the study area. A full meeting summary is available in the appendix of this report.

4thTechnical Advisory Group Meeting

The fourth technical advisory group meeting was held on March 11, 2013 at the conference room of the MassDOT Office of Transportation Planning located at 10 Park Plaza in Boston. The primary topics of the meeting were: (1) a review of the draft presentation for the neighborhood meeting at the Argenziano School in Somerville; and (2) comments on the draft study findings to date. A full meeting summary is available in the appendix of this report.

1.5 Public Informational Meetings

The civic engagement plan for this study also included additional coordination with the public through attendance at informal neighborhood meetings, special briefings with local officials, and a public informational meeting.

Neighborhood Public Meetings

East Boston High School

A meeting was held on February 6, 2013 at the East Boston High School, located at 81 White Street, East Boston. The primary purpose of the meeting was to (1) meet with the local communities, (2) inform them of the study and any findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

Argenziano School in Somerville

A meeting was held on March 11, 2013 at the Argenziano School, located at 290 Washington Street, Somerville. The primary purpose of the meeting was to (1) meet with the local communities, (2) inform them of the study and findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

Informal Neighborhood Meetings

Chelsea Public Schools

A meeting was held on February 6, 2013 with the representatives from the Chelsea Public Schools, at City Hall, in Chelsea. The primary purpose of the meeting was to (1) meet with the key members of the school, (2) inform them of the study and any findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

New England Produce Center

A meeting was held on February 7, 2013 with the New England Produce Center in Chelsea. The primary purpose of the meeting was to (1) meet with the representatives of local businesses, (2) inform them of the study and any findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

Chelsea Business Owners

A meeting was held on February 26, 2013 with business owners in Chelsea. The primary purpose of the meeting was to (1) meet with the representatives of local businesses, (2) inform them of the study and any findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

Massachusetts Emergency Management Agency

A meeting was held on March 13, 2013 with the Massachusetts Emergency Management Agency in Framingham. The primary purpose of the meeting was to (1) meet with the representatives of state emergency preparedness agencies, (2) inform them of the study and any findings to date, and (3) to get any feedback which could be beneficial to the study. A full meeting summary is available in the appendix of this report.

1.6 Project Web Site

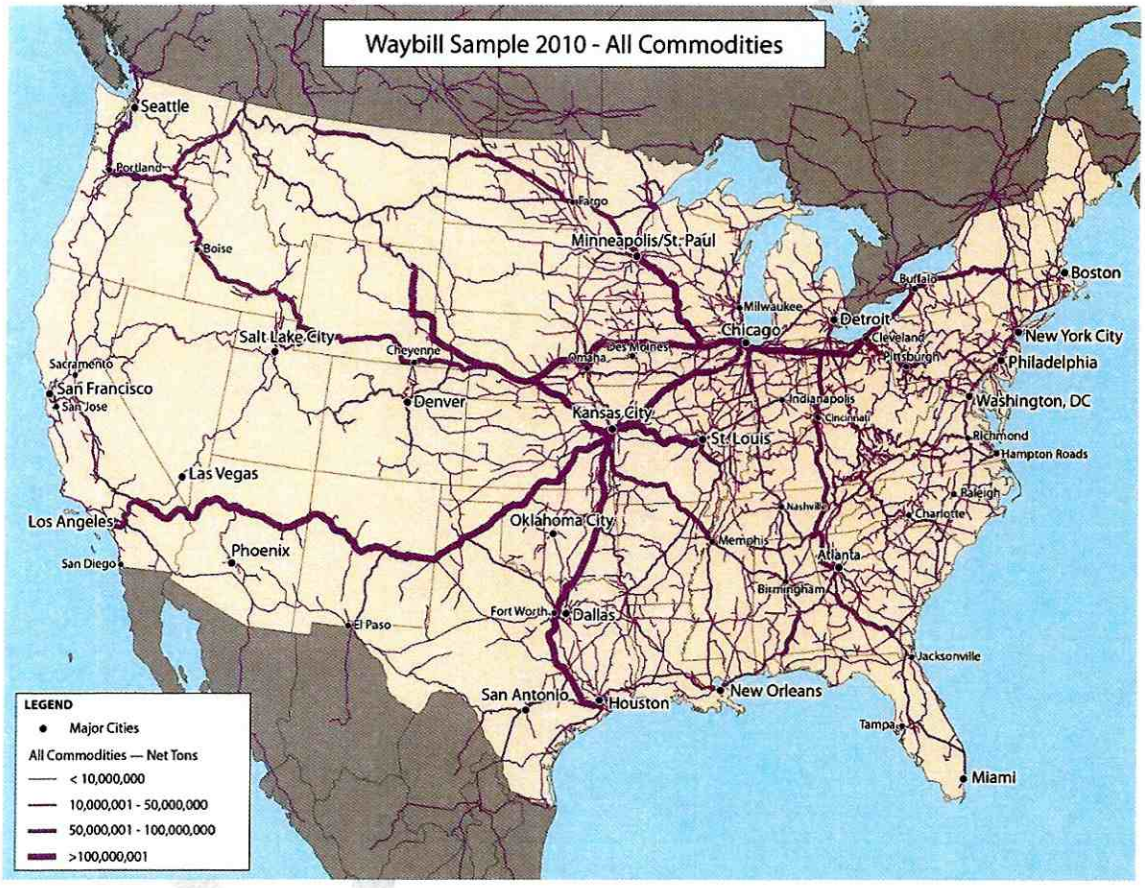
MassDOT established a bilingual project website for the study: www.mass.gov/massdot/ethanolsafety . The website was utilized as a tool for sharing information on the study, including the draft materials and information on public meetings.

Chapter 2: Identification of Rail Corridors and Assessment of their Condition

2.1 Definition of railroad corridors accessing the site

Determining the railroad corridors that may carry ethanol through the study area requires an understanding of the national freight rail system that serves Massachusetts. A map of the national railroad system is shown below in Figure 2-1. This map depicts the general route and quantity of freight that travels across the United States.

Figure 2-1: The National Freight Railroad System



There are many railroads in Massachusetts, most of which are smaller regional routes that distribute freight to local destinations. However, there are three primary rail routes that connect Massachusetts to the national railroad network, and that are used to transport freight longer distances into and out of the Commonwealth. The first two routes traverse the state in an east-west direction, while the third crosses the state from the north-south. The first of the east-west routes is the Pan Am Southern Mainline, which approximately parallels Route 2, entering Massachusetts in Williamstown and connecting to the MBTA Fitchburg commuter rail line in Fitchburg. The second east-west route is the CSX mainline, which approximately parallels the Massachusetts Turnpike, entering Massachusetts in West Stockbridge and traveling through Pittsfield, Springfield, and then Worcester, where it connects to a number of rail lines,

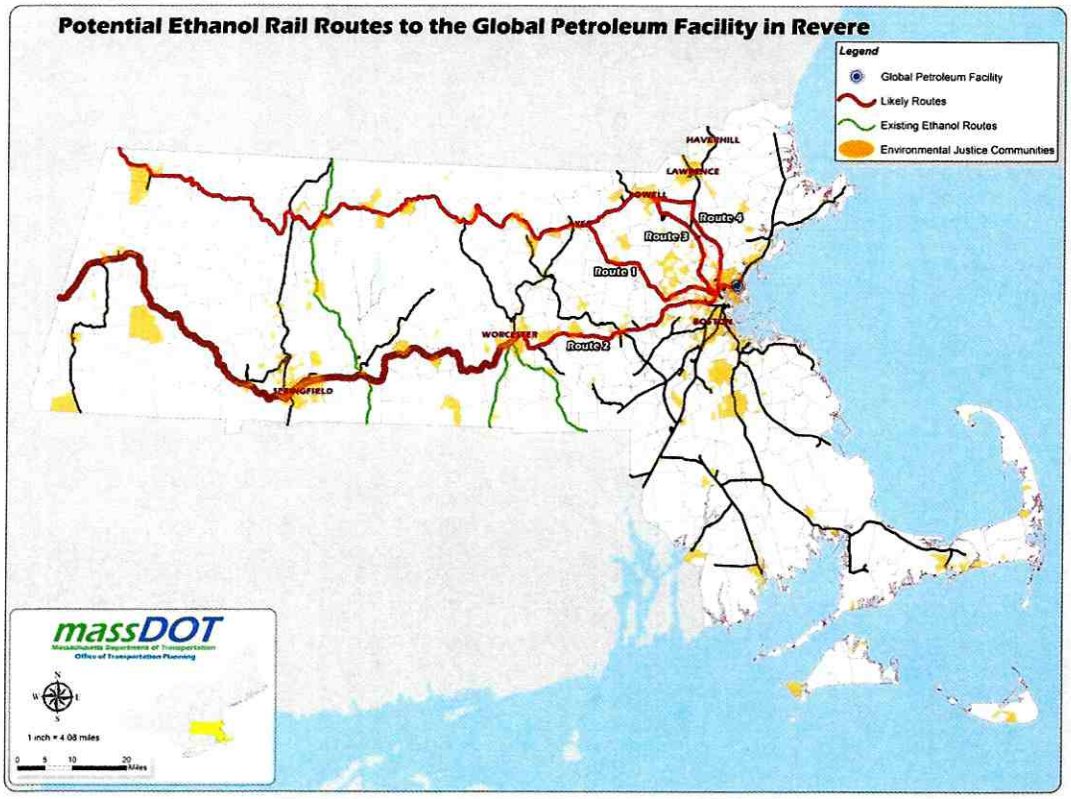
including the MBTA Worcester commuter rail line, which is also the freight connection into Boston. These two routes link to the four possible routes that could be used to transport ethanol to the Global facility in Revere. These routes are highlighted in Figure 2-2.

The north-south route, called the New England Central Railroad, enters into Massachusetts in Northfield from Vermont. The route primarily heads due south until Amherst, where it veers to the south-east until it crosses the Mass Turnpike in Palmer. Once in Palmer the route heads due south again until it crosses the border into Connecticut in Monson. The route then re-enters Massachusetts in Webster and heads directly to into Worcester. At the freight terminal in Worcester freight that carries on to Providence then heads south-east into Providence crossing at Blackstone.

As shown in Figure 2-2, ethanol is currently transported through Massachusetts on the CSX mainline and the New England Central Railroad to Worcester where it is then transported down to Providence to be loaded on a barge. This barge is currently used to deliver ethanol to the Global facility in Revere. As shown in Figures 2-x and 2-2, ethanol trains currently pass through many dense urban areas; these include Pittsfield, West Springfield, Springfield, Greenfield, and Worcester in Massachusetts, as well as Providence.

Figure 2-2 also shows the potential routes that would be used to transport ethanol to the Global facility.

Figure 2-2: The Massachusetts Freight Railroad System & Potential Ethanol Routes



Rail Corridors within the Study Area

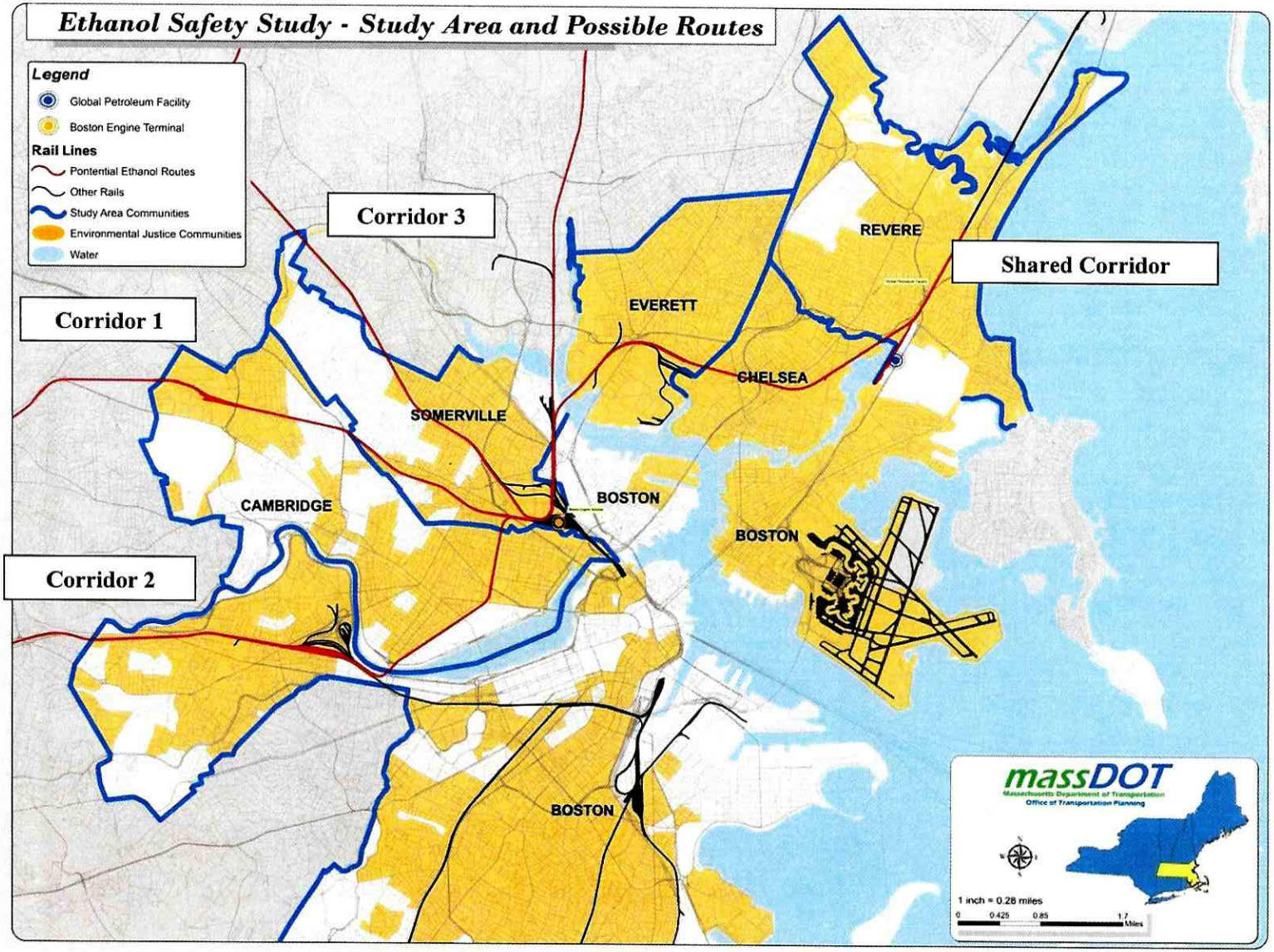
As shown in Figure 2-2, there are a number of routes that Global could use to transport ethanol by rail directly to its Revere terminal. These rely upon either of the two main east-west rail routes through the Commonwealth, the Pan Am Southern Line and the CSX Mainline, which would then connect to one of four rail routes for connection to Revere.

Within the study area, the primary rail route that is expected to be used for transporting ethanol to the Global facility traverses several lines of the MBTA commuter rail system, utilizing the Fitchburg, Haverhill, and Newburyport/ Rockport commuter rail lines within the study area. This potential rail route starts at the Belmont/ Cambridge town lines, and heads east along the Fitchburg commuter rail line into Somerville where the route would curve around the Boston Engine Terminal (BET) onto the Haverhill Commuter Rail Line heading north. At Assembly Square in Somerville, the route then switches to the Newburyport/Rockport commuter rail line, crossing the Mystic River and passing through Everett and Chelsea to enter Revere. Once in Revere, the train requires a reverse move to enter the spur that leads to the Global facility. To do this, the train would travel along the Newburyport/Rockport commuter rail line as far north as Revere Street; the train would then run in reverse and be switched onto the East Boston spur to deliver the ethanol. This route is shown as Corridor 1 in Figure 2-3.

While corridor 1 is the most direct rail route to the Global terminal, there are other routes that could potentially be used to transport ethanol within the study area. Which route is used can be based on an

operational decision by the MBTA, or the railroad company that is shipping the commodity. Two of these possible rail routes within the study area have been selected for a full evaluation as part of this report. These two routes would overlap with Corridor 1 between the BET and the Global facility; this section is denoted as the Shared Corridor, and will be discussed later in the chapter. One of the alternate routes enters the study area in Allston and travels through Brighton by means of the Worcester/Framingham commuter rail line. The line then uses the Grand Junction (GJ) route to cross the Charles River and pass through Cambridge and Somerville. The second of the alternate routes passes through Somerville via the Lowell commuter rail line. These routes are shown as Corridor 2 and Corridor 3 in Figure 2-3, respectively. Another rail route that may carry ethanol, utilizing the Haverhill commuter rail line down from the north, was not selected for full evaluation because it is mostly located outside of the study area. The portion of this route that is in Somerville is included in the evaluation of Corridor 1.

Figure 2-3: Possible Ethanol Rail Routes in the Study Area



There are four other rail routes within the study area that were not selected for evaluation because they are not expected to carry ethanol. The first is the Newburyport/Rockport commuter rail line north of Revere Street in Revere. The northern section of this rail line was not included in the analysis because it lacks a connection to the remainder of the freight rail network. The Fairmount, Providence/Stoughton (which also carries the AMTRAK Northeast Corridor), and the Old Colony commuter rail lines were not included in the analysis due to the circuitous route necessary to connect to the Shared Corridor and ultimately the Global facility. The Boston Mainline through downtown Boston was not included because there is no possible connection to the Global facility beyond the Grand Junction and because hazardous materials are not permitted to pass through the Prudential tunnel in Boston.

Detailed Rail Corridor Descriptions

Corridor 1 starts at the Belmont/Cambridge line and head east through Cambridge along the Fitchburg commuter rail line passing under the Alewife Brook Parkway and through Porter Square. At Porter Square, the route passes into Somerville roughly paralleling Somerville Avenue into Union Square where it then passes under the McGrath Highway in the vicinity of the Twin City Plaza, to access the Boston Engine Terminal (BET), where it then joins the Shared Corridor described below.

Corridor 2 starts at the Newton/Boston line and heads east along the Worcester/Framingham commuter rail line which parallels the Massachusetts Turnpike through Allston and Brighton. The route would then pass through the Beacon Park Yards in Allston, with trains then switching onto the Grand Junction route that crosses the Charles River and passes into Cambridge. In Cambridge, the Grand Junction route parallels Vassar Street until it turns north crossing Broadway and Cambridge Street before it enters Somerville, crossing under the McGrath Highway, in the vicinity of the Twin City Plaza, to connect to the BET, where it then joins the Shared Corridor described below.

Corridor 3 starts at the Medford/Somerville line and heads southeast along the Lowell commuter rail line through a portion of Somerville and then enters Medford, leaving the study area. The route then re-enters Somerville and the study area, crossing under Broadway near Ball Square and following the Lowell commuter rail line between Medford Street and Highland Avenue. The route then crosses under the McGrath Highway just north of the intersection with Highland Avenue and passes through the Inner Belt neighborhood to connect to the BET, where it joins the Shared Corridor described below.

The **Shared Corridor** starts at the BET then traverses the Haverhill Commuter Rail Line heading north. At Assembly Square in Somerville, the route then switches to the Newburyport/Rockport commuter rail line, crossing the Mystic River and passing through Everett and Chelsea to enter Revere. Once in Revere, the train requires a reverse move to enter the spur that leads to the Global facility. To do this, the train would travel along the Newburyport/Rockport commuter rail line as far north as Revere Street; it would then run in reverse and be switched onto the East Boston spur to deliver the ethanol.

2.2 Physical Conditions of the Rail Corridors

The rail corridors within the study area are owned and maintained by the MBTA and MassDOT. Therefore, they share some similar physical characteristics, including track condition, track maintenance, signal control, and general operating speeds. Other physical characteristics, such as number of tracks, right-of-way width, and number of at-grade crossings vary with each corridor.

One important note on the property ownership is that neither the MBTA nor MassDOT originally constructed these railroad corridors, but instead purchased them from the freight railroads. As part of the agreements transferring the railroad properties to public ownership, the freight railroads retained the right to operate freight service over the tracks through a permanent easement. Pan Am Railways (as the successor to the Boston and Maine Railroad) owns the freight easements over Corridor 1, Corridor 3, and the Shared Corridor. CSX Transportation owns the freight easements over Corridor 2, including the Grand Junction.

Railroad Track Condition

The MBTA and MassDOT maintain the railroad tracks within the study area in compliance with Class 3 railroad standards as defined in the *Track Safety Standards Compliance Manual*. This manual provides a classification system to measure overall track quality that is based on the condition of the roadbed, track geometry, track structure, and track devices. As shown in Table 2-1, the classifications range from "excepted" up through Class 9. Each class of railroad track carries separate speed limits for freight trains and passenger trains. Passenger trains are prohibited from operating on track with the "excepted" classification, and freight trains are limited to a speed of 10 mph.

The MBTA contracts out the operation of its commuter rail system, including the maintenance of the commuter rail tracks, with the Massachusetts Bay Commuter Railroad (MBCR). As a safeguard of the track condition and passenger safety and comfort, the MBTA has stipulated in this contract that MBCR must maintain all railroad track to Class 4, i.e. one class higher than what the FRA has deemed adequate for Class 3. This ensures that at a minimum, even if the track should deteriorate somewhat in between inspections, that the railroad track is compliant with the desired Class 3 standards. The MBTA also provides continuously welded track along the commuter rail lines; this provides added safety for rail operations by removing the rail joints, which can be a source of derailments if they are allowed to deteriorate significantly.

Table 2-1: FRA Classification Requirements Allowable Speeds

Over track that meets all of the requirements prescribed in this part for	The maximum allowable speed for freight trains is	The maximum allowable speed for passenger trains is
Excepted	10 mph	N/A
1	10 mph	15 mph
2	25 mph	30 mph
3	40 mph	60 mph
4	60 mph	80 mph
5	80 mph	90 mph
6	110 mph	
7	125 mph	
8	160 mph	
9	200 mph	

Signaling Equipment

The MBTA signaling systems within the study area consist of Automatic Block Signaling (ABS) with and without Cab Signaling/Automatic Train Control systems depending on the commuter rail line. These signals are controlled by one of two control centers, the North Side center for commuter rail lines into North Station, and the South Side center for commuter rail lines into South Station. These two stations communicate with the signal systems through a mix of fiber optic cables, copper cables, and wireless communications infrastructure that follows the rail right-of-way.

At-Grade Crossings

There are two types of warning indicators for all public railroad crossings at-grade: passive and active. Passive crossings are indicated by signs approaching the crossing informing drivers and pedestrians that a crossing is approaching. This could be in the form of street sighs, or painting markings. Active warning signs are indicated by flashing lights and/or the use of gates to physically stop vehicles or pedestrians from crossing the tracks when a train is approaching, passing, or moving away from the crossing. A complete inventory of the crossings along each of the corridors is included as a part of this chapter; this can be found in the description of each corridor respectively.

Right-of-Way

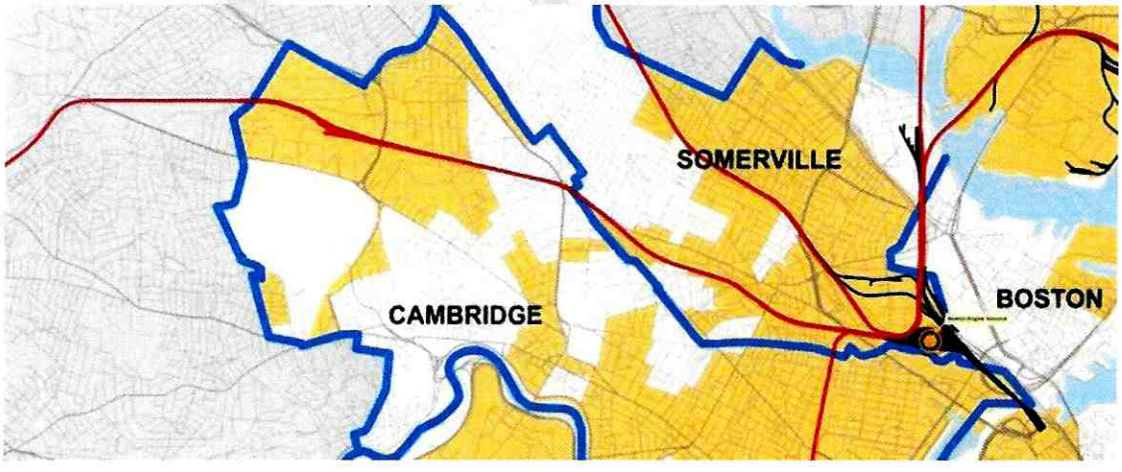
The right-of-way width throughout Massachusetts is approximately 70 feet; there are a few locations where this width varies. When applicable, this is detailed in the description of each corridor.

Corridor 1, shown in Figure 2-4, consists primarily of two railroad tracks from the Cambridge city line through to the Boston Engine Terminal. The widest track cross section is located in West Cambridge, west of the Alewife Brook Parkway, where there are five track sidings primarily used for maintenance of way equipment for the MBTA. There are two at-grade roadway/rail crossings along this segment as can be seen in the following table. The table additionally shows the number of tracks at each roadway/rail crossing.

Table 2-2: Corridor 1 Roadway/Rail crossings, locations and type

Street Crossing	Tracks	Type of Crossing	Warning Type	Type of Signals	Pedestrian Crossing
Switch-Grand Junction Section Track					
McGrath Highway	3	bridge	-	-	-
Medford Street	2	bridge	-	-	-
Prospect Street	2	bridge	-	-	-
Webster Street	2	bridge	-	-	-
Washington Street	2	bridge	-	-	-
Dane Street	2	bridge	-	-	-
Park Street	2	at-grade	active	street marking and gates	gates
Sacramento Street	2	bridge	-	-	-
Beacon Street	2	bridge	-	-	-
Porter Square	2	bridge	-	-	-
Massachusetts Avenue	2	bridge	-	-	-
Signal Bridge	2	bridge	-	-	-
Walden Street	2	bridge	-	-	-
Yerxa Street	2	bridge	-	-	-
Sherman Street	3	at-grade	active	gate only	gate
Alewife Brook Parkway	3	bridge	-	-	-
Culvert	7	bridge	-	-	-

Figure 2-4: Corridor 1 - Fitchburg Line to the Boston Engine Terminal (BET)



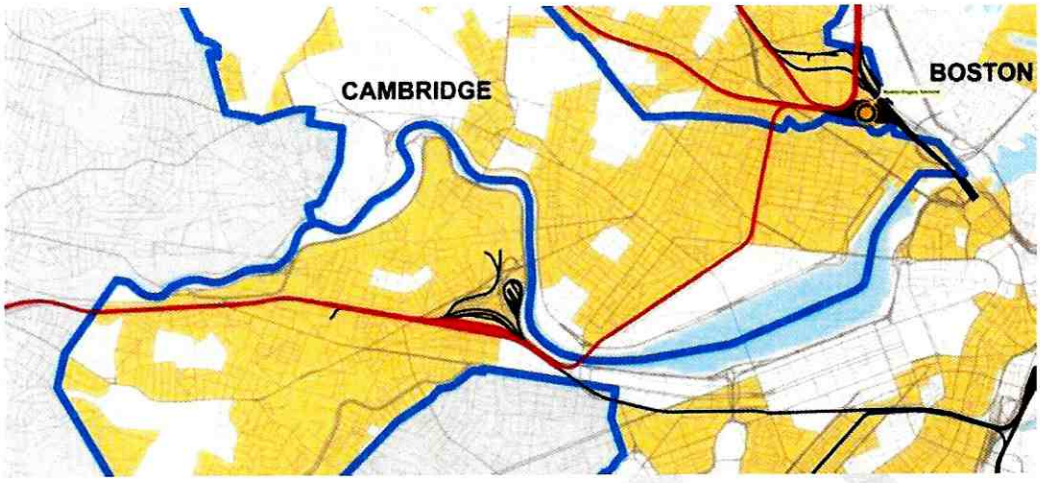
Corridor 2, shown in Figure 2-5, consists primarily of two tracks from the Boston city line to the Beacon Park Yard in Allston and one railroad track from the Beacon Park Yard to the Boston Engine Terminal. The widest track cross section is located at the Beacon Park Yard, where there is a former CSX freight offloading operation. In addition to the sidings in the Beacon Park Yard facility, there is another siding ("the long siding") between the Fort Washington Pedestrian Way and Massachusetts Avenue. This route crosses the Charles River on a bridge in the vicinity of the BU Bridge. The route also passes through two buildings on the campus of the Massachusetts Institute of Technology (MIT). There are two major switching moves along this route located just east of the Beacon Park Yard in Boston and at the BET.

There are seven public and two private at-grade roadway/rail crossings along this segment as can be seen in the following table. The table additionally shows the number of tracks at each roadway/rail crossing.

Table 2-3: Corridor 2 Roadway/Rail crossings, locations and type

Street Crossing	Tracks	Type of Crossing	Warning Type	Type of Signals	Pedestrian Crossing
Grand Junction					
McGrath Highway	1	bridge	-	-	-
Medford Street	1	at-grade	active	gates	gate
Cambridge Street	1	at-grade	active	street markings & gates	gates
Binney Street	1	at-grade	passive	street markings	-
Broadway	1	at-grade	active	street markings & gates	gate
Main Street	1	at-grade	passive	street markings	-
Private Street	1	under bldg.	unknown	unknown	unknown
University Pedestrian Way	1	under bldg.	unknown	unknown	unknown
Massachusetts Avenue	2	at-grade	active	street markings & gates	gates
Fort Washington Pedestrian Way	2	at-grade	active	-	gates
Memorial Drive	3	bridge	-	-	-
Charles River	1	bridge	-	-	-
Soldiers Field Road	1	bridge	-	-	-
Switch - Beacon Park Yard					
Switch - Framingham Line					
Framingham-Worcester Line					
Switch - Grand Junction					
Cambridge Street	2	bridge	-	-	-
Underpass	2	bridge	-	-	-
Cambridge Street	2	bridge	-	-	-
Franklin Road	2	bridge	-	-	-
Everett Street, Frontage Road	2	bridge	-	-	-
Switch - Brighton Yard					
Market Street	2	bridge	-	-	-
North Beacon Street	2	bridge	-	-	-
Parsons Street	2	bridge	-	-	-
Brooks Street	2	bridge	-	-	-
Massachusetts Turnpike	2	bridge	-	-	-

Figure 2-5: Corridor 2 – Framingham/Worcester Line to the Boston Engine Terminal (BET)

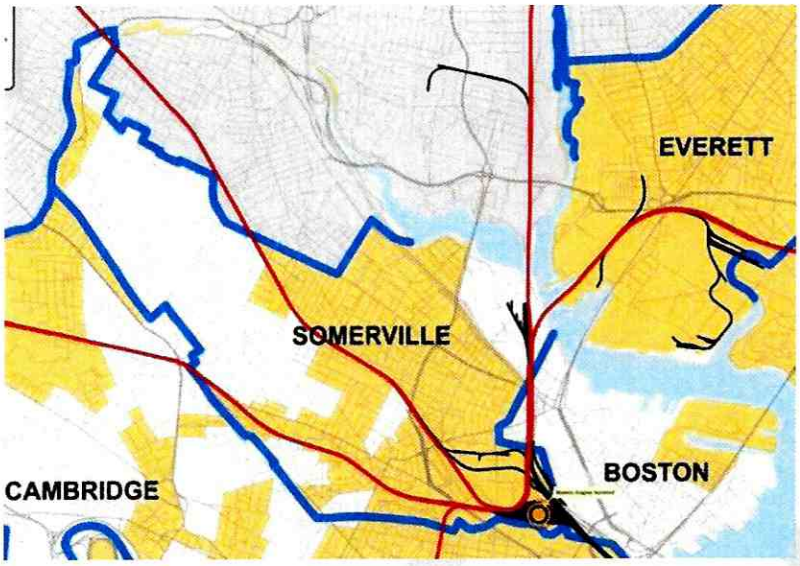


Corridor 3, shown in Figure 2-6, consists primarily of two railroad tracks from the Somerville city limits to the Boston Engine Terminal. This route passes through the campus of Tufts University. The widest track cross section is located just prior to the Boston Engine Terminal where there are four tracks. This route crosses the Mystic River as it enters the City of Somerville. There are no at-grade roadway/rail crossings along this segment which is noted in the following table. The table additionally shows the number of tracks at each roadway/rail crossing.

Table 2-4: Corridor 3 Roadway/Rail Crossings, locations and type

Street Crossing	Tracks	Type of Crossing	Warning Type	Type of Signals	Pedestrian Crossing
Pipe Tunnel	2	bridge	-	-	-
B & A Tracks	2	bridge	-	-	-
Inner Belt Road	2	bridge	-	-	-
Switch - Yard 8					
Switch - Yard 10 Lead					
Washington Street	5	bridge	-	-	-
Cross Street	3	bridge	-	-	-
Northern Artery	3	bridge	-	-	-
Walnut Street	3	bridge	-	-	-
Medford Street	3	bridge	-	-	-
School Street	3	bridge	-	-	-
Sycamore Street	3	bridge	-	-	-
Central Street	3	bridge	-	-	-
Switch - North Cambridge					
Switch - Section Track					
Lowell Street	3	bridge	-	-	-
Mystic Valley Parkway	2	bridge	-	-	-

Figure 2-6: Corridor 3 – Lowell Line to the Boston Engine Terminal (BET)

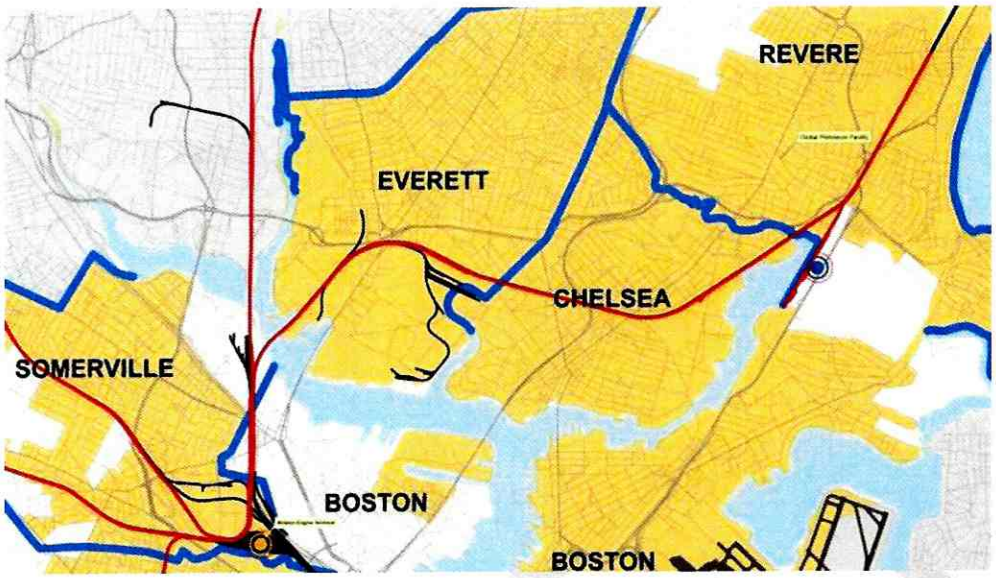


The **Shared Corridor**, shown in Figure 2-7, consists primarily of two railroad tracks from the Boston Engine Terminal through to the East Boston spur line to the Global Partners facility. The widest track cross section is located at Assembly Square in Somerville, where the Newburyport/Rockport commuter rail line parallels the Haverhill commuter rail line and an industrial spur line for a total of six railroad tracks. There are also a significant number of siding tracks that serve the industrial properties along this route, including the Mobil facility in Everett and the New England Produce Center in Chelsea. The shared corridor passes over the Mystic River on a causeway. The East Boston spur line currently consists of 2 railroad tracks that are partially buried. As part of the proposal to transport ethanol to the Global Partners facility, Pan Am Railways is planning to upgrade the line to a single railroad track with sidings for the ethanol trains located adjacent to the Global Partners facility. There are three major switching moves along this route located at the BET, in Assembly Square, and at the East Boston branch in Revere near the intersection of Route 1A and Route 16. There are seven at-grade roadway/rail crossings along this segment, as shown in Table 2-5. The table also shows the number of tracks at each roadway/rail crossing.

Table 2-5: Shared Corridor, Roadway/Rail crossings, locations and type

Street Crossing	Tracks	Type of Crossing	Warning Type	Type of Signals	Pedestrian Crossing
Switch - Mystic Junction Yard					
Cambridge Street	2	bridge	-	-	-
Sullivan Square Station	2	bridge	-	-	-
Main Street	2	bridge	-	-	-
Mystic Avenue	2	bridge	-	-	-
Mystic River	2	bridge	-	-	-
Subway	2	bridge	-	-	-
Monsanto Private	3	unknown	-	-	-
Switch - Saugus Branch					
Broadway	3	bridge	-	-	-
Culvert	2	bridge	-	-	-
2nd Street	2	at-grade	active	gates	-
3rd Street	3	at-grade	active	gates	-
Everett Street	2	at-grade	active	street markings & gates	gates
Spruce Street	2	at-grade	active	gates	-
NE Expressway (Rt. 1)	2	bridge	-	-	-
Arlington Street	2	at-grade	active	street markings & gates	
6th Street	2	at-grade	active	street markings & gates	
Washington Avenue	2	bridge	-	-	-
Broadway	2	bridge	-	-	-
Switch - Chelsea Yard					
Eastern Avenue	2	at-grade	active	street markings & gates	gates
Forbes Street	2	bridge	-	-	-
Mill Creek	2	bridge	-	-	-
Railroad Street	2	bridge	-	-	-
Switch - East Boston Branch					
Culvert	3	bridge	-	-	-
Winthrop Avenue	3	bridge	-	-	-
Lee Burbank Highway	2	bridge	-	-	-
Beach Street	2	bridge	-	-	-
Wonderland	2	bridge	-	-	-
Revere Street	2	bridge	-	-	-

Figure 2-7: Shared Corridor - Boston Engine Terminal to the Global Partners Facility



2.3 Operational Conditions Along Each Corridor

The four study rail corridors are used each day by passenger train movements. Passenger train movements are defined as the scheduled MBTA commuter rail trains, the scheduled Amtrak passenger trains, and the movement of empty passenger rail equipment for maintenance or scheduling purposes (referred to as "deadhead movements"). The number of passenger train movements is shown in **Table 2.6**. The deadhead movements are primarily between North Station and the Boston Engine Terminal, which is used for mid-day train storage and maintenance of the equipment. It should be noted that the numbers of trains moving across each line can vary depending on operating conditions.

Table 2.6: 2012 Average Daily Passenger Train Movements within the Study Area Corridors

	Study Area Corridor				
Passenger Movements	1 - Fitchburg	2 - Worcester/GJ	3 - Lowell	4 - Haverhill	Shared
MBTA Commuter Rail	34	41	58	48	62
Amtrak	0	2	0	10	0
Deadheads	10	0	19	11	11
Total	**44**	**43**	**77**	**69**	**73**

The MBTA and the freight companies have operating agreements that dictate how the freight and passenger trains interact along the four study corridors. Under these agreements, the MBTA controls the dispatching of all trains within the study area; as a result, passenger trains are given priority over the freight trains. Because of this priority for passenger movements, freight can move more freely at night when there are no passenger trains running. As a result, the freight railroads choose to make most, but not all, freight movements outside of the standard operating times for the MBTA system. Freight that must be moved during the day can move more freely outside of peak hours, when the passenger train traffic is highest. Any freight movements made within the operating times for the MBTA system would

mostly likely move during mid-day. Table 2-7 shows the span of passenger service along each of the study corridors.

Table 2-7: Standard Hours of Weekday Passenger Train Operations

	Study Area Corridor				
	1 - Fitchburg	2 - Worcester/GJ	3 - Lowell	4 - Haverhill	Shared
Start Time	6:36 AM	4:05 AM	5:45 AM	6:02 AM	6:03 AM
End Time	12:20 AM	1:30 AM	12:22 AM	12:20 AM	11:56 PM
Span of Service	17 h 44 m	21 h 25 m	18 h 37 m	18 h 18 m	17 h 53 m

The existing freight operations along the study area corridors are less consistent than the passenger operations because they are dependent on the needs of the rail customers along the routes. However, there are three freight trains that move along the study area corridors on a regular basis. The first is a delivery of sand and/or gravel to Boston Sand & Gravel, which utilizes Corridor 3. The second is a train that travels from Lawrence to Chelsea and Salem, which utilizes study Corridor 3 and the Shared Corridor. The final freight train that operates on a regular basis is the "Fruit Train," which travels to the New England Produce Market in Chelsea via study Corridor 2 and the Shared Corridor. Table 2-8 provides a summary of the freight rail movements along the study area corridors.

Table 2-8: 2012 Average Daily Freight Train Movements within the Study Area Corridors

	Study Area Corridor				
Freight Movements	1 - Fitchburg	2 - Worcester/GJ	3 - Lowell	4 - Haverhill	Shared
Boston S&G	0	0	2	0	0
Lawrence to Salem	0	0	2	0	2
Produce Market	0	2	0	0	2
Total	**0**	**2**	**4**	**0**	**4**

Chapter 3: Evaluation of Impact on Public Safety

3.1 Rail Safety Record and Potential Safety Risks

In order to identify potential risks to public safety that could be caused by the transport of ethanol by rail in the Commonwealth, MassDOT staff has reviewed available information on rail crashes and derailments in the United States and Massachusetts for the past five years. The materials reviewed were those made publicly available by the Federal Railroad Administration (FRA), Association of American Railroad (AAR), and the National Railroad Transportation Board (NTSB).

Nationwide Ethanol Rail Accidents

National freight carriers transport roughly 29.4 million carloads of freight every year across more than 140,000 miles of rail in the United States, according to the American Association of Railroads (AAR). Of that, more than 200,000 of the carloads contain ethanol. In the five years reviewed, approximately one percent of total incidents released hazmat, and 0.32% released ethanol. Table 3-1 details the summary statistics for accidents in the United States from 2008 to 2012.

Table 3-1: Summary Statistics for Rail Crashes between 2008-2012

	2008	2009	2010	2011	2012
Accidents Involving Hazmat					
Train Only (Not Highway-Rail)	2,481	1,910	1,902	2,010	1,678
Trains Carrying Hazmat	754	617	580	579	484
Involving the Release of Hazmat	22	22	21	20	23
% Involving Release of Hazmat	0.89%	1.15%	1.10%	1.00%	1.49%
Accidents Involving Ethanol, or Not Otherwise Specified Hazardous Material (NOS)					
Involving Release of Ethanol or NOS	4	8	4	7	8
% Involving Release of Ethanol or NOS	0.16%	0.42%	0.21%	0.35%	0.48%

Table 3-2 lists all incidents, as catalogued by the FRA, in the US from 2008 to 2012. The FRA identifies the following information for each: date of incident, state, county, type of track, primary cause (of incident), rail road property damage, people killed and/or injured, area evacuated, reported speed of incident, and number of locomotives and/or cars derailed. From 2008 to 2012 there were 31 incidents, 21 of which included the release of ethanol and 10 others that resulted in the release of a hazardous material (hazmat) but that do not list the type of hazmat involved. Those 10 incidents have been included in the statistical analysis as if they were ethanol in order to provide the most conservative analysis.

The major causes of the incidents were due to inspection errors, maintenance problems, or lack of communication between train crews. The train speed and DOT-111 railcar design were the primary causes of the release of ethanol. Although actual damage in most incidents was to the immediate area surrounding the tracks, the required minimum distance of a half mile was evacuated for each of the

relevant incidents. In some situations, a greater distance was evacuated based on the specific circumstances. The average number of people evacuated per incident was 54, and the average cost of damages to railroad property was $841,000.

Of the 31 incidents, one event resulted in a fatality, in Cherry Valley, Illinois. This crash occurred in a small rural community located directly southwest of Rockford, IL. The derailment was caused by a wash-out of a portion of the track, which was discovered about one hour before the train was scheduled to pass that section. The Canadian National Railway Company (CN) did not notify the train crew of the known wash-out in time to stop the train due to the inadequacy of CN's emergency communications procedures. Contributing to the accident was the CN's failure to work with the local county government to develop a comprehensive storm water management design in order to address previous wash-outs of track in 2006 and 2007. Contributing to the severity of the accident was CN's failure to issue a flash flood warning to the train crew and the design of the DOT-111 tank cars, which made the cars subject to damage and catastrophic loss of hazardous materials during the derailment.

Table 3.2: National Rail Incidents Involving Ethanol or Unknown Hazardous Material (2008-2012)

Date	State	County	Type Track	Primary Cause	Property Damage $	Killed	Injured	Evac-uated	Speed Mph	Derailed	
										Loco	Car
7/29/2008	MN	Houston	Main	Equipment	2,294,052	0	0	0	25	0	28
8/16/2008	NC	Columbus	Main	Equipment	358,839	0	2	0	17	0	10
8/22/2008	OK	Oklahoma	Main	Track	852,915	0	0	35	19	0	14
3/8/2009	IA	Buchanan	Siding	Track	148,926	0	0	31	8	0	7
4/9/2009	CA	Los Angeles	Yard	Track	400,924	0	0	0	10	0	6
5/18/2009	IL	Cook	Yard	Equipment	13,919	0	0	0	9	0	1
6/19/2009	IL	Winnebago	Main	Track	1,816,653	1	11	60 0	34	0	19
7/23/2009	ND	Mclean	Main	Track	610,000	0	0	0	11	0	7
8/15/2009	ME	Oxford	Main	Track	1,106,830	0	0	2	27	0	20
9/15/2009	TN	Knox	Main	Human Factor	462,073	0	0	25	10	0	8
11/27/2009	MN	Hennepin	Yard	Human Factor	124,506	0	0	0	7	0	5
4/19/2010	OH	Williams	Main	Equipment	2,431,870	0	0	28	44	0	39
8/3/2010	NE	Boone	Main	Human Factor	334,774	0	0	0	2	0	16
2/6/2011	OH	Hancock	Main	Track	1,917,500	0	0	20	46	0	33
5/4/2011	OR	Multnomah	Main	Equipment	785,677	0	0	0	24	0	11
7/15/2011	IL	Iroquois	Main	Track	106,510	0	0	0	22	0	1
7/19/2011	SD	Brookings	Yard	Track	89,842	0	0	0	8	0	5
10/7/2011	IL	Bureau	Main	Track	1,847,619	0	0	50 0	37	0	26
6/1/2012	IN	Pike	Main	Track	876,000	0	0	0	25	0	8
7/11/2012	OH	Franklin	Main	Miscellaneous	681,866	0	2	10 0	23	0	17
10/12/2012	TN	Knox	Yard	Track	250,000	0	0	0	5	0	6

Table 3.2: National Rail Incidents Involving Ethanol or Unknown Hazardous Material (2008-2012) (continued)

Date	State	County	Type Track	Primary Cause	Property Damage $	Killed	Injured	Evac-uated	Speed Mph	Derailed	
										Loco	Car
Type of Hazmat Not Otherwise Specified (NOS)											
8/28/2008	NM	Curry	Yard	Equipment	23,117	0	0	0	3	0	1
2/20/2010	CA	Kern	Main	Track	2,222,672	0	0	35	20	0	6
9/13/2010	WI	Pierce	Main	Equipment	2,091,287	0	0	14	54	0	9
9/13/2011	TX	Galveston	Yard	Track	69,600	0	0	14	8	0	8
9/16/2011	TX	Potter	Yard	Human Factor	946,211	0	3	200	5	0	1
3/27/2012	IN	Nobel	Main	Track	1,311,523	0	0	54	47	0	25
8/5/2012	MT	Fallon	Main	Track	1,400,085	0	0	0	23	0	18
8/10/2012	NV	Clark	Siding	Human Factor	16,205	0	0	3	8	0	6
11/1/2012	AZ	Graham	Main	Track	66,335	0	0	0	22	0	7
11/30/2012	NJ	Gloucester	Main	Miscellaneous	413,388	0	121	0	8	0	7

The table does not identify the freight carrier for each incident, nor the safety record for the four primary freight carriers in the US. Of the four primary carriers, Norfolk Southern and CSX primarily serve the eastern United States, while Burlington Northern – Santa Fe (BNSF) and Union Pacific serve the west. Table 3.2 details the reported incidents since 2001 for each of these freight carriers, as reported by the AAR. A summary of the national crash data is also provided in Appendix 2.

Table 3-3 Accidents since 2001 on the Class 1 Railroad Systems

Top Freight Carriers	Derailments
Union Pacific	2,019
BNSF Railway Co	1,781
CSX Corp.	1,005
Norfolk Southern	695

Rail Incidents in Massachusetts

A review of all railroad incidents in Massachusetts helps to give a better understanding of how the tracks are operated and maintained along the rail lines leading up to and within the study area for this analysis. To include a greater breadth of the types of incidents, five years worth of incidents were reviewed. During this time period, 68 incidents were reported in Massachusetts, including five collisions, 39 derailments, and 24 incidents that were classified as other accidents. The main lines had 8 more incidents than in the yards and sidings. There were 28 incidents with passenger cars, 21 incidents involved freight traffic, and the remaining 19 were other types of train cars.

Of the 68 incidents, none resulted in a fatality. The most recent fatality in Massachusetts occurred in 2007 in Woburn. The train involved in this crash struck railroad equipment that was left on the track

near a switch while travelling at 62 MPH. The cause can be traced to a dispatcher who failed to notify the crews in time to either move the equipment from the tracks or stop the train. The accident resulted in 2 deaths and 10 injuries.

Of all the incidents reported in Massachusetts, five resulted in personal injury and no evacuations were ordered. A record for each of these 68 incidents can be found in Appendix 2, along with the incident crash report data.

Based on the information ascertained from ethanol-related accidents nationwide and all rail incidents in Massachusetts, the following are identified as potential safety concerns: (1) the older design version of the DOT-111 tank cars that are still in use, and (2) more remote locations along the corridor that might result in a communication breakdown.

The DOT-111 is the primary model of tank car that transports hazmat commodities throughout the United States. According to the National Transportation Safety Board (NTSB), 69 percent of all tank cars are DOT-111, and as ethanol is the most frequently transported hazardous material, there are 40,000 DOT-111 cars that are used to transport the denatured fuel ethanol. The National Transportation Safety Board (NTSB) Office of Railroad, Pipeline and Hazardous Materials Safety has recently completed a report on the DOT-111 model tank cars. The report cites several incidents where a DOT-111 tank car is the primary cause for the release of a hazardous material. The main concern with the cars is that upon impact, the tanks cars can puncture, and valves can break open.

These design inadequacies resulted in a collaborated effort between the AAR and the NTSB, where the AAR has suggested design modifications for all new DOT-111 tank cars made after October 1, 2011. The suggested improvements are: (1) Increase head and shell thickness; (2) Use normalized steel; (3) Provide ½-inch thick material for the head shield; (4) Use top fitting protection; (5) Comply with the current design requirements for the valve operating mechanisms.

The NTSB recognizes that the AAR actions do not address the existing fleet. NTSB states that there are impediments to retrofitting the tank cars, and unless the older version of the DOT-111 is in a crash, its long service life makes it difficult to take out of service and retrofit. NTSB reports that ultimately the safety benefits suggested will not be fully realized if old and new tank cars are commingled in trainsets.

The potential for a breakdown in communication is increased at locations along rail lines that may require additional surveillance and maintenance, as the necessary information needs to be relayed to all pertinent members of the train crews. These locations include, but not limited to: sidings, yards, switches, bridges, tunnels, areas that are subject to impacts of severe weather, and areas that are more remote/rural. A critical issue is the condition of a railroad mainline in a more remote area; trains travel at much higher speeds on rail mainlines and in more remote areas, where it is less likely that a problem will be detected. The railroad lines in the study are all in dense urban areas, and they are used many times daily for passenger trains, which would result in rapid detection of a problem.

3.2 Potentially Exposed Populations

A major part of understanding the potential impact on public safety of transporting ethanol by rail is identifying the potentially exposed populations along the potential routes. The following section provides information on the populations and facilities potentially exposed in the event of an ethanol train crash or derailment.

Identifying the populations and facilities requires the definition of the potential reach of any ethanol incident. The U.S. DOT Emergency Response Guidebook recommends that an ethanol tanker or railcar fire be isolated for ½ mile in all directions, with evacuations of the same distance. The length of the train also factors into the tallying of potentially exposed populations. The theoretical maximum length of a train within the study area, based on the state regulation that no grade crossing can be blocked for more than five minutes, is 100 railcars. This is train length was used to provide a conservative estimate of the potential exposure, even though no plans have been discussed of bringing in a train of that length by any freight railroad.

These two conditions were then applied as a buffer around the corridors identified in Section 2.1. These buffer zones were overlaid with the available data from the Massachusetts Geographic Information System (MassGIS) on Assisted Living Facilities, Nursing Homes, Rest Homes, Private/Public Colleges/Universities, Public/Private Schools, Hospitals, Fire Stations, and Commuter Rail/Transit Stations. These categories were selected based on the requirements set forth in Section 24 in Chapter 242 of the Acts of 2012.

MassDOT also identified the total number of people within the buffer areas based on the data from the 2000 Census. This evaluation of population also included a breakdown of the populations within the buffer area that are also classified as "Environmental Justice" populations as defined by the Executive Office of Energy and Environmental Affairs. Environmental Justice populations are defined by the Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," which directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low-income populations. The maps of potentially exposed populations and facilities are shown in Figures 3-1, 3-2, 3-3, and 3-4.

Members of the TAG have also provided lists of sensitive receptors in their communities. The complete lists are included in Appendix 2. In addition, this report includes analysis from a MassGIS data layer that locates the facilities along each corridor and specifically within the half-mile buffer zone surrounding the corridors. Table 3-4 details the number of locations within the buffer zone for each city.

Table 3-4: Sensitive Receptors within ½-mile of the Potential Ethanol Rail Routes

City	Assisted Living Facilities, Nursing and Rest Homes	Private/ Public Colleges/ Universities	Public/ Private Schools	Hospitals	Medical Clinics	Fire Stations	Transit Stations	Total Sensitive Receptors
Boston	1	2	3	0	0	3	11	20
Allston	0	0	4	0	1	0	0	5
Brighton	1	0	8	0	0	0	0	9
Charlestown	0	0	0	0	0	0	0	0
East Boston	1	0	1	0	0	0	0	2
Cambridge	5	4	9	1	14	7	6	46
Chelsea	6	0	10	1	2	2	1	22
Everett	0	0	2	0	1	1	0	4
Revere	0	0	4	0	3	2	2	11
Somerville	6	1	14	2	7	6	1	37
Totals	**20**	**7**	**55**	**4**	**28**	**21**	**21**	**156**

From the MassGIS layer based on the 2000 Census data, we are able to determine the number of people living within this buffer zone for each of the cities. Because the corridors overlap within the towns, Table 3-5 shows the total population for each city within the buffer zone for all corridors. The table also shows the total population of the Environmental Justice for each city.

Table 3-5: Population within ½-mile of the Potential Ethanol Rail Routes

City	Outside of EJ Area	Within EJ Area	Total Population in 0.5 mile buffer around all corridors in SA
Boston	6,868	3,173	10,041
Allston	4,278	18,174	22,452
Brighton	4,475	18,397	22,872
Charlestown	2,444	0	2,444
East Boston	0	5,518	5,518
Cambridge	24,737	54,379	79,116
Chelsea	0	31,792	31,792
Everett	0	20,288	20,288
Revere	1,143	29,121	30,264
Somerville	32,344	38,136	70,480
Total	**76,289**	**218,978**	**295,267**

Figure 3-1: Potentially Exposed Populations in Corridor 1

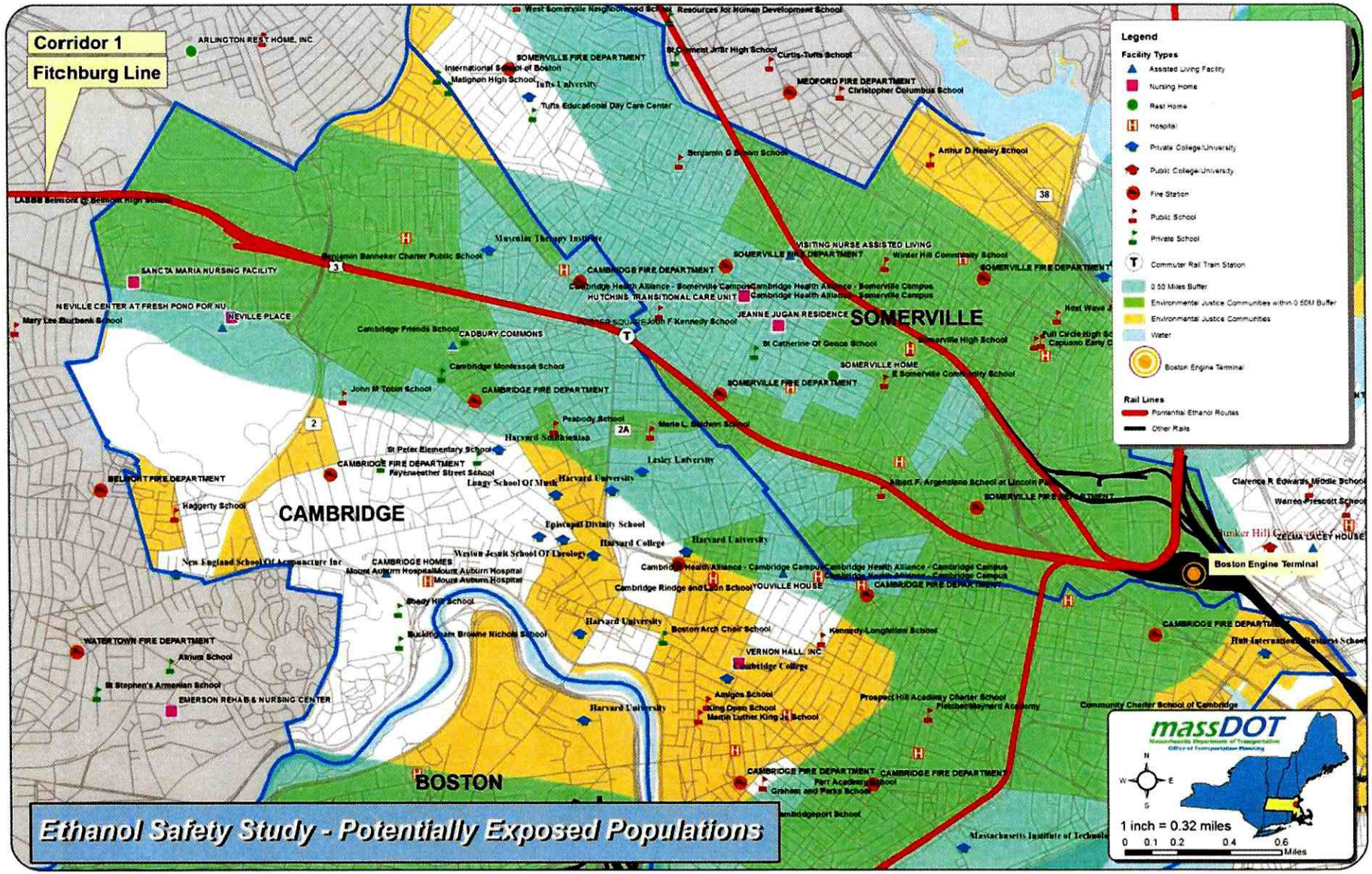


Figure 3-2: Potentially Exposed Populations in Corridor 2

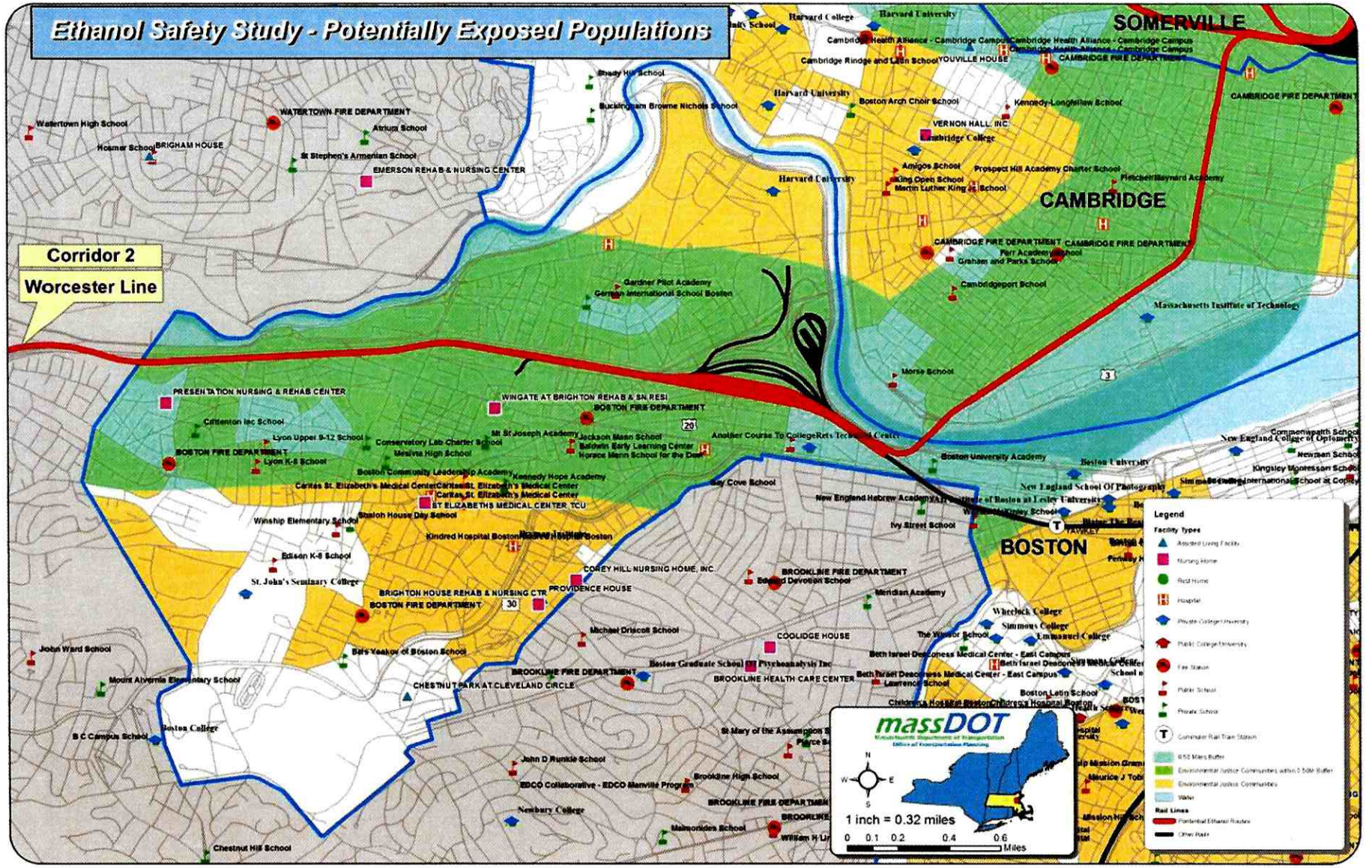


Figure 3-3: Potentially Exposed Populations in Corridor 3

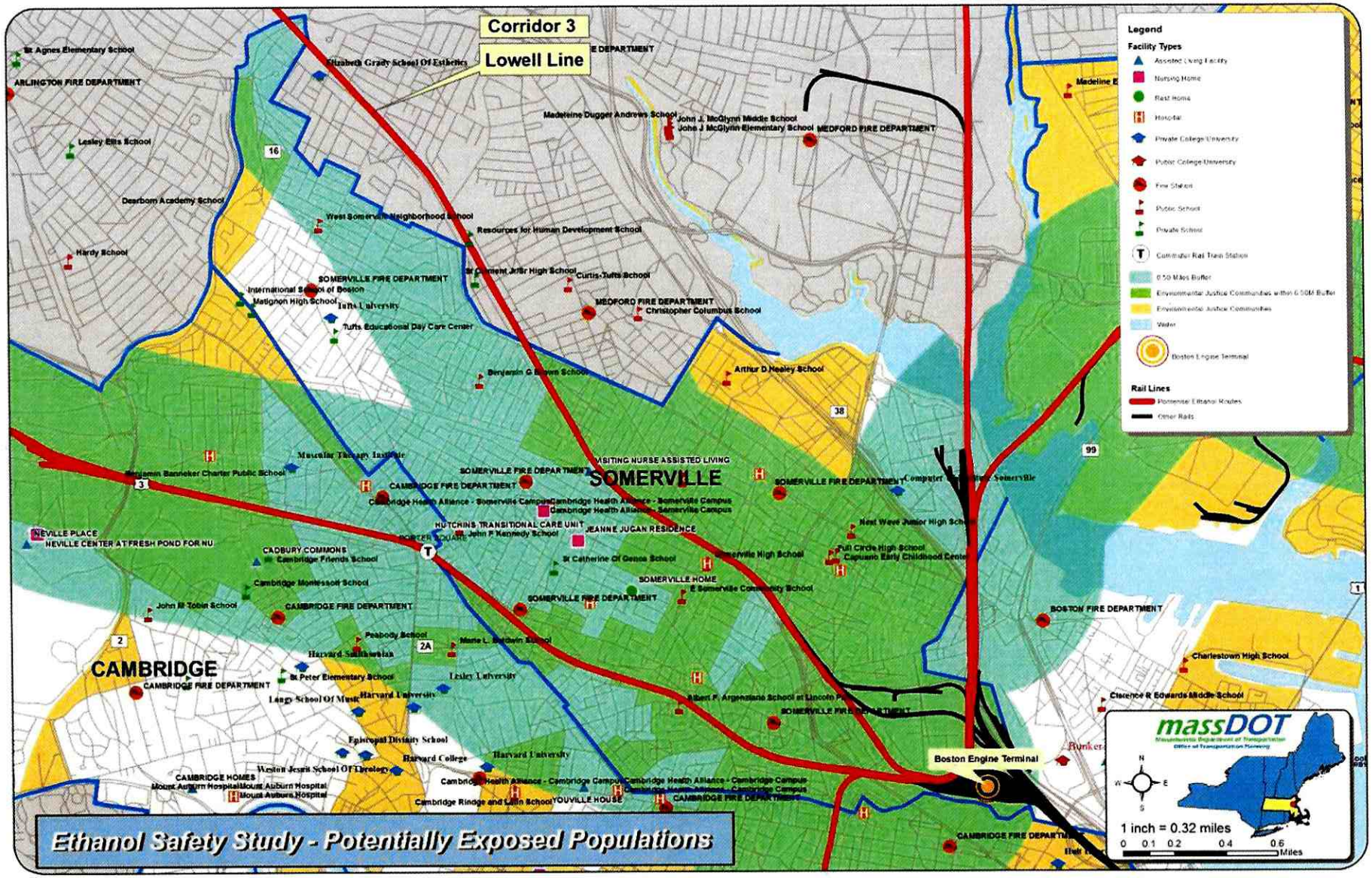
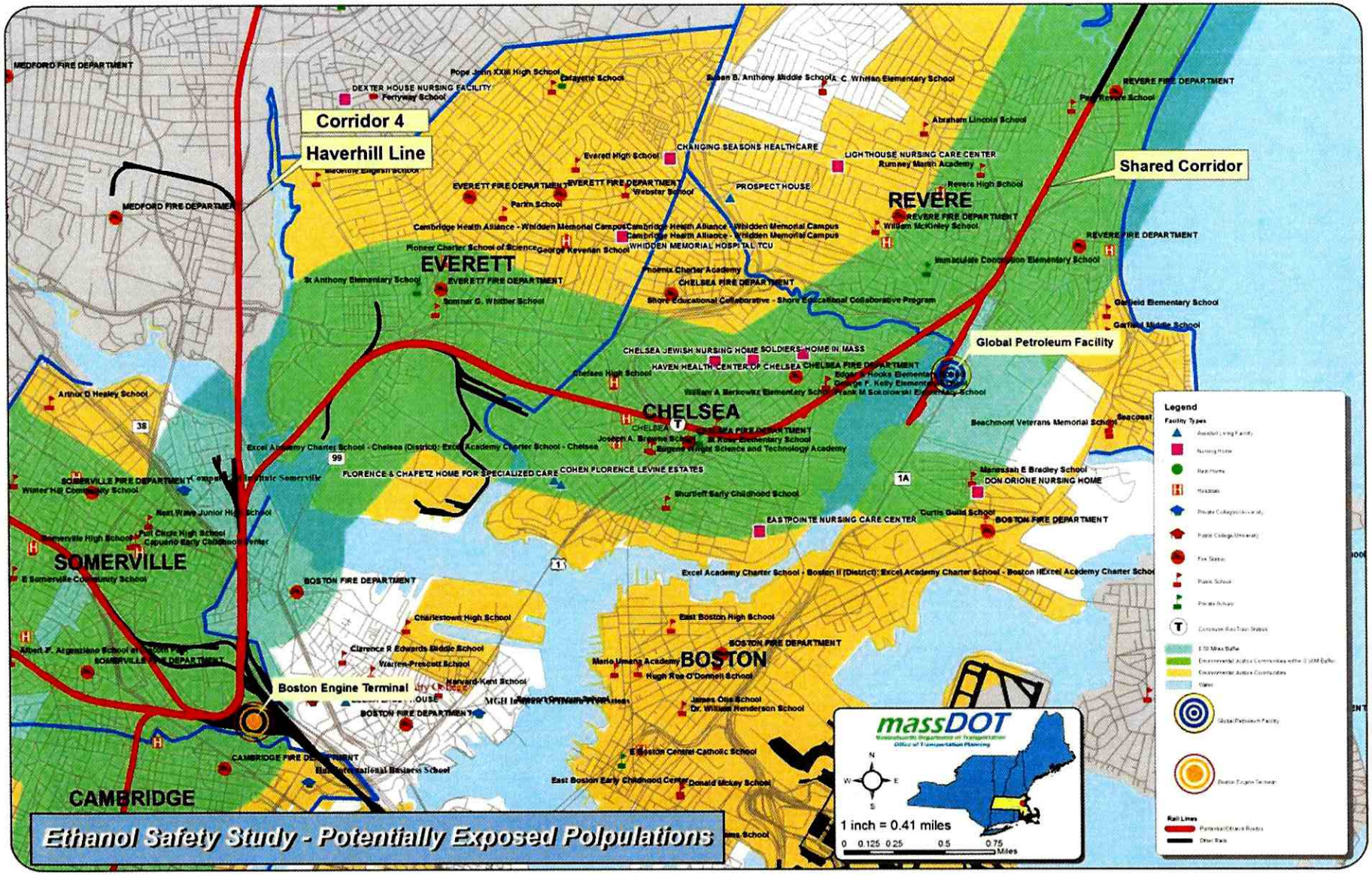


Figure 3-4: Potentially Exposed Populations in the Shared Corridor



3.3 Existing Safety and Security Policies and Procedures for Handling Ethanol

The following section provides an overview of the safety and security regulations that govern the transportation of ethanol. Transporting ethanol and other hazardous materials is regulated by the federal government. There are a number of federal agencies responsible for oversight of hazardous material shipments and oversight of the businesses that deal with the hazardous materials in order to ensure that these regulations are followed.

Overview of Federal Agency Authority

Multiple federal-level agencies are tasked with regulating and authorizing the use and transport of hazardous materials. While the majority of rail-specific regulations are handled by the Federal Railroad Administration (FRA), other agencies have oversight into various aspect of transport, or other means of transport.

The specific roles of each federal agency were outlined comprehensively in a 2010 Department of Homeland Security (DHS) plan: "Chemical Sector-Specific Plan, An Annex to the National Infrastructure Protection Plan." A section of this plan can be found in Appendix 2, and the full report is available on the DHS website.

Department of Homeland Security

The Department of Homeland Security is granted authority through the Homeland Security Presidential Directive 7 (HSPD-7), Chemical Facility Anti-Terrorism Standards mandate (CFATS), the Maritime Transportation Security Act (MTSA), Hazardous Materials Transportation Act (HMTA) and other laws and regulations. DHS is responsible for managing security of the entire chemical sector, with a specific focus on high-risk facilities and water-adjacent facilities.

HSPD-7 gives DHS responsibility for coordinating protection activities for the entire chemical sector. This includes development of risk management frameworks and sector-specific plans, such as the one for ethanol. It is through these plans and management tools that DHS coordinates with partners in the private sector to regulate high-risk materials.

Specifically, CFATS gives DHS the authority to require high-risk facilities to develop vulnerability assessments, develop site security plans, and create security performance standards. These performance standards are used to evaluate facilities by DHS, and DHS is able to mandate that protective measures be implemented based on evaluations. CFATS also requires DHS to complete inspections and audits of facilities. CFATS became law in April 2007.

The Maritime Transportation Security Act gives DHS the authority, via the US Coast Guard, to protect the transportation of hazardous materials over water, and to secure chemical facilities that are adjacent to navigable waterways. Much like CFATS, MTSA requires the development of security plans, use of performance standards and the implementation of protective measures. MTSA applies at the port, vessel and facility level, and regular inspections are required of each. This also applies to certain foreign vessels entering US ports. MTSA also has provisions to ensure security within the workforce of ports and vessels.

The Transportation Worker Identification Credential program provides for biometric identification badges to allow access to secure areas of selected ports. All workers who require secure access for their jobs were required to submit biometric information and pass a security threat assessment by April 2009.

Executive Order 13416, signed into law by President Bush in December 2006, improves upon HSPD-7. Titled "Strengthening Surface Transportation Security," the order facilitates the implementation of a comprehensive, coordinated and efficient security program. It set new deadlines for key security related activities, such as the development of security assessments.

The Hazardous Materials Transportation Act (HMTA) regulates the 3.5 million commercial vehicle drivers that transport hazardous materials via truck. These drivers are required to, in conjunction with TSA and the FBI, submit to periodic background checks and security assessments in order to maintain the hazmat endorsement on their driver's license. In addition, DHS tasks the TSA in areas of rail security. TSA is permitted to inspect property, facilities, and records relevant to rail security. Freight carriers must also be able to report the location and shipping information of various substances to TSA upon request, and maintain chain-of-custody documents to ensure the safe exchange of materials.

U.S. Environmental Protection Agency

The US EPA has authority over hazardous materials through three federal laws: the Clean Air Act, The Emergency Planning and Community Right-to-Know Act (EPCRA), and Superfund. The Clean Air Act requires that any facility that stores or handles hazardous materials over a certain amount must develop and implement a risk management program that is submitted to and reviewed by EPA. These plans must be updated every five years for each facility, and include assessments of potential chemical release scenarios, information on accident prevention and emergency response, as well as a five year history of incidents at the facility. These program reports are also submitted to DHS, which uses them to determine which facilities to classify as "high risk" or "high consequence."

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires states and municipalities to develop state- and local-level emergency response commissions. The commissions are then responsible to developing emergency response plans for the potential release of chemical substances. Local facilities are required to assist the commissions in developing these plans, and to provide any information necessary. Commissions collect material safety data sheets on the substances stored at local facilities, and ensure that they are distributed to the appropriate local authorities. Finally, facilities must submit annual inventories of hazardous materials to the commission.

The Superfund Amendments and Reauthorization Act of 1986 gave the Centers for Disease Control and Prevention (CDC) the responsibility for public health logistical support in the event of a chemical release event. CDC has responsibility in the areas of public health assessments, establishment and maintenance of material databases, information dissemination, and medical education. In addition, the CDC has developed a plan for a laboratory response network in the event of a chemical event in order to allow for immediate testing and communication to benefit public health. This involves rapid material screenings to benefit the public and first responders.

U.S. Department of Justice

The US Department of Justice, through the Drug Enforcement Administration (DEA), has authority under the Controlled Substances Act and the Controlled Substances Import and Export Act to regulate the security of certain chemicals. DEA guards against theft or diversion of these materials, and evaluates the physical security of various facilities

U.S. Department of Labor

The U.S. Department of Labor has authority through the Occupational Safety and Health Act (OSHA) to regulate the handling of hazardous materials. OSHA requires facilities to conduct a hazard analysis, develop operational procedures, develop emergency action plans, report on incidents and conduct regular compliance audits.

U.S. Department of Transportation

The U.S. DOT has authority to regulate hazardous materials under a number of laws, including the Hazardous Materials Transportation Act (HMTA), the Federal Rail Safety Act, and multiple rulemaking responsibilities. HMTA gives US DOT wide authority to ensure safe and secure shipments of hazardous materials. Railroad-specific programs are discussed below. General requirements are developed by the Pipeline and Hazardous Materials Safety Administration (PHMSA) within US DOT. PHMSA's regulations cover classification, packaging, emergency communication, training, and modal-specific requirements for materials, and integrate with international regulations. Much like other regulations, PHMSA also requires security plans, risk assessments and employee training.

The Federal Rail Safety Act gives authority to the FRA to ensure secure movement of hazardous freight via railroads. This includes regulations on the design, design, manufacture, and repair of the equipment, freight cars, locomotives, and track used to carry hazardous materials, and information on the movement of these materials. More detail on FRA programs is included below.

The "Hazardous Materials: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipments" rulemaking enhances rail transportation safety and security. This rulemaking requires railroads to use routes with the fewest overall safety and security risks to transport hazardous materials. This regulation went into effect in July 2008, and FRA ensures compliance with this rule. The "Hazardous Materials: Risk-Based Adjustment of Transportation Security Plan Requirements" rulemaking of 2010 narrowed the list of materials subject to security plan requirements. This allows a greater focus on materials with the most potential for concern. One of the hazardous materials regulated under this rule is ethanol.

Overview of Federal Railroad Administration Programs

As discussed above, the Federal Railroad Administration, under the umbrella of US DOT, is authorized to carry out a number of safety and security programs. At FRA, this is delegated to the Office of Safety, which has a number of divisions with programs aimed at addressing certain issues.

Hazardous Materials Division

The Hazardous Materials Division administers a safety program that oversees the movement of hazardous materials. This focuses on tank car safety and movement approvals. The tank car safety

program ensures that vehicles that carry hazardous materials are secure and properly maintained through various regulations and guidance materials. This also includes procedures for loading and unloading railcars. The Division also regulates movement approvals by instating a tiered process for shippers. The regulations supported by this division are found in 49 CFR 171 to 180.

Highway-Rail Grade Crossing and Trespass Prevention Division

This Division focuses on trespassing prevention and grade crossing security. FRA's program has reduced the number grade crossing deaths by 50 percent over 20 years. Information on train horns and quiet zones is also controlled by this Division. FRA works with the railroad industry and state and local governments, to sponsor, plan and conduct educational outreach efforts at schools, workplaces, and other venues, in order to raise awareness about the dangers and consequences of railroad trespassing. The regulations supported by this division are found in 49 CFR 222 and 229.

Rail and Infrastructure Integrity Division

The Rail and Infrastructure Integrity Division promotes an understanding of and compliance with standards concerning rail and bridge maintenance. The purpose of the Division is to prevent accidents that result from rail and structure degradation. In addition, the Division provides technical expertise to ensure maximum safety in railroad operations. Specific focuses are in the areas of maintenance and development of continuous welded rail, and bridge and structure worker safety. The regulations supported by this division are found in 49 CFR 213 and 214.

Motive Power and Equipment Division

This Division provides technical expertise and direction relevant to motive power and freight, passenger, and commuter equipment. It promotes an understanding of and compliance with Federal standards to inspect locomotives, passenger and freight cars, and its safety appliances such as air brakes. The regulations supported by this division are found in 49 CFR 215, 218, 221, 223, 224, 229, 230, 231 and 232.

Operating Practices Division

The Operating Practices Division examines railroad carrier operating rules, employee qualification guidelines, and carrier training and testing programs to determine compliance with the Railroad Safety Act of 1970; railroad occupational safety and health standards; the Hours of Service Act; and accident and personal injury reporting requirements. The regulations supported by this division are found in 49 CFR 217 through 222, 225, 228, 239, 240 and 242.

Risk Reduction Program Division

The Risk Reduction Program Division ensures the safety railroads by evaluating safety risks and managing those risks in order to reduce the numbers and rates of accidents. This includes collecting data on accidents, developing programs to mitigate risk, developing best practices and providing support. Some programs developed by this division include the Confidential Close Call Reporting System, Peer-to-Peer Safety program, Fatigue Management Plans, and programs to eliminate in-cab distractions.

Signal and Train Control

The Signal and Train Control Division promotes an understanding of and compliance with the various Federal regulations related to signal and train control systems; highway-rail grade crossing warning systems; and the hours of service laws applicable to signal employees. The applicable regulations primarily address the design, installation, maintenance, inspection and testing of these signal systems, and the necessary system components adjustment, repair, or replacement; as well as the associated recordkeeping and reporting requirements. The regulations supported by this division are found in 49 CFR 214, 228 and 233 through 236.

Track Division

The Track Division's mission is to provide technical expertise and direction relevant to railroad track. This includes reports and guidance on track maintenance and conditions, standards development and compliance manuals.

Overview of Safety and Security Plans

As noted, facilities and shippers of hazardous materials are required to submit safety and security plans to reduce the risk and mitigate impacts of an incident with a hazardous material. For railroads, these regulations are codified in 49 CFR 172. Ethanol is classified as a Class 3 material under this regulation, meaning it qualifies for packaging in Group I or II type containers. In addition, the Maritime Transportation Security Act (MTSA) also enumerates components necessary in safety plans, specifically for ports and vessels.

The safety plans outlined under these two regulations are remarkably similar. Specific components of a security plan are listed in the regulation. These include measures to provide personnel security and authorized access; security en route to a destination; identification of key contacts; training received by employees; and background checks. The regulations also call for specific hazard drills, and screening of potential employees.

This railroad regulation also states that states or municipalities are not permitted to prohibit the use of a rail line for transporting hazardous materials.

Safety and security plans are typically required to remain confidential, due to the sensitive nature and risk of incident. This results in a limitation of available information on the subject. DHS classifies most information contained within safety and security plans to be either classified, sensitive security information, or information relating to a chemical terrorism vulnerability. The information on critical infrastructure and key resources is shared only with the specific agencies and private partners who need it. Protected information includes:

- Security Vulnerability Assessments;
- Site Security Plans;
- Documents related to the Department's review and approval of SVAs and Site Security Plans, including Letters of Authorization, Letters of Approval, and responses to them;
- Alternative Security Programs;
- Documents related to inspections and audits;

- Records required to be created and maintained by regulated facilities;
- Sensitive portions of orders, notices, or letters;
- Information developed pursuant to the Top-Screen process; and
- Other information designated as CVI by the Secretary of Homeland Security.

Various entities and laws govern the use and protection of this information, including the Critical Infrastructure Information Act of 2002 and the Critical Infrastructure Partnership Advisory Council. Within the Boston metropolitan area, the Metro-Boston Homeland Security Region (encompassing Boston, Brookline, Cambridge, Chelsea, Everett, Revere, Somerville, Quincy and Winthrop) and the Urban Area Security Initiative work with the federal government on the release and use of this information. Critical infrastructure and key resources are further protected by the Critical Infrastructure Monitoring System (a central hub of targeted cameras and sensors), target hardening, and work on enhancing the prevention tools of local bomb squads.

3.4 Existing Emergency Response Capabilities

While the safety and security of ethanol transportation and storage are regulated at the federal level, the response to any ethanol derailment or crash is the responsibility of the local fire departments and other local emergency responders. The following section provides an overview of the emergency response capabilities within the study area and the resources available for emergency planning and preparation.

Local Response

In the event of an ethanol train crash or derailment, the local fire departments and emergency personnel would be the first to respond. Table 3-6 identifies the fire stations within the study area that are located within ½ mile of the potential ethanol rail routes. The staff and apparatus from these stations would likely be the first on-site during an ethanol train incident.

Table 3-6: Fire Stations within ½ mile of the Potential Rail Routes

City	Facility Name	Address
Boston	Engine 51	425 Faneuil Street
Boston	Engine 41, Ladder 14	460 Cambridge Street
Boston	Engine 32, Ladder 9	525 Main Street
Cambridge	Engine 8, Ladder Co. 4	113 Garden Street
Cambridge	Engine 5	1384 Cambridge Street
Cambridge	Engine 4	2029 Massachusetts Avenue
Cambridge	Engine 3, Ladder Co. 2	175 Cambridge Street
Cambridge	Engine 2, Ladder Co. 3	378 Massachusetts Avenue
Chelsea	Headquarters	307 Chestnut Street
Chelsea	Engine 3 Ladder 2	883 Broadway
Everett	Headquarters	384 Broadway
Revere	Engine 5	4 Freeman Street
Revere	Engine 1	13 Walden Street
Somerville	Headquarters	266 Broadway
Somerville	Engine 7	265 Highland Avenue
Somerville	Engine 4 & Tower 1	651 Somerville Avenue
Somerville	Engine 3	255 Somerville Avenue

Depending upon the scale and nature of the incident, responding fire departments will likely rely on mutual aid agreements to respond to the incident. Mutual aid agreements in the Boston metro area are coordinated through Metrofire, which is an association of 34 municipal fire departments in and around Boston.

Local Emergency Planning

Each city is responsible for creating a comprehensive emergency management plan. As required by MEMA, the local government must accomplish the following through these plans:

1. Establish and maintain an emergency management framework at the local level involving all government, private, and volunteer organizations that have a role in the success of comprehensive emergency management within the jurisdiction.
2. Provide for development of a broad-based public awareness, education, and information program designed to reach all local citizens, including those needing alternative media formats such as Braille or non-English languages.
3. Participate actively in discussions and negotiations with the Commonwealth regarding policies and priorities to ensure that the work being done contributes to the improvement of emergency capabilities for the town or city.
4. Perform work for Federal and state emergency management programs within the negotiated scope and in a responsible manner.
5. Provide direction and control of a local response and recovery approach that involves broad participation from local organizations and is compatible with the state response and recovery organization and concept of operations.

6. Participate in programs and initiatives designed to avoid, reduce, and mitigate the effects of hazards through development and enforcement of policies, standards, and regulations.
7. Establish and maintain mutual aid agreements with other towns and cities.

State-Level Initiatives

There are a number of resources available to the study area communities to assist in preparing and responding to an ethanol crash or derailment.

Massachusetts Emergency Management Agency

The Massachusetts Emergency Management Agency (MEMA) is the central state agency responsible for coordinating the deployment and coordination of local, regional, and statewide assets during an emergency. The primary emergency planning document produced by MEMA is the State Comprehensive Emergency Management Plan. The sixth revision of this document was published in September 2007. The State Comprehensive Emergency Management Plan includes a series of Massachusetts Emergency Support Functions (MAESFs), which are meant to lay out the framework for responding to an emergency that has overwhelmed the communities capabilities and resources. The framework under the MAESFs includes initial response actions, continuing response actions, and recovery actions for all potential emergencies, including fire fighting and environmental protection and hazardous materials. The Comprehensive Emergency Management Plan includes a Hazardous Materials Annex and a Large Volume Ethanol Annex which is included in Appendix 2.

Department of Fire Services

The Massachusetts Department of Fire Services (DFS) includes two special response groups that are available to assist local fire departments in their response to an emergency (such as an ethanol incident). The DFS Special Operations team is meant to provide the local command structure with specialized resources necessary to coordinate the response of multiple agencies to significant events within the Commonwealth of Massachusetts. This is accomplished through the deployment of their specialized mobile incident support unit. The DFS Hazmat Response group is made up of six regional response teams that are strategically located for a maximum of 1-hour response to anywhere in the Commonwealth. The teams are supported by specialized equipment, including the Operational Response Units (ORUs), which contain specialized personal protective equipment and decontamination equipment, and the Technical Operations Mobile Unit (TOM), which is a state-of-the-art support vehicle containing chemical information databases and a sophisticated communications network of radios and telephones. In addition to the emergency response teams outlined above, DFS is also a major planning and training resource for local fire departments.

Responding to an ethanol fire requires the use of alcohol resistant foam which is classified as AR-AFFF foam. DFS maintains a listing of the mobile foam resources across the Commonwealth which is shown in Table 3-7. The table shows that there are approximately 7,000 gallons of foam available within District 13, which includes the entirety of the study area. However, only 5,500 gallons are alcohol resistant.

Table 3-7: Mobile Foam Resources in Massachusetts

Foam trailers - Location	Type AFT = Attack Foam Tanker FT= resupply only	Type of concentrate UC = unconfirmed	District	Amount of concentrate (gallons)
Mashpee	AFT	AR-AFFF 1-3%	1	500
Nantucket	AFT	AR-AFFF 1-3%	1	500
Tisbury	AFT	AR-AFFF 1-3%	1	500
Sandwich	AFT	AR-AFFF 3-6% UC	1	1000
MMR (Otis AFB)	FT	AFFF 3%	1	1000
Kingston	AFT	AR-AFFF 1-3%	2	500
Wareham	AFT	FireAde non	2	500
Hingham	AFT	FireAde	2	500
Raynham	AFT	AR-AFFF 1-3%	3	500
New Bedford	AFT	AR-AFFF 1-3%	3	600
Somerset	AFT	AR-AFFF 1-3%	3	600
Plainville	AFT	AR-AFFF 1-3%	4	500
Needham	AFT	AR-AFFF 1-3%	4	500
Randolph	AFT	AR-AFFF 1-3%	4	500
Danvers	AFT	AR-AFFF 3-6%	5	500
Salem	AFT	AFFF 6% UC	5	500
Ayer	AFT	AFFF 6% UC	6	500
Worcester	AFT	AR-AFFF 1-3%	7 and 8	500
Ashburnham	AFT	AR-AFFF 1-3%	8	500
Holden	AFT	AR-AFFF 1-3%	8	500
Orange	AFT	AR-AFFF 1-3%	9	500
Westover AFB	AFT	AR-AFFF 1-3%	11	500
Longmeadow	AFT	AR-AFFF 1-3%	11	500
Palmer (Monsanto)	AFT	AR-AFFF 3-6% UC	11	1000
Pittsfield	AFT	AR-AFFF 1-3%	12	500
Logan 1	AFT	AFFF 3%	13	750
Logan 2	AFT	AFFF 3%	13	750
Westover AFB	FT	AFFF 3%	11	1000
Hanscom AFB	FT	AFFF 3%	14	1000
Chelsea	FT	AR-AFFF 3-6% UC	13	500
Revere	FT	AR-AFFF 3-6% UC	13	500
Somerville	FT	AR-AFFF 3-6% UC	13	500
Braintree (Citgo) 1	FT	AR-AFFF 3-6%	13	2000
Braintree (Citgo) 2	FT	AR-AFFF 3-6%	13	2000
North Andover.	AFT	AR-AFFF 3-6%	15	500

DFS offers a number of training courses to local fire departments on ethanol-related issues. A list of the courses and their descriptions are provided below:

Course #266 – Ethanol for First Responders: This 6-hour program introduces the local response community risks and challenges for first responders when dealing with small and large volume gasoline/ethanol blended fuels and denatured ethanol. Topics covered: what is ethanol, how is ethanol made, what are its transportation modes, what are its primary and secondary hazards, what public protective actions are required, and what firefighting methods are required. The program stresses the use of alcohol resistant foams and dry chemical extinguishing agents, since ethanol is a polar solvent. Program includes a live demonstration of AR-AFFF foam and dry chemical on an ethanol fire.

Course #267 – Ethanol Risk and Challenges for Community Leaders: Increased transportation and storage of ethanol within the Commonwealth is creating new challenges for the fire service, emergency management, public health and the environment. In response to these challenges, the Department of Fire Services has developed a course specifically geared toward elected and appointed officials. The goal of this 3-hour course is to provide community decision makers with the information they need to support the new public safety challenges posed by ethanol. Topics include: transportation modes and routes, primary and secondary hazards, public protective actions, and firefighting considerations.

Course #401 – Flammable Gas Firefighter Training, Classroom: This course is designed to provide students with knowledge of the general properties of flammable gases to include a working knowledge of the effects of temperature and pressure as they relate to firefighting efforts. Classroom theory and practical application firefighting evolutions on actual gas equipment and situations are included. Students applying must successfully complete the classroom portion of the course prior to acceptance into the practical session.

Course #402 – Flammable Gas Firefighter Training, Practical: Practical session for Flammable Gas Firefighting: See course #401 for description. This is day two (practical session) of the 2-day flammable gas program that must be attended during the same semester. As part of the 2-day program, the practical portion is designed to provide students with hands on experience and a working knowledge of the effects of temperature and pressure as they relate to firefighting evolutions on actual gas equipment. Safety considerations require that a minimum of 18 students be enrolled in this 12-hour course.

Department of Environmental Protection

Like DFS, the Massachusetts Department of Environmental Protection (DEP) is a statewide agency that has emergency response capabilities and training resources for local fire departments and emergency responders. The DEP Emergency Response Program is structured to respond to releases and threats of release of oil and hazardous materials to the environment to protect public health, safety, and the environment. DEP also has a Field Assessment and Support Team (FAST), which is made up of staff chemists, biologists, engineers, and environmental scientists to provide technical support at chemical and oil spill incidents.

DEP has contributed to the preparation for ethanol spill response through the release of the report titled "Large Volume Ethanol Spills – Environmental Impacts and Response Options" in July 2011. This

report includes general information on ethanol, including the characteristics of it under different spill conditions along with recommended longer term response priorities in recovering from a spill. These priorities include media specific options for soil, groundwater, surface water, wetlands, marine areas, and open ocean.

Department of Public Health

The Massachusetts Department of Public Health (DPH) provides support to hospitals and other public health agencies to ensure their overall emergency preparedness. These programs include preparations for treatment and transport of patients during a mass casualty incidents and hospital evacuation plans. Hospitals are required to update their comprehensive plans for partial or full evacuation annually.

Chapter 4: Report Findings & Recommendations

Transporting ethanol by rail through the cities of Boston, Cambridge, Chelsea, Everett, Revere, and Somerville will be a change to the status quo for each of these communities. While the railroad lines that will be used to transport ethanol through these communities have existed for over 100 years, they have not recently been used on a regular basis to move ethanol or other hazardous materials in the quantities that are expected to be shipped to the Global Petroleum Facility in Revere. However, the movement of such materials is regulated at a federal level, and cannot be regulated in any manner at the state or local level.

The findings and recommendations outlined below are meant to provide a better understanding of the impacts on public safety of this change to the transportation system.

4.1 Report Findings

As with all hazardous materials there are inherent risks in transporting or storing ethanol. Ethanol is classified as a flammable liquid and unlike gasoline; it mixes with water and is still capable of catching fire even in a solution of only twenty percent. There are a number of factors identified in the body of this report that contribute to the safe and secure transportation of ethanol through the Study Area.

The first is the existing regulatory environment. Businesses such as Global Petroleum and the railroads must comply with a comprehensive set of federal regulations that address both safety and security in order to transport or store ethanol. These regulations govern the training of their personnel, the operating procedures they employ, and the design of their facilities.

The second is the existing safety record of rail transportation. Looking specifically at the railroad industry, the regulations in place have helped keep the number of railroad incidents low. Between 2008 and 2012 there was an average of 5.66 crashes per million train miles nationwide. Thirty one train crashes that resulted in the release of ethanol were identified between 2008 and 2012. That represents only 0.15% of the crashes that occurred during that period while ethanol represented approximately 1.1% of all rail carloads during that same time. Additionally only two of the thirty one crashes resulted in a death and/or injury. Statewide, there were sixty eight railroad crashes between 2008 and 2012 and none of them involved the release of ethanol. The rail corridors within the study area have added safety improvements such as block signaling systems, maintenance of the track at FRA Class 3 standards, and the use of welded rail which further helps reduce the risks of crash and/or derailment.

The third is the emergency response planning that occurs at the state and local level. Planning and preparing for such an incident is primarily the responsibility of city fire departments and emergency response staff, although it is closely supported by training and assistance from the Massachusetts Emergency Management Agency (MEMA), the Massachusetts Department of Fire Services (DFS), the Massachusetts Department of Environmental Protection (MassDEP), and the Massachusetts Department of Public Health (MassDPH). These plans help identify the procedures for regional collaboration in the event of an emergency including training resources, on-site command, and mutual aid agreements.

Despite the factors identified above, that the rail corridors in the study area are unusual (but not unique) in terms of their density of residents, joint public/private use of the rail assets, and adjacent

industrial businesses that may also house hazardous materials on-site. There are a number of steps beyond the current regulations and emergency response planning that should be taken in order to maximize the safety and security of transportation of ethanol by rail through the study area; handling of the ethanol as it is being offloaded; storage of ethanol at the Global facility; and the response of communities, railroad companies, first responders, and emergency managers to any derailment or emergency.

4.2 Recommendations

Based on the report findings, MassDOT makes the following recommendations to ensure the safe and secure transportation of ethanol by rail.

1. The railroad tracks along any possible ethanol transportation routes should be maintained to a Class 3 standard (consistent with the current MBTA standards for passenger service). This recommendation includes the East Boston branch, which is currently planned for rehabilitation to provide access to the Global facility.
2. The ethanol train speeds should be as slow as possible to reduce the energy of any crash or derailment.
3. The railroads should work with shippers to maximize the use of DOT-111 railcars for ethanol delivery that were constructed after October 1, 2011 to be compliant with the new American Association of Railroads (AAR) design guidelines.
4. Ethanol trains should be scheduled to avoid conflicts with any other trains (passenger or freight) that may cause them to be delayed or stored on sidings during transit to the Global facility.
5. Ethanol train schedules should be reported to community and state fire officials with sufficient notice.
6. At-grade crossing safety equipment should be maintained and/or upgraded to prevent collisions with motor vehicles.
7. The railroads should utilize Department of Homeland Security (DHS) resources to update their security plans regularly to reflect changes in the safety and security conditions.

MassDOT makes the following additional recommendations for the safe and secure offloading of ethanol:

1. The railroads and Global Petroleum should secure the railroad tracks and sidings where the ethanol trains will be stored adjacent to the Global facility.
2. On-site fire suppression systems should be kept in working condition and tested regularly to ensure this.
3. Global Petroleum should update its facility security plan to address the added risks of storing and offloading the ethanol from the railcars on their site. This revised plan should identify procedures to isolate any ethanol spill or fire to prevent spreading to the other stored railcars within the confined tracks along the facility.
4. Global Petroleum should utilize the Voluntary Chemical Assessment Tool (VCAT) in updating their facility security plan. The VCAT is a voluntary assessment tool available to chemical sector industries from the Department of Homeland Security.

MassDOT makes the following additional recommendations to ensure that the communities, railroad companies, first responders, and emergency managers are prepared to respond to any derailment or emergency:

1. City fire departments and other emergency personnel should take advantage of the training courses currently offered by the Massachusetts Department of Fire Services related to ethanol and flammable gases. These courses include classroom and practical training sessions.
2. City fire departments and other emergency personnel should take advantage informational materials and training courses offered by the Massachusetts Department of Environmental Protection on the latest methods for responding to an ethanol spill, including containment strategies.
3. Hospitals and other healthcare facilities that may be exposed during an ethanol emergency should take full advantage of the programs offered by the Massachusetts Department of Public Health in planning for mass casualty incidents and hospital evacuations that may result.
4. City fire departments and other emergency personnel should utilize the informational materials and training resources provided by the Massachusetts Department of Fire Services, the Massachusetts Department of Environmental Protection, and the Massachusetts Department of Public Health in future revisions to their comprehensive emergency management plans in order to address issues that may result from an ethanol train fire, including protection of structures adjacent to the incident and methods for accessing the rail right-of-way.
5. City fire departments and other emergency personnel should identify critical facilities along the potential ethanol transportation routes and develop detailed emergency response plans as necessary.
6. The Massachusetts Department of Fire Services should work with the city fire departments and other emergency personnel to analyze the regional capabilities needed to battle an ethanol train fire, including the amount of alcohol resistant foam that would be required. A plan should then be developed to put those capabilities in place.

Appendix 1

Appendix 2

Appendix 1

1st Technical Advisory Group Meeting

Thursday, January 10, 2013

11:00 AM

MassDOT Office of Transportation Planning

10 Park Plaza, Room 4150

Boston, Massachusetts

Study of the Safety Impacts of Ethanol Transportation by Rail through Boston, Cambridge, Chelsea, Everett, Somerville & Revere

Technical Advisory Group Meeting
Thursday, January 10, 2013
11:00 AM

MassDOT Office of Transportation Planning
10 Park Plaza, Room 4150
Boston, Massachusetts

Attendance

Technical Advisory Group Members and Public who signed in:

Name	Title	Organization
Mary E. Clark	Director of the Emergency Preparedness Bureau	Mass. Dept. of Public Health
Jay Ash	City Manager	City of Chelsea
Roseann Bongiovanni	Assistant Executive Director	The Chelsea Collaborative
Chris Bresnahan	Environmental Engineer	Mass. Dept. of Environmental Protection
David Butler	Fire Chief	Everett Fire Department
Kelly Davis	Director of Regulatory Affairs	Renewable Fuels Association
Edward J. Faneuil	General Counsel	Global Partners LP
Matt Frank	City Councilor	City of Chelsea
Roderick Fraser	Commissioner	Boston Fire Department
Jake Glickel	Chief of Staff	Boston Environmental Department
John Hahesy		PretiMinahan Strategies
Bernie Kelly	Operations Manager	Global Partners LP
Janet Knott	Chief of Staff	Councilor LaMattina
Adrian Madaro	Chief of Staff	Office of Rep. Carlo P. Basile
Gerard E. Mahoney	Assistant Fire Chief	Cambridge Fire Department
Hayes Morrison	Dir. of Infrastructure and Trans.	City of Somerville
Kingsley Ndi		Mass. Dept. of Environmental Protection
Ira Novoselsky	City Council President	City of Revere
Ed O'Hara	Revere Resident	
Mark S. Pare	Operations Section Chief	Mass. Dept. of Fire Services
Jay Picariello	Captain	Revere Fire Department
Staci Rubin	Staff Attorney	Alternatives for Community & Environment, Inc.
Minka vanBeuzekom	City Councilor	City of Cambridge
John Walkey	Field Organizer/East Boston Resident	Transportation for America

Massachusetts Department of Transportation Staff:

Calli Cenizal	Office of Transportation Planning
Ned Codd	Office of Transportation Planning
Paul Nelson	Office of Transportation Planning

DRAFT Meeting Summary

Paul Nelson, the project manager for the study, opened the meeting by welcoming attendees and conducting a safety briefing summarizing emergency procedures. He then asked all attendees to introduce themselves. Following introductions, Paul walked the group through the agenda for the meeting which included:

1. Overview of the Study,
    a. Legislation & Deadlines,
    b. Responsibilities of the Technical Advisory Group;
2. Review of the Study Scope of Work; and
3. Review of the Project Schedule.

Overview of the Study

Paul summarized Section 24 of Chapter 242 of the Acts of 2012 (Section 24), passed by the Massachusetts Legislature and signed into law by Governor Patrick on August 9, 2012. Section 24 requires the Massachusetts Department of Transportation (MassDOT) to complete a study to determine the impact on the public safety of transporting ethanol by train through the cities of Boston, Cambridge, Chelsea, Everett, and Revere. The report is due to the legislature on February 9, 2013.

Paul stated that MassDOT has assembled this Technical Advisory Group (TAG) as part of the study's civic engagement process. The membership of the TAG was selected to reflect the many perspectives (communities, businesses, emergency responders, etc.) on the transportation of ethanol through these cities. The TAG will meet several times throughout the study to review the study's technical memoranda, which will make up the chapters of the final report. He stated that the TAG members should view these meetings as a chance to discuss their safety-related concerns with other members that bring different knowledge and perspectives, and to better understand the issues with ethanol and its transport by rail. TAG members are encouraged to ask questions throughout the process.

Review of the Study Scope of Work

Paul then provided an outline of the scope of work developed by MassDOT in response to Section 24. This scope of work will be used to guide the efforts of the TAG and MassDOT staff as the study is conducted. The study will include the following tasks:

1. Study Background & Civic Engagement
2. Identification of Rail Corridors and Assessment of Their Condition
3. Evaluation of the Impact on Public Safety
4. Conclusions and Final Report

Paul provided a summary of the civic engagement plan, which in addition to the TAG also includes a project website, briefings for community officials, attendance at neighborhood meetings, and a public informational meeting. He stated that given the limited amount of time available before the report was due, MassDOT has already started work on the technical tasks within **Task 1** – the summary of the project history, the summary of the Massachusetts legislation, and the review of relevant regulations – and that a draft of the Task 1 technical memorandum would be distributed to the TAG within a week.

He summarized the work conducted to date under **Task 1**, including a brief description of the plan by Global Partners, LP to upgrade the rail siding at their facility in Revere to allow delivery of ethanol by train and the federal regulations related to rail transportation. He pointed out that Global needs a license for the proposed project from the Massachusetts Department of Environmental Protection (DEP) under Chapter 91 of the Massachusetts General Laws because the facility is located within a Designated Port Area (DPA) and that the license has been put on hold by Section 24.

Paul then explained that the freight railroads, such as Pan Am Railways and CSX, have existing agreements with the MBTA and MassDOT that allow the transportation of freight over the rail lines within the study area. He also explained that railroad operations, by federal law, are regulated by the Surface Transportation Board (STB) and that this shields rail operations from application of many state and local laws, including zoning and permitting laws that have the effect of managing or governing rail transportation. However, he noted that the STB has made it clear that the "police powers" to regulate public health and safety are retained by local and state governments, so far as they do not seek to govern rail transportation.

Paul then discussed the aspects of **Task 2**, which include defining the rail corridors likely to carry ethanol and evaluating the physical and operational conditions of each corridor within the Study Area. He pointed out that most discussions for transporting ethanol by rail have focused on the MBTA's Fitchburg commuter rail line, which would be used to transport the ethanol from Ayer, MA through the cities of Cambridge and Somerville to the Boston Engine Terminal (BET). After the BET, the ethanol trains would then utilize the MBTA Haverhill commuter rail route north to the MBTA Newburyport/Rockport commuter rail line, which crosses the Mystic River into Everett. The ethanol trains would then follow that route through Everett, Chelsea and Revere until it intersects the East Boston Branch. The train would then back onto the East Boston Branch through a reverse move in order to access the Global Partners, LP site.

Paul pointed out that depending on how the trains are scheduled, there are three additional routes the trains could take to access the BET, including the MBTA Lowell commuter rail line, the MBTA Haverhill commuter rail line, and the MBTA Worcester commuter rail line via the Grand Junction; freight railroads retain operating rights to operate freight trains on all of these lines. Ethanol trains using these additional routes would still use the MBTA Newburyport/Rockport rail line and the East Boston Branch to access the Global Partners, LP site. MassDOT will include all four routes in the safety study to ensure a complete evaluation of the public safety impact.

Task 3 would include the majority of the work for this safety study, including a review of the history of train derailments and crashes and the identification of potential risks for the populations defined in Section 24. The public safety evaluation would also include a review of the existing safety procedures employed by Global Partners, LP and the railroads to assess the safety of ethanol handling as well as the emergency response capabilities of the study area cities. This information would then be used to identify gaps and propose countermeasures to address those gaps.

Paul then stated that **Task 4** consisted primarily of developing conclusions based on the analysis in Tasks 1, 2, and 3. He stated that the conclusions would be structured to inform the TAG and the public in their evaluation of the overall risk to public safety of transporting ethanol by rail through the subject cities.

Comments & Questions

A member of the advisory group asked for clarification of the Grand Junction route. Paul responded that the Grand Junction is one of the potential rail routes for ethanol which originates at Beacon Park Yard in the Allston Landing area of Boston, crosses the Charles River near the BU Bridge, passes through Cambridge, and connects to the Boston Engine Terminal in Somerville.

Ed O'Hara asked for clarification of which police powers at the local/state level would apply to the railroads under the Surface Transportation Board's rulings. Paul gave the example that railroads must comply with city and state building codes. He added that MassDOT and the advisory group would be exploring how those powers apply to the state agencies and cities for the transportation of ethanol as part of this study.

Mr. O'Hara then asked if Pan Am Railways would be transporting the ethanol to the Global Partners, LP site in Revere. Paul replied that it was his understanding that Pan Am Railways would be transporting the ethanol to Revere in cooperation with Norfolk Southern through an existing business agreement between the two companies. Mr. O'Hara followed up with a question about the jurisdiction over the rail lines included in the study area. Paul replied that all of the rail lines within the study area are

owned by either the MBTA or MassDOT. However, the freight railroads (Pan Am Railways & CSX Transportation) retain operating rights over the MBTA or MassDOT rail lines. Each railroad has an agreement with the MBTA and/or MassDOT that outlines the operating procedures for moving freight over these lines. The study will be looking at this issue as part of Task 2.

A member of the advisory group asked if the railroads will be participating in this group. Paul responded that yes, the Massachusetts Railroad Association, a business group of the railroads operating in the state, is a member of the technical advisory group.

Ira Novoselsky requested that the study area maps reflect all of the impact in Revere, including the track used during the reverse move to enter the Global track. He stated that the trains will extend beyond Wonderland. Paul responded that MassDOT will ensure that the evaluation includes the exposure along the MBTA Newburyport/Rockport commuter rail line during this reverse move.

A member of the advisory group asked if the route maps could be updated to include the locations of interest points (hospitals, schools, etc.). Paul responded that detailed maps showing the location of those facilities will be available at the next technical advisory group meeting for review.

A member of the advisory group asked if there was any way that the study could look beyond the five cities to look at the safety issues in other communities. Paul responded that the study is limited by the legislation passed in Section 24, which only lists the five cities of Boston, Cambridge, Chelsea, Everett, and Revere. He noted that although the detailed analysis will be limited to the five subject communities, the report will also inform the public of the findings and lessons learned from outside those five communities in order to ensure safe transportation of ethanol by rail. Communities and state agencies can then use these lessons to ensure safe transportation of ethanol by rail throughout the Commonwealth.

A member of the advisory group asked if there was a list of incidents available. Paul stated that as part of subtask 3.1, the scope of work includes an analysis of all the accidents involving transportation of ethanol by rail within the United States and any derailments along the four corridors within the study area over the last five years. Another member of the advisory group stated that the five year look back should be longer and that there have been rail accidents in adjacent communities that are relevant to this study. Mr. O'Hara added that the study should look at all derailments, not just ethanol derailments. Paul requested that the advisory group review the data and information that MassDOT provides in order to assess its utility. He also noted that MassDOT would take these requests under consideration, while noting that MassDOT's study is constrained by the legislated requirements.

Mr. O'Hara asked if reports from the National Transportation Safety Board and Transportation Security Administration will be included in the report. Paul stated that they will be included.

Mr. O'Hara suggested that the Department of Homeland Security be included in this group and that the security threats need to be better evaluated as part of this study. Paul responded that a member of the Massachusetts Emergency Management Agency has been included on the advisory group.

Ed Faneuil asked how the study would handle situations where security plans may be in place and the details are subject to confidentiality agreements and/or security clearance. Paul responded that it is not the purpose of this report to compromise any confidential or secret information.

Mr. O'Hara pointed out that the ethanol tank cars will be stored on MBTA property. He asked who would be liable for any incidents. Paul responded that this will be added to the scope of work under the review of the agreements between the MBTA and the freight railroads as part of this study.

Mr. Novoselsky suggested that the study should look at training for how to handle events, and how this training will be funded. Mr. Ash suggested that as part of the evaluation of emergency response capabilities, the scope of work should include the shelter resources available during evacuations when necessary. Another member of the advisory group added that it should also include an evacuation route analysis. Paul responded that all three issues will be evaluated as part of Task 3.

Staci Rubin asked if the final report will be released in Spanish. Paul responded that it would and that MassDOT will try to ensure that both versions are available at the same time.

Roderick Fraser requested that the study include a list of the current cargo carried by rail along the study area rail lines because this would help the advisory group understand what level of protection is currently in place. He pointed out that if hazardous materials are already transported along this route, the safety impact may only be incremental. Paul responded that MassDOT will work with the railroads to identify the cargo currently carried along the rail lines within the study area, but that MassDOT may again be constrained by a lack of availability of data.

Minka vanBeuzekom suggested that the study look at alternative methods of transportation of ethanol (e.g. barge). Paul responded that the language in Section 24 dictates that only ethanol transported on rail will be studied. Ethanol is currently brought into the Global Oil site via barge, and the legislation does not take up the transportation of ethanol by any other mode of transportation. Paul also reminded the group that under federal regulations, no state or local action may have the effect of managing or governing railroad operations under the jurisdiction of the Surface Transportation Board.

Roseann Bongiovanni asked what the distribution of ethanol looks like after the ethanol arrivers at the Global Partners, LP facility in Revere. Paul stated that this study is specifically focused on only the public safety issues associated with the intake of ethanol to the Global Oil site, and only by rail. Matt Frank stated that only looking at rail ignores half of the problem, that transportation of ethanol on the roads is also a safety problem. Paul reminded the participants that ethanol is currently coming to the site by barge, and leaving the site by truck, and that the legislation is targeted at the public safety issues associated with the change to inbound transportation mode.

Review of the Project Schedule

Paul reviewed the overall project schedule. He pointed out that the final report is due to the legislature on February 9, 2013. To accomplish this within the limited time available, he has proposed that the technical advisory group meet every two weeks to review the study's progress. With this schedule, the meetings would not line up exactly with the task deliverables. Therefore, Paul suggested that additional review be conducted via e-mail, or physical mail as preferred by the group. With the proposed schedule, the next technical advisory group meeting would be held on Thursday, January 24th.

Comments & Questions

Paul asked for feedback on the convenience of this time for future meetings. The advisory group agreed that this time was convenient for future meetings.

Staci Rubin asked what the process will be for getting input for those not on the committee. Paul replied that the civic engagement process also allows for meetings with interested stakeholders. Ms. Bongiovanni requested information on the neighborhood meetings. Paul stated that the advisory group members contact him with information on any groups that may be interested. Ms. Bongiovanni suggested that those meetings occur soon before too much of the study has been completed.

Ms. Rubin inquired when the website would be available and if it would be in both English and Spanish. Paul responded that the website will be available by January 18th in both languages. Mr. Frank added that it would be helpful to include an online comment form on the website.

Paul thanked everyone for attending the advisory group meeting. The meeting ended at 12:45 PM.

2nd Technical Advisory Group Meeting

Thursday, January 24, 2013

11:00 AM

Revere City Hall

281 Broadway

Revere, Massachusetts

Study of the Safety Impacts of Ethanol Transportation by Rail through Boston, Cambridge, Chelsea, Everett, Somerville & Revere

Technical Advisory Group Meeting
Thursday, January 24, 2013
11:00 AM

Revere City Hall
281 Broadway
Revere, Massachusetts

Attendance

Technical Advisory Group Members and Public who signed or called in:

Name	Title	Department
Jay Ash	City Manager	City of Chelsea
Roseann Bongiovanni	Assistant Executive Director	The Chelsea Collaborative
David Butler	Fire Chief	Everett Fire Department
Mary E. Clark	Director of the Emergency Preparedness Bureau	Massachusetts Department of Public Health
Kelly Davis	Director of Regulatory Affairs	Renewable Fuels of America
Edward J. Faneuil	General Counsel	Global Partners LP
Matt Frank	City Councilor	City of Chelsea
Roderick Fraser	Commissioner	Boston Fire Department
Jake Glickel	Chief of Staff	Boston Environmental Department
John Hahesy	PretiMinahan Strategies	
Bernie Kelly	Operations Manager	Global Partners LP
Janet Knott	Chief of Staff	Councilor LaMattina
Gerard E. Mahoney	Assistant Fire Chief	Cambridge Fire Department
Kingsley Ndi		Department of Environmental Protection
Ira Novoselsky	City Council President	City of Revere
Ed O'Hara		Revere Resident
Mark S. Pare	Operations Section Chief	Massachusetts Department of Fire Services
Staci Rubin	Staff Attorney	Alternatives for Community & Environment, Inc.
Albe Simenas		Department of Environmental Protection
Minka vanBeuzekom	City Councilor	City of Cambridge
John Walkey	Field Organizer/East Boston Resident	Transportation for America
Nick Child	Chief Emergency Response CERO	MasDEP
David Slagle	Environmental Analyst	MasDEP
Gene Doherty	Fire Chief	Revere Fire
Tom Todseo	Emergency Plan Revere	Revere Fire
Pat Sullivan	Somerville Fire Department Deputy Chief	City of Somerville
Tom Graney	Mayor's Office	City of Somerville
Seth Daniel	Revere News Group	
John Powers	Revere City Council	
Rick Promise	Government Facilitator	Revere TV

Massachusetts Department of Transportation Staff:

Jody Ray	Deputy Administrator, Rail and Transit Division
Ammie Rogers	Office of Transportation Planning
Ned Codd	Office of Transportation Planning
Paul Nelson	Office of Transportation Planning

Meeting Summary

Paul Nelson, the project manager for the study, opened the meeting by welcoming attendees of the Technical Advisory Group (the Advisory Group) and conducting the safety briefing. He then asked all attendees to introduce themselves. Following introductions, Paul walked the group through the agenda for the meeting, which included:

1. Review of Comments from the 1st Meeting
2. Task 2: Rail Corridor Conditions
    a. Physical Conditions
    b. Passenger & Freight Operations
3. Task 3: Evaluation of Impact on Public Safety
    a. Review of Potential Safety Risks
    b. Maps of Potentially Exposed Populations

Review of the comments from the 1st Meeting on January 10th

Paul informed the Advisory Group that the request by the City of Somerville and the TAG for Somerville to be included within the study area would be honored due to the fact that the identified rail routes run through it, and because it has similar development patterns to the other cities named in the legislation. He also announced that the study website had been put up on the MassDOT website. The direct link, which would be available later in the day, is http://mass.gov/massdot/ethanolsafety. He stated that meeting materials and other technical produces from the study would be posted to the website as soon as they were translated into Spanish. Paul informed the group that a number of meetings had been requested following the first TAG meeting. Those meetings included:

- A neighborhood meeting in East Boston,
- A special briefing with the Chelsea Public Schools,
- A special briefing with the New England Produce Center,
- A joint special briefing with other business interests such as the Chamber of Commerce, Suffolk Downs, the Chelsea Healthcare Center, the Federal Bureau of Investigation, and Spaulding Rehabilitation, and
- A joint special briefing with the Chelsea, Cambridge, and Somerville Boards of Health and the Boston Public Health Commission.

Comments & Questions

Members of the TAG asked whether MassDOT would be able to hold the neighborhood meeting in East Boston on February 6th as had been requested. Paul responded that MassDOT could not commit to that specific meeting time yet because MassDOT needed to determine if the proper personnel and resources would be available. Staci Rubin stated that a lot of outreach to the community had been conducted and that February 6th was the most convenient time. Other members of the advisory group suggested additional meetings. Paul requested that each advisory group member e-mail him by the end of the week with their specific meeting requests and suggested times and locations. He noted that with only a little over two weeks until the completion of the report, the more flexible the meeting times could be the better.

A member of the advisory group questioned whether the deadline for the report could be extended given the relatively short time frame to finish the report. Both Paul and Ned Codd responded that the deadline for the issuance of the report was set by the legislation, but that they would relay the group's concerns to appropriate MassDOT staff.

An Advisory Group member asked what procedure the Department of Environment Protection (DEP) would follow to issue the Chapter 91 license once the MassDOT report was completed. David Slagle, from DEP, stated that DEP would consider the evaluation contained within the MassDOT report and then make a decision to issue or deny the draft Chapter 91 license. Following that decision, anyone who had previously commented on the license would have 21 days to appeal the decision.

Task 2: Identification of railroad corridors accessing the site

Paul then reviewed a series of maps provided in the PowerPoint presentation that provided details on the railroad corridors within the study area. The first slide detailed the study area, including Somerville, and provided a description of the potential corridors. The four possible ethanol rail routes converge at the Boston Engine Terminal (BET) in Somerville and then follow along the Newburyport/Rockport line through the cities of Everett, Chelsea, and Revere to the Global facility. To enter the track leading the Global the train would have to make a reverse move requiring it to go as far north as Revere Street. Paul informed the TAG that this portion of the line has been labeled as the Shared Corridor in this study. The four possible lines connecting to the Shared Corridor are:

Corridor 1 – Along the Fitchburg Commuter Rail (CR) line to the intersection to the BET
Corridor 2 – Along the Worcester/Framingham CR Line to the intersection of the Grand Junction line, which it follows north until it terminates at the intersection with Corridor 1
Corridor 3 – Along the Lowell CR Line to the BET
Corridor 4 – Along the Haverhill CR Line to the BET

Paul then reviewed the figure showing the Massachusetts statewide freight rail network. He pointed out that there are two major routes that ethanol could potentially take into the state. The first is the

CSX mainline that approximately parallels the Massachusetts Turnpike, and the second is the Pan Am Southern corridor that approximately parallels Route 2 across the northern tier of the state to Ayer. He then showed how these two corridors connect to the four corridors selected for the safety evaluation.

The next slide contained a figure of the study area rail routes showing the range of allowable speeds, the number of tracks along each corridor, and the location of all switches. Jody Ray informed the Advisory Group that the speeds listed on the figure are accurate for CR trains, but that the maximum speed for freight trains on these lines in the study area communities is 40 miles per hour (mph).

The final slide related to Task 2 showed information on the weekday train operations along the four corridors. The slide included a breakdown of train type, including: CR, deadhead movements, Amtrak and freight trains. The slide also showed the time periods during the early morning when there are no passenger rail movements; most freight movements occur during this period. Jody noted that there may still be some limited overlap of passenger and freight movements during transition periods, but that these overlapping movements are carefully scheduled and managed.

Comments & Questions

An Advisory Group member then asked if it was certain that the trains would go no further north than Revere Street in Revere. Paul informed the TAG that this distance was based on an ethanol train with 60 cars. He asked Jody Ray from the MassDOT Rail & Transit Administration what the maximum length of the train would be. Jody informed the Advisory Group that trains are not permitted to block a grade crossing for more than five minutes (MGL Chapter 160, Section 151) and therefore are generally no longer than one-mile in length. Paul stated that he would include this additional distance to the route.

A member of the Advisory Group requested to know more about the track inspections and maintenance that are carried out along the rail corridors in the study area. Paul responded that he would provide this information in the draft memo for Task 2.

Another Advisory Group member requested a copy of the agreement between the MBTA and the freight companies to better understand when freight trains are allowed to use the tracks, how the trains are dispatched to allow for freight to overlap with CR trains on the tracks, and if they are allowed on the tracks at the same time. He was especially concerned about the safety issues related to ethanol trains that must wait for commuter rail trains to pass by. Paul responded that through Task 2, MassDOT would identify any specific tracks where an ethanol train may be stored as it is bypassed by other trains and will also provide information on the train dispatching protocols in place to prevent collisions between passenger and freight trains.

Gerard Mahoney of the Cambridge Fire Department pointed out that many of the safety concerns could be addressed through a series of consequence studies. He explained that in a consequence study, a set of emergency response procedures are developed based on a set of potential events. The Advisory Group agreed that such as study would help address the potential questions regarding emergency response procedures and the capabilities of the cities within the study area. A member of the advisory group pointed out that a similar report was prepared for the City of Everett in relation to the liquefied natural gas tankers passing through the harbor. Ned Codd pointed out that while a full consequence study is beyond the capabilities of the MassDOT, they could include recommended consequence study events and locations as part of the report's findings.

A member of the Advisory Group requested that the MassDOT report include an analysis of each city's evacuation plan regarding potential ethanol spills. Paul stated that the evacuation routes would be identified in the report as part of Task 3.

An advisory group member representing the Department of Environmental Protection (DEP) stated that they have prepared a report on potential ethanol incidents and that it is available on their website (http://www.mass.gov/eopss/docs/dfs/emergencyresponse/special-ops/ethanol-spill-impacts-and-response-7-11.pdf). Additionally he added that there are a number of other reports related to the response plans for a train accident which include fire safety and local response to an accident. He stated that the DEP will send a link to all of the relevant reports.

Jay Ash, Chelsea City Manager, stated that he was very concerned about the risks and exposure of these trains to terrorist attack, and asked if the MassDOT report would address the risks of a terrorist attack on an ethanol train and how to prevent that from occurring. Paul stated that the issue of a terrorist attack would be addressed in Task 3 of the report. Ned Codd noted that the MassDOT report would not be able to include a comprehensive evaluation of all potential terrorism risks and scenarios, as Mr. Ash seemed to be asking, but that it would assess security issues for trains in the study area and would identify potential consequences of ethanol train incidents, whether those incidents are the result of terrorism or some other cause.

Task 3: Evaluation of impact on public safety

Paul then provided a summary of the rail crashes that have occurred within the study area communities over the past five years. He stated that three crashes were identified between 2009 and 2012. Of those crashes, two involved vehicles at highway/rail grade crossings and the other crash was a derailment. All three crashes were caused by human error, including a failure to heed the warnings at the grade crossings and the misplacement of a utility box on the tracks. No fatalities or evacuations resulted from any of the crashes; however, one event resulted in personal injury.

Next, Paul provided a summary of the ethanol derailments nationwide. He stated that MassDOT had identified eight ethanol derailments between 2006 and 2012, and that four of those derailments had full crash reports from the FRA or NTSB. Information from those crashes shows that improper track inspections/maintenance and lack of communication were the major causes of the derailments. Following the derailments of those trains, both train speed and factors related to the DOT-11 tank car design contributed to the release of ethanol. Two of the crashes resulted in personal injury, with one of those crashes resulting in a fatality. The average cost of damages due to the derailments was $7.4 million and consisted mostly of damage to railroad property and lost product. Evacuations were ordered in each of the eight derailments.

Paul then distributed the maps showing the potentially exposed populations and facilities and requested that advisory group members review the information for accuracy and provide him with any comments as soon as possible.

Comments & Questions

Two members of the Advisory Group stated that they had compiled lists of ethanol train incidents that they wanted to share with MassDOT. Paul requested that they provide those lists to him via e-mail so that they could be included in the report.

Another member of the group asked if anyone had found an example of an ethanol accident that occurred in a similar density as any of the cities in the study area. The advisory group members replied that none of the incidents had occurred in cities with similar densities.

A member of the Advisory Group requested that MassDOT only include incidents in the report that occur in areas comparable to the study area or that have other relevant information to support the safety analysis. Paul replied that the report will include a comprehensive listing of incidents, and will identify those that are most relevant and comparable to the study area.

A member of the Advisory Group requested that MassDOT add public housing to the maps of the facilities that are close to the possible routes. Paul noted that the legislation did not specify that the report include public housing facilities and that residential density and environmental justice populations were probably more relevant metrics. The analysis will include a measure of the population potentially exposed along each rail route that would take into account all types of housing.

The Revere Fire Chief stated that he can provide Paul with the requested NEMA Electronic Comprehensive Emergency Management Plan (ECEMP) documents.

Paul thanked everyone for attending the advisory group meeting. The meeting ended at 1:10 PM.

3rd Technical Advisory Group Meeting

Thursday, February 7, 2013

3:00 PM

Chelsea Collaborative

318 Broadway

Chelsea, Massachusetts 02150

Study of the Safety Impacts of Ethanol Transportation by Rail through Boston, Cambridge, Chelsea, Everett, Somerville & Revere

Technical Advisory Group Meeting
Thursday, February 7, 2013
3:00 PM

Chelsea Collaborative
318 Broadway
Chelsea, Massachusetts 02150

Attendance

Technical Advisory Group Members and Public who signed in:

Name	Title	Organization
Roseann Bongiovanni	Assistant Executive Director	The Chelsea Collaborative
Matt Frank	City Councilor	City of Chelsea
Kingsley Ndi	NERO Emergency Response Chief	Department of Environmental Protection
Staci Rubin	Staff Attorney	Alternatives for Community & Environment, Inc.
Albe Simenas	ER Section Chief	Department of Environmental Protection
Minka vanBeuzekom	City Councilor	City of Cambridge
Gene Doherty	Fire Chief	Revere Fire
Tom Todisco	Emergency Plan Revere	Revere Fire
Pat Sullivan	Somerville Fire Department Deputy Chief	City of Somerville
Tom Graney	Mayor's Office	City of Somerville
Bruce Kaplan	Special Projects Coordinator	Global Partners LP
Wig Zamore	Resident of Somerville	

Massachusetts Department of Transportation Staff:

John D. Ray	Deputy Administrator, Rail and Transit Division
Ammie Rogers	Office of Transportation Planning
Paul Nelson	Office of Transportation Planning

DRAFT Meeting Summary

Paul Nelson, the project manager for the study, opened the meeting by welcoming attendees and conducting the safety briefing, with the help of Roseann from the Chelsea Collaborative. He then asked all attendees to introduce themselves. Following introductions, Paul walked the group through the agenda for the meeting which included:

1. Review of the Project Schedule
2. Review of the Public Feedback
    a. Chelsea Public School Meeting
    b. East Boston Neighborhood Meeting
    c. New England Produce Center Meeting
3. Task 3: Evaluation of Impact on Public Safety
    a. Maps of Potential Exposed Populations
    b. Safety Procedures for Transporting Ethanol
    c. Emergency Response Capabilities
4. Discussion/ Other Business

Review of the Project Schedule

Paul informed the group that based on the request of the Technical Advisory Group along with Speaker of the House Robert A. DeLeo, Senator Anthony Petruccelli, Senator Sal DiDomenico, Representative Carlo Basile, Representative Kathi-Anne Reinstein, and Representative Eugene L. O'Flaherty, MassDOT has requested a 45-day extension of the report deadline. Rosanne asked why a 90 day extension, which had been requested by the TAG, was not requested by MassDOT to the Legislature. Paul stated that a 45-day extension was requested as a compromise between what was requested and the original deadline of that the report. He stated that the report will now finished on March 23rd.

Review of the Public Feedback

Paul reviewed the meetings held with since the last Technical Advisory Group meeting. Paul informed the group that MassDOT met with representatives from the Chelsea Public Schools on Wednesday, February 6th at 11:30 AM. The primary issues brought up by the school officials included: (1) that all nine schools in the school system are within a half mile of the potential ethanol routes; (2) the proximity of the ethanol route to the Mary C. Burke elementary complex on Eastern Avenue is a major concern; (3) that approximately 100 school buses would be needed to evacuate every school in the case of an emergency; and (4) that any emergency response plans must consider the fact that parents would head towards the schools to retrieve their children. The school officials asked that MassDOT look into ways that daytime shipments of ethanol could be prohibited as a way to prevent exposure to the students.

Paul then asked Rosanne and Staci to review the neighborhood meeting held at East Boston High School on February 6th at 6:30 PM. They stated that approximately 75 people signed into the event. Staci stated that the primary issues brought up by the attendees included: (1) concern that the trains would be a terrorist target; (2) additional concern that the spur rail line to the Global facility would not be maintained properly; (3) concern that an ethanol crash would result in a chain reaction explosion involving the other stored fuels in the area; and (4) requests that the fire departments along all possible corridors have sufficient training and supplies of alcohol-resistant foam to respond to any crash. Staci added that there was additional concern about the added truck traffic that would be leaving the Global facility and the resulting air quality impacts. Paul responded that MassDOT has assumed that the ethanol transported to the Global facility by rail would simply be a change in delivery mode and not a significant change in overall volume. With no major change in volume the level of truck traffic for local delivery is not expected to change significantly.

Paul then reviewed the meeting held at the New England Produce Center (NEPC) earlier that day at Noon. At the meeting, MassDOT met with representatives of the companies that operate out of the NEPC, which is located off of Beacham Street in Chelsea adjacent to the Shared Corridor route. Paul stated that unlike many of the other businesses within the study area, the produce companies at the NEPC are at their full strength in the middle of the night as they unload and repackage produce for delivery. This means that the NEPC employees would be present if any incident occurred during a nighttime ethanol delivery. The attendees pointed out that communication to their businesses was very important in case of an incident. Paul added that they had discussed how although unlikely, the ethanol unit trains may be temporarily stored on the siding outside of the NEPC during its transit to the Global facility. The NEPC representatives requested that a consequence study be conducted to identify ways to ensure safety and security of their facility in such a case.

Comments & Questions

Gene Doherty stated that for an evacuation, it is typical to move the evacuees into the schools as they are the only buildings large enough to accommodate the people. He also pointed out that there are many schools along the route but it is unlikely that they will all need to be evacuated at once so it would be possible to move the children from one school to the next to make sure everyone is accommodated. He added that the fire departments have established plans for evacuations.
Paul asked if there was a need for concern with children coming in contact with Ethanol verses an adult. Gene confirmed that there is no more of a concern with children's skin being exposed to ethanol then adults.

A member of the advisory group requested that a consequence study be done to look at the schools in such close proximity to each other.

Several members of the committee from the DEP stated that Chelsea has a comprehensive Emergency Preparedness Plan and that MEMA has a report that explains the evacuation procedures for municipal employees.

Gene said that much of the security planning in the Boston Metropolitan Area us done through the Urban Area Security Initiative (UASI). He stated that the UASI reports would be a good source of information for the report.

Task 3: Evaluation of Impact on Public Safety

Paul continued the presentation with a discussion of the work MassDOT will be doing to evaluate the potential impact on public safety. Ammie Rogers then walked the TAG through the following two handouts: (1) a summary and list of train crashes that occurred in Massachusetts from 2006 to 2012 and (2) a summary and list of train crashes which involve Ethanol or an unknown hazardous material from 2008 to 2012. Paul then reviewed the four maps that show the facilities that are located within a half mile of the possible ethanol routes. He stated that the maps were assembled using information from MassGIS that needs to be checked for accuracy by the TAG members. Finally, Paul provided a summary of the policies and procedures in place to ensure safe and secure handling of ethanol.

Comments & Questions

A member of the TAG suggested that cameras be added to the switches on the tracks surrounding the Boston Engine Terminal to help mitigate problems.

An advisory group member asked why the average number of cars involved in Massachusetts crashes is two, while the average number of cars in nationwide crashes is 12. Ammie explained that the nationwide analysis only included crashes where ethanol was released while the statewide analysis included all crashes. Crashes where ethanol (or any product) was released tend to be larger, leading to the difference in average number of cars involved.

Wig Zamore stated that his biggest concern with the ethanol is the potential for a fire that will ensue from a possible crash. He asked if there are specific situations where a fire will be extinguished or where it will it be allowed to burn itself out. Gene Doherty responded by saying it is not possible to provide a definitive answer for that, it will have to be a decision that is made on a case per case basis.

Wig suggested that each train should carry foam in one car so if there is a crash then there will be the necessary amount of foam nearby. Gene suggested that that might not be the ideal solution because the trains can be up to a mile long and it is not feasible to get a car of foam closer to the accident if it is too far up the line. He also pointed out that if the train derails at the foam car and spills that material then it will not be of any use to put out a fire.

Gene stated that while there is currently some foam available to each community, there is a lack of necessary volumes foam to respond to a major incident. He said he is working with the fire departments in each community to obtain more foam and store it at stations along the tracks in multiple locations to help mitigate this problem.

An advisory group member requested that MassDOT create a map of the rail types that are similar to the class of rail in the communities in the study and see what crashes occurred on those lines. Paul stated that MassDOT would include the rail type in the report on crashes so that a comparison can be made.

A member of the group pointed out that she thought there was an accident that happened in Chelsea that is not listed on the crashes in the handout. John D. Ray confirmed that he was aware of a crash where a young girl was crossing the tracks and was killed, MassDOT agreed to look into this.

Staci asked why there is only half- mile radius around each route on the maps. Tom Graney confirmed that according to Emergency Response Guidebook, the required evacuation area for an ethanol crash is half-a-mile. Gene also let everyone know that the evacuation area is decided on a per case basis so it is best to look at the maps with a half-a-mile radius to see what the required amount is.

Staci requested that the report include all siding locations where an ethanol train could be stored on the maps. Paul responded that those edits will be made.

Gene stated that the access to the trains in many of the corridors might be a problem. The grade next to the tracks is steep and densely populated so it is difficult to get a safety vehicle in next to a crash. Typically the 1st responders gain access at a grade crossing and then drive down the tracks to meet the closest point to the crash. An advisory group member suggested that MassDOT could show a map of all the ROW and access points for the first responders to access in case of an accident. Paul responded that the report would look into potential access issues and ways to address these issues.

Paul thanked everyone for attending the advisory group meeting. The meeting ended at 5:00 PM.

Appendix 2

Incidents in MA from 2008 to 2012

and

Incidents in United States for

Ethanol or Unknown Hazardous Material

from 2008 to 2006

STATISTICS FOR ALL RAIL INCIDENTS IN MASSACHUSETTS FROM 2008 TO 2012

Primary Cause	
Track	26
Human Factor	18
Equipment	12
Signal	0
Miscellaneous	12
Total Incidents	68

Incidents by Year	
2008	18
2009	16
2010	12
2011	18
2012	4
Total 2006-2012	68

Railroad Type	
Main	38
Yard	28
Siding	2
Total Incidents	68

Type of RR Equipment	
Passenger	25
Yard/Switch	12
Not RPD or n/a	1
Freight	21
Single Car	1
Cut of Cars	1
Light Loco(s)	3
Commuter	3
Maintenance Car	1
Total Statewide	68

Type of Incidents	
Other	24
Collision	5
Derailed	39
Total Incidents	68

Incidents by County	
Suffolk	19
Worcester	12
Franklin	1
Bristol	7
Hampden	9
Plymouth	1
Norfolk	5
Middlesex	6
Berkshire	5
Essex	1
Hampshire	2
Total Statewide	68

	Average	Maximum
Railroad Property Damage	$ 67,803	$878,796
Killed	0	2
Injured	2	141
Speed (MPH)	32	150
Locomotives Derailed	0	1
Cars Derailed	2	24

Incidents City Location	
Boston	19
Worcester	7
Attleboro	5
Springfield	4
Westborough	3
Framingham	3
Mansfield	2
Somerville	2
Palmer	2
Amherst	2
Canton	1
Pittsfield	1
Lawrence	1
Holden	1
Wendell	1
Winchendon	1
Woronoco	1
Belchertown	1
West Springfield	1
New Bedford	1
Braintree	1
South Lee	1
Wellesley	1
Berkshire	1
Stock Bridge	1
Sharon	1
Belmont	1
Middleboro	1
Housationic	1
Total Statewide	68

Date	City	County	Primary Cause	RR Equiptment	Type Track	Type Acc	Property Damage ($)	Killed	Injured	Spd Mph	Derailed	
											Loco	Car
1/31/2008	Framingham	Middlesex	Human Factor	Yard/Switch	Yard	Other	20,311	0	0	5	0	2
3/25/2008	Canton	Norfolk	Miscellaneous	Passenger	Main	Other	878,796	0	141	0	0	0
4/3/2008	Pittsfield	Berkshire	Human Factor	Freight	Main	Derailed	9,000	0	0	10	0	3
5/8/2008	Lawrence	Essex	Track	Freight	Yard	Derailed	65,000	0	0	6	0	2
5/19/2008	Worcester	Worcester	Track	Yard/Switch	Yard	Derailed	11,800	0	0	8	0	3
5/22/2008	Springfield	Hampden	Human Factor	Freight	Main	Derailed	64,500	0	0	4	0	4
6/6/2008	Worcester	Worcester	Track	Yard/Switch	Yard	Derailed	14,000	0	0	6	0	4
6/12/2008	Boston	Suffolk	Track	Yard/Switch	Yard	Other	20,000	0	0	7	0	0
6/20/2008	Westborough	Worcester	Human Factor	Freight	Yard	Derailed	14,300	0	0	4	0	1
7/24/2008	Boston	Suffolk	Track	Passenger	Main	Derailed	81,600	0	0	10	0	2
9/8/2008	Mansfield	Bristol	Equipment	Passenger	Main	Other	11,000	0	0	110	0	0
9/18/2008	Boston	Suffolk	Track	Passenger	Main	Derailed	420,000	0	0	11	0	2
10/30/2008	Attleboro	Bristol	Equipment	Passenger	Main	Other	20,000	0	0	150	0	0
11/1/2008	Springfield	Hampden	Track	Passenger	Main	Derailed	9,100	0	0	5	1	1
11/24/2008	Attleboro	Bristol	Track	Passenger	Main	Other	23,000	0	0	150	0	0
11/24/2008	Holden	Worcester	Equipment	Passenger	Main	Other	20,750	0	0	147	0	0
12/7/2008	Wendell	Franklin	Equipment	Freight	Main	Derailed	24,264	0	0	8	0	1
12/23/2008	Boston	Suffolk	Human Factor	Yard/Switch	Yard	Derailed	9,707	0	0	6	1	0
1/4/2009	Worcester	Worcester	Human Factor	Cut of Cars	Yard	Other	25,000	0	0	2	0	1
2/8/2009	Attleboro	Bristol	Equipment	Passenger	Main	Other	19,000	0	0	140	0	0
2/10/2009	Westborough	Worcester	Miscellaneous	Freight	Yard	Derailed	33,319	0	0	5	0	1
2/13/2009	Boston	Suffolk	Equipment	Passenger	Main	Other	22,900	0	0	108	0	0
2/20/2009	Somerville	Middlesex	Miscellaneous	Passenger	Yard	Derailed	12,768	0	0	5	0	1
3/3/2009	Winchendon	Worcester	Track	Freight	Main	Derailed	587,321	0	0	23	0	20
3/8/2009	Woronoco	Hampden	Track	Passenger	Main	Derailed	112,233	0	1	36	1	4
3/25/2009	Boston	Suffolk	Track	Passenger	Main	Other	20,500	0	0	85	0	0
4/7/2009	Belchertown	Hampden	Track	Passenger	Main	Derailed	30,377	0	0	42	0	0
5/27/2009	Framingham	Middlesex	Track	Yard/Switch	Yard	Derailed	19,250	0	0	5	0	4
7/2/2009	Attleboro	Bristol	Human Factor	Maintenance Car	Main	Collision	22,850	0	1	2	0	0
7/2/2009	Framingham	Middlesex	Track	Freight	Yard	Derailed	69,843	0	0	6	0	4
8/16/2009	Attleboro	Bristol	Miscellaneous	Passenger	Main	Other	16,750	0	0	112	0	0
9/12/2009	West Springfield	Hampden	Human Factor	Freight	Yard	Derailed	121,515	0	0	8	0	5
10/16/2009	Boston	Suffolk	Track	Passenger	Main	Other	34,500	0	0	110	0	0
11/10/2009	New Bedford	Norfolk	Miscellaneous	Freight	Yard	Derailed	26,590	0	0	5	0	1

Date	City	County	Primary Cause	RR Equiptment	Type Track	Type Acc	Property Damage ($)	Killed	Injured	Spd Mph	Derailed	
											Loco	Car
2/22/2010	Boston	Suffolk	Human Factor	Not RPD or n/a	Main	Collision	71,050	0	1	2	0	0
3/25/2010	Braintree	Norfolk	Human Factor	Commuter	Main	Derailed	18,877	0	0	12	0	1
3/29/2010	South Lee	Berkshire	Track	Freight	Main	Derailed	381,735	0	0	23	0	8
4/28/2010	Boston	Suffolk	Equipment	Yard/Switch	Yard	Other	14,000	0	0	5	0	0
6/21/2010	Boston	Suffolk	Equipment	Yard/Switch	Yard	Other	21,000	0	0	3	0	0
7/4/2010	Boston	Suffolk	Human Factor	Yard/Switch	Yard	Other	11,700	0	0	5	0	0
7/17/2010	Boston	Suffolk	Track	Passenger	Main	Other	34,500	0	0	110	0	0
8/25/2010	Wellesley	Norfolk	Equipment	Passenger	Main	Other	10,467	0	0	0	0	0
8/27/2010	Mansfield	Bristol	Equipment	Passenger	Main	Other	39,500	0	0	150	0	0
10/1/2010	Somerville	Middlesex	Human Factor	Commuter	Yard	Derailed	21,257	0	0	9	1	0
10/27/2010	Boston	Suffolk	Track	Passenger	Main	Derailed	78,460	0	0	9	0	1
12/14/2010	Boston	Suffolk	Track	Yard/Switch	Yard	Derailed	13,500	0	0	4	1	0
1/18/2011	Boston	Suffolk	Human Factor	Yard/Switch	Yard	Other	20,000	0	0	2	0	0
1/21/2011	Berkshire	Berkshire	Human Factor	Freight	Yard	Derailed	35,576	0	0	3	0	5
1/28/2011	Westborough	Worcester	Miscellaneous	Freight	Yard	Derailed	20,762	0	0	3	0	4
1/29/2011	Springfield	Hampden	Miscellaneous	Passenger	Main	Derailed	12,939	0	0	6	0	1
2/1/2011	Palmer	Hampden	Miscellaneous	Freight	Siding	Other	20,350	0	0	3	0	0
2/27/2011	Springfield	Hampden	Track	Passenger	Main	Derailed	17,680	0	0	9	1	0
4/2/2011	Boston	Suffolk	Miscellaneous	Passenger	Yard	Other	31,751	0	0	0	0	0
5/31/2011	Amherst	Hampshire	Track	Freight	Main	Derailed	120,000	0	0	20	0	7
6/24/2011	Boston	Suffolk	Track	Light Loco(s)	Yard	Derailed	45,900	0	0	5	1	0
6/25/2011	Amherst	Hampshire	Track	Freight	Main	Derailed	250,000	0	0	34	0	7
7/15/2011	Worcester	Worcester	Human Factor	Freight	Yard	Derailed	17,627	0	0	6	0	4
7/19/2011	Palmer	Hampden	Equipment	Freight	Main	Derailed	23,082	0	0	18	0	3
8/12/2011	Stock Bridge	Berkshire	Miscellaneous	Freight	Main	Derailed	127,146	0	0	10	0	7
9/16/2011	Worcester	Worcester	Human Factor	Freight	Yard	Collision	26,890	0	0	3	0	1
9/24/2011	Boston	Suffolk	Human Factor	Yard/Switch	Yard	Collision	35,000	0	0	3	1	0
10/16/2011	Worcester	Worcester	Miscellaneous	Passenger	Main	Other	25,943	0	1	40	0	0
10/31/2011	Boston	Suffolk	Track	Light Loco(s)	Yard	Derailed	10,304	0	0	3	1	0
12/19/2011	Sharon	Norfolk	Track	Passenger	Main	Other	65,315	0	0	80	0	0
6/28/2012	Worcester	Worcester	Human Factor	Light Loco(s)	Main	Collision	12,656	0	0	32	0	0
8/14/2012	Belmont	Middlesex	Miscellaneous	Commuter	Main	Derailed	14,383	0	0	23	0	1
8/15/2012	Middleboro	Plymouth	Equipment	Single Car	Siding	Derailed	20,280	0	0	10	0	1
11/15/2012	Housationic	Berkshire	Track	Freight	Main	Derailed	49,123	0	0	10	0	17

STATISTICS FOR INCIDENTS IN UNITED STATES WHERE ETHANOL OR UNKNOWN HAZMAT WAS RELEASED FROM CRASH 2008 TO 2012

Primary Cause	
Equipment	7
Human Factor	5
Track	17
Miscellaneous	2
Total Incidents	31

Incidents by Year	
2008	4
2009	8
2010	4
2011	7
2012	8
Total 2008-2012	31

Railroad Type	
Main	21
Yard	8
Siding	2
Total Incidents	31

Type of RR Equipment	
Single Car	1
Freight Train	28
Yard/Switching	2
Total Incidents	31

	Average	Maximum
Railroad Property Damage	$ 841,023	$ 2,431,870
Killed	0	1
Injured	4	121
Speed (MPH)	20	54
Locomotives Derailed	0	0
Cars Derailed	12	39
People Evacuated	41	500

Incidents State	
AZ	1
CA	2
IA	1
IL	4
IN	2
ME	1
MN	2
MT	1
NC	1
ND	1
NE	1
NJ	1
NM	1
NV	1
OH	3
OK	1
OR	1
SD	1
TN	2
TX	2
WI	1
Total Incidents	31

All Rail Incidents in United States Where Ethanol or Unknown Hazmat Material was Released From 2008-2012

Date	State	County	Type Track	Primary Cause	Property Damage ($)	Killed	Injured	Evac	Spd Mph	Derailed	
										Loco	Car
7/29/2008	MN	Houston	Main	Equipment	2,294,052	0	0	0	25	0	28
8/16/2008	NC	Columbus	Main	Equipment	358,839	0	2	0	17	0	10
8/22/2008	OK	Oklahoma	Main	Track	852,915	0	0	35	19	0	14
3/8/2009	IA	Buchanan	Siding	Track	148,926	0	0	31	8	0	7
4/9/2009	CA	Los Angeles	Yard	Track	400,924	0	0	0	10	0	6
5/18/2009	IL	Cook	Yard	Equipment	13,919	0	0	0	9	0	1
6/19/2009	IL	Winnebago	Main	Track	1,816,653	1	11	600	34	0	19
7/23/2009	ND	Mclean	Main	Track	610,000	0	0	0	11	0	7
8/15/2009	ME	Oxford	Main	Track	1,106,830	0	0	2	27	0	20
9/15/2009	TN	Knox	Main	Human Factor	462,073	0	0	25	10	0	8
11/27/2009	MN	Hennepin	Yard	Human Factor	124,506	0	0	0	7	0	5
4/19/2010	OH	Williams	Main	Equipment	2,431,870	0	0	28	44	0	39
8/3/2010	NE	Boone	Main	Human Factor	334,774	0	0	0	2	0	16
2/6/2011	OH	Hancock	Main	Track	1,917,500	0	0	20	46	0	33
5/4/2011	OR	Multnomah	Main	Equipment	785,677	0	0	0	24	0	11
7/15/2011	IL	Iroquois	Main	Track	106,510	0	0	0	22	0	1
7/19/2011	SD	Brookings	Yard	Track	89,842	0	0	0	8	0	5
10/7/2011	IL	Bureau	Main	Track	1,847,619	0	0	500	37	0	26
6/1/2012	IN	Pike	Main	Track	876,000	0	0	0	25	0	8
7/11/2012	OH	Franklin	Main	Miscellaneous	681,866	0	2	100	23	0	17
10/12/2012	TN	Knox	Yard	Track	250,000	0	0	0	5	0	6
Type of Hazmat not confirmed											
8/28/2008	NM	Curry	Yard	Equipment	23,117	0	0	0	3	0	1
2/20/2010	CA	Kern	Main	Track	2,222,672	0	0	35	20	0	6
9/13/2010	WI	Pierce	Main	Equipment	2,091,287	0	0	14	54	0	9
9/13/2011	TX	Galveston	Yard	Track	69,600	0	0	14	8	0	8
9/16/2011	TX	Potter	Yard	Human Factor	946,211	0	3	200	5	0	1
3/27/2012	IN	Nobel	Main	Track	1,311,523	0	0	54	47	0	25
8/5/2012	MT	Fallon	Main	Track	1,400,085	0	0	0	23	0	18
8/10/2012	NV	Clark	Siding	Human Factor	16,205	0	0	3	8	0	6
11/1/2012	AZ	Graham	Main	Track	66,335	0	0	0	22	0	7
11/30/2012	NJ	Gloucester	Main	Miscellaneous	413,388	0	121	0	8	0	7

Sensitive Receptors

Within the 0.5 mile Buffer Zone

Along All Corridor

Corridor	If in multiple corridors	Type of Facility	Facility Name	Address	Town
c1		Schools	Albert F. Argenziano School at Lincoln Park	290 Washington Street	Somerville
c1		Transit	Alewife	Alewife	Cambridge
c1		Schools	Benjamin Banneker Charter Public School	21 Notre Dame Avenue	Cambridge
c1		Homes	CADBURY COMMONS	66 SHERMAN ST	Cambridge
c1		Medical	Cambridge Family Health	237 Hampshire Street	Cambridge
c1		Medical	Cambridge Family Health North	2067 Massachusetts Ave	Cambridge
c1	c1, c2	Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 3, Ladder Co. 2	175 Cambridge Street	Cambridge
c1		Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 4	2029 Massachusetts Avenue	Cambridge
c1		Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 5	1384 Cambridge Street	Cambridge
c1		Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 8, Ladder Co. 4	113 Garden Street	Cambridge
c1		Schools	Cambridge Friends School	5 Cadbury Rd	Cambridge
c1		Hospital	Cambridge Health Alliance	1493 Cambridge Street	Cambridge
c1		Medical	Cambridge Health Alliance - Cambridge Campus	1493 Cambridge Street	Cambridge
c1		Medical	Cambridge Health Alliance - Cambridge Campus	1493 Cambridge Street	Cambridge
c1		Medical	Cambridge Health Alliance - Cambridge Campus	1493 Cambridge Street	Cambridge
c1	c1, c3	Hospital	Cambridge Health Alliance - Somerville Campus	230 Highland Avenue	Somerville
c1		Medical	Cambridge Health Alliance Birth Center	1493 Cambridge Street	Cambridge
c1		Schools	Cambridge Montessori School	161 Garden Street	Cambridge
c1		Medical	Cambridge Pediatrics	1493 Cambridge Street	Cambridge
c1		Medical	Central Street Health Center	26 Central Street	Somerville
c1		Transit	Davis	Davis	Somerville
c1	c1, c3	Schools	E Somerville Community School	42 Prescott Street	Somerville
c1	c1, c2, c3	Medical	East Cambridge Health Center	157 Gore Street	Cambridge
c1		Colleges	Harvard University	1563 Mass Ave.	Cambridge
c1	c1, c3	Homes	HUTCHINS TRANSITIONAL CARE UNIT	230 Highland Avenue	Somerville
c1	c1, c3	Homes	JEANNE JUGAN RESIDENCE	186 HIGHLAND AVE	Somerville
c1		Schools	John F Kennedy School	5 Cherry Street	Somerville
c1		Schools	John M Tobin School	197 Vassal Lane	Cambridge
c1	c1, c2, c3	Transit	Lechmere	Lechmere	Cambridge
c1		Colleges	Lesley University	29 Everett Street,	Cambridge
c1		Schools	Maria L. Baldwin School	28 Sacramento Street	Cambridge
c1		Colleges	Muscular Therapy Institute	122 Rindge Ave	Cambridge
c1		Homes	NEVILLE CENTER AT FRESH POND FOR NU	640 CONCORD AVE	Cambridge
c1		Homes	NEVILLE PLACE	650 CONCORD AVE	Cambridge
c1		Medical	North Cambridge Health Center	266B Rindge Avenue	Cambridge
c1		Schools	Peabody School	70 Rindge Avenue	Cambridge
c1		Transit	Porter	Porter	Cambridge
c1		Medical	Primary Care Center	1493 Cambridge Street	Cambridge
c1		Homes	SANCTA MARIA NURSING FACILITY	799 CONCORD AVE	Cambridge
c1	c1, c3	Fire	SOMERVILLE FIRE DEPARTMENT: Engine 3	255 Somerville Avenue	Somerville
c1		Fire	SOMERVILLE FIRE DEPARTMENT: Engine 4 & Tower 1	651 Somerville Avenue	Somerville
c1	c1, c3	Fire	SOMERVILLE FIRE DEPARTMENT: Engine 7	265 Highland Avenue	Somerville
c1	c1, c3	Homes	SOMERVILLE HOME	117 SUMMER ST	Somerville
c1		Medical	Spaulding Cambridge Outpatient Center	1575 Cambridge St	Cambridge
c1	c1, c3	Schools	St Catherine Of Genoa School	192 Summer Street	Somerville
c1	c1, c3	Medical	Union Square Health Center	337 Somerville Ave	Somerville
c1		Homes	YOUVILLE HOUSE	1573 CAMBRIDGE ST	Cambridge

Corridor	If in multiple corridors	Type of Facility	Facility Name	Address	Town
c1		Medical	Zinberg Clinic	1493 Cambridge Street	Cambridge
c2		Schools	Another Course To College	20 Warren Street	Brighton
c2		Transit	Babcock Street	Babcock Street	Boston
c2		Schools	Baldwin Early Learning Center	121 Corey Road	Brighton
c2		Transit	Blandford Street	Blandford Street	Boston
c2		Fire	BOSTON FIRE DEPARTMENT: Engine 41, Ladder 14	460 Cambridge Street	Boston
c2		Fire	BOSTON FIRE DEPARTMENT: Engine 51	425 Faneul Street	Boston
c2		Colleges	Boston University	121 Bay State Road	Boston
c2		Schools	Boston University Academy	1 University Road	Boston
c2		Transit	Boston University Central	Boston University Central	Boston
c2		Transit	Boston University East	Boston University East	Boston
c2		Transit	Boston University West	Boston University West	Boston
c2		Medical	Brighton/Allston Afterschool Enrichment Program (BASE)	5 Saint Luke's Road	Allston
c2		Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 2, Ladder Co. 3	378 Massachusetts Avenue	Cambridge
c2	c1, c2	Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 3, Ladder Co. 2	175 Cambridge Street	Cambridge
c2		Schools	Cambridgeport School	89 Elm Street	Cambridge
c2		Schools	Conservatory Lab Charter School	25 Arlington Street	Brighton
c2		Schools	Crittenton Inc School	10 Perthshire Rd	Boston
c2	c1, c2, c3	Medical	East Cambridge Health Center	157 Gore Street	Cambridge
c2		Schools	Fletcher/Maynard Academy	225 Windsor Street	Cambridge
c2		Schools	Gardner Pilot Academy	30 Athol Street	Allston
c2		Schools	German International School Boston	57 Holton Street	Allston
c2		Transit	Griggs Street	Griggs Street	Boston
c2		Transit	Harvard Avenue	Harvard Avenue	Boston
c2		Schools	Horace Mann School for the Deaf	40 Armington Street	Allston
c2		Schools	Jackson Mann School	40 Armington Street	Allston
c2		Transit	Kendall/MIT	Kendall/MIT	Cambridge
c2	c1, c2, c3	Transit	Lechmere	Lechmere	Cambridge
c2		Schools	Lyon K-8 School	50 Beechcroft Street	Brighton
c2		Schools	Lyon Upper 9-12 School	95 Beechcroft Street	Brighton
c2		Colleges	Massachusetts Institute of Technology	77 Massachusetts Avenue	Cambridge
c2		Schools	MATCH Charter Public High School	1001 Commonwealth Avenue	Boston
c2		Schools	Mesivta High School	34 Sparhawk Street	Brighton
c2		Schools	Morse School	40 Granite Street	Cambridge
c2		Schools	Mt St Joseph Academy	617 Cambridge	Brighton
c2		Transit	Packards Corner	Packards Corner	Boston
c2		Transit	Pleasant Street	Pleasant Street	Boston
c2		Homes	PRESENTATION NURSING & REHAB CENTER	10 BELLAMY ST	Brighton
c2		Colleges	Rets Technical Center	965 Commonwealth Ave	Boston
c2		Transit	Saint Paul Street	Saint Paul Street	Boston
c2		Schools	St Columbkille Partnership School	25 Arlington Street	Brighton
c2		Medical	Windsor Street Health Center	119 Windsor Street	Cambridge
c2		Homes	WINGATE AT BRIGHTON REHAB & SN RESI	100 N BEACON ST	Boston
c3		Schools	Benjamin G Brown School	201 Willow Avenue	Somerville
c3		Medical	Broadway Health Center	300 Broadway	Somerville
c3		Fire	CAMBRIDGE FIRE DEPARTMENT: Engine 3, Ladder Co. 2	175 Cambridge Street	Cambridge
c3	c1, c3	Hospital	Cambridge Health Alliance - Somerville Campus	230 Highland Avenue	Somerville

Corridor	If in multiple corridors	Type of Facility	Facility Name	Address	Town
c3		Schools	Capuano Early Childhood Center	150 Glen Street	Somerville
c3	c1, c3	Schools	E Somerville Community School	42 Prescott Street	Somerville
c3	c1, c2, c3	Medical	East Cambridge Health Center	157 Gore Street	Cambridge
c3		Medical	East Somerville Health Center	42 Cross Street	Somerville
c3		Schools	Full Circle High School	8 Bonair Street	Somerville
c3	c1, c3	Homes	HUTCHINS TRANSITIONAL CARE UNIT	230 Highland Avenue	Somerville
c3		Medical	Internal Medicine Associates	236 Highland Ave	Somerville
c3	c1, c3	Homes	JEANNE JUGAN RESIDENCE	186 HIGHLAND AVE	Somerville
c3	c1, c2, c3	Transit	Lechmere	Lechmere	Cambridge
c3	c3, cS	Schools	Next Wave Junior High School	8 Bonair Street	Somerville
c3	c1, c3	Fire	SOMERVILLE FIRE DEPARTMENT: Engine 3	255 Somerville Avenue	Somerville
c3	c1, c3	Fire	SOMERVILLE FIRE DEPARTMENT: Engine 7	265 Highland Avenue	Somerville
c3		Fire	SOMERVILLE FIRE DEPARTMENT: Headquarters	266 Broadway	Somerville
c3		Schools	Somerville High School	81 Highland Avenue	Somerville
c3	c1, c3	Homes	SOMERVILLE HOME	117 SUMMER ST	Somerville
c3		Medical	Somerville Teen Connection at Somerville High School	81 Highland Avenue	Somerville
c3	c1, c3	Schools	St Catherine Of Genoa School	192 Summer Street	Somerville
c3	c1, c3	Medical	Union Square Health Center	337 Somerville Ave	Somerville
c3		Schools	West Somerville Neighborhood School	177 Powderhouse Blvd	Somerville
c3		Schools	Winter Hill Community School	115 Sycamore Street	Somerville
cS		Hospital	Beth Israel Deaconess Medical Center	1000 Broadway Street	Chelsea
cS		Fire	BOSTON FIRE DEPARTMENT: Engine 32, Ladder 9	525 Main Street	Boston
cS		Fire	CHELSEA FIRE DEPARTMENT: Engine 3 Ladder 2	883 Broadway	Chelsea
cS		Fire	CHELSEA FIRE DEPARTMENT: Headquarters	307 Chestnut Street	Chelsea
cS		Medical	Chelsea High School	299 Everett Ave	Chelsea
cS		Schools	Chelsea High School	299 Everett Avenue	Chelsea
cS		Homes	CHELSEA JEWISH NURSING HOME	17 LAFAYETTE AVE	Chelsea
cS		Hospital	Chelsea Soldier Home-Quigley Memorial Hospital	91 Crest Avenue	Chelsea
cS		Transit	Chelsea, Commuter Rail Station	Chelsea Station	Chelsea
cS		Schools	Clark Avenue School	8 Clark Avenue	Chelsea
cS		Homes	COHEN FLORENCE LEVINE ESTATES	201 CAPTAINS ROW	Chelsea
cS		Colleges	Computer-ed Institute-Somerville	5 Middlesex Ave	Somerville
cS		Homes	DON ORIONE NURSING HOME	111 ORIENT AVE	East Boston
cS		Homes	EASTPOINTE NURSING CARE CENTER	255 CENTRAL AVE	Chelsea
cS		Schools	Edgar A Hooks Elementary School	300 Crescent Avenue	Chelsea
cS		Schools	Eugene Wright Science and Technology Academy	180 Walnut Street	Chelsea
cS		Fire	EVERETT FIRE DEPARTMENT: Headquarters	384 Broadway	Everett
cS		Homes	FLORENCE & CHAFETZ HOME FOR SPECIALIZED CARE	175 CAPTAINS ROW	Chelsea
cS		Schools	Frank M Sokolowski Elementary School	300 Crescent Avenue	Chelsea
cS		Schools	George F. Kelly Elementary School	300 Crescent Avenue	Chelsea
cS		Homes	HAVEN HEALTH CENTER OF CHELSEA	932 BROADWAY	Chelsea
cS		Schools	Immaculate Conception Elementary School	127 Winthrop Avenue	Revere
cS		Schools	Joseph A. Browne School	180 Walnut Street	Chelsea
cS		Schools	Manassah E Bradley School	110 Beachview Road	East Boston
cS		Hospital	MGH Chelsea HealthCare Center	100 Everett Ave	Chelsea
cS		Medical	MGH Chelsea HealthCare Center	151 Everett Avenue	Chelsea
cS		Medical	MGH Everett Family Care	19-21 Norwood Street	Everett

Corridor	If in multiple corridors	Type of Facility	Facility Name	Address	Town
cS		Medical	MGH Revere HealthCare Center	300 Broadway	Revere
cS		Medical	MGH Revere HealthCare Center/Community Health Associates	300 Ocean Avenue	Revere
cS		Medical	MGH/Revere High School	101 School Street	Revere
cS	c3, cS	Schools	Next Wave Junior High School	8 Bonair Street	Somerville
cS		Schools	Paul Revere School	395 Revere Street	Revere
cS		Transit	Revere Beach	Revere Beach	Revere
cS		Fire	REVERE FIRE DEPARTMENT: Engine 1	13 Walden Street	Revere
cS		Fire	REVERE FIRE DEPARTMENT: Engine 5	4 Freeman Street	Revere
cS		Schools	Revere High School	101 School Street	Revere
cS		Schools	Rumney Marsh Academy	140 American Legion Highway	Revere
cS		Schools	Shurtleff Early Childhood School	99 Hawthorn Street	Chelsea
cS		Homes	SOLDIERS' HOME IN MASS	91 CREST AVE	Chelsea
cS		Schools	St Anthony Elementary School	54 Oakes Street	Everett
cS		Schools	St Rose Elementary School	580 Broadway	Chelsea
cS		Transit	Sullivan Square	Sullivan Square	Boston
cS		Schools	Sumner G. Whittier School	337 Broadway	Everett
cS		Schools	William A Berkowitz Elementary School	300 Crescent Avenue	Chelsea
cS		Transit	Wonderland	Wonderland	Revere

List of Federal Oversight Authorities

List of Federal Authorities with Oversight of Ethanol Transportation and Storage

The paragraphs below, pulled from the Department of Homeland Security report titled: "Chemical Sector-Specific Plan, An Annex to the National Infrastructure Protection Plan" that was released in 2010, outline the authorities vested in different Federal agencies that are related to the safety and security of the ethanol industry, either directly (e.g., requirements for vulnerability assessments) or indirectly (e.g., risk management planning under the Clean Air Act), and which provide essential support to the DHS in securing the ethanol industry as a component of the larger chemical sector of the economy. The regulations have been divided into those that apply primarily to the safety and security of the manufacturing and storage of chemicals and those that apply primarily to the security of chemicals during their transport and distribution.

Authorities Governing the Security of the Manufacturing and Storage of Chemicals

The authorities that most directly impact Chemical Sector activities are those primarily focused on the security of chemicals during the manufacturing and storage of chemicals. HSPD-7 assigns responsibility for managing the security of the Chemical Sector (including ethanol) to the Department of Homeland Security, and the Chemical Facility Anti-Terrorism Standards (CFATS) mandate security standards for high-risk chemical facilities. Additionally, the Maritime Transportation Security Act (MTSA) provides DHS (via the United States Cost Guard -USCG) with regulatory authority over chemical facilities located on or adjacent to bodies of water, and there are multiple other environmental and safety statutes that indirectly help DHS secure the manufacturing and storage of chemicals. These directives and regulations are discussed below.

Homeland Security Presidential Directive 7 (HSPD-7): Pursuant to paragraph 15 of HSPD-7, DHS has primary responsibility for coordinating protection activities for the Chemical Sector. This responsibility includes managing the implementation of the NIPP risk management framework in the Chemical Sector, as well as working with sector partners to develop and implement this Sector Specific Plan.

Department of Homeland Security Authorities

Chemical Facility Anti-Terrorism Standards (CFATS): In Section 550 of the Department of Homeland Security Appropriations Act of 2007, Congress gave DHS the authority to require high-risk chemical facilities to complete vulnerability assessments, develop site security plans, and implement the protective measures necessary to meet DHS-defined performance standards. In accordance with this authority, on April 2, 2007, DHS released CFATS as an interim final rule.

Through CFATS, DHS established risk-based performance standards for the security of the Nation's high-risk chemical facilities. CFATS requires covered chemical facilities to prepare Security Vulnerability Assessments (SVAs), which identify facility security vulnerabilities, and to develop and implement Site Security Plans, which include measures that satisfy the CFATS risk-based performance standards. It also allows certain covered chemical facilities, under specified circumstances, to submit Alternate Security Programs (ASPs) in lieu of an SVA, Site Security Plan, or both.

CFATS also contains associated provisions addressing inspections and audits, recordkeeping, and the protection of information that constitutes Chemical-terrorism Vulnerability Information (CVI). Finally, the rule provides the Department with the authority to seek compliance through the issuance of Orders, including Orders Assessing Civil Penalty and Orders for the Cessation of Operations.

Maritime Transportation Security Act (MTSA): Under MTSA (46 U.S.C. 70101 et seq.), the USCG has authority over the transportation of bulk and packaged chemicals via water, as well as authority over the security of chemical facilities adjacent to navigable waters that may be involved in transportation security incidents. This authority includes the collection and maintenance of essential infrastructure information concerning these facilities, and review and approval of facility security assessments (FSAs) and facility security plans (FSPs).

Under MTSA, the USCG is to establish area maritime security committees and prepare area maritime security plans for maritime security (33 CFR 102 and 103), which require assessments of ports, vessels, and U.S. facilities to identify those that pose a high risk of being involved in a transportation security incident. Additionally, MTSA requires owners and operators of chemical facilities located contiguous to waterways to complete FSAs and submit FSPs to the USCG for review and approval (33 CFR 105). FSPs must include security measures; procedures for responding to security threats; and detailed preparedness, prevention, and response activities for each maritime security (MARSEC) level. High-risk vessels must also submit security assessments and security plans (33 CFR 104). The USCG also ensures that foreign flag vessels meet certain security standards (33 CFR 104.105(c)).

- **Transportation Worker Identification Credential:** Transportation Worker Identification Credentials (TWICs) are tamper-resistant biometric credentials issued to workers who require unescorted access to secure areas of MTSA-regulated ports, vessels, outer continental shelf facilities, and all credentialed merchant mariners. To obtain a TWIC, an individual must provide biographic and biometric information such as fingerprints, sit for a digital photograph, and successfully pass a security threat assessment conducted by TSA. TWIC was developed in accordance with the legislative provisions of MTSA and the Security and Accountability For Every Port Act (SAFE). The USCG is responsible for enforcement of the TWIC regulations in the maritime domain. All workers who require unescorted access to secure areas of maritime facilities and vessels, and all U.S.-credentialed mariners should have been in compliance by April 15, 2009.
- **Transportation Worker Identification Credential—Reader Requirements** has been released for Advance Notice of Proposed Rulemaking. The public comment period for the proposed rule ended May 26, 2009. The rule will provide guidance on the frequency of biometric checks against TWIC stored data. Frequency will be based on the risk posed by the facility as defined by USCG.

Executive Order 13416, Strengthening Surface Transportation Security (December 5, 2006): Executive Order 13416 builds on the improvements made in surface transportation security since the September

11th attacks, specifically actions taken under HSPD-7. The Executive Order requires the strengthening of U.S. surface transportation systems by facilitating and implementing a comprehensive, coordinated, and efficient security program. The order sets deadlines for key security activities, including security assessments of each surface transportation mode and an evaluation of the effectiveness and efficiency of current Federal Government surface transportation security initiatives.

U.S. Environmental Protection Agency Authorities

Clean Air Act: Under Section 112(r) of the Clean Air Act (42 U.S.C. 7401–7671q), any facility that stores, processes, uses, or otherwise handles certain regulated substances above specific threshold amounts is required to develop and implement a risk management program and submit to EPA a risk management plan. The plan must provide information on the regulated substances handled at the facility, an assessment of worst case release scenario(s) and alternative release scenario(s), a 5-year accident history of the facility, and information about the chemical accident prevention and emergency response programs at the facility. Facilities regulated under this section of the Clean Air Act must provide updated Risk Management Program (RMP) information every 5 years. The most recent round of 5-year updates was completed in 2009. Additionally, RMP facilities submit updated information when significant changes occur at their facility. These RMPs are a source of information for DHS and help DHS identify Chemical Sector assets and determine which assets potentially are high risk or high consequence, based on the human health impact.

Emergency Planning and Community Right-to-Know Act (EPCRA): Under EPCRA (42 U.S.C. 11001–11050), States are required to establish State emergency response commissions (SERCs), which, in turn, are required to establish local emergency planning committees (LEPCs). LEPCs are to develop local emergency response plans for releases of extremely hazardous substances. Each facility that handles extremely hazardous substances in excess of threshold planning quantities must notify the LEPC and provide it with the information needed to develop the local emergency response plan. Facilities must also report any releases over a specific quantity to the SERC and LEPC. If the facility is required under the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.) to maintain material safety data sheets (MSDS), the facility must submit an MSDS for each hazardous and extremely hazardous chemical onsite above the threshold quantity or a list of such chemicals, grouped by hazard (e.g., flammable, toxic, etc.), to the LEPC, the SERC, and the local fire department. The facilities must also submit annual inventories of hazardous and extremely hazardous chemicals managed at the facility over specified threshold quantities during the previous year. The information submitted to the LEPC, the SERC, and the local fire department is useful to DHS to identify at-risk facilities and to determine the mitigation measures and response measures necessary for and in place at each facility.

Superfund Amendments and Reauthorization Act of 1986: The passage of the Superfund Amendments and Reauthorization Act tasked the Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances and Disease Registry with the responsibility for environmental public health logistical support in the event of a chemical release. This act broadened CDC's responsibilities in the areas of public health assessments, establishment and maintenance of toxicological databases, information dissemination, and medical education.

The CDC has developed a National Public Health Strategy for Terrorism Preparedness and Response under which it supports the laboratory response network, a consortium of laboratories ready to provide immediate and sustained laboratory testing and communication in the event of public health emergencies involving chemical terrorism. The CDC also has developed a rapid toxic screen to help responders determine what chemical agents were used, who has been exposed, and to what extent. The CDC also supports training for medical toxicologists to provide surge capacity and expert consultation in the event of chemical terrorism.

U.S. Department of Justice Authorities

Controlled Substances Act: Under the Controlled Substances Act (21 U.S.C. 801) and the Controlled Substances Import and Export Act (21 U.S.C. 951), the Drug Enforcement Administration (DEA) has established regulations for the registration and security of 34 controlled essential (List 1) and precursor (List 2) chemicals. Manufacturers and distributors (including importers and exporters) of the 34 identified chemicals must establish controls to guard against theft or diversion, maintain records of all transactions, and report suspicious orders for these chemicals to DEA. DEA evaluates the effectiveness of List 1 facilities' respective physical security, sales, and storage procedures (see 21 CFR 1301 and 1310.02(a) and (b)). This information can help DHS by identifying the status of controls to guard against theft or diversion of certain highly dangerous chemicals.

U.S. Department of Labor Authorities

Occupational Safety and Health Act: Pursuant to the Occupational Safety and Health Act (29 U.S.C. 655) and the Clean Air Act, OSHA requires facilities that handle highly hazardous chemicals to institute a program of process safety management (29 CFR 1910.119). These regulations require regulated facilities to conduct a process hazard analysis, develop written operational procedures, investigate incidents involving the release of covered chemicals (including "near misses"), develop emergency action plans, and conduct compliance audits.

Regulations Impacting the Security of Chemicals During Transportation and Distribution

As DHS reports in the report "Chemical Sector-Specific Plan, An Annex to the National Infrastructure Protection Plan" that was released in 2010, transportation is critical to the Chemical Sector (including ethanol) as a key part of the chemical industry's value chain. Raw materials must be moved from suppliers to chemical manufacturers. Basic chemicals, intermediaries, and end products must be transported inside chemical facilities, to distributors, and to end users. While the transportation of chemicals within a facility is clearly the facility owner or operator's responsibility, the transportation of chemicals between facilities is primarily the responsibility of the transportation provider. Consequently, what follows is simply a brief summation of some of the relevant HAZMAT transportation laws and regulations. Similar to DHS, the U.S. Department of Transportation (DOT) has numerous divisions, many of which regulate, in part, the transportation of HAZMAT.

U.S. Department of Transportation Authorities

Hazardous Materials Transportation Act: Under the Hazardous Materials Transportation Act (49 U.S.C. 5101 et seq.), DOT has the authority to promulgate regulations regarding the safe and secure shipment of HAZMAT. Within DOT, this responsibility has been delegated to the Pipeline and Hazardous Materials Safety Administration (PHMSA) with enforcement authority shared by the modal administrations. Pursuant to this authority, PHMSA has established regulations governing the transportation of HAZMAT on public highways, by rail, in aircraft, and in vessels. In general, commercial HAZMAT move by permission of DOT granted through compliance with PHMSA's regulations, which are internationally harmonized to ensure that transportation is not unduly impeded. These regulations cover classification, packaging, emergency communication, training, and modal-specific requirements. Among PHMSA's rules are those that require sellers and transporters of certain types of HAZMAT to develop and implement security plans and conduct security training for employees. Security plans must be based on vulnerability assessments and must address personnel, access, and en route security related to HAZMAT in transportation. PHMSA ensures that the Nation's HAZMAT transportation rules are uniform through its preemptive authority over non-Federal requirements. PHMSA serves as the U.S. authority for HAZMAT transportation safety and security in international forums.

Enhancing Rail Transportation Safety and Security: On November 26, 2008 the Pipeline and Hazardous Materials Safety Administration (PHMSA) published a final rule under Docket HM-232E entitled "Hazardous Materials: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipments" (73 FR 72181). The final rule builds upon and responds to comments received regarding an interim final rule (IFR; 73 FR 20751) issued on April 16, 2008 by PHMSA. Together the rules require that railroads use routes with the fewest overall safety and security risks to transport security-sensitive hazardous materials. The newly established requirements fully comply with the 9/11 Commission Act of 2007 (signed into law on August 3, 2007). The rules were developed in close consultation with the Federal Railroad Administration (FRA) and were based on the TSA definitions for "security-sensitive material" and "high-consequence target." On July 1, 2008, railroads began implementing the various safety and security provisions of the rule and FRA's compliance oversight and enforcement commenced.

Narrowing the List of Materials Subject to Security Plan Requirements: On March 9, 2010 the Federal Register published a final rule under Docket HM-232F entitled "Hazardous Materials: Risk-Based Adjustment of Transportation Security Plan Requirements." As part of its continuing assessment of hazardous materials risk in transportation, PHMSA in consultation with DHS, narrowed the list of materials subject to security plan requirements. The revised list is based on an evaluation of the security risks associated with specific types and quantities of hazardous materials. Besides refining the list of materials with a potential for misuse in a terrorist incident, the final rule also clarifies certain requirements related to security planning, training, and documentation.

Federal Rail Safety Act: Under authority designated from the Secretary of Transportation, the Federal Railroad Administration's regulatory responsibilities include the safe and secure movement of freight on railways across the United States. This responsibility includes the design, manufacture, and repair of the equipment, freight cars, locomotives, and track used to carry packaged HAZMAT, and the gathering of

data on the movement of these chemicals throughout the United States, as well as internationally between the United States, Canada, and Mexico.

Department of Homeland Security Authorities

Rail Transportation Security: The TSA has security requirements (49 CFR 1580) for rail transportation that include freight railroad carriers and rail operations at certain fixed-site facilities that ship or receive specified HAZMAT by rail. The regulation codifies the scope of TSA's existing inspection program, requiring regulated parties to allow TSA and other DHS officials to enter, inspect, and test property, facilities, and records relevant to rail security. This section also requires parties to designate rail security coordinators and report significant security concerns to DHS. Freight rail carriers and certain facilities handling rail security-sensitive materials must also be able to report location and shipping information to TSA upon request and implement chain-of-custody requirements to ensure a positive and secure exchange of rail security-sensitive materials.

Hazardous Materials Transportation Act (HMTA): HMTA was amended by the USA PATRIOT Act, Public Law 107-56, 115 Stat. 272, Section 1012, and, more recently, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59 at 49 U.S.C. 5103a to require TSA, in conjunction with DOT, to administer safeguards for licensing HAZMAT transport drivers. Pursuant to this responsibility, TSA published regulations that can be found at 49 CFR Part 1572. Under these rules, the roughly 3.5 million commercial drivers with HAZMAT endorsements on their commercial driver's licenses are required to undergo a periodic security assessment based on a review of FBI criminal records, and immigration and other relevant international databases, as appropriate.

HAZARDOUS MATERIALS ANNEX

Commonwealth of Massachusetts

TABLE OF CONTENTS

I. INTRODUCTION

Hazardous materials (HazMat) incidents are common occurrences throughout the Commonwealth of Massachusetts. From simple gasoline spills to major chemical releases, the wide variety and prevalence of HazMats ensures that releases will continue to occur in the future.

Because of their frequency, most municipalities and the responders that serve them are familiar with HazMat incidents and have some capability to isolate, contain, and mitigate a release of hazardous substances. In response to these routine events, the Commonwealth provides oversight and direction in ensuring acceptable levels of cleanup and remediation. Additionally, local governments may request the technical and operational capabilities of the Department of Fire Services Hazardous Materials Response Teams (HMRT). The Massachusetts Department of Environmental Protection (MassDEP) has outlined these actions in a separate document entitled the Massachusetts Contingency Plan (MCP).

For HazMat events in which state resources and assets are needed to directly support response and remediation efforts, the Massachusetts Emergency Management Agency (MEMA) has established Emergency Support Function 10 (MAESF 10) – Environmental Protection and Hazardous Materials within the Commonwealth's Comprehensive Emergency Management Plan (CEMP). MAESF 10 broadly outlines state action in response to large or complex HazMat incidents and the relationship between state agencies that coordinate resources or provide support.

This annex was created to support the CEMP by further defining the roles and responsibilities of state agencies outlined in MAESF 10, and to provide a framework for state response efforts. This document is intended (1) to bridge the gap between MAESF 10 and HazMat response plans that already exist at the local and regional levels, and (2) to help local and regional planners better understand the capabilities and role of state resources in response to HazMat incidents.

This annex provides introductory information in Section I, presents HazMat threats in Section II, summarizes assumptions in Section III, and outlines the concept of operations in Section IV. References cited in this document are listed in Section V. This introduction describes the purpose of this annex, presents situational statements, discusses the scope of this annex, and outlines the criteria for each response level for a HazMat release.

A. Purpose

The purpose of the Massachusetts HazMat Annex is to ensure situational awareness and outline the operational activities surrounding a state response to a Level 2 or 3 HazMat incident (described in Section D of this introduction) within the Commonwealth of Massachusetts. The activities conducted by the Commonwealth are intended to support local responders as directed by the Massachusetts CEMP and may include activation of MAESF 10.

This plan is an Annex to the Commonwealth's CEMP and bridges the gap between the broad responsibilities of MAESF 10 and local and regional response plans. While this document addresses aspects of the Commonwealth's response to HazMat releases, it does not supersede or replace the

reporting, response, or remediation requirements placed on a potentially responsible party (RP) by MassDEP and outlined in the MCP.

B. Situation

Below are basic statements describing the situation related to HazMats and HazMat releases throughout the United States and the Commonwealth of Massachusetts. These situational statements lend context to planning for a HazMat release.

1. HazMats are an essential building block of modern society and are continuously being used, stored, or transported.

2. Unintentional releases of HazMats occur with varying potential for impacts to public health, safety, property, and the environment.

3. Many HazMat incidents can be handled at the local level where local and regional planning, resources, and expertise are sufficient to mitigate their impact.

4. Depending on the type and scope of the incident, supplemental state resources may be required to assist in a response to a HazMat release.

5. If a HazMat release is the result of a more widespread incident or disaster, state resources may be committed to other aspects of response or events concurrent with the incident.

6. A state HazMat annex is needed to outline response capabilities, resource activation, and assignment prioritization related to a state-level response to one or multiple HazMat releases.

7. Effective response to a major or serious HazMat incident may require outside resources of adjacent counties, cities, states, the federal government, and the private sector.

8. The RP is responsible for immediately notifying the appropriate agencies of a HazMat release.

C. Scope

This annex outlines state action in support of Level 2 or 3 HazMat events, including mobilizing and providing personnel, equipment, supplies, and other resources as required. This annex addresses actions surrounding an initial response and mitigation activities. State participation in long-term monitoring and remediation is governed by the MassDEP MCP.

This annex focuses on coordinating resources for the response aspects of a HazMat incident including accidental releases or instances of dumping/abandonment. This annex does not provide in-depth guidance for dealing with related or coinciding activities such as shelter-in-place, public warning, or evacuation operations. Additionally, the scope of this annex does not extend to off-shore or navigable waters. Intentional releases impacting homeland security are governed by the State Terrorism Incident

Response Plan and require a separate response structure and close involvement with law enforcement and the U.S. Federal Bureau of Investigation (FBI).

D. Response Level Criteria

The following generalized HazMat response level criteria are intended to be broad guidelines. Ultimate responsibility for determining the size, extent, complexity, and response level of any HazMat incident rests with the on-scene Incident Commander.

Level 1 – Controlled Emergency Condition

- Incident that can be controlled by the primary first response agencies of a local jurisdiction
- Single jurisdiction and limited agency involvement
- Does not require evacuation except for the affected structure or facility
- Confined geographic area
- No immediate threat to life, health, or property

Level 2 – Limited Emergency Condition

- Potential threat to life, health, or property
- Expanded geographic scope
- Limited evacuation of nearby residents or facilities
- Involvement of one or more jurisdictions
- Limited participation or mutual aid needed from agencies that do not routinely respond to emergency incidents in the area
- Specialist or technical team is called to the scene
- Combined emergency operations required such as fire fighting and evacuation, or containment and emergency medical care

Level 3 – Full Emergency Condition

- Serious hazard or severe threat to life, health, and property
- Large geographic impact
- Major community evacuation
- Multi-jurisdictional involvement
- State and federal involvement

- Specialists and technical teams deployed
- Extensive resource management and allocation
- Multiple emergency operations

II. THREAT

This section describes the types of HazMat releases (Section A) and vulnerable locations, populations, dates and times, and coinciding events that could be affected by HazMat releases (Section B).

A. RELEASE TYPES

HazMat releases generally fall into one of the three following categories:

1. **Fixed Facility/Storage Incidents** – Most HazMats are either used in the production of other goods and materials or are stored in various quantities at fixed locations. In either case, HazMats are usually adequately marked and identified. Additionally, when present in large quantities or presenting a significant hazard, additional safeguards such as secondary containment, remote sensors, warning sirens, and on-site HazMat responders are sometimes required. Certain facilities with chemicals classified as Extremely Hazardous Substances (EHS) are required by federal law to have plans specifically outlining how a release creating off-site impacts will be managed. This preplanning, along with the communication and preparedness activities of the local community, allows many releases at fixed facilities to be managed at the local level.

   However, while the predictability of a fixed facility allows for pre-event mitigation and planning, the prevalence of these facilities suggests that HazMat releases will continue to occur. Regardless of preparedness activities, some events will be too large, too complex, or too remote to be handled at the local level. In these instances, rapid response from state resources will be needed to supplement local assets and ensure an acceptable resolution to the event.

2. **Transportation Incidents** – Though releases at fixed facilities are confined to known geographic areas, transportation HazMat incidents occur virtually anywhere. While these events are somewhat limited in scope due to the quantity of material that can be transported, events involving tractor trailers, rail cars, and ships may involve quantities in excess of those at many fixed facilities. Furthermore, different types of HazMats are often transported together and, depending on the incident, HazMat placards and cargo manifests may be difficult to discern. For this reason, transportation incidents have an increased chance of volatile reactions as a secondary risk to the initial release.

   Close proximity of transportation routes and dense population centers makes the release of even minimal quantities of some HazMats potentially disastrous. Without warning sirens and notification systems that are sometimes available at fixed facilities, timely notifications to the

public concerning evacuation or shelter-in-place decisions becomes increasingly difficult. State assistance will be imperative in helping to safely isolate the incident and provide public health expertise.

3. **Incidents of Unknown Origin (e.g. dumping, abandonment)** – Releases of unknown origin can be challenging because of delayed notification. Often these incidents are caused by illegal dumping or abandonment and the RP may have gone to great lengths to hide the release. As a result, releases of unknown origin may have an extended period in which to contaminate their surroundings and migrate unabated. These types of releases are particularly challenging when waterways have been impacted.

   Incidents of unknown origin may necessitate state assistance during the initial stages when the chemical identity and public impact is still unknown. Furthermore, in the aftermath of a regional disaster such as flooding or severe weather, numerous releases may be discovered. State resources may be needed to supplement local responders for what otherwise may have been routine or manageable events.

B. Vulnerabilities

This section discusses the vulnerable locations, populations, dates/times, and coinciding events that could be affected by a HazMat release.

1. **Locations**

   a. **Urban Areas** – Urban areas provide the largest potential for public impact primarily because of population density and the prevalence of HazMat facilities and transportation routes. These concerns are somewhat offset by the presence of highly evolved emergency response systems and plans. While urban areas tend to have access to more resources to call upon, the size and complexity of potential events can cause local resources to be quickly overwhelmed.

   b. **Rural Areas** – While usually lacking the dense population concerns of an urban environment, rural areas often have limited response capabilities compared to urban areas. Long distances, often coupled with rough terrain, may hamper response efforts and greatly delay arrival of additional resources or mutual aid.

   c. **Inaccessible Areas** – Regardless of proximity to response resources, releases that occur within inaccessible areas may present a unique challenge. Releases involving trains or ships may be inaccessible by road. Events in inaccessible areas may necessitate coordination of water or air resources and assets.

   d. **Lakes, Streams, and Rivers** – Waterborne HazMat releases can quickly become disastrous to both the environment and to sources of water allocated for human consumption and agricultural purposes. These releases travel swiftly over vast areas and their effects on the environment quickly emerge. A massive response to quickly mitigate releases to lakes,

streams, and rivers may be required in order to avoid expensive and long-term remediation efforts in the future.

e. **Environmentally Sensitive Areas** – Environmentally sensitive areas are often the most vulnerable to the effects of HazMat releases. Fragile ecologies and rare species may be severely impacted or lost forever if these releases are not carefully managed. Additionally, special care must be taken not to further damage the area through the sudden arrival of large numbers of responders. Impact of the release must be balanced with the negative effects associated with a large-scale response effort involving a rapid influx of personnel and materials to the area.

2. **Populations**

a. **General Public** – Incidents involving large numbers of potentially impacted people require complex coordination to ensure quick and effective dissemination of public information and direction in the event of a shelter-in-place or evacuation decision.

b. **Individual Requiring Additional Assistance (IRAA)** – IRAA populations such as the elderly or disabled require additional support and assistance if evacuation is warranted. These functional needs populations may be unable to self-evacuate and may need to shelter in place until assistance can be provided.

c. **Foreign Cultures/Languages** – Public Information must be tailored to the public's needs and accessible modes of communication. Some cultures may be sensitive to government authority or reluctant to heed advice to leave their homes. Rapid involvement of foreign language media outlets and community or religious leaders may be needed to effectively communicate to specific populations.

d. **Schools and Daycare Facilities** – While many schools possess shelter-in-place or evacuation plans, transportation to a safe location can be challenging. Mobility and functional needs issues compound these challenges. In many cases, managing parents will be the greatest challenge when schools are impacted by a HazMat incident. Because parents' reactions may range from simply seeking information to arriving on scene to look for their children, great effort must be taken to keep parents informed, reduce their apprehension, and ensure that no unnecessary risks or delays occur as a result of their reactions.

e. **Hospitals and Nursing Homes** – Medical facilities are very difficult to evacuate. Unless directly impacted by an immediate threat such as a fire or an internal release, sheltering in place is often preferred. Many patients are non-ambulatory and will require assistance exiting the building. Other patients may be unable to survive without specialized medical equipment that is impractical or impossible to move. As a result, the decision to evacuate a hospital or nursing home must be made with the knowledge that unless detailed preplanning has occurred, some patients may not survive the process.

f. **Jails, Prisons, and Courthouses** – HazMat responses at jails, prisons, police stations, and courthouses presents several planning challenges. Police stations and courthouses often

have prisoners and holding cells while jails and prisons often have a population of special needs prisoners as well as a medical facility. At a minimum, prisoners will require additional supervision and transportation assets capable of transporting large numbers of inmates while ensuring effective control. As with hospitals, it is often preferable to have prisons shelter in place rather than evacuate, and preplanning for these circumstances by the facility is imperative.

g. **Stadiums** – While only a concern when full, stadiums usually lack the ability to shelter occupants in place. As a result, evacuation may be the only option, which may present a challenge as people leave the stadium and attempt to get to their vehicles or leave parking lots. To ensure timely evacuation, preplanning to coordinate vehicular transportation is crucial and should emphasize provisions for IRAA populations.

h. **Military Installations/Armories** – Military installations and armories present special challenges because of the type of equipment and supplies stored or in use.

i. **Critical Infrastructure** – Critical infrastructure including municipal buildings, dams, power plants, bridges and wastewater treatment plants may not be able to be evacuated. In some cases extra time may be needed to ensure a facility has been secured or safely shutdown before evacuations can occur.

3. **Date/Time**

   a. **Nights and Weekends** – Non-business hours have the benefit of reduced highway and road activity. However, with the exception of full-time public safety agencies, most responders will need added response time. Additionally, emergency managers and other support agency personnel such as technical experts will have to be called before robust planning and organizing activities can occur.

   b. **Holidays** – Similar to nights and weekends, responders and other assets will have longer response times on holidays. Additionally, many people may be out of town or on vacation, which may limit surge staffing capacity of areas that rely on volunteer departments for response.

   c. **Rush Hour** – Any time large numbers of people are gathered, the risk of a HazMat incident occurring increases. Rush hour compounds the problem by preventing responders and other assets from moving effectively. Drivers may be reluctant to leave their vehicles if instructed or may make the decision on their own, further compounding the traffic problem.

4. **Coinciding Events**

   a. **Regional Disasters** – Response efforts to a HazMat incident in the wake of or during regional disasters may suffer from a lack of personnel and resources. Responders and other assets will be committed to other operational areas and concerns. Prioritizing activities are challenging for both local governments and the state agencies involved.

   b. **Spectator Events** – Spectator events such as baseball, football, and basketball games often involve large numbers of people confined in a stadium and increased traffic congestion.

HazMat releases impacting these events will have an added layer of complexity because of the number of people in a geographically compressed area.

c. **Gatherings (e.g. parades, celebrations, etc.)** – Any large gathering of people presents challenges to responders during a HazMat release. Often events such as parades and other celebrations have little or no planning for effective crowd dispersion or communication. Each event is different and requires coordinated response efforts to overcome these challenges.

III. ASSUMPTIONS

Below is a list of assumptions used when constructing this annex:

1) HazMat incidents may occur at any time with little or no warning.
2) HazMat incidents of varying degrees occur frequently.
3) Many HazMat incidents can be handled at the local level.
4) Local responders have some familiarity with HazMat response.
5) Local and regional HazMat response plans exist.
6) Some HazMat incidents will overwhelm local and regional responders.
7) The Commonwealth of Massachusetts will be requested to provide HazMat response support.
8) The Commonwealth of Massachusetts will provide assistance when requested.
9) Along with resources specifically tailored to HazMat response, the Commonwealth of Massachusetts has other assets that may be useful when mitigating a HazMat release.
10) At the time of an aid request, state resources may be committed to other emergency response efforts, potentially including coinciding HazMat releases.
11) The state will prioritize its operational needs and deploy or redeploy assets as needed.
12) The state will call upon other mutual aid resources and the federal government as needed.
13) Proper implementation of local plans reduces or prevents releases and related harmful exposures to the public and to the environment.
14) Use of local and outside resources requires careful coordination.
15) Knowledge of hazards and appropriate training lower the potential for HazMat incidents.

16) Protective actions for the general population may include in-place sheltering or evacuation.

IV. CONCEPT OF OPERATIONS

This section details the concept of response operations, including notifications, activation, response operations, and recovery actions.

A. NOTIFICATIONS

Although separate reporting requirements under the MCP require facilities and responsible parties to report to MassDEP and the National Response Center (NRC), emergency responders need only escalate notifications in the event additional resources may be needed. If the incident has the potential to reach a Level 2 or 3 response, MEMA should be notified. The chain of notification is as follows:

1. **Initial Discovery** –A facility operator, first responder, or member of the general public will likely discover the HazMat release.

2. **Local Notification** – Calls from the discovering party to 9-1-1 will be the most likely avenue of local agency notification.

3. **Regional** – Local jurisdictions may call for support from adjacent municipalities or directly to the regional HMRT in accordance with local plans and procedures.

4. **MEMA** – Once the Incident Commander has determined the event to be a Level 2 or 3 emergency, MEMA should be contacted via the State Emergency Operations Center (SEOC).

5. **MAESF 10 Lead Agencies** – MAESF 10 lead agencies such as the Executive Office of Energy and Environmental Affairs, the Department of Environmental Protection (MassDEP), the Department of Fire Services (DFS), and the Department of Public Health (DPH) will be notified by MEMA if the activation of MAESF 10 is required. These agencies may also have been notified directly by the on-scene Incident Commander in accordance with requests for assistance or support.

6. **MAESF 10 Supporting Agencies** –MEMA will notify agencies with tertiary MAESF-10 roles as needed when it is determined that state action is or may become necessary.

7. **Other State Agencies** – MEMA will notify state agencies without a direct role in MAESF 10 as needed.

8. **Executive Branch** – MEMA will notify the executive branch in accordance with its internal policies and procedures.

9. **Federal Assistance** – MEMA will request federal assistance for a HazMat incident through the Regional Response Team (RRT). Other requests will be coordinated in accordance with the National Incident Management System (NIMS) and the National Response Framework (NRF)

10. **Alternate Notification** – Because of MCP reporting requirements for the RP or requests for assistance from the on-scene Incident Commander, MassDEP or DFS may be notified of a

HazMat release before MEMA. MassDEP and DFS should notify MEMA if it receives information concerning a release with a high probability of becoming a Level 2 or 3 emergency.

B. ACTIVATION

This plan is activated upon state notification of an actual or potential Level 2 or 3 HazMat emergency. The SEOC will act in coordination with the local emergency management agency or designee and the Incident Commander to determine whether additional state resources are required. Once additional assistance is required or becomes likely, the SEOC will contact the lead agency for MAESF 10 at its discretion. MAESF-10 support agencies and other MAESFs will be requested as needed.

C. RESPONSE OPERATIONS

This section describes the command and control structure and agency responsibilities for response operations.

1. **Command and Control**

   a. **Incident Command System –** The incident will be managed on scene using the Incident Command System (ICS). This system allows responders from multiple agencies and jurisdictions to operate in a coordinated manner with common objectives, communication, and organization.

   b. **Unified Command –** A unified command structure is used when incidents involve several jurisdictions or several agencies from the same political jurisdiction. A unified command structure allows all agencies with responsibilities for an incident, either geographical or functional, to establish a common set of incident objectives and strategies to which all can subscribe. Upon request or arrival, state agencies may form a unified command with the local on-scene Incident Commander.

   c. **State Emergency Operations Center –** The SEOC in Framingham, Massachusetts, provides full-time monitoring and coordination of emergency events. Depending on the size and complexity of the incident, the SEOC will act as a coordinating center between state agencies up to and including full activation of all applicable emergency support functions.

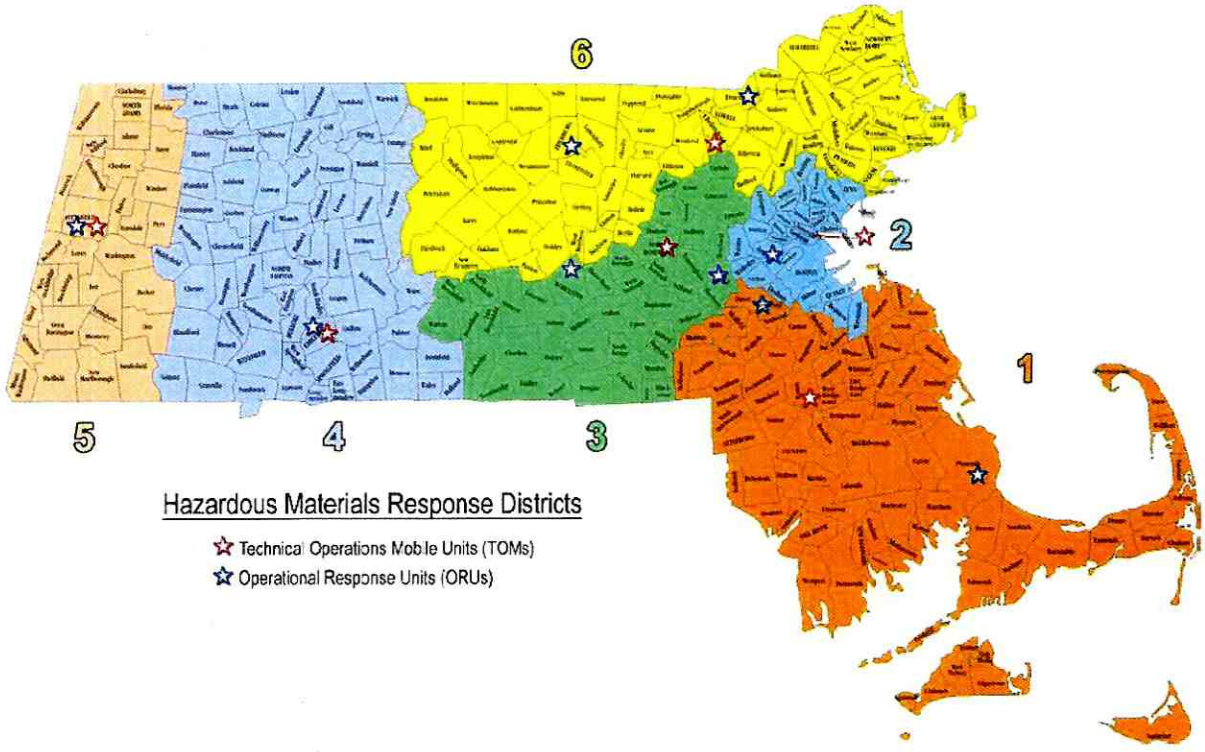
   d. **Massachusetts Emergency Support Function 10 –** The Executive Office of Energy and Environmental Affairs coordinates MAESF 10 – Environmental Protection and Hazardous Materials. MAESF 10 is closely supported by the MassDEP, DFS, and DPH. These core agencies act in coordination with other MAESFs to ensure all aspects of a response are supported. MAESF 10 coordinates closely with MAESF 4 – Firefighting. Through MEMA, MAESF 10 is the conduit through which state resources are channeled into a HazMat incident response.

   e. **Adjacent State and Federal Aid –** In addition to MAESF 10, SEOC can also request adjacent state and federal mutual aid resources. With limited exception, all requests for these resources should be made to the SEOC through the local emergency management agency (EMA) (if activated) or an on-scene MEMA representative if available. In certain cases,

municipalities in proximity to other states may have local mutual aid agreements with other local governments in adjoining states. In these cases mutual aid can be requested at the local level. All requests for mutual aid must be approved by the Incident Commander. MEMA will request federal HazMat response assistance through the federal Regional Response Team (RRT).

f. **Hazardous Materials Response Teams** – The Commonwealth of Massachusetts has six HazMat response districts (illustrated in Figure 1 below), and each district has an HMRT. These teams have resources staged at various locations throughout their districts to reduce initial response time. HMRTs can be requested directly by the on-scene Incident Commander as needed. HMRTs are an asset of the Department of Fire Services but upon being dispatched to a HazMat incident, HMRTs are included in the on-scene ICS structure.

Figure 1: Regional Hazardous Materials Response Teams (HMRT)



g. **Mass Decontamination** – Massachusetts has a robust system for mass decontamination of victims. Deployment of specialized mass decontamination units (MDU) is coordinated through the Fire District Control Centers and MEMA Communications section. Depending on the incident, decontamination resources may be sent to the site to provide on-scene decontamination for large numbers of people, while additional resources may be sent directly to hospitals to decontaminate arriving patients.

h. **Security** – Security operations are primarily a law-enforcement activity and will be coordinated through the on-scene ICS elements and by MAESF 16 (Law Enforcement and

Security) at the state level. Depending on the size and nature of the incident, additional security resources may be needed from the Massachusetts National Guard and can be requested through MAESF 13 (Military Support). Security at HazMat releases will often include keeping and patrolling a perimeter, establishing crowd control, and maintaining the flow of traffic around the incident, as described below:

Perimeter - Security perimeters should be large enough to account for sudden changes in wind direction or the sudden release of a pressurized vessel. While monitoring devices may be used to establish the direction and size of a chemical plume, the perimeter established for human occupancy should extend beyond this zone. While some law enforcement officers are equipped with personal protection equipment (PPE) including gas masks and chemical-resistant clothing, the security perimeter should be established far enough away from the incident that this equipment is not needed.

Crowd Control - Crowd control can be an essential part of a successful HazMat operation, especially if large numbers of contaminated people need decontamination. For proper decontamination to occur, crowds must remain calm and orderly while waiting their turn. This may be especially true at hospitals where large numbers of self-presenting patients may be requesting treatment or decontamination while higher-priority patients arrive from the scene. This scenario may require the deployment of law enforcement personnel to the receiving hospitals.

Traffic Control - Traffic control is usually an issue whenever a perimeter is established. Law enforcement officers trained in traffic management will most likely be required to keep traffic away from the affected area. This will become even more critical during an evacuation when large numbers of people are fleeing an area. In these cases, officers must keep the flow of traffic steadily moving to avoid a gridlock situation.

i. **Evacuation/Shelter in Place** – When a HazMat release impacts or has the ability to impact the nearby population, a shelter-in-place or evacuation decision must be made. While these two activities are simple in theory, they can be immensely complicated in practice. As a result, local and regional responders and officials must have adequate plans and resources for either. Shelter-in-place and evacuation decisions are made by the on-scene Incident Commander but may require significant state resources. These options are briefly discussed below:

Shelter-in-Place – Sheltering in place within homes or businesses may be less complicated and quicker than an evacuation; however, time becomes a factor as the HazMat plume may slowly begin permeating buildings and people become increasingly uncomfortable without air conditioning or heat. Nonetheless, sheltering in place may be the safest option while a coordinated evacuation plan is developed and IRAA populations can be assisted.

Evacuation – In incidents involving a limited number of people, evacuating the area can be quick and efficient. An evacuation ensures that the public will have no contact with the release and gives the Incident Commander time to more thoroughly assess the situation before making entry decisions. Additionally, when an incident involves a transportation accident or a facility equipped with a siren or communications system, self-evacuations may already have occurred. Depending on the size of the impacted area and the inclusion of IRAA populations (such as hospitals, prisons, and schools), evacuations may become extremely long or arduous and an evacuation may prompt people to leave their homes or businesses and become immediately exposed to the released chemical. In these instances, sheltering in place may be a more effective solution.

j. **Public Information** – All public information concerning state assets or responses must be coordinated through either the on-scene Public Information Officer (PIO) or the SEOC and MAESF 14 (Public Information) in accordance with MEMA's public information procedures. In addition, the Incident Commander must approve all information disseminated regarding that specific incident. During certain complex events, PIOs from the state level may be requested on scene. In the event that PIOs are requested, requests will be coordinated through the SEOC or MAESF 14 (Public Information) as necessary.

k. **Other** – All other resources, needs, and requests will be handled through the SEOC or appropriate MAESF. MEMA will serve as the coordinating agency for all additional state or federal resource requests and will ensure timely requests for information or resources between the MAESFs.

2. Agency Responsibilities

a. **Responsibilities of Primary Agency** – MEMA is the primary Massachusetts agency responsible for coordination of state resources. MEMA will:

- Work with federal, state, and local agencies to identify potential emergencies, mitigate risks, and support response and remediation efforts if necessary
- Notify federal response authorities and other required state authorities as needed
- Coordinate state-level response activities and resources based on MAESF structures
- Track response expenditures, file appropriate reports and financial statements, and coordinate post-incident reimbursement procedures

b. **Responsibilities of Support Agencies** – In addition to those responsibilities already cited, support agencies shall provide the following special resources or capabilities:

1. The Executive Office of Energy and Environmental Affairs will:

a. Manage overall efforts of MAESF 10

b. Ensure that requests for state and federal assistance through MAESF 10 are directed to the appropriate requesting agency

c. Coordinate with MassDEP to ensure an efficient transition to the recovery phase

2. The Massachusetts Department of Environmental Protection (MassDEP) will:

   a. Work in conjunction with the Executive Office of Environmental Affairs to coordinate efforts of MAESF 10

   b. Ensure a successful transition to response and recovery guidance under the MCP

   c. Provide technical and scientific support

   d. Provide limited HazMat response PPE and equipment as available

3. Massachusetts State Police will:

   a. Provide support for security coverage and access to the incident site if needed

   b. Facilitate transportation of required assets to and from the incident site and/or staging areas

   c. Field and support requests for Bomb Squad resources

   d. As directed, establish and maintain traffic control and staging area discipline

4. Massachusetts Department of Fire Services (DFS) will:

   a. Provide HazMat support to contain, confine, and control releases of HazMat releases as requested

   b. Coordinate response of HMRT and MDU

   c. Perform estimates of the downwind hazard

   d. Determine the nature of and identify the hazard

   e. Execute site management and site safety functions

   f. Coordinate emergency decontamination of victims

   g. Execute technical decontamination of responders

5. Massachusetts Department of Public Health (DPH) will:

a. Assess human exposure to chemical agents by analyzing clinical specimens for contaminants of concern and/or their metabolites

b. Carry out testing of environmental and clinical samples for chemical or radioactive materials related to the incident

c. Deploy Chempack stockpiles in response to specific hazardous materials releases

d. Deploy the Strategic National Stockpile (SNS) and local pharmaceutical caches as necessary

e. Engage federal partners to assist with testing of environmental and clinical samples related to the incident

f. Evaluate both short and long-term potential health impacts from exposure and from contamination of food, water, and soil

g. Evaluate environmental data for possible health impacts that will inform appropriate actions

h. Provide technical and scientific support such as from the Field Assessment Support Team (FAST) and laboratory support from the Wall Experiment Station (WES)

i. Facilitate recovery process to include disposal of impacted food, cleanup of indoor spaces, evaluation of housing, and provision of risk communication for the public

j. Identify vulnerable populations in the affected area to inform evacuation and long-term treatment issues

k. If feasible, conduct health surveillance activities to determine health impact of the release

l. Notify and work with healthcare facilities to respond to event

m. Provide laboratory identification of unknown chemicals and confirmation of field screening results

n. Provide safety guidance for first responders and the public

o. Work with MassDEP, HazMat teams, U.S. Environmental Protection Agency (EPA) and other partners to determine environmental pathways (air, water, soil, and food) for contamination and evaluate human exposure potential that may lead to recommendations for sampling

6. Massachusetts National Guard <u>may</u> provide:

   a. Civil Support Teams (CST) chemical response team to augment HazMat personnel and provide chemical support

b. Basic needs equipment/supplies (e.g. food, water, tents, etc.)

c. Decontamination capability

d. Engineer units

e. Helicopters

f. Scene security

g. Water purification

c. **Responsibilities of Federal Government.** Federal responsibilities are outlined in the NRF and the NIMS. Federal resources are available specifically for incidents that expand beyond available local, state, and mutual aid resources.

D. RECOVERY ACTIONS

Once the response phase of a HazMat release is complete, recovery actions and remediation activities often continue for months or years. Depending on the incident, the recovery action process is usually overseen by MassDEP in conjunction with the EPA and other agencies as warranted. These actions are outlined in the MCP.

In order to transition from the response phase to the recovery phase, the Incident Commander--in conjunction with the Safety Officer and HazMat Branch Chief--must be reasonably certain that no immediate threat to health and safety, personal property, or the environment remains. This standard applies to immediate hazards and does not include elevated risks from exposure to long-term pollution or contamination, which fall under the MCP.

V. REFERENCES

State:

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1. National Response Framework. January 2008.

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5. National Incident Management System. December 2008.

6. NRT-1 Hazardous Materials Planning Guide. National Response Team. 2001.

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LARGE-VOLUME / HIGH-CONCENTRATION ETHANOL ANNEX

Commonwealth of Massachusetts

TABLE OF CONTENTS

I. INTRODUCTION

Ethanol has been a component of blended motor vehicle fuels in the United States since the early 1970s. Since 2000, it has come into greater use as an alternative to fuel additives such as methyl tertiary butyl ether MTBE. Ethanol is also used in greater concentrations (up to 85%) in blended fuels as an alternative to gasoline itself for use in automobiles specially designed to run on it.

According to the Renewable Fuels Association, the national trade association for the U.S. ethanol industry, the United States produced 13.2 billion gallons of ethanol in 2010, up from 1.6 billion gallons in 2000. In January 2011, 204 ethanol plants were operating in the United States, up from 54 plants in January 2000. Ethanol production is predicted to continue to increase, largely due to the mandates of the Energy Policy Act of 2005, which was amended by the Energy Independence and Security Act of 2007 (EISA). The Energy Policy Act established substantial tax credits for installation of alternative fuel infrastructure. One of the stated aims of the EISA is to increase the production of clean renewable fuels. The EISA defines "applicable volumes of renewable fuel" that must be produced, the largest of which is ethanol that is blended into gasoline.

The increase in ethanol production and the construction and expansion of new plants has not been hampered by the logistical concerns of transport and storage. Ethanol is transported over land and water by rail tank cars, tanker trucks and barges and ships. It is not presently transported via pipeline because of its particular hazards (such as corrosivity) that differ from those of more ubiquitous fuels such as gasoline. As the infrastructure for ethanol production, storage, and transportation expands throughout the country, local emergency planners must be aware of the ethanol that may be produced, stored, and transported within their jurisdictions and the resources that are available for response, and must plan accordingly.

Fortunately, catastrophic releases of ethanol into the environment have been relatively few since ethanol first gained prominence as a fuel and fuel additive. However, the releases that have occurred caused incidents affecting in facilities, rails, roadways, and marine industry. Some of the notable facility incidents occurred in Kentucky at plants that distill ethanol for alcoholic beverages. Local emergency planners can learn from these incidents, and can use this document to better prepare for responses to an emergency incident involving ethanol.

A. Purpose

The purpose of the Massachusetts Large-Volume/High-Concentration Ethanol Appendix is to promote situational awareness and outline the operational activities surrounding a state response to an emergency involving ethanol within the Commonwealth of Massachusetts. The activities conducted by the Commonwealth are intended to support local responders as directed by the Massachusetts CEMP and may include activation of MAESF-10. This appendix intends to provide the information required to refine the plans and procedures documented in the Hazardous Materials Annex to address the challenges involved with a large-quantity/high-concentration ethanol emergency.

B. Situation

The basic statements listed below describe the situation related to ethanol throughout the United States and the Commonwealth of Massachusetts. These statements lend context to planning for an ethanol release.

1. Ethanol is blended into nearly half the gasoline produce in the United States.
2. Ethanol-blended fuels are available coast to coast.
3. Ethanol production continues to increase.
4. Transportation of ethanol occurs over rail, water, and road.
5. Transloading of ethanol, where ethanol is moved from a railcar to a tanker truck on a rail siding, occurs on rail sidings that may have minimal fire control equipment.
6. Ethanol and ethanol fuel blends have different properties than gasoline and require different firefighting techniques and equipment.
7. Under fire conditions, high-concentration ethanol has less visible smoke than a gasoline fire.
8. Depending on the type and scope of the incident, supplemental state resources may be required to assist in a responding to an ethanol release.
9. Ethanol has a wider flammable range than gasoline.
10. Aqueous Film-Forming Foam (AFFF) and copious amounts of water are ineffective fire suppression techniques for fire involving high concentrations of ethanol.

C. Scope

This annex outlines the actions the state intends to take in support of a Level 2 or 3 incident involving ethanol (as defined below), including mobilizing and providing personnel, equipment, supplies, and other resources as required. This annex addresses actions surrounding an initial response, mitigation activities, and the recovery process. Massachusetts Department of Environmental Protection (MassDEP) Contingency Plan (MCP) governs state participation in long-term monitoring and remediation.

This annex does not provide in-depth guidance for dealing with related or coinciding activities such as shelter-in-place, public warning, or evacuation operations. Additionally, the scope of this annex does not address off-shore or navigable waters and the interfacing with the appropriate authority having jurisdiction (United States Coast Guard, US EPA, Local FD, and/or Mass DEP). Intentional releases impacting homeland security are governed by the State Terrorism Incident Response Plan and require a

separate response structure and close involvement with law enforcement and the U.S. Federal Bureau of Investigation (FBI).

D. Response Level Criteria

The following generalized large-volume ethanol response-level criteria are intended to be broad guidelines. Ultimate responsibility for determining the size, extent, complexity, and response level of any ethanol incident rests with the on-scene Incident Commander.

Level 1 – Controlled Emergency Condition

- Incident that can be controlled by the primary first response agencies of a local jurisdiction
- Single jurisdiction and limited agency involvement
- Does not require evacuation except for the affected structure or facility
- Confined geographic area
- No immediate threat to life, health, or property

Level 2 – Limited Emergency Condition

- Potential threat to life, health, or property
- Expanded geographic scope
- Limited evacuation of nearby residents or facilities
- Involvement of one or more jurisdictions
- Limited participation or mutual aid needed from agencies that do not routinely respond to emergency incidents in the area
- Specialist or technical team is called to the scene
- Combined emergency operations required such as firefighting and evacuation, or containment and emergency medical care

Level 3 – Full Emergency Condition

- Serious hazard or severe threat to life, health, and property
- Large geographic impact
- Major community evacuation
- Multi-jurisdictional involvement

- State and federal involvement
- Specialists and technical teams deployed
- Extensive resource management and allocation
- Multiple emergency operations

II. THREAT

This section describes the types of ethanol releases (Section A) and vulnerable locations, populations, dates and times, and coinciding events that could be affected by these releases (Section B).

A. RELEASE TYPES

Releases generally fall into one of the three following categories:

1. Storage/Blending/Production Facility Incidents – At fixed facilities, ethanol storage tanks should be properly marked and identified utilizing the NFPA 704 marking system. Additionally, when present in large quantities, safeguards such as secondary containment, remote sensors, and specialized firefighting equipment are sometimes present. Proper planning, along with the communication and preparedness activities of the local community, allows many releases at fixed facilities to be managed at the local level. The different types of ethanol fixed facilities are listed below.

    a. Production Facilities - Ethanol production facilities conduct activities related to the manufacture of ethanol, such as mashing and distilling corn. Many production facilities are located in the midwest United States to be close to where a large amount of corn is grown in order to be cost effective. Sugar cane is also used as a feedstock for ethanol. New technological research is leading to ethanol produced by algae and other methods, so that such production facilities need not be located near farmland.

    b. Bulk Storage Facilities - Bulk ethanol storage facilities, or terminals, receive shipments of ethanol products by marine vessels and rail tank cars. At these facilities, ethanol is blended with gasoline in varying percentages and distributed to smaller facilities.

    c. Retail Filling Stations - Retail filling stations, commonly referred to as "gas stations," store and dispense ethanol and ethanol-blended fuels for use by consumers in automobiles and other vehicles and equipment with internal combustion engines.

2. Transportation Incidents – Though releases at fixed facilities are confined to known geographic areas, transportation incidents may occur anywhere ethanol transits. High-concentration ethanol is moved throughout the United States on railways and barges. Events involving multiple rail cars may involve aggregate quantities in excess of those at fixed facilities. Different types of hazardous materials may be transported on the same train, creating additional hazards.

For this reason, transportation incidents have an increased chance of volatile reactions as a secondary risk. The different types of ethanol transportation options are listed below.

a. Rail - The most common mode of transportation for fuel ethanol leaving an ethanol production facility is via rail transport. An estimated 70 percent of all ethanol produced today will travel via rail during the path to the marketplace, as it has been proven to be an extremely efficient mode of transportation of ethanol. Commonly referred to as a "virtual pipeline," a single-unit train may contain upwards of 2.5 million gallons of fuel ethanol. Ethanol is shipped in standard rail tank cars (approved for flammable liquids): DOT 111A or AAR T108 rail cars. Rail tank cars that carry ethanol usually have a capacity of approximately 30,000 gallons. Rail tank cars may be unloaded on private sidings or railroad-siding facilities equipped for transferring flammable or combustible liquids.

b. Marine Vessel - Marine vessels used for transportation of ethanol include tank barges and tank ships. Tank barges are more commonly used to transport ethanol than tank ships in the United States. Tank barges and ships that are certified to carry chemicals such as ethanol are constructed differently than those that carry oil (e.g., coated or stainless steel for cargo tanks is used to withstand corrosivity of the chemicals they carry). Local emergency planners are encouraged to familiarize themselves with the types of marine traffic that may call facilities located within their jurisdiction, or that transit water bodies in or adjacent to their jurisdictions.

c. Tanker Trucks – Tanker trucks are commonly used to transport ethanol products from storage and blending facilities to retail filling stations. A typical tanker truck has a capacity of 8,000 gallons. Tankers are loaded by means of a "rack" from a tank at a storage facility. They may also be loaded directly from a rail tank car at a siding. Tanker trucks then transport the ethanol to retail filling stations, where they offload their tanks to the stations' storage tanks.

B. Vulnerabilities

This section discusses the vulnerable locations, populations, dates/times, and coinciding events that could be affected by a hazardous materials (HAZMAT) release.

1. Locations

a. Urban Areas – Urban areas provide the largest potential for public impact primarily because of population density and the prevalence of ethanol facilities and transportation routes. These concerns are somewhat offset by the presence of highly evolved emergency response systems, plans, equipment, and training. While urban areas tend to have access to more resources, the size and complexity of potential events can cause local resources to be quickly overwhelmed.

b. Rural Areas – While usually lacking the dense population concerns of an urban environment, rural areas often have limited response capabilities compared to urban areas. Long distances, often coupled with rough terrain, may hamper response efforts and greatly delay arrival of additional resources or mutual aid. Additionally, the open environment presents a greater risk to environmental impact than that of the more urban environment.

c. Inaccessible Areas – Regardless of proximity to response resources, releases that occur within inaccessible areas may present a unique challenge. Releases involving transportation vessels may be inaccessible by road. Events in inaccessible areas may necessitate coordination of alternate resources such as water and air responses.

d. Lakes, Streams, and Rivers – Waterborne ethanol releases can quickly become disastrous to both the environment and to water sources allocated for human consumption and agricultural purposes. While ethanol dissipates in water, the additional chemicals used to stabilize the product or the gasoline mixture will present challenges during the recovery process. These byproducts and mixing agents may travel swiftly over vast areas, quickly impacting the environment. A massive response to quickly mitigate releases to lakes, streams, and rivers may be required in order to avoid expensive and long-term remediation efforts in the future.

e. Environmentally Sensitive Areas – Environmentally sensitive areas are often the most vulnerable to the effects of HAZMAT releases. Fragile ecologies and rare species may be severely impacted or lost forever if these releases are not carefully managed. Additionally, special care must be taken not to further damage the area through the sudden arrival of large numbers of responders and/or equipment. Impact of the release must be balanced with the negative effects associated with a large-scale response effort involving a rapid influx of personnel and materials to the area.

2. Populations

a. General Public – Incidents involving large numbers of potentially impacted people require complex coordination to ensure quick and effective dissemination of public information and direction in the event of a shelter-in-place or evacuation decision. While the effects of ethanol are considered to be minor on the human population, the impact in confined spaces (such as basements) of intact structures may lead to the risk of explosion, thus creating a risk to the general population.

b. Individual Requiring Additional Assistance (IRAA) – IRAA populations such as the elderly or disabled require additional support and assistance if evacuation is warranted. These populations may be unable to self-evacuate and may need to shelter in place until assistance can be provided. Additionally, IRAA populations may be more susceptible to the effects of product contamination based on pre-existing conditions.

c. Foreign Cultures/Languages – Public Information must be tailored to the public's needs and accessible modes of communication. Some cultures may be sensitive to government

authority or reluctant to heed advice to leave their homes. Rapid involvement of foreign language media outlets and community or religious leaders may be needed to effectively communicate to specific populations.

d. Schools and Daycare Facilities – While many schools possess shelter-in-place or evacuation plans, transportation to a safe location can be challenging. Mobility and functional needs issues compound these challenges. In many cases, managing parents will be the greatest challenge when schools are impacted by a large-volume ethanol incident. Because parents' reactions may range from simply seeking information to arriving on scene to look for their children, great effort must be taken to keep parents informed, reduce their apprehension, and ensure that no unnecessary risks or delays occur as a result of their reactions.

e. Hospitals and Nursing Homes – Medical facilities within a community are vital locations that are very difficult to evacuate because of the population they serve and the need to provide specific services. Unless directly impacted by an immediate threat such as a fire or an internal release, sheltering in place is often preferred. Many patients are non-ambulatory and will require assistance exiting the building. Other patients may be unable to survive without specialized medical equipment that is impractical or impossible to move. As a result, the decision to evacuate a hospital or nursing home must be made with the knowledge that unless detailed planning has occurred, some patients may not survive the process.

f. Jails, Prisons, and Courthouses – Large-volume ethanol responses to jails, prisons, police stations, and courthouses present several planning challenges. Police stations and courthouses often have prisoners and holding cells, while jails and prisons often have a population of special needs prisoners as well as a medical facility. At a minimum, prisoners will require additional supervision and transportation assets capable of transporting large numbers of inmates while ensuring effective control. As with hospitals, it is often preferable to have prisons shelter in place rather than evacuate, and planning for these circumstances by the facility is imperative.

g. Stadiums – While only a concern when full, stadiums usually lack the ability to shelter occupants in place. As a result, evacuation may be the only option, which may present a challenge as people leave the stadium and attempt to get to their vehicles or leave parking lots. To ensure timely evacuation, planning to coordinate vehicular transportation is crucial and should emphasize provisions for IRAA populations.

h. Military Installations/Armories – Military installations and armories present special challenges because of the types of equipment and supplies stored or in use, and the hierarchy of the military management structure. In general, the management at these facilities will handle the evacuation internally while looking to the local and state agencies for situational awareness.

i. Critical Infrastructure – Critical infrastructure including municipal buildings, dams, power plants, bridges, and wastewater treatment plants may not be able to be evacuated. In some cases, extra time may be needed to ensure a facility has been secured or safely shutdown before evacuations can occur.

3. Date/Time

   a. Nights and Weekends – Non-business hours have the benefit of reduced highway and road activity. However, with the exception of full-time public safety agencies, most volunteer responders will need added response time. Additionally, emergency managers and other support agency personnel such as technical experts will have to be called before robust planning and organizing activities can occur.

   b. Holidays – Similar to nights and weekends, responders and other assets will have longer response times on holidays. Additionally, many people may be out of town or on vacation, which may limit surge staffing capabilities of areas that rely on volunteer departments during a response.

   c. Rush Hour – Any time large numbers of people are gathered, the risk of a HAZMAT incident occurring increases. Rush hour compounds the problem by preventing responders and other assets from moving effectively. Drivers may be reluctant to leave their vehicles if instructed or may make the decision on their own, further compounding the traffic problem.

4. Coinciding Events

   a. Regional Disasters – Response efforts to an ethanol incident in the wake of or during regional disasters may suffer from a lack of personnel and resources. Responders and other assets will be committed to other operational areas and concerns. Prioritizing activities are challenging for both local governments and the state agencies involved.

   b. Spectator Events – Spectator events such as baseball, football, and basketball games often involve large numbers of people confined in a stadium and create increased traffic congestion. A large-volume release of ethanol that impacts this type of event will have an added layer of complexity because of the number of people in a geographically compressed area.

   c. Gatherings (e.g. parades, celebrations, etc.) – Any large gathering of people presents challenges to responders during a large-volume ethanol release. Often events such as parades and other celebrations have little or no planning for effective crowd dispersion or communication. Each event is different and requires coordinated response efforts to overcome these challenges.

III. ASSUMPTIONS

Below is a list of assumptions used when constructing this annex:

1) Ethanol incidents may occur at any time with little or no warning.

2) Local responders have some familiarity with responding to ethanol releases.

3) Local and regional HAZMAT response plans exist and may be valuable resources to planners.

4) Some ethanol incidents will overwhelm local and regional responders.

5) The Commonwealth of Massachusetts may be requested to provide response support.

6) The Commonwealth of Massachusetts may provide assistance when requested.

7) Along with resources specifically tailored to HAZMAT response, the Commonwealth of Massachusetts has additional assets that may be useful when mitigating an ethanol release.

8) At the time of an aid request, state resources may be committed to other emergency response efforts, potentially including coinciding releases.

9) The state will prioritize its operational needs and deploy or redeploy assets based on need and availability.

10) The state will call upon mutual aid resources and the federal government as needed.

11) Proper implementation of local plans reduces or prevents releases and related harmful exposures to the public and to the environment.

12) Use of local and outside resources requires careful coordination.

13) Protective actions for the general population may include in-place sheltering or evacuation.

IV. CONCEPT OF OPERATIONS

This section details the concept of response operations, including notifications, activation, response operations, and recovery actions.

A. NOTIFICATIONS

Although separate reporting requirements under the MCP require facilities and responsible parties to report to MassDEP and the National Response Center (NRC), emergency responders need only escalate notifications in the event that additional resources may be needed. If the incident has the potential to reach a Level 2 or 3 response, MEMA should be notified. The chain of notification is as follows:

1. Initial Discovery – A facility operator, first responder, or member of the general public will likely discover the ethanol release.

2. Local Notification – Calls from the discovering party to 9-1-1 or communication via public safety radio will be the most likely avenue of local agency notification.

3. Regional – Local jurisdictions may call for support from adjacent municipalities or directly to the regional Hazardous Material Response Team HMRT in accordance with local plans and procedures.

4. MEMA – Once the Incident Commander has determined the event to be a Level 2 or 3 emergency, MEMA should be contacted via the State Emergency Operations Center (SEOC).

5. MAESF 10 Lead Agencies – MAESF 10 lead agencies such as the Executive Office of Energy and Environmental Affairs, MassDEP, the Department of Fire Services (DFS), and the Department of Public Health (DPH) will be notified by MEMA if the activation of MAESF 10 is required. These agencies may also have been notified directly by the on-scene Incident Commander in accordance with requests for assistance or support.

6. MAESF 10 Supporting Agencies – MEMA will notify agencies with tertiary MAESF 10 roles as needed when it is determined that state action is or may become necessary.

7. Other State Agencies – MEMA will notify state agencies without a direct role in MAESF 10 as needed.

8. Executive Branch – MEMA will notify the executive branch in accordance with its internal policies and procedures.

9. Federal Assistance – MEMA will request federal assistance for a major ethanol incident through the Regional Response Team (RRT). Other requests will be coordinated in accordance with the National Incident Management System (NIMS) and the National Response Framework (NRF).

10. Alternate Notification – Because of MCP reporting requirements for the reporting party (RP)or requests for assistance from the on-scene Incident Commander, MassDEP or DFS may be notified of a release before MEMA. MassDEP and DFS should notify MEMA if it receives information concerning a release with a high probability of becoming a Level 2 or 3 emergency.

B. ACTIVATION

This plan is activated upon notification to the state of an actual or potential Level 2 or 3 ethanol emergency. The SEOC shall act in a support role with the local emergency management agency or designee and the Incident Commander to determine whether additional state resources are required. When the need for additional assistance is determined, the SEOC will make contact with the lead agency for the MASEF 10 to request support and fill requests.

C. RESPONSE OPERATIONS

This section describes the command and control structure and agency responsibilities for response operations.

1. Command and Control

   a. Incident Command System – The incident will be managed on scene using the Incident Command System (ICS). This system allows responders from multiple agencies and jurisdictions to operate in a coordinated manner with common objectives, communication, and organization.

   b. Unified Command – A unified command structure is used when incidents involve several jurisdictions or several agencies from the same political jurisdiction. A unified command structure allows all agencies with responsibilities for an incident, either geographical or functional, to establish a common set of incident objectives and strategies to which all can subscribe. Upon request or arrival, state agencies may form a unified command with the local on-scene Incident Commander.

   c. State Emergency Operations Center – The SEOC in Framingham, Massachusetts, provides full-time monitoring and coordination of emergency events. Depending on the size and complexity of the incident, the SEOC will act as a coordinating center between state agencies up to and including full activation of all applicable emergency support functions.

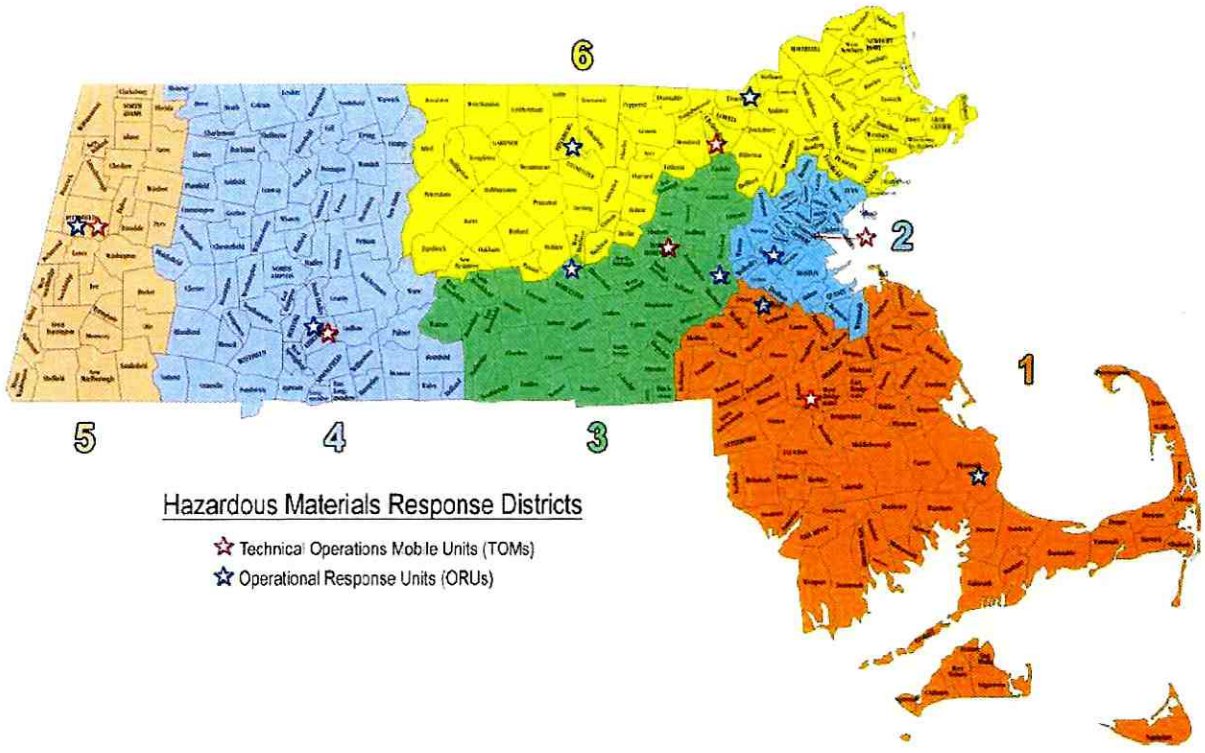
   d. Massachusetts Emergency Support Function 10 – The Executive Office of Energy and Environmental Affairs coordinates MAESF 10 – Environmental Protection and Hazardous Materials. MAESF 10 is closely supported by the MassDEP, DFS, and DPH. These core agencies act in coordination with other MAESFs to ensure all aspects of a response are supported. MAESF 10 coordinates closely with MAESF 4 – Firefighting. Through MEMA, MAESF 10 is the conduit through which state resources are channeled into a HAZMAT incident response.

   e. Adjacent State and Federal Aid – In addition to MAESF 10, SEOC can also request adjacent state and federal mutual aid resources. With limited exception, all requests for these resources should be made to the SEOC through the local emergency management agency (EMA) (if activated) or an on-scene MEMA representative if available. In certain cases, municipalities in proximity to other states may have local mutual aid agreements with other local governments in adjoining states. In these cases, mutual aid can be requested at the local level. The Incident Commander must approve all requests for mutual aid. MEMA will request federal HAZMAT response assistance through the federal RRT.

   f. Hazardous Materials Response Teams – The Commonwealth of Massachusetts has six HAZMAT response districts (illustrated in Figure 1 below), and each district has an HMRT. These teams have resources staged at various locations throughout their districts to reduce initial response time. HMRTs can be requested directly by the on-scene Incident

Commander as needed. HMRTs are an asset of the Department of Fire Services but upon being dispatched to a HazMat incident, HMRTs are included in the on-scene ICS structure.

Figure 1: Regional Hazardous Materials Response Teams (HMRT)



g. Security – Security operations are primarily a law-enforcement activity and will be coordinated through the on-scene ICS and by MAESF 16 (Law Enforcement and Security) at the state level. Depending on the size and nature of the incident, additional security resources may be needed from the Massachusetts National Guard and can be requested through MAESF 13 (Military Support). Security at an ethanol release will often include keeping and patrolling a perimeter, establishing crowd control, and maintaining the flow of traffic around the incident, as described below:

Perimeter - Security perimeters should be large enough to account for sudden changes in wind direction or the sudden release of a pressurized vessel. While monitoring devices may be used to establish the direction and size of a plume, the perimeter established for human occupancy should extend beyond this zone. While some law enforcement officers are equipped with personal protection equipment (PPE), the security perimeter should be established far enough away from the incident that this equipment is not needed.

Traffic Control - Traffic control is usually an issue whenever a perimeter is established. Law enforcement officers trained in traffic management will most likely be required to keep traffic away from the affected area. This will become even more critical during an evacuation when large numbers of people are fleeing an area. In these cases, officers must keep the flow of traffic steadily moving to avoid a gridlock situation.

h. Evacuation/Shelter in Place – With a large-volume ethanol release that impacts or has the ability to impact the nearby population, a shelter-in-place or evacuation decision must be made. While these two activities are simple in theory, they can be immensely complicated in practice. As a result, local and regional responders and officials must have adequate plans and resources for either. Shelter-in-place and evacuation decisions are made by the on-scene Incident Commander but may require significant state resources. These options are briefly discussed below:

Shelter-in-Place – Sheltering in place within homes or businesses may be less complicated and quicker than an evacuation; however, time becomes a factor as the plume may slowly begin permeating buildings and people become increasingly uncomfortable without air conditioning or heat. Nonetheless, sheltering in place may be the safest option while a coordinated evacuation plan is developed and IRAA populations can be assisted. It should be noted that structures in proximity to the spill may become hazardous because the buildup of explosive levels of ethanol or methane.

Evacuation – In incidents involving a limited number of people, evacuating the area can be quick and efficient. An evacuation ensures that the public will have no contact with the release and gives the Incident Commander time to more thoroughly assess the situation before making entry decisions. Additionally, when an incident involves a transportation accident or a facility equipped with a siren or communications system, self-evacuations may already have occurred. Depending on the size of the impacted area and the inclusion of IRAA populations (such as hospitals, prisons, and schools), evacuations may become extremely long or arduous and an evacuation may prompt people to leave their homes or businesses and become immediately exposed to the released chemical. In these instances, sheltering in place may be a more effective solution.

i. Public Information – All public information concerning state assets or responses must be coordinated through either the on-scene Public Information Officer (PIO) or the SEOC and MAESF 14 (Public Information) in accordance with MEMA's public information procedures. In addition, the Incident Commander must approve all information disseminated regarding that specific incident. During certain complex events, PIOs from the state level may be requested on scene. In the event that PIOs are requested, requests will be coordinated through the SEOC or MAESF 14 (Public Information) as necessary.

j. Other – All other resources, needs, and requests will be handled through the SEOC or appropriate MAESF. MEMA will serve as the coordinating agency for all additional state or federal resource requests and will ensure timely requests for information or resources between the MAESFs.

2. Agency Responsibilities

a. Responsibilities of Primary Agency – MEMA is the primary Massachusetts agency responsible for coordination of state resources. MEMA will:

- Work with federal, state, and local agencies to identify potential emergencies, mitigate risks, and support response and remediation efforts if necessary
- Notify federal response authorities and other required state authorities as needed
- Coordinate state-level response activities and resources based on MAESF structures
- Track response expenditures, file appropriate reports and financial statements, and coordinate post-incident reimbursement procedures

b. Responsibilities of Support Agencies – In addition to those responsibilities already cited, support agencies shall provide the following special resources or capabilities:

1. The Executive Office of Energy and Environmental Affairs will:
    a. Manage overall efforts of MAESF 10
    b. Ensure that requests for state and federal assistance through MAESF 10 are directed to the appropriate requesting agency
    c. Coordinate with MassDEP to ensure an efficient transition to the recovery phase
2. The Massachusetts Department of Environmental Protection (MassDEP) will:
    a. Work in conjunction with the Executive Office of Environmental Affairs to coordinate efforts of MAESF 10
    b. Ensure a successful transition to response and recovery guidance under the MCP
    c. Provide technical and scientific support
    d. Provide limited HAZMAT response PPE and equipment as available
3. Massachusetts State Police will:

a. Provide support for security coverage and access to the incident site if needed

b. Facilitate transportation of required assets to and from the incident site and/or staging areas

c. Field and support requests for Bomb Squad resources

d. As directed, establish and maintain traffic control and staging area discipline

4. Massachusetts Department of Fire Services (DFS) will:

a. Provide support to contain, confine, and control releases of HAZMAT releases as requested

b. Coordinate response of HMRT and MDU

c. Perform estimates of the downwind hazard

d. Determine the nature of and identify the hazard

e. Execute site management and site safety functions

f. Coordinate emergency decontamination of victims

g. Execute technical decontamination of responders

5. Massachusetts Department of Public Health (DPH) will:

a. Assess human exposure to chemical agents by analyzing clinical specimens for contaminants of concern and/or their metabolites

b. Carry out testing of environmental and clinical samples for chemical or radioactive materials related to the incident

c. Deploy Chempack stockpiles in response to specific hazardous materials releases

d. Deploy the Strategic National Stockpile (SNS) and local pharmaceutical caches as necessary

e. Engage federal partners to assist with testing of environmental and clinical samples related to the incident

f. Evaluate both short and long-term potential health impacts from exposure and from contamination of food, water, and soil

g. Evaluate environmental data for possible health impacts that will inform appropriate actions

h. Provide technical and scientific support such as from the Field Assessment Support Team (FAST) and laboratory support from the Wall Experiment Station (WES)

i. Facilitate recovery process to include disposal of impacted food, cleanup of indoor spaces, evaluation of housing, and provision of risk communication for the public

j. Identify vulnerable populations in the affected area to inform evacuation and long-term treatment issues

k. If feasible, conduct health surveillance activities to determine health impact of the release

l. Notify and work with healthcare facilities to respond to event

m. Provide laboratory identification of unknown chemicals and confirmation of field screening results

n. Provide safety guidance for first responders and the public

o. Work with MassDEP, HAZMAT teams, U.S. Environmental Protection Agency (EPA) and other partners to determine environmental pathways (air, water, soil, and food) for contamination and evaluate human exposure potential that may lead to recommendations for sampling

6. Massachusetts National Guard may provide:

   a. Civil Support Teams (CST) chemical response team to augment HAZMAT personnel and provide chemical support

   b. Basic needs equipment/supplies (e.g. food, water, tents, etc.)

   c. Decontamination capability

   d. Engineer units

   e. Helicopters

   f. Scene security

   g. Water purification

d. Responsibilities of Federal Government. Federal responsibilities are outlined in the NRF and the NIMS. Federal resources are available specifically for incidents that expand beyond available local, state, and mutual aid resources.

3. Planning Considerations

a. In any ethanol release, the risk of fire is a clear and present danger. Once ignited, ethanol requires specialized training and equipment to extinguish. The Incident Commander must also weigh the factors when determining to extinguish or allow the fire to burn out.
b. Protection of structures is key when letting an ethanol fire burn out. Streams of cooling water or agent will provide additional safety for any surrounding exposures.
c. Planning for run off is critical during a firefighting operation as the water used to fight the fire or (in many cases) protect the exposure may be contaminated and require intervention to protect any waterway or downstream populations.
d. Past incidents have found the most significant impact is to the local environment. With the deoxygenating properties of ethanol, large fish kills have been reported in locations that are separated from the incident scene by great distances.
e. Methane gas is a possible byproduct of ethanol as it is released into the soil. Planning for large pockets of gas build up will impact the evacuation area and ensure the safety of the general population and responders.

D. RECOVERY ACTIONS

Once the response phase of a HAZMAT release is completed, recovery actions and remediation activities often continue for months or years. Depending on the incident, the recovery action process is usually overseen by MassDEP in conjunction with EPA and other agencies as warranted. These actions are outlined in the MCP.

In order to transition from the response phase to the recovery phase, the Incident Commander--in conjunction with the Safety Officer and HazMat Branch Chief--must be reasonably certain that no immediate threat to health and safety, personal property, or the environment remains. This standard applies to immediate hazards and does not include elevated risks from exposure to long-term pollution or contamination, which fall under the MCP. Recovery action planning considerations are listed below.

1. Planning Considerations

a. The threat of deoxygenating from a large volume ethanol release may require the inclusion of oxygen-generation systems to minimize the impact on the local marine life.
b. While acute ethanol exposure to the general population is considered a non-critical but dangerous exposure, the great threat comes in the buildup of pockets of ethanol gas, byproducts such as methane, and mixing agents such as benzene. This collection will require continuous monitoring and remediation in accordance with the guidance set forth by the MassDEP.
c. Additional guidance on the recovery from a large-volume ethanol release can be found through the MassDEP.

V. REFERENCES

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