



# New England Hurricane Evacuation Study

## Technical Data Report

June 2016



**US Army Corps  
of Engineers®**  
New England District





**New England  
Hurricane Evacuation Study**

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# 1.0 Study Area

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## 1.0 Study Area

### 1.1 Introduction

#### 1.1.1 Study Purpose

The New England Hurricane Evacuation Study (HES) Technical Data Report (TDR) was developed to evaluate the major factors that must be considered in hurricane preparedness and to provide emergency management officials in Connecticut, Rhode Island and Massachusetts timely, state of the art information needed for sound hurricane evacuation decision-making. State, county and town agencies can use the technical data presented in this report to supplement and/or revise their hurricane evacuation plans and operational procedures, enabling them to more effectively respond to future hurricane threats.

The study areas for the three states in the New England HES TDR includes the storm surge vulnerable cities/towns listed in table 1 through 3 below, as well as the maps of the study area as depicted in Figures 1 through 3.

#### 1.1.2 Funding

The New England HES and the completion of the representative state TDRs (i.e., Connecticut, Rhode Island and Massachusetts) was funded by the Federal Emergency Management Agency (FEMA), in coordination with the United States Army Corps of Engineers (USACE) – New England District.

#### 1.1.3 Authority

The authority for the USACE's participation in this study is Section 206 of the Flood Control Act of 1960, as amended (Public Law 86-645). FEMA's participation is authorized by the Disaster Relief Act of (Public Law 93-288). These laws authorize the allocation of federal resources for planning activities related to hurricane preparedness.

## 1.2 Major Analysis

### 1.2.1 General

The New England HES was initiated in 2012 and completed in 2015 with the publication of one Technical Data Report (TDR) for each state, as well as this multi-state synopsis report. This document summarizes the results and other findings for all three states in an executive summary format document. Each state TDR consists of several related analyses that develop technical data concerning hurricane hazards, vulnerability of the population, public response to evacuation advisories, sheltering needs and the transportation implications for various



## 1.0 Study Area

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hurricane threat situations. For more details regarding any findings or the methodologies discussed herein, please consult the more detailed state specific TDRs and their specific chapters.

### 1.2.2 Hazards Analysis

The hazards analysis determines the timing and magnitude of wind and storm surge hazards that can be expected from hurricanes of various categories, tracks, and forward speeds. The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) numerical model is used by the National Hurricane Center to compute the wind speeds and surge heights. The Hazards Analysis is presented in more detail in Chapter Two of each respective state TDR.

### 1.2.3 Vulnerability Analysis

Utilizing the results of the hazards analysis, the vulnerability analysis identifies those areas, populations, and facilities that are vulnerable to specific hazards under a variety of hurricane threats. Inundation maps are then produced and the areas to be evacuated (referred to as scenarios or zones) are developed. For the Massachusetts HES, hurricane evacuation zones were delineated for each county in the study area. Population data was used to determine the vulnerable population within each evacuation zone. Further discussion on all aspects of the Vulnerability Analysis is provided in Chapter Three of each respective state TDR.

### 1.2.4 Behavioral Analysis

This analysis determines the expected response of the population threatened by various hurricane events in terms of the percentage of the population expected to evacuate, the timing of their departure, probable destinations of evacuees, public shelter use, and utilization of available vehicles. The methodology employed to develop the behavioral data relied on telephone sample surveys and personal interviews within the study area, information from other Hurricane Evacuation Studies, and post-hurricane behavioral studies. A behavioral study was completed in 2013 for the Massachusetts HES after Hurricane Sandy (2012). A presentation of the Behavioral Analysis can be found in Chapter Four of each respective state TDR.

### 1.2.5 Shelter Analysis

The shelter analysis presents an inventory of public shelter facilities, capacities of the shelters, and shelter demand for each jurisdiction. Emergency management offices furnished shelter names, capacities, and other details for their shelter inventory. Shelter demands for each state's HES were calculated using behavioral analysis data. Chapter Five of each respective state TDR contains information on the Shelter Analysis.



# 1.0 Study Area

## 1.2.6 Transportation Analysis

The principal purposes of the transportation analysis is to: 1) determine the time required to evacuate the vulnerable population (Clearance Times); and 2) evaluate traffic control measures that could improve the flow of evacuating traffic. Complete details on the Transportation Analysis are presented in Chapter Six of each respective state TDR.

## 1.2.7 HURREVAC/Decision Tools

HURREVAC is a hurricane evacuation decision-making tool that uses Clearance Times in conjunction with National Hurricane Center (NHC) advisories to help determine when and if evacuations should begin. More information on this program may be found at the HURREVAC web-site at [www.hurrevac.com](http://www.hurrevac.com). Chapter Seven of each respective state TDR describes the HURREVAC computer program.

**Table 1:** Connecticut HES TDR Study Area

County	Town	County	Town
<b>Fairfield County</b>	Bridgeport	<b>New London County</b>	East Lyme
	Darien		Groton
	Fairfield		Ledyard
	Greenwich		Lyme
	Norwalk		Montville
	Stamford		New London
	Stratford		Old Lyme
	Westport		Preston
<b>Middlesex County</b>	Chester		Stonington
	Clinton		Waterford
	Deep River		
	Essex		
	Old Saybrook		
	Westbrook		
<b>New Haven County</b>	Branford		
	East Haven		
	Guilford		
	Hamden		
	Madison		
	Milford		
	New Haven		
	North Haven		
West Haven			



## 1.0 Study Area

**Table 2:** Rhode Island HES TDR Study Area

County	Town	County	Town
<b>Bristol County</b>	Barrington	<b>Providence County</b>	Cranston
	Bristol		East Providence
	Warren		Pawtucket
<b>Kent County</b>	East Greenwich		Providence
	Warwick	<b>Washington County</b>	Charlestown
<b>Newport County</b>	Jamestown		Narragansett
	Little Compton		New Shoreham
	Middletown		North Kingstown
	Newport		South Kingstown
	Portsmouth		Westerly
Tiverton			

**Table 3:** Massachusetts HES TDR Study Area

<b>Barnstable County</b>	Barnstable; Bourne; Brewster; Chatham; Dennis; Eastham; Falmouth; Harwich; Mashpee; Orleans; Provincetown; Sandwich; Truro; Wellfleet; and Yarmouth
<b>Bristol County</b>	Acushnet; Berkley; Dartmouth; Dighton; Fairhaven; Fall River; Freetown; New Bedford; Raynham; Rehoboth; Seekonk; Somerset; Swansea; Taunton; and Westport
<b>Dukes and Nantucket Counties</b>	Aquinnah; Chilmark; Edgartown; Oak Bluffs; Tisbury; West Tisbury; and Nantucket
<b>Essex County</b>	Beverly; Danvers; Essex; Gloucester; Ipswich; Lynn; Manchester; Marblehead; Nahant; Newbury; Newburyport; Peabody; Rockport; Rowley; Salem; Salisbury; Saugus; and Swampscott
<b>Middlesex County</b>	Arlington; Belmont; Cambridge; Everett; Malden; Medford; Newton; Somerville; Waltham; Watertown; and Winchester
<b>Norfolk County</b>	Braintree; Brookline; Cohasset; Milton; Quincy; and Weymouth
<b>Plymouth County</b>	Duxbury; Hingham; Hull; Kingston; Marion; Marshfield; Mattapoisett; Plymouth; Rochester; Scituate; and Wareham
<b>Suffolk County</b>	Boston; Chelsea; Revere; and Winthrop



# 1.0 Study Area

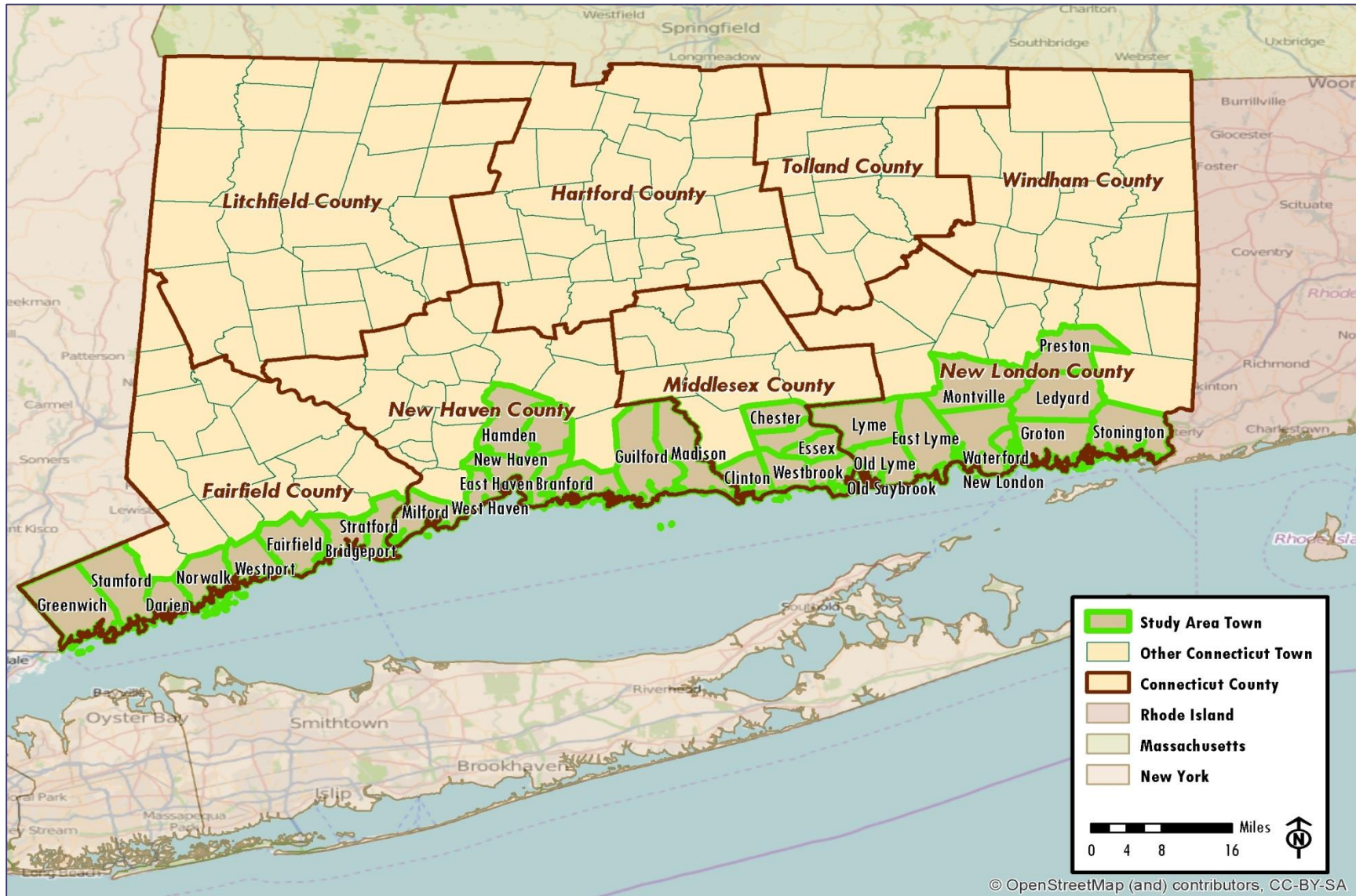


Figure 1: Map of Connecticut HES TDR Study Area





# 1.0 Study Area

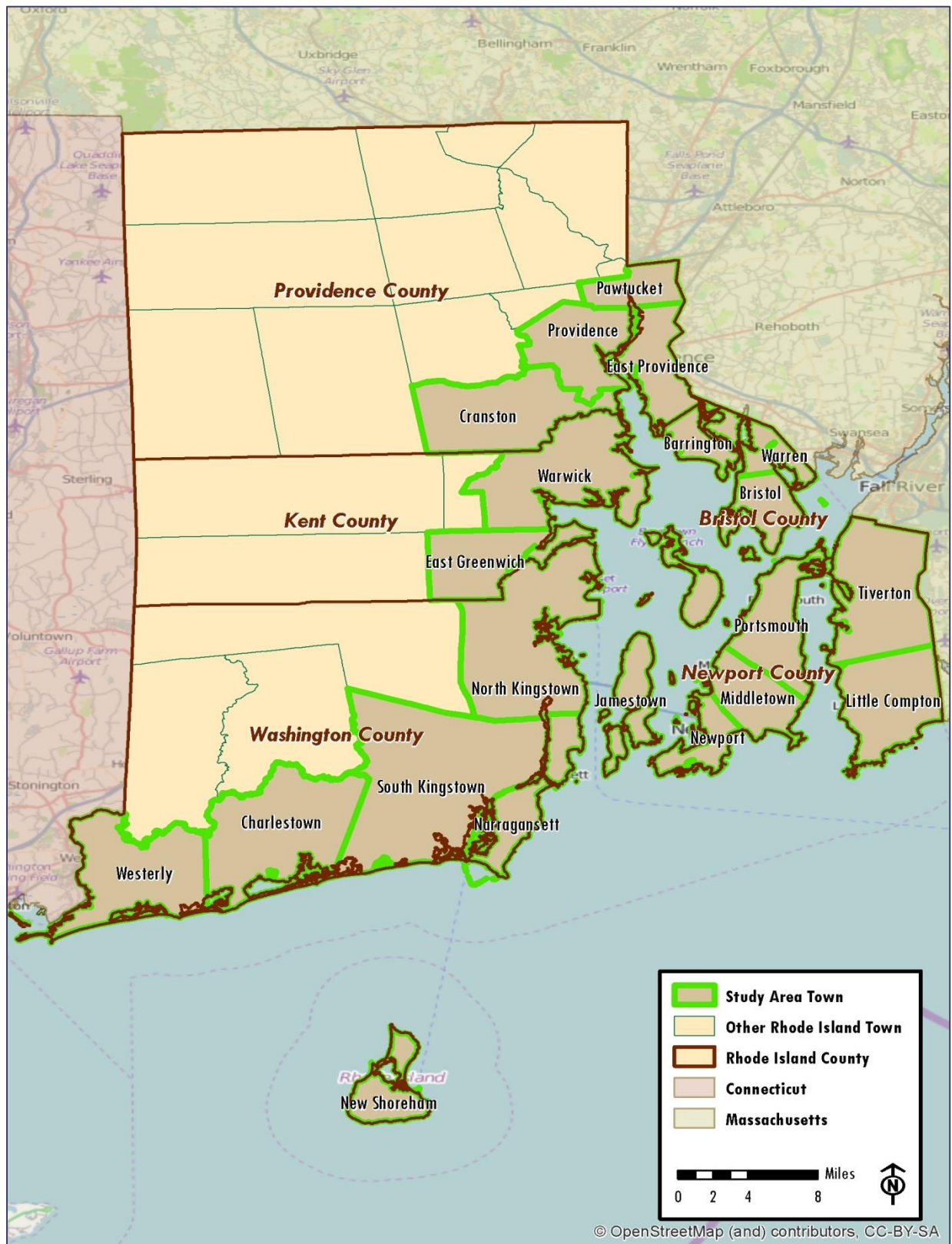


Figure 2: Map of Rhode Island HES TDR Study Area







# 1.0 Study Area

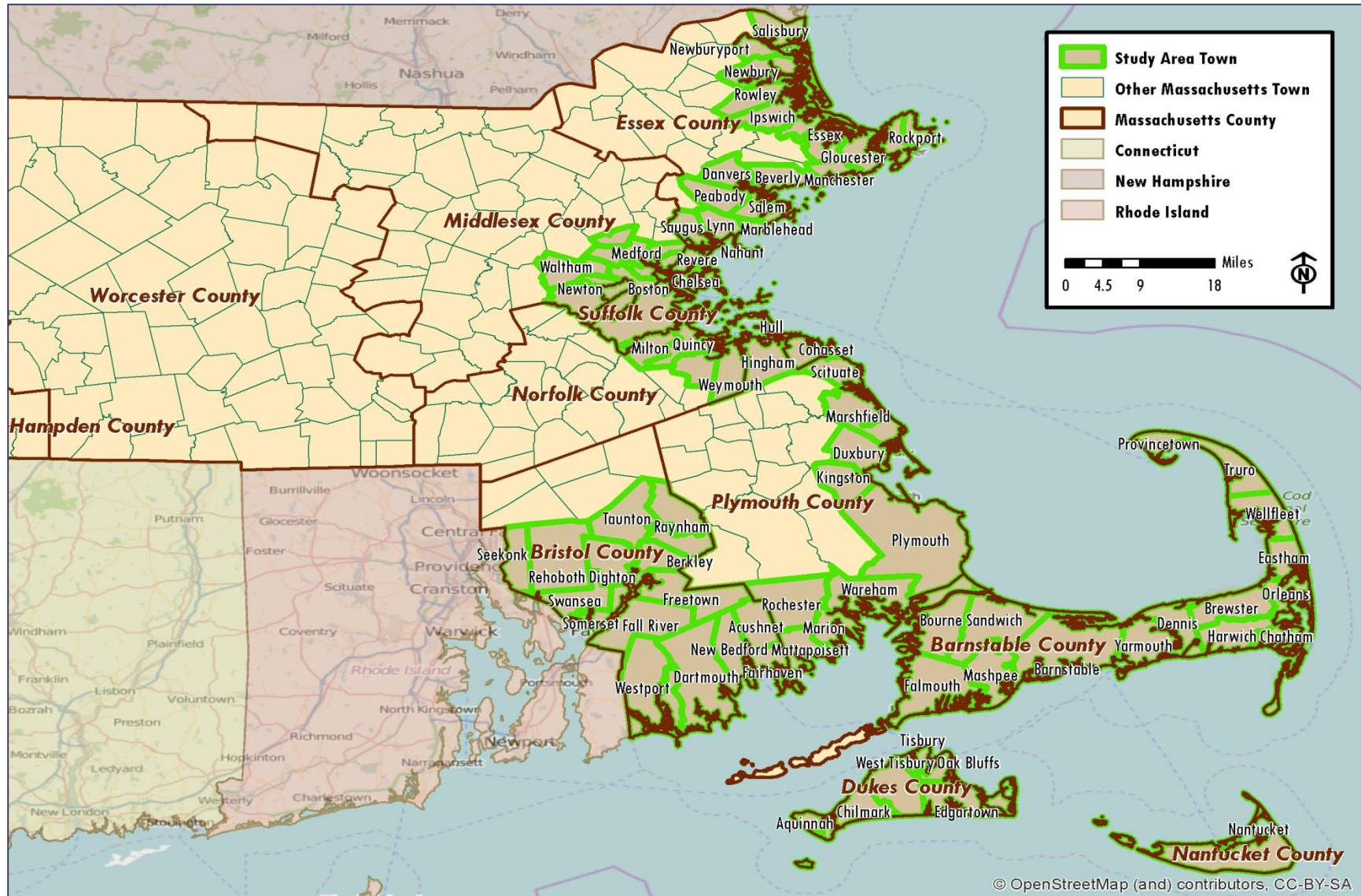


Figure 3: Map of Massachusetts HES TDR Study Area





## 2.0 Hazard Analysis

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### 2.0 Hazard Analysis

#### 2.1 Purpose

The purpose of the hazards analysis is to quantify the still-water surge heights for hurricanes that have a reasonable meteorological probability of occurring in the study area. This basic hazard assessment is done through the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model run by the National Hurricane Center. The primary objective of the hazards analysis is to determine the probable worst-case effects from hurricanes for various intensities that could strike the region. For the purposes of this study, the term “worst-case” is used to describe the peak surges that can be expected at all locations within the study area without regard to hurricane track.

Once the appropriate SLOSH model/s were run and the results compiled and disseminated, the U.S. Army Corps of Engineers developed storm tide atlases, one for each state. These Storm Tide Atlases contain detailed maps that depict the maximum inland extent of inundation from storm surge for each modeled category of storm. Chapter 2 of each respective state TDR contains details regarding the SLOSH basin used to determine storm tides for that area, as well as the maps depicting the maximum storm surge for category 1 through 4 storms by each town in the study area.

Chapter 2 in each of the state TDRs also addresses the inland extents of various intensities of sustained winds based on results of the DeMaria and Kaplan Wind Decay Model. These wind Maximum Envelope of Winds (MEOW) are mapped and included in the Hazards Analysis. Freshwater flooding from heavy rainfall accompanying hurricanes is an additional hazard which must be considered, but is not specifically addressed in these study TDRs.

#### 2.2 SLOSH

##### 2.2.1 SLOSH Basins

Chapter 2 provides details on the SLOSH basins used to perform the storm tide hazard analysis for Connecticut, Rhode Island and Massachusetts. The size of this overall study area and the various facets of the regional shoreline required the use of three different SLOSH basins with overlapping edges to accomplish adequate coverage with substantial detail.

The Connecticut shoreline includes two SLOSH basins, the New York 3 basin and the Providence/Boston 2 Basin, the former providing detail from Fairfield to New London and the latter covering from the Connecticut River to Stonington. The grids are shown in Figures 4 and 5 respectively below.



## 2.0 Hazard Analysis

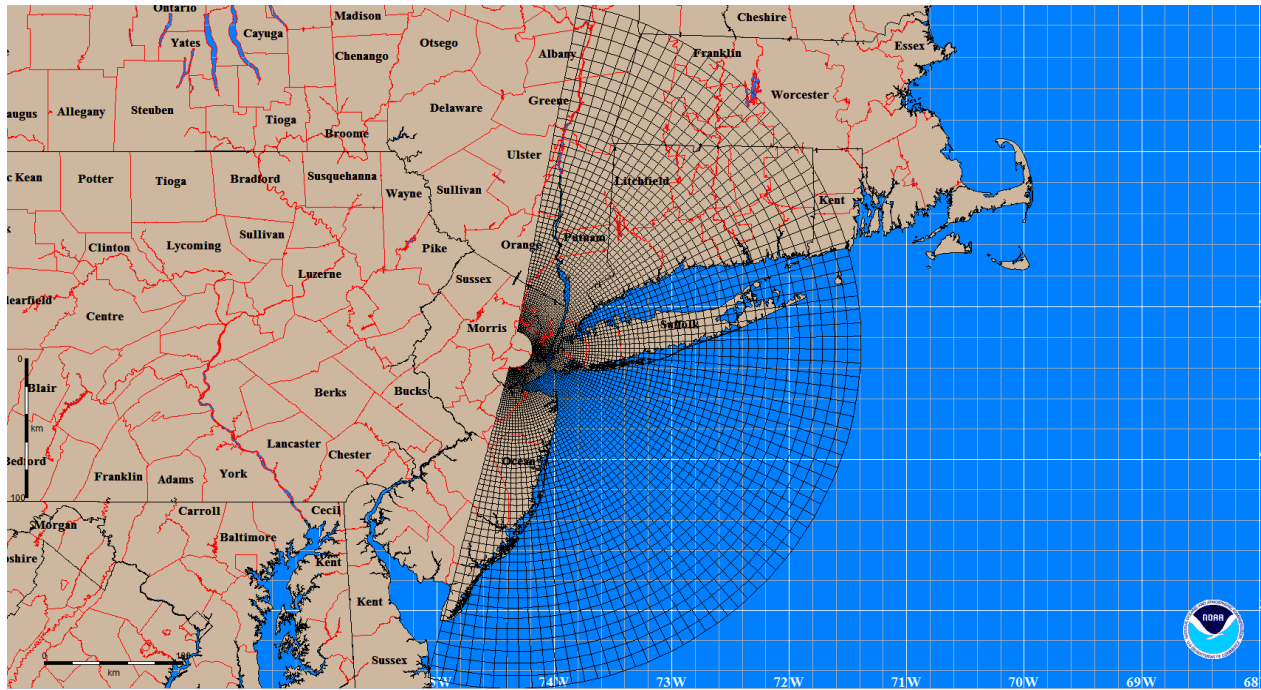


Figure 4: New York 2 SLOSH Basin Grid

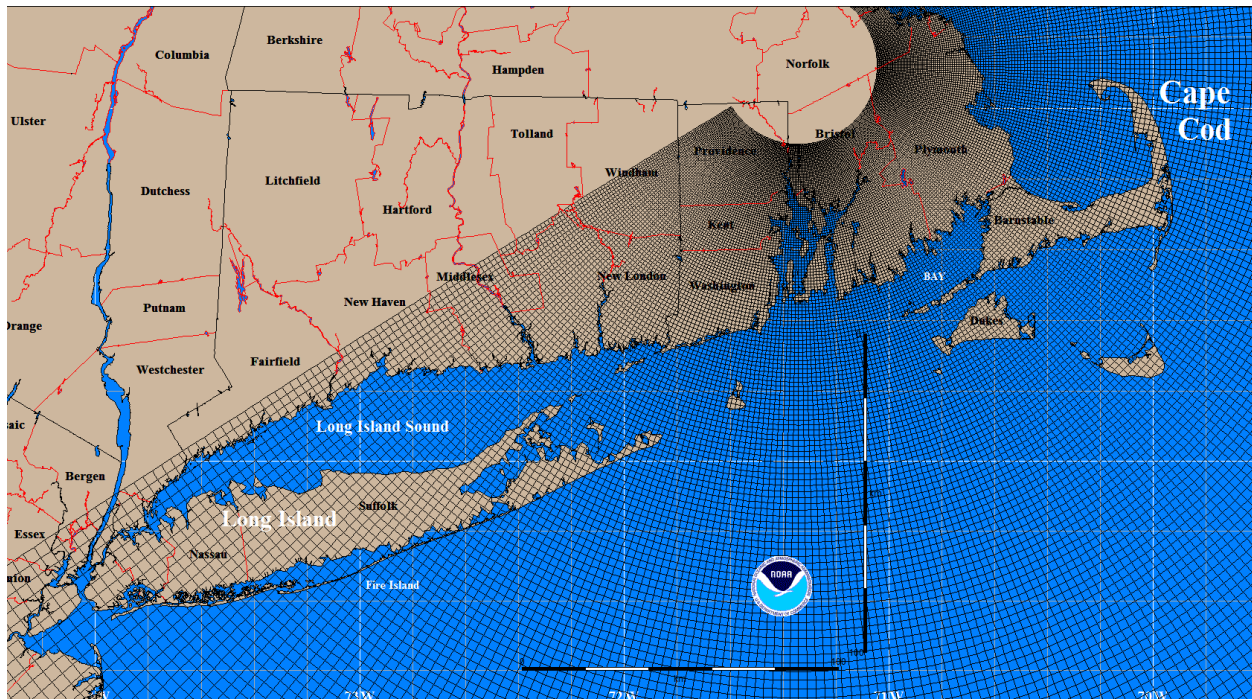
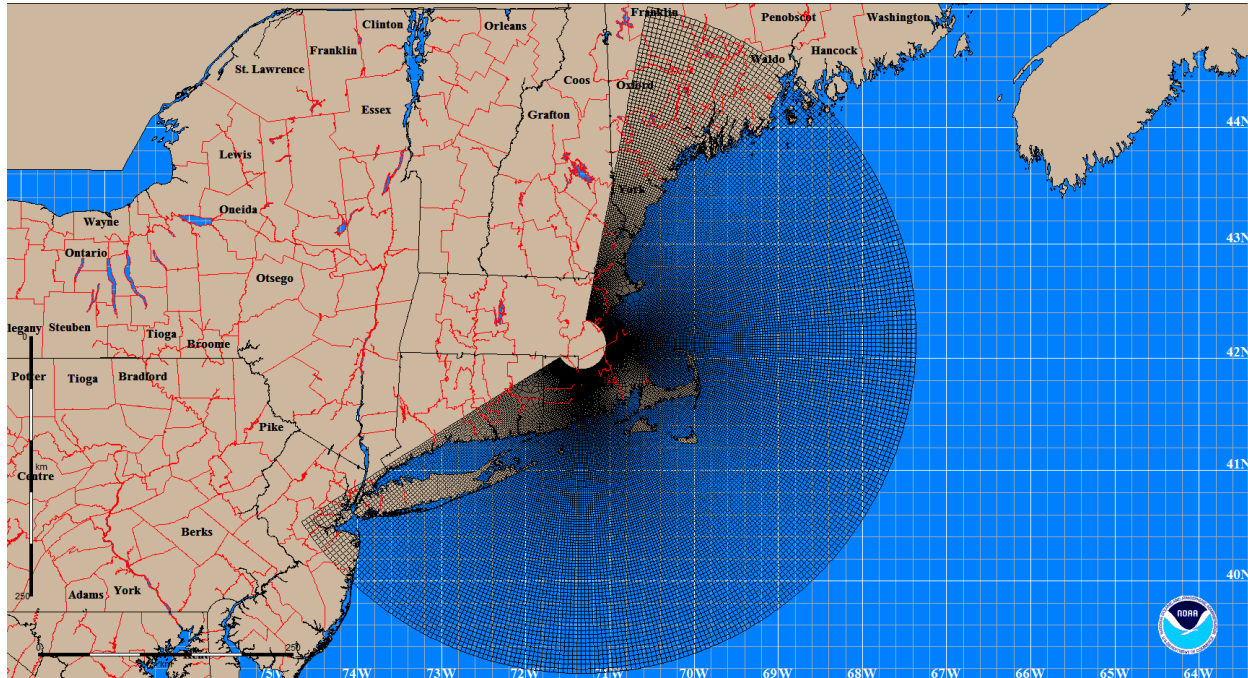


Figure 5: Providence/Boston 2 SLOSH Basin Grid



## 2.0 Hazard Analysis

Both Rhode Island and Massachusetts are covered by the Providence/Boston 2 SLOSH Basin which is shown below in Figure 6.



**Figure 6:** Providence/Boston 2 SLOSH Basin Grid Coverage

### 2.2.2 Model Output

The SLOSH model output for a modeled storm consists of envelopes of high water, and contains the maximum surge height values calculated for each grid cell in the model. Maximum surges along the coastline do not necessarily occur at the same time. The time of the maximum surge for one location may differ by several hours from the maximum surge that occurs at another location. Therefore, at each grid point, the water height value shown is the maximum that was computed at that point during the 72 hours of model time, irrespective of the time during the simulation that the maximum surge height occurred. . The datum used in all the models is the North American Vertical Datum of 1988 (NAVD 88).

Time-history data of surge heights, wind speeds, and wind directions are tabulated in the model. The data is listed at 30-minute intervals for a 72-hour segment of a simulated storm track, starting 48 hours prior to landfall and continuing for 24 hours after landfall or closest approach. The surge heights are in feet, the wind speeds in statute miles per hour, and the wind directions in azimuths from which the wind is blowing.

The outputs for each SLOSH basin are compiled into Storm Tide Atlases with maps that provide detail regarding the maximum inland extents of water by category. The Storm Tide Atlases are



## 2.0 Hazard Analysis

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stand-alone documents also included as part of this study. Subsequently, based on the inland extents portrayed in the Storm Tide Atlases, the U.S. Army Corps of Engineers and FEMA worked with local and state emergency management officials to develop evacuation zone maps that delineate which specific populations and areas will be directed to evacuate by storm category. The resulting hurricane evacuation zones maps are provided in Chapter Three of each respective state's TDR.

### 2.3 Inland Wind Model

#### 2.3.1 Inland Wind Model

In addition to storm surge, extreme winds can be a life-threatening feature of hurricanes. To some degree, all structures exposed to hurricane-force winds are vulnerable to wind-related hazards. This is especially true of intense storms, generally considered Category 3 and greater hurricanes. However, high-rise buildings merit special consideration in all categories because wind pressures on upper portions of tall structures (including bridges) can be much greater than those at ground level.

Mark DeMaria and John Kaplan of NOAA's Hurricane Research Division developed a model for predicting inland winds associated with landfalling hurricanes. The model applies a simple two parameter decay equation to the hurricane wind field at landfall to estimate the maximum sustained surface wind as a storm moves inland. This model can be used for operational forecasting of the maximum winds of landfalling tropical cyclones, as well as estimate the maximum inland penetration of hurricane force winds (or any wind threshold) for a given initial storm intensity and forward storm motion.

#### 2.3.2 Inland Wind Model Output

Wind MEOW (Maximum Envelopes of Wind) maps were prepared for the entire United States based on prevalent wind scenarios specific to each region. These maps depict the most inland penetration of a representative category of wind speed for any storm making landfall from the Atlantic Ocean. It is important to note that these depictions do not represent the inland extent for any one storm, but a compilation of many events combined together to show the overall effects regardless of where a tropical cyclone makes landfall. Chapter 2 of each state's TDR includes myriad maps detailing the inland extents of various wind fields in relation to the town boundaries so that users can generally assess the wind threat for any intensity storm scenario.



## 3.0 Vulnerability Analysis

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### 3.0 Vulnerability Analysis

#### 3.1 Purpose

The primary purpose of the vulnerability analysis is to identify the areas, populations, and facilities that are vulnerable to storm surge and to wind damage. Storm surge data from the hazards analysis were used to map inundation areas; to develop evacuation zones; to quantify the vulnerable population; and to identify major facilities that are potentially vulnerable to storm surge.

Mobile homes also have been proven to be particularly susceptible to wind damage, and they should be considered vulnerable under any storm category. No attempt has been made to identify other types of construction that may have a high risk of wind damage.

#### 3.2 Hurricane Evacuation Scenarios and Zones

Hurricane evacuation zones are sub-areas of each scenario that should be evacuated to protect residents from flooding, be it from storm surge and/or riverine flooding. They sometimes include non-flood areas that could be cut off or completely surrounded by flooding.

Hurricanes with unlike parameters can have very similar implications for hurricane evacuation. Evacuation scenarios are developed to simplify evacuation decision-making by comparing areas of potential surge flooding for each hurricane category. Where there is no significant difference, surge areas flooded by storms of different categories may be treated the same and evacuated as one scenario.

In most of the jurisdictions in each of the three study area states, Category 1 and 2 storms were combined into one evacuation scenario, or zone, while Category 3 and 4 storms were combined into a second evacuation scenario, or zone. Two major exception to this approach were employed; the first added a third “response scenario” or zone to capture potential impacts of the special flood areas in the City of Providence, Rhode Island, the second involved Massachusetts and the accommodation of a third scenario, or zone, employed by the Cities of Boston and Cambridge to address unique population and geographic concerns.

The emergency management community, including the communities in Massachusetts participating in this study, typically use the term “scenario” to refer to an area of evacuation. The terms “scenario” and “zone” are also often used interchangeably. The Massachusetts portion of the Hurricane Evacuation Study report, however, avoids the use of the term “scenario” as much of possible in favor of the term “mapped evacuation zone”, or simply by referencing specific storm categories to avoid any confusion that might occur in attempting to correlate the zones of Boston and Cambridge to those of the other Massachusetts communities





### 3.0 Vulnerability Analysis

which all use a slightly different array of storm categories in the establishment of the areas that they plan to evacuate. In Connecticut and Rhode Island, because of the consistency between communities in the areas to be evacuated, the term “response scenario” is used.

Evacuation zones are based to some degree on U.S. Census tracts, traffic analysis zones, or prominent features, and are a key basis for the transportation analysis. Evacuation Zones were developed by FEMA and USACE, in concert with state and local communities and were finalized before use in the transportation modeling process. These evacuation zones were used to estimate the evacuating population and number of evacuating vehicles.

Tables 4 through 8 show Connecticut’s Response Scenarios represented by colors, as well as the evacuating population within each evacuation zone for each Response Scenario. The first table is a county total summary while the tables immediately following are the same data by community aggregated alphabetically by county. This pattern of tables is repeated in Tables 9 through 14 for Rhode Island. Tables 15 through 24 pertain to Massachusetts and use a slightly different format based on storm categories, to best address the evacuation areas of Boston and Cambridge.

**Table 4:** Connecticut Vulnerable Population by County Summaries

County	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Fairfield County</b>	145,659	155,403	214,103	225,993
<b>Middlesex County</b>	22,450	28,447	26,556	32,780
<b>New Haven County</b>	119,261	129,198	167,575	178,895
<b>New London County</b>	56,408	69,519	74,816	91,586
<b>Totals</b>	<b>343,778</b>	<b>382,567</b>	<b>483,050</b>	<b>529,254</b>





### 3.0 Vulnerability Analysis

**Table 5: Connecticut Evacuating People Statistics – Fairfield County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Bridgeport</b>	21,275	21,352	21,275	21,352
	4,226	4,591	12,239	12,645
	10,651	10,747	21,178	21,313
<b>Darien</b>	2,696	2,761	2,696	2,761
	178	181	531	535
	1,779	1,834	3,534	3,610
<b>Fairfield</b>	11,818	12,353	11,818	12,353
	973	1,105	2,796	2,942
	4,626	4,822	9,127	9,401
<b>Greenwich</b>	11,823	12,312	11,823	12,312
	843	939	2,438	2,545
	5,081	5,960	9,887	11,117
<b>Norwalk</b>	11,211	11,426	11,211	11,426
	948	961	2,832	2,846
	7,738	8,892	15,074	16,689
<b>Stamford</b>	10,240	10,509	10,240	10,509
	4,758	6,694	12,446	14,597
	10,286	11,806	20,098	22,226
<b>Stratford</b>	12,187	12,782	12,187	12,782
	778	801	2,312	2,337
	3,841	4,328	7,535	8,218
<b>Westport</b>	5,006	5,259	5,006	5,259
	628	661	1,780	1,816
	2,069	2,327	4,040	4,402

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 6: Connecticut Evacuating People Statistics – Middlesex County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Chester</b>	433	440	436	451
	0	0	0	0
	159	172	619	637
<b>Clinton</b>	5,510	6,902	5,510	6,902
	113	113	340	340
	1,059	1,096	1,975	2,026
<b>Deep River</b>	286	293	289	302
	0	0	0	0
	168	186	648	673
<b>Essex</b>	645	718	681	827
	8	11	47	52
	327	381	1,235	1,312
<b>Old Saybrook</b>	8,202	10,739	8,202	10,739
	87	92	256	261
	340	440	651	791
<b>Westbrook</b>	4,520	5,933	4,520	5,933
	257	558	487	822
	336	373	660	712

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 7: Connecticut Evacuating People Statistics – New Haven County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Branford</b>	12,527	13,288	12,527	13,288
	294	309	870	886
	2,022	2,646	3,703	4,578
<b>East Haven</b>	11,501	11,930	11,501	11,930
	793	927	2,251	2,400
	1,472	1,538	2,924	3,016
<b>Guilford</b>	4,599	5,233	4,599	5,233
	122	130	358	367
	1,765	1,970	3,468	3,755
<b>Hamden</b>	634	636	634	636
	214	217	639	643
	5,734	5,860	11,429	11,606
<b>Madison</b>	5,149	7,518	5,149	7,518
	388	475	1,081	1,178
	1,124	1,199	2,225	2,330
<b>Milford</b>	17,039	18,303	17,039	18,303
	1,076	1,132	3,173	3,236
	3,816	4,742	7,217	8,514
<b>New Haven</b>	14,569	15,109	14,569	15,109
	4,067	4,276	11,949	12,181
	10,091	10,903	19,912	21,048
<b>North Haven</b>	591	594	591	594
	191	195	567	573
	2,353	2,531	4,643	4,892
<b>West Haven</b>	11,498	11,597	11,498	11,597
	1,962	1,980	5,870	5,890
	3,670	3,960	7,189	7,594

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 8: Connecticut Evacuating People Statistics – New London County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>East Lyme</b>	6,073	7,913	6,073	7,913
	239	503	468	762
	1,634	2,203	3,094	3,890
<b>Groton</b>	7,370	8,406	7,370	8,406
	414	418	1,236	1,241
	4,130	5,364	7,682	9,410
<b>Ledyard</b>	629	640	635	656
	3	3	17	17
	1,058	1,221	3,353	3,581
<b>Lyme</b>	367	407	387	467
	0	0	0	0
	153	206	484	557
<b>Montville</b>	665	681	673	706
	0	0	0	0
	1,694	2,103	4,854	5,426
<b>New London</b>	4,036	4,236	4,036	4,236
	0	0	0	0
	2,573	2,976	5,025	5,589
<b>Old Lyme</b>	3,734	6,327	3,734	6,327
	59	84	155	182
	577	747	1,104	1,342
<b>Preston</b>	257	259	257	259
	0	0	0	0
	435	480	839	902
<b>Stonington</b>	9,264	10,746	9,264	10,746
	1,187	3,157	1,701	3,890
	1,241	1,328	2,276	2,399
<b>Waterford</b>	7,147	7,475	7,147	7,475
	107	109	319	321
	1,362	1,527	2,633	2,865

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 9: Rhode Island Vulnerable Population by County Summaries**

County	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Scenario C Low Occ	Scenario C High Occ
<b>Bristol County</b>	22,070	22,984	26,936	27,932	26,936	27,932
<b>Kent County</b>	19,338	22,178	32,446	36,164	32,446	36,164
<b>Newport County</b>	23,563	34,303	32,294	44,633	32,294	44,633
<b>Providence County</b>	32,052	36,741	75,139	80,944	76,142	82,034
<b>Washington County</b>	33,067	53,750	46,951	69,293	46,951	69,293
<b>Totals</b>	130,090	169,956	213,766	258,966	214,769	260,056

1. Scenario C only applies to Providence County.

**Table 10: Rhode Island Evacuating People Statistics – Bristol County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Barrington</b>	11,098	11,269	11,098	11,269
	509	533	1,835	1,862
	102	109	301	311
<b>Bristol</b>	3,622	3,991	3,622	3,991
	166	173	602	609
	974	1,120	2,804	3,009
<b>Warren</b>	5,115	5,233	5,115	5,233
	277	317	962	1,007
	207	239	597	641

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)

**Table 11: Rhode Island Evacuating People Statistics – Kent County**

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>East Greenwich</b>	139	150	139	150
	79	80	277	278
	678	726	1,952	2,020
<b>Warwick</b>	12,230	12,566	12,230	12,566
	2,268	2,681	7,789	8,248
	3,944	5,975	10,059	12,902

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 12:** Rhode Island Evacuating People Statistics – Newport County

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Jamestown</b>	1,515	2,175	1,515	2,175
	18	18	67	67
	314	531	769	1,072
<b>Little Compton</b>	608	1,106	608	1,106
	74	195	116	251
	401	779	811	1,340
<b>Middletown</b>	789	1,169	789	1,169
	49	92	122	171
	1,603	2,859	3,494	5,253
<b>Newport</b>	8,178	11,699	8,178	11,699
	400	798	956	1,399
	1,614	3,096	3,590	5,666
<b>Portsmouth</b>	4,023	4,949	4,023	4,949
	95	218	193	330
	1,116	1,434	2,677	3,122
<b>Tiverton</b>	1,667	1,938	1,667	1,938
	0	0	0	0
	1,099	1,247	2,719	2,926

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 13:** Rhode Island Evacuating People Statistics – Providence County

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Scenario C Low Occ	Scenario C High Occ
<b>Cranston</b>	2,087	2,098	2,087	2,098	2,087	2,098
	472	483	1,716	1,729	1,716	1,729
	3,959	4,182	11,575	11,888	11,575	11,888
<b>East Providence</b>	3,945	3,970	3,945	3,970	3,945	3,970
	1,028	1,048	3,745	3,767	3,745	3,767
	1,990	2,162	5,704	5,945	5,704	5,945
<b>Pawtucket</b>	260	260	260	260	260	260
	55	58	196	200	196	200
	4,019	4,210	11,311	11,578	11,311	11,578
<b>Providence</b>	2,511	2,765	2,511	2,765	2,511	2,765
	1,500	3,457	3,001	5,175	3,001	5,175
	783	1,389	2,070	2,849	3,073	3,939
	9,443	10,659	27,018	28,720	27,018	28,720

1. Key:
- Zone A (Category 1 & 2)
  - Zone B (Category 3 & 4)
  - Zone C (Category 3 & 4/Fox Point Hurricane Barrier Failure)
  - Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 14:** Rhode Island Evacuating People Statistics – Washington County

Evacuation Zones <sup>1</sup>	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ
<b>Charlestown</b>	1,782	3,600	1,782	3,600
	194	483	340	662
	1,047	2,248	2,007	3,689
<b>Narragansett</b>	8,695	12,110	8,695	12,110
	1,393	2,428	3,737	4,887
	254	427	622	864
<b>New Shoreham</b>	717	1,705	717	1,705
	66	183	87	204
	1,423	4,103	1,589	4,269
<b>North Kingstown</b>	3,625	4,054	3,625	4,054
	834	908	2,791	2,873
	1,246	1,457	3,219	3,514
<b>South Kingstown</b>	3,824	6,552	3,824	6,552
	326	699	716	1,132
	1,975	2,905	4,972	6,274
<b>Westerly</b>	3,858	6,724	3,858	6,724
	300	602	713	1,048
	1,508	2,562	3,657	5,132

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)





### 3.0 Vulnerability Analysis

**Table 15: Massachusetts Vulnerable Population Summary**

County	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Barnstable County</b>	136,749	233,948	174,447	298,978
<b>Bristol County</b>	40,126	44,976	91,353	97,900
<b>Dukes County</b>	10,039	22,514	14,487	32,175
<b>Essex County</b>	102,606	113,587	148,048	163,163
<b>Middlesex County</b>	113,170	117,284	171,533	178,243
<b>Nantucket County</b>	6,341	15,202	9,629	22,565
<b>Norfolk County</b>	73,868	76,352	101,417	105,299
<b>Plymouth County</b>	83,146	98,860	101,062	119,248
<b>Suffolk County</b>	68,182	69,170	79,494	80,566
<b>Totals</b>	<b>634,227</b>	<b>791,893</b>	<b>891,470</b>	<b>1,098,137</b>

Suffolk County	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
<b>Boston</b>	58,134	70,114	230,121	259,791	454,499	494,073

Middlesex County	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
<b>Cambridge</b>	6,315	10,179	123,371	130,056	129,662	137,164



### 3.0 Vulnerability Analysis

**Table 16: Massachusetts Evacuating People Statistics – Barnstable County**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Barnstable</b>	13,572	18,994	13,572	18,994
	674	1,417	1,198	2,024
	6,039	10,310	12,050	20,593
<b>Bourne</b>	9,225	12,393	9,225	12,393
	466	652	1,073	1,279
	1,665	2,461	3,247	4,839
<b>Brewster</b>	466	983	466	983
	231	541	369	714
	2,499	5,641	4,997	11,282
<b>Chatham</b>	2,426	5,288	2,426	5,288
	308	650	545	925
	1,629	3,963	3,257	7,926
<b>Dennis</b>	11,114	22,135	11,114	22,135
	506	1,135	848	1,547
	2,032	4,128	3,985	8,176
<b>Eastham</b>	1,116	2,091	1,116	2,091
	624	1,427	1,024	1,916
	1,596	4,102	3,192	8,205
<b>Falmouth</b>	31,529	41,149	31,529	41,149
	1,552	2,579	3,270	4,411
	2,645	4,390	5,290	8,780
<b>Harwich</b>	3,884	7,562	3,884	7,562
	880	2,097	1,383	2,735
	1,688	3,172	3,361	6,330
<b>Mashpee</b>	4,824	9,081	4,824	9,081
	76	131	155	217
	1,768	2,823	3,484	5,595
<b>Orleans</b>	1,741	2,964	1,741	2,964
	204	442	354	618
	1,170	2,533	2,321	5,047
<b>Provincetown</b>	594	1,536	594	1,536
	3,060	7,836	4,382	9,688
	42	83	83	167

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 16:** Massachusetts Evacuating People Statistics – Barnstable County (continued)

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Sandwich</b>	1,150	1,912	1,150	1,912
	940	1,822	1,788	2,768
	2,061	2,613	4,122	5,227
<b>Truro</b>	577	1,506	577	1,506
	378	1,052	481	1,230
	962	2,552	1,914	5,094
<b>Wellfleet</b>	3,328	6,466	3,328	6,466
	38	91	59	118
	971	2,350	1,890	4,648
<b>Yarmouth</b>	9,985	18,645	9,985	18,645
	2,545	4,901	4,864	7,482
	1,969	3,349	3,930	6,692

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 17: Massachusetts Evacuating People Statistics – Bristol County**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Acushnet</b>	0	0	0	0
	326	329	1,119	1,122
	661	678	1,624	1,658
<b>Berkley</b>	673	702	1,085	1,114
	6	8	28	30
	74	75	510	512
<b>Dartmouth</b>	3,389	4,298	3,389	4,298
	43	46	154	157
	1,702	1,845	3,367	3,652
<b>Dighton</b>	384	400	618	634
	17	19	84	86
	77	89	616	639
<b>Fairhaven</b>	3,205	3,954	3,205	3,954
	1,304	1,371	4,657	4,731
	285	303	790	824
<b>Fall River</b>	1,392	1,410	1,392	1,410
	187	189	684	685
	4,444	4,598	13,169	13,476
<b>Freetown</b>	483	499	779	795
	0	0	0	0
	98	138	814	896
<b>New Bedford</b>	861	872	861	872
	3,605	3,644	13,169	13,212
	3,620	3,700	10,712	10,874
<b>Raynham</b>	160	160	259	259
	61	171	92	214
	722	919	2,228	2,623
<b>Rehoboth</b>	201	203	327	329
	17	19	83	84
	120	144	1,107	1,154
<b>Seekonk</b>	188	377	246	435
	9	9	44	44
	843	1,136	1,676	2,261

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 17: Massachusetts Evacuating People Statistics – Bristol County (continued)**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Somerset</b>	1,180	1,398	1,849	2,067
	18	20	89	91
	792	829	1,577	1,652
<b>Swansea</b>	2,825	2,878	2,825	2,878
	321	327	1,168	1,175
	561	579	1,673	1,709
<b>Taunton</b>	1,294	1,294	2,103	2,103
	71	76	345	351
	1,479	1,663	6,629	6,996
<b>Westport</b>	1,415	2,113	1,415	2,113
	58	84	179	208
	955	1,410	2,613	3,523

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)

**Table 18: Massachusetts Evacuating People Statistics – Dukes County**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Aquinnah</b>	136	341	136	341
	0	0	0	0
	135	343	269	685
<b>Chilmark</b>	479	1,163	479	1,163
	80	207	114	255
	412	1,069	817	2,131
<b>Edgartown</b>	1,416	3,317	1,416	3,317
	662	1,823	856	2,147
	1,122	2,709	2,243	5,418
<b>Oak Bluffs</b>	1,463	2,977	1,463	2,977
	578	1,405	843	1,763
	820	1,735	1,627	3,457
<b>Tisbury</b>	846	1,611	846	1,611
	11	30	14	36
	839	1,738	1,661	3,459
<b>West Tisbury</b>	333	562	333	562
	60	139	97	185
	647	1,345	1,273	2,668

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 19: Massachusetts Evacuating People Statistics – Essex County**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Beverly</b>	2,898	2,967	2,898	2,967
	442	447	1,615	1,620
	1,821	1,993	5,342	5,686
<b>Danvers</b>	3,668	3,920	3,668	3,920
	426	635	1,293	1,526
	1,801	2,800	4,542	6,541
<b>Essex</b>	1,285	1,530	1,285	1,530
	17	17	64	64
	124	145	361	403
<b>Gloucester</b>	7,889	9,489	7,889	9,489
	360	468	1,182	1,302
	1,326	1,939	3,635	4,862
<b>Ipswich</b>	3,424	3,825	3,424	3,825
	218	235	779	797
	473	547	1,383	1,530
<b>Lynn</b>	12,738	12,773	12,738	12,773
	1,169	1,174	4,280	4,285
	3,586	3,634	10,667	10,763
<b>Manchester</b>	1,129	1,247	1,129	1,247
	85	98	293	308
	201	242	581	665
<b>Marblehead</b>	3,388	3,670	3,388	3,670
	106	113	382	389
	929	1,083	2,634	2,942
<b>Nahant</b>	3,491	3,608	3,491	3,608
	0	0	0	0
	0	0	0	0
<b>Newbury</b>	3,233	3,666	3,233	3,666
	147	157	526	537
	142	149	422	437
<b>Newburyport</b>	2,309	2,558	2,309	2,558
	108	120	383	395
	810	960	2,355	2,656

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 19: Massachusetts Evacuating People Statistics – Essex County (continued)**

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Peabody</b>	1,437	1,437	1,437	1,437
	164	165	599	600
	3,767	4,511	9,511	10,999
<b>Rockport</b>	1,047	1,819	1,047	1,819
	0	0	0	0
	609	1,189	1,537	2,697
<b>Rowley</b>	391	419	391	419
	18	18	66	66
	276	287	823	845
<b>Salem</b>	18,700	18,923	18,700	18,923
	1,026	1,294	3,420	3,718
	898	955	2,665	2,780
<b>Salisbury</b>	5,552	6,937	5,552	6,937
	48	49	173	174
	358	367	797	816
<b>Saugus</b>	4,339	4,343	4,339	4,343
	269	273	984	988
	1,322	1,641	3,633	4,271
<b>Swampscott</b>	1,901	1,946	1,901	1,946
	167	171	610	613
	574	634	1,692	1,811

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 20:** Massachusetts Evacuating People Statistics – Middlesex County

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Arlington</b>	7,799	8,015	7,799	8,015
	649	660	2,364	2,377
	1,604	1,665	4,771	4,891
<b>Belmont</b>	2,392	2,403	2,392	2,403
	202	209	734	741
	1,100	1,152	3,255	3,359
<b>Everett</b>	7,580	7,595	7,580	7,595
	150	152	549	551
	1,703	1,717	5,072	5,099
<b>Malden</b>	21,458	21,577	21,458	21,577
	875	883	3,198	3,207
	1,710	1,726	5,024	5,057
<b>Medford</b>	28,794	29,153	28,794	29,153
	1,246	1,263	4,549	4,567
	1,016	1,039	3,010	3,057
<b>Newton</b>	559	561	559	561
	534	544	1,947	1,957
	4,683	5,757	13,459	15,606
<b>Somerville</b>	14,820	15,465	14,820	15,465
	2,299	2,324	8,398	8,425
	2,319	2,362	6,936	7,022
<b>Waltham</b>	147	147	147	147
	241	252	869	882
	3,616	4,838	10,199	12,644
<b>Watertown</b>	1,869	1,893	1,869	1,893
	1,127	1,155	4,098	4,129
	1,170	1,200	3,495	3,555
<b>Winchester</b>	233	233	233	233
	267	285	955	975
	1,008	1,059	3,000	3,100





### 3.0 Vulnerability Analysis

**Table 20:** Massachusetts Evacuating People Statistics – Middlesex County (continued)

Evacuation Zones <sup>1</sup>	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
Cambridge	3,613	3,840	3,613	3,840	3,613	3,840
	2,443	5,561	80,537	86,150	80,849	87,086
	239	718	38,914	39,680	43,826	44,784
	20	60	307	386	1,374	1,454

1. Key:  Zone A  Zone B  Zone C  Inland Area (Non-Surge)

**Table 21:** Massachusetts Evacuating People Statistics – Nantucket County

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
Nantucket	2,574	6,292	2,574	6,292
	784	1,986	1,141	2,477
	2,983	6,924	5,914	13,796

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 22:** Massachusetts Evacuating People Statistics – Norfolk County

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Braintree</b>	1,361	1,363	1,361	1,363
	64	64	235	235
	1,824	2,047	5,362	5,807
<b>Brookline</b>	3,661	3,762	3,661	3,762
	1,318	1,754	4,275	4,759
	2,618	3,008	7,612	8,391
<b>Cohasset</b>	2,316	2,411	2,316	2,411
	0	0	0	0
	336	367	936	996
<b>Milton</b>	642	642	642	642
	147	149	538	540
	1,300	1,352	3,874	3,978
<b>Quincy</b>	42,780	43,189	42,780	43,189
	1,125	1,145	4,100	4,122
	2,426	2,985	6,975	8,093
<b>Weymouth</b>	9,445	9,513	9,445	9,513
	93	93	339	339
	2,412	2,508	6,966	7,159

1. Key:  Zone A (Category 1 & 2)     Zone B (Category 3 & 4)     Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 23:** Massachusetts Evacuating People Statistics – Plymouth County

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Duxbury</b>	2,914	3,351	2,914	3,351
	21	23	75	77
	660	750	1,935	2,115
<b>Hingham</b>	4,676	4,719	4,676	4,719
	430	461	1,539	1,573
	823	886	2,368	2,493
<b>Hull</b>	11,122	12,751	11,122	12,751
	2	2	6	6
	0	0	0	0
<b>Kingston</b>	1,836	2,006	1,836	2,006
	0	0	0	0
	896	928	2,171	2,234
<b>Marion</b>	4,409	5,153	4,409	5,153
	138	167	467	499
	3	3	9	9
<b>Marshfield</b>	15,375	17,262	15,375	17,262
	22	22	80	80
	594	637	1,733	1,818
<b>Mattapoisett</b>	3,282	4,288	3,282	4,288
	153	166	545	559
	150	216	415	548
<b>Plymouth</b>	3,138	4,741	3,138	4,741
	508	779	1,516	1,817
	4,403	6,284	10,987	14,748
<b>Rochester</b>	39	39	64	64
	30	38	132	141
	54	67	483	510
<b>Scituate</b>	6,901	8,291	6,901	8,291
	0	0	0	0
	715	807	1,993	2,177
<b>Wareham</b>	18,888	22,900	18,888	22,900
	25	28	88	92
	939	1,095	1,915	2,226

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



### 3.0 Vulnerability Analysis

**Table 24:** Massachusetts Evacuating People Statistics – Suffolk County

Evacuation Zones <sup>1</sup>	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
Chelsea	24,634	24,900	24,634	24,900
	209	212	2,280	2,287
	56	56	835	844
Revere	24,878	25,458	24,878	25,458
	627	642	6,830	6,861
	181	184	2,440	2,498
Winthrop	17,597	17,718	17,597	17,718
	0	0	0	0
	0	0	0	0

Evacuation Zones <sup>1</sup>	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
Boston	36,563	39,771	36,563	39,771	36,563	39,771
	13,333	21,920	170,397	187,573	188,370	205,546
	4,640	4,825	15,948	25,200	211,992	230,496
	3,598	3,598	7,213	7,247	17,574	18,260

1. Key:  Zone A  Zone B  Zone C  Inland Area (Non-Surge)

### 3.3 Critical Facilities Inventory and Vulnerability

Also included in Chapter 3 of the Technical Data Report for each state is a listing of any infrastructure facilities deemed critical by emergency management and other government officials. These lists were prepared and provided by the respective state emergency management agencies through the USACE, with the data subsequently plotted and mapped for the purposes of this study.

Each state has different facilities included in its critical inventory list with different facility specific data associated with it. Furthermore, once each critical facility was plotted on a map its vulnerability to storm surge was assessed. Therefore the listing of critical facilities in each state specific TDR also relates whether the facility is located in a designated evacuation zone. Each state provided lists of the following critical facility categories:

Connecticut: Fire Stations; Hospitals; Law Enforcement Facilities; and Nursing Homes;



## 3.0 Vulnerability Analysis

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Rhode Island: Banking and Finance Facilities; Commercial Facilities; Communications Facilities; Dams; Defense Industrial Bases; Energy Facilities; Emergency Services; Government Facilities; Healthcare and Public Health Facilities; Chemical and Hazardous Materials Industry Plants; Information Technology Centers; Nuclear Reactors; Materials, and Waste; Postal and Shipping Facilities; Transportation Facilities; and Water Facilities;  
Massachusetts: Fire Stations; Hospitals; Law Enforcement Facilities; and Nursing Homes.

Shelters were also included in the critical facility submissions by all three states, but they have not been included in the Chapter 3 inventories. Shelter listings and associated data are included in Chapter 5 of all three state TDRs, which specifically deals with sheltering issues.

### 3.4 Mobile Homes

Finally, Chapter 3 provides an accounting of mobile homes, since they are very vulnerable to high winds, especially tropical cyclone events. For this reason it is recommended that evacuation orders include all mobile homes regardless of proximity to the coast and irrespective of forecast intensity at landfall. The mobile home unit figures, aggregated by town and included in Chapter Three of each state's TDR, were culled from U.S. Census decennial data. Mobile home units and population figures were then related to their locations within the Evacuation Zones (A, B or C), as well as any outside surge vulnerable areas, since it is recommended they should also be ordered to evacuate.





## 4.0 Behavioral Analysis

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### 4.0 Behavioral Analysis

#### 4.1 Purpose

In emergency management, as in any profession that must manage the collective actions of large number of individuals, it is clear that people do not always behave in the way emergency managers would like, nor do they always comply with official safety messages. Regarding evacuation orders, official messages are rarely complied with by the entire public. Public responses to hurricane threats have been shown to vary with storm-specific circumstances, perceptions of the public and advice of local officials. Under-compliance, where fewer than expected people evacuate from a risk area, place individuals in harm's way and may force emergency management officials to launch rescue efforts during a storm. Alternatively, over-compliance (shadow evacuation), where individuals from outside of an ordered evacuation zone decide to evacuate can also complicate evacuations by loading additional cars on an already taxed evacuation network.

During 2012 and 2013, Dr. Jay Baker of Hazards Management Group conducted behavioral surveys and prepared analyses for all three states in the study area. These telephonic behavioral surveys targeted multiple households within each evacuation zone and in non-surge vulnerable areas. The questions in the surveys not only addressed hypothetical tropical cyclone scenarios, but also past actions during actual evacuation events. The hundreds of responses collected from the surveyed households were then analyzed with the results provided in Chapter Four of each state TDR.

These findings are not only incorporated into the Shelter Analysis (Chapter Five) and Transportation Analysis (Chapter Six) data and figures, but also help guide emergency management decision making and public awareness efforts. In addition to covering many topics related to public responses during tropical cyclone events, a behavioral analysis is designed to answer the following salient questions:

- What percentage of the population will evacuate given various hurricane threat scenarios or in response to evacuation advisories?
- When will the evacuating population leave in response to an evacuation order given by local officials?
- How many vehicles will the evacuating population use during a hurricane evacuation?
- What are the destinations of the evacuees and what type of shelter will they seek?



## 4.0 Behavioral Analysis

### 4.2 Participation Rates

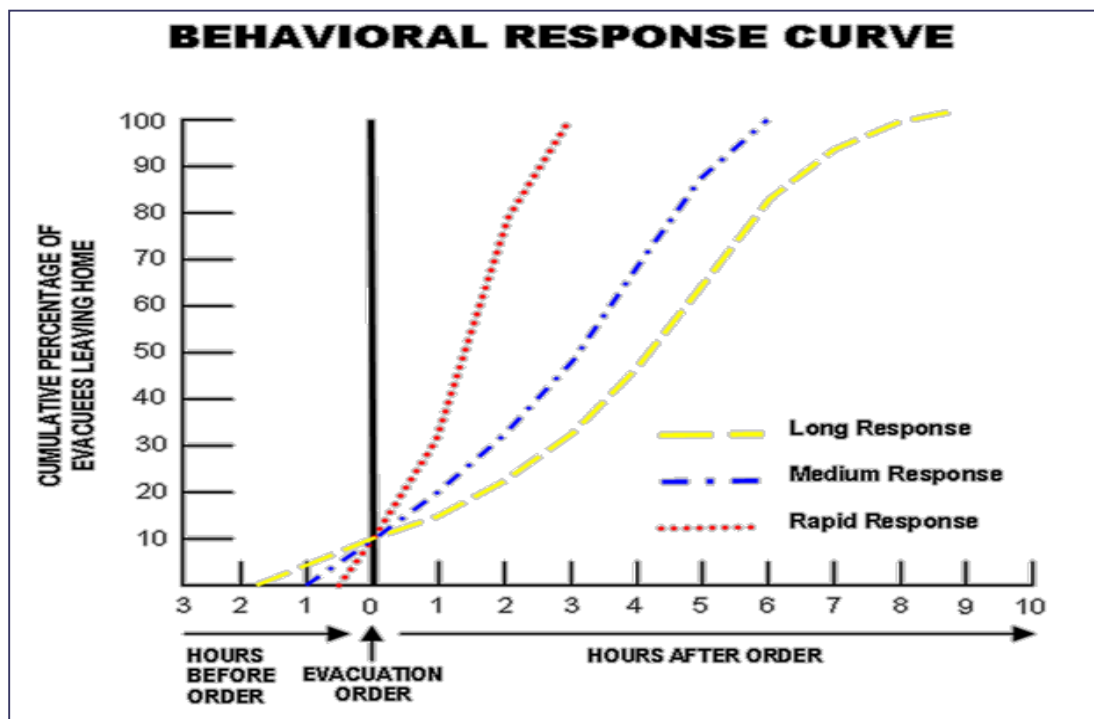
Participation rates relate to what percentage of the population will evacuate given various hurricane threat scenarios or in response to evacuation advisories.

**Table 25:** State Participation Rates

Evacuation/ Response Zone	Category 2			Category 3			Category 4		
	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge
Connecticut	69%	65%	61%	76%	71%	68%	85%	82%	79%
Rhode Island	68%	67%	62%	75%	75%	67%	83%	83%	70%
Massachusetts	65%	62%	65%	76%	73%	72%	83%	79%	74%

### 4.3 Evacuation Timing

Establishes how long it will take the evacuating public to load the evacuation road network.



**Figure 7:** Slow, Medium and Fast Response Curves





## 4.0 Behavioral Analysis

The response curves depicted above relate to the following real-world examples regarding their use during an actual tropical cyclone response. A long response would be an appropriate clearance time assumption during nighttime hours, or during the middle of a normal weekday when most families are scattered to work, school and other routine activities away from home. A medium response curve would be appropriately applied during weekend days and any evening hours when most families have been rejoined at their residences and can be informed and mobilized in relatively short order. A rapid response relates to periods when most families are together and can be alerted and motivated to respond quickly, such as in the morning before most families have left from normal daytime activities and before schools and businesses are opened.

### 4.4 Vehicle Use

Relates to what percentage of vehicles available to households would be used in an evacuation.

**Table 26:** Transportation Modes

Evacuation/ Response Zone	Mean Vehicles Available			Mean Vehicles To Take			Percent Vehicles To Take		
	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge
<b>Connecticut</b>	1.82	1.80	2.00	1.51	1.49	1.45	83%	83%	73%
<b>Rhode Island</b>	1.93	1.83	1.76	1.42	1.37	1.25	74%	75%	71%
<b>Massachusetts</b>	1.73	1.67	1.98	1.39	1.26	1.34	80%	75%	68%



## 4.0 Behavioral Analysis

### 4.5 Evacuation Destination

Relates to what percentage of vehicles available to households would be used in an evacuation.

**Table 27:** Intended Destination

Evacuation/ Response Zone	Public Shelter			In Community			Exit Community		
	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge	Zone A	Zone B	Non- Surge
<b>Connecticut</b>	12%	15%	14%	47%	42%	33%	51%	54%	53%
<b>Rhode Island</b>	14%	17%	20%	42%	41%	39%	54%	55%	57%
<b>Massachusetts</b>	20%	22%	20%	48%	52%	54%	46%	44%	41%

The remainder of the respondents who did not chose to evacuate ‘In Community’ or ‘Exit Community’ did not know their intended destination. According to the responses in all three states and regardless of hurricane category, a large majority of respondents (>90%) indicated that they would remain in their own state. The public shelter figures (in yellow) can either remain within or leave the community, although those that choose to evacuate locally are much more likely to seek public shelter.



## 5.0 Shelter Analysis

### 5.0 Shelter Analysis

#### 5.1 Purpose

The purpose of the shelter analysis is to estimate the number of evacuees that will seek public shelter and determine the number of shelter spaces available. The shelter analysis, performed by the United States Army Corps of Engineers (USACE), considers shelter locations, vulnerability to storm surge, capacities for each location, demand for shelter spaces, and shelter inventories. Data developed in the hazards, vulnerability and behavioral analyses is also used to perform the shelter evaluation. It is important to note that the identification of a shelter in this report does not indicate that the facility will be open and available for every hurricane evacuation event. The choice of public shelters for a specific evacuation is a state and local emergency management decision. Local authorities will open shelters based on a variety of circumstances including storm intensity, storm direction, availability of qualified shelter operators and other factors. This chapter will discuss shelter vulnerability, shelter demand (number of evacuees seeking public shelter) and shelter inventories and capacities.

#### 5.2 Shelter Demand

Public shelter demand is the number of evacuees expected to seek public shelter. Based on the behavioral data discussed in Chapter 4 of this report, shelter demand was assigned to various populations based on the response scenarios (A, B and C) and the evacuation zones for each town. Tables 28 through 45 also provide the total number of shelter spaces in each town based on the Evacuation Capacity provided in the National Shelter System (NSS) database provided by the American Red Cross (ARC). It should be noted that the tables for Massachusetts reference storm categories, rather than scenarios.

##### 5.2.1 Connecticut Shelter Demand

**Table 28:** Public Sheltering Demand and Sheltering Capacity – Fairfield County

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
<b>Bridgeport</b>	2,329	2,338	3,781	3,791	5,872
<b>Darien</b>	319	322	511	516	1,119
<b>Fairfield</b>	1,084	1,101	1,623	1,642	1,238
<b>Greenwich</b>	319	322	511	516	2,112
<b>Norwalk</b>	1,328	1,349	2,136	2,164	834
<b>Stamford</b>	1,671	1,719	3,006	3,065	1,560
<b>Stratford</b>	1,000	1,014	1,437	1,455	3,635
<b>Westport</b>	475	488	725	741	4,112
<b>Totals</b>	<b>8,525</b>	<b>8,653</b>	<b>13,730</b>	<b>13,890</b>	<b>20,482</b>



## 5.0 Shelter Analysis

\* Based on ARC National Shelter Survey (NSS) database.

**Table 29: Public Sheltering Demand and Sheltering Capacity – Middlesex County**

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
<b>Chester</b>	38	38	83	84	600
<b>Clinton</b>	1,100	1,133	1,647	1,691	2,800
<b>Deep River</b>	36	37	101	104	100
<b>Essex</b>	62	65	155	160	600
<b>Old Saybrook</b>	403	449	441	488	0
<b>Westbrook</b>	244	276	288	320	300
<b>Totals</b>	<b>1,883</b>	<b>1,998</b>	<b>2,715</b>	<b>2,847</b>	<b>4,400</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 30: Public Sheltering Demand and Sheltering Capacity – New Haven County**

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
<b>Branford</b>	806	832	992	1,023	70
<b>East Haven</b>	750	761	968	978	175
<b>Guilford</b>	395	413	574	594	35
<b>Hamden</b>	613	618	1,202	1,209	5,145
<b>Madison</b>	344	385	487	530	105
<b>Milford</b>	1,224	1,255	1,652	1,689	4,962
<b>New Haven</b>	1,892	1,914	3,254	3,282	400
<b>North Haven</b>	266	271	511	517	50
<b>West Haven</b>	1,026	1,032	1,567	1,576	105
<b>Totals</b>	<b>7,316</b>	<b>7,481</b>	<b>11,207</b>	<b>11,398</b>	<b>11,047</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 31: Public Sheltering Demand and Sheltering Capacity – New London County**

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
East Lyme	420	465	567	616	5,800
Groton	733	770	1,108	1,152	3,903
Ledyard	130	133	358	362	0
Lyme	32	35	64	69	0
Montville	185	190	493	502	2,000
New London	439	449	677	689	2,340
Old Lyme	202	262	258	320	800
Preston	55	56	95	97	540
Stonington	580	628	703	754	3,419
Waterford	486	496	622	633	1,555
<b>Totals</b>	<b>3,262</b>	<b>3,484</b>	<b>4,945</b>	<b>5,194</b>	<b>20,357</b>

\* Based on ARC National Shelter Survey (NSS) database.

### 5.2.2 Rhode Island Shelter Demand

**Table 32: Public Sheltering Demand and Sheltering Capacity – Bristol County**

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
Barrington	587	592	673	678	300
Bristol	276	288	479	493	300
Warren	287	291	359	364	250
<b>Totals</b>	<b>1,150</b>	<b>1,171</b>	<b>1,511</b>	<b>1,535</b>	<b>850</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 33: Public Sheltering Demand and Sheltering Capacity – Kent County**

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
East Greenwich	77	79	214	217	718
Warwick	1,018	1,056	1,869	1,919	1,795
<b>Totals</b>	<b>1,095</b>	<b>1,135</b>	<b>2,083</b>	<b>2,136</b>	<b>2,513</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 34:** Public Sheltering Demand and Sheltering Capacity – Newport County

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
<b>Jamestown</b>	91	109	136	157	0
<b>Little Compton</b>	54	81	92	125	330
<b>Middletown</b>	142	166	313	345	2,098
<b>Newport</b>	462	547	664	763	336
<b>Portsmouth</b>	291	323	448	485	797
<b>Tiverton</b>	184	196	345	359	350
<b>Totals</b>	<b>1,224</b>	<b>1,422</b>	<b>1,998</b>	<b>2,234</b>	<b>3,911</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 35:** Public Sheltering Demand and Sheltering Capacity – Providence County

County	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Scenario C Low Occ	Scenario C High Occ	Shelter Capacities*
<b>Cranston</b>	515	523	1,337	1,346	0	0	1,968
<b>East Providence</b>	440	444	945	949	0	0	3,122
<b>Pawtucket</b>	410	414	1,143	1,149	0	0	2,144
<b>Providence</b>	1,078	1,128	2,947	3,010	2,996	3,059	6,482
<b>Totals</b>	<b>2,443</b>	<b>2,509</b>	<b>6,372</b>	<b>6,454</b>	<b>2,996</b>	<b>3,059</b>	<b>13,716</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 36:** Public Sheltering Demand and Sheltering Capacity – Washington County

Town	Scenario A Low Occ	Scenario A High Occ	Scenario B Low Occ	Scenario B High Occ	Shelter Capacities*
<b>Charlestown</b>	124	191	208	286	0
<b>Narragansett</b>	454	542	604	697	1,142
<b>New Shoreham</b>	65	156	82	174	475
<b>North Kingstown</b>	332	347	623	642	1,344
<b>South Kingstown</b>	325	412	629	728	1,521
<b>Westerly</b>	267	348	487	580	759
<b>Totals</b>	<b>1,567</b>	<b>1,996</b>	<b>2,633</b>	<b>3,107</b>	<b>5,241</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

### 5.2.3 Massachusetts Shelter Demand

**Table 37: Public Sheltering Demand and Sheltering Capacity – Barnstable County**

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Barnstable</b>	795	1029	1,268	1,625	2,425
<b>Bourne</b>	569	654	727	831	3,137
<b>Brewster</b>	167	289	319	549	2,895
<b>Chatham</b>	175	322	277	510	0
<b>Dennis</b>	538	837	686	1,071	984
<b>Eastham</b>	138	261	235	447	978
<b>Falmouth</b>	861	1127	1,155	1,489	0
<b>Harwich</b>	287	437	432	644	1,705
<b>Mashpee</b>	323	448	466	629	1,212
<b>Orleans</b>	148	225	226	352	249
<b>Provincetown</b>	91	189	151	259	0
<b>Sandwich</b>	266	314	493	561	2,220
<b>Truro</b>	60	132	103	220	0
<b>Wellfleet</b>	172	282	219	377	200
<b>Yarmouth</b>	594	826	858	1,142	5,027
<b>Totals</b>	<b>5,184</b>	<b>7372</b>	<b>7,615</b>	<b>10,706</b>	<b>21,032</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 38:** Public Sheltering Demand and Sheltering Capacity – Bristol County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Acushnet</b>	82	82	217	219	176
<b>Berkley</b>	40	41	106	106	0
<b>Dartmouth</b>	324	348	492	522	259
<b>Dighton</b>	27	28	96	97	517
<b>Fairhaven</b>	241	258	459	476	0
<b>Fall River</b>	517	522	1,408	1,417	6,658
<b>Freetown</b>	33	34	118	121	100
<b>New Bedford</b>	582	586	1,767	1,775	922
<b>Raynham</b>	72	76	220	226	390
<b>Rehoboth</b>	22	23	129	131	0
<b>Seekonk</b>	77	83	153	161	1,255
<b>Somerset</b>	134	138	248	253	0
<b>Swansea</b>	212	214	364	368	0
<b>Taunton</b>	208	212	770	776	2,418
<b>Westport</b>	143	172	299	343	814
<b>Totals</b>	<b>2,714</b>	<b>2817</b>	<b>6,846</b>	<b>6,991</b>	<b>13,509</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 39:** Public Sheltering Demand and Sheltering Capacity –ukes County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Aquinnah</b>	11	24	18	39	0
<b>Chilmark</b>	37	80	60	128	117
<b>Edgartown</b>	120	240	191	376	294
<b>Oak Bluffs</b>	120	201	185	303	0
<b>Tisbury</b>	84	129	137	213	878
<b>West Tisbury</b>	59	93	102	164	0
<b>Totals</b>	<b>431</b>	<b>767</b>	<b>693</b>	<b>1,223</b>	<b>1,289</b>

\* Based on ARC National Shelter Survey (NSS) database.





## 5.0 Shelter Analysis

**Table 40:** Public Sheltering Demand and Sheltering Capacity – Essex County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Beverly</b>	341	346	746	755	0
<b>Danvers</b>	331	347	603	632	0
<b>Essex</b>	73	79	98	105	0
<b>Gloucester</b>	496	547	746	814	0
<b>Ipswich</b>	221	231	337	349	0
<b>Lynn</b>	1,051	1054	1,914	1,919	0
<b>Manchester</b>	78	81	125	131	0
<b>Marblehead</b>	258	269	438	455	130
<b>Nahant</b>	173	175	173	175	0
<b>Newbury</b>	176	184	223	231	0
<b>Newburyport</b>	193	202	356	370	0
<b>Peabody</b>	424	434	988	1,008	0
<b>Rockport</b>	81	112	154	202	0
<b>Rowley</b>	47	49	104	106	0
<b>Salem</b>	1,065	1073	1,359	1,371	0
<b>Salisbury</b>	294	321	344	372	0
<b>Saugus</b>	348	352	601	608	273
<b>Swampscott</b>	158	161	290	295	0
<b>Totals</b>	<b>5,808</b>	<b>6017</b>	<b>9,599</b>	<b>9,898</b>	<b>403</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 41:** Public Sheltering Demand and Sheltering Capacity – Middlesex County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Arlington</b>	577	581	978	984	0
<b>Belmont</b>	237	241	478	484	0
<b>Everett</b>	556	557	912	913	0
<b>Malden</b>	1,286	1,287	1,732	1,735	0
<b>Medford</b>	1,596	1,601	1,960	1,966	20
<b>Newton</b>	479	498	1,382	1,420	0
<b>Somerville</b>	1,074	1,082	1,838	1,849	4,900
<b>Waltham</b>	327	342	963	995	4,261
<b>Watertown</b>	265	268	645	649	0
<b>Winchester</b>	124	126	356	361	0
<b>Totals</b>	<b>6,521</b>	<b>6,583</b>	<b>11,244</b>	<b>11,356</b>	<b>9,181</b>

Community	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ	
<b>Cambridge</b>	241	287	6,053	6,132	6,429	6,470	3,476

\* Based on ARC National Shelter Survey (NSS) database.

**Table 42:** Public Sheltering Demand and Sheltering Capacity – Nantucket County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Evacuation Zone A
	Low Occ	High Occ	Low Occ	High Occ	
<b>Nantucket</b>	269	517	458	863	400
<b>Totals</b>	<b>269</b>	<b>517</b>	<b>458</b>	<b>863</b>	<b>400</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 43:** Public Sheltering Demand and Sheltering Capacity – Norfolk County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Braintree</b>	244	247	597	604	0
<b>Brookline</b>	485	501	1,116	1,142	0
<b>Cohasset</b>	147	150	206	210	0
<b>Milton</b>	167	170	443	447	2,760
<b>Quincy</b>	2,408	2,423	2,988	3,014	0
<b>Weymouth</b>	714	720	1,179	1,189	4,827
<b>Totals</b>	<b>4,165</b>	<b>4,211</b>	<b>6,529</b>	<b>6,606</b>	<b>7,587</b>

\* Based on ARC National Shelter Survey (NSS) database.

**Table 44:** Public Sheltering Demand and Sheltering Capacity – Plymouth County

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Duxbury</b>	203	216	331	347	0
<b>Hingham</b>	334	339	542	549	230
<b>Hull</b>	531	561	531	561	0
<b>Kingston</b>	178	183	304	311	2,910
<b>Marion</b>	215	231	233	249	0
<b>Marshfield</b>	799	839	915	956	0
<b>Mattapoisett</b>	169	193	214	239	0
<b>Plymouth</b>	531	629	1,178	1,341	2,918
<b>Rochester</b>	8	10	56	59	0
<b>Scituate</b>	393	424	518	553	0
<b>Wareham</b>	974	1060	1,070	1,163	0
<b>Totals</b>	<b>4,335</b>	<b>4685</b>	<b>5,892</b>	<b>6,328</b>	<b>6,058</b>

\* Based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 45: Public Sheltering Demand and Sheltering Capacity – Suffolk County**

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	
<b>Chelsea</b>	1,243	1,246	1,424	1,428	0
<b>Revere</b>	1,282	1,290	1,816	1,828	0
<b>Winthrop</b>	878	880	878	880	0
<b>Totals</b>	<b>3,403</b>	<b>3,416</b>	<b>4,118</b>	<b>4,136</b>	<b>0</b>

Community	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane		Shelter Capacities*
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ	
<b>Boston</b>	2,853	2,986	11,290	11,621	22,947	23,169	2,506

\* Based on ARC National Shelter Survey (NSS) database.

### 5.3 Shelter Inventories and Capacities

Shelter Inventory tables were obtained from the American Red Cross (ARC) NSS database, as well as each respective state emergency management office. The locations of the public shelters were plotted and compared with the Response Zones boundaries to determine their potential risk for storm surge impacts or inundation. In determining the risk, the depth of flooding was not considered at each facility, nor were any other on-site hazards (such as wind) or vulnerabilities factored into these assessments. None of these particular reported facilities were directly visited by the HES study team. Consequently, these shelter inventories are only conveying data obtained from the above sources, and are not the results of any direct on-site inspection of the public shelter premises.

Although they are not included in this particular report, the shelter inventory and capacity tables are detailed in Chapter 5 of each state’s respective TDR. The TDR tables list potential hurricane evacuation shelters and capacities throughout the study area that might be used during an evacuation. The table shows the shelter name, community, the Response Zone that each shelter lies in, along with any other information that was provided in the source tables.



## 5.0 Shelter Analysis

### 5.4 Shelter Demand vs Capacity Comparisons

The final component of each state’s shelter analysis is reconciling the shelter demand with the shelter capacities and identifying those towns or regions that have either shelter surpluses, or deficits. Shelter surpluses for a town or region indicate that all evacuees who want to use public shelters can do so locally and do not have to travel to other locations to do so. On the other hand shelter deficits, depending on their magnitude, mean that reasonably large segments of locally evacuating populations will have to travel to other communities, thereby increasing their impacts on the evacuation roadway network. Tables 46 through 63 below provide an overview of those figures by evacuation zone, tourist occupancy and by town. The figures in red parentheses below indicate those communities that have a shelter space deficit and the extent of the shortfall.

#### 5.4.1 Connecticut

**Table 46:** Shelter Capacities and Demand Summary – Fairfield County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Bridgeport</b>	7,680	7,671	2,091	2,081
<b>Darien</b>	800	797	608	603
<b>Fairfield</b>	154	137	(385)	(404)
<b>Greenwich</b>	2,154	2,151	1,601	1,596
<b>Norwalk</b>	(494)	(515)	(1,302)	(1,330)
<b>Stamford</b>	161	113	(1,446)	(1,505)
<b>Stratford</b>	2,933	2,919	2,198	2,180
<b>Westport</b>	3,637	3,624	3,387	3,371
<b>Totals</b>	<b>17,025</b>	<b>16,897</b>	<b>6,752</b>	<b>6,592</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.

**Table 47:** Shelter Capacities and Demand Summary – Middlesex County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Chester</b>	562	562	517	516
<b>Clinton</b>	1,700	1,667	1,153	1,109
<b>Deep River</b>	64	63	(1)	(4)
<b>Essex</b>	538	535	445	440
<b>Old Saybrook</b>	(403)	(449)	(441)	(488)
<b>Westbrook</b>	1,056	1,024	12	(20)
<b>Totals</b>	<b>3,517</b>	<b>3,402</b>	<b>1,685</b>	<b>1,553</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 48:** Shelter Capacities and Demand Summary – New Haven County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Branford</b>	(701)	(727)	(922)	(953)
<b>East Haven</b>	(540)	(551)	(793)	(803)
<b>Guilford</b>	(325)	(343)	(539)	(559)
<b>Hamden</b>	4,532	4,527	3,943	3,936
<b>Madison</b>	(204)	(245)	(382)	(425)
<b>Milford</b>	3,738	3,707	3,310	3,273
<b>New Haven</b>	(1,387)	(1,409)	(2,854)	(2,882)
<b>North Haven</b>	(216)	(221)	(461)	(467)
<b>West Haven</b>	(886)	(892)	(1,462)	(1,471)
<b>Totals</b>	<b>4,011</b>	<b>3,846</b>	<b>(160)</b>	<b>(351)</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.

**Table 49:** Shelter Capacities and Demand Summary – New London County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>East Lyme</b>	5,380	5,335	5,233	5,184
<b>Groton</b>	3,470	3,433	2,795	2,751
<b>Ledyard</b>	(130)	(133)	(358)	(362)
<b>Lyme</b>	(32)	(35)	(64)	(69)
<b>Montville</b>	1,815	1,810	1,507	1,498
<b>New London</b>	1,901	1,891	1,663	1,651
<b>Old Lyme</b>	598	538	542	480
<b>Preston</b>	485	484	445	443
<b>Stonington</b>	2,839	2,791	2,716	2,665
<b>Waterford</b>	1,349	1,339	933	922
<b>Totals</b>	<b>17,675</b>	<b>17,453</b>	<b>15,412</b>	<b>15,163</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

### 5.4.2 Rhode Island

**Table 50:** Shelter Capacities and Demand Summary – Bristol County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Barrington</b>	(287)	(292)	(373)	(378)
<b>Bristol</b>	24	12	(179)	(193)
<b>Warren</b>	(37)	(41)	(109)	(114)
<b>Totals</b>	<b>(300)</b>	<b>(321)</b>	<b>(661)</b>	<b>(685)</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.

**Table 51:** Shelter Capacities and Demand Summary – Kent County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>East Greenwich</b>	641	639	504	501
<b>Warwick</b>	777	739	(74)	(124)
<b>Totals</b>	<b>1,418</b>	<b>1,378</b>	<b>430</b>	<b>377</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.

**Table 52:** Shelter Capacities and Demand Summary – Newport County\*

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Jamestown</b>	(91)	(109)	(136)	(157)
<b>Little Compton</b>	276	249	238	205
<b>Middletown</b>	1,956	1,932	1,785	1,753
<b>Newport</b>	(126)	(211)	(328)	(427)
<b>Portsmouth</b>	506	474	349	312
<b>Tiverton</b>	166	154	5	(9)
<b>Totals</b>	<b>2,687</b>	<b>2,489</b>	<b>1,913</b>	<b>1,677</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.



## 5.0 Shelter Analysis

**Table 53: Shelter Capacities and Demand Summary – Providence County\***

County	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ	Zone C Low Occ	Zone C High Occ
<b>Cranston</b>	1,453	1,445	631	622		
<b>East Providence</b>	2,682	2,678	2,177	2,173		
<b>Pawtucket</b>	1,734	1,730	1,001	995		
<b>Providence</b>	5,404	5,354	3,535	3,472	3,486	3,423
<b>Totals</b>	<b>11,273</b>	<b>11,207</b>	<b>7,344</b>	<b>7,262</b>	<b>3,486</b>	<b>3,423</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.

**Table 54: Shelter Capacities and Demand Summary – Washington County\***

Town	Zone A Low Occ	Zone A High Occ	Zone B Low Occ	Zone B High Occ
<b>Charlestown</b>	(124)	(191)	(208)	(286)
<b>Narragansett</b>	688	600	538	445
<b>New Shoreham</b>	410	319	393	301
<b>North Kingstown</b>	1,012	997	721	702
<b>South Kingstown</b>	1,196	1,109	892	793
<b>Westerly</b>	492	411	272	179
<b>Totals</b>	<b>3,674</b>	<b>3,245</b>	<b>2,608</b>	<b>2,134</b>

\* Figures derived from shelter capacities based on ARC National Shelter Survey (NSS) database.





## 5.0 Shelter Analysis

### 5.4.3 Massachusetts

**Table 55:** Shelter Capacities and Demand Summary – Barnstable County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Barnstable</b>	1,630	1,396	1,157	800
<b>Bourne</b>	2,568	2,483	2,410	2,306
<b>Brewster</b>	2,728	2,606	2,576	2,346
<b>Chatham</b>	(175)	(322)	(277)	(510)
<b>Dennis</b>	939	640	298	(87)
<b>Eastham</b>	840	717	743	531
<b>Falmouth</b>	(502)	(768)	(1,155)	(1,489)
<b>Harwich</b>	1,418	1,268	1,273	1,061
<b>Mashpee</b>	889	764	746	583
<b>Orleans</b>	101	24	23	(103)
<b>Provincetown</b>	(91)	(189)	(151)	(259)
<b>Sandwich</b>	1,954	1,906	1,727	1,659
<b>Truro</b>	(60)	(132)	(103)	(220)
<b>Wellfleet</b>	28	(82)	(19)	(177)
<b>Yarmouth</b>	4,848	4,616	4,169	3,885
<b>Totals</b>	<b>17,115</b>	<b>14,927</b>	<b>13,417</b>	<b>10,326</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 5.0 Shelter Analysis

**Table 56:** Shelter Capacities and Demand Summary – Bristol County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Acushnet</b>	94	94	(41)	(43)
<b>Berkley</b>	(40)	(41)	(106)	(106)
<b>Dartmouth</b>	(65)	(89)	(233)	(263)
<b>Dighton</b>	490	489	421	420
<b>Fairhaven</b>	(241)	(258)	(459)	(476)
<b>Fall River</b>	6,141	6,136	5,250	5,241
<b>Freetown</b>	67	66	(18)	(21)
<b>New Bedford</b>	340	336	(845)	(853)
<b>Raynham</b>	318	314	170	164
<b>Rehoboth</b>	(22)	(23)	(129)	(131)
<b>Seekonk</b>	1,178	1,172	1,102	1,094
<b>Somerset</b>	(134)	(138)	(248)	(253)
<b>Swansea</b>	(212)	(214)	(364)	(368)
<b>Taunton</b>	2,210	2,206	1,648	1,642
<b>Westport</b>	671	642	515	471
<b>Totals</b>	<b>10,795</b>	<b>10,692</b>	<b>6,663</b>	<b>6,518</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.

**Table 57:** Shelter Capacities and Demand Summary – Dukes County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Aquinnah</b>	(11)	(24)	(18)	(39)
<b>Chilmark</b>	80	37	57	(11)
<b>Edgartown</b>	174	54	103	(82)
<b>Oak Bluffs</b>	(120)	(201)	(185)	(303)
<b>Tisbury</b>	794	749	741	665
<b>West Tisbury</b>	(59)	(93)	(102)	(164)
<b>Totals</b>	<b>858</b>	<b>522</b>	<b>596</b>	<b>66</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 5.0 Shelter Analysis

**Table 58:** Shelter Capacities and Demand Summary – Essex County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Beverly</b>	(341)	(346)	(746)	(755)
<b>Danvers</b>	(331)	(347)	(603)	(632)
<b>Essex</b>	(73)	(79)	(98)	(105)
<b>Gloucester</b>	(496)	(547)	(746)	(814)
<b>Ipswich</b>	(221)	(231)	(337)	(349)
<b>Lynn</b>	(271)	(274)	(1,914)	(1,919)
<b>Manchester</b>	(78)	(81)	(125)	(131)
<b>Marblehead</b>	(128)	(139)	(308)	(325)
<b>Nahant</b>	(173)	(175)	(173)	(175)
<b>Newbury</b>	124	116	(223)	(231)
<b>Newburyport</b>	(193)	(202)	(356)	(370)
<b>Peabody</b>	(424)	(434)	(988)	(1,008)
<b>Rockport</b>	(81)	(112)	(154)	(202)
<b>Rowley</b>	(47)	(49)	(104)	(106)
<b>Salem</b>	(1,005)	(1,013)	(1,359)	(1,371)
<b>Salisbury</b>	(294)	(321)	(344)	(372)
<b>Saugus</b>	158	154	(328)	(335)
<b>Swampscott</b>	(158)	(161)	(290)	(295)
<b>Totals</b>	<b>(4,032)</b>	<b>(4,241)</b>	<b>(9,196)</b>	<b>(9,495)</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 5.0 Shelter Analysis

**Table 59:** Shelter Capacities and Demand Summary – Middlesex County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Arlington</b>	(577)	(581)	(978)	(984)
<b>Belmont</b>	(237)	(241)	(478)	(484)
<b>Cambridge</b>	3,235	3,189	(2,577)	(2,656)
<b>Everett</b>	(556)	(557)	(912)	(913)
<b>Malden</b>	(1,286)	(1,287)	(1,732)	(1,735)
<b>Medford</b>	(1,576)	(1,581)	(1,940)	(1,946)
<b>Newton</b>	(479)	(498)	(1,382)	(1,420)
<b>Somerville</b>	5,086	5,078	3,062	3,051
<b>Waltham</b>	3,934	3,919	3,298	3,266
<b>Watertown</b>	(265)	(268)	(645)	(649)
<b>Winchester</b>	(124)	(126)	(356)	(361)
<b>Totals</b>	<b>7,155</b>	<b>7,047</b>	<b>(4,640)</b>	<b>(4,831)</b>

Community	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
<b>Cambridge</b>	3,235	3,189	(2,577)	(2,656)	(2,953)	(2,994)

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.

**Table 60:** Shelter Capacities and Demand Summary – Nantucket County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Nantucket</b>	131	(117)	(58)	(463)

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 5.0 Shelter Analysis

**Table 61:** Shelter Capacities and Demand Summary – Norfolk County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Braintree</b>	(244)	(247)	(597)	(604)
<b>Brookline</b>	(485)	(501)	(1,116)	(1,142)
<b>Cohasset</b>	(147)	(150)	(206)	(210)
<b>Milton</b>	2,593	2,590	2,317	2,313
<b>Quincy</b>	(2,408)	(2,423)	(2,988)	(3,014)
<b>Weymouth</b>	4,113	4,107	3,648	3,638
<b>Totals</b>	<b>3,422</b>	<b>3,376</b>	<b>1,058</b>	<b>981</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.

**Table 62:** Shelter Capacities and Demand Summary – Plymouth County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Duxbury</b>	(203)	(216)	(331)	(347)
<b>Hingham</b>	(104)	(109)	(312)	(319)
<b>Hull</b>	(531)	(561)	(531)	(561)
<b>Kingston</b>	2,732	2,727	2,606	2,599
<b>Marion</b>	(215)	(231)	(233)	(249)
<b>Marshfield</b>	(799)	(839)	(915)	(956)
<b>Mattapoisett</b>	(169)	(193)	(214)	(239)
<b>Plymouth</b>	2,387	2,289	1,740	1,577
<b>Rochester</b>	(8)	(10)	(56)	(59)
<b>Scituate</b>	(393)	(424)	(518)	(553)
<b>Wareham</b>	(974)	(1,060)	(1,070)	(1,163)
<b>Totals</b>	<b>1,723</b>	<b>1,373</b>	<b>166</b>	<b>(270)</b>

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 5.0 Shelter Analysis

**Table 63:** Shelter Capacities and Demand Summary – Suffolk County <sup>1,2</sup>

Community	Category 1 & 2 Hurricane		Category 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ
<b>Chelsea</b>	(1,243)	(1,246)	(1,424)	(1,428)
<b>Revere</b>	(1,282)	(1,290)	(1,816)	(1,828)
<b>Winthrop</b>	(878)	(880)	(878)	(880)
<b>Totals</b>	<b>(3,777)</b>	<b>(3,896)</b>	<b>(12,902)</b>	<b>(13,251)</b>

Community	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane	
	Low Occ	High Occ	Low Occ	High Occ	Low Occ	High Occ
<b>Boston</b>	(374)	(480)	(8,784)	(9,115)	(20,441)	(20,663)

1. Based on American Red Cross National Shelter Survey (NSS) database shelter capacities.
2. Figures in red parentheses indicate communities with public shelter deficits and the amount of the shortfall relative to demand.



## 6.0 Transportation Analysis

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### 6.0 Transportation Analysis

#### 6.1 Purpose

The main objective of the transportation analysis performed for Connecticut, Rhode Island and Massachusetts is to estimate evacuation clearance times; the time it takes to clear the roadway of all evacuating vehicles. To make these estimates, the evacuation road network had to be defined and general traffic control issues examined. Clearance time is a value resulting from a transportation engineering analysis performed under a specific set of assumptions. During an actual tropical cyclone event, it must be considered in conjunction with a pre-landfall hazards time to determine the optimal timeframe for issuing an evacuation order. The pre-landfall hazards time is the period before the forecast arrival of tropical storm force winds and/or the onset of roadway flooding prior to landfall of a tropical cyclone.

The transportation analysis task initially identified traffic movements associated with a hurricane evacuation. Basic assumptions for the transportation analysis were related to storm scenarios, vulnerable population, behavioral and socioeconomic characteristics, as well as the roadway system and traffic control. A transportation model and the evacuation roadway system were developed for the Connecticut study area to facilitate model application and development of clearance times. The major components involved in the transportation analysis are as follows:

1. Establish evacuation zones with the cooperation of each state and local emergency management agency;
2. Quantify the potential evacuation population for each storm scenario using socioeconomic and behavioral data;
3. Identify the existing evacuation roadway network, recognizing any recent or future infrastructure improvements, as well as state and local traffic control measures;
4. Using the evacuation road network develop:
  - Directional service volume per roadway segment;
  - Evacuation traffic congestion by roadway segment by storm scenario;
5. Identify local and regional bottlenecks/critical roadway segments;
6. Determine regional evacuation traffic that is expected to cross county lines and move inland;
7. Use evacuation zones and plans developed by each state to complete transportation modeling and clearance time calculations;
8. Develop hurricane evacuation clearance times; and
9. Recommend traffic management measures and actions that can improve overall evacuation traffic congestion and clearance times.



## 6.0 Transportation Analysis

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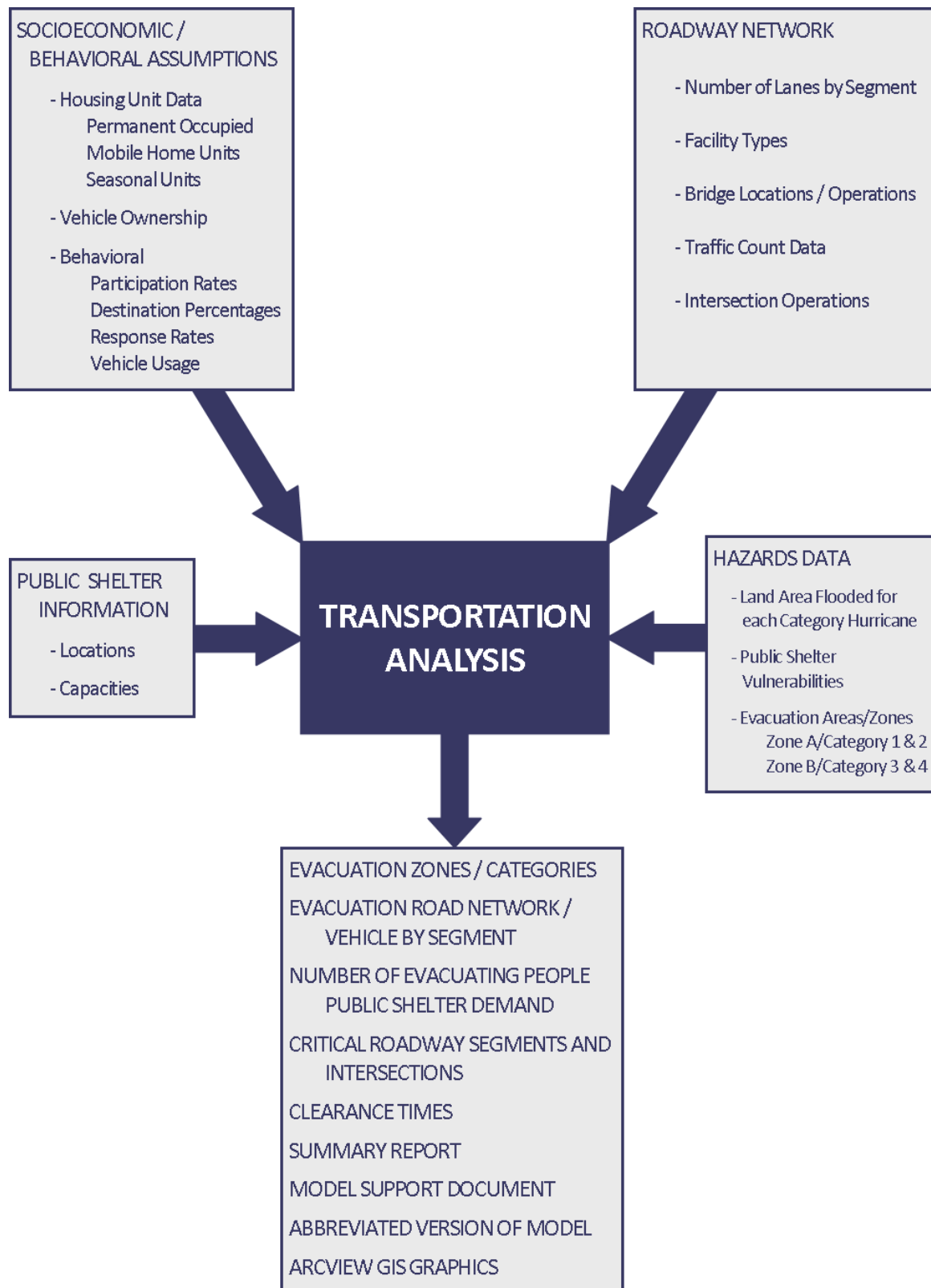
### 6.2 Transportation Inputs and Products

The specifics regarding the inputs, the applied methodology and the outputs from the transportation analysis for each state are spelled out in detail in Chapter 6 of each of their TDR documents. Therefore a summary diagram is provided below that provides a simplified schematic of the transportation analysis process. Figure 8 below is a schematic representation of the transportation model inputs and outputs, this particular one for Rhode Island.





## 6.0 Transportation Analysis



**Figure 8:** Transportation Analysis Model Process



## 6.0 Transportation Analysis

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### 6.3 Evacuation Zones and Statistics

Chapter 6 in each state TDR provides evacuation zone maps that were developed from the SLOSH inundation limit maps discussed and depicted in each respective Chapter 3 document. These evacuation zones were developed by the U.S. Army Corps of Engineers and FEMA in consultation with local and state emergency management offices. The evacuation zone maps are the very basis of the entire transportation analysis process in that they determine the evacuating populations and vehicles, which then establish the evacuation demand portion of the transportation analysis equation.

Based on the areas delineated as being in Zone A, Zone B and in some cases a Zone C, population and other socioeconomic variables are combined with the behavioral response characteristics to result in evacuation statistics. These evacuation statistics include the number of evacuating people and vehicles from each zone including the tourist populations using low and high occupancy assumptions. These evacuation statistics tables for each state are included below.



## 6.0 Transportation Analysis

### 6.3.1 Connecticut Evacuation Statistics

**Table 64:** Evacuating People and Vehicles – High Occupancy – Middlesex County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Chester</b>	440	451	391	395	174	136	217	259
	0	0	0	0	0	0	0	0
	172	637	110	424	52	186	59	237
<b>Clinton</b>	6,902	6,902	3,970	3,970	1,465	1,141	2,505	2,829
	113	340	66	198	26	59	40	139
	1,096	2,026	571	1,060	276	465	295	595
<b>Deep River</b>	293	302	213	216	94	73	119	143
	0	0	0	0	0	0	0	0
	186	673	92	343	41	148	51	194
<b>Essex</b>	718	827	533	572	223	174	310	398
	11	52	6	34	2	9	4	24
	381	1,312	202	733	87	312	115	421
<b>Old Saybrook</b>	10,739	10,739	6,028	6,028	2,127	1,657	3,902	4,371
	92	261	58	169	22	50	36	119
	440	791	196	361	72	130	124	231
<b>Westbrook</b>	5,933	5,933	3,688	3,688	1,333	1,038	2,355	2,649
	558	822	241	423	35	76	206	347
	373	712	184	356	82	148	101	208
<b>Totals</b>	<b>28,447</b>	<b>32,780</b>	<b>16,549</b>	<b>18,970</b>	<b>6,111</b>	<b>5,802</b>	<b>10,439</b>	<b>13,164</b>

1. Key:  Zone A

Zone B

Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 65:** Evacuating People and Vehicles – Low Occupancy – New Haven County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Branford</b>	12,527	12,527	7,763	7,763	3,435	2,672	4,328	5,091
	294	870	159	471	62	140	96	330
	2,022	3,703	1,008	1,870	450	774	557	1,096
<b>East Haven</b>	11,501	11,501	6,254	6,254	2,781	2,163	3,473	4,090
	793	2,251	406	1,175	153	345	253	830
	1,472	2,924	754	1,502	371	669	383	833
<b>Guilford</b>	4,599	4,599	2,956	2,956	1,281	997	1,675	1,959
	122	358	76	225	30	67	46	158
	1,765	3,468	1,013	2,005	489	880	524	1,125
<b>Hamden</b>	634	634	352	352	158	123	194	229
	214	639	122	365	49	109	74	256
	5,734	11,429	2,565	5,116	1,272	2,289	1,293	2,828
<b>Madison</b>	5,149	5,149	2,860	2,860	1,105	860	1,756	2,000
	388	1,081	261	754	98	221	163	533
	1,124	2,225	669	1,331	328	591	341	740
<b>Milford</b>	17,039	17,039	10,449	10,449	4,605	3,582	5,844	6,867
	1,076	3,173	599	1,777	236	530	363	1,247
	3,816	7,217	1,893	3,619	867	1,529	1,026	2,090
<b>New Haven</b>	14,569	14,569	5,655	5,655	2,503	1,947	3,152	3,708
	4,067	11,949	1,422	4,177	554	1,241	867	2,935
	10,091	19,912	2,903	5,713	1,382	2,483	1,521	3,230
<b>North Haven</b>	591	591	450	450	202	157	248	293
	191	567	121	360	48	108	73	252
	2,353	4,643	1,224	2,425	597	1,072	627	1,353

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 66:** Evacuating People and Vehicles – Low Occupancy – New Haven County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>West Haven</b>	11,498	11,498	6,192	6,192	2,779	2,162	3,413	4,031
	1,962	5,870	939	2,811	374	842	565	1,969
	3,670	7,189	1,428	2,801	689	1,229	739	1,572
<b>Totals</b>	<b>119,261</b>	<b>167,575</b>	<b>60,493</b>	<b>81,428</b>	<b>26,898</b>	<b>29,782</b>	<b>33,594</b>	<b>51,645</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 67:** Evacuating People and Vehicles – High Occupancy – New Haven County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Branford</b>	13,288	13,288	8,029	8,029	3,437	2,674	4,592	5,355
	309	886	164	477	62	140	101	336
	2,646	4,578	1,226	2,176	453	777	774	1,399
<b>East Haven</b>	11,930	11,930	6,404	6,404	2,783	2,165	3,621	4,239
	927	2,400	453	1,227	154	345	300	882
	1,538	3,016	777	1,534	372	669	406	865
<b>Guilford</b>	5,233	5,233	3,178	3,178	1,284	999	1,894	2,179
	130	367	79	228	30	67	49	161
	1,970	3,755	1,085	2,106	490	881	595	1,224
<b>Hamden</b>	636	636	353	353	158	123	195	230
	217	643	123	367	49	109	75	257
	5,860	11,606	2,609	5,178	1,272	2,289	1,337	2,889
<b>Madison</b>	7,518	7,518	3,689	3,689	1,113	868	2,576	2,821
	475	1,178	292	788	99	222	193	567
	1,199	2,330	696	1,367	329	591	367	776
<b>Milford</b>	18,303	18,303	10,891	10,891	4,609	3,586	6,282	7,305
	1,132	3,236	618	1,799	236	530	383	1,269
	4,742	8,514	2,217	4,073	870	1,533	1,347	2,540
<b>New Haven</b>	15,109	15,109	5,844	5,844	2,505	1,949	3,339	3,895
	4,276	12,181	1,495	4,258	555	1,242	940	3,016
	10,903	21,048	3,187	6,111	1,385	2,487	1,802	3,623
<b>North Haven</b>	594	594	451	451	202	157	249	294
	195	573	122	362	48	108	74	254
	2,531	4,892	1,287	2,512	597	1,073	689	1,439

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 68:** Evacuating People and Vehicles – High Occupancy – New Haven County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>West Haven</b>	11,597	11,597	6,227	6,227	2,779	2,162	3,448	4,065
	1,980	5,890	945	2,818	374	842	571	1,976
	3,960	7,594	1,530	2,943	690	1,231	839	1,712
<b>Totals</b>	<b>129,198</b>	<b>178,895</b>	<b>63,971</b>	<b>85,390</b>	<b>26,935</b>	<b>29,819</b>	<b>37,038</b>	<b>55,568</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 69:** Evacuating People and Vehicles – Low Occupancy – New London County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>East Lyme</b>	6,073	6,073	3,731	3,731	1,537	1,196	2,194	2,535
	239	468	87	175	17	38	71	138
	1,634	3,094	743	1,425	323	580	420	845
<b>Groton</b>	7,370	7,370	3,923	3,923	1,686	1,312	2,238	2,612
	414	1,236	215	644	86	193	129	451
	4,130	7,682	1,805	3,387	797	1,391	1,008	1,996
<b>Ledyard</b>	629	635	451	453	202	157	249	296
	3	17	2	13	1	4	1	9
	1,058	3,353	577	1,858	274	818	302	1,039
<b>Lyme</b>	367	387	289	296	127	99	162	197
	0	0	0	0	0	0	0	0
	153	484	91	300	41	129	50	170
<b>Montville</b>	665	673	504	507	226	176	279	332
	0	0	0	0	0	0	0	0
	1,694	4,854	799	2,331	365	1,005	435	1,326
<b>New London</b>	4,036	4,036	1,961	1,961	867	675	1,094	1,287
	0	0	0	0	0	0	0	0
	2,573	5,025	877	1,712	404	727	473	985
<b>Old Lyme</b>	3,734	3,734	2,358	2,358	862	671	1,497	1,687
	59	155	36	100	13	29	23	72
	577	1,104	313	609	142	256	171	353
<b>Preston</b>	257	257	232	232	104	81	128	151
	0	0	0	0	0	0	0	0
	435	839	295	573	144	253	151	320

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)





## 6.0 Transportation Analysis

**Table 70:** Evacuating People and Vehicles – Low Occupancy – New London County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Stonington</b>	9,264	9,264	6,037	6,037	2,603	2,025	3,434	4,012
	1,187	1,701	481	792	58	126	423	665
	1,241	2,276	653	1,201	319	531	334	670
<b>Waterford</b>	7,147	7,147	4,807	4,807	2,138	1,663	2,669	3,144
	107	319	65	195	26	58	39	136
	1,362	2,633	737	1,434	354	627	383	806
<b>Totals</b>	<b>56,408</b>	<b>74,816</b>	<b>32,069</b>	<b>41,054</b>	<b>13,716</b>	<b>14,820</b>	<b>18,357</b>	<b>26,234</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 71:** Evacuating People and Vehicles – High Occupancy – New London County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>East Lyme</b>	7,913	7,913	4,375	4,375	1,544	1,203	2,831	3,172
	503	762	180	278	18	39	162	239
	2,203	3,890	942	1,704	325	583	617	1,121
<b>Groton</b>	8,406	8,406	4,286	4,286	1,689	1,315	2,596	2,971
	418	1,241	217	646	86	193	131	453
	5,364	9,410	2,237	3,991	801	1,397	1,436	2,594
<b>Ledyard</b>	640	656	455	461	202	157	253	303
	3	17	2	13	1	4	1	9
	1,221	3,581	634	1,937	275	819	359	1,118
<b>Lyme</b>	407	467	302	323	127	99	176	224
	0	0	0	0	0	0	0	0
	206	557	109	325	41	129	68	196
<b>Montville</b>	681	706	510	519	226	176	284	343
	0	0	0	0	0	0	0	0
	2,103	5,426	942	2,531	366	1,007	576	1,524
<b>New London</b>	4,236	4,236	2,031	2,031	868	675	1,163	1,356
	0	0	0	0	0	0	0	0
	2,976	5,589	1,018	1,910	405	729	613	1,181
<b>Old Lyme</b>	6,327	6,327	3,266	3,266	871	680	2,395	2,585
	84	182	45	110	13	29	32	81
	747	1,342	373	692	143	256	230	435
<b>Preston</b>	259	259	233	233	104	81	129	152
	0	0	0	0	0	0	0	0
	480	902	311	595	144	253	167	342

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 72:** Evacuating People and Vehicles – High Occupancy – New London County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Stonington</b>	10,746	10,746	6,556	6,556	2,608	2,030	3,948	4,526
	3,157	3,890	1,170	1,558	65	134	1,106	1,424
	1,328	2,399	683	1,244	319	531	364	712
<b>Waterford</b>	7,475	7,475	4,922	4,922	2,139	1,664	2,783	3,258
	109	321	66	195	26	58	40	137
	1,527	2,865	795	1,515	355	628	440	887
<b>Totals</b>	<b>69,519</b>	<b>89,565</b>	<b>36,660</b>	<b>46,216</b>	<b>13,761</b>	<b>14,869</b>	<b>22,900</b>	<b>31,343</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 73:** County and State Summary of Evacuating People and Vehicles – Low Occupancy

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Fairfield County</b>	86,256	86,256	41,199	41,199	18,348	14,271	22,852	26,928
	13,332	37,374	5,536	15,672	2,036	4,555	3,499	11,117
	46,071	90,473	19,927	39,247	9,564	17,161	10,361	22,086
<b>Middlesex County</b>	19,596	19,638	12,924	12,939	5,397	4,200	7,525	8,737
	465	1,130	262	703	84	193	179	509
	2,389	5,788	1,265	3,149	610	1,389	654	1,759
<b>New Haven County</b>	78,107	78,107	42,931	42,931	18,849	14,663	24,083	28,268
	9,107	26,758	4,105	12,115	1,604	3,603	2,500	8,510
	32,047	62,710	13,457	26,382	6,445	11,516	7,011	14,867
<b>New London County</b>	39,542	39,576	24,293	24,305	10,352	8,055	13,944	16,253
	2,009	3,896	886	1,919	201	448	686	1,471
	14,857	31,344	6,890	14,830	3,163	6,317	3,727	8,510
<b>Totals</b>	<b>223,501</b>	<b>223,577</b>	<b>121,347</b>	<b>121,374</b>	<b>52,946</b>	<b>41,189</b>	<b>68,404</b>	<b>80,186</b>
	<b>24,913</b>	<b>69,158</b>	<b>10,789</b>	<b>30,409</b>	<b>3,925</b>	<b>8,799</b>	<b>6,864</b>	<b>21,607</b>
	<b>95,364</b>	<b>190,315</b>	<b>41,539</b>	<b>83,608</b>	<b>19,782</b>	<b>36,383</b>	<b>21,753</b>	<b>47,222</b>
<b>Overall Totals</b>	<b>343,778</b>	<b>483,050</b>	<b>173,675</b>	<b>235,391</b>	<b>76,653</b>	<b>86,371</b>	<b>97,021</b>	<b>149,015</b>

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 74:** County and State Summary of Evacuating People and Vehicles – High Occupancy

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Fairfield County</b>	88,754	88,754	42,072	42,072	18,356	14,278	23,716	27,792
	15,933	40,263	6,446	16,682	2,047	4,565	4,399	12,119
	50,716	96,976	21,552	41,523	9,580	17,183	11,971	24,339
<b>Middlesex County</b>	25,025	25,154	14,823	14,869	5,416	4,219	9,408	10,649
	774	1,475	371	824	85	194	286	629
	2,648	6,151	1,355	3,277	610	1,389	745	1,886
<b>New Haven County</b>	84,208	84,208	45,066	45,066	18,870	14,683	26,196	30,383
	9,641	27,354	4,291	12,324	1,607	3,605	2,686	8,718
	35,349	67,333	14,614	28,000	6,458	11,531	8,156	16,467
<b>New London County</b>	47,090	47,191	26,936	26,972	10,378	8,080	16,558	18,890
	4,274	6,413	1,680	2,800	209	457	1,472	2,343
	18,155	35,961	8,044	16,444	3,174	6,332	4,870	10,110
<b>Totals</b>	<b>245,077</b>	<b>245,307</b>	<b>128,897</b>	<b>128,979</b>	<b>53,020</b>	<b>41,260</b>	<b>75,878</b>	<b>87,714</b>
	<b>30,622</b>	<b>75,505</b>	<b>12,788</b>	<b>32,630</b>	<b>3,948</b>	<b>8,821</b>	<b>8,843</b>	<b>23,809</b>
	<b>106,868</b>	<b>206,421</b>	<b>45,565</b>	<b>89,244</b>	<b>19,822</b>	<b>36,435</b>	<b>25,742</b>	<b>52,802</b>
<b>Overall Totals</b>	<b>382,567</b>	<b>527,233</b>	<b>187,250</b>	<b>250,853</b>	<b>76,790</b>	<b>86,516</b>	<b>110,463</b>	<b>164,325</b>

1. Key:  Zone A (Category 1 & 2)  Zone B (Category 3 & 4)  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

### 6.3.2 Rhode Island Evacuation Statistics

**Table 75:** Evacuating People and Vehicles – Low Occupancy – Bristol County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Barrington</b>	11,098	11,098	6,077	6,077	2,117	1,814	3,960	4,263
	509	1,835	267	967	92	289	175	679
	102	301	48	142	19	49	29	93
<b>Bristol</b>	3,622	3,622	1,830	1,830	619	530	1,212	1,300
	166	602	98	357	34	107	64	250
	974	2,804	463	1,348	175	460	288	889
<b>Warren</b>	5,115	5,115	2,836	2,836	986	845	1,851	1,991
	277	962	150	530	50	157	100	373
	207	597	102	298	39	102	64	197
<b>Totals</b>	<b>22,070</b>	<b>26,936</b>	<b>11,871</b>	<b>14,385</b>	<b>4,131</b>	<b>4,353</b>	<b>7,743</b>	<b>10,035</b>

1. Key:  Zone A     Zone B     Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 76:** Evacuating People and Vehicles – High Occupancy – Bristol County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Barrington</b>	11,269	11,269	6,137	6,137	2,117	1,815	4,020	4,322
	533	1,862	275	977	92	289	183	688
	109	311	51	146	19	49	32	97
<b>Bristol</b>	3,991	3,991	1,959	1,959	620	532	1,339	1,428
	173	609	100	359	34	107	66	253
	1,120	3,009	514	1,420	176	460	338	959
<b>Warren</b>	5,233	5,233	2,878	2,878	986	845	1,892	2,033
	317	1,007	164	546	50	157	114	389
	239	641	113	314	39	102	74	212
<b>Totals</b>	<b>22,984</b>	<b>27,932</b>	<b>12,191</b>	<b>14,736</b>	<b>4,133</b>	<b>4,356</b>	<b>8,058</b>	<b>10,381</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 77: Evacuating People and Vehicles – Low Occupancy – Kent County**

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
East Greenwich	139	139	89	89	30	26	58	63
	79	277	57	202	20	60	37	141
	678	1,952	352	1,021	138	353	215	668
Warwick	12,230	12,230	7,106	7,106	2,467	2,115	4,639	4,991
	2,268	7,789	1,244	4,378	411	1,290	833	3,088
	3,944	10,059	1,895	5,039	620	1,595	1,276	3,445
<b>Totals</b>	<b>19,338</b>	<b>32,446</b>	<b>10,743</b>	<b>17,835</b>	<b>3,686</b>	<b>5,439</b>	<b>7,058</b>	<b>12,396</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)

**Table 78: Evacuating People and Vehicles – High Occupancy – Kent County**

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
East Greenwich	150	150	93	93	31	26	62	67
	80	278	58	203	20	60	38	142
	726	2,020	369	1,045	138	354	232	691
Warwick	12,566	12,566	7,224	7,224	2,468	2,116	4,755	5,108
	2,681	8,248	1,389	4,539	412	1,290	976	3,247
	5,975	12,902	2,606	6,034	627	1,605	1,979	4,430
<b>Totals</b>	<b>22,178</b>	<b>36,164</b>	<b>11,739</b>	<b>19,138</b>	<b>3,696</b>	<b>5,451</b>	<b>8,042</b>	<b>13,685</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)





## 6.0 Transportation Analysis

**Table 79:** Evacuating People and Vehicles – Low Occupancy – Newport County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Jamestown</b>	1,515	1,515	946	946	292	250	654	696
	18	67	13	46	4	14	8	32
	314	769	170	450	53	140	117	311
<b>Little Compton</b>	608	608	351	351	93	80	258	271
	74	116	31	61	4	11	28	49
	401	811	200	436	54	121	146	315
<b>Middletown</b>	789	789	381	381	111	95	270	286
	49	122	23	65	5	17	18	48
	1,603	3,494	676	1,532	185	431	491	1,100
<b>Newport</b>	8,178	8,178	3,205	3,205	912	783	2,293	2,422
	400	956	175	462	37	116	137	346
	1,614	3,590	657	1,526	162	411	495	1,116
<b>Portsmouth</b>	4,023	4,023	2,187	2,187	710	609	1,476	1,578
	95	193	43	103	8	24	35	79
	1,116	2,677	572	1,403	207	464	365	938
<b>Tiverton</b>	1,667	1,667	1,167	1,167	392	336	775	831
	0	0	0	0	0	0	0	0
	1,099	2,719	609	1,525	234	521	376	1,003
<b>Totals</b>	<b>23,563</b>	<b>32,294</b>	<b>11,406</b>	<b>15,846</b>	<b>3,463</b>	<b>4,423</b>	<b>7,942</b>	<b>11,421</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 80:** Evacuating People and Vehicles – High Occupancy – Newport County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Jamestown</b>	2,175	2,175	1,177	1,177	294	253	883	924
	18	67	13	46	4	14	8	32
	531	1,072	246	557	54	141	192	416
<b>Little Compton</b>	1,106	1,106	526	526	95	82	431	444
	195	251	74	108	4	12	70	96
	779	1,340	332	621	55	123	276	498
<b>Middletown</b>	1,169	1,169	514	514	112	96	402	417
	92	171	38	82	6	17	33	65
	2,859	5,253	1,116	2,147	189	438	927	1,710
<b>Newport</b>	11,699	11,699	4,438	4,438	925	795	3,513	3,642
	798	1,399	314	617	39	118	275	499
	3,096	5,666	1,176	2,253	167	418	1,009	1,835
<b>Portsmouth</b>	4,949	4,949	2,511	2,511	713	612	1,797	1,899
	218	330	86	151	8	24	78	126
	1,434	3,122	684	1,558	208	466	475	1,092
<b>Tiverton</b>	1,938	1,938	1,262	1,262	393	337	868	924
	0	0	0	0	0	0	0	0
	1,247	2,926	661	1,597	234	522	427	1,075
<b>Totals</b>	<b>34,303</b>	<b>44,633</b>	<b>15,168</b>	<b>20,165</b>	<b>3,500</b>	<b>4,468</b>	<b>11,664</b>	<b>15,694</b>

1. Key:  Zone A     Zone B     Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 81:** Evacuating People and Vehicles – Low Occupancy – Providence County

Evacuation Areas <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to Local Destinations			Evacuating Vehicles to Out of County Destinations		
	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C
<b>Cranston</b>	2,087	2,087	2,087	843	843	843	294	252	252	549	591	591
	472	1,716	1,716	239	871	871	83	261	261	156	611	611
	3,959	11,575	11,575	1,753	5,142	5,142	686	1,781	1,781	1,067	3,361	3,361
<b>East Providence</b>	3,945	3,945	3,945	2,134	2,134	2,134	745	639	639	1,388	1,495	1,495
	1,028	3,745	3,745	523	1,908	1,908	182	571	571	341	1,337	1,337
	1,990	5,704	5,704	882	2,541	2,541	341	875	875	541	1,666	1,666
<b>Pawtucket</b>	260	260	260	75	75	75	26	23	23	49	53	53
	55	196	196	24	86	86	8	26	26	16	60	60
	4,019	11,311	11,311	1,611	4,540	4,540	631	1,573	1,573	980	2,967	2,967
<b>Providence</b>	2,511	2,511	2,511	583	583	583	189	162	162	394	421	421
	1,500	3,001	3,001	445	758	758	39	117	117	406	641	641
	783	2,070	3,073	289	778	1,160	65	194	304	224	584	856
	9,443	27,018	27,018	2,915	8,302	8,302	1,083	2,804	2,804	1,832	5,497	5,497
<b>Totals</b>	<b>32,052</b>	<b>75,139</b>	<b>76,142</b>	<b>12,316</b>	<b>28,561</b>	<b>28,943</b>	<b>4,372</b>	<b>9,278</b>	<b>9,388</b>	<b>7,943</b>	<b>19,284</b>	<b>19,556</b>

1. Key:  Zone A  Zone B  Zone C (Fox Point Barrier Failure)  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 82:** Evacuating People and Vehicles – High Occupancy – Providence County

Evacuation Areas <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to Local Destinations			Evacuating Vehicles to Out of County Destinations		
	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C
<b>Cranston</b>	2,098	2,098	2,098	847	847	847	295	252	252	553	595	595
	483	1,729	1,729	243	876	876	83	261	261	160	615	615
	4,182	11,888	11,888	1,831	5,251	5,251	687	1,782	1,782	1,144	3,469	3,469
<b>East Providence</b>	3,970	3,970	3,970	2,142	2,142	2,142	745	639	639	1,397	1,504	1,504
	1,048	3,767	3,767	530	1,915	1,915	182	571	571	348	1,344	1,344
	2,162	5,945	5,945	942	2,625	2,625	342	876	876	601	1,750	1,750
<b>Pawtucket</b>	260	260	260	75	75	75	26	23	23	49	53	53
	58	200	200	25	87	87	8	26	26	17	62	62
	4,210	11,578	11,578	1,678	4,634	4,634	632	1,574	1,574	1,046	3,060	3,060
<b>Providence</b>	2,765	2,765	2,765	672	672	672	190	163	163	482	509	509
	3,457	5,175	5,175	1,130	1,519	1,519	46	125	125	1,084	1,394	1,394
	1,389	2,849	3,939	502	1,051	1,463	67	197	307	434	854	1,156
	10,659	28,720	28,720	3,341	8,897	8,897	1,087	2,810	2,810	2,253	6,087	6,087
<b>Totals</b>	<b>36,741</b>	<b>80,944</b>	<b>82,034</b>	<b>13,958</b>	<b>30,591</b>	<b>31,003</b>	<b>4,390</b>	<b>9,299</b>	<b>9,409</b>	<b>9,568</b>	<b>21,296</b>	<b>21,598</b>

1. Key:  Zone A  Zone B  Zone C (Fox Point Barrier Failure)  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 83:** Evacuating People and Vehicles – Low Occupancy – Washington County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Charlestown</b>	1,782	1,782	988	988	238	204	750	784
	194	340	82	169	11	34	70	135
	1,047	2,007	456	937	101	228	356	709
<b>Narragansett</b>	8,695	8,695	5,233	5,233	1,628	1,397	3,604	3,836
	1,393	3,737	714	2,124	188	579	525	1,545
	254	622	125	327	38	100	87	227
<b>New Shoreham</b>	717	717	304	304	131	131	173	173
	66	87	25	38	5	18	20	20
	1,423	1,589	515	608	46	139	469	469
<b>North Kingstown</b>	3,625	3,625	2,159	2,159	730	626	1,429	1,533
	834	2,791	459	1,554	156	462	303	1,092
	1,246	3,219	622	1,628	234	552	388	1,076
<b>South Kingstown</b>	3,824	3,824	2,148	2,148	589	506	1,558	1,642
	326	716	165	438	36	110	129	327
	1,975	4,972	829	2,136	268	670	561	1,466
<b>Westerly</b>	3,858	3,858	1,995	1,995	528	453	1,468	1,542
	300	713	152	421	35	109	117	312
	1,508	3,657	687	1,754	203	526	484	1,228
<b>Totals</b>	<b>33,067</b>	<b>46,951</b>	<b>17,658</b>	<b>24,961</b>	<b>5,165</b>	<b>6,844</b>	<b>12,491</b>	<b>18,116</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 84:** Evacuating People and Vehicles – High Occupancy – Washington County

Evacuation Areas <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B	Scenario A	Scenario B
<b>Charlestown</b>	3,600	3,600	1,624	1,624	244	210	1,380	1,414
	483	662	183	282	12	36	171	246
	2,248	3,689	877	1,526	105	234	772	1,292
<b>Narragansett</b>	12,110	12,110	6,428	6,428	1,640	1,408	4,788	5,020
	2,428	4,887	1,076	2,527	192	583	884	1,944
	427	864	186	412	39	101	147	311
<b>New Shoreham</b>	1,705	1,705	650	650	131	131	519	519
	183	204	66	79	5	18	61	61
	4,103	4,269	1,453	1,546	46	139	1,407	1,407
<b>North Kingstown</b>	4,054	4,054	2,309	2,309	731	627	1,577	1,681
	908	2,873	485	1,583	157	462	328	1,120
	1,457	3,514	696	1,731	235	553	461	1,178
<b>South Kingstown</b>	6,552	6,552	3,103	3,103	599	515	2,504	2,588
	699	1,132	296	583	37	112	259	471
	2,905	6,274	1,155	2,591	272	675	883	1,917
<b>Westerly</b>	6,724	6,724	2,998	2,998	538	463	2,460	2,535
	602	1,048	257	538	36	110	221	428
	2,562	5,132	1,056	2,271	207	531	849	1,739
<b>Totals</b>	<b>53,750</b>	<b>69,293</b>	<b>24,898</b>	<b>32,781</b>	<b>5,226</b>	<b>6,908</b>	<b>19,671</b>	<b>25,871</b>

1. Key:  Zone A  Zone B  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 85: County and State Summary of Evacuating People and Vehicles – Low Occupancy**

Evacuation Areas <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to Local Destinations			Evacuating Vehicles to Out of County Destinations		
	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C
<b>Bristol</b>	19,835	19,835		10,743	10,743		3,722	3,189		7,023	7,554	
	952	3,399		515	1,854		176	553		339	1,302	
	1,283	3,702		613	1,788		233	611		381	1,179	
<b>Kent</b>	12,369	12,369		7,195	7,195		2,497	2,141		4,697	5,054	
	2,347	8,066		1,301	4,580		431	1,350		870	3,229	
	4,622	12,011		2,247	6,060		758	1,948		1,491	4,113	
<b>Newport</b>	16,780	16,780		8,237	8,237		2,510	2,153		5,726	6,084	
	636	1,454		285	737		58	182		226	554	
	6,147	14,060		2,884	6,872		895	2,088		1,990	4,783	
<b>Providence</b>	8,803	8,803		3,635	3,635		1,254	1,076		2,380	2,560	
	3,055	8,658		1,231	3,623		312	975		919	2,649	
	783	2,070	3,073	289	778	1,160	65	194	304	224	584	856
	19,411	55,608		7,161	20,525		2,741	7,033		4,420	13,491	
<b>Washington</b>	22,501	22,501		12,827	12,827		3,844	3,317		8,982	9,510	
	3,113	8,384		1,597	4,744		431	1,312		1,164	3,431	
	7,453	16,066		3,234	7,390		890	2,215		2,345	5,175	
<b>Totals</b>	<b>71,485</b>	<b>71,485</b>		<b>39,002</b>	<b>39,002</b>		<b>12,573</b>	<b>10,800</b>		<b>26,428</b>	<b>28,202</b>	
	<b>10,103</b>	<b>29,961</b>		<b>4,929</b>	<b>15,538</b>		<b>1,408</b>	<b>4,372</b>		<b>3,518</b>	<b>11,165</b>	
	<b>783</b>	<b>2,070</b>	<b>3,073</b>	<b>289</b>	<b>778</b>	<b>1,160</b>	<b>65</b>	<b>194</b>	<b>304</b>	<b>224</b>	<b>584</b>	<b>856</b>
	<b>38,916</b>	<b>101,447</b>		<b>16,139</b>	<b>42,635</b>		<b>5,517</b>	<b>13,895</b>		<b>10,627</b>	<b>28,741</b>	

1. Key:  Zone A  Zone B  Zone C (Fox Point Barrier Failure)  Inland Area (Non-Surge)



## 6.0 Transportation Analysis

**Table 86:** County and State Summary of Evacuating People and Vehicles – High Occupancy

Evacuation Areas <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to Local Destinations			Evacuating Vehicles to Out of County Destinations		
	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C	Scen A	Scen B	Scen C
<b>Bristol</b>	20,493	20,493		10,974	10,974		3,723	3,192		7,251	7,783	
	1,023	3,478		539	1,882		176	553		363	1,330	
	1,468	3,961		678	1,880		234	611		444	1,268	
<b>Kent</b>	12,716	12,716		7,317	7,317		2,499	2,142		4,817	5,175	
	2,761	8,526		1,447	4,742		432	1,350		1,014	3,389	
	6,701	14,922		2,975	7,079		765	1,959		2,211	5,121	
<b>Newport</b>	23,036	23,036		10,428	10,428		2,532	2,175		7,894	8,250	
	1,321	2,218		525	1,004		61	185		464	818	
	9,946	19,379		4,215	8,733		907	2,108		3,306	6,626	
<b>Providence</b>	9,093	9,093		3,736	3,736		1,256	1,077		2,481	2,661	
	5,046	10,871		1,928	4,397		319	983		1,609	3,415	
	1,389	2,849	3,939	502	1,051	1,463	67	197	307	434	854	1,156
	21,213	58,131		7,792	21,407		2,748	7,042		5,044	14,366	
<b>Washington</b>	34,745	34,745		17,112	17,112		3,883	3,354		13,228	13,757	
	5,303	10,806		2,363	5,592		439	1,321		1,924	4,270	
	13,702	23,742		5,423	10,077		904	2,233		4,519	7,844	
<b>Totals</b>	<b>90,990</b>	<b>90,990</b>		<b>45,831</b>	<b>45,831</b>		<b>12,637</b>	<b>10,863</b>		<b>33,190</b>	<b>34,965</b>	
	<b>15,454</b>	<b>35,899</b>		<b>6,802</b>	<b>17,617</b>		<b>1,427</b>	<b>4,392</b>		<b>5,374</b>	<b>13,222</b>	
	<b>1,389</b>	<b>2,849</b>	<b>3,939</b>	<b>502</b>	<b>1,051</b>	<b>1,463</b>	<b>67</b>	<b>197</b>	<b>307</b>	<b>434</b>	<b>854</b>	<b>1,156</b>
	<b>53,030</b>	<b>120,135</b>		<b>21,083</b>	<b>49,176</b>		<b>5,558</b>	<b>13,953</b>		<b>15,524</b>	<b>35,225</b>	

1. Key:  Zone A  Zone B  Zone C (Fox Point Barrier Failure)  Inland Area (Non-Surge)





## 6.0 Transportation Analysis

### 6.3.3 Massachusetts Evacuation Statistics

**Table 87:** Evacuating People and Vehicles – Low Occupancy – Barnstable County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Barnstable</b>	13,572	13,572	6,384	6,384	1,624	383	4,760	6,001
	674	1,198	295	575	76	44	220	530
	6,039	12,050	2,748	5,482	908	414	1,840	5,068
<b>Bourne</b>	9,225	9,225	4,743	4,743	1,891	424	2,853	4,319
	466	1,073	263	635	104	60	159	575
	1,665	3,247	785	1,529	292	128	493	1,401
<b>Brewster</b>	466	466	245	245	70	16	175	229
	231	369	107	198	24	14	83	183
	2,499	4,997	1,076	2,152	242	116	834	2,036
<b>Chatham</b>	2,426	2,426	1,101	1,101	275	65	826	1,036
	308	545	163	334	47	27	116	306
	1,629	3,257	670	1,339	122	60	548	1,279
<b>Dennis</b>	11,114	11,114	5,441	5,441	1,600	371	3,841	5,071
	506	848	219	406	50	30	169	376
	2,032	3,985	885	1,728	237	107	648	1,621
<b>Eastham</b>	1,116	1,116	561	561	177	41	384	520
	624	1,024	261	470	56	33	206	437
	1,596	3,192	654	1,307	101	52	553	1,256
<b>Falmouth</b>	31,529	31,529	14,161	14,161	3,051	737	11,110	13,425
	1,552	3,270	780	1,760	272	158	508	1,602
	2,645	5,290	1,220	2,440	415	189	805	2,251
<b>Harwich</b>	3,884	3,884	2,167	2,167	692	159	1,475	2,008
	880	1,383	391	699	82	49	309	651
	1,688	3,361	748	1,488	222	102	526	1,386

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 87:** Evacuating People and Vehicles – Low Occupancy – Barnstable County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Mashpee</b>	4,824	4,824	2,755	2,755	912	208	1,843	2,546
	76	155	39	88	13	8	26	80
	1,768	3,484	803	1,580	280	125	523	1,455
<b>Orleans</b>	1,741	1,741	949	949	333	76	616	874
	204	354	89	169	22	13	67	156
	1,170	2,321	545	1,078	140	65	405	1,013
<b>Provincetown</b>	594	594	239	239	35	9	204	230
	3,060	4,382	1,179	1,812	163	98	1,016	1,714
	42	83	16	33	4	2	12	31
<b>Sandwich</b>	1,150	1,150	649	649	234	53	416	596
	940	1,788	467	984	142	83	325	901
	2,061	4,122	977	1,955	397	178	580	1,777
<b>Truro</b>	577	577	254	254	43	11	211	243
	378	481	145	201	13	8	132	193
	962	1,914	382	757	49	26	332	731
<b>Wellfleet</b>	3,328	3,328	1,828	1,828	581	133	1,247	1,695
	38	59	17	31	4	2	13	29
	971	1,890	405	779	76	34	329	744
<b>Yarmouth</b>	9,985	9,985	4,861	4,861	1,521	350	3,340	4,511
	2,545	4,864	1,160	2,402	341	199	819	2,203
	1,969	3,930	932	1,860	313	143	619	1,718
<b>Totals</b>	<b>136,749</b>	<b>174,447</b>	<b>64,759</b>	<b>82,609</b>	<b>18,246</b>	<b>5,603</b>	<b>46,516</b>	<b>77,007</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 88:** Evacuating People and Vehicles – High Occupancy – Barnstable County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Barnstable</b>	18,994	18,994	8,281	8,281	1,643	402	6,639	7,880
	1,417	2,024	556	864	78	47	477	816
	10,310	20,593	4,243	8,472	923	444	3,320	8,028
<b>Bourne</b>	12,393	12,393	5,852	5,852	1,902	436	3,950	5,416
	652	1,279	328	708	105	61	223	647
	2,461	4,839	1,064	2,086	295	133	769	1,952
<b>Brewster</b>	983	983	426	426	72	18	354	408
	541	714	216	318	25	16	190	303
	5,641	11,282	2,176	4,351	253	138	1,922	4,213
<b>Chatham</b>	5,288	5,288	2,102	2,102	285	75	1,817	2,027
	650	925	283	467	48	29	235	438
	3,963	7,926	1,487	2,973	130	77	1,357	2,897
<b>Dennis</b>	22,135	22,135	9,298	9,298	1,638	409	7,660	8,889
	1,135	1,547	439	650	52	32	387	618
	4,128	8,176	1,618	3,195	244	121	1,374	3,073
<b>Eastham</b>	2,091	2,091	902	902	181	44	722	858
	1,427	1,916	542	782	58	36	484	746
	4,102	8,205	1,531	3,062	110	69	1,421	2,993
<b>Falmouth</b>	41,149	41,149	17,528	17,528	3,085	770	14,443	16,758
	2,579	4,411	1,139	2,160	275	162	864	1,998
	4,390	8,780	1,831	3,662	421	201	1,410	3,460
<b>Harwich</b>	7,562	7,562	3,454	3,454	705	172	2,749	3,282
	2,097	2,735	817	1,172	86	53	730	1,119
	3,172	6,330	1,267	2,527	227	112	1,040	2,415

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)

## 6.0 Transportation Analysis



**Table 88:** Evacuating People and Vehicles – Low Occupancy – Barnstable County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Mashpee</b>	9,081	9,081	4,245	4,245	927	223	3,318	4,021
	131	217	59	109	14	8	45	101
	2,823	5,595	1,172	2,319	284	132	888	2,187
<b>Orleans</b>	2,964	2,964	1,377	1,377	337	80	1,040	1,297
	442	618	172	261	22	14	149	247
	2,533	5,047	1,022	2,032	145	74	877	1,957
<b>Provincetown</b>	1,536	1,536	569	569	38	12	531	557
	7,836	9,688	2,851	3,669	180	116	2,671	3,552
	83	167	31	62	4	2	27	60
<b>Sandwich</b>	1,912	1,912	916	916	236	56	680	860
	1,822	2,768	776	1,327	145	86	630	1,241
	2,613	5,227	1,171	2,341	399	182	772	2,160
<b>Truro</b>	1,506	1,506	579	579	46	14	533	565
	1,052	1,230	381	463	16	11	365	452
	2,552	5,094	938	1,870	55	37	883	1,833
<b>Wellfleet</b>	6,466	6,466	2,926	2,926	592	144	2,334	2,782
	91	118	36	51	4	2	32	49
	2,350	4,648	887	1,744	81	44	807	1,700
<b>Yarmouth</b>	18,645	18,645	7,892	7,892	1,551	380	6,341	7,512
	4,901	7,482	1,985	3,318	349	208	1,636	3,110
	3,349	6,692	1,415	2,827	318	152	1,097	2,675
<b>Totals</b>	<b>233,948</b>	<b>298,978</b>	<b>98,780</b>	<b>126,189</b>	<b>18,584</b>	<b>6,034</b>	<b>80,193</b>	<b>120,152</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 89:** Evacuating People and Vehicles – Low Occupancy – Bristol County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Acushnet</b>	0	0	0	0	0	0	0	0
	326	1,119	178	612	80	245	98	367
	661	1,624	346	849	154	337	191	512
<b>Berkley</b>	673	1,085	385	623	247	402	138	221
	6	28	3	15	2	9	1	5
	74	510	36	247	23	160	13	87
<b>Dartmouth</b>	3,389	3,389	2,205	2,205	922	820	1,283	1,385
	43	154	27	98	12	39	15	59
	1,702	3,367	723	1,430	314	552	408	877
<b>Dighton</b>	384	618	240	388	154	250	86	137
	17	84	9	44	6	29	3	16
	77	616	39	314	24	202	15	113
<b>Fairhaven</b>	3,205	3,205	1,973	1,973	830	738	1,143	1,235
	1,304	4,657	680	2,443	301	972	379	1,471
	285	790	137	380	60	150	77	231
<b>Fall River</b>	1,392	1,392	656	656	424	424	232	232
	187	684	101	369	65	240	35	129
	4,444	13,169	1,732	5,134	1,108	3,303	623	1,831
<b>Freetown</b>	483	779	298	482	192	312	106	171
	0	0	0	0	0	0	0	0
	98	814	48	427	27	268	22	159
<b>New Bedford</b>	861	861	407	407	183	162	225	245
	3,605	13,169	1,247	4,556	558	1,820	689	2,737
	3,620	10,712	1,396	4,132	622	1,642	774	2,490

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 89:** Evacuating People and Vehicles – Low Occupancy – Bristol County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Raynham</b>	160	259	81	132	36	53	45	79
	61	92	22	37	2	6	21	30
	722	2,228	332	1,039	134	389	198	650
<b>Rehoboth</b>	201	327	141	229	91	148	49	80
	17	83	11	55	7	35	4	19
	120	1,107	64	606	39	389	25	217
<b>Seekonk</b>	188	246	85	118	24	34	61	84
	9	44	5	24	2	10	3	15
	843	1,676	423	841	168	296	255	544
<b>Somerset</b>	1,180	1,849	718	1,143	442	718	276	424
	18	89	9	42	5	27	3	15
	792	1,577	404	805	258	515	146	290
<b>Swansea</b>	2,825	2,825	1,856	1,856	831	739	1,025	1,117
	321	1,168	186	681	83	272	103	409
	561	1,673	316	945	141	375	175	569
<b>Taunton</b>	1,294	2,103	677	1,100	440	715	237	385
	71	345	33	161	21	104	12	57
	1,479	6,629	665	3,007	412	1,913	253	1,093
<b>Westport</b>	1,415	1,415	880	880	343	305	538	576
	58	179	32	107	12	41	20	66
	955	2,613	489	1,373	185	487	304	886
<b>Totals</b>	<b>40,126</b>	<b>91,353</b>	<b>20,295</b>	<b>42,965</b>	<b>9,984</b>	<b>20,647</b>	<b>10,309</b>	<b>22,315</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 90:** Evacuating People and Vehicles – High Occupancy – Bristol County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Acushnet</b>	0	0	0	0	0	0	0	0
	329	1,122	179	613	80	245	99	369
	678	1,658	352	861	154	337	197	524
<b>Berkley</b>	702	1,114	395	633	247	402	148	231
	8	30	4	15	2	9	2	6
	75	512	36	248	23	160	13	87
<b>Dartmouth</b>	4,298	4,298	2,524	2,524	926	823	1,598	1,700
	46	157	28	99	12	39	16	60
	1,845	3,652	773	1,529	315	553	458	976
<b>Dighton</b>	400	634	245	393	154	250	91	143
	19	86	10	45	6	29	4	16
	89	639	43	322	24	202	19	121
<b>Fairhaven</b>	3,954	3,954	2,235	2,235	833	741	1,402	1,494
	1,371	4,731	703	2,469	301	972	402	1,497
	303	824	143	392	60	150	83	242
<b>Fall River</b>	1,410	1,410	662	662	424	424	238	238
	189	685	101	370	65	240	36	130
	4,598	13,476	1,785	5,242	1,109	3,304	677	1,938
<b>Freetown</b>	499	795	304	488	192	312	112	176
	0	0	0	0	0	0	0	0
	138	896	63	455	27	269	36	187
<b>New Bedford</b>	872	872	411	411	183	162	229	249
	3,644	13,212	1,261	4,571	558	1,820	702	2,752
	3,700	10,874	1,424	4,189	622	1,642	802	2,546

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 90:** Evacuating People and Vehicles – High Occupancy – Bristol County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Raynham</b>	160	259	81	132	36	53	45	79
	171	214	61	80	2	7	59	73
	919	2,623	401	1,177	135	390	266	787
<b>Rehoboth</b>	203	329	141	229	91	148	50	81
	19	84	12	55	7	35	5	20
	144	1,154	72	622	39	389	33	234
<b>Seekonk</b>	377	435	151	184	24	35	127	149
	9	44	5	24	2	10	3	15
	1,136	2,261	526	1,046	169	298	357	747
<b>Somerset</b>	1,398	2,067	794	1,219	443	719	351	500
	20	91	9	43	5	27	4	16
	829	1,652	417	831	259	515	158	316
<b>Swansea</b>	2,878	2,878	1,874	1,874	831	739	1,043	1,135
	327	1,175	189	683	83	272	105	411
	579	1,709	322	957	141	376	181	582
<b>Taunton</b>	1,294	2,103	677	1,100	440	715	237	385
	76	351	34	162	21	104	14	59
	1,663	6,996	730	3,135	413	1,914	317	1,221
<b>Westport</b>	2,113	2,113	1,124	1,124	345	307	780	817
	84	208	41	117	13	41	29	76
	1,410	3,523	648	1,691	187	490	461	1,201
<b>Totals</b>	<b>44,976</b>	<b>97,900</b>	<b>21,990</b>	<b>45,251</b>	<b>10,003</b>	<b>20,669</b>	<b>11,989</b>	<b>24,586</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)





## 6.0 Transportation Analysis

**Table 91:** Evacuating People and Vehicles – Low Occupancy – Duques County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Aquinnah</b>	136	136	59	59	21	17	38	42
	0	0	0	0	0	0	0	0
	135	269	53	105	15	24	38	81
<b>Chilmark</b>	479	479	202	202	76	62	127	140
	80	114	31	48	8	18	23	31
	412	817	159	315	41	64	118	251
<b>Edgartown</b>	1,416	1,416	398	398	62	49	336	349
	662	856	221	271	18	34	203	237
	1,122	2,243	394	789	108	175	287	614
<b>Oak Bluffs</b>	1,463	1,463	640	640	340	281	300	359
	578	843	226	352	75	143	152	209
	820	1,627	314	622	140	226	174	396
<b>Tisbury</b>	846	846	429	429	267	222	162	208
	11	14	4	5	0	1	3	4
	839	1,661	341	674	167	270	174	405
<b>West Tisbury</b>	333	333	174	174	121	101	53	74
	60	97	26	46	11	23	15	23
	647	1,273	260	510	125	200	135	311
<b>Totals</b>	<b>10,039</b>	<b>14,487</b>	<b>3,931</b>	<b>5,639</b>	<b>1,595</b>	<b>1,910</b>	<b>2,338</b>	<b>3,734</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 92:** Evacuating People and Vehicles – High Occupancy – Duques County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Aquinnah</b>	341	341	131	131	22	17	109	114
	0	0	0	0	0	0	0	0
	343	685	125	250	16	24	110	226
<b>Chilmark</b>	1,163	1,163	442	442	78	62	364	380
	207	255	76	98	9	18	67	80
	1,069	2,131	389	775	43	64	346	711
<b>Edgartown</b>	3,317	3,317	1,063	1,063	69	49	994	1,014
	1,823	2,147	627	722	22	34	605	689
	2,709	5,418	950	1,900	113	175	837	1,725
<b>Oak Bluffs</b>	2,977	2,977	1,170	1,170	346	281	824	889
	1,405	1,763	516	674	78	143	438	531
	1,735	3,457	634	1,263	143	226	491	1,037
<b>Tisbury</b>	1,611	1,611	697	697	270	222	427	476
	30	36	11	12	0	1	10	12
	1,738	3,459	656	1,304	170	270	486	1,034
<b>West Tisbury</b>	562	562	254	254	122	101	132	154
	139	185	53	77	11	23	42	54
	1,345	2,668	504	998	128	200	376	799
<b>Totals</b>	<b>22,514</b>	<b>32,175</b>	<b>8,298</b>	<b>11,830</b>	<b>1,640</b>	<b>1,910</b>	<b>6,658</b>	<b>9,925</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)

## 6.0 Transportation Analysis



**Table 93:** Evacuating People and Vehicles – Low Occupancy – Essex County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Beverly</b>	2,898	2,898	1,612	1,612	720	640	892	972
	442	1,615	178	651	80	260	98	391
	1,821	5,342	810	2,383	351	930	459	1,453
<b>Danvers</b>	3,668	3,668	2,087	2,087	920	818	1,167	1,270
	426	1,293	206	662	77	249	129	413
	1,801	4,542	802	2,058	284	687	518	1,371
<b>Essex</b>	1,285	1,285	801	801	342	304	460	498
	17	64	9	34	4	14	5	20
	124	361	64	189	27	73	37	116
<b>Gloucester</b>	7,889	7,889	4,748	4,748	2,013	1,790	2,735	2,958
	360	1,182	153	513	61	197	92	316
	1,326	3,635	580	1,617	214	563	366	1,054
<b>Ipswich</b>	3,424	3,424	2,070	2,070	901	801	1,169	1,269
	218	779	108	390	47	155	61	235
	473	1,383	247	728	105	281	141	447
<b>Lynn</b>	12,738	12,738	4,637	4,637	2,084	1,853	2,553	2,785
	1,169	4,280	377	1,380	169	552	208	828
	3,586	10,667	1,189	3,535	531	1,407	657	2,127
<b>Manchester</b>	1,129	1,129	725	725	317	282	408	443
	85	293	51	180	22	71	29	109
	201	581	96	279	40	106	56	173
<b>Marblehead</b>	3,388	3,388	1,933	1,933	848	754	1,085	1,179
	106	382	62	224	27	89	35	135
	929	2,634	436	1,244	184	476	252	767

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 93:** Evacuating People and Vehicles – Low Occupancy – Essex County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Nahant</b>	3,491	3,491	2,133	2,133	951	845	1,182	1,288
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>Newbury</b>	3,233	3,233	2,157	2,157	937	833	1,220	1,324
	147	526	74	268	33	107	42	162
	142	422	74	219	33	87	41	133
<b>Newburyport</b>	2,309	2,309	1,423	1,423	621	552	802	871
	108	383	68	245	30	97	38	148
	810	2,355	392	1,150	165	439	227	710
<b>Peabody</b>	1,437	1,437	715	715	322	286	393	429
	164	599	97	354	43	141	53	212
	3,767	9,511	1,731	4,395	722	1,656	1,009	2,738
<b>Rockport</b>	1,047	1,047	608	608	214	190	394	417
	0	0	0	0	0	0	0	0
	609	1,537	266	697	75	200	191	497
<b>Rowley</b>	391	391	218	218	96	85	122	133
	18	66	10	35	4	14	5	21
	276	823	145	434	65	172	81	262
<b>Salem</b>	18,700	18,700	7,913	7,913	3,544	3,150	4,369	4,763
	1,026	3,420	461	1,569	187	607	274	962
	898	2,665	377	1,120	165	440	212	680
<b>Salisbury</b>	5,552	5,552	3,321	3,321	1,388	1,234	1,933	2,087
	48	173	24	88	11	35	13	53
	358	797	171	382	76	152	95	230

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 93:** Evacuating People and Vehicles – Low Occupancy – Essex County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Saugus</b>	4,339	4,339	2,481	2,481	1,116	992	1,365	1,489
	269	984	146	534	66	214	81	321
	1,322	3,633	635	1,762	261	661	374	1,101
<b>Swampscott</b>	1,901	1,901	1,235	1,235	552	491	683	744
	167	610	74	271	33	108	41	163
	574	1,692	260	771	113	300	148	471
<b>Totals</b>	<b>102,606</b>	<b>148,048</b>	<b>51,190</b>	<b>71,178</b>	<b>22,191</b>	<b>27,440</b>	<b>29,000</b>	<b>43,738</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 94:** Evacuating People and Vehicles – High Occupancy – Essex County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Beverly</b>	2,967	2,967	1,636	1,636	720	640	916	996
	447	1,620	180	653	80	260	100	393
	1,993	5,686	870	2,503	352	931	518	1,572
<b>Danvers</b>	3,920	3,920	2,176	2,176	921	819	1,255	1,357
	635	1,526	279	744	77	250	202	494
	2,800	6,541	1,152	2,758	288	694	865	2,064
<b>Essex</b>	1,530	1,530	887	887	343	305	545	582
	17	64	9	34	4	14	5	20
	145	403	72	204	27	73	44	131
<b>Gloucester</b>	9,489	9,489	5,308	5,308	2,019	1,796	3,289	3,513
	468	1,302	191	555	61	197	130	357
	1,939	4,862	795	2,046	216	567	579	1,479
<b>Ipswich</b>	3,825	3,825	2,211	2,211	902	802	1,308	1,408
	235	797	114	396	48	155	67	241
	547	1,530	273	779	106	282	167	498
<b>Lynn</b>	12,773	12,773	4,649	4,649	2,084	1,853	2,565	2,797
	1,174	4,285	379	1,382	169	552	209	830
	3,634	10,763	1,205	3,568	531	1,408	674	2,161
<b>Manchester</b>	1,247	1,247	766	766	317	282	449	484
	98	308	55	185	22	71	33	114
	242	665	110	309	40	106	70	202
<b>Marblehead</b>	3,670	3,670	2,032	2,032	849	755	1,183	1,277
	113	389	64	227	27	89	37	137
	1,083	2,942	490	1,352	185	478	305	874

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 94:** Evacuating People and Vehicles – High Occupancy – Essex County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Nahant</b>	3,608	3,608	2,174	2,174	951	845	1,223	1,328
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>Newbury</b>	3,666	3,666	2,309	2,309	939	835	1,370	1,474
	157	537	78	272	33	107	45	166
	149	437	76	225	33	87	44	138
<b>Newburyport</b>	2,558	2,558	1,510	1,510	622	553	888	957
	120	395	72	249	30	97	42	152
	960	2,656	445	1,255	165	440	279	814
<b>Peabody</b>	1,437	1,437	715	715	322	286	393	429
	165	600	97	354	43	141	54	213
	4,511	10,999	1,992	4,915	724	1,662	1,267	3,254
<b>Rockport</b>	1,819	1,819	878	878	217	193	661	685
	0	0	0	0	0	0	0	0
	1,189	2,697	469	1,103	77	204	392	899
<b>Rowley</b>	419	419	228	228	96	86	132	142
	18	66	10	35	4	14	5	21
	287	845	149	442	65	172	85	270
<b>Salem</b>	18,923	18,923	7,991	7,991	3,545	3,151	4,446	4,840
	1,294	3,718	554	1,674	188	608	367	1,065
	955	2,780	397	1,160	165	440	231	720
<b>Salisbury</b>	6,937	6,937	3,805	3,805	1,392	1,239	2,413	2,567
	49	174	25	88	11	35	14	53
	367	816	175	388	76	152	98	237

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 94:** Evacuating People and Vehicles – High Occupancy – Essex County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Saugus</b>	4,343	4,343	2,482	2,482	1,116	992	1,366	1,490
	273	988	147	536	66	214	82	322
	1,641	4,271	746	1,985	262	663	484	1,322
<b>Swampscott</b>	1,946	1,946	1,251	1,251	552	491	698	760
	171	613	76	273	33	108	42	164
	634	1,811	281	813	113	301	169	512
<b>Totals</b>	<b>113,587</b>	<b>163,163</b>	<b>55,035</b>	<b>76,470</b>	<b>22,228</b>	<b>27,495</b>	<b>32,805</b>	<b>48,975</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)





## 6.0 Transportation Analysis

**Table 95: Evacuating People and Vehicles – Low Occupancy – Middlesex County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Arlington</b>	7,799	7,799	3,972	3,972	2,558	2,558	1,415	1,415
	649	2,364	299	1,091	193	708	106	383
	1,604	4,771	710	2,113	455	1,360	255	753
<b>Belmont</b>	2,392	2,392	1,408	1,408	914	914	494	494
	202	734	96	348	62	226	34	123
	1,100	3,255	475	1,406	303	902	172	504
<b>Everett</b>	7,580	7,580	2,867	2,867	1,289	1,146	1,578	1,721
	150	549	53	194	24	77	29	116
	1,703	5,072	578	1,720	259	686	319	1,034
<b>Malden</b>	21,458	21,458	8,407	8,407	5,451	5,451	2,956	2,956
	875	3,198	306	1,118	198	726	108	392
	1,710	5,024	587	1,724	380	1,117	207	607
<b>Medford</b>	28,794	28,794	14,128	14,128	9,143	9,143	4,985	4,985
	1,246	4,549	581	2,125	376	1,379	205	746
	1,016	3,010	388	1,151	250	743	139	408
<b>Newton</b>	559	559	287	287	186	186	101	101
	534	1,947	261	951	168	617	92	334
	4,683	13,459	1,935	5,596	1,138	3,397	798	2,199
<b>Somerville</b>	14,820	14,820	8,930	8,930	3,969	3,528	4,961	5,402
	2,299	8,398	836	3,055	374	1,220	462	1,835
	2,319	6,936	788	2,356	351	936	437	1,419
<b>Waltham</b>	147	147	73	73	47	47	25	25
	241	869	105	380	67	246	38	134
	3,616	10,199	1,476	4,198	822	2,455	653	1,743

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 95: Evacuating People and Vehicles – Low Occupancy – Middlesex County (continued)**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Watertown</b>	1,869	1,869	1,096	1,096	710	710	386	386
	1,127	4,098	540	1,967	348	1,275	192	692
	1,170	3,495	533	1,594	343	1,029	190	565
<b>Winchester</b>	233	233	129	129	84	84	45	45
	267	955	142	511	90	330	52	181
	1,008	3,000	448	1,335	286	857	162	479
<b>Totals</b>	<b>113,170</b>	<b>171,533</b>	<b>52,434</b>	<b>76,230</b>	<b>30,838</b>	<b>44,053</b>	<b>21,596</b>	<b>32,177</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane
<b>Cambridge</b>	3,613	3,613	3,613	1,894	1,894	1,894	835	742	742	1,059	1,152	1,152
	2,443	80,537	80,849	850	27,713	27,822	142	10,702	10,702	707	17,011	17,119
	239	38,914	43,826	84	11,441	12,888	1	4,524	5,090	83	6,917	7,798
	20	307	1,374	7	144	663	0	52	260	7	92	403
<b>Cambridge Totals</b>	<b>6,315</b>	<b>123,371</b>	<b>129,662</b>	<b>2,835</b>	<b>41,192</b>	<b>43,267</b>	<b>978</b>	<b>16,020</b>	<b>16,794</b>	<b>1,856</b>	<b>25,172</b>	<b>26,472</b>

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 96: Evacuating People and Vehicles – High Occupancy – Middlesex County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Arlington</b>	8,015	8,015	4,048	4,048	2,558	2,558	1,490	1,490
	660	2,377	303	1,096	193	708	110	388
	1,665	4,891	731	2,155	455	1,361	276	795
<b>Belmont</b>	2,403	2,403	1,412	1,412	914	914	498	498
	209	741	98	351	62	226	37	125
	1,152	3,359	493	1,442	303	903	190	540
<b>Everett</b>	7,595	7,595	2,872	2,872	1,289	1,146	1,583	1,726
	152	551	54	194	24	77	30	117
	1,717	5,099	582	1,729	259	686	323	1,043
<b>Malden</b>	21,577	21,577	8,448	8,448	5,451	5,451	2,997	2,997
	883	3,207	309	1,121	198	726	111	396
	1,726	5,057	592	1,735	380	1,117	213	618
<b>Medford</b>	29,153	29,153	14,253	14,253	9,144	9,144	5,109	5,109
	1,263	4,567	587	2,131	376	1,379	211	752
	1,039	3,057	396	1,167	250	743	147	424
<b>Newton</b>	561	561	287	287	186	186	101	101
	544	1,957	264	955	168	617	96	338
	5,757	15,606	2,311	6,347	1,142	3,404	1,170	2,943
<b>Somerville</b>	15,465	15,465	9,155	9,155	3,971	3,530	5,184	5,625
	2,324	8,425	845	3,065	375	1,220	470	1,845
	2,362	7,022	803	2,386	351	937	451	1,449
<b>Waltham</b>	147	147	73	73	47	47	25	25
	252	882	109	385	67	246	42	139
	4,838	12,644	1,904	5,053	827	2,463	1,077	2,590

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 96:** Evacuating People and Vehicles – High Occupancy – Middlesex County (continued)

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Watertown</b>	1,893	1,893	1,104	1,104	710	710	395	395
	1,155	4,129	550	1,978	348	1,275	202	703
	1,200	3,555	544	1,615	343	1,029	200	585
<b>Winchester</b>	233	233	129	129	84	84	45	45
	285	975	148	518	90	330	58	188
	1,059	3,100	466	1,370	286	857	180	513
<b>Totals</b>	<b>117,284</b>	<b>178,243</b>	<b>53,870</b>	<b>78,574</b>	<b>30,851</b>	<b>44,074</b>	<b>23,021</b>	<b>34,502</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane
<b>Cambridge</b>	3,840	3,840	3,840	1,973	1,973	1,973	835	743	743	1,138	1,230	1,230
	5,561	86,150	87,086	1,941	29,677	30,005	153	10,722	10,725	1,788	18,956	19,280
	718	39,680	44,784	251	11,709	13,223	3	4,527	5,093	249	7,182	8,130
	60	386	1,454	21	172	691	0	52	260	21	119	431
<b>Cambridge Totals</b>	<b>10,179</b>	<b>130,056</b>	<b>137,164</b>	<b>4,186</b>	<b>43,531</b>	<b>45,892</b>	<b>991</b>	<b>16,044</b>	<b>16,821</b>	<b>3,196</b>	<b>27,487</b>	<b>29,071</b>

1. Key:  Zone A       Zone B       Zone C       Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 97:** Evacuating People and Vehicles – Low Occupancy – Nantucket County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
Nantucket	2,574	2,574	1,143	1,143	450	369	694	774
	784	1,141	297	457	80	167	217	290
	2,983	5,914	1,159	2,293	429	686	730	1,608
<b>Totals</b>	<b>6,341</b>	<b>9,629</b>	<b>2,599</b>	<b>3,893</b>	<b>959</b>	<b>1,222</b>	<b>1,641</b>	<b>2,672</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)

**Table 98:** Evacuating People and Vehicles – High Occupancy – Nantucket County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
Nantucket	6,292	6,292	2,445	2,445	463	369	1,982	2,075
	1,986	2,477	717	924	84	167	633	757
	6,924	13,796	2,538	5,052	443	686	2,095	4,367
<b>Totals</b>	<b>15,202</b>	<b>22,565</b>	<b>5,700</b>	<b>8,421</b>	<b>990</b>	<b>1,222</b>	<b>4,710</b>	<b>7,199</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 99:** Evacuating People and Vehicles – Low Occupancy – Norfolk County

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Braintree</b>	1,361	1,361	619	619	278	247	340	371
	64	235	28	104	13	41	16	62
	1,824	5,362	811	2,393	348	927	463	1,466
<b>Brookline</b>	3,661	3,661	1,243	1,243	552	490	692	753
	1,318	4,275	426	1,367	158	514	268	853
	2,618	7,612	897	2,605	373	989	523	1,616
<b>Cohasset</b>	2,316	2,316	1,481	1,481	659	586	822	895
	0	0	0	0	0	0	0	0
	336	936	168	469	73	184	95	286
<b>Milton</b>	642	642	358	358	161	143	197	215
	147	538	76	278	34	111	42	167
	1,300	3,874	538	1,603	238	634	300	969
<b>Quincy</b>	42,780	42,780	18,768	18,768	8,414	7,479	10,354	11,288
	1,125	4,100	441	1,608	197	642	244	966
	2,426	6,975	997	2,883	406	1,077	591	1,806
<b>Weymouth</b>	9,445	9,445	5,070	5,070	2,276	2,023	2,794	3,047
	93	339	53	194	24	78	29	116
	2,412	6,966	1,108	3,205	491	1,269	617	1,936
<b>Totals</b>	<b>73,868</b>	<b>101,417</b>	<b>33,082</b>	<b>44,248</b>	<b>14,695</b>	<b>17,434</b>	<b>18,387</b>	<b>26,812</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 100: Evacuating People and Vehicles – High Occupancy – Norfolk County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Braintree</b>	1,363	1,363	619	619	278	247	341	372
	64	235	28	104	13	41	16	62
	2,047	5,807	889	2,549	348	928	540	1,621
<b>Brookline</b>	3,762	3,762	1,279	1,279	552	491	726	788
	1,754	4,759	579	1,537	160	516	419	1,021
	3,008	8,391	1,033	2,878	375	991	658	1,886
<b>Cohasset</b>	2,411	2,411	1,514	1,514	660	586	855	928
	0	0	0	0	0	0	0	0
	367	996	179	490	73	184	105	307
<b>Milton</b>	642	642	358	358	161	143	197	215
	149	540	76	278	34	111	42	167
	1,352	3,978	556	1,640	238	635	318	1,005
<b>Quincy</b>	43,189	43,189	18,911	18,911	8,415	7,481	10,496	11,430
	1,145	4,122	448	1,616	197	642	251	974
	2,985	8,093	1,193	3,275	407	1,081	785	2,194
<b>Weymouth</b>	9,513	9,513	5,094	5,094	2,277	2,024	2,817	3,070
	93	339	53	194	24	78	29	116
	2,508	7,159	1,142	3,273	491	1,270	650	2,003
<b>Totals</b>	<b>76,352</b>	<b>105,299</b>	<b>33,951</b>	<b>45,609</b>	<b>14,703</b>	<b>17,449</b>	<b>19,245</b>	<b>28,159</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 101: Evacuating People and Vehicles – Low Occupancy – Plymouth County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Duxbury</b>	2,914	2,914	1,732	1,732	746	663	986	1,069
	21	75	11	41	5	16	6	25
	660	1,935	331	977	142	378	189	599
<b>Hingham</b>	4,676	4,676	2,536	2,536	1,138	1,011	1,398	1,524
	430	1,539	254	918	112	365	142	553
	823	2,368	386	1,113	169	437	217	676
<b>Hull</b>	11,122	11,122	6,095	6,095	2,618	2,327	3,478	3,768
	2	6	1	2	0	1	0	1
	0	0	0	0	0	0	0	0
<b>Kingston</b>	1,836	1,836	1,210	1,210	531	472	678	737
	0	0	0	0	0	0	0	0
	896	2,171	440	1,067	196	423	244	645
<b>Marion</b>	4,409	4,409	2,718	2,718	1,166	1,037	1,552	1,682
	138	467	64	221	26	86	37	135
	3	9	1	4	1	2	1	3
<b>Marshfield</b>	15,375	15,375	8,662	8,662	3,753	3,336	4,910	5,326
	22	80	12	45	6	18	7	27
	594	1,733	311	909	136	358	174	551
<b>Mattapoisett</b>	3,282	3,282	1,945	1,945	798	709	1,147	1,236
	153	545	77	278	34	110	44	168
	150	415	69	196	26	69	43	126
<b>Plymouth</b>	3,138	3,138	1,845	1,845	707	629	1,138	1,217
	508	1,516	261	834	96	313	164	521
	4,403	10,987	2,020	5,104	764	1,785	1,256	3,319

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)





## 6.0 Transportation Analysis

**Table 101: Evacuating People and Vehicles – Low Occupancy – Plymouth County (continued)**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Rochester</b>	39	64	30	49	20	32	11	17
	30	132	18	83	11	53	7	30
	54	483	29	271	17	173	12	98
<b>Scituate</b>	6,901	6,901	3,978	3,978	1,683	1,496	2,295	2,481
	0	0	0	0	0	0	0	0
	715	1,993	346	969	148	375	197	594
<b>Wareham</b>	18,888	18,888	10,382	10,382	4,363	3,879	6,019	6,503
	25	88	13	45	5	18	7	27
	939	1,915	465	949	197	359	268	591
<b>Totals</b>	<b>83,146</b>	<b>101,062</b>	<b>46,242</b>	<b>55,178</b>	<b>19,614</b>	<b>20,930</b>	<b>26,627</b>	<b>34,249</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 102: Evacuating People and Vehicles – High Occupancy – Plymouth County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Duxbury</b>	3,351	3,351	1,885	1,885	747	664	1,138	1,221
	23	77	12	42	5	16	7	25
	750	2,115	363	1,040	142	379	220	661
<b>Hingham</b>	4,719	4,719	2,551	2,551	1,138	1,011	1,413	1,539
	461	1,573	265	930	112	365	153	565
	886	2,493	408	1,157	169	437	239	720
<b>Hull</b>	12,751	12,751	6,666	6,666	2,623	2,333	4,042	4,333
	2	6	1	2	0	1	0	1
	0	0	0	0	0	0	0	0
<b>Kingston</b>	2,006	2,006	1,269	1,269	532	473	737	796
	0	0	0	0	0	0	0	0
	928	2,234	451	1,089	196	423	255	667
<b>Marion</b>	5,153	5,153	2,979	2,979	1,169	1,039	1,810	1,940
	167	499	74	232	27	86	47	146
	3	9	1	4	1	2	1	3
<b>Marshfield</b>	17,262	17,262	9,323	9,323	3,759	3,343	5,563	5,980
	22	80	12	45	6	18	7	27
	637	1,818	325	939	137	358	189	581
<b>Mattapoisett</b>	4,288	4,288	2,297	2,297	801	713	1,496	1,584
	166	559	82	283	34	110	48	173
	216	548	92	242	26	70	66	172
<b>Plymouth</b>	4,741	4,741	2,406	2,406	713	634	1,694	1,772
	779	1,817	355	940	97	314	258	625
	6,284	14,748	2,678	6,421	771	1,798	1,907	4,623

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 102: Evacuating People and Vehicles – High Occupancy – Plymouth County (continued)**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to Local Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Rochester</b>	39	64	30	49	20	32	11	17
	38	141	21	86	11	53	10	33
	67	510	34	280	17	173	16	107
<b>Scituate</b>	8,291	8,291	4,464	4,464	1,688	1,501	2,776	2,963
	0	0	0	0	0	0	0	0
	807	2,177	378	1,033	149	376	229	658
<b>Wareham</b>	22,900	22,900	11,786	11,786	4,377	3,893	7,409	7,893
	28	92	14	46	5	18	8	29
	1,095	2,226	520	1,058	198	360	322	699
<b>Totals</b>	<b>98,860</b>	<b>119,248</b>	<b>51,742</b>	<b>61,544</b>	<b>19,670</b>	<b>20,993</b>	<b>32,071</b>	<b>40,553</b>

1. Key:  Zone A  Zone B  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 103: Evacuating People and Vehicles – Low Occupancy – Suffolk County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Chelsea</b>	24,634	24,634	7,450	7,450	3,332	2,962	4,118	4,488
	209	2,280	55	594	24	237	30	357
	56	835	14	203	6	81	7	123
<b>Revere</b>	24,878	24,878	13,944	13,944	6,230	5,538	7,714	8,406
	627	6,830	201	2,190	89	874	112	1,316
	181	2,440	54	732	24	289	30	443
<b>Winthrop</b>	17,597	17,597	9,185	9,185	4,124	3,666	5,061	5,519
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>68,182</b>	<b>79,494</b>	<b>30,903</b>	<b>34,298</b>	<b>13,829</b>	<b>13,647</b>	<b>17,072</b>	<b>20,652</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane
<b>Boston</b>	36,563	36,563	36,563	16,839	16,839	16,839	7,460	6,631	6,631	9,379	10,208	10,208
	13,333	170,397	188,370	4,707	72,887	80,824	1,803	28,597	31,772	2,904	44,291	49,053
	4,640	15,948	211,992	1,079	3,418	48,941	479	1,067	18,975	600	2,351	29,966
	3,598	7,213	17,574	1,494	2,991	7,213	672	1,195	2,863	822	1,796	4,350
<b>Boston Totals</b>	<b>58,134</b>	<b>230,121</b>	<b>454,499</b>	<b>24,119</b>	<b>96,135</b>	<b>153,817</b>	<b>10,414</b>	<b>37,490</b>	<b>60,241</b>	<b>13,705</b>	<b>58,646</b>	<b>93,577</b>

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 104: Evacuating People and Vehicles – High Occupancy – Suffolk County**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane	Cat 1 & 2 Hurricane	Cat 3 & 4 Hurricane
<b>Chelsea</b>	24,900	24,900	7,543	7,543	3,333	2,963	4,210	4,580
	212	2,287	56	597	24	237	32	359
	56	844	14	207	6	81	8	126
<b>Revere</b>	25,458	25,458	14,147	14,147	6,232	5,540	7,915	8,607
	642	6,861	207	2,201	89	874	117	1,327
	184	2,498	55	752	24	289	31	463
<b>Winthrop</b>	17,718	17,718	9,227	9,227	4,124	3,666	5,103	5,561
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>69,170</b>	<b>80,566</b>	<b>31,249</b>	<b>34,674</b>	<b>13,832</b>	<b>13,650</b>	<b>17,416</b>	<b>21,023</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 (not worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (not worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (not worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (not worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane
<b>Boston</b>	39,771	39,771	39,771	17,374	17,374	17,374	7,465	6,637	6,637	9,908	10,737	10,737
	21,920	187,573	205,546	6,138	75,750	83,687	1,818	28,625	31,800	4,321	47,125	51,887
	4,825	25,200	230,496	1,109	4,960	52,025	479	1,082	19,006	631	3,878	33,019
	3,598	7,247	18,260	1,494	2,997	7,328	672	1,195	2,864	822	1,801	4,463
<b>Boston Totals</b>	<b>70,114</b>	<b>259,791</b>	<b>494,073</b>	<b>26,115</b>	<b>101,081</b>	<b>160,414</b>	<b>10,434</b>	<b>37,539</b>	<b>60,307</b>	<b>15,682</b>	<b>63,541</b>	<b>100,106</b>



## 6.0 Transportation Analysis

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)

**Table 105: County and State Summary of Evacuating People and Vehicles – Low Occupancy**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Barnstable</b>	95,531	95,531	46,338	46,338	13,039	3,036	33,301	43,304
	12,482	21,793	5,575	10,764	1,409	826	4,168	9,936
	28,736	57,123	12,846	25,507	3,798	1,741	9,047	23,767
<b>Bristol</b>	17,650	20,353	10,602	12,192	5,159	5,820	5,444	6,371
	6,043	21,895	2,543	9,244	1,156	3,849	1,386	5,395
	16,433	49,105	7,150	21,529	3,669	10,978	3,479	10,549
<b>Dukes</b>	4,673	4,673	1,902	1,902	887	732	1,016	1,172
	1,391	1,924	508	722	112	219	396	504
	3,975	7,890	1,521	3,015	596	959	926	2,058
<b>Essex</b>	78,819	78,819	40,817	40,817	17,886	15,900	22,932	24,919
	4,770	16,649	2,098	7,398	894	2,910	1,204	4,489
	19,017	52,580	8,275	22,963	3,411	8,630	4,864	14,330
<b>Middlesex</b>	85,651	85,651	41,297	41,297	24,351	23,767	16,946	17,530
	7,590	27,661	3,219	11,740	1,900	6,804	1,318	4,936
	19,929	58,221	7,918	23,193	4,587	13,482	3,332	9,711
<b>Nantucket</b>	4,673	4,673	1,902	887	1,016	1,172	4,673	1,902
	1,391	1,924	722	112	396	504	1,924	508
	3,975	7,890	3,015	596	926	2,058	7,890	1,521
<b>Norfolk</b>	60,205	60,205	27,539	27,539	12,340	10,968	15,199	16,569
	1,867	9,487	723	3,551	298	1,386	426	2,164
	7,874	31,725	3,403	13,158	1,445	5,080	1,959	8,079
<b>Plymouth</b>	72,580	72,605	41,133	41,152	17,523	15,591	23,612	25,560
	1,329	4,448	711	2,467	295	980	414	1,487
	9,237	24,009	4,398	11,559	1,796	4,359	2,601	7,202



## 6.0 Transportation Analysis

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)

**Table 105: County and State Summary of Evacuating People and Vehicles – Low Occupancy (continued)**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Suffolk</b>	67,109	67,109	30,579	30,579	13,686	12,166	16,893	18,413
	836	9,110	256	2,784	113	1,111	142	1,673
	237	3,275	68	935	30	370	37	566
<b>Totals</b>	<b>486,891</b>	<b>489,619</b>	<b>242,109</b>	<b>242,703</b>	<b>105,887</b>	<b>89,152</b>	<b>140,016</b>	<b>155,740</b>
	<b>37,699</b>	<b>114,891</b>	<b>16,355</b>	<b>48,782</b>	<b>6,573</b>	<b>18,589</b>	<b>11,378</b>	<b>31,092</b>
	<b>109,413</b>	<b>291,818</b>	<b>48,594</b>	<b>122,455</b>	<b>20,258</b>	<b>47,657</b>	<b>34,135</b>	<b>77,783</b>
<b>Overall Totals</b>	<b>634,003</b>	<b>896,328</b>	<b>307,058</b>	<b>413,940</b>	<b>132,718</b>	<b>155,398</b>	<b>185,529</b>	<b>264,615</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane
<b>Boston</b>	36,563	36,563	36,563	16,839	16,839	16,839	7,460	6,631	6,631	9,379	10,208	10,208
	13,333	170,397	188,370	4,707	72,887	80,824	1,803	28,597	31,772	2,904	44,291	49,053
	4,640	15,948	211,992	1,079	3,418	48,941	479	1,067	18,975	600	2,351	29,966
	3,598	7,213	17,574	1,494	2,991	7,213	672	1,195	2,863	822	1,796	4,350
<b>Boston Totals</b>	<b>58,134</b>	<b>230,121</b>	<b>454,499</b>	<b>24,119</b>	<b>96,135</b>	<b>153,817</b>	<b>10,414</b>	<b>37,490</b>	<b>60,241</b>	<b>13,705</b>	<b>58,646</b>	<b>93,577</b>

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 105:** County and State Summary of Evacuating People and Vehicles – Low Occupancy (continued)

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane
	Cambridge	3,613	3,613	3,613	1,894	1,894	1,894	835	742	742	1,059	1,152
	2,443	80,537	80,849	850	27,713	27,822	142	10,702	10,703	707	17,011	17,119
	239	38,914	43,826	84	11,441	12,888	1	4,524	5,090	83	6,917	7,798
	20	307	1,374	7	144	663	0	52	260	7	92	403
<b>Cambridge Totals</b>	<b>6,315</b>	<b>123,371</b>	<b>129,662</b>	<b>2,835</b>	<b>41,192</b>	<b>43,267</b>	<b>978</b>	<b>16,020</b>	<b>16,795</b>	<b>1,856</b>	<b>25,172</b>	<b>26,472</b>

1. Key:  Zone A      Zone B      Zone C      Inland (Non-Surge Areas)





## 6.0 Transportation Analysis

**Table 106:** County and State Summary of Evacuating People and Vehicles – High Occupancy

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Barnstable</b>	152,705	152,705	66,347	66,347	13,238	3,235	53,111	63,112
	26,773	37,672	10,580	16,319	1,457	881	9,118	15,437
	54,470	108,601	21,853	43,523	3,889	1,918	17,964	41,603
<b>Bristol</b>	20,558	23,261	11,618	13,208	5,169	5,830	6,451	7,377
	6,312	22,190	2,637	9,346	1,157	3,850	1,480	5,500
	18,106	52,449	7,735	22,697	3,677	10,989	4,058	11,709
<b>Dukes</b>	9,971	9,971	3,757	3,757	907	732	2,850	3,027
	3,604	4,386	1,283	1,583	120	219	1,162	1,366
	8,939	17,818	3,258	6,490	613	959	2,646	5,532
<b>Essex</b>	85,077	85,077	43,008	43,008	17,907	15,923	25,100	27,086
	5,434	17,382	2,330	7,657	896	2,912	1,434	4,742
	23,076	60,704	9,697	25,805	3,425	8,660	6,271	17,147
<b>Middlesex</b>	87,042	87,042	41,781	41,781	24,354	23,770	17,427	18,011
	7,727	27,811	3,267	11,794	1,901	6,804	1,367	4,991
	22,515	63,390	8,822	24,999	4,596	13,500	4,227	11,500
<b>Nantucket</b>	60,880	60,880	27,775	27,775	12,343	10,972	15,432	16,803
	2,228	9,995	850	3,729	299	1,388	551	2,340
	9,004	34,424	3,799	14,105	1,447	5,089	2,349	9,016
<b>Norfolk</b>	152,705	152,705	66,347	66,347	13,238	3,235	53,111	63,112
	26,773	37,672	10,580	16,319	1,457	881	9,118	15,437
	54,470	108,601	21,853	43,523	3,889	1,918	17,964	41,603
<b>Plymouth</b>	85,501	85,526	45,656	45,675	17,567	15,636	28,089	30,038
	1,686	4,844	836	2,606	297	981	538	1,624
	11,673	28,878	5,250	13,263	1,806	4,376	3,444	8,891

1. Key:  Zone A  Zone B  Zone C  Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 106: County and State Summary of Evacuating People and Vehicles – High Occupancy (continued)**

Evacuation Zones <sup>1</sup>	Evacuating People		Evacuating Vehicles		Evacuating Vehicles to In County Destinations		Evacuating Vehicles to Out of County Destinations	
	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
<b>Suffolk</b>	68,076	68,076	30,917	30,917	13,689	12,169	17,228	18,748
	854	9,148	263	2,798	113	1,111	149	1,686
	240	3,342	69	959	30	370	39	589
<b>Totals</b>	<b>722,515</b>	<b>725,243</b>	<b>337,206</b>	<b>338,815</b>	<b>118,412</b>	<b>91,502</b>	<b>218,799</b>	<b>247,314</b>
	<b>81,391</b>	<b>171,100</b>	<b>32,626</b>	<b>72,151</b>	<b>7,697</b>	<b>19,027</b>	<b>24,917</b>	<b>53,123</b>
	<b>202,493</b>	<b>478,207</b>	<b>82,336</b>	<b>195,364</b>	<b>23,372</b>	<b>47,779</b>	<b>58,962</b>	<b>147,590</b>
<b>Overall Totals</b>	<b>1,006,399</b>	<b>1,374,550</b>	<b>452,168</b>	<b>606,330</b>	<b>149,481</b>	<b>158,308</b>	<b>302,678</b>	<b>448,027</b>

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane
<b>Boston</b>	39,771	39,771	39,771	17,374	17,374	17,374	7,465	6,637	6,637	9,908	10,737	10,737
	21,920	187,573	205,546	6,138	75,750	83,687	1,818	28,625	31,800	4,321	47,125	51,887
	4,825	25,200	230,496	1,109	4,960	52,025	479	1,082	19,006	631	3,878	33,019
	3,598	7,247	18,260	1,494	2,997	7,328	672	1,195	2,864	822	1,801	4,463
<b>Boston Totals</b>	<b>70,114</b>	<b>259,791</b>	<b>494,073</b>	<b>26,115</b>	<b>101,081</b>	<b>160,414</b>	<b>10,434</b>	<b>37,539</b>	<b>60,307</b>	<b>15,682</b>	<b>63,541</b>	<b>100,106</b>

1. Key:  Zone A     Zone B     Zone C     Inland (Non-Surge Areas)



## 6.0 Transportation Analysis

**Table 106:** County and State Summary of Evacuating People and Vehicles – High Occupancy (continued)

Evacuation Zones <sup>1</sup>	Evacuating People			Evacuating Vehicles			Evacuating Vehicles to In County Destinations			Evacuating Vehicles to Out of County Destinations		
	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane
Cambridge	3,840	3,840	3,840	1,973	1,973	1,973	835	743	743	1,138	1,230	1,230
	5,561	86,150	87,086	1,941	29,677	30,005	153	10,722	10,725	1,788	18,956	19,280
	718	39,680	44,784	251	11,709	13,223	3	4,527	5,093	249	7,182	8,130
	60	386	1,454	21	172	691	0	52	260	21	119	431
<b>Cambridge Totals</b>	<b>10,179</b>	<b>130,056</b>	<b>137,164</b>	<b>4,186</b>	<b>43,531</b>	<b>45,892</b>	<b>991</b>	<b>16,044</b>	<b>16,821</b>	<b>3,196</b>	<b>27,487</b>	<b>29,071</b>

1. Key:  Zone A     Zone B     Zone C     Inland (Non-Surge Areas)





## 6.0 Transportation Analysis

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### 6.4 Evacuation Route Development

The other side of this transportation analysis is to determine the capabilities of the evacuation roadway network to convey the evacuation demand defined above. Therefore the transportation analysis must first cull from the myriad roadways available throughout the New England region those corridors that will be used that will be used for evacuation purposes. It is understood that all roadways will bear some evacuation traffic, but experience and behavioral survey data indicates that an overwhelming number of vehicles will be found on the major routes, and that is where most of the evacuation congestion problems will occur. For this study in all three states, the preponderance of roadways selected as major evacuation corridors were Interstate and federal highways, state roads and in some cases local arterials, especially if they were pre-designated or signed as evacuation routes (as in Rhode Island).

Once the routes themselves have been designated, they were compartmentalized into a “link-node” system. The links are the roadway segments between nodes, with each link identified by a letter designation, and nodes are the intersections where the links meet or the point where the characteristics (i.e., number of lanes) of the roadway change. This arrangement allows the entire network capacity to then be quantified relative to the evacuation capacity. The coastal communities in Connecticut, Rhode Island and Massachusetts are relatively urban in nature and consequently have complex, well developed roadway networks. That required the delineation and analysis of 1880 separate road segments in Connecticut, 1418 in Rhode Island and 3040 in Massachusetts for the purposes of this study.

Evacuation capacity for each link is represented by an hourly directional service volume which is the number of vehicles that can pass through a given roadway segment in one direction in an hour. For the purposes of this transportation analysis, a slightly lesser service volume than free flow movement was assigned to each roadway segment to account for the possibility of inclement weather (which may exist pre-landfall), as well as the general degradation caused by a large number of vehicles using a roadway simultaneously. The hourly “capacity” figures for the evacuation roadway network were derived from Level of Service (LOS) tables in conjunction with traffic counter data made available by each state DOT.

Basically, an evacuation can impose the same travel demands on a roadway segment as a normal rush hour event, except the congestion is not necessarily relegated to urban areas or on normally problematic roadways, nor does it only occur during normal hours (i.e., morning or evening commuting times). Chapter 6 in each of the state’s TDRs includes maps of the evacuation roadway networks in each town, as well as tables with the assumed hourly service volume for all the potential roadway bottlenecks that can occur during an evacuation. Once these critical roadway segments have been identified, a sensitivity analyses is performed to determine the extent of possible failure during an evacuation. Those roadways that experience



## 6.0 Transportation Analysis

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the highest degree of congestion and require the most amount of time to process their expected traffic demand determine the clearance time for a particular area.

### 6.5 Key Roadway Segments

Once the vehicle trips from each evacuation sector have been distributed according to the three destination categories (i.e., local public shelters, local friends and family/hotels, and out of community), the model actually routes those vehicles from the start point of each evacuation sector to the three assumed safe objective points. The two types of internal trips and one external for every evacuation zone are assigned to the potential bottlenecks listed below, if warranted, and cumulated to provide a total number of evacuating vehicles for that key roadway segment. Once the most congested, or potential evacuation bottlenecks are identified, sensitivity analyses are performed on them to determine their clearance times with respect to response loading curves, variations in background traffic and other variables associated with traffic operations. Again, the State DOT traffic counter data determined the peak hour background traffic figures used in the sensitivity analysis. The roadway segments identified below are the key intersections for evacuations in each state and indicate those locations on the roadway network that warrant special consideration in developing evacuation plans.



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### 6.5.1 Connecticut Critical Roadway Segments

**Table 121:** Evacuating Vehicle Volume (Total Volume of Vehicles)

Bottleneck Location <sup>1</sup>	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles			
		Low Occupancy		High Occupancy	
		Scenario A	Scenario B	Scenario A	Scenario B
<b>Greenwich</b>	Sound Beach Ave @ Laddins Rock Rd (CAB)	2,434	3,288	2,567	3,453
<b>Stamford</b>	Elm St @ I-95 interchange (COG)	3,266	5,459	3,636	5,911
<b>Darien</b>	Tokeneke Rd/CT 136 @ US Hwy 1 (BFU)	1,087	1,539	1,111	1,568
<b>Norwalk</b>	West Ave @ I-95 interchange (CBD)	5,473	7,960	5,732	8,306
	East Ave @ I-95 interchange (CBK)	2,614	3,785	2,736	3,947
	Merritt Pkwy/CT 15 @ Main Ave interchange (AVK)	3,693	6,262	4,182	6,874
<b>Westport</b>	I-95 N/Connecticut Tpk @ Saugatuck Ave interchange (AAW)	5,059	8,411	5,678	9,187
	Compo Rd S @ Bridge St/CT 136 (CBM)	954	1,323	993	1,370
<b>Bridgeport</b>	I-95 N/Connecticut Tpk @ State Hwy 8 /25 interchange (ABI)	8,658	13,891	9,350	14,744
	CT 8/25 @ CT 8 & CT 25 split (AYK)	5,058	8,472	5,303	8,761
	Park Ave @ State St/CT 130 (CCW)	1,470	2,257	1,492	2,283
<b>Trumbull</b>	Merritt Pkwy/CT 15 @ CT 8 interchange (AVW)	4,003	6,841	4,437	7,380
<b>Stratford</b>	Main St/CT 113 @ W Broad St (BJH)	2,812	3,395	2,869	3,462
<b>Milford</b>	High St @ Jepson Dr (CEY)	3,539	4,741	3,849	5,103
	Milford Pkwy @ Merritt Pkwy/CT 15 (CMM)	3,397	4,961	3,739	5,364
<b>West Haven</b>	I-95 N/Connecticut Tpk @ West River bridge (ACF)	7,082	11,364	7,580	11,979
<b>New Haven</b>	I-95 N/Connecticut Tpk @ CT 34 interchange (ACJ)	6,685	10,735	7,153	11,314
	I-91 N @ CT 80 interchange (AKC)	15,438	23,382	16,874	25,046
	I-95 S/Connecticut Tpk @ I-91 interchange (AHG)	8,402	11,603	9,297	12,597
	Townsend Ave/CT 337 @ Main St (BOI)	636	995	670	1,036
<b>Hamden</b>	State St/US Hwy 5 @ Skiff St (AUN)	1,833	3,705	1,874	3,761
<b>North Haven</b>	I-91 N @ Wharton Brook Connector (AKG)	14,784	22,599	16,148	24,187



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**Table 121: Evacuating Vehicle Volume (Total Volume of Vehicles) (continued)**

Bottleneck Location <sup>1</sup>	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles			
		Low Occupancy		High Occupancy	
		Scenario A	Scenario B	Scenario A	Scenario B
<b>East Haven</b>	Hemingway Ave/CT 142 @ Main St (BPX)	3,518	4,251	3,620	4,358
<b>Branford</b>	Cedar St @ US 1 (CHP)	2,188	2,530	2,312	2,677
<b>Guilford</b>	Church St/CT 77 @ Boston Post Rd/US Hwy 1 (CLE)	2,118	2,728	2,266	2,890
<b>Madison</b>	Durham Rd/CT 79 @ I-95 interchange (BQX)	1,433	1,747	1,598	1,914
<b>Clinton</b>	High St/CT 81 @ I-95 interchange (BRL)	2,014	2,398	2,233	2,621
<b>Westbrook</b>	Essex Rd/CT 153 @ I-95 interchange (BSH)	1,660	1,668	1,954	1,955
<b>Old Saybrook</b>	Middlesex Tpk/CT 154 @ I-95 interchange (BSZ)	3,989	4,188	4,657	4,866
<b>Essex</b>	West Ave/CT 153 @ CT 9 interchange (BTQ)	739	1,355	784	1,437
	Chester Bowles Hwy/CT 9 @ Middlesex Tpk/CT 154 (BAL)	4,249	5,705	5,522	7,079
<b>Deep River</b>	Chester Bowles Hwy/CT 9 @ Elm St/CT 80 interchange (BAN)	4,300	5,865	5,556	7,224
<b>Chester</b>	Chester Bowles Hwy/CT 9 @ W Main St interchange (BAP)	4,444	6,173	5,682	7,514
<b>Old Lyme</b>	I- 95 S/Connecticut Tpk/US Hwy 1 bridge over Connecticut R. (AGC)	2,718	3,666	3,627	4,655
	Shore Rd/CT 156 @ Four Mile River Rd (BUZ)	1,326	1,541	1,832	2,059
<b>East Lyme</b>	Flanders Rd/CT 161 @ Society Rd (BVI)	2,599	2,979	3,012	3,432
<b>Montville</b>	I-395 N @ CT 2 Alt interchange (CNI)	7,283	11,440	8,719	13,083
<b>Waterford</b>	Boston Post Rd/US Hwy 1 @ Cross Rd (ASF)	1,903	2,029	1,937	2,068
<b>New London</b>	Colman St/US Hwy 1 @ Broad St/CT 85 (ASM)	2,555	3,376	2,718	3,574
<b>Groton</b>	Gold Star Memorial Bridge/I- 95/US Hwy 1 westbound (AFK)	3,482	4,857	4,392	5,895
	North Rd/CT 117 @ I-95 interchange (BYD)	1,335	1,829	1,540	2,079
<b>Stonington</b>	CT 234 Interchange to I-95 (CNB)	4,087	4,577	4,794	5,333
	I-95 N @ Liberty St/CT 2 interchange (AER)	3,353	4,625	4,141	5,493

- 1 Bottleneck location is the town in which the bottleneck is physically located, not the community for which it constitutes the critical link.
- 2 The letters in parenthesis pertain to the road segment designators from the Evacuation Roadway Network maps contained in Chapter 6 of the Connecticut TDR.





## 6.0 Transportation Analysis

### 6.5.2 Rhode Island Critical Roadway Segments

**Table 122:** Evacuating Vehicle Volume (Total Volume of Vehicles)

Bottleneck Location <sup>1</sup>	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles					
		Low Occupancy			High Occupancy		
		Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
<b>Westerly</b>	Beach St/RI 1A north of Winnapaug Rd intersection (BAI)	1,284	2,002		1,737	2,505	
	Post Rd/US 1 east of Shore Rd/RI 1A intersection (AFO)	1,161	1,713		1,823	2,447	
<b>Charlestown</b>	Post Rd/US 1 at Narrow Ln intersection (AFU)	1,830	2,660		3,232	4,251	
<b>South Kingston</b>	Tower Hill Rd/US 1 at Old Tower Hill Rd intersection (AGK)	4,048	5,810		6,309	8,318	
	Tower Hill Rd/US 1 at Bridgetown Rd intersection (AGO)	5,173	7,410		8,017	10,542	
<b>Portsmouth</b>	RI 24 westbound bridge across the Sakonnet River (ARP)	712	1,091		947	1,365	
	RI 114/Mt Hope Bridge into Bristol (APG)	1,957	2,895		2,747	3,822	
<b>Newport</b>	Admiral Kalbfus Rd/RI 138 intersection with Newport Bridge access (ART)	1,585	2,338		2,476	3,395	
<b>North Kingston</b>	Tower Hill Rd/US 1 at Col Rodman Hwy/RI 4 intersection (AGR)	6,380	9,197		9,909	13,147	
<b>Warwick</b>	Col Rodman Hwy/RI 4 at I-95 interchange (AUI)	6,374	9,715		9,849	13,354	
	W. Shore Rd/RI 117 at RI 113 intersection (AWG)	1,712	2,227		1,788	2,322	
	Post Rd/RI 117 at RI 115 intersection (AWM)	1,723	1,972		1,838	2,090	
	I-95 Northbound at I-295 split (AAQ)	6,187	9,432		9,428	12,836	
<b>Cranston</b>	I-95 Northbound at RI-10 interchange (AAV)	5,151	7,945		7,908	10,858	
	Park Ave/RI 12 at Park View Blvd (AYF)	1,196	2,736		1,244	2,801	



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**Table 122: Evacuating Vehicle Volume (Total Volume of Vehicles) (continued)**

Bottleneck Location <sup>1</sup>	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles					
		Low Occupancy			High Occupancy		
		Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
<b>Providence</b>	Thurbers Ave at I-95 (BNV)	501	1,244		658	1,436	
	Broadway at Hartford Ave (BPN)	404	1,008	1,040	485	1,107	1,141
	Washington St @ Winter St	236	644	658	248	659	673
	I-95 Northbound at I-195 interchange (ABB)	3,374	5,280		5,177	7,191	
	I-95 Northbound at US 6 interchange (ABE)	2,282	3,939	3,976	3,484	5,243	5,284
	I-195 Northbound @ US 44 interchange (ADK)	1,558	2,505	2,512	2,386	3,389	3,397
	US 6 Westbound @ RI 128 interchange (ALG)	1,393	2,847	2,914	2,105	3,656	3,732
	I-95 Northbound at RI 146 interchange (ABF)	2,315	4,657	4,762	3,501	6,000	6,117
<b>Bristol</b>	Hope St/RI 114 @ Elmwood Dr (APP)	1,936	4,306		3,715	5,309	
<b>Warren</b>	Main St/RI 103/114 bridge over the Warren River (APU)	3,223	4,591		3,804	5,265	
	Metacom Ave/RI 136 across Massachusetts state line (ATY)	1,659	2,386		2,005	2,790	
<b>Barrington</b>	County Rd/RI103/114 @ Federal Rd (APY)	6,030	7,819		6,610	8,492	
	Wampanoag Trail/RI 114 @ Argyle Ave (APZ)	4,950	6,520		5,426	7,065	
	County Rd/RI 103 (AQM)	1,029	1,296		1,122	1,404	
<b>East Providence</b>	Henderson Expy W (BUE)	795	1,574		821	1,609	
	I-195 W / US 1 Alt (ADR)	5,130	7,436		5,559	7,933	
<b>Pawtucket</b>	I-95 Northbound @ Broadway/RI15 interchange	1,456	3,153	3,207	2,075	3,857	3,917

- 1 Bottleneck location is the town in which the bottleneck is physically located, not the community for which it constitutes the critical link.
- 2 The letters in parenthesis pertain to the road segment designators from the Evacuation Roadway Network maps contained in Chapter 6 of the Rhode Island TDR.



## 6.0 Transportation Analysis

### 6.5.3 Massachusetts Critical Roadway Segments

**Table 123:** Evacuating Vehicle Volume (Total Volume of Vehicles)

Bottleneck <sup>1</sup> Location	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles			
		Low Tourist Occupancy		High Tourist Occupancy	
		Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
Eastham	Grand Army of the Republic Hwy/US 6 @ Nauset Rd (AXE)	2,788	4,532	6,740	9,517
Orleans	Mid Cape Hwy/US 6 @ Cranberry Hwy/MA 6A (AXL)	5,803	9,932	12,914	19,664
Harwich	MA 137 @ Mid Cape Hwy/US 6 (CJP)	3,422	5,860	7,244	11,096
Harwich	Mid Cape Hwy/MA 6 @ Lake Pleasant Ave/MA 124 (AXO)	9,450	15,954	20,358	30,931
Harwich	Lake Pleasant Ave/MA 124 @ Mid Cape Hwy/US 6 (CKD)	2,686	3,514	4,499	5,874
Dennis	East West Dennis Rd/MA 134 @ Mid Cape Hwy/US 6 (CKS)	2,944	4,136	5,461	7,495
Yarmouth	Station Ave @ Mid Cape Hwy/US 6 (CKX)	3,883	5,197	6,763	8,780
Yarmouth	Mid Cape Hwy/MA 6 @ Station Ave (AXS)	10,477	17,500	22,427	33,247
Barnstable	Iyannough Rd/MA 132 @ Mid Cape Hwy/US 6 (CMT)	7,504	10,660	12,691	17,131
Barnstable	Mid Cape Hwy/US 6 @ Iyannough Rd MA 132 interchange (AXW)	15,901	27,298	32,419	49,005
Falmouth	MA 28 @ Nathan Ellis Hwy/MA 151 (BMU)	10,475	17,179	17,741	26,365
Bourne	Bourne Bridge/MA 28 (BMY)	14,667	21,726	21,223	32,060
Bourne	Mid Cape Hwy/US 6 Bridge over the Cape Cod Canal (AYD)	20,622	35,060	37,767	58,383
Wareham	I-495 north of MA 58 interchange (AKU)	19,542	26,945	26,649	37,332
Acushnet	Alfred Bessette Mem Hwy / MA 140 @ Braley Rd interchange (BVC)	4,281	8,871	5,149	10,021
Fall River	MA 24/79 north of MA 24/79 junction (BPL)	2,087	4,160	2,419	4,619
Raynham	MA 24 @ US 44 interchange (BPT)	8,225	17,346	9,521	19,155
Bridgewater	Amvets Mem Hwy/MA 24 north of I-495 interchange (BPV)	11,121	17,148	14,689	22,302
Seekonk	I-195 @ MA/RI state line (ARX)	1,275	2,076	1,666	2,687
Plymouth	Pilgrim Hwy/MA3 @ US 44 interchange (BCP)	21,431	37,002	38,588	60,496
Duxbury	Pilgrim Hwy/MA3 @ Tremont St/MA 3A interchange (BCR)	21,926	37,702	38,965	61,024



## 6.0 Transportation Analysis

**Table 123:** Evacuating Vehicle Volume (Total Volume of Vehicles) (continued)

Bottleneck <sup>1</sup> Location	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles			
		Low Tourist Occupancy		High Tourist Occupancy	
		Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
Duxbury	Pilgrim Hwy/MA3 @ Congress St/MA 14 interchange (BCS)	22,594	38,528	39,444	61,555
Pembroke	Pilgrim Hwy/MA3 @ Church St/MA 139 interchange (BCV)	27,177	43,594	44,300	66,777
Hingham	Geo Washington Blvd @ Rockland St (CVJ)	5,170	5,229	5,689	5,749
Hingham	Summer St/MA 3A @ Water St (BIF)	11,305	12,676	12,336	13,754
Quincy	Hancock St/MA 3A @ Beale St	12,888	15,824	13,778	16,795
Braintree	Pilgrim Hwy/MA3 @ I-93 interchange (BDF)	24,032	39,754	39,036	60,208
Brookline	Boylston St/MA 9 @ Hammond Pond Pky (DEC)	8,144	12,912	8,787	13,757
Somerville	Broadway @ Holland St (DNE)	8,058	11,517	8,316	11,823
Medford	Harvard St/MA 16 @ Main St (DNY)	10,012	12,790	10,366	13,261
Revere	Revere Beach Pky/MA 145 @ MA 1A (DRE)	8,588	9,180	8,655	9,253
Revere	Revere Beach Pky/MA 16 @ Broadway (DLK)	6,209	7,279	6,349	7,453
Randolf	Amvets Mem Hwy/MA 24 @ I 93 interchange (BQB)	7,896	12,175	10,430	15,834
Canton	I-95 @ I-93/US 1 interchange (inner loop)(AAJ)	27,138	44,140	42,046	64,636
Weston	I-95 @ I 90 interchange (inner loop)(AAU)	20,598	38,843	37,000	56,880
Weston	I-90 @ I 95 interchange (AFW)	16,887	23,593	18,931	26,311
Lexington	MA 2 @ I-95 interchange (BFW)	6,310	8,698	7,146	9,821
Lexington	I-95 @ MA 2 interchange (inner loop)(ABB)	17,564	28,594	27,284	41,951
Burlington	US 3 @ Burlington Rd/MA 62 interchange (AWJ)	3,338	4,697	4,076	5,695
Burlington	I-95 @ US 3 interchange (inner loop)(ABE)	15,648	25,478	24,316	37,388
Reading	I-93 @ I-95 interchange (AIL)	23,212	32,035	25,119	34,488
Reading	I-95 @ I-93 interchange (inner loop)(ABK)	11,975	19,490	18,588	28,580



## 6.0 Transportation Analysis

**Table 123:** Evacuating Vehicle Volume (Total Volume of Vehicles) (continued)

Bottleneck <sup>1</sup> Location	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles			
		Low Tourist Occupancy		High Tourist Occupancy	
		Category 1 & 2 Hurricane	Category 3 & 4 Hurricane	Category 1 & 2 Hurricane	Category 3 & 4 Hurricane
Reading	Fellsway/MA 28 @ I-95 interchange (BPE)	10,892	13,595	11,647	14,532
Peabody	US 1 @ I-95/MA 28 (ATC)	11,566	16,766	12,122	17,483
Reading	I-95 @ I-93 interchange (outer loop)(ADV)	20,989	30,650	27,958	40,525
Burlington	I-95 @ US 3 interchange (outer loop)(AEB)	18,608	27,170	24,755	35,881
Lexington	I-95 @ MA 2 interchange (outer loop)(AEE)	16,469	24,044	21,883	31,718
Weston	I-95 @ I 90 interchange (outer loop)(AEK)	14,128	20,627	18,788	27,232
Peabody	Yankee Division Hwy/I-95/MA 128 @ US 1 Connector interchange (ADO)	23,774	34,736	31,920	46,278
Saugus	Main St @ US 1 interchange (DSC)	4,130	5,552	4,225	5,706
Lynn	Lewis St/ MA1A/129 @ Chestnut St/MA 129A (BEM)	3,166	4,467	3,255	4,599
Peabody	Yankee Division Hwy/MA 128 @ Lowell St interchange (DVF)	17,536	24,499	19,253	26,935
Beverly	Yankee Division Hwy/MA 128 @ Dodge St/MA 1A (DUZ)	11,464	15,689	13,076	17,807
Gloucester	Yankee Division Hwy/MA 128 bridge @ Annisquam River (DUP)	4,957	6,481	6,023	7,913
Rowley	Haverhill St/MA 133 @ I-95 interchange (DXW)	661	1,063	714	1,125
Newburyport	Storey Ave/MA113 @ I-95 interchange (DYV)	1,651	2,381	1,816	2,592
Newburyport	I-95 @ Storey Ave/MA113 interchange ACW)	9,844	14,936	23,439	34,011
Amesbury	Macy Street @ I-95 interchange (DZE)	1,402	1,623	1,701	1,924
Amesbury	I-95 @ Macy Street interchange (ACV)	4,732	7,139	11,597	16,745
Salisbury	I-95 @ MA/NH state line (ACQ)	12,823	19,394	20,188	29,721
Andover	I-93 @ I-495 (AIQ)	20,891	28,832	22,607	31,040
Methuen	I-93 @ MA/NH state line (AIV)	7,958	11,075	8,698	12,025



## 6.0 Transportation Analysis

**Table 123:** Evacuating Vehicle Volume (Total Volume of Vehicles) (continued)

Bottleneck <sup>1</sup> Location	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles					
		Low Tourist Occupancy			High Tourist Occupancy		
		Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane	Cat 1 (next to worst case) Hurricane	Cat 1 (worst case) & Cat 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 Hurricane
Boston	I-93 @ Columbia Rd interchange (AHS)	180	21,351	21,805	208	23,707	24,182
Boston	Bowdoin St between Cambridge St and Beacon St (DCN)	961	6,533	9,650	1,035	6,942	10,141
Boston	Huntington Ave/MA 9 @ Boylston St (DEB)	1,675	7,391	11,600	1,932	8,026	12,434

Bottleneck <sup>1</sup> Location	Critical Roadway Segments <sup>2</sup>	Evacuating Vehicles					
		Low Tourist Occupancy			High Tourist Occupancy		
		Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane	Cat 1 & 2 (not worst case) Hurricane	Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane	Cat 3 & 4 (worst case) Hurricane
Cambridge	Prospect St @ Massachusetts Ave/MA 2A (DIV)	1,688	12,717	13,297	2,045	13,316	13,966

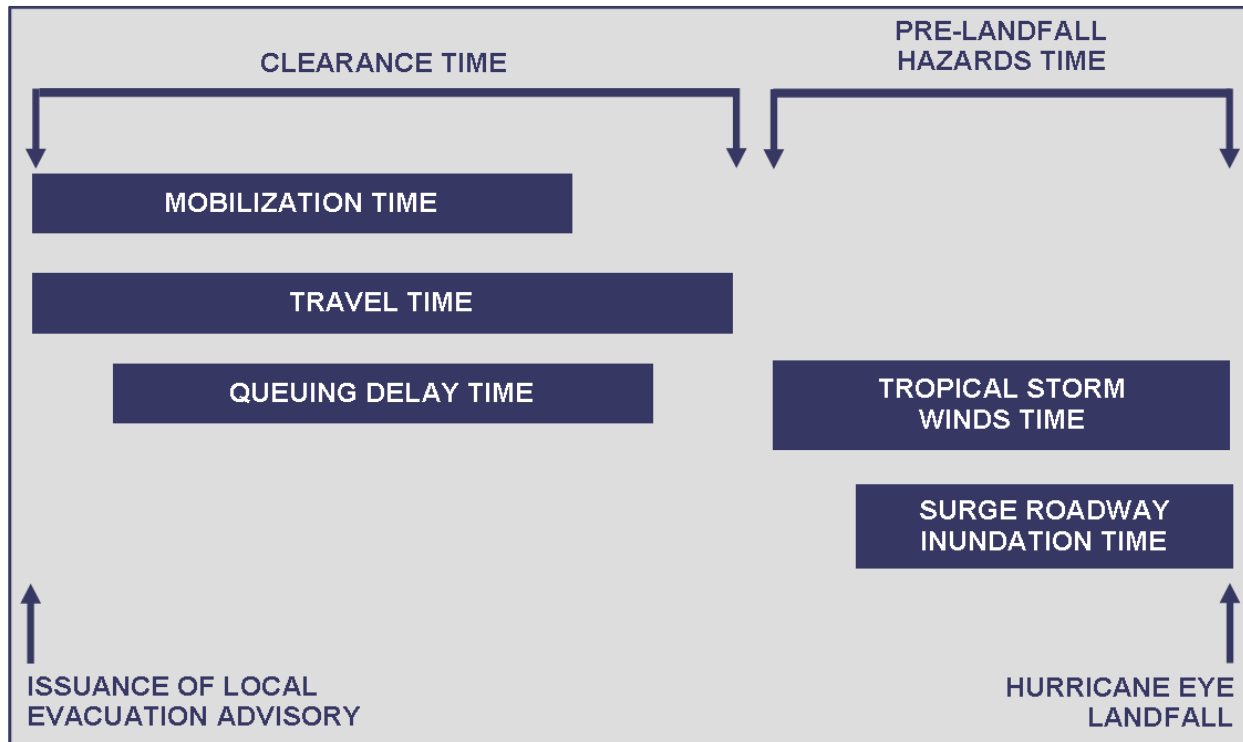
- 1 Bottleneck location is the town in which the bottleneck is physically located, not the community for which it constitutes the critical link.
- 2 The letters in parenthesis pertain to the road segment designators from the Evacuation Roadway Network maps contained in Chapter 6 of the Massachusetts TDR.



## 6.0 Transportation Analysis

### 6.6 Estimated Evacuation Clearance Times

The most important product of the transportation analysis is the clearance times developed by storm scenario and by behavioral characteristics for each group of counties. Clearance time is one of two major considerations involved in issuing an evacuation or storm advisory. Clearance time must be weighed with the forecast arrival of sustained tropical storm winds to make a prudent evacuation decision. Figure 9 illustrates these two timing issues of evacuation and their relationship to each other.



**Figure 9:** Components of Evacuation Timing

Clearance time is the time required to clear the roadway of all vehicles evacuating in response to a hurricane situation. Clearance time begins when the first evacuating vehicle enters the road network and ends when the last evacuating vehicle reaches an assumed point of safety. Clearance time includes the time required by evacuees to secure their homes and prepare to leave (referred to as mobilization time). Clearance time also encompasses the time spent by evacuees traveling along the road network (referred to as travel time), and the time spent by evacuees waiting along the road network due to traffic congestion (referred to as queuing delay time). Clearance time does not relate to the time any one vehicle spends traveling on the road network and does not include time needed for local officials to assemble and make a decision to evacuate. Tables 124 through 126 below provide the estimated clearance times by town, by scenario and according to slow, medium and fast response times.







## 6.0 Transportation Analysis

### 6.6.1 Connecticut Evacuation Clearance Times

**Table 124:** Evacuation Clearance Times (in hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Fairfield County	Bridgeport	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
	Darien	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
	Fairfield	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
	Greenwich	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
	Norwalk	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
	Stamford	12.7	13.3	16.1	16.8	11.0	11.5	14.3	14.9	9.2	9.7	12.6	13.3
	Stratford	8.2	8.4	9.2	9.4	6.6	6.8	7.6	7.8	4.8	5.0	5.9	6.1
	Westport	8.6	8.8	9.8	10.0	7.1	7.2	8.3	8.5	5.4	5.6	6.7	6.9
Middlesex County	Chester	3.9	4.4	4.5	5.0	3.4	3.9	4.0	4.5	3.0	3.4	3.6	4.1
	Clinton	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	Deep River	4.0	4.4	4.5	5.0	3.5	3.9	4.0	4.5	2.9	3.4	3.5	4.0
	Essex	4.0	4.5	4.6	5.1	3.5	4.0	4.0	4.5	3.0	3.4	3.5	4.0
	Old Saybrook	12.5	13.4	12.8	13.7	10.8	11.7	11.1	12.0	9.2	10.1	9.5	10.4
	Westbrook	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0



## 6.0 Transportation Analysis

**Table 124:** Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
New Haven County	Branford	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	East Haven	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	Guilford	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	Hamden	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	Madison	8.0	8.2	8.7	9.0	6.5	6.7	7.3	7.5	5.0	5.2	5.8	6.0
	Milford	7.3	7.7	9.1	9.7	6.9	7.4	8.7	9.3	6.8	7.3	8.7	9.3
	New Haven	8.0	8.2	9.7	10.1	6.8	7.2	8.7	9.1	5.8	6.2	7.8	8.1
	North Haven	7.9	8.2	9.7	10.1	6.8	7.2	8.7	9.1	5.8	6.2	7.8	8.1
	West Haven	8.1	8.2	9.1	9.4	6.5	6.8	7.9	8.2	5.3	5.6	6.8	7.1
New London County	East Lyme	9.2	9.8	9.7	10.4	7.9	8.5	8.4	9.0	6.6	7.2	7.1	7.8
	Groton	6.1	6.4	6.8	7.2	5.2	5.5	5.9	6.2	4.2	4.5	4.9	5.3
	Ledyard	7.6	8.2	9.2	9.9	6.5	7.0	8.1	8.7	5.3	5.9	7.0	7.7
	Lyme	3.9	4.4	4.5	5.0	3.4	3.9	4.0	4.5	3.0	3.4	3.6	4.1
	Montville	7.6	8.2	9.2	9.9	6.5	7.0	8.1	8.7	5.3	5.9	7.0	7.7
	New London	7.0	7.2	8.0	8.2	6.1	6.3	7.1	7.3	5.2	5.5	6.3	6.5
	Old Lyme	5.0	5.3	5.3	5.5	4.0	4.3	4.3	4.5	2.9	3.2	3.2	3.5
	Preston	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Stonington	8.8	9.8	9.5	10.5	8.1	9.1	8.8	9.9	7.7	8.8	8.5	9.6
Waterford	6.9	6.9	7.1	7.1	5.9	6.0	6.1	6.1	4.9	5.0	5.1	5.2	



## 6.0 Transportation Analysis

### 6.6.2 Rhode Island Evacuation Clearance Times

Table 125: Evacuation Clearance Times (in hours)

County	Town	SLOW Response						MEDIUM Response						RAPID Response					
		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Bristol County	Barrington	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Bristol	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Warren	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
Kent County	East Greenwich	6.9	7.1	7.2	7.5			5.2	5.5	5.5	5.8			3.4	3.6	3.7	4.0		
	Warwick	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
Newport County	Jamestown	6.9	7.1	7.2	7.5			5.2	5.5	5.5	5.8			3.4	3.6	3.7	4.0		
	Little Compton	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Middletown	6.9	7.1	7.2	7.5			5.2	5.5	5.5	5.8			3.4	3.6	3.7	4.0		
	Newport	6.9	7.1	7.2	7.5			5.2	5.5	5.5	5.8			3.4	3.6	3.7	4.0		
	Portsmouth	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Tiverton	14.6	15.4	17.1	18.1			13.0	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
Providence County	Cranston	7.1	7.3	7.6	7.9	7.6	7.9	5.4	5.6	5.9	6.2	5.9	6.2	3.4	3.7	3.9	4.2	4.0	4.3
	East Providence	4.1	4.1	4.4	4.5			3.2	3.3	3.6	3.7			2.3	2.4	2.7	2.7		
	Pawtucket	3.9	4.1	4.3	4.5			3.0	3.1	3.4	3.5			2.0	2.1	2.3	2.5		
	Providence	7.1	7.3	7.6	7.9	7.6	7.9	5.4	5.6	5.9	6.2	5.9	6.2	3.4	3.7	3.9	4.2	4.0	4.3
Washington County	Charlestown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
	Narragansett	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
	New Shoreham	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
	North Kingstown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
	South Kingstown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
	Westerly	6.2	6.8	6.8	7.3			4.9	5.4	5.4	6.0			3.4	3.9	3.9	4.5		



## 6.0 Transportation Analysis

### 6.6.3 Massachusetts Evacuation Clearance Times

**Table 126:** Evacuation Clearance Times (in hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Barnstable	Barnstable	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Bourne	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Brewster	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Chatham	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Dennis	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Eastham	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Falmouth	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Harwich	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Mashpee	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Orleans	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Provincetown	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Sandwich	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Truro	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Wellfleet	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
Yarmouth	12.1	16.7	15.5	23.3	10.6	15.2	12.7	18.4	9.3	14.1	11.5	17.4	
Bristol	Acushnet	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Berkley	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Dartmouth	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Dighton	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Fairhaven	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Fall River	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9



## 6.0 Transportation Analysis

Table 126: Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Bristol</b> (continued)	Freetown	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	New Bedford	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Raynham	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Rehoboth	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Seekonk	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Somerset	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Swansea	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Taunton	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
<b>Dukes</b>	Westport	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Aquinnah	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Chilmark	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Edgartown	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Oak Bluffs	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Tisbury	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	West Tisbury	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
<b>Essex</b>	Beverly	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Danvers	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Essex	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Gloucester	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Ipswich	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Lynn	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2



## 6.0 Transportation Analysis

Table 126: Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Essex</b> (continued)	Manchester	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Marblehead	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Nahant	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
	Newbury	9.6	10.0	11.4	12.1	8.1	8.6	10.0	10.6	6.7	7.2	8.7	9.3
	Newburyport	9.6	10.0	11.4	12.1	8.1	8.6	10.0	10.6	6.7	7.2	8.7	9.3
	Peabody	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Rockport	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Rowley	9.6	10.0	11.4	12.1	8.1	8.6	10.0	10.6	6.7	7.2	8.7	9.3
	Salem	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Salisbury	9.6	10.0	11.4	12.1	8.1	8.6	10.0	10.6	6.7	7.2	8.7	9.3
	Saugus	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
Swampscott	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2	
<b>Middlesex</b>	Arlington	4.3	4.4	4.9	5.1	3.6	3.7	4.2	4.4	2.9	3.1	3.5	3.7
	Belmont	4.3	4.4	4.9	5.1	3.6	3.7	4.2	4.4	2.9	3.1	3.5	3.7
	Everett	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Malden	10.8	11.1	12.5	12.9	9.1	9.5	10.8	11.3	7.5	7.8	9.3	9.7
	Medford	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Newton	9.3	9.8	11.0	11.7	8.0	8.5	9.7	10.3	6.7	7.2	8.5	9.1
	Somerville	16.7	17.3	17.3	18.0	15.7	16.3	16.3	17.0	15.3	16.0	16.0	16.7
	Waltham	9.3	9.8	11.0	11.7	8.0	8.5	9.7	10.3	6.7	7.2	8.5	9.1
	Watertown	9.3	9.8	11.0	11.7	8.0	8.5	9.7	10.3	6.7	7.2	8.5	9.1
Winchester	10.8	11.1	12.5	12.9	9.1	9.5	10.8	11.3	7.5	7.8	9.3	9.7	



## 6.0 Transportation Analysis

Table 126: Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Nantucket</b>	Nantucket	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
<b>Norfolk</b>	Braintree	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
	Brookline	9.0	9.3	11.3	11.7	7.7	8.0	0.0	0.0	6.3	6.6	0.0	0.0
	Cohasset	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
	Milton	6.7	6.7	10.9	11.4	5.0	5.0	9.1	9.6	3.0	3.0	7.3	7.8
	Quincy	17.2	18.1	20.3	21.3	16.2	17.1	19.2	20.2	15.7	16.7	18.9	20.0
	Weymouth	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
<b>Plymouth</b>	Duxbury	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Hingham	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Hull	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Kingston	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Marion	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Marshfield	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Mattapoisett	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Plymouth	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Rochester	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Scituate	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Wareham	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
<b>Suffolk</b>	Chelsea	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Revere	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Winthrop	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9





## 6.0 Transportation Analysis

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### 6.7 Critical Evacuation Roadway Segments

Of the key roadway segments listed above in section 6.5, one bottleneck or roadway link will determine the clearance time for an area; for a community or region it becomes the critical evacuation roadway segment. This critical link, because of its traffic demand relative to its capacity will experience the highest degree of congestion vis-a-vis the other key segments impacted by an evacuation decision. All of the other segments listed above, while important for the overall smooth conduct of an evacuation, will not have the same deleterious impact to an evacuation as failure at the critical locations listed below.

The implications of a failure (e.g., traffic accident or vehicle breakdown, etc.) at any of the below key roadway segments are a possible significant increase in clearance times over the numbers provided in this report, or worse yet, a total inability to complete an evacuation, thereby leaving evacuees stranded in surge prone areas as hazardous conditions arrive. Therefore, these critical links will require special attention to ensure they remain as viable as possible throughout the course of an evacuation. They should have the benefit of a law enforcement presence to monitor and control traffic; incident management teams stationed nearby to address any impediments to vehicular flow; and a means (e.g., cameras, traffic counters, etc.) to continuously track and quantify the progress of movement through the roadway segment. These particular segments may also warrant specialized maintenance of traffic (MOT) and other operational measures, such as shoulder-use or one-way plans, to enhance capacity and thereby reduce clearance times.

Tables 127 through 129 list the critical evacuation roadway segments for Connecticut, Rhode Island and Massachusetts respectively by the town in which the critical road segment is located, as well as the specific towns that it impacts with respect to determining the clearance time. Please note that in most cases the critical roadway segment for a particular community is outside of its jurisdictional control which may require additional coordination among local governments in the area.





## 6.0 Transportation Analysis

### 6.7.1 Connecticut Critical Evacuation Roadway Segments

**Table 127:** Clearance Time Determining Critical Links

County	Physical Location	Name of Link	Impacted Towns	
Fairfield County	Bridgeport	I-95 N/Connecticut Tpk @ State Hwy 8 /25 interchange (ABI)	Bridgeport Darien Fairfield Greenwich Norwalk Westport	
Middlesex County	Stamford	Elm St @ I-95 interchange (COG)	Stamford	
	Stratford	Merritt Pkwy/CT 15 @ CT 8 interchange (AVW)	Stratford	
	Old Saybrook	Middlesex Tpk/CT 154 @ I-95 interchange (BSZ)	Old Saybrook	
	Chester	Chester Bowles Hwy/CT 9 @ W Main St interchange (BAP)	Chester	
New Haven County	New Haven	I-95 S/Connecticut Tpk @ I-91 interchange (AHG)	Clinton Westbrook	
	Essex	Chester Bowles Hwy/CT 9 @ Middlesex Tpk/ CT 154 interchange (BAL)	Essex	
	Deep River	Chester Bowles Hwy/CT 9 @ Elm St/CT 80 interchange (BAN)	Deep River	
	New Haven County	New Haven	I-95 S/Connecticut Tpk @ I-91 interchange (AHG)	Branford East Haven Guilford Hamden Madison New Haven
		North Haven	I-91 N @ Wharton Brook Connector (AKG)	North Haven
New London County	West Haven	I-95 N/Connecticut Tpk @ West River bridge (ACF)	West Haven	
	Milford	High St @ Jepson Dr (CEY)	Milford	
	East Lyme	Flanders Rd/CT 161 @ Society Rd (BVI)	East Lyme	
	Groton	North Rd/CT 117 @ I-95 interchange (BYD)	Groton	
	Montville	I-395 N @ CT 2 Alt interchange (CNI)	Ledyard Montville	



## 6.0 Transportation Analysis

**Table 127:** Clearance Time Determining Critical Links

County	Physical Location	Name of Link	Impacted Towns
<b>New London County</b>	Chester	Chester Bowles Hwy/CT 9 @ W Main St interchange (BAP)	Lyme
	New London	Colman St/US Hwy 1 @ Broad St/CT 85 (ASM)	New London
	Old Lyme	I- 95 S/Connecticut Tpke/US Hwy 1 bridge over Connecticut River (AGC)	Old Lyme
	Stonington	CT 234 Interchange to I-95 (CNB)	Stonington
	Waterford	Boston Post Rd/US Hwy 1 @ Cross Rd (ASF)	Waterford



## 6.0 Transportation Analysis

### 6.7.2 Rhode Island Critical Evacuation Roadway Segments

**Table 128:** Clearance Time Determining Critical Links

County	Physical Location	Name of Link	Impacted Towns
<b>Bristol</b>	Barrington	County Rd/RI103/114 @ Federal Rd (APY)	Barrington Bristol Warren
<b>Newport</b>	Barrington	County Rd/RI103/114 @ Federal Rd (APY)	Little Compton Portsmouth Tiverton
	Providence	I-95 Northbound at I-195 interchange (ABB)	Jamestown Middletown Newport
<b>Providence</b>	Providence	I-95 Northbound at RI 146 interchange (ABF)	Cranston Providence
	East Providence	I-195 W / US 1 Alt (ADR)	East Providence
	Pawtucket	I-95 Northbound @ Broadway/RI15 interchange (ABN)	Pawtucket
<b>Kent</b>	Providence	I-95 Northbound at I-195 interchange (ABB)	East Greenwich
	Warwick	Post Rd/RI 117 at RI 115 intersection (AWM)	Warwick
<b>Washington</b>	Providence	I-95 Northbound at I-195 interchange (ABB)	Charlestown Narragansett North Kingstown South Kingstown
	Warwick	I-95 Northbound at I-295 split (AAQ)	Westerly



## 6.0 Transportation Analysis

### 6.7.3 Massachusetts Critical Evacuation Roadway Segments

**Table 129:** Clearance Time Determining Critical Links

County	Impacted Communities	Name of Link	Physical Location
<b>Barnstable</b>	Brewster Chatham Eastham Harwich Orleans Provincetown Truro Wellfleet	Mid Cape Hwy/MA 6 @ Lake Pleasant Ave/MA 124 (AXO)	Harwich
	Barnstable Dennis Mashpee Sandwich Yarmouth (Scenario B)	Mid Cape Hwy/US 6 Bridge over the Cape Cod Canal (AYD)	Bourne
	Bourne	Pilgrim Hwy/MA3 @ US 44 interchange (BCP)	Plymouth
	Falmouth	Bourne Bridge/MA 28 (BMY)	Bourne
	Yarmouth (Scenario A)	Station Ave @ Mid Cape Hwy/US 6 (CKX)	Yarmouth
<b>Bristol</b>	Acushnet Berkley Dartmouth Dighton Fairhaven Fall River Freetown New Bedford Raynham Rehoboth Seekonk Somerset Swansea Taunton	Amvets Mem Hwy/MA 24 north of I-495 interchange (BPV)	Bridgewater



## 6.0 Transportation Analysis

**Table 129:** Clearance Time Determining Critical Links (continued)

County	Impacted Communities	Name of Link	Physical Location
<b>Bristol</b>	Westport	Amvets Mem Hwy/MA 24 north of I-495 interchange (BPV)	Bridgewater
<b>Dukes</b>	Aquinnah Chilmark Edgartown Oak Bluffs Tisbury West Tisbury	Bourne Bridge/MA 28 (BMY)	Bourne
<b>Essex</b>	Beverly Danvers Essex Gloucester Ipswich Manchester Marblehead Peabody Rockport Salem	Yankee Division Hwy/MA 128 @ Lowell St interchange (DVF)	Peabody
	Lynn Nahant Saugus Swampscott	Main St @ US 1 interchange (DSC)	Saugus
	Newbury Newburyport Rowley Salisbury	Yankee Division Hwy/I-95/MA 128 @ US 1 Connector interchange (ADO)	Peabody
<b>Middlesex</b>	Arlington Belmont	MA 2 @ I-95 interchange (BFW)	Lexington
	Everett Medford	Harvard St/MA 16 @ Main St (DNY)	Medford



## 6.0 Transportation Analysis

**Table 129:** Clearance Time Determining Critical Links (continued)

County	Impacted Communities	Name of Link	Physical Location
<b>Middlesex</b>	Malden Winchester	I-93 @ I-95 interchange (AIL)	Reading
	Newton Waltham Watertown	I-90 @ I 95 interchange (AFW)	Weston
	Cambridge Somerville	Prospect St @ Massachusetts Ave/MA 2A (DIV)	Cambridge
<b>Norfolk</b>	Braintree Cohasset Weymouth	Pilgrim Hwy/MA3 @ I-93 interchange (BDF)	Braintree
	Brookline	Boylston St/MA 9 @ Hammond Pond Pky (DEC)	Brookline
	Milton	I-93 @ Columbia Rd interchange (AHS)	Boston
	Quincy	Hancock St/MA 3A @ Beale St (BIU)	Quincy
<b>Plymouth</b>	Duxbury Kingston Marshfield Plymouth	Pilgrim Hwy/MA 3 @ Church St/MA 139 interchange (BCV)	Pembroke
	Hingham Hull Scituate	Summer St/MA 3A @ Water St (BIF)	Hingham
	Marion Mattapoisett Rochester Wareham	Amvets Mem Hwy/MA 24 north of I-495 interchange (BPV)	Bridgewater
<b>Suffolk</b>	Boston (scenario A)	Revere Beach Pky/MA 16 @ Broadway (DLK)	Revere
	Boston (scenario B)	I-93 @ Columbia Rd interchange (AHS)	Boston
	Boston (scenario C)	Bowdoin St between Cambridge St and Beacon St (DCN)	Boston
	Chelsea Revere Winthrop	Harvard St/MA 16 @ Main St (DNY)	Medford





## 6.0 Transportation Analysis

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### 6.8 State to State Trips and Clearance Time Impacts

As an additional aid to hurricane and emergency preparedness planners, the transportation model calculated the number of vehicles moving between the states of Connecticut, Rhode Island and Massachusetts. This section will also address those vehicles that are introduced into the study region from the adjoining states of New York, Maine and New Hampshire to determine their impacts on the above clearance times.

Table 130 details the numbers of evacuating vehicles that will cross state lines during each response scenario. Only major highways are included in these tables since they are the corridors that have the most potential to impose enough traffic on their adjoining state roadways and thereby have an effect on clearance times. In addition, only those roadways impacted by evacuations in Boston and Cambridge, Massachusetts, as well as Providence, Rhode Island will have numbers in the response scenario C columns.

Table 131 through 133 detail the impacts to clearance times caused by the infusion of extra-state vehicles on the clearance times provided above in Tables 124 (CT), 125 (RI) and 126 (MA). In most cases the additional vehicles impose relatively minor increases to clearance times with the exception of New York's traffic on western coastal Connecticut. For Massachusetts, the exiting vehicles from Rhode Island and Connecticut do not have a substantive impact on any critical bottlenecks, and therefore their effects are not measurable. Evacuations in Maine and New Hampshire, on the other hand, will only increase some clearance times in the northern part of the study area, mainly in towns along the Essex County coastline.

Finally, to expand upon all the clearance time tables above, Tables 134 through 136 provide the revised clearance times for a multi-state evacuation. In addition to all three states in the study region, these tables include total clearance time figures that factor in simultaneous evacuations in Maine, New Hampshire and the New York City vicinity.





## 6.0 Transportation Analysis

**Table 130:** Evacuating Vehicles across State Lines

Connecticut									
Major In Routes	Major Out Routes	From	To	Scenario A Low Tourism	Scenario A High Tourism	Scenario B Low Tourism	Scenario B High Tourism	Scenario C Low Tourism	Scenario C High Tourism
I-95 NB		New York		10,597	12,518	30,212	32,706		
Hutchinson River Pkwy NB		New York		2,382	3,252	10,668	12,035		
	US 1 NB		Rhode Island	3,308	3,799	4,718	5,255		
	I-95 NB		Rhode Island	3,671	4,517	5,531	6,474		
	US 6 EB		Rhode Island	2,320	2,775	3,780	4,304		
	I-395 NB		Massachusetts	3,639	4,352	6,123	6,947		
Rhode Island									
Major In Routes	Major Out Routes	From	To	Scenario A Low Tourism	Scenario A High Tourism	Scenario B Low Tourism	Scenario B High Tourism	Scenario C Low Tourism	Scenario C High Tourism
	US 1 NB	Connecticut		3,308	3,799	4,718	5,255		
	I-95 NB	Connecticut		3,671	4,517	5,531	6,474		
	US 6 EB	Connecticut		2,214	2,650	3,478	3,977		
	I-195 SB	Massachusetts		1,430	1,736	2,203	2,684		
	US 1 SB		Connecticut	664	1,114	953	1,455		

**Table 130:** Evacuating Vehicles across State Lines (continued)



## 6.0 Transportation Analysis

Rhode Island (Cont.)									
Major In Routes	Major Out Routes	From	To	Scenario A Low Tourism	Scenario A High Tourism	Scenario B Low Tourism	Scenario B High Tourism	Scenario C Low Tourism	Scenario C High Tourism
				I-95 SB		Connecticut	665	763	1,305
I-95 NB		Massachusetts	2,306	3,080	4,423	5,322	4,476	5,381	
I-195 NB		Massachusetts	154	198	349	403	357	412	
RI 24 NB		Massachusetts	1,084	1,420	1,681	2,081	1,084	1,420	

Massachusetts									
Major In Routes	Major Out Routes	From	To	Scenario A Low Tourism	Scenario A High Tourism	Scenario B Low Tourism	Scenario B High Tourism	Scenario C Low Tourism	Scenario C High Tourism
				I-95 NB		Rhode Island	2,306	3,080	4,423
I-195 NB		Rhode Island	154	198	349	403	357	412	
RI 24 NB		Rhode Island	1,084	1,420	1,681	2,081	1,084	1,420	
I-95 SB		Maine/New Hampshire	4,018	10,714	6,309	15,746			
	I-195 SB		Rhode Island Maine/New Hampshire	1,275	2,076	1,666	2,687		
	I-95 NB		Hampshire	6,231	9,772	10,570	6,688	10,451	11,311



## 6.0 Transportation Analysis

### 6.8.1 Connecticut Multi-State Evacuation Clearance Time Increases

**Table 131:** Change to Evacuation Clearance Times (in additional hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Fairfield County	Bridgeport	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
	Darien	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
	Fairfield	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
	Greenwich	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
	Norwalk	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
	Stamford	0	0	0	0	0	0	0	0	0	0	0	0
	Stratford	0.6	0.8	2.8	3.2	0.6	0.8	2.8	3.1	0.7	0.9	2.9	3.3
	Westport	1.8	2.1	5.2	5.7	1.8	2.2	5.1	5.6	1.9	2.2	5.4	5.8
Middlesex County	Chester	0	0	0	0	0	0	0	0	0	0	0	0
	Clinton	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	Deep River	0	0	0	0	0	0	0	0	0	0	0	0
	Essex	0	0	0	0	0	0	0	0	0	0	0	0
	Old Saybrook	0	0	0	0	0	0	0	0	0	0	0	0
	Westbrook	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9



## 6.0 Transportation Analysis

Table 131: Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
New Haven County	Branford	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	East Haven	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	Guilford	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	Hamden	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	Madison	0.9	1	2.6	2.7	0.9	1.1	2.5	2.7	0.9	1.1	2.6	2.9
	Milford	0	0	0	0	0	0	0	0	0	0	0	0
	New Haven	0.9	1	1.8	2	0.7	0.7	1.8	1.9	0.7	0.7	1.8	2.1
	North Haven	0.6	0.7	1.8	2	0.7	0.7	1.8	1.9	0.7	0.7	1.8	2.1
	West Haven	1.5	1.8	4.2	1.6	0.5	0.6	1.5	1.6	0.6	0.6	1.6	1.7
New London County	East Lyme	0	0	0	0	0	0	0	0	0	0	0	0
	Groton	0	0	0	0	0	0	0	0	0	0	0	0
	Ledyard	0.2	0.2	0.6	0.6	0.2	0.3	0.6	0.6	0.2	0.3	0.6	0.6
	Lyme	0	0	0	0	0	0	0	0	0	0	0	0
	Montville	0.2	0.2	0.6	0.6	0.2	0.3	0.6	0.6	0.2	0.3	0.6	0.6
	New London	0	0	0	0	0	0	0	0	0	0	0	0
	Old Lyme	0.3	0.2	0.6	0.7	0.3	0.2	0.6	0.7	0.3	0.3	0.6	0.7
	Preston	0	0	0	0	0	0	0	0	0	0	0	0
	Stonington	0	0	0	0	0	0	0	0	0	0	0	0
Waterford	0	0	0	0	0	0	0	0	0	0	0	0	



## 6.0 Transportation Analysis

### 6.8.2 Rhode Island Multi-State Evacuation Clearance Time Increases

Table 132: Change to Evacuation Clearance Times (in additional hours)

County	Town	SLOW Response						MEDIUM Response						RAPID Response					
		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Bristol County	Barrington	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bristol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Warren	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kent County	East Greenwich	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	0	0	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	0	0	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	0	0
	Warwick	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newport County	Jamestown	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	0	0	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	0	0	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	0	0
	Little Compton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Middletown	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	0	0	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	0	0	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	0	0
	Newport	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	0	0	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	0	0	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	0	0
	Portsmouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tiverton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Providence County	Cranston	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.7</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.6</b>	<b>0.5</b>	<b>0.6</b>
	East Providence	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pawtucket	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>
	Providence	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.7</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.6</b>	<b>0.5</b>	<b>0.6</b>
Washington County	Charlestown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Narragansett	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	North Kingstown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	South Kingstown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Westerly	<b>0.5</b>	<b>0.5</b>	<b>0.7</b>	<b>0.7</b>	0	0	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.8</b>	0	0	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.8</b>	0	0



## 6.0 Transportation Analysis

### 6.8.3 Massachusetts Multi-State Evacuation Clearance Time Increases

**Table 133:** Change to Evacuation Clearance Times (in additional hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Barnstable	Barnstable	0	0	0	0	0	0	0	0	0	0	0	0
	Bourne	0	0	0	0	0	0	0	0	0	0	0	0
	Brewster	0	0	0	0	0	0	0	0	0	0	0	0
	Chatham	0	0	0	0	0	0	0	0	0	0	0	0
	Dennis	0	0	0	0	0	0	0	0	0	0	0	0
	Eastham	0	0	0	0	0	0	0	0	0	0	0	0
	Falmouth	0	0	0	0	0	0	0	0	0	0	0	0
	Harwich	0	0	0	0	0	0	0	0	0	0	0	0
	Mashpee	0	0	0	0	0	0	0	0	0	0	0	0
	Orleans	0	0	0	0	0	0	0	0	0	0	0	0
	Provincetown	0	0	0	0	0	0	0	0	0	0	0	0
	Sandwich	0	0	0	0	0	0	0	0	0	0	0	0
	Truro	0	0	0	0	0	0	0	0	0	0	0	0
	Wellfleet	0	0	0	0	0	0	0	0	0	0	0	0
Yarmouth	0	0	0	0	0	0	0	0	0	0	0	0	
Bristol	Acushnet	0	0	0	0	0	0	0	0	0	0	0	0
	Berkley	0	0	0	0	0	0	0	0	0	0	0	0
	Dartmouth	0	0	0	0	0	0	0	0	0	0	0	0
	Dighton	0	0	0	0	0	0	0	0	0	0	0	0
	Fairhaven	0	0	0	0	0	0	0	0	0	0	0	0
	Fall River	0	0	0	0	0	0	0	0	0	0	0	0





## 6.0 Transportation Analysis

Table 133: Change to Evacuation Clearance Times (in additional hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response				
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4		
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	
<b>Bristol (continued)</b>	Freetown	0	0	0	0	0	0	0	0	0	0	0	0	
	New Bedford	0	0	0	0	0	0	0	0	0	0	0	0	
	Raynham	0	0	0	0	0	0	0	0	0	0	0	0	
	Rehoboth	0	0	0	0	0	0	0	0	0	0	0	0	
	Seekonk	0	0	0	0	0	0	0	0	0	0	0	0	
	Somerset	0	0	0	0	0	0	0	0	0	0	0	0	
	Swansea	0	0	0	0	0	0	0	0	0	0	0	0	
	Taunton	0	0	0	0	0	0	0	0	0	0	0	0	
	Westport	0	0	0	0	0	0	0	0	0	0	0	0	
	<b>Dukes</b>	Aquinnah	0	0	0	0	0	0	0	0	0	0	0	0
		Chilmark	0	0	0	0	0	0	0	0	0	0	0	0
		Edgartown	0	0	0	0	0	0	0	0	0	0	0	0
		Oak Bluffs	0	0	0	0	0	0	0	0	0	0	0	0
		Tisbury	0	0	0	0	0	0	0	0	0	0	0	0
		West Tisbury	0	0	0	0	0	0	0	0	0	0	0	0
<b>Essex</b>	Beverly	0	0	0	0	0	0	0	0	0	0	0	0	
	Danvers	0	0	0	0	0	0	0	0	0	0	0	0	
	Essex	0	0	0	0	0	0	0	0	0	0	0	0	
	Gloucester	0	0	0	0	0	0	0	0	0	0	0	0	
	Ipswich	0	0	0	0	0	0	0	0	0	0	0	0	
	Lynn	0	0	0	0	0	0	0	0	0	0	0	0	



## 6.0 Transportation Analysis

Table 133: Change to Evacuation Clearance Times (in additional hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Essex (continued)	Manchester	0	0	0	0	0	0	0	0	0	0	0	0
	Marblehead	0	0	0	0	0	0	0	0	0	0	0	0
	Nahant	0	0	0	0	0	0	0	0	0	0	0	0
	Newbury	<b>0.7</b>	<b>2.0</b>	<b>1.2</b>	<b>2.9</b>	<b>0.8</b>	<b>2.0</b>	<b>1.1</b>	<b>2.9</b>	<b>0.8</b>	<b>2.1</b>	<b>1.2</b>	<b>3.1</b>
	Newburyport	<b>0.7</b>	<b>2.0</b>	<b>1.2</b>	<b>2.9</b>	<b>0.8</b>	<b>2.0</b>	<b>1.1</b>	<b>2.9</b>	<b>0.8</b>	<b>2.1</b>	<b>1.2</b>	<b>3.1</b>
	Peabody	0	0	0	0	0	0	0	0	0	0	0	0
	Rockport	0	0	0	0	0	0	0	0	0	0	0	0
	Rowley	<b>0.7</b>	<b>2.0</b>	<b>1.2</b>	<b>2.9</b>	<b>0.8</b>	<b>2.0</b>	<b>1.1</b>	<b>2.9</b>	<b>0.8</b>	<b>2.1</b>	<b>1.2</b>	<b>3.1</b>
	Salem	0	0	0	0	0	0	0	0	0	0	0	0
	Salisbury	<b>0.7</b>	<b>2.0</b>	<b>1.2</b>	<b>2.9</b>	<b>0.8</b>	<b>2.0</b>	<b>1.1</b>	<b>2.9</b>	<b>0.8</b>	<b>2.1</b>	<b>1.2</b>	<b>3.1</b>
	Saugus	0	0	0	0	0	0	0	0	0	0	0	0
Swampscott	0	0	0	0	0	0	0	0	0	0	0	0	
Middlesex	Arlington	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>	0	0	0	<b>0.1</b>
	Belmont	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>	0	0	0	<b>0.1</b>
	Everett	0	0	0	0	0	0	0	0	0	0	0	0
	Malden	0	0	0	<b>0.1</b>	0	0	<b>0.1</b>	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>
	Medford	0	0	0	0	0	0	0	0	0	0	0	0
	Newton	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	0	0	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>
	Somerville	0	0	0	0	0	0	0	0	0	0	0	0
	Waltham	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	0	0	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>
	Watertown	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	0	0	0	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>
Winchester	0	0	0	<b>0.1</b>	0	0	<b>0.1</b>	<b>0.1</b>	0	<b>0.1</b>	0	<b>0.1</b>	



## 6.0 Transportation Analysis

Table 133: Change to Evacuation Clearance Times (in additional hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Nantucket</b>	Nantucket	0	0	0	0	0	0	0	0	0	0	0	0
<b>Norfolk</b>	Braintree	0	0	0	0	0	0	0	0	0	0	0	0
	Brookline	0	0	0	0	0	0	0	0	0	0	0	0
	Cohasset	0	0	0	0	0	0	0	0	0	0	0	0
	Milton	0	0	0	0	0	0	0	0	0	0	0	0
	Quincy	0	0	0	0	0	0	0	0	0	0	0	0
	Weymouth	0	0	0	0	0	0	0	0	0	0	0	0
<b>Plymouth</b>	Duxbury	0	0	0	0	0	0	0	0	0	0	0	0
	Hingham	0	0	0	0	0	0	0	0	0	0	0	0
	Hull	0	0	0	0	0	0	0	0	0	0	0	0
	Kingston	0	0	0	0	0	0	0	0	0	0	0	0
	Marion	0	0	0	0	0	0	0	0	0	0	0	0
	Marshfield	0	0	0	0	0	0	0	0	0	0	0	0
	Mattapoisett	0	0	0	0	0	0	0	0	0	0	0	0
	Plymouth	0	0	0	0	0	0	0	0	0	0	0	0
	Rochester	0	0	0	0	0	0	0	0	0	0	0	0
	Scituate	0	0	0	0	0	0	0	0	0	0	0	0
	Wareham	0	0	0	0	0	0	0	0	0	0	0	0
<b>Suffolk</b>	Chelsea	0	0	0	0	0	0	0	0	0	0	0	0
	Revere	0	0	0	0	0	0	0	0	0	0	0	0
	Winthrop	0	0	0	0	0	0	0	0	0	0	0	0



## 6.0 Transportation Analysis

Table 133: Change to Evacuation Clearance Times (in additional hours) (continued)

Suffolk County	SLOW Response						MEDIUM Response						RAPID Response					
	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane		Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane		Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane	
	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Boston</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middlesex County	SLOW Response						MEDIUM Response						RAPID Response					
	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane		Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane		Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane	
	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Cambridge</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



## 6.0 Transportation Analysis

### 6.9 Multi-State Evacuation Clearance Times

#### 6.9.1 Connecticut Multi-State Evacuation Clearance Times

**Table 134:** Multi-State Evacuation Clearance Times (in hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Fairfield County	Bridgeport *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
	Darien *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
	Fairfield *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
	Greenwich *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
	Norwalk *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
	Stamford	12.7	13.3	16.1	16.8	11	11.5	14.3	14.9	9.2	9.7	12.6	13.3
	Stratford *	8.8	9.2	12	12.6	7.2	7.6	10.4	10.9	5.5	5.9	8.8	9.4
	Westport *	10.4	10.9	15	15.7	8.9	9.4	13.4	14.1	7.3	7.8	12.1	12.7
Middlesex County	Chester	3.9	4.4	4.5	5	3.4	3.9	4	4.5	3	3.4	3.6	4.1
	Clinton *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	Deep River	4	4.4	4.5	5	3.5	3.9	4	4.5	2.9	3.4	3.5	4
	Essex	4	4.5	4.6	5.1	3.5	4	4	4.5	3	3.4	3.5	4
	Old Saybrook	12.5	13.4	12.8	13.7	10.8	11.7	11.1	12	9.2	10.1	9.5	10.4
	Westbrook *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9

## 6.0 Transportation Analysis



Table 134: Multi-State Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Scenario A		Scenario B		Scenario A		Scenario B		Scenario A		Scenario B	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
New Haven County	Branford *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	East Haven *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	Guilford *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	Hamden *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	Madison *	8.9	9.2	11.3	11.7	7.4	7.8	9.8	10.2	5.9	6.3	8.4	8.9
	Milford	7.3	7.7	9.1	9.7	6.9	7.4	8.7	9.3	6.8	7.3	8.7	9.3
	New Haven *	8.9	9.2	11.5	12.1	7.5	7.9	10.5	11	6.5	6.9	9.6	10.2
	North Haven *	8.5	8.9	11.5	12.1	7.5	7.9	10.5	11	6.5	6.9	9.6	10.2
	West Haven *	9.6	10	13.3	11	7	7.4	9.4	9.8	5.9	6.2	8.4	8.8
New London County	East Lyme	9.2	9.8	9.7	10.4	7.9	8.5	8.4	9	6.6	7.2	7.1	7.8
	Groton	6.1	6.4	6.8	7.2	5.2	5.5	5.9	6.2	4.2	4.5	4.9	5.3
	Ledyard *	7.8	8.4	9.8	10.5	6.7	7.3	8.7	9.3	5.5	6.2	7.6	8.3
	Lyme	3.9	4.4	4.5	5	3.4	3.9	4	4.5	3	3.4	3.6	4.1
	Montville *	7.8	8.4	9.8	10.5	6.7	7.3	8.7	9.3	5.5	6.2	7.6	8.3
	New London	7	7.2	8	8.2	6.1	6.3	7.1	7.3	5.2	5.5	6.3	6.5
	Old Lyme *	5.3	5.5	5.9	6.2	4.3	4.5	4.9	5.2	3.2	3.5	3.8	4.2
	Preston	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Stonington	8.8	9.8	9.5	10.5	8.1	9.1	8.8	9.9	7.7	8.8	8.5	9.6
Waterford	6.9	6.9	7.1	7.1	5.9	6	6.1	6.1	4.9	5	5.1	5.2	

\* When evacuating with simultaneous evacuations in New York.



## 6.0 Transportation Analysis

### 6.9.2 Rhode Island Multi-State Evacuation Clearance Times

Table 135: Multi-State Evacuation Clearance Times (in hours)

County	Town	SLOW Response						MEDIUM Response						RAPID Response					
		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C		Scenario A		Scenario B		Scenario C	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Bristol County	Barrington	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Bristol	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Warren	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
Kent County	East Greenwich *	7.2	7.4	7.6	7.9			5.5	5.8	5.9	6.3			3.7	4	4.1	4.5		
	Warwick	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9		
Newport County	Jamestown *	7.2	7.4	7.6	7.9			5.5	5.8	5.9	6.3			3.7	4	4.1	4.5		
	Little Compton	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Middletown *	7.2	7.4	7.6	7.9			5.5	5.8	5.9	6.3			3.7	4	4.1	4.5		
	Newport *	7.2	7.4	7.6	7.9			5.5	5.8	5.9	6.3			3.7	4	4.1	4.5		
	Portsmouth	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
	Tiverton	14.6	15.4	17.1	18.1			13	13.8	15.5	16.4			11.6	12.5	14.2	15.2		
Providence County	Cranston *	7.5	7.7	8.1	8.4	8.2	8.6	5.7	6	6.3	6.7	6.4	6.8	3.8	4.1	4.4	4.8	4.5	4.9
	East Providence	4.1	4.1	4.4	4.5			3.2	3.3	3.6	3.7			2.3	2.4	2.7	2.7		
	Pawtucket *	4.1	4.3	4.6	4.7	4.6	4.8	3.2	3.3	3.6	3.8	3.7	3.9	2.2	2.3	2.6	2.8	2.7	2.9
	Providence *	7.5	7.7	8.1	8.4	8.2	8.6	5.7	6	6.3	6.7	6.4	6.8	3.8	4.1	4.4	4.8	4.5	4.9
Washington County	Charlestown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9	8.9	9.1
	Narragansett	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9	8.9	9.1
	North Kingstown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9	8.9	9.1
	South Kingstown	8.9	9.1	9.3	9.4			7.2	7.4	7.5	7.7			5.3	5.5	5.7	5.9	8.9	9.1
	Westerly *	6.9	7.4	7.6	8.2			5.5	6	6.2	6.9			4.1	4.6	4.8	5.5	6.9	7.4

\* When evacuating with simultaneous evacuations in Connecticut and New York.



## 6.0 Transportation Analysis

### 6.9.3 Massachusetts Multi-State Evacuation Clearance Times

**Table 136:** Multi-State Evacuation Clearance Times (in hours)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
Barnstable	Barnstable	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Bourne	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Brewster	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Chatham	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Dennis	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Eastham	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Falmouth	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Harwich	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Mashpee	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Orleans	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Provincetown	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
	Sandwich	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
	Truro	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1
Wellfleet	21.4	24.1	20.1	33.8	12.2	22.1	18.1	31.7	11.7	22.0	17.8	32.1	
Yarmouth	12.1	16.7	15.5	23.3	10.6	15.2	12.7	18.4	9.3	14.1	11.5	17.4	
Bristol	Acushnet	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Berkley	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Dartmouth	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Dighton	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Fairhaven	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Fall River	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Freetown	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9





## 6.0 Transportation Analysis

Table 136: Multi-State Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Bristol</b> (continued)	New Bedford	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Raynham	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Rehoboth	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Seekonk	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Somerset	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Swansea	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Taunton	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Westport	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
<b>Dukes</b>	Aquinnah	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Chilmark	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Edgartown	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Oak Bluffs	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	Tisbury	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
	West Tisbury	8.7	11.3	11.5	15.5	7.9	10.5	10.7	14.6	7.3	10.0	10.2	14.3
<b>Essex</b>	Beverly	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Danvers	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Essex	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Gloucester	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Ipswich	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Lynn	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
	Manchester	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Marblehead	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8



## 6.0 Transportation Analysis

**Table 136:** Multi-State Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Essex</b> (continued)	Nahant	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
	Newbury *	10.3	12.0	12.6	15.0	8.9	10.6	11.1	13.5	7.5	9.3	9.9	12.4
	Newburyport *	10.3	12.0	12.6	15.0	8.9	10.6	11.1	13.5	7.5	9.3	9.9	12.4
	Peabody	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Rockport	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Rowley *	10.3	12.0	12.6	15.0	8.9	10.6	11.1	13.5	7.5	9.3	9.9	12.4
	Salem	12.6	13.2	15.0	15.9	10.9	11.5	13.4	14.2	9.3	9.9	11.9	12.8
	Salisbury *	10.3	12.0	12.6	15.0	8.9	10.6	11.1	13.5	7.5	9.3	9.9	12.4
	Saugus	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
	Swampscott	11.3	11.5	13.5	13.7	10.0	10.1	12.1	12.3	8.7	8.9	11.0	11.2
<b>Middlesex</b>	Arlington *	4.3	4.5	4.9	5.2	3.6	3.8	4.2	4.5	2.9	3.1	3.5	3.8
	Belmont *	4.3	4.5	4.9	5.2	3.6	3.8	4.2	4.5	2.9	3.1	3.5	3.8
	Everett	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Malden *	10.8	11.1	12.5	13.0	9.1	9.5	10.9	11.4	7.5	7.9	9.3	9.8
	Medford	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Newton *	9.4	9.9	11.1	11.8	8.0	8.5	9.7	10.4	6.7	7.3	8.5	9.2
	Somerville	16.7	17.3	17.3	18.0	15.7	16.3	16.3	17.0	15.3	16.0	16.0	16.7
	Waltham *	9.4	9.9	11.1	11.8	8.0	8.5	9.7	10.4	6.7	7.3	8.5	9.2
	Watertown *	9.4	9.9	11.1	11.8	8.0	8.5	9.7	10.4	6.7	7.3	8.5	9.2
Winchester *	10.8	11.1	12.5	13.0	9.1	9.5	10.9	11.4	7.5	7.9	9.3	9.8	



## 6.0 Transportation Analysis

Table 136: Multi-State Evacuation Clearance Times (in hours) (continued)

County	Town	SLOW Response				MEDIUM Response				RAPID Response			
		Category 1-2		Category 3-4		Category 1-2		Category 3-4		Category 1-2		Category 3-4	
		Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Nantucket</b>	Nantucket	10.6	16.4	15.5	23.3	9.6	15.4	14.5	22.3	8.9	14.9	14.0	22.1
<b>Norfolk</b>	Braintree	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
	Brookline	9.0	9.3	11.3	11.7	7.7	8.0	9.9	10.3	6.3	6.6	8.7	9.1
	Cohasset	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
	Milton	6.7	6.7	10.9	11.4	5.0	5.0	9.1	9.6	3.0	3.0	7.3	7.8
	Quincy	17.2	18.1	20.3	21.3	16.2	17.1	19.2	20.2	15.7	16.7	18.9	20.0
	Weymouth	10.8	14.1	14.3	18.7	9.3	12.6	12.8	17.2	7.9	11.3	11.5	16.1
<b>Plymouth</b>	Duxbury	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Hingham	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Hull	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Kingston	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Marion	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Marshfield	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Mattapoisett	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Plymouth	14.2	19.9	19.7	27.5	12.9	18.6	18.3	26.1	11.8	17.8	17.6	25.7
	Rochester	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
	Scituate	10.7	16.5	15.9	23.9	9.9	15.6	15.1	23.0	9.3	15.3	14.8	23.0
	Wareham	8.6	9.8	10.6	12.4	7.3	8.5	9.3	11.1	6.0	7.3	8.1	9.9
<b>Suffolk</b>	Chelsea	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Revere	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9
	Winthrop	13.6	13.9	16.5	17.0	12.7	13.1	15.6	16.1	12.3	12.7	15.4	15.9

\* When evacuating with simultaneous evacuations in New Hampshire and Maine.



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Table 136: Multi-State Evacuation Clearance Times (in hours) (continued)

Suffolk County	SLOW Response						MEDIUM Response						RAPID Response					
	Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane		Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane		Cat 1 (next to worst case) Hurricane		Cat 1 (worst case) & Cat 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 Hurricane	
	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Boston</b>	8.5	8.6	10.9	11.4	12.9	13.5	7.3	7.4	9.1	9.6	12.2	12.7	6.1	6.2	7.3	7.8	11.9	12.4

Middlesex County	SLOW Response						MEDIUM Response						RAPID Response					
	Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane		Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane		Cat 1 & 2 (not worst case) Hurricane		Cat 2 (worst case) & Cat 3 & 4 (not worst case) Hurricane		Cat 3 & 4 (worst case) Hurricane	
	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.	Low Tour Occ.	High Tour Occ.
<b>Cambridge</b>	5.1	5.5	16.7	17.3	17.3	18.0	4.2	4.6	15.7	16.3	16.3	17.0	3.3	3.7	15.3	16.0	16.0	16.7

## 6.0 Transportation Analysis

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### 6.10 Transportation Analysis and Evacuation Summary

Except for the situation on Cape Cod, generally the region-wide evacuation clearance times are reasonably manageable; that is to say most towns will be able to complete their evacuations within the execution time provided by a Hurricane Warning from the NHC. This statement even holds true when multi-state evacuations are considered. Simultaneous evacuations from New York, New Hampshire and Maine, although having a measurable impact on overall clearance times, do not negate the above statement.

As mentioned, the only outlier to the above assertion is Cape Cod. Given the large at-risk population in Barnstable County, especially during summer months when large numbers of tourists join the fray, the evacuation situation for getting off the Cape should come as no surprise. Of particular concern regarding a Cape Cod evacuation is not the expected congestion at the Bourne and Sagamore Bridges, but rather the much more acute clearance times further east in the town of Harwich. There, US 6 is only a two-lane facility that becomes overwhelmed with evacuation travel demand, especially in Response Scenario B (cat 3 and 4 event) during high tourist occupancy periods. Clearance times in that vicinity during the very worst case scenario are just under 34 hours, a daunting figure for any area in the United States.

Fortunately, there are remedies for this situation, as well as any other potential bottlenecks identified in this report for the three study states. There are general solutions that address all aspects of the evacuation and sheltering situation, and also more specific recommendations that pertain to each state alone. Listed below are the general and specialized measure that can be undertaken to ease the flow of traffic, lessen congestion and generally improve the evacuation situation in the region.

#### 6.10.1 Region-wide and General Evacuation Recommendations

Below are the comments and recommendations that pertain generally to all three states:

- Given the very high percentages of non-mobile home, inland residents who indicated that they would evacuate in the 2013 Behavioral Analysis commissioned by the USACE in all three states, it is imperative that public information before and during the disaster specifically address who should not evacuate, as well as who should. These inland residents who are electing to leave their homes could be the largest component of the evacuating population in most jurisdictions, regardless of storm intensity.
- Where the state and local jurisdictions have sufficient personnel resources, officers should be stationed at critical intersections to facilitate traffic flow, especially at those locations listed in Tables 127 through 129. Where intersections will continue to have signalized control, signal patterns should provide the most “green time” for any evacuation route, especially those corridors that lead inland, perpendicularly away from the coast.

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- If possible, arrangements should be made with tow truck operators and roving incident management teams so that they are prepositioned along key travel corridors and critical roadway facilities such as bridges.
- The state, counties, and the city should jointly work on a statewide evacuation and shelter monitoring system which would monitor travel flow at key locations and report traffic tie ups/ shelter availability to the general public as they evacuate. This should include the installation of strategically placed permanent traffic counters that could detect speed and volumes.
- High level bridges need to be monitored for the early arrival of sustained tropical storm winds. High profile vehicles such as recreational vehicles (RVs), trucks and buses could be adversely affected before the evacuation at ground level is completed or terminated.

### 6.10.2 Connecticut Specific Evacuation Recommendations

- All draw/swing bridges needed for evacuation should be locked in the “down” position during a hurricane warning, if possible. The following bridges have the potential to exacerbate traffic congestion on all adjacent evacuation routes if allowed to open while an evacuation is underway:
  - US 1/Main St bridge over the Mystic R. (ATH and ATI);
  - CT 156/W. Main/Rope Ferry Rd bridge over the Niantic R. (BE and BVF);
  - US 1/Forbes Ave bridge in New Haven (APX);
  - US 1/Burnham Ave Cutoff/Bridgeport Ave in Milford/Stamford (AOY and AOZ);
  - CT 130/Stratford Ave bridge in Bridgeport (BIL);
  - Other CT 130/Stratford Ave bridge in Bridgeport (BIK); and
  - Washington St Bridge in Norwalk (BGD).

Boat owners must be made aware of flotilla plans and time requirements beforehand so that they prepare their vessels for departure, or secure them at the marinas and docks.

- Some railroad crossings directly cross evacuation roadways and could complicate evacuations if long trains cause major delays on evacuation routes. Coordinate with CT Department of Transportation to establish when train schedules may interfere with crossing traffic during evacuation periods. The following evacuation route segments which are all included in the transportation model have railroad crossings that could be an impediment to evacuation traffic:
  - US 1/Cross St (AMW) in Norwalk (Danbury Branch);
  - New Canaan Ave (BGV) in Norwalk (Danbury Branch);
  - CT 113 Lordship Blvd (BIY) in Stratford (Stratford Industrial Spur);
  - CT 130/Stratford Ave (BIP) in Stratford (Stratford Industrial Spur);
  - CT 146/Stony Creek Rd (BQP) in Branford (Branford Steam RR Line);

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- CT 153/Plains Rd (BTS) in Essex (Valley Line); and
  - CT 154/CT 602/Main St (BTD) in Essex (Valley Line).
- The implementation of more robust ITS measures in more states and urban jurisdictions makes effective coordinated communication among all response agencies responsible for evacuations all the more important. The Department of Transportation Traffic Operations Centers (e.g., Newington, Bridgeport and New London, etc.), Emergency Management EOCs, Law Enforcement Command Posts (CPs) and American Red Cross (ARC) Chapters should all be communicating and sharing data to ensure that all aspects of implementing evacuation operations from decision making to traffic management to sheltering are coordinated. Furthermore, it will be imperative for inland towns to know what level of evacuation may be coming their way and when it will start.

### 6.10.3 Rhode Island Specific Evacuation Recommendations

- Almost all of the critical links identified in Table 128 above, or are inside storm tide inundation/evacuation zones. This increases the likelihood that vehicles could be stranded in hazardous areas if not allowed to clear that bottleneck before the arrival of tropical storm force winds. Law enforcement assets in addition to ITS measures must be emplaced at these locations during evacuations to ensure continuous monitoring and efficient emergency response of these locations.
- Coordinate with Providence and Worcester Railroad to coordinate train schedules for the spur that runs south to north through Pawtucket and East Providence from Phillipsdale to the Valley Falls. That spur crosses six evacuation roadway segments including: RI 114 / Pawtucket Ave (BVE); RI 15 / Armistice Blvd (AZF); Central Ave (BWL); Roosevelt Ave (BWM); US 1 / Broadway (AIR); and Fountain St/ Roosevelt Ave (BWO). Although none of these segments are considered critical according to the tables above, trains impacting these evacuation routes may have cascading effects that can propagate to other more vital roadway corridors or segments.

### 6.10.4 Massachusetts Specific Evacuation Recommendations

- All draw/swing bridges needed for evacuation should be locked in the “down” position during a hurricane warning, if possible. The following bridges have the potential to exacerbate traffic congestion on all adjacent evacuation routes if allowed to open while an evacuation is underway:
  - US 1/MA 1A bridge over the Merrimac R. (AUA and AUB);
  - MA 107 bridge over the Saugus R. (EAS);
  - MA 1A/Gen. Edwards Bridge (BER);
  - MA 28/Charles River Dam Bridge (BOK);
  - Chelsea St Bridge (DHK);

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- Andrew McArdle Bridge (DHL and DHM);
- MA 99/Alford St bridge (DGI);
- Granite Ave bridge over the Neponset R. (DAZ);
- MA 3A/Washington St bridge over the Weymouth Fore R. (BIO);
- US 6 bridge over the Acushnet R. (AZK); and
- US 6 bridge over the Taunton R. (BAL).

Boat owners must be made aware of flotilla plans and time requirements for securing vessels.

- Coordinate with CSX, Pan American (PA), Massachusetts Coastal (MC), AmTrak and Metropolitan Boston Transit Authority (MBTA) to coordinate train schedules. Some railroad crossings are directly across the roadway and could complicate evacuations if long trains cause major delays on evacuation routes. The following evacuation route segments are all included in the transportation model that have railroad crossings that could be an impediment to evacuation traffic:
  - Hannover St (DYM) in Newbury (MBTA);
  - Topsfield Rd (DXU) in Ipswich (PA and MBTA);
  - MA 1A/Cabot St (BEB) in Beverly (PA and MBTA);
  - MA 62/Elliot St (DVV) in Beverly (PA and MBTA);
  - Eastern Ave (DPY) in Chelsea (PA and MBTA);
  - Everett Ave (DQP) in Everett (PA and MBTA);
  - Second St (DOZ) in Everett (PA and MBTA);
  - Cambridge St (DIB) in Cambridge (CSX);
  - Broadway (DII) in Cambridge (CSX);
  - Main St (DIO) in Cambridge (CSX);
  - First Parish Rd (CUK) in Scituate (MBTA);
  - Beaver Dam Rd (CUL) in Scituate (MBTA);
  - Gannett Rd (CUN) in Scituate (MBTA);
  - King St (CUY) in Cohasset (MBTA);
  - N. Main St (CUR) in Cohasset (MBTA);
  - MA 228 Hull St (CVC) in Hingham (MBTA);
  - Kilby St (CVK) in Hingham (MBTA);
  - Water St (CVP) in Hingham (MBTA);
  - Commercial St (CVW) in Weymouth (MBTA);
  - Willow St (CLG) in Yarmouth (MC);
  - Hyannis Barnstable Rd (CMP) in Barnstable (MC);
  - MA 149/Meetinghouse Way (CNP) in Barnstable (MC); and
  - Barlow's Landing Rd (CQR) in Borne (MC).



## 6.0 Transportation Analysis

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- Upon the Governor’s signing of an emergency declaration in response to an approaching hurricane and subsequent evacuation all tolls should be lifted to expedite travel away from the coast and inland. Some evacuees may be dissuaded from using viable roadways because of tolls or the perception of long lines at toll plazas. In addition the toll plazas will constitute a traffic impediment, especially for those that do not have Fast Lane. Among the roadways with tolls that should be lifted are:
  - The Massachusetts Turnpike (at least to I-495);
  - The Sumner Tunnel (since the toll is collected only for Boston-bound traffic);
  - The Ted Williams Tunnel (like the Sumner Tunnel); and
  - The Tobin Memorial Bridge.
- The implementation of more robust ITS measures in more states and urban jurisdictions makes effective coordinated communication among all response agencies responsible for evacuations all the more important. The Department of Transportation Traffic Management Centers (TMCs), Emergency Management EOCs, Law Enforcement Command Posts (CPs) and American Red Cross (ARC) Chapters should all be communicating and sharing data to ensure that all aspects of implementing evacuation operations from decision making to traffic management to sheltering are coordinated. Furthermore, it will be imperative for inland towns to know what level of evacuation may be coming their way and when it will start.
- Consider the development and implementation measures necessary to reverse lane US 6 from the MA 6 A interchange in Orleans to the MA 134 interchange in Dennis during a Scenario B evacuation. The reverse lane would be reserved for traffic entering the operation at the beginning terminus (US 6A interchange), with traffic from the MA 137 and MA 124 interchanges only allowed to get on US 6 in the normal travel lanes. The reverse lane could be transitioned to the normal lanes at the ending terminus with the construction of a paved crossover. This operation would be relatively easy to implement, especially with the prepositioning of required maintenance of traffic (MOT) and other equipment, and would enhance the conveyance of vehicles through the most congested evacuation roadway segments in the state.
- Additionally, more vehicles from the towns of eastern Cape Cod could be diverted to MA 6A, even if their intended route is US 6. The vehicles shunted to this alternate roadway could be allowed to enter onto US 6 at the MA 134 and Willow St interchange in Dennis. This measure would bypass the same very congested roadway portion of US 6 from Orleans through Harwich and Dennis, with the vehicles from MA 6A entering US 6 after the roadway has widened to a four lane facility.