RHODE ISLAND HURRICANE EVACUATION STUDY

TRANSPORTATION ANALYSIS SUPPORT DOCUMENTATION

April, 1995

Prepared For:

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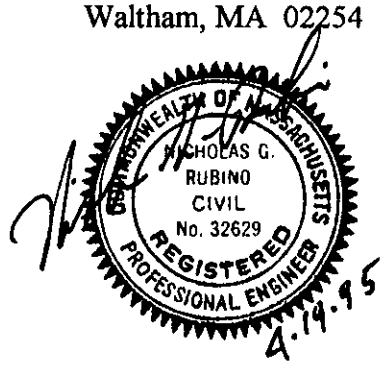

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SECTION ONE

INTRODUCTION

1.1 PURPOSE

The purpose of the Transportation Analysis is to estimate roadway clearance times for coastal Rhode Island communities and affected coastal communities in Bristol County, Massachusetts[1] under a variety of hurricane evacuation scenarios. Clearance time is defined as the amount of time required for all vehicles to clear the roadways after a regional or state level hurricane evacuation recommendation is disseminated to the public. During an evacuation, a large number of vehicles have to travel on a road system in a relatively short period of time. A number of different vehicle trips are possible, varying by trip origination, time of departure, and trip destination. The number of vehicle trips becomes particularly significant for an area such as Rhode Island's coast because its land areas are highly urbanized with many residents living near the immediate shore. The number of evacuating vehicles varies depending upon the intensity of the hurricane, actions taken by local authorities, and certain human behavioral response characteristics of the area's population. Motorists evacuating their homes and intermixing with traffic from people leaving work or traveling for other trip purposes can lead to significant traffic congestion and backups, ultimately delaying the evacuation.

The Transportation Analysis is one element of a much broader study entitled the Rhode Island Hurricane Evacuation Study (HES). The Rhode Island HES Technical Data Report presents the results of several technical analyses to provide emergency management officials with realistic data quantifying the major factors involved in hurricane evacuation decision-making. The technical data presented in the Study is not intended to replace the detailed operations plans developed by the State and communities. Rather, the data is intended to provide a framework within which each jurisdiction can update and revise hurricane evacuation plans and from which operation procedures and guides can be developed for future hurricane threats. Because the Transportation Analysis builds upon results from other analyses of the Study, in this report, reference is frequently made to information that is presented in the Technical Data Report (TDR).

A transportation modeling methodology and a roadway representation were developed for all coastal communities in Rhode Island and southeastern Massachusetts within the study area to conduct the analysis and estimate clearance times. This analysis establishes the clearance time portions of evacuation times. Clearance time is one component of the total time required for a regional hurricane evacuation to be completed. An additional time component, which considers the amount of time necessary for public officials to notify people to evacuate, must be combined with clearance time to determine the total evacuation time. More information on how decision-makers can use the results of this analysis is discussed in detail in Chapter Eight, Decision Analysis, of the TDR.

1.2 STUDY AREA

The study area for the Transportation Analysis includes the entire State of Rhode Island and Bristol County, Massachusetts as illustrated in Figure 1-1. Bristol County, Massachusetts is included as part of

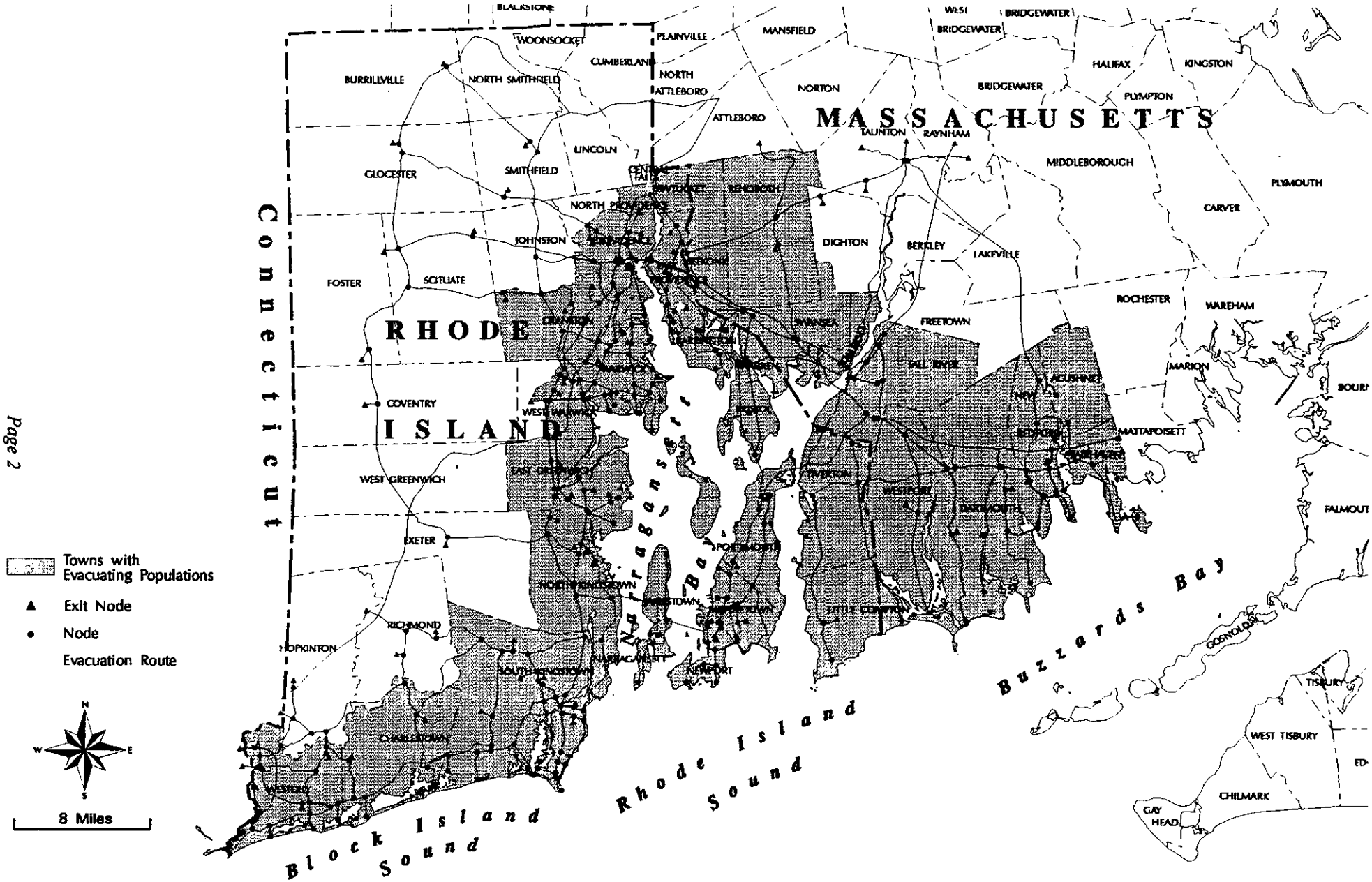

FIGURE 1-1: STUDY AREA

the Rhode Island Transportation Analysis because of the interdependence and inseparability of the eastern Rhode Island and southern Massachusetts roadway systems. The vastness of the Rhode Island and Bristol County, Massachusetts study area required that the region be divided into two approximately equal sized areas and analyzed individually. The two networks were defined as the "West Bay/Rhode Island Network" and the "East Bay/Massachusetts Network". The West Bay/Rhode Island Network extends from approximately the Connecticut-Rhode Island State Line eastward to Narragansett Bay. The East Bay/Massachusetts Network extends from approximately the Fairhaven-Mattapoisett, Massachusetts town line westward to Narragansett Bay.

The study area does not include the community of New Shoreham (Block Island) and Prudence Island. It is the intention of the community of New Shoreham and the Rhode Island Emergency Management Agency to evacuate all non-permanent residents from Block Island by ferry boat or other means possible in response to a hurricane threat. Currently, the Rhode Island Emergency Management Agency, in conjunction with the community of New Shoreham, is developing an Emergency Operations Plan which will include provisions for evacuating non-permanent residents from the Island. Shelter space will be provided on the island for permanent residents at an ARC Mass Care Facility located at the New Shoreham High School. No permanent residents live on Prudence Island.

The road system under examination includes major State maintained highways from the Connecticut state line to the Fairhaven-Mattapoisett, Massachusetts town line, extending approximately 15 miles inland from the coast. The analysis assumes evacuees originate from the various coastal communities and safe destinations include locations within coastal communities as well as locations farther inland, or in adjacent States. The Transportation Analysis was done at a state level, or macro scale, rather than at a community level because the intermixing of traffic from one community to the next was considered perhaps a leading contributor to delays in evacuations.

1.3 METHODOLOGY

The Behavioral Analysis discussed in Chapter Four of the TDR presents information about which destination types evacuees are most likely to choose during an evacuation in Rhode Island. The analysis concludes that people who evacuate surge areas are most likely to seek safe destinations at public shelters, friends'/relatives' homes, or hotels/motels. Although behavioral data provided in Chapter Four can give some guidance in predicting the actual geographic areas people will evacuate to and the evacuation routes people may use to reach their destinations, assumptions of this nature tend to be subjective. This is caused by the vast number of possible destinations and routes available to evacuees in highly populated areas. Clearance time calculations are further complicated by the affects of significant and varying amounts of "background" traffic that will be present on roadways as an evacuation progresses ("background" traffic refers to vehicle trips by people who leave work early and return home, people who travel through the region, and trips made by people preparing for the arrival of hurricane conditions or engaged in normal activities).

The study considered several approaches to estimate clearance times for the Rhode Island study area. The first approach considered was the one used by the Corps of Engineers and the FEMA to complete hurricane

evacuation studies in the Gulf and southern Atlantic coast states. This approach assigns destinations and evacuation routes for the evacuating population by matching probable evacuee destinations (determined by a behavioral analysis) with the land uses known for the region. A mathematical model of the study area's roadway system is then used to calculate clearance times based on the trip distributions assumed for the evacuation. The time required for all evacuees to reach their predetermined destination is considered the clearance time. As reported in a post-hurricane assessment of Hurricane Hugo in 1989, the transportation analyses conducted for the North Carolina and South Carolina Hurricane Evacuation Studies were found to be very accurate in that the clearance times experienced during evacuations were very near predicted times. These results give evidence that this approach is accurate for study areas with limited alternative roadway systems and where adequate behavioral data and landuse information is suitable to identify evacuation routes and predict the destinations of evacuees. The following paragraphs explain some differences in the Rhode Island study area in comparison to other areas, and give the reasons why the Corps of Engineers employed an alternative transportation modeling approach for Rhode Island and Bristol County, Massachusetts.

One concern in using the transportation modeling approach discussed above for the Rhode Island study area was the appropriateness of assuming specific zonal evacuee destinations and evacuation routes. Inundation areas in Rhode Island and Bristol County, Massachusetts are relatively narrow, but densely populated. The complex system of interconnecting freeways, undivided state routes, and numerous local streets offer evacuees, and others on the roadways, many possible travel routes to reach their destinations. The region is generally characterized by diverse land uses in small geographic areas. Hotels and motels are sporadically located in most communities, friends' and relatives' homes could well be distributed over the entire area, and Rhode Island communities tend to open public shelters to accommodate their individual demands. The Study concluded that it was not practical to use the behavioral information developed for Rhode Island and Bristol County, Massachusetts to derive specific assumptions about evacuee destinations and evacuation routes. The study did conclude that the behavioral response curves presented in the Behavioral Analysis, and used in other hurricane evacuation studies, are useful when estimating the general response and destinations sought by residents who live in surge vulnerable areas.

The second concern in using the modeling approach used in other studies was the representation of the relationship between the number of people evacuating from vulnerable areas in comparison to the number of background vehicles that would be on the roadways during evacuations. Although surge areas are densely populated, the relatively small land areas that they encompass include only a fraction of the region's total population. When viewing the region's roadways as an entire transportation system, most of the traffic on roadways during initial and mid stages of an evacuation is likely to be from people leaving work early and from daily vehicles passing through the region. The problem during evacuations is that evacuating vehicles are forced to compete for roadway capacity with a larger amount of background traffic. This can cause increased congestion, potentially delaying the overall evacuation. Because background traffic will travel in both directions on nearly all roadways during evacuations, the Study determined that the transportation methodology for Rhode Island should not focus on assuming assigned evacuation routes as has been done in other study areas. Instead, the methodology should focus on analyzing the influence that background traffic can have on the overall evacuation.

To address the unique behavioral and transportation issues of the Rhode Island study area, an alternative modeling strategy was used. A mathematical model of the road system was developed and calibrated to simulate the traffic flows of a normal week day. Empirical traffic engineering studies and local traffic count data from the State's Department of Transportation (DOT) were used to establish various existing traffic flow conditions within the study area. The transportation modeling methodology used for this study assumes that the preferences of evacuees to travel on given routes are related to the traffic patterns of a normal day, except where it is clear that evacuees will travel directly to public shelters. The large portion of vehicles associated with background traffic enables the methodology to neglect assigning specific destinations and evacuation routes to evacuees traveling to hotels/motels and friends'/relatives' homes. Large business districts and confined hurricane surge areas in most coastal communities in Rhode Island and Bristol County, Massachusetts will give rise to evacuations involving mostly traffic generated by people leaving work rather than people evacuating surge areas. Analysis of traffic data collected on the days of Hurricanes Gloria and Bob further support this assumption. Accordingly, the modeling strategy used in the Rhode Island study focuses on estimating clearance times which qualitatively measure how competition by evacuating traffic may affect, and possibly delay, the movement of all traffic during an evacuation.

1.4 NETVAC2 TRAFFIC SIMULATION SOFTWARE

The NETVAC2 evacuation simulation software was used to create a mathematical model representing the study area's road system. NETVAC2 is a special purpose, network evacuation computer model designed by the Massachusetts Institute of Technology in cooperation with HMM Associates, Incorporated (now EARTH TECH). It was specifically designed to represent traffic flows over a transportation system during an emergency evacuation. This particular model was selected from several available models because it can be easily applied to model hurricane evacuations conducted in areas with complex roadway systems such as that in coastal Rhode Island and Bristol County, Massachusetts.

NETVAC2 represents roadways as links and intersections connecting two or more roadways as nodes. Physical characteristics about representative links and nodes, and the logic connecting them are inputs to the model used in computing vehicle capacity constraints and legal turning movements. Traffic flows at nodes are subject to intersection approach capacity constraints, whereas traffic flow assignments on outbound links are subject to the volume capacities of the modeled roads. Capacities are based on the Highway Capacity Manual (Highway Research Board) and Interim Material on Highway Capacity (Transportation Research Board).

A complementary program for use with NETVAC2, entitled POPDIS, converts the population that is assigned to enter onto roadways to an equivalent number of vehicles. The user enters the vehicle occupancy rates and the number of people assigned to enter the network at each node. As many as five different population types can be specified. POPDIS aggregates the population input for each entry node and in turn computes the effective average vehicle loading rate per minute at each node.

As vehicles are modeled to move throughout the road networks, NETVAC2 utilizes dynamic programming theory to update vehicle densities, speeds, flows, queues, spillbacks and other relevant traffic information at

a fixed time step prescribed by the user. Traffic assignments from links entering and emanating nodes are made with each time step. One main feature of the model is that link assignments are made based upon the relative combinations of route preferences input for each node. The model also uses dynamic route selection such that route preferences are modified if significant backups exist at one or more emanating links. Vehicles preferring to travel on links undergoing heavy flows or large queues will be rerouted to another link of second preference. This is an important consideration when simulating hurricane evacuations because evacuees are not likely to wait in traffic for long periods of time if less restrictive, alternate routes are available to them.

Simulations terminate after vehicles exit the road system. NETVAC2 model results include computer print files of node and link time history flow and queue data, departing vehicle summaries, total simulation time, and total vehicles on the road system at specified report intervals.

SECTION TWO

MODEL DEVELOPMENT

2.1 GENERAL

The following sections discuss the coding assumptions made in applying NETVAC2 for modeling the hurricane evacuations in Rhode Island. The NETVAC2 User's Manual[2] gives specific data format instructions and a complete description of all parameters required by the model.

The Rhode Island DOT provided information for the roadway and intersection data used for model development. Roadway and intersection data was retrieved from printouts of state routes extracted from a study by Louis Berger Associates provided by the RI DOT[7]. The study contained detailed information such as the number of travel lanes and auxiliary lanes, lane widths, and intersection approach widths. The total length of each road segment was measured from a scaled map of the roadway network. Functional classification of routes and land use information are also listed. As networks were created, field surveys conducted at several locations verified that the modeling strategy and data input in the models were consistent with physical conditions.

2.2 ROAD NETWORKS

The NETVAC2 program allows networks with up to 500 links and 1000 nodes to be constructed. The vastness of the Rhode Island and Bristol County, Massachusetts study area required that the region be divided into two approximately equal sized areas and analyzed individually. The two networks were defined as the "West Bay/Rhode Island Network" and the "East Bay/Massachusetts Network". The West Bay/Rhode Island Network extends from approximately the Connecticut-Rhode Island state line eastward to Narragansett Bay. The East Bay/Massachusetts Network extends from approximately the Fairhaven-Mattapoisett, Massachusetts town line westward to Narragansett Bay. In the NETVAC2 model, roadways and intersections in the study area are represented by a link-node network as shown in Figures 2-1 through 2-9.

For each link, the actual number of lanes, lane widths, total roadway length in feet, roadway type, surrounding land use, and lateral clearances from roadside obstructions were entered into a computer link file. Values for roadway lateral clearances were input such that link capacities were not influenced by roadside obstructions except in cases where a particular link represented a highway bridge with a restrictive road shoulder. The logical turning movements from one link to the next and route preferences controlling traffic flow onto each link were also specified.

Single nodes were used to identify intersections of two or more undivided state roads, or to represent significant changes in roadway characteristics. Traffic flowing through intersections modeled using single nodes is forced to compete for the right of way with opposing traffic from other approaches. Major interchanges connecting divided and undivided highways, or connecting two undivided highways were modeled with four nodes per interchange. A greater number of nodes at these interchanges were needed to replicate non-opposing continuous traffic flow characteristic of highway on-ramps and off-ramps.

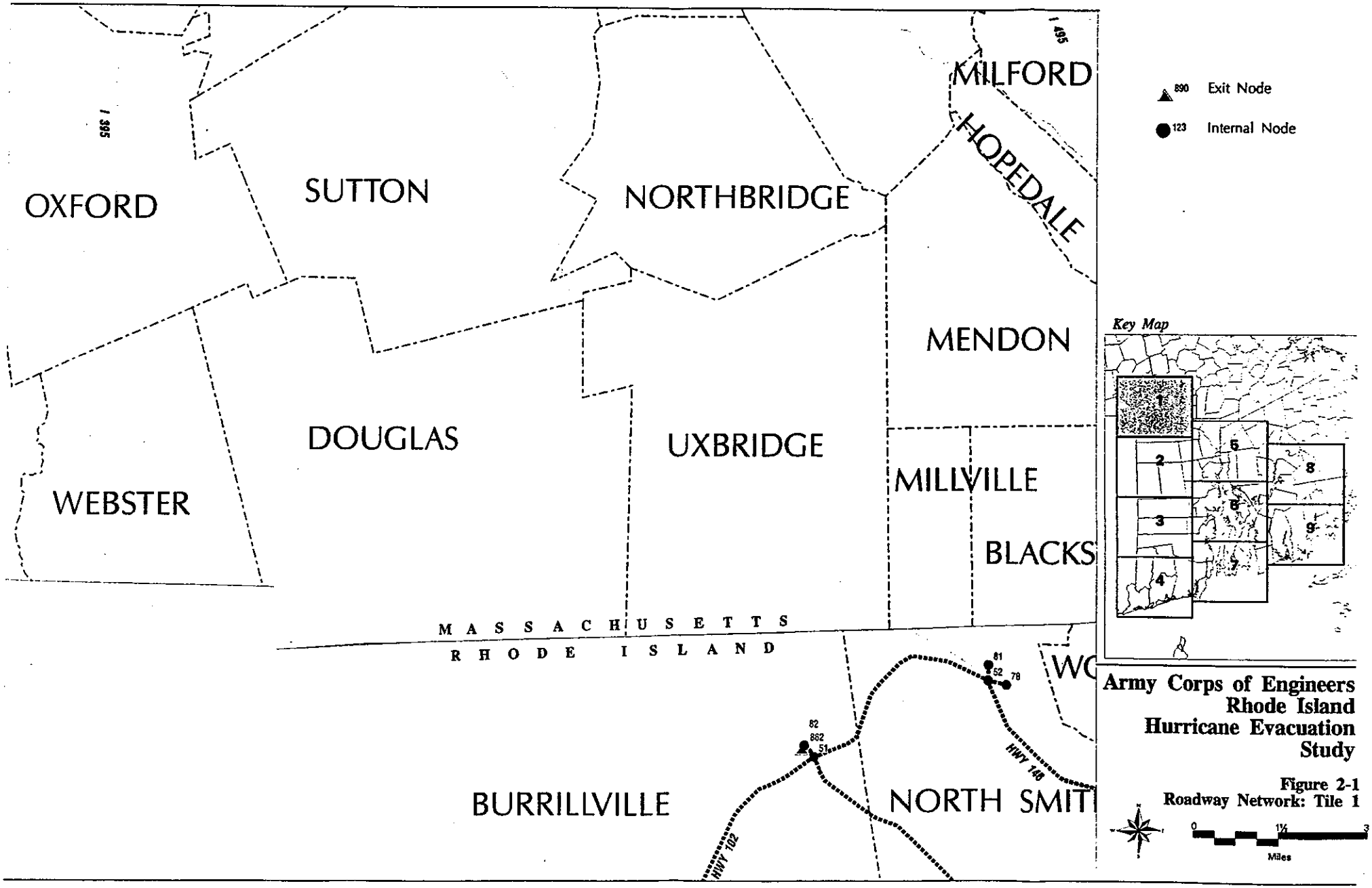

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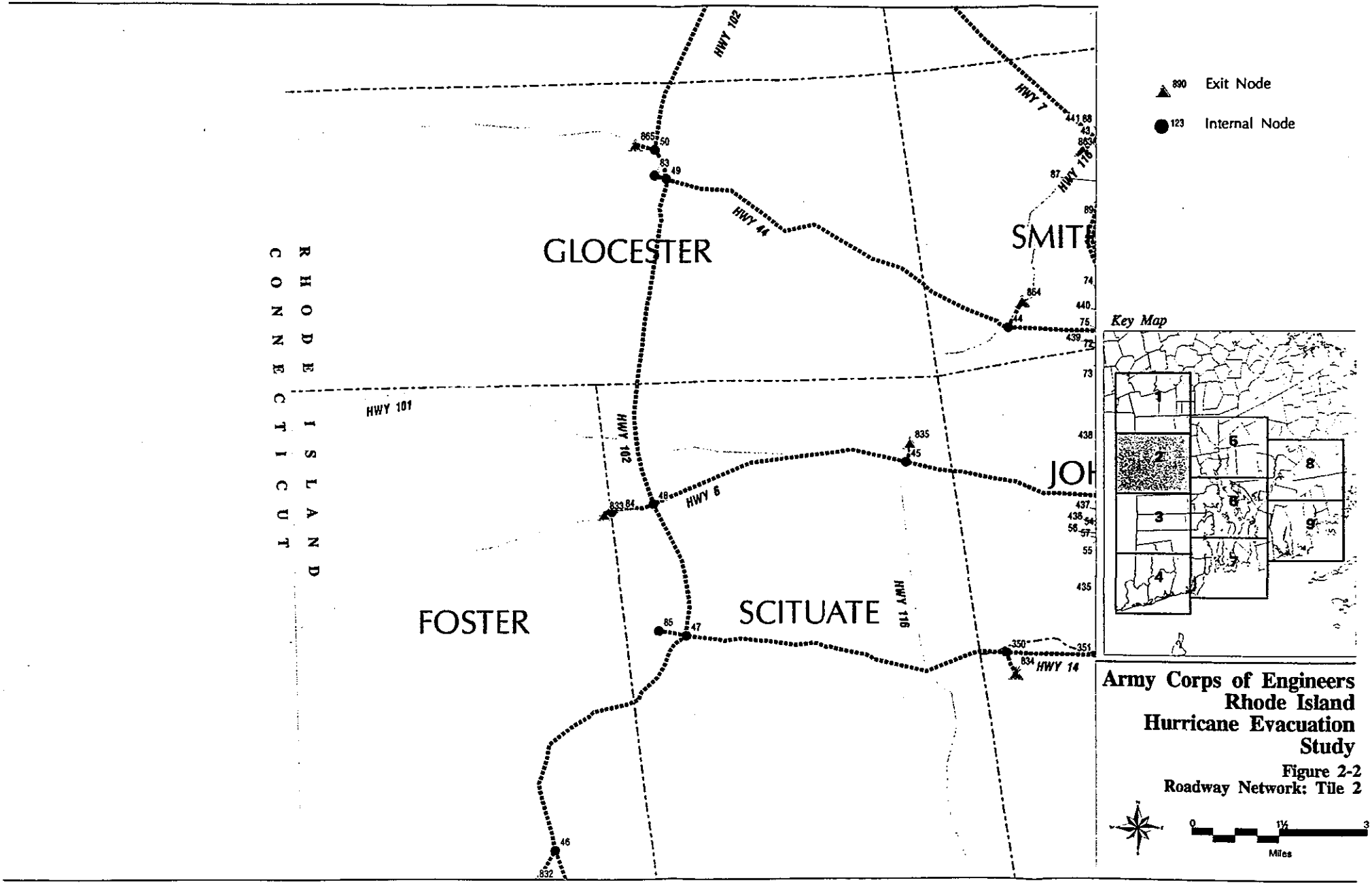
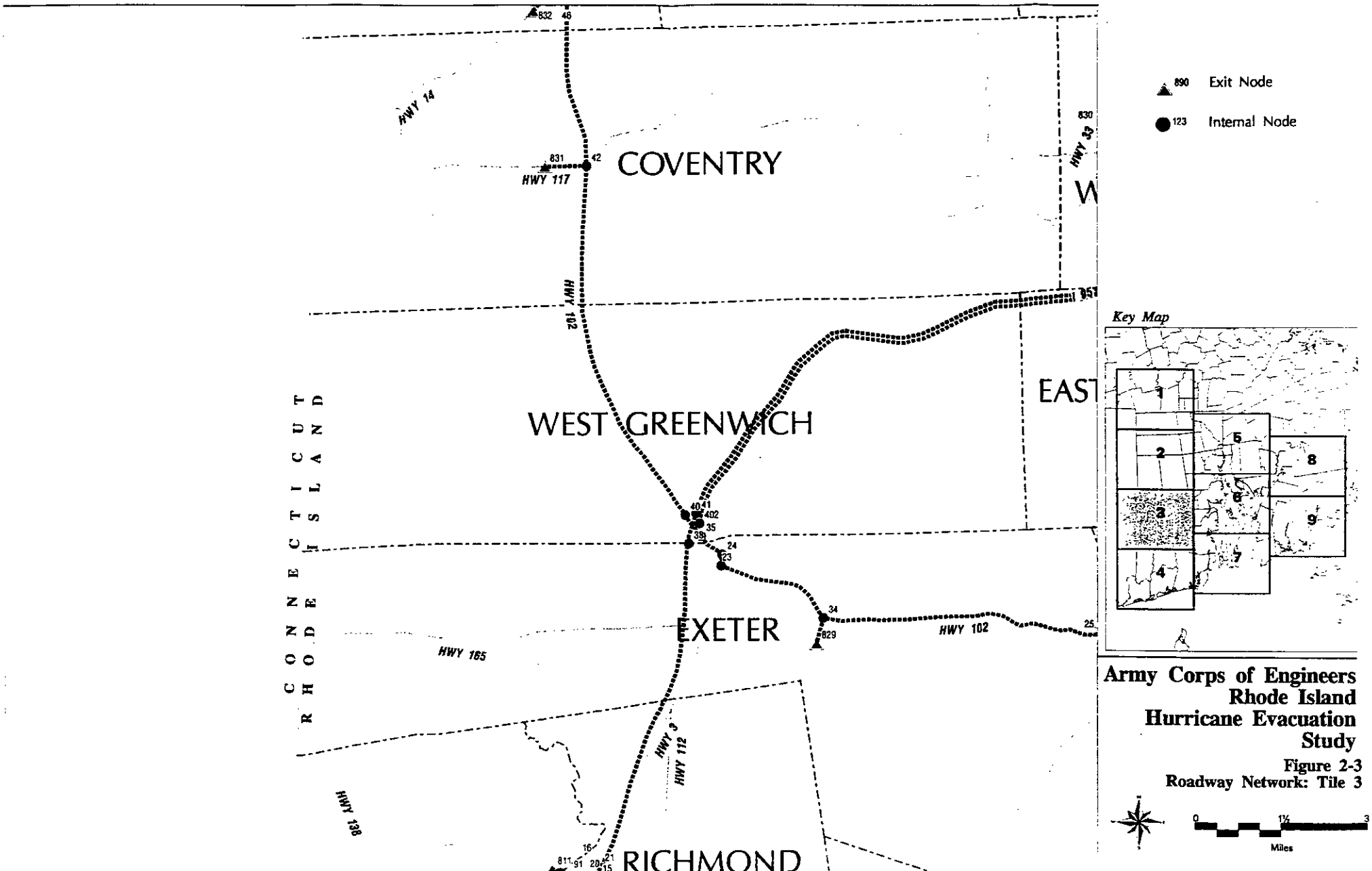
Figure 2-1
Roadway Network: Tile 1

0 1½ 3
Miles


890 Exit Node
123 Internal Node
GLOCESTER
SMITH
FOSTER
SCITUATE
JOH
HWY 102
HWY 7
HWY 44
HWY 101
HWY 6
HWY 116
HWY 14
RHODE ISLAND
CONNECTICUT
Key Map
Army Corps of Engineers
Rhode Island
Hurricane Evacuation
Study
Figure 2-2
Roadway Network: Tile 2
Miles


COVENTRY
WEST GREENWICH
EXETER
RICHMOND
EAST
CONNECTICUT
RHODE ISLAND
HWY 14
HWY 117
HWY 102
HWY 33
HWY 165
HWY 3
HWY 112
HWY 138
832
831
830
829
811
Exit Node
Internal Node
Key Map
1
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5
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Army Corps of Engineers
Rhode Island
Hurricane Evacuation
Study
Figure 2-3
Roadway Network: Tile 3
0
1½
3
Miles

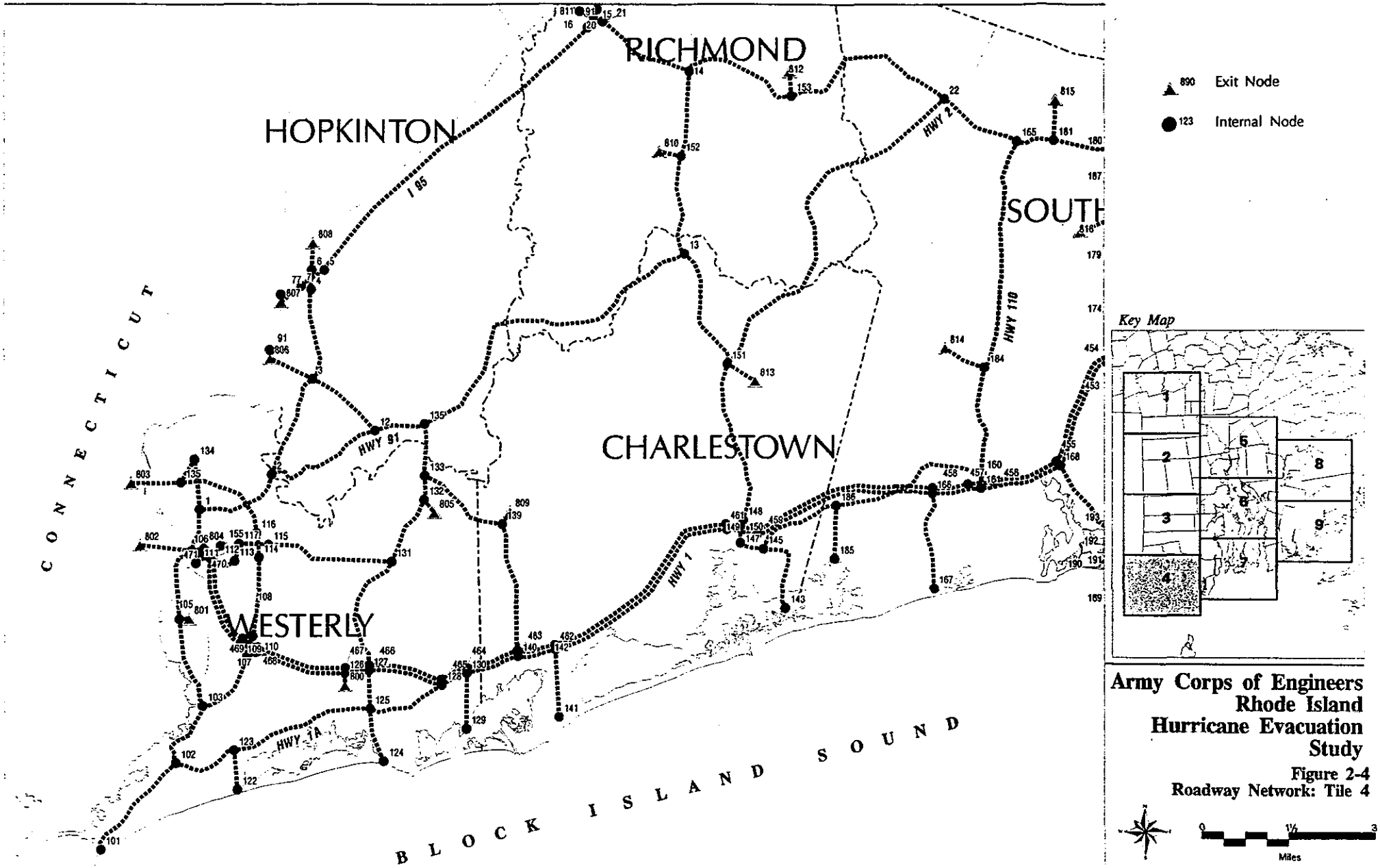

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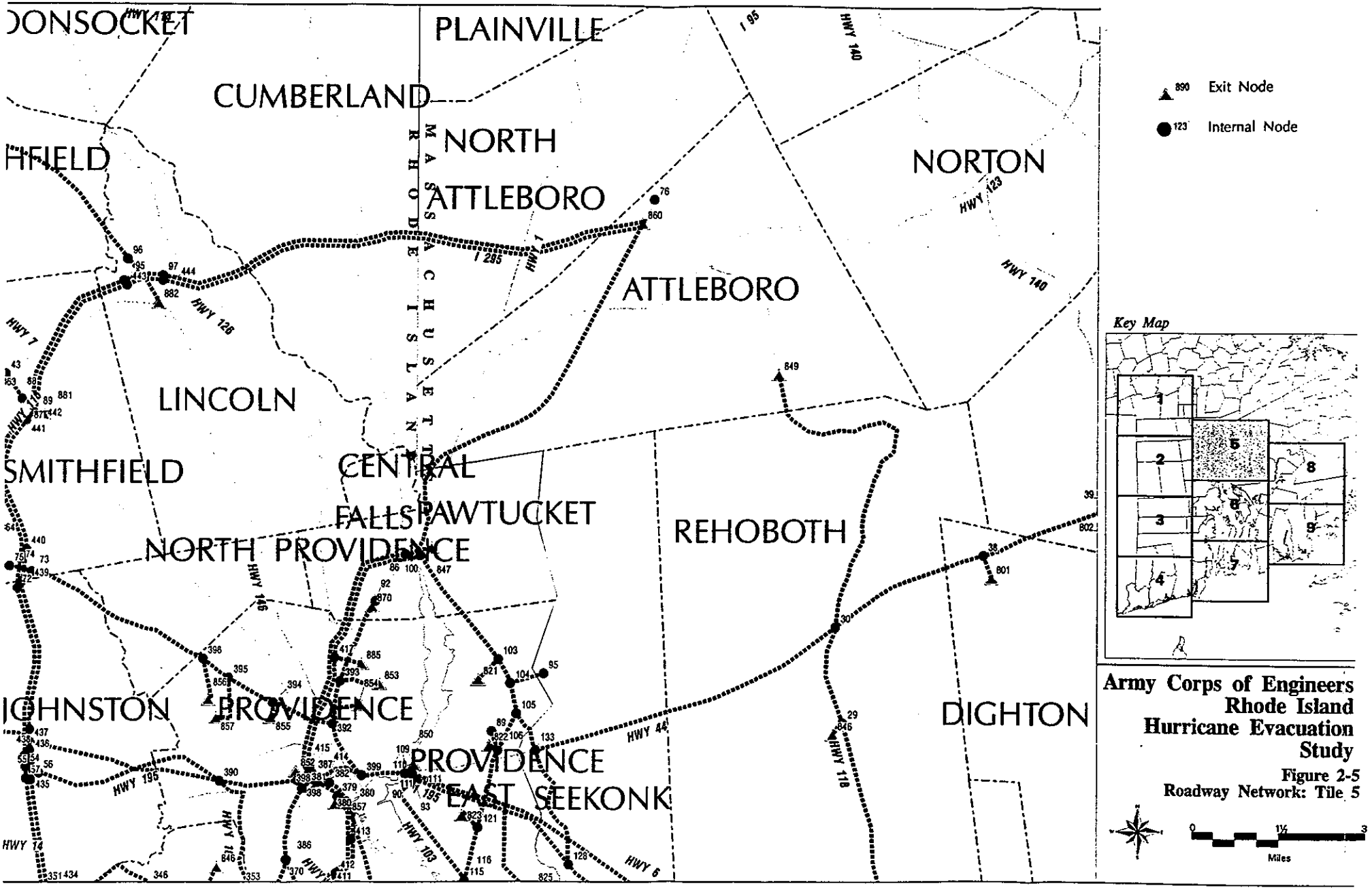
Figure 2-4
Roadway Network: Tile 4


DONSOCKET
PLAINVILLE
CUMBERLAND
NORTH ATTLEBORO
NORTON
ATTLEBORO
LINCOLN
SMITHFIELD
CENTRAL FALLS
PAWTUCKET
NORTH PROVIDENCE
REHOBOTH
JOHNSTON
PROVIDENCE
EAST SEEKONK
DIGHTON
MASSACHUSETTS
RHODE ISLAND
I 95
I 295
HWY 1
HWY 123
HWY 140
HWY 126
HWY 146
HWY 44
HWY 118
HWY 195
HWY 103
HWY 6
890 Exit Node
123 Internal Node
Key Map
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Rhode Island
Hurricane Evacuation
Study
Figure 2-5
Roadway Network: Tile 5
0
1½
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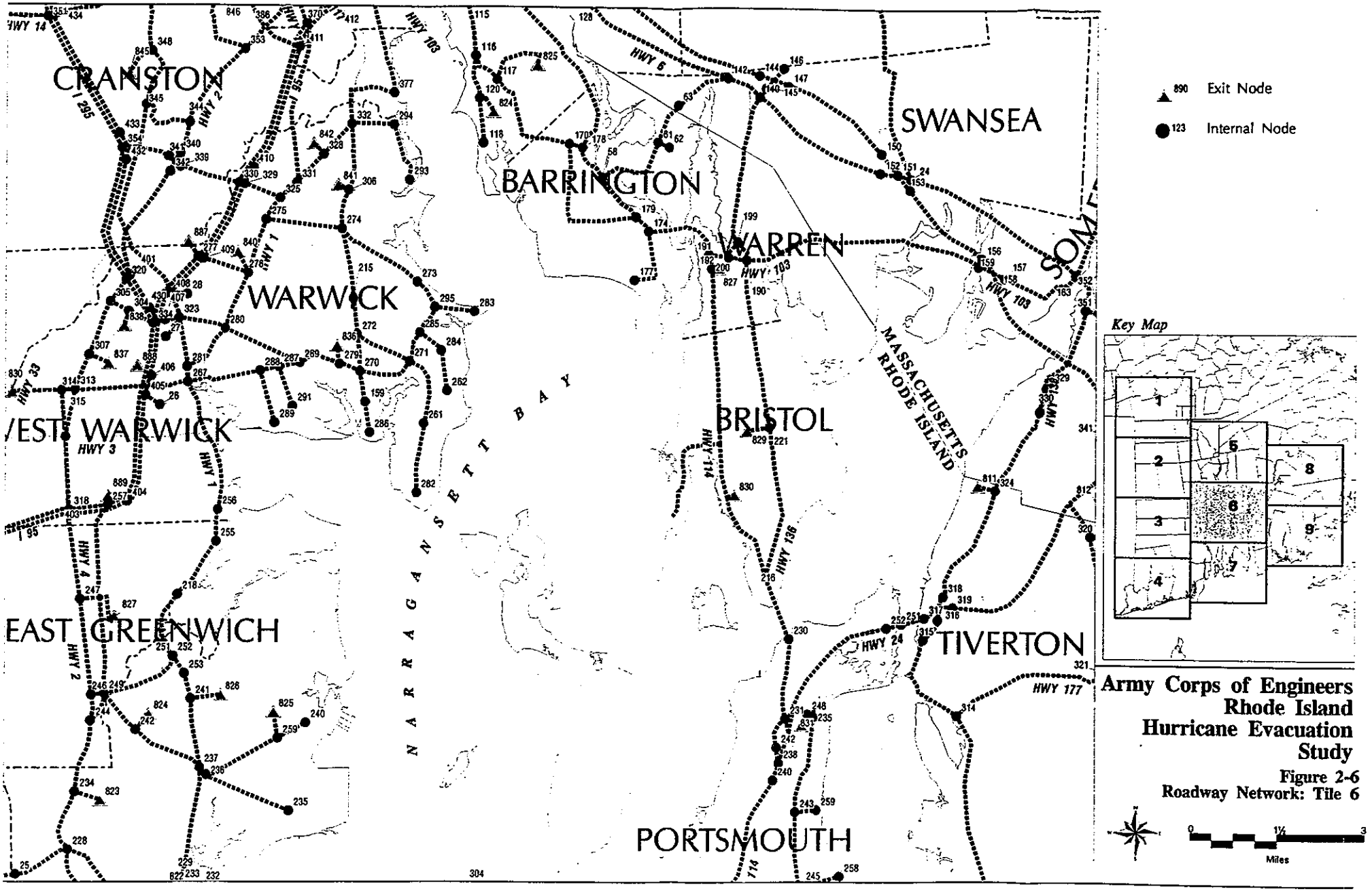
Miles


CRANSTON
WARWICK
WEST WARWICK
EAST GREENWICH
BARRINGTON
WARREN
BRISTOL
SWANSEA
TIVERTON
PORTSMOUTH
NARRAGANSETT BAY
MASSACHUSETTS
RHODE ISLAND
HWY 1
HWY 2
HWY 3
HWY 4
HWY 6
HWY 24
HWY 33
HWY 103
HWY 114
HWY 136
HWY 177
I 95
I 295
890 Exit Node
123 Internal Node
Key Map
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Army Corps of Engineers
Rhode Island
Hurricane Evacuation
Study
Figure 2-6
Roadway Network: Tile 6
0
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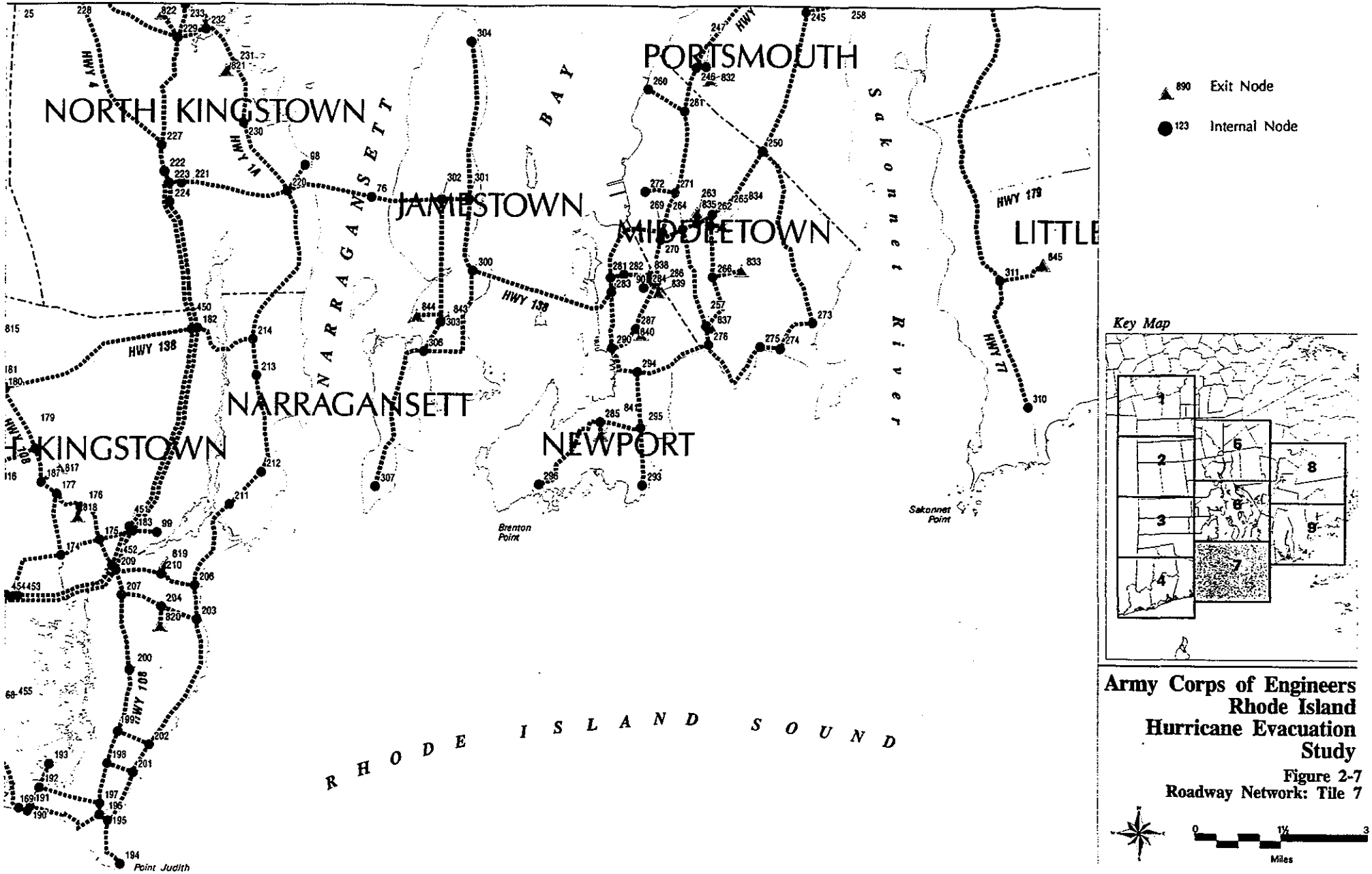
NORTH KINGSTOWN
JAMESTOWN
PORTSMOUTH
MIDDLETOWN
LITTLE
NARRAGANSETT
NEWPORT
KINGSTOWN
NARRAGANSETT BAY
Sakonnet River
HWY 4
HWY 1A
HWY 138
HWY 108
HWY 77
HWY 179
RHODE ISLAND SOUND
Brenton Point
Sakonnet Point
Point Judith
890 Exit Node
123 Internal Node
Key Map
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Army Corps of Engineers
Rhode Island
Hurricane Evacuation
Study
Figure 2-7
Roadway Network: Tile 7
0
1½
3
Miles

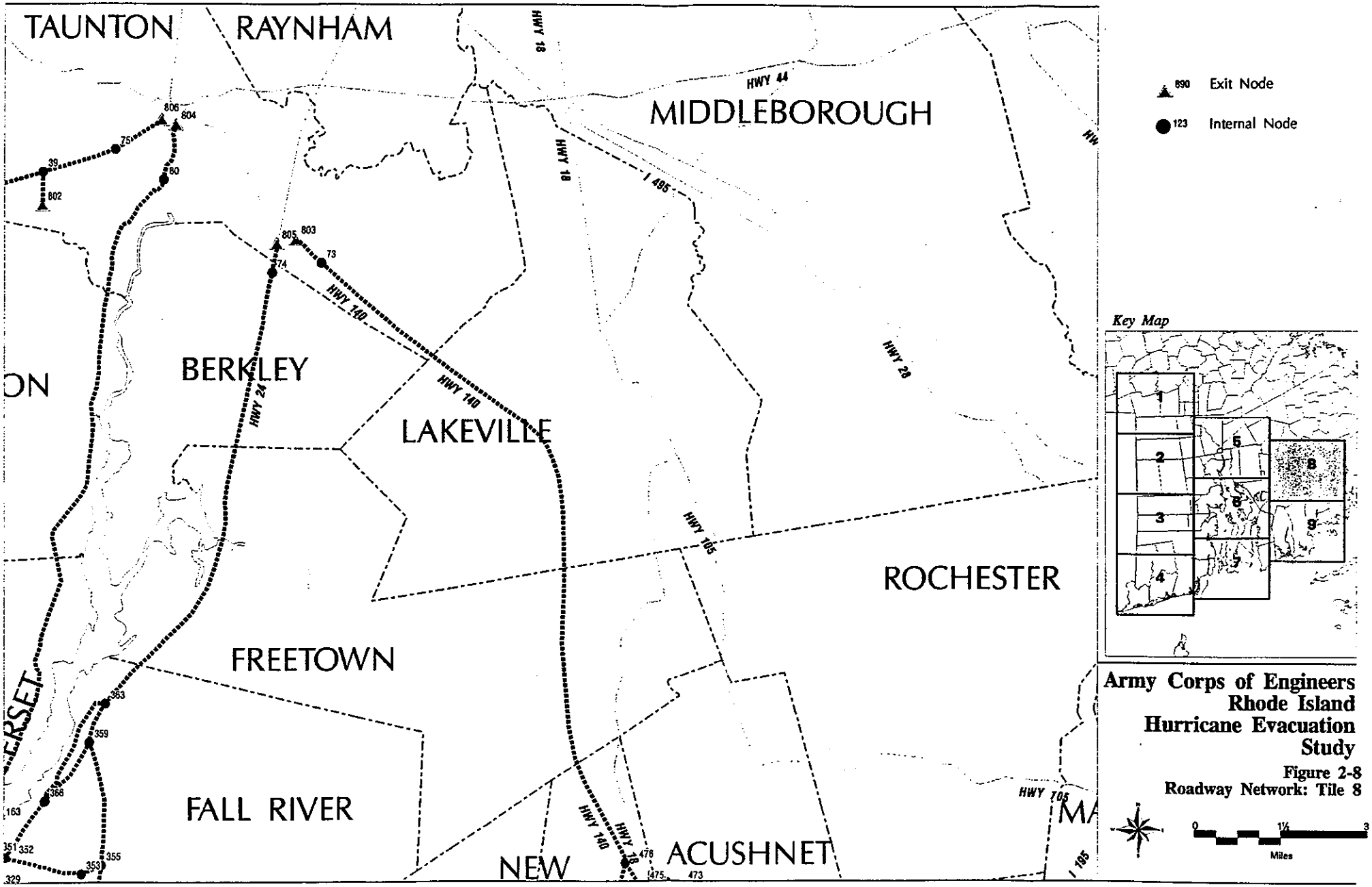

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Figure 2-8
Roadway Network: Tile 8

0 1½ 3
Miles

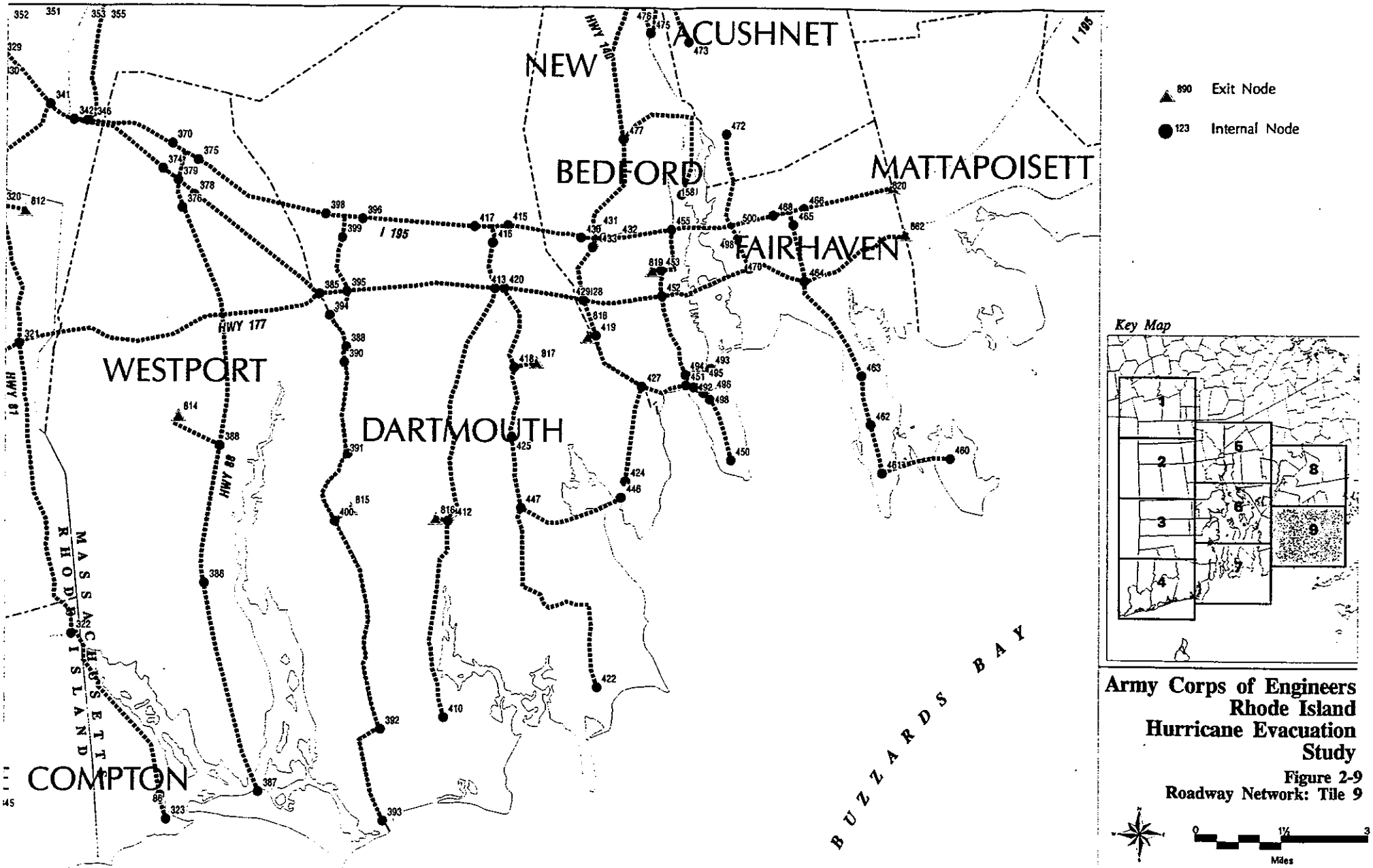

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Figure 2-9
Roadway Network: Tile 9

0 1½ 3
Miles

Because areas along the immediate coast lack direct access to state routes, evacuees leaving these areas would first travel on local streets before entering onto state routes. Therefore, areas immediately along the coast, which do not have state routes passing nearby, were provided network access by links representing local streets. The information entered for these links idealized the capacities of several local streets rather than any particular street. The majority of evacuees were programmed to enter networks from local streets extending into coastal areas. However, some evacuees were assigned to enter directly onto the networks at nodes positioned along state routes near the coast.

As a starting point, intersection approaches were all initially coded as equal priority. Coding the model in this manner assumes that at signalized intersections the green time for a particular intersection approach is directly proportional to the relative amount of traffic volume from its approach, relative to the cumulative volume of traffic from all other approaches. In turn, this forces vehicles to compete for the right of way which is typical of normal traffic conditions. Accordingly, more green time is allotted to approaches with the highest volumes.

NETVAC2 allows vehicles to exit networks at specified nodes, designated as sink nodes. Exits were created within each study area's interior to represent locations of available public shelters (locations are illustrated by the squares in Figures 2-1 through 2-9).

The following presents the rationale used to develop an estimate of the general destinations of evacuees from study area communities. The report entitled Hurricane Evacuation Behavior in the Middle Atlantic and Northeast States (HEB Report) indicated the following:

- In the northeast, 55 to 79% of the evacuating population stay within their local town.
- In the northeast, between 83 and 100% of the evacuating population reach their destination in approximately 30 minutes.
- In the northeast between 3 and 23% of the evacuating population uses public shelters.

A second source, the Federal Emergency Management Agency (FEMA), has a standard for public sheltering capacity of 20%. A third source in determining the approach for this study was the actual shelter capacities in the affected communities. It was calculated that the vulnerable communities in total have capacity to shelter approximately 50 to 60% of the total evacuating population. Based on the above, the following approach for determining which exit nodes are assigned priorities was used:

- Assign 15% of the evacuating population to exit nodes corresponding to public shelters within the community (this is slightly higher than would be expected in the northeast but in line with the FEMA 20% planning basis).
- Assign an additional 40% of the evacuating population to exit nodes within the community from which they evacuate. Many of these exit nodes will be the same location as the public shelters. This brings the total evacuating population which stays within their

community up to 55% between public shelters and other destinations (consistent with the 55-79% which stay within their town).

- Assign 25% of the evacuating population to interior exit nodes outside the affected communities but within 15 miles of the coast (corresponding to 30 minute travel time). This brings the total within 30 minutes travel time up to 80% (slightly lower than with the 83-100% anticipated in the northeast but tends to be conservative).

- Assign 20% of the evacuating population to exterior exit nodes, roughly 15 miles or more from the inundation areas.

2.3 MODEL CALIBRATION

Before evacuation simulations were run, each network was first calibrated for its study area. Calibration is performed for two primary reasons. First, it establishes the route preferences that will be used by all vehicles during an evacuation simulation. Route preferences control the numbers of vehicles assigned to travel on each road. Second, calibration determines how many vehicles must be loaded at a given loading rate to achieve traffic patterns typical of a normal day. Before an evacuation takes place, the modeling methodology assumes traffic patterns of a normal day occur. Therefore, NETVAC2 was programmed to simulate normal traffic patterns at peak, mid-peak, and off peak conditions at the start of all model runs. Only after a hurricane threat becomes imminent, and people begin responding to warnings, are changes in normal day traffic anticipated. The following paragraphs describe how traffic counts recorded for average daily periods were used to calibrate each study area network.

Average Daily Traffic (ADT) volume data (i.e., 24-hour period) are collected along most state and interstate roadways in Rhode Island, by the Rhode Island Department of Transportation, and in Massachusetts by the Massachusetts Highway Department. In addition to the 24-hour counts, detailed hourly counts are conducted on a continuous basis at central stations in both Rhode Island[5] and Massachusetts[6].

The following sources of data were used to develop estimates of the existing, typical traffic volume levels along the study area roadways:

- "State Highway Map of Rhode Island, Traffic Flow Map", Rhode Island Department of Transportation, 1994 (showing 1993 Annual 24-hour Average Daily Traffic)

- "1993 Traffic Volumes for the Commonwealth of Massachusetts", Massachusetts Highway Department, 1994

- Automatic Traffic Counter Records (hourly summaries) for the following locations, from the Rhode Island Department of Transportation:

  - I-295 Southbound, Johnston
  - I-295 Northbound, Cumberland

- I-95 Northbound, Exeter
- I-95 Southbound, Exeter

- Route 1 Northbound, South Kingstown
- Route 1 Southbound, South Kingstown

- I-195 Eastbound, East Providence
- I-195 Westbound, East Providence

Hourly counts for I-195 in Dartmouth, MA were also obtained from the Massachusetts Highway Department[6].

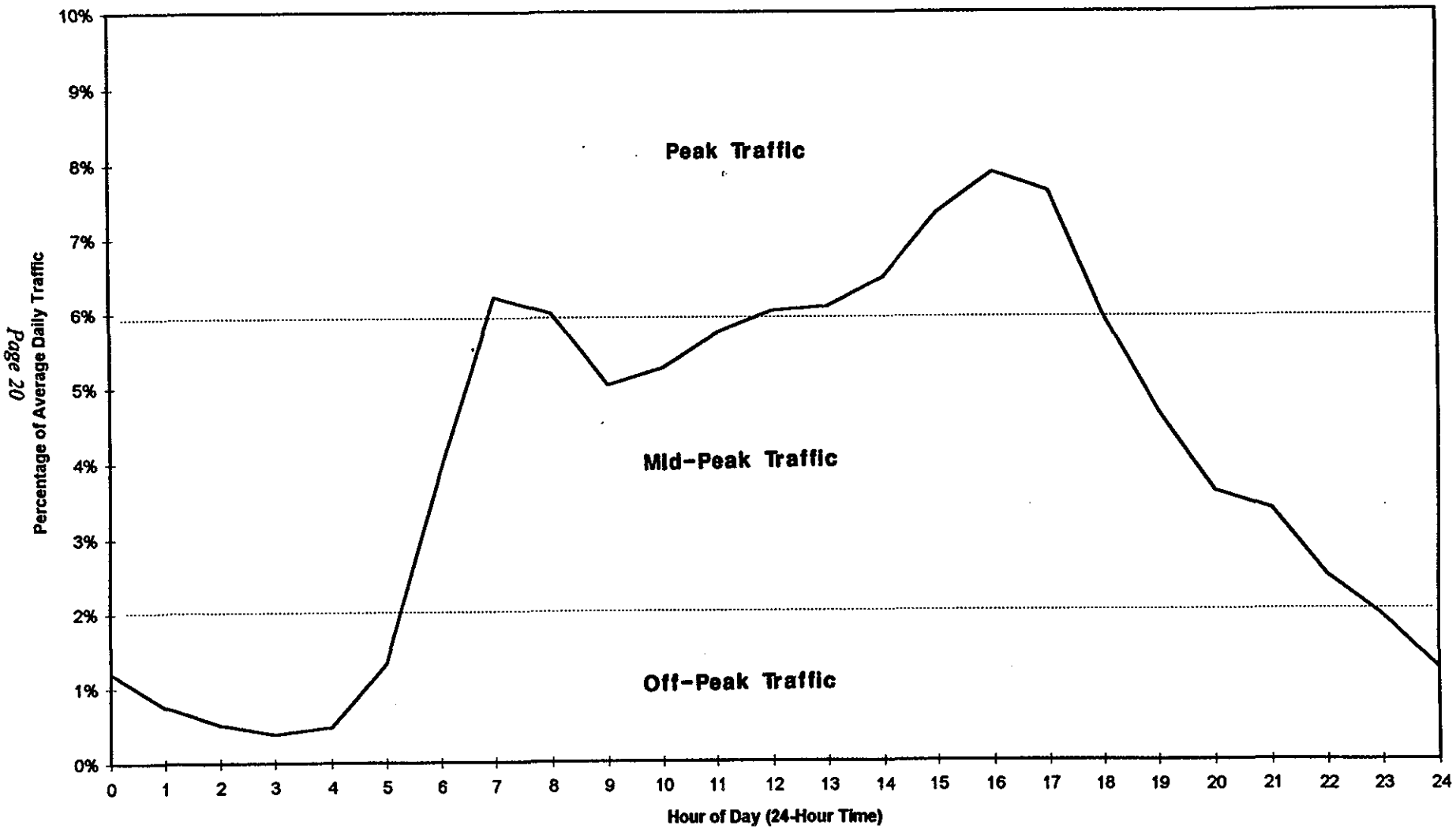
The distribution of ADT over a 24-hour period varies with each hour and day of the week. In general, the percentage of ADT is usually many times greater during peak traffic periods compared with times of off-peak traffic. Figure 2-10 plots weighted averages of the hourly weekday ADT volume recorded at traffic monitoring stations in Johnston, RI; Exeter, RI; South Kingstown, RI; East Providence, RI; and Dartmouth, MA. The distribution of hourly ADT at each location was found to vary in terms of magnitude, but overall trends and variations are generally similar.

In Figure 2-10, dashed lines delineate approximate levels of ADT corresponding to off-peak, mid-peak, and peak traffic. For the most part, off-peak traffic refers to light traffic volumes that typically occur late at night or in the early morning. Mid-peak traffic refers to moderate traffic conditions similar to that generally experienced in the late morning or early afternoon on weekdays, or on weekend days. Peak traffic represents the volume of traffic that is typical during weekday afternoon rush hour.

Although the distribution of ADT in Figure 2-10 may not reflect all of the local traffic patterns for each road in the study area, it does however provide a reasonable representation of how most of the vehicle trips in Rhode Island and Bristol County, Massachusetts are distributed over a normal day. Therefore, Figure 2-10 was used as a basis by which all the roadways within networks were calibrated.

For the final calibration tests, focus was placed on 31 key roadway links in Rhode Island and Southeastern Massachusetts to evaluate overall results. The actual unidirectional ADT at exterior nodes was entered as vehicles, and programmed to flow throughout each system. As simulation progressed, printouts every hour of simulation time reported the cumulative link departures and link speeds, as well as any spill backs and queues found at nodes. Calibration was accomplished using an iterative process of running NETVAC2, comparing modeled two-way ADTs to actual two-way ADTs for the 31 links, then adjusting link preference factors and adding traffic onto the network where appropriate before rerunning the model. During this process, a loading distribution that approximated average actual conditions was developed. The entire portion of major corridors such as I-95, I-195 and Route 1 were also reviewed in detail to ensure that the identified "check" locations were not isolated spots where ADT was correlated. The transportation methodology assumed calibration was complete when the volume of vehicles on each of the 31 links matched its corresponding actual two-way ADT by ±10% for Principal Arterials and 15% for Major Collectors[8], and the distribution of hourly traffic approximated actual conditions.

FIGURE 2-10: AVERAGE OF HOURLY ADT ALONG MAJOR ROUTES IN RHODE ISLAND AND BRISTOL COUNTY, MASSACHUSETTS



The results of the calibrated network analyses for these key links are represented in Tables 2-1 and 2-2, for the West Bay/Rhode Island and East Bay/Massachusetts networks.

TABLE 2-1: WEST BAY/RHODE ISLAND NETWORK CALIBRATION ANALYSIS

RHODE ISLAND NETWORK CHECKPOINTS

ROUTE	TOWN	ACTUAL ADT	MODELED ADT	% DIFFERENCE
14	Scituate	2,400	2,316	-4%
102	W. Greenwich/Coventry	4,100	4,633	+13%
2	Charlestown	4,300	4,482	+4%
6	Scituate	5,200	4,810	-8%
7	Smithfield	6,400	6,710	+5%
1	Charlestown	10,600	12,059	+14%
44	Glocester	10,800	12,446	+15%
1	East Greenwich/Warwick	16,100	17,246	+7%
1	South Kingstown	18,600	20,341	+9%
1	Westerly	20,600	17,831	-13%
295	Cumberland/N. Attleboro	29,600	27,690	-6%
95	Richmond/Exeter	34,100	37,504	+10%
295	Cranston	44,200	48,236	+9%
295	Johnston	51,400	48,132	-6%
195	Providence	60,300	58,066	-3%
95	Providence/N. Providence	120,600	112,231	-7%
95	Cranston/Providence	159,000	153,978	-3%

TABLE 2-2: EAST BAY/MASSACHUSETTS NETWORK CALIBRATION ANALYSES

SOUTHEASTERN MASSACHUSETTS NETWORK CHECKPOINTS

ROUTE	TOWN	ACTUAL ADT	MODELED ADT	% DIFFERENCE
114	Portsmouth	13,600	12,477	-8%
24	Portsmouth	19,600	19,769	+1%
77	Little Compton	2,800	2,795	0%
87	Tiverton	3,200	3,056	-4%
177	Westport	5,000	4,708	-6%
88	Westport	7,200	7,294	+1%
6	Dartmouth	16,000	14,462	-10%
195	Dartmouth	50,000	51,602	+3%
6	Fairhaven	28,000	28,640	+2%
195	Fairhaven	33,400	35,982	+8%
24	Berkley	30,000	32,088	+1%
138	Dighton	11,300	11,074	-2%
44	Taunton	16,000	15,320	-4%
195	East Providence	60,300	64,481	+7%

SECTION THREE

DEVELOPMENT OF TRAFFIC DATA

3.1 CLASSIFICATION OF MOTORISTS

After road networks were developed, the next steps of the analysis were to estimate the total number of vehicles that will load onto roadways, and determine the rates at which vehicles will load onto roadways over the course of an evacuation. To facilitate the development of this information, vehicles were classified as belonging to one of four major categories listed below:

(1) Surge Vulnerable Evacuees: Permanent and seasonal residents living in evacuation zones who evacuate when directed to do so by authorities.

(2) Non-Surge Vulnerable Evacuees: Permanent and seasonal residents, excluding mobile home residents, living outside evacuation zones who choose to evacuate. Most of the evacuees of this category leave their homes because of perceived dangers and not necessarily because of real flooding threats. However, in some cases, officials may deem it necessary to evacuate small groups of people who live in substandard housing units particularly vulnerable to hurricane winds, or those who live in or near areas that may be exposed to freshwater flooding.

(3) Mobile Home Evacuees: All permanent and seasonal mobile home residents of coastal communities. The analysis assumes all mobile home residents will be told to evacuate by local officials due of their high risk to strong winds from storms of even modest intensities.

(4) Background Vehicles: The population associated with all remaining vehicle trip purposes. Examples are: Trips made by people who leave work early and return home, people who travel through the region, and trips made by persons preparing for the arrival of hurricane conditions or engaged in normal activities. This traffic can also include transit vehicles (vans/buses) used to pick up evacuees without personal transportation.

The number of vehicles assumed to participate during an evacuation from each group listed is an important factor in estimating clearance times. Human behavioral information developed in Chapter Four, Behavioral Analysis, in the TDR, gives clear estimates of the participation that can be expected from the first three groups. The fourth group, Background Vehicles, is not addressed by the Behavioral Analysis. However, motorists belonging to this group mostly comprise of people making shopping trips or commuting, which is related to the ADT distribution shown in Figure 2-10.

For Rhode Island, Tables 3-1 and 3-2 list estimates made of the numbers of permanent and seasonal people who were assumed to evacuate their homes by population type for two levels of hurricane threat. Table 3-1 refers to evacuations for a weak hurricane scenario, and Table 3-2 gives similar estimates for a severe hurricane scenario. The same information for Bristol County, Massachusetts is provided in Tables 3-3 and 3-4. Estimates were made by applying evacuation participation behavioral assumptions to community population data (see TDR).

TABLE 3-1:
RHODE ISLAND EVACUATING POPULATION FOR A WEAK HURRICANE SCENARIO

Community	Permanent Population	Seasonal Population	Population Evacuating Mobile Homes	Population Evacuation Surge Areas	Population Evacuating Non-Surge Areas	Total Evacuating Population
Barrington	15,850	180	0	8,970	40	9,010
Bristol	21,630	400	20	2,980	330	3,330
Charlestown	6,480	4,010	330	1,330	160	1,820
Cranston	76,060	200	50	1,600	1,480	3,130
East Greenwich	11,870	60	110	720	210	1,040
East Providence	50,380	110	170	4,740	860	5,770
Jamestown	5,000	1,070	10	1,640	70	1,720
Little Compton	3,340	920	190	650	60	900
Middletown	19,460	240	450	840	350	1,640
Narragansett	14,990	4,850	10	6,080	220	6,310
New Shoreham	840	1,880	0	670	40	710
Newport	28,230	1,640	0	7,300	390	7,690
North Kingstown	23,790	630	540	5,240	330	6,110
Pawtucket	72,640	70	880	540	1,420	2,840
Portsmouth	16,860	1,380	1,080	4,280	230	5,590
Providence	160,730	330	90	490	3,200	3,780
South Kingstown	24,630	6,610	460	3,850	510	4,820
Tiverton	14,310	450	720	1,670	230	2,620
Warren	11,390	270	10	4,650	80	4,740
Warwick	85,430	900	210	17,840	1,150	19,200
Westerly	21,610	3,570	210	4,150	380	4,740
TOTALS	685,520	29,770	5,540	80,230	11,740	97,510

TABLE 3-2:
RHODE ISLAND EVACUATING POPULATION
FOR A SEVERE HURRICANE SCENARIO

Community	Permanent Population	Seasonal Population	Population Evacuating Mobile Homes	Population Evacuating Surge Areas	Population Evacuating Non-Surge Areas	Total Evacuating Population
Barrington	15,850	180	0	12,500	110	12,610
Bristol	21,630	400	20	4,780	840	5,640
Charlestown	6,480	4,010	330	1,960	400	2,690
Cranston	76,060	200	50	2,050	3,700	5,800
East Greenwich	11,870	60	110	1,010	540	1,660
East Providence	50,380	110	170	6,530	2,150	8,850
Jamestown	5,000	1,070	10	2,130	190	2,330
Little Compton	3,340	920	190	870	160	1,220
Middletown	19,460	240	450	1,420	880	2,750
Narragansett	14,990	4,850	10	8,110	540	8,660
New Shoreham	840	1,880	0	760	90	850
Newport	28,230	1,640	0	9,530	960	10,490
North Kingstown	23,790	630	540	6,540	830	7,910
Pawtucket	72,640	70	880	600	3,560	5,040
Portsmouth	16,860	1,380	1,080	4,910	590	6,580
Providence	160,730	330	90	910	8,000	9,000
South Kingstown	24,630	6,610	460	4,970	1,260	6,690
Tiverton	14,310	450	720	2,130	580	3,430
Warren	11,390	270	10	6,760	210	6,980
Warwick	85,430	900	210	25,700	2,880	28,790
Westerly	21,610	3,570	210	5,960	960	7,130
TOTALS	685,520	29,770	5,540	110,130	29,430	145,100

TABLE 3-3
BRISTOL COUNTY, MASSACHUSETTS EVACUATING POPULATION FOR A WEAK HURRICANE SCENARIO

Community	Permanent Population	Seasonal Population	Population Evacuating Mobile Homes	Population Evacuating Surge Areas	Population Evacuating Non-Surge Areas	Total Evacuating Population
Acushnet	9,550	30	570	0	160	730
Dartmouth	27,240	1,130	130	2,700	490	3,320
Fairhaven	16,130	1,150	50	3,850	100	4,000
Fall River	92,700	150	90	2,520	1,760	4,370
New Bedford	99,920	140	170	1,680	1,600	3,450
Rehoboth	8,660	50	10	410	160	580
Seekonk	13,050	50	0	330	250	580
Somerset	17,660	50	10	2,960	280	3,250
Swansea	15,410	170	10	4,270	210	4,490
Westport	13,850	1,830	90	1,550	270	1,910
	314,170	4,750	1,130	20,270	5,280	26,680

TABLE 3-4
BRISTOL COUNTY, MASSACHUSETTS EVACUATING POPULATION FOR A SEVERE HURRICANE SCENARIO

Community	Permanent Population	Seasonal Population	Population Evacuating Mobile Homes	Population Evacuating Surge Areas	Population Evacuating Non-Surge Areas	Total Evacuating Population
Acushnet	9,550	30	570	820	410	1,800
Dartmouth	27,240	1,130	130	3,200	1,230	4,560
Fairhaven	16,130	1,150	50	11,100	250	11,400
Fall River	92,700	150	90	4,370	4,400	8,860
New Bedford	99,920	140	170	17,710	4,010	21,890
Rehoboth	8,660	50	10	580	400	990
Seekonk	13,050	50	0	480	630	1,110
Somerset	17,660	50	10	3,320	700	4,030
Swansea	15,410	170	10	4,810	510	5,330
Westport	13,850	1,830	90	1,740	680	2,510
TOTALS	314,170	4,750	1,130	48,130	13,220	62,480

3.2 BEHAVIORAL RESPONSE OF MOTORISTS

Perhaps one of the most critical assumptions that must be considered when estimating clearance times is the timing at which evacuees load onto roadways. Behavioral data from research obtained from past hurricane evacuations show that mobilization and actual departures of the evacuating population occur over a period of many hours and sometimes several days[3]. For Rhode Island, evacuation simulations were tested for three evacuation rates that are summarized by the response curves in Figure 3-1. Behavioral response curves describe the percentages of the evacuating population who leave their homes and load onto roadways at hourly intervals relative to when an evacuation recommendation is disseminated to the public.

The behavioral response curves are intended to include the most probable range of public responses that will be experienced in a future hurricane evacuation. The rapid response curve depicts the quickest mobilization response by evacuating households. For analysis purposes, the rapid response curve includes two hours of response time occurring before the evacuation recommendation is disseminated to the public and four hours after it is disseminated. For the moderate response curve, three hours of response time is assumed before dissemination of the evacuation recommendation, and six hours after. The slow response curve includes four hours of response time before notification of the evacuation recommendation, and eight hours after. The public's response before evacuation accounts for people who choose to evacuate their homes before being directed to do so by authorities. Regardless of the behavioral response curve used, 85 percent of all people who will eventually leave their homes are assumed to leave after being directed to do so by officials. This is an important point because people's timeliness in responding to a hurricane evacuation is extremely dependent upon the aggressiveness of authorities to encourage them to leave[4].

3.3 VEHICLE USAGE

The behavioral analysis conducted for Rhode Island estimated that approximately 75 percent of the vehicles available to evacuees will be used during future evacuations[4]. For the most part, families usually evacuate using one vehicle for fear of separation, but some households evacuate using two or more vehicles depending upon how many are available to them. Differences in vehicle ownership may vary with variations in access to public transportation, household income, and other socio-economic characteristics of the region.

The first column of Table 3-5 list permanent population by community. The second and third columns list the numbers of available vehicles per owner and renter - occupied housing units, respectively. This information was obtained from socio-economic data reported in the 1980 census[9]. The fourth column of the Table gives the number of available vehicles per person, and the fifth column gives the calculated average numbers of people that will travel in each evacuating vehicle, assuming 75 percent of the available vehicles are used. Similar information for Bristol County, Massachusetts is provided in Table 3-6. A sample calculation of the assumed persons per evacuating vehicle for Westerly, Rhode Island is shown below.

FIGURE 3-1: BEHAVIORAL RESPONSE CURVES

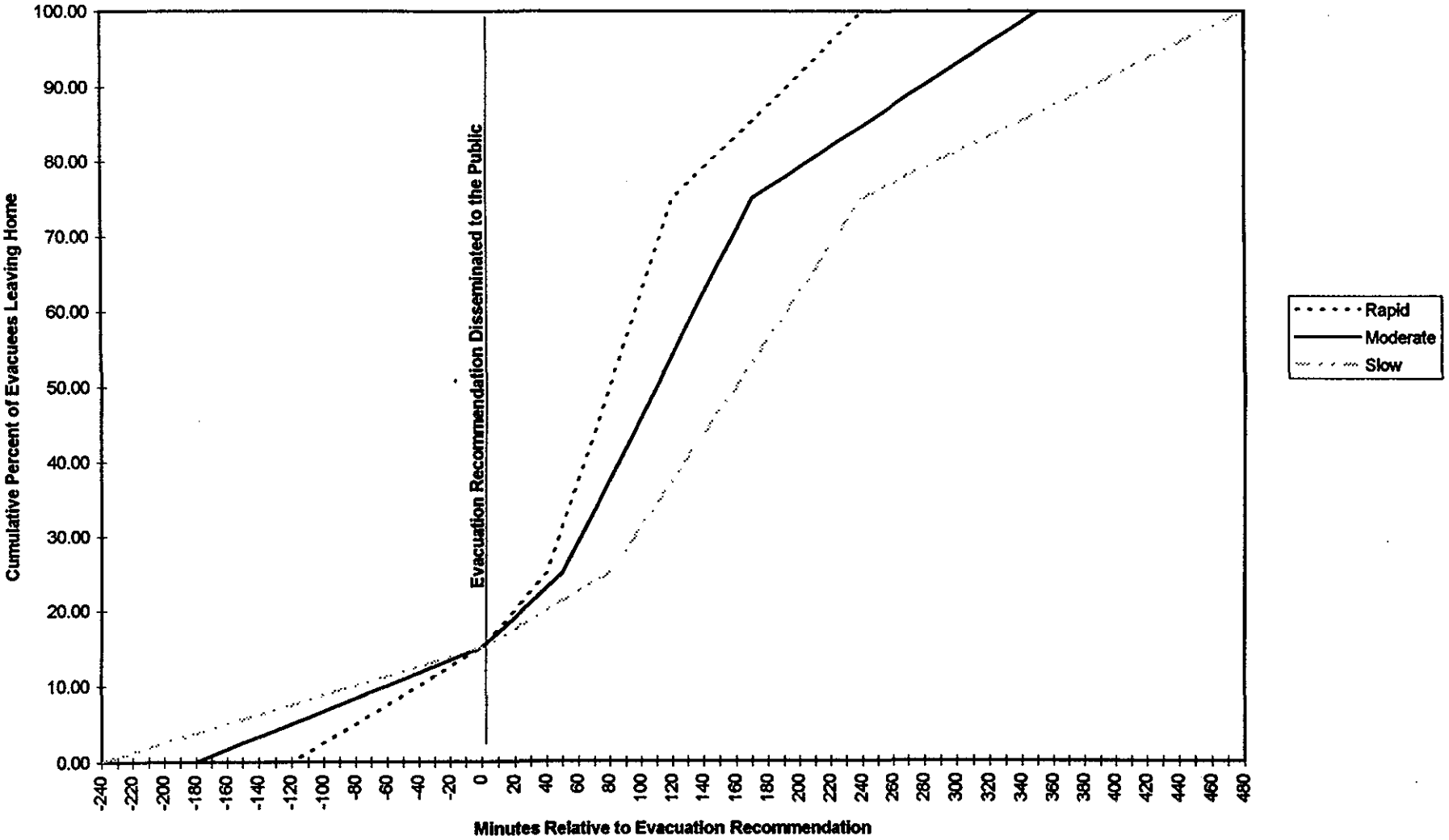


TABLE 3-5:
ASSUMED VEHICLE USAGE RATES BY COMMUNITY (RHODE ISLAND)

Community	Permanent Population	Available Vehicles in Owner Occupied Housing Units	Available Vehicles in Renter Occupied Housing Units	Vehicles Per Person	Persons per Evacuating Vehicle (75% Usage)
Barrington	15,850	10,400	890	0.71	1.88
Bristol	21,630	9,970	3,670	0.63	2.12
Charlestown	6,480	3,790	1,020	0.74	1.80
Cranston	76,060	37,370	12,210	0.65	2.05
East Greenwich	11,870	7,300	1,230	0.72	1.85
East Providence	50,380	22,500	9,240	0.63	2.12
Jamestown	5,000	3,240	730	0.79	1.69
Little Compton	3,340	2,250	490	0.82	1.63
Middleton	19,460	6,220	5,060	0.58	2.30
Narragansett	14,990	7,010	4,520	0.77	1.73
New Shoreham	840	540	240	0.93	1.43
Newport	28,230	8,140	8,020	0.57	2.34
North Kingstown	23,790	13,560	3,690	0.73	1.83
Pawtucket	72,640	24,430	18,410	0.59	2.26
Portsmouth	16,860	9,290	2,850	0.72	1.85
Providence	160,730	35,470	37,140	0.45	2.96
South Kingstown	24,630	10,900	3,380	0.58	2.30
Tiverton	14,310	9,230	1,360	0.74	1.80
Warren	11,390	5,080	2,390	0.66	2.02
Warwick	85,430	49,670	10,760	0.71	1.88
Westerly	21,610	10,500	4,530	0.70	1.90

TABLE 3-6
ASSUMED VEHICLE USAGE RATES BY COMMUNITY (MASSACHUSETTS)

Community	Permanent Population	Available Vehicles in Owner Occupied Housing Units	Available Vehicles in Renter Occupied Housing Units	Vehicles Per Person	Persons per Evacuating Vehicle (75% Usage)
Acushnet	9,550	5,820	690	0.68	1.96
Dartmouth	27,240	13,970	2,180	0.59	2.26
Fairhaven	16,130	7,840	2,290	0.63	2.12
Fall River	92,700	20,450	24,590	0.49	2.72
New Bedford	99,920	27,130	19,430	0.47	2.84
Rehoboth	8,660	5,730	520	0.72	1.85
Seekonk	13,050	8,730	820	0.73	1.83
Somerset	17,660	10,800	1,540	0.70	1.90
Swansea	15,410	9,930	800	0.70	1.90
Westport	13,850	8,510	1,480	0.72	1.85

Permanent Population	= 21,610 people	
Available vehicles	= 10,500 + 4,500	= 15,030 vehicles
Vehicles per person	$\frac{\text{= 15,030 vehicles}}{\text{21,610 person}}$	$= 0.70 \frac{\text{vehicles}}{\text{person}}$

Persons per evacuating vehicle, assuming 75% usage

$$\frac{1}{0.70 \text{ vehicles/person} \times 0.75} = 1.90 \text{ persons per vehicle}$$

The transportation methodology used the information in Table 3-5 and 3-6 to determine the vehicles that would load onto roadways during evacuations. The user enters the vehicle occupancy rates and the number of people assigned to enter the network at each node. NETVAC2's complimentary program, POPDIS, aggregates the population input for each entry node and in turn computes the effective average vehicle loading rates per minute to be input into NETVAC2 at network entry locations.

SECTION FOUR

EVACUATION SCENARIOS

Since all hurricanes differ from one another in some respect, it becomes necessary to set forth clear assumptions about storm characteristics and evacuees' expected response before transportation modeling can begin. Not only does a storm vary in its track, intensity and size, but also in the way it is perceived by residents in potentially vulnerable areas. These factors cause a wide variance in the behavior of the vulnerable population. Even the time of day at which a storm makes landfall influences the time parameters of an evacuation response. The transportation analysis computes clearance times based on sets of assumed conditions and behavioral responses. It is likely that an actual storm will differ from a simulated storm for which clearance times are calculated in this report. Therefore, key input parameters were varied to derive a range of evacuation scenarios idealizing many possible situations officials may have to contend with. The three major parameters that were varied with each simulation are described below.

(1) Hurricane Severity: Storms are classified as either weak or severe hurricanes. Evacuating population estimates (see Tables 3-1 through 3-4) are significantly greater (approximately double) for an evacuation due to severe hurricanes when compared with that for weak hurricanes. Category 5 hurricanes were not considered because the cooler waters of the Northeast can not sustain hurricanes of this intensity.

(2) Behavioral Response: The time in which evacuees mobilize to leave their homes and enter onto the roadway system is characterized by the behavioral response curves shown in Figure 3-1. Behavioral response curves are defined for rapid, moderate, and slow responses.

(3) Background Traffic Condition: The traffic condition at the start of an evacuation will depend upon the time of day the evacuation begins as well as other factors that may influence initial traffic conditions. As the NETVAC2 models were run, initial traffic conditions corresponding to off-peak, mid-peak, and peak ADT levels were analyzed. Figures 4-1a through 4-1c illustrate background vehicle distributions assumed for the following three conditions.

a. **Off-peak**: The off-peak traffic condition refers to light traffic volumes that typically occur late at night or in the early morning.

b. **Mid-peak**: The mid-peak traffic condition refers to moderate traffic conditions similar to that generally experienced in the two hour period occurring before and after the AM and PM peak conditions.

c. **Peak**: The peak traffic condition replicates the "rush hour" volume of traffic that is typical of the two hour period from 4:00 - 6:00 PM.

As noted above, background vehicles refer to motorists who travel roadways during an evacuation with trip purposes other than for evacuating their homes. At the start of an evacuation, the number of background

Figure 4-1a: Off-Peak Background Traffic Distribution

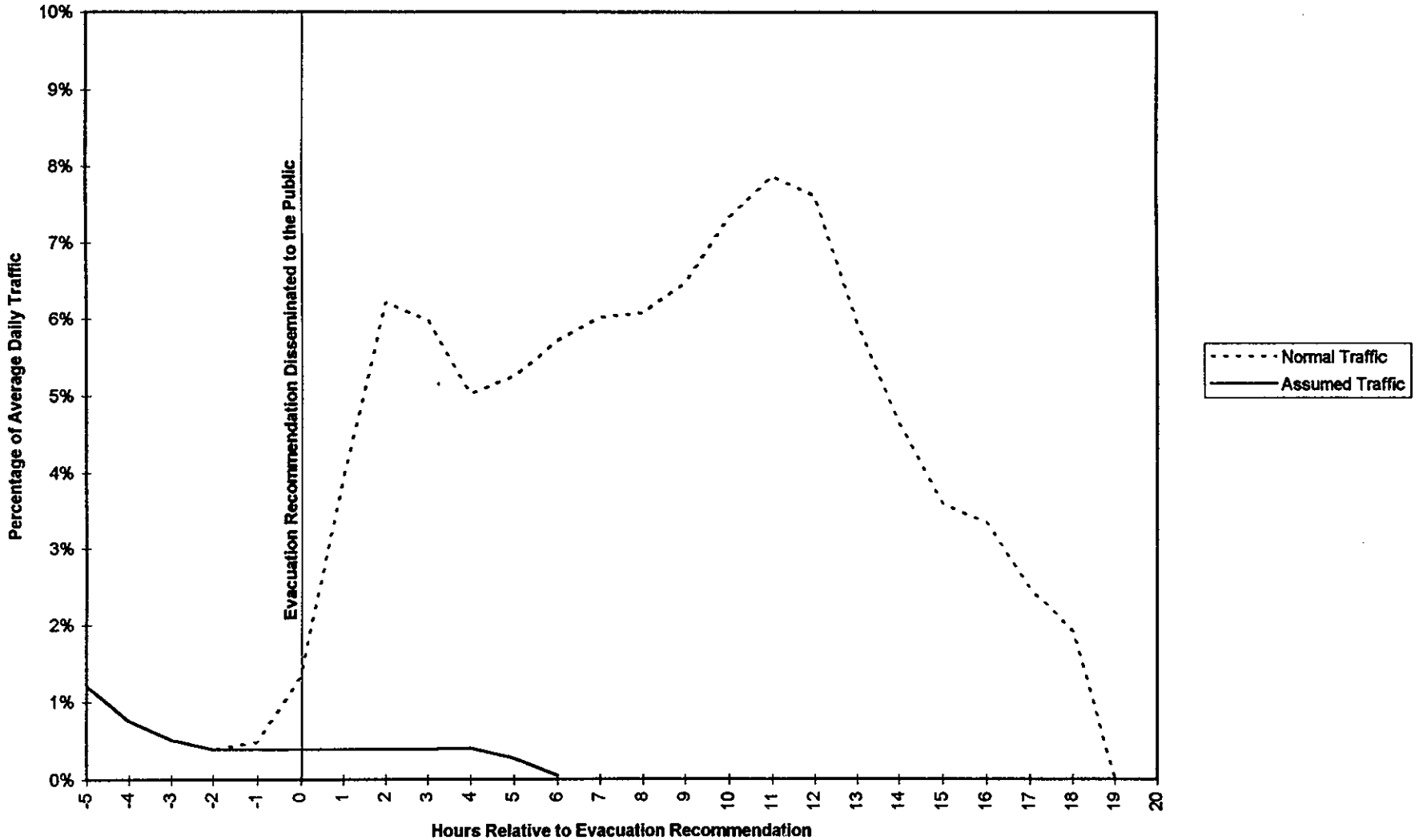


Figure 4-1b: Mid-Peak Background Distribution

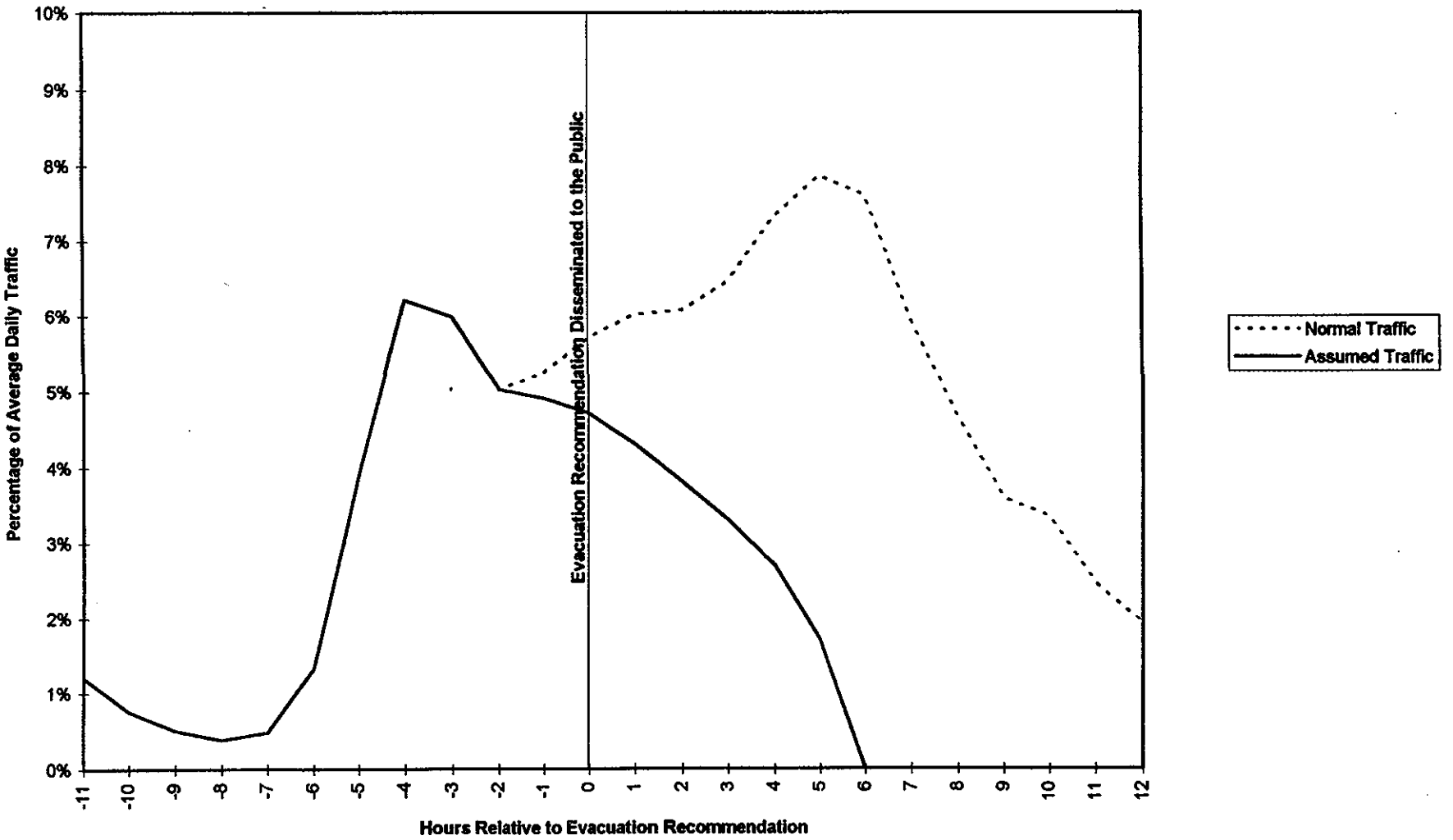
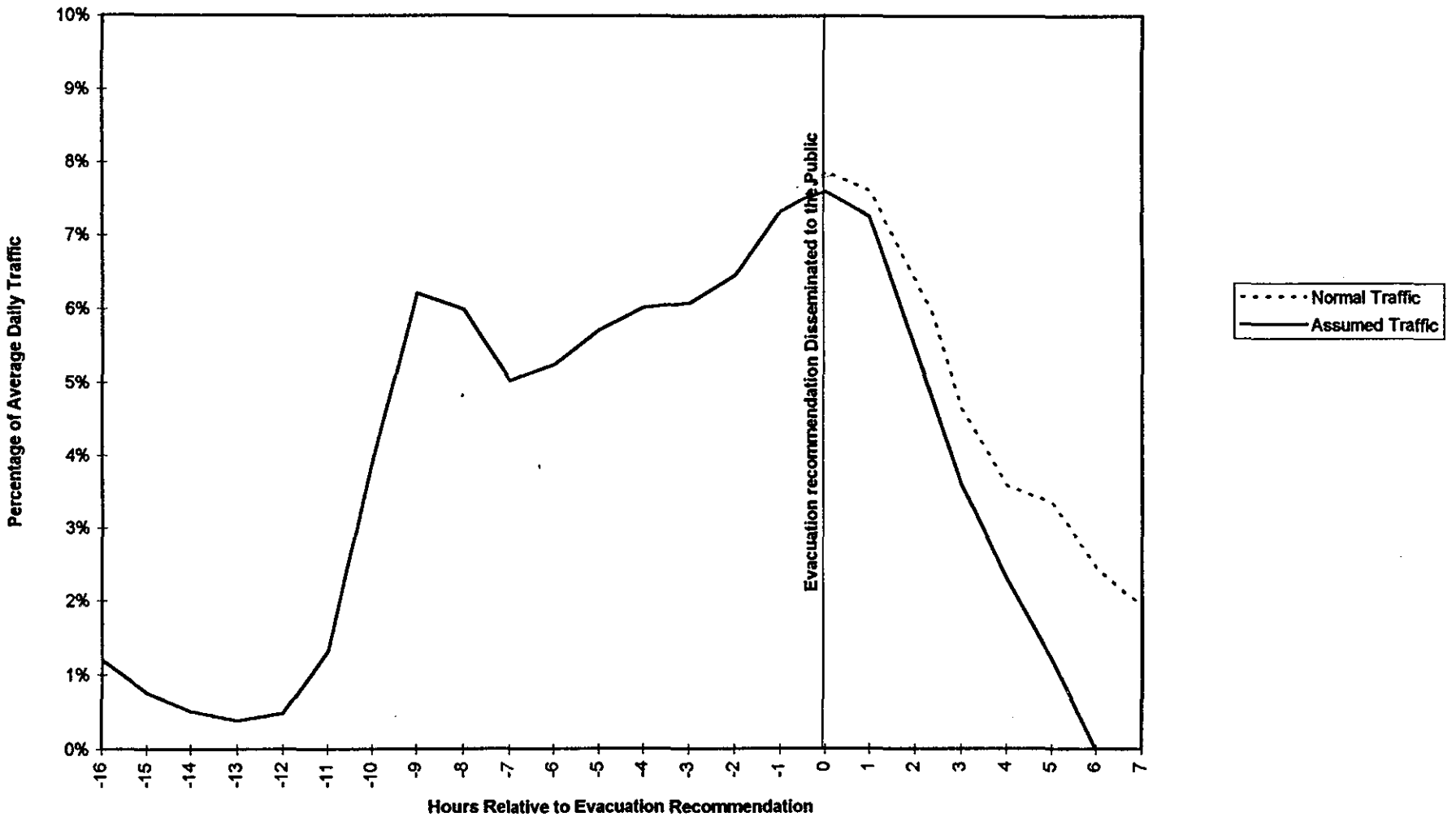


Figure 4-1c: Peak Background Distribution



vehicles assumed to exist on a particular road was taken as the ADT for that road on a normal day. As an evacuation progressed, the initial ADT assumed was slowly decreased until approximately zero background vehicles were on the roads at the completion of the evacuation.

Referring to the ADT distribution shown in Figure 2-10, the Transportation Analysis simulated evacuations occurring coincident with rush hour by programming evacuees to load onto roadways that were initially set at peak ADT volumes. Conversely, an evacuation occurring at times of light traffic, such as late at night or in the early morning, was modeled by running the model with background vehicles initially set at off-peak ADT volumes. Simulations run with background traffic at mid-peak ADT volumes represented moderate traffic volumes typical of mid-morning and mid-afternoon on weekdays or weekends.

The Transportation Analysis assumed the background traffic distributions shown in Figures 4-1a through 4-1c to apply to evacuations assuming a moderate behavioral response by evacuees. Background traffic distributions used for evacuations assuming a rapid or a slow behavioral response (not shown) follow the same curves shown in Figures 4-1a through 4-1c. The only exception is that evacuees are programmed to load onto roadways slightly before or after background traffic starts its decline. The number of background vehicles on any roadway during a a model run will vary depending upon each road's particular ADT and the hourly percentage of ADT assumed for the traffic condition modeled. A key point in using Figure 2-10 to derive background traffic conditions is that all traffic conditions are derived from actual traffic patterns observed for Rhode Island and Bristol County, Massachusetts rather than assumed hypothetical conditions.

Combinations of these key input parameters were used in developing 18 possible scenarios. For each of the networks, simulations were run for evacuations assuming weak hurricanes and severe hurricanes. Initial traffic conditions imparted on the road network followed the background distributions for off-peak, mid-peak, and peak traffic. Evacuees entered road networks at prescribed time intervals defined by the rapid, moderate, and slow behavioral responses.

Seasonal resident population and transient population visiting the area (i.e., tourism) varies widely in the study area, based upon the time of year, weather conditions, etc. The evacuating population used during simulations included seasonal residents as estimated from the 1990 census[10] from seasonal housing unit information. Coastal Rhode Island's seasonal population was found to be less than 12 percent of its permanent population. Although the varying transient conditions were not specifically evaluated for all scenarios, they were inherently addressed in a sensitivity analysis which focused on an evaluation of varying increases in study area population (refer to Section 5.3).

SECTION FIVE

ANALYSIS

5.1 GENERAL

Clearance time and dissemination time are two major considerations in deciding when an evacuation recommendation should be issued. The combination of these times defines a region's total evacuation time. Clearance time begins when an evacuation recommendation is clearly disseminated to the threatened public, and ends when the last evacuees clear the road system. This time includes the time required by evacuees to secure their homes and prepare to leave (mobilization time), the time spent by evacuees traveling along the road network (travel time), and the time lost due to traffic congestion (queuing delay time). Clearance time *does not relate solely to the time any one vehicle spends traveling on the road system.*

Dissemination time is the amount of time required by officials to notify the public to evacuate after the decision has been made. These values may differ by region depending on the communication and warning procedures utilized by State and local officials in their areas, and can best be estimated by the responsible state and local officials. The times calculated by the Transportation Analysis include only the clearance time component of evacuation time, and officials using this information must determine the dissemination time appropriate for their areas. Failure to add dissemination time to clearance time will underestimate total evacuation time, which could result in insufficient time for all evacuees to safely clear the hazard area.

Evacuations should be completed before the arrival of gale force winds (34 knot/39 mph) and/or storm surge. Vehicle accidents and reduced travel speeds from inclement weather can impede traffic flows, and potentially disrupt the evacuation. Therefore, the transportation modeling assumes that evacuations will occur well enough before a hurricane to preclude possible delays caused by significant weather. Moreover, the analysis assumes that provisions would be made for removal of vehicles in distress during the evacuation. The Decision Arc Method, outlined in Chapter Eight of the TDR, explains how the clearance times, used in conjunction with the dissemination times specified by officials, can provide guidance in hurricane evacuation decision-making. The time at which gale force winds arrive has been incorporated into the decision-making process of the Decision Arc Method and, therefore, does not need to be factored into the calculation of clearance time.

Evacuations for 18 combinations of storm strength, background traffic conditions, and evacuee response were simulated using the NETVAC2 computer model for both the West Bay/Rhode Island and the East Bay/Massachusetts networks. The simulated evacuations were reviewed to identify locations and duration of vehicle queuing delays (congestion), as well as to determine clearance times. The results of the simulated evacuations are presented below.

5.2 RESULTS

The NETVAC2 program presents information on traffic operations throughout the course of the simulated evacuation, including reports on vehicle arrivals and departures, roadway link speeds, and the total number of vehicles on the network for each reporting interval specified by the user. The total number of vehicles on

a network can be plotted versus time to display graphically how quickly vehicles evacuate the roadway network. Figures 5-1 through 5-4 are such graphs, plotted from analysis results for the West Bay/Rhode Island and East Bay/Massachusetts networks under weak and severe hurricane evacuation scenarios, respectively. A moderate behavioral response curve was assumed for all scenarios presented in these figures. In each graph, the curves depict the numbers of vehicles remaining on a network, throughout the course of the evacuation, for evacuations starting with off-peak, mid-peak, and peak background traffic conditions.

For modeling purposes, evacuations were considered complete when the evacuating vehicles reached safe destinations. One limitation when calibrating networks to traffic patterns of a normal day is that near the completion of simulations, when most of the vehicles on the network are from evacuees rather than background traffic, vehicles adhere to turning movements of a normal day instead of seeking the most logical exit nodes. The remaining percentage on the network (2 percent) accounts for this difference. It is expected that evacuees leaving homes immediately before storm arrival will seek safe destinations of the shortest travel time. Free flow conditions are verified up to one hour before model termination to ensure the last evacuees experience light traffic free from queuing.

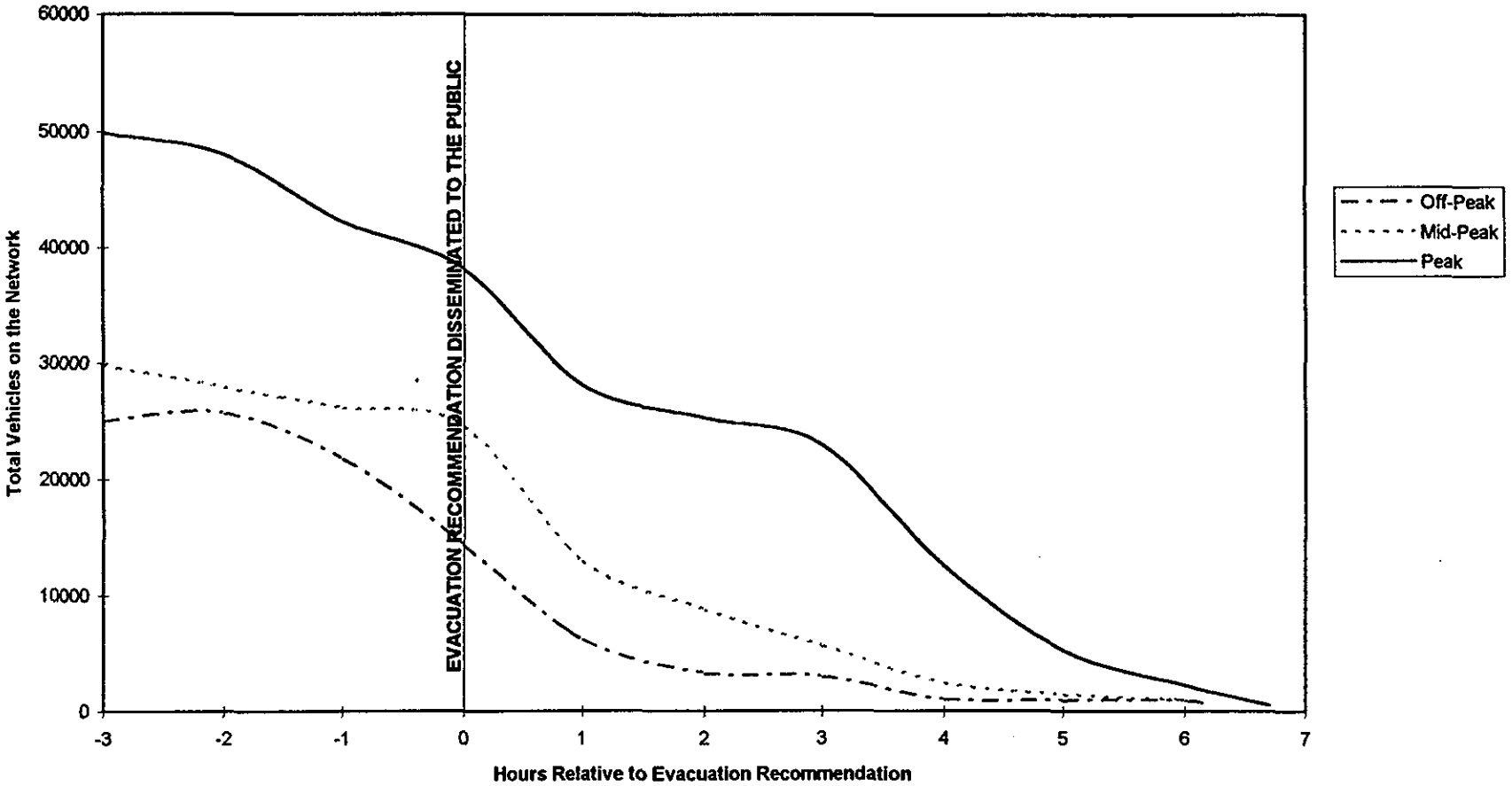
Tables 5-1 and 5-2 present the clearance times estimated for the West Bay/Rhode Island and East Bay/Massachusetts networks for weak and severe hurricane scenarios, respectively. Times are organized by intensity of hurricane, by the rate of response of the evacuating population, and by the level of background traffic at the start of the evacuation.

The clearance times were calculated assuming that each community is capable of sheltering their individual demands. The Transportation Analysis assessed how inadequate shelter capacity might influence clearance times, through sensitivity testing discussed in Section 5.3. Results showed that deficiencies in shelter capacity have a minimal affect on clearance time. This point is explained by the fact that the number of vehicles determined to travel to public shelters is very small in comparison to all vehicles on roadways. Consequently, the clearance times provided in Tables 5-1 and 5-2 are considered valid for the existing condition of deficient community shelter capacities and in the future if community sheltering capabilities improve.

Clearance times ranged from a minimum of approximately 4 hours and 15 minutes for an off-peak traffic condition under a weak hurricane scenario, to a maximum of about 9 hours and 35 minutes for a peak traffic condition under a severe hurricane scenario. The longer clearance times for the West Bay/Rhode Island network can be attributed to queuing along Route 1 from Providence to North Kingstown, as well as congestion on roads feeding into Route 1 along this same roadway section.

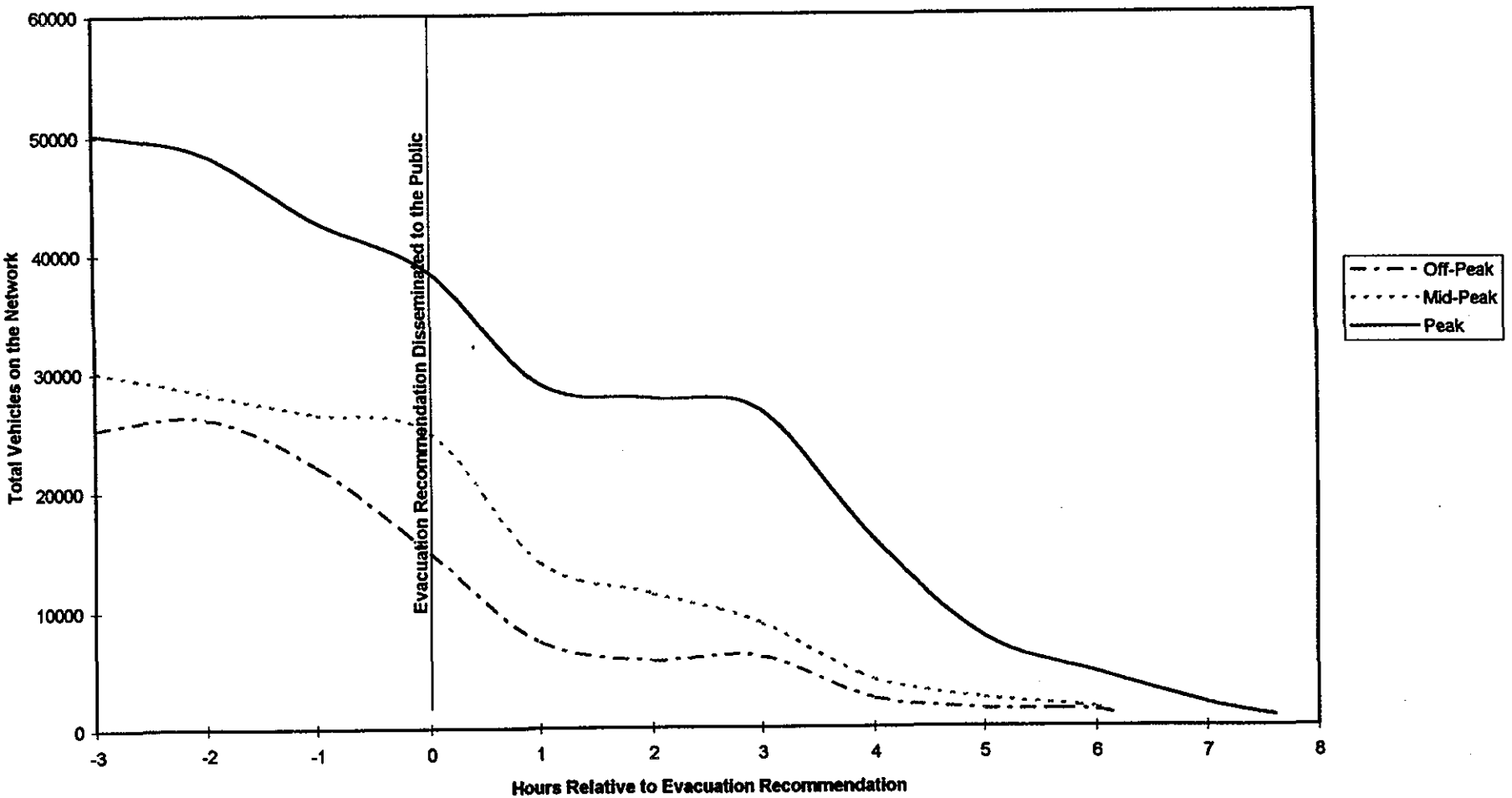
A summary of the evacuation clearance times for the West Bay/Rhode Island and East Bay/Massachusetts networks is presented in Tables 5-1 and 5-2.

FIGURE 5-1:
WEST BAY/RHODE ISLAND NETWORK PLOTTED RESULTS
FOR MODERATE BEHAVIORAL RESPONSE (WEAK HURRICANE)



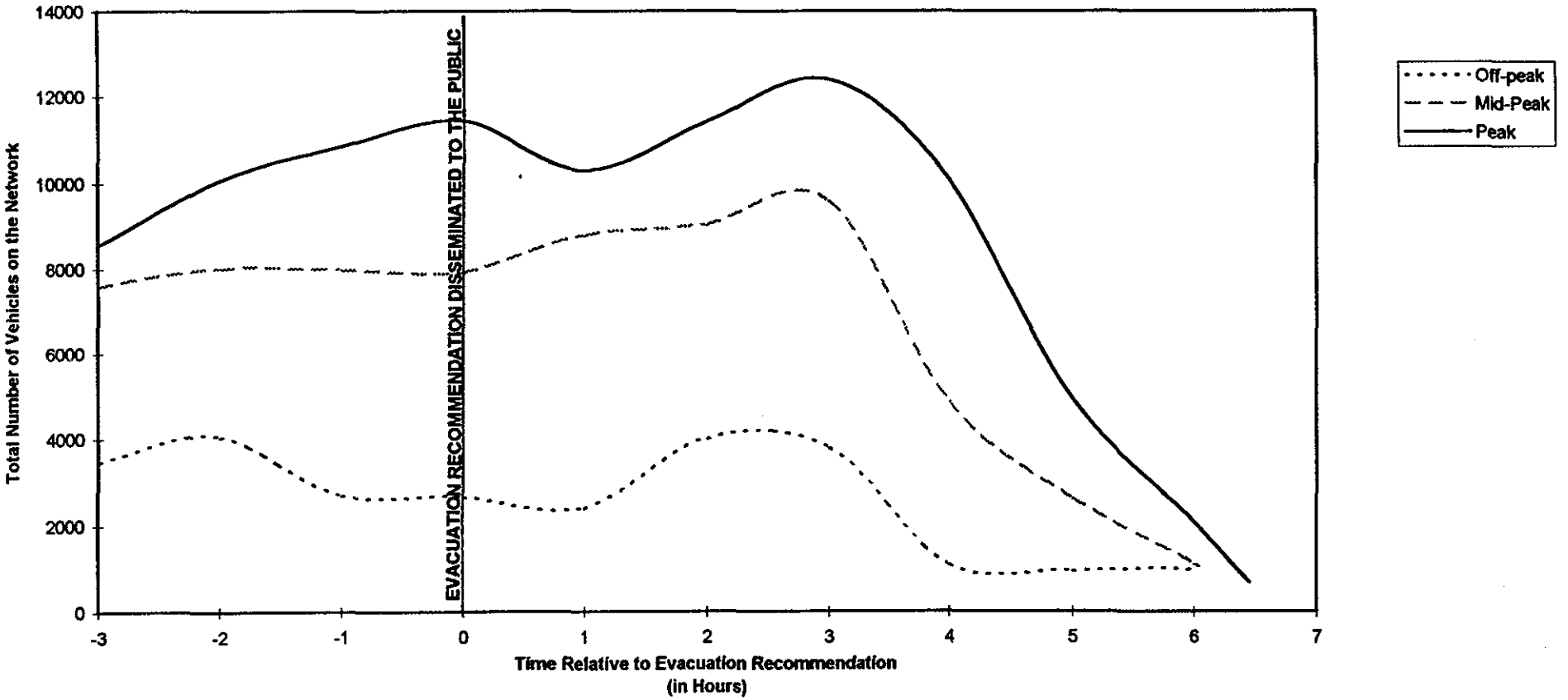
Note: **About 540 vehicles were on the network at the end of simulation *for all background runs.***

FIGURE 5-2:
WEST BAY/RHODE ISLAND NETWORK PLOTTED RESULTS
FOR MODERATE BEHAVIORAL RESPONSE (SEVERE HURRICANE)



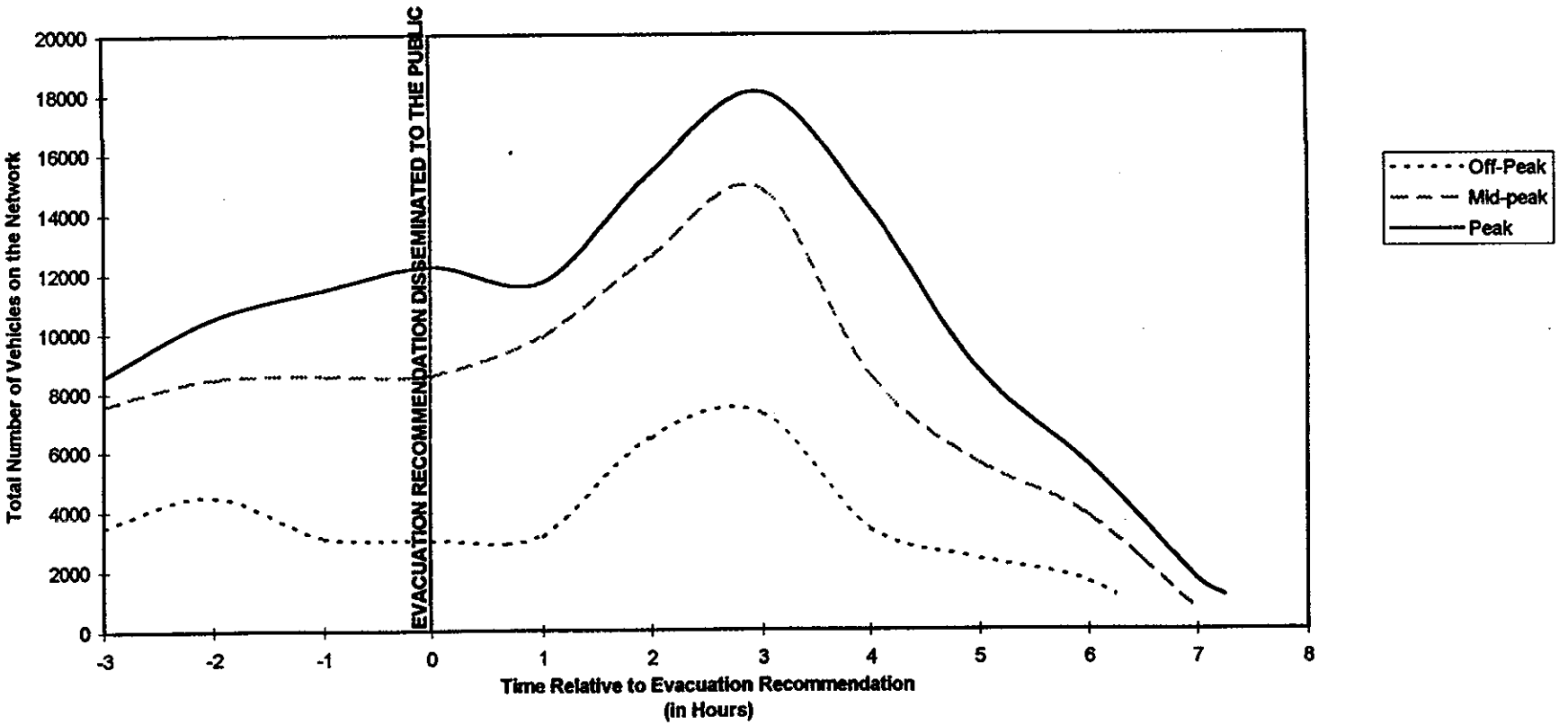
Note: **About 860 vehicles were on the network at the end of simulation for all background traffic conditions.**

FIGURE 5-3:
EAST BAY/MASSACHUSETTS NETWORK PLOTTED RESULTS
FOR MODERATE BEHAVIORAL RESPONSE (WEAK HURRICANE)



Note: **About 690 vehicles were on the network at the end of simulation for all background runs.**

FIGURE 5-4:
EAST BAY/MASSACHUSETTS NETWORK PLOTTED RESULTS
FOR MODERATE BEHAVIORAL RESPONSE (SEVERE HURRICANE)



Note: **About 1140 vehicles were on the network at the end of simulation for all background runs.**

TABLE 5-1
SUMMARY OF CLEARANCE TIMES (Weak Hurricane Scenario)

	BACKGROUND TRAFFIC CONDITION		
	Off-peak	Mid-peak	Peak
WEST BAY/RHODE ISLAND NETWORK	Hrs:Min		
Rapid Response	4:21	4:24	4:42
Moderate Response	6:10	6:11	6:43
Slow Response	8:04	8:04	8:38
EAST BAY/MASSACHUSETTS NETWORK			
Rapid Response	4:15	4:41	5:08
Moderate Response	6:06	6:10	6:28
Slow Response	8:01	8:02	8:22

TABLE 5-2
SUMMARY OF CLEARANCE TIMES (Severe Hurricane Scenario)

	BACKGROUND TRAFFIC CONDITION		
	Off-peak	Mid-peak	Peak
WEST BAY/RHODE ISLAND NETWORK	Hrs:Min		
Rapid Response	4:35	4:42	5:33
Moderate Response	6:10	6:13	7:37
Slow Response	8:04	8:04	9:36
EAST BAY/MASSACHUSETTS NETWORK			
Rapid Response	5:07	5:33	5:44
Moderate Response	6:06	6:47	7:15
Slow Response	8:03	8:11	8:36

West Bay/Rhode Island Network

For the West Bay/Rhode Island network, clearance times ranged from a minimum of approximately 4 hours and 20 minutes to a maximum of approximately 9 hours and 35 minutes. For this network, the evacuation clearance times for off-peak and mid-peak conditions under both weak and severe hurricane scenarios are only slightly higher than the response times, indicating that the response times are the primary factor influencing the total clearance times for these conditions. For the off-peak and mid-peak conditions under both the weak and severe hurricane scenarios, simulated traffic conditions are mostly free flow, with no long-term congestion along the network. For these conditions, some intermittent queuing occurs along Route 2 in East Greenwich; Route 1 in North Kingstown and Warwick and along Route 117 and 117A in Warwick; as well as some off ramps to I-95 in Warwick and Providence. The simulations for the off peak conditions showed limited congestion along I-95 and Route 1 north of Warwick.

West Bay/Rhode Island Network clearance times for all of the peak conditions reflect more congestion and lower travel speeds in numerous areas, compared to the off-peak and mid-peak conditions. Extended queuing is predicted to occur along Route 1, from Providence to North Kingstown, along I-95 in Warwick and Providence, as well as along most ramps accessing I-95 in these communities for extended periods during the evacuation. A moderate amount of congestion is also expected to occur along Route 138, between Route 102 and the Jamestown Bridge, as well as along Routes 2 and 4 in East Greenwich. Intermittent vehicle queuing and congestion would also occur along Routes 110 and 108 in South Kingstown, and Routes 117 and 117A in Warwick. For the peak conditions, Route 1 in Warwick is the one link expected to experience the highest level of overall congestion. Route I-95 in Warwick is also expected to experience prolonged delays during portions of the evacuation, with travel speeds lowering to 25-40 miles per hour. Along Route 1, travel speeds are predicted to decrease to 15 to 25 miles per hour for much of the time after the evacuation recommendation is disseminated.

In summary, the controlling factor for clearance of the West Bay/Rhode Island network is evacuee response time for off-peak and mid-peak conditions, while increased congestion in the peak case has an impact on extending the evacuation time, over the response time, by up to approximately 1 hour and 30 minutes. The difference in clearance times between the weak hurricane and severe hurricane storm scenarios are generally less than 1 hour, indicating that the number of evacuees and available roadway capacities are not the major influence on the clearance time for the West Bay/Rhode Island network.

East Bay/Massachusetts Network

For the East Bay/Massachusetts network, clearance times range from a minimum of 4 hours and 15 minutes, to a maximum of approximately 8 hours and 35 minutes. The evacuation clearance times for off-peak and mid-peak conditions under the weak hurricane scenario are only slightly higher than the response times, indicating that the background traffic conditions are the primary factor influencing total clearance times for these conditions.

Evacuation traffic conditions for off-peak, mid-peak, and peak rapid response conditions under the weak hurricane scenario generally result in free flow conditions, except for portions of Route 6 in Swansea, and Fall River, MA, and sections of Route 114 through Portsmouth and Middleton, RI and sections of 103

through Barrington and Warren. The level of congestion however, is more prominent for the mid-peak and peak rapid response scenarios. In these locations, intermittent vehicle queuing temporarily slows travel speeds to approximately 20 to 25% of the posted travel speeds. However, for these conditions, the intermittent congestion corresponds to the loading intervals for evacuating traffic. This indicates that the intermittent congestion and reductions in travel speeds are directly related to the assumed rate at which evacuees load onto roadways.

Evacuation traffic conditions for off-peak, mid-peak, and peak rapid response conditions under the severe hurricane scenarios has greater congestion problems along Route 6 in East Providence, Swansea and Fall River; Route 103 in Barrington and Warren and sections of Route 114 through Portsmouth and Middleton, RI, particularly during the rapid response condition. This intermittent congestion also corresponds to the loading intervals for evacuating traffic.

For peak conditions under the weak hurricane scenario, and most conditions under the severe hurricane scenario, increased vehicle queuing and congestion is expected along portions of Routes 6 in Swansea, MA, and sections of Route 114 through Portsmouth and Middleton, RI. Congestion is also predicted around the major urban centers subsequent to the evacuation recommendation, including key connectors such as Routes 6, 103 and 138 in the vicinities of East Providence, RI, Fall River, MA, Somerset, MA, Swansea, MA, Bristol, RI, and Barrington, RI. The roadways which will experience the most significant vehicle queuing are Route 6, between Fall River, MA and East Providence, and Route 114, between the Mount Hope Bridge and Route 6 in East Providence, RI. Congestion is also expected along Route 103 in Barrington and Warren.

In summary, evacuation clearance times for the East Bay/Massachusetts network, for the off-peak and mid-peak, moderate and slow response conditions under the weak and severe hurricane scenarios are generally defined by the response time. Although some intermittent queuing is expected, the major factor influencing these clearance times are the times associated with behavioral response. Simulations of most of the remaining weak storm and severe storm conditions indicate that prolonged vehicle queuing and congestion will have more of an impact in defining the overall clearance time. Specifically, congestion and vehicle queuing are predicted along major arterials, such as Route 6 in New Bedford, MA, and urban roadways such as Routes 114 and 24, and 103 in the bay communities, adding up to 1 hour and 45 minutes over the response time to the rapid response scenario.

A comparison of the clearance times for the East Bay/Massachusetts network indicates that the difference in evacuating population between a weak and severe storm would generally add an hour or less to the total clearance time. This indicates that even for the mid-peak and off-peak conditions, the response time is a substantial component of the overall clearance time.

5.3 SENSITIVITY ANALYSIS

5.3.1 Overview

The purpose of the sensitivity analysis was to evaluate the impact of simulated clearance times to key parameters that may vary from the base conditions discussed earlier. The key parameters considered in this analysis are:

- Population - to evaluate the impact of increased levels of the evacuating population on simulated clearance times
- Response Time - to access the sensitivity of a reduced response time for the rapid response condition
- Evacuation Shelter Use - to see how a reduction in community shelter use would impact simulated clearance times

The intent of the sensitivity analysis was not to simulate all cases and scenarios, but rather to evaluate a range of conditions which would define appropriate bounds from which conclusions for all conditions could be drawn.

Simulations for these three sensitivity analysis conditions were evaluated first for the severe hurricane scenario. If appropriate, for cases where a significant impact was found, the weak hurricane scenario would be considered. To limit the number of simulations, only scenarios that could be considered as defining the "upper" and "lower" bounds of clearance time were considered. From the base condition results, these scenarios were determined to be rapid and slow evacuee conditions during off-peak and peak background scenarios.

5.3.2 Sensitivity to Population Increases

The effect of population increases of up to 20% on clearance times were evaluated for the conditions outlined above. The simulated results for the cases analyzed are presented in Annex C, Table AC-1.

The results indicate that, for the severe hurricane scenario, several analysis conditions are sensitive to population increases of this magnitude. The most significant increases would be associated with the peak conditions (up to an 80 minute increase for the West Bay/Rhode Island network, and up to a 60 minute increase for the East Bay/Massachusetts network).

For the off-peak slow response scenario, the 20% increase in population had little effect on the clearance time for both networks. The 20% increase in population for the off-peak rapid response condition added up to 40 minutes to the clearance time.

In summary, an increase of total evacuating population of 20% for the severe hurricane scenario would have an appreciable effect on clearance times for the peak conditions. For the West Bay/Rhode Island network the most significant increase in clearance time would occur during the rapid response condition, whereas for the East Bay/Massachusetts network the most significant increase would occur for the slow response condition. Increases for the moderate response condition would be expected to be appreciable for both networks. These differences (i.e., between the East Bay/Massachusetts, and West Bay/Rhode Island

network results) are associated with differences in the ability of the networks to accommodate the added traffic under the various loading scenarios.

Overall, it can be stated that for the defining cases, a 20% increase in population will result in an increase of clearance times of up to 80 minutes (up to 1 hour with a 10% increase).

5.3.3 Sensitivity to Shorter Rapid Response Time

A shorter rapid response time was evaluated to determine how sensitive the assumptions on rapid response were to clearance times. A 2-hour decrease in rapid response time (or a total response time of 2 hours) was used for the sensitivity analysis, for the severe hurricane scenario. The results of the sensitivity analysis simulations are presented in Annex C, Table AC-2.

The results indicate that, under the severe hurricane scenario, for both the West Bay/Rhode Island and East Bay/Massachusetts network, reduced rapid response assumptions have little effect on overall clearance times. For both off-peak and peak conditions, the shorter response times produced results within approximately 50 minutes of the base condition results.

It can be concluded that for the West Bay/Rhode Island and East Bay/Massachusetts networks, a reduction in the assumed rapid response time will have little effect on the overall clearance times. When the response time is reduced to 2 hours, the roadway network and capacity constraints become more of a constraining factor influencing the total clearance time.

5.3.4 Sensitivity to a Reduction in Community Shelter Use

An analysis was also performed to determine if the assumption on the number of persons expected to use community shelters could have an appreciable effect on the clearance times. Specifically, the intent was to determine if less evacuees used the shelters than predicted, would the additional traffic on the evacuating roadways have a significant effect on the clearance times.

The analysis was conducted for the severe hurricane scenario, assuming that only half of the evacuees assumed to use shelters under the base condition would actually use the shelters. The results, presented in Annex C, Table AC-3, indicate that for this condition, the impact would be nominal for most scenarios. The greatest increase in clearance time would be approximately 35 minutes for the West Bay/Rhode Island network, and 20 minutes for the East Bay/Massachusetts network. For most other conditions, the increased times resulting from decreased shelter use was about 10 minutes or less. Accordingly, it can be concluded that for most conditions under the severe hurricane scenario, the impact of a 50% reduction in community shelter use will not have an appreciable impact on clearance times.

It can also be concluded that for the weak hurricane scenario conditions, a reduction in community shelter use would generally have a nominal impact on clearance times.

SECTION SIX

SUMMARY

The Rhode Island Transportation Analysis is one element of a more comprehensive study entitled the Rhode Island Hurricane Evacuation Study. Two major considerations in hurricane evacuation planning are: 1) how much time will it take to notify people that they must leave their homes after authorities have determined an evacuation is necessary (dissemination time), and 2) how much time will it take for people who evacuate their homes to travel roadways and reach safe destinations (clearance time). Evacuation time is defined as the combination of these two times. The overall objective of the Transportation Analysis is to develop estimates of clearance times under a variety of hurricane evacuation scenarios for coastal Rhode Island. Clearance times and the results from other technical analyses are compiled in the Technical Data Report of the Rhode Island Hurricane Evacuation Study offering State and local officials state-of-the-art information for which hurricane preparedness plans can be updated.

An evacuation simulation computer model entitled NETVAC2 was used to create a mathematical representation of the road system in Rhode Island and Bristol County, Massachusetts. The model was calibrated to the traffic patterns of a normal day (a day for which no hurricanes are forecasted) using traffic and roadway data obtained from the Rhode Island Department of Transportation and Massachusetts Highway Department. Estimates of the numbers of seasonal and permanent residents that would evacuate prior to future hurricanes were made using estimates of the total vulnerable population and application of human behavioral characteristics assumed for the study area. During evacuation simulations, evacuating vehicles were programmed to enter roadways at prescribed loading rates and compete for roadway and intersection capacities with other vehicles of different trip purposes.

Evacuation scenarios, idealizing some of the possible situations officials may be faced with while contending with the decision to issue an evacuation, were outlined. Key parameters of evacuation scenarios include the intensity or severity of the hurricane, the behavioral response of evacuees to mobilize and leave their homes, and the time of day an evacuation takes place. Because Rhode Island and Bristol County, Massachusetts support an industrial and commercial base employing many people in and near inundation areas, evacuations are complicated by the presence of commuter traffic which varies at different times of the day. A total of 18 different scenarios formulated from combinations of key parameters were analyzed using the NETVAC2 model.

For the West Bay/Rhode Island network, results showed that in situations where people left their homes over a moderate to long period of time (6 to 8 hours after being told to do so by authorities), the density and capacity of the roadway system are such that evacuating traffic clears the network in slightly greater time than response times. For the rapid response condition (where people leave their homes within 4 hours of being told to do so by authorities) during peak background traffic, vehicle queuing and congestion can add up to 1 hour and 45 minutes to the clearance time.

For off-peak and mid-peak conditions under both weak and severe hurricane scenarios, simulated traffic conditions are mostly free flow with no long-term congestion throughout the network. However, clearance times for all of the peak conditions reflect greater congestion and lower travel speeds in Providence,

Warwick, East Greenwich, and North Kingstown. However, the congestion does clear soon after the loading period.

The lowest clearance time calculated was approximately 4 hours and 30 minutes for the weak hurricane scenario assuming rapid response and off-peak background traffic in the West Bay/Rhode Island and East Bay/Massachusetts networks. The highest clearance time of about 9 hours and 35 minutes was calculated for the West Bay/Rhode Island network, for the severe hurricane scenario assuming slow evacuee response during peak background traffic conditions.

All scenarios assuming slow evacuee response resulted in clearance times ranging from approximately 8 hours to 9 hours and 35 minutes in both networks, independent of the severity of the hurricane or background traffic conditions.

A sensitivity analysis has been performed to evaluate the impact of key assumptions and parameters to evacuation clearance times. This analysis has indicated the following:

- An increase of total evacuating population of 20% for the severe hurricane scenario would add up to about 80 minutes for the West Bay/Rhode Island network and up to about 60 minutes for the East Bay/Massachusetts network. For the majority of cases, the increase in clearance times associated with a 20% increase in population results in a predicted increase in clearance times of less than 10%.

- Reductions in the assumed rapid response times will have little effect on the overall clearance times, for all conditions. When the response times are reduced to 2 hours, the roadway network and capacity constraints become more of a constraining factor influencing the total clearance time.

- A reduction in the assumed use of community shelters will generally have little effect on clearance times for most conditions. The greatest increase in clearance times for both the West Bay/Rhode Island and East Bay/Massachusetts network would be about 35 minutes for the peak condition. For most other conditions, the increased times resulting from decreased shelter use would be 10 minutes or less.

As stated before, the clearance times calculated in the analysis comprise only a portion of total evacuation times. An additional time component is required for officials to effectively disseminate evacuation recommendations to the public. Dissemination time may differ by region depending on communication and warning procedures utilized by State and local officials in a particular area, and can best be estimated by the responsible state and local officials. Failure to add this component to clearance times will underestimate evacuation times which could result in insufficient time for all evacuees to safely clear the hazard area. Evacuation times can be determined by adding an appropriate amount of time for dissemination to the clearance times estimated for Rhode Island in this analysis. This topic is discussed more fully in Chapter Seven, Evacuation Times, of the Technical Data Report.

REFERENCES

1. USACOE, New England Division, Rhode Island Hurricane Evacuation Study, Inundation Map Atlas; May 1993.

2. Sheffi, Mahmassani, Powell, Klimm, NETVAC2 User Manual; 1980.

3. USACOE, Mobile District, Tri-State Hurricane Evacuation Study, Appendix C, Transportation Analysis; June 1986.

4. Hazards Management Group, Inc., Hurricane Evacuation Behavior in Middle Atlantic and Northeast States; 1989.

5. US Department of Transportation Federal Highway Administration, State Highway Map of Rhode Island (Traffic Flow Map); 1993.

6. Massachusetts Highway Department, 1993 Traffic Volumes for the Commonwealth of Massachusetts; 1994.

7. Rhode Island, Department of Transportation Highway Intersection Data; 1994.

8. Per guidance presented in "Calibration and Adjustment of System Planning Models, Federal Highway Administration", December 1990, Washington, D.C.

9. US Department of Commerce, Bureau of the Census, 1980 Census of Population and Housing Summary Tape File 3A; July 1983.

10. US Department of Commerce, Bureau of the Census, 1990 Census of Population and Housing Summary Tape File; 1990.

ANNEX A:
RHODE ISLAND NETWORK COMPUTER INPUT FILES

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102 103 6283 11 11  2 1 1 7 4 30     75 105     107
102 123 5385 10 10  2 1 1 7 4 30     25 125
103 105 7800 11 11  2 1 1 7 4 30     80 106     801
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106 802 1000 22 11  6 2 1 5 3 40     99
106 111 3009 22 11  6 2 1 5 3 40    100 112
107 108 1000 22 11  2 2 1 8 3 50     90 114
107 110 1000 11 11  2 1 1 1 3 30     10 126
108 11414520 22 11  2 2 1 8 3 50     90 116     115
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109 110 1000 22 11  6 2 1 5 3 40    100 126     126
468 108 1000 22 11  2 2 1 1 3 25      1 114
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111 106 3000 22 11  6 2 1 5 3 40     99 802     001
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295	285	3000	10	10	2	1	1	7	2	30	50	271				
313	310	6000	22	11	2	2	1	4	2	35	20		311			
313	314	1000	22	11	2	2	1	4	2	35	100	830				
314	830	4500	11	11	2	1	1	5	2	25	20					
314	313	1000	22	11	2	2	1	4	2	35	80	310				
315	307	6000	22	11	2	2	1	6	3	40	80	305	837			
315	314	2400	11	11	2	1	1	5	3	40	20			830		
317	315	5000	11	11	2	1	1	5	3	40	50	314	307			
317	318	1000	11	11	2	1	1	1	4	25	100	041				
318	04149500		36	12	6	3	1	8	2	55	100	038	040			
403	40449500		36	12	6	3	1	8	2	55	100	405				
319	335	5250	24	12	6	2	1	8	2	55	25	337		336		
320	321	7200	11	11	2	1	1	1	2	25	100	309				
407	408	4500	48	12	6	4	1	8	4	55	75	409				
407	430	7200	24	12	6	2	1	8	4	55	25	431	890			
321	309	2250	24	12	6	2	1	8	2	55	100		310			
322	839	1000	11	11	2	1	1	5	4	25	20					
322	323	1000	11	11	2	1	1	4	4	40	80	336				
323	33611400		24	12	6	2	1	6	4	40	25	345				
323	324	1000	11	11	2	1	1	1	4	25	75	300				
324	300	1000	22	11	2	1	1	6	1	40	100		408			
324	280	1000	22	11	2	1	1	6	1	40	10	276				
325	326	3000	11	11	2	1	1	1	4	25	5	329				
325	327	1800	22	11	6	2	1	5	4	40	95	331				
326	329	1800	24	12	6	2	1	6	4	50	100	339		410		
327	331	3000	22	11	6	2	1	5	4	40	100			370		
327	326	1000	11	11	2	1	1	1	4	25	50	329				
328	842	1000	11	11	2	1	1	5	4	25	20					
328	331	2700	24	12	6	2	1	8	4	50	80	327	370			

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329 410 1000 11 11  2 1 1 1 4 25     75 411
329 339 6900 24 12  6 2 1 6 4 50     25 341
410 41111250 48 12  6 4 1 8 2 50    100 412
330 27812000 48 12  6 4 1 8 2 55     75 302     887
331 370 9000 22 11  6 2 1 5 2 40     50 386
331 327 2400 22 11  6 2 1 5 2 50    100 325     326
332 328 3000 11 11  2 1 1 5 2 50    100         842
332 376 7000 11 11  2 1 1 5 2 50    100 377
333 324 3000 11 11  2 1 1 5 2 25    100 280
334 309 6000 24 12  6 2 1 8 4 55    100 311
335 337 3000 22 11  6 2 1 1 2 40     50 338
336 345 9600 11 11  2 1 1 5 3 35    100 346
337 338 2700 24 12  6 2 1 6 2 45    100 340
338 340 1000 24 12  6 2 1 6 2 45    100 344
339 341 1500 24 12  6 2 1 6 2 45    100 354
340 341 1000 11 11  2 1 1 1 2 25    100         354
341 354 2700 24 12  6 2 1 6 2 50    100         433
344 353 7500 22 11  2 2 1 6 3 40    100 386                 846
344 340 3600 24 12  6 2 1 6 2 50     25         341
340 344 3600 24 12  6 2 1 6 2 50     75 353
344 345 6000 22 11  2 2 1 5 2 35     75         346
345 344 6000 22 11  2 2 1 5 2 35    100 353
346 347 5000 22 11  2 2 1 5 2 35     80 348
335 336 1000 11 11  2 1 1 1 2 25     50 345
315 317 5000 22 11  2 2 1 6 3 40     50         318
345 346 5250 22 11  2 2 1 5 2 35    100 347                 845
346 845 3000 11 11  2 1 1 5 3 35     20
346 345 5250 22 11  2 2 1 5 2 35     80 344
347 348 3000 22 11  2 2 1 5 2 35    100 349
347 346 5000 22 11  2 2 1 5 2 35    100 345     845
348 349 6750 22 11  2 2 1 5 2 35    100 350                 351
349 348 6750 22 11  2 2 1 5 2 35     80 347
348 347 3000 22 11  2 2 1 5 2 35    100 346
349 351 1000 11 11  2 1 1 6 4 25     50                     355
349 434 1000 11 11  2 1 1 6 4 25     20         435
349 35013500 22 11  2 2 1 5 2 35     50 047                 834
350 34913500 22 11  2 2 1 5 2 35     80 348     434
350 834 1000 11 11  2 1 1 5 4 35     15
350 04728500 12 12  6 1 1 7 4 40     85         048         046
353 846 8250 11 11  2 1 1 5 3 35     20
353 344 7500 22 11  2 2 1 6 3 40     80 340     345
353 386 6750 22 11  2 2 1 6 3 40     80 358
354 433 1500 11 11  2 1 1 1 3 25    100 434
351 35512000 24 12  6 2 1 8 4 55    100 357
355 35712000 24 12  6 2 1 8 4 55    100 320
357 32012000 24 12  6 2 1 8 4 55    100 334
320 334 4500 24 12  6 2 1 8 4 55    100 309
358 850 1000 11 11  2 1 1 4 1 30     20
238 23311100 22 11  6 2 1 5 4 50    100 229
370 386 7500 22 11  2 2 1 5 1 40     20 358
370 371 1000 11 11  2 1 1 1 1 25     80 843                 372
370 331 9000 22 11  6 2 1 6 2 40    100         327
371 372 2700 11 11  2 1 1 1 1 25     80 374     412
372 374 1000 22 11  2 2 1 1 1 40     50 389
412 413 9750 48 12  6 4 1 8 1 55    100 414
374 375 1000 11 11  2 1 1 1 1 25    100 330
375 33011250 48 12  6 4 1 8 2 55    100 278     886
411 412 1200 24 12  6 2 1 8 1 55    100 413
376 332 6000 24 12  6 2 1 6 2 50    100         328
376 377 1800 11 11  2 1 1 5 2 45    100                    378
377 378 2100 11 11  2 1 1 5 2 45    100 379
378 379 5400 24 12  6 2 1 6 2 50    100 413                851
379 851 2400 11 11  2 1 1 5 2 25     20
379 413 1000 11 11  2 1 1 1 4 25     80 414
413 414 5250 48 12  6 4 1 8 2 55    100 415     382
414 382 2100 12 12  2 1 1 8 1 50     20         397
414 415 1500 48 12  6 4 1 8 1 55     80 417
383 381 1500 48 12  6 4 1 8 1 55    100 380
382 397 2400 36 12  6 3 1 8 1 50     10 871
382 415 1800 12 12  2 1 1 8 1 50     80         417
383 87025500 48 12  6 4 1 1 4 50    100
359 38325500 48 12  6 4 1 8 2 55    100 381
416 872 1000 48 12  6 4 1 8 4 55    100
381 380 5250 48 12  6 4 1 8 2 55    100 373
380 373 9000 48 12  6 4 1 8 2 55    100 375     374
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373 375 1200 48 12  6 4 1 8 2 55    90 330
373 374 1000 11 11  2 1 1 1 2 25    10          389
387 398 1000 24 12  6 2 1 6 1 45   100 390      852
389 37413500 24 12  6 2 1 6 1 50   100          375
389 391 2700 24 12  6 2 1 8 1 55   100 056
390 06115900 24 12  6 2 1 6 2 55    20 059
391 05615600 24 12  6 2 1 6 2 55   100 057
389 05618000 24 12  6 2 1 8 4 55   100          436
392 397 3600 22 11  2 2 1 4 1 40    95 871
392 854 3000 11 11  2 1 1 5 1 30    05
358 392 9000 22 11  2 2 1 5 1 40   100 226                394
392 394 5250 22 11  2 2 1 5 3 40    35 395                855
393 853 3750 11 11  2 1 1 5 1 30    05
393 870 9000 22 11  2 2 1 5 1 40    95
393 226 1500 22 11  2 2 1 5 1 40    95 392
394 392 5250 22 11  2 2 1 5 3 40   100 397                854
394 855 1000 11 11  2 1 1 5 4 30    20
394 395 3900 22 11  2 2 1 5 3 40    80 396                857
395 394 3900 22 11  2 2 1 5 3 40   100 392      855
395 857 4500 11 11  2 1 1 5 4 30    20
395 396 5250 22 11  2 2 1 5 3 40    80 073                856
396 856 3000 11 11  2 1 1 5 4 30    20
396 07315000 22 11  2 2 1 5 4 40    80 075      440
396 395 3000 22 11  2 2 1 5 4 40    80 394      857
397 871 6000 36 12  6 3 1 8 1 50   100
398 852 1000 11 11  2 1 1 5 1 10    20
398 390 6750 24 12  6 2 1 6 1 45    80 061      391
390 398 6750 24 12  6 2 1 6 1 45    80                    852
390 391 1000 11 11  2 1 1 5 1 25    80          056
386 358 2000 22 11  2 2 1 5 1 40    50 392                850
358 386 2000 22 11  2 2 1 5 1 40    80 370      353
386 353 6750 11 11  2 1 1 5 1 30    10 344      846
386 370 7500 22 11  6 2 1 5 1 40    90 331
374 38914000 22 11  2 2 1 1 1 40   100          056
372 412 1000 11 11  2 1 1 1 1 25    50          413
371 843  500 11 11  2 1 1 5 1 25    20
054 056 1000 11 11  2 1 1 1 4 25   100 389
226 870 1000 22 11  2 2 1 7 1 50     1
337 325 1500 24 12  6 2 1 7 2 50    50 275
325 275 1500 24 12  6 2 1 5 2 40   100 276
280 281 5250 22 11  6 2 1 5 3 40     4                    266
281 266 9000 22 11  6 2 1 5 3 40    95 265
253 241 6000 22 11  6 2 1 5 3 40   100 238                826
241 238 6500 22 11  6 2 1 5 4 40    90 233
233 229 3000 22 11  6 2 1 7 4 40   100 227
229 227 9000 22 11  6 2 1 5 4 50   100 222
227 222 4500 22 11  6 2 1 7 4 40   100 224
222 224 1500 22 11  6 2 1 8 4 50    50 450
224 45012000 22 11  6 2 1 8 4 50   100 451      180
463 464 6000 22 11  6 2 1 8 4 50   100 465
238 241 6500 22 11  6 2 1 5 4 40    85 253
266 281 9000 22 11  6 2 1 5 3 40   100          280
327 325 1000 22 11  6 2 1 7 3 40    50 275
392 226 1500 22 11  6 2 1 7 3 40   100 393
392 358 9000 22 11  6 2 1 7 3 40   100 386
382 381 1500 22 11  2 2 1 4 3 35    10 380
383 382 1500 22 11  2 2 1 4 3 35   100 397
397 392 6000 22 11  2 2 1 5 3 40   100 394
397 382 6000 36 12  6 3 1 8 1 50   100          415      381
398 387 1500 24 12  6 2 1 6 1 45    90 382
387 382 1500 24 12  6 2 1 8 4 55   100 397
226 392 1500 22 11  6 2 1 5 1 40    99 358
026 405 6000 24 12  2 2 1 4 2 40   100 406
027 407 6000 24 12  2 2 1 4 2 40   100 408
028 408 6000 24 12  2 2 1 4 2 40   100 409
029 409 6000 24 12  2 2 1 4 2 40   100 410
415 41712000 48 12  6 4 1 4 2 55   100 416      885
417 41612000 48 12  6 4 1 4 2 55    70 872
417 885 3000 24 12  2 2 1 4 2 45    30
430 431 3000 24 12  6 2 1 8 4 55    80 432      891
431 43212000 24 12  6 2 1 8 4 55    80 433
432 433 1500 24 12  6 2 1 8 4 55   100 434
433 43413500 24 12  6 2 1 8 4 55   100 435      349
434 43510500 24 12  6 2 1 8 4 55    96 436      056
434 349 1000 11 11  2 1 1 1 4 25     4          350
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 435 436 3000 24 12  6 2 1 8 4 55    100 437
 436 437 1500 24 12  6 2 1 8 4 55    100 438     061
 437 061 1000 11 11  2 1 1 1 4 25     15 390
 437 438 1500 24 12  6 2 1 8 4 55     85 439
 438 43915000 24 12  6 2 1 8 4 55    100 440
 439 440 1000 24 12  6 2 1 8 4 55     90 441     075
 439 073 1000 11 11  2 1 1 1 4 25     10 396
 440 44113500 24 12  6 2 1 8 4 55     85 442     881      088
 440 075 1000 11 11  2 1 1 5 1 25     15 044
 441 881 1000 11 11  2 1 1 5 1 25     40
 441 442 1000 24 12  6 2 1 8 4 55     40 443
 441 088 1000 11 11  2 1 1 5 1 25     10
 442 44315000 24 12  6 2 1 8 4 55    100 444     882
 443 882 1000 11 11  2 1 1 5 1 25     40
 443 444 1000 24 12  6 2 1 8 3 55    100 860
 444 86042000 24 12  6 2 1 8 3 55    100
 278 887 3000 24 12  6 2 1 8 3 55     30
 330 886 3000 24 12  6 2 1 8 3 55     20
 309 888 3000 24 12  6 2 1 8 3 55     25
 257 889 3000 24 12  6 2 1 8 3 55     46
 030 386 8300 22 11  2 2 1 5 1 40    100 370
 450 18018510 11 11  2 1 1 4 4 40      5 181
 167 458 9000 10 10  2 1 1 7 4 50    100 459
 463 13910500 11 11  2 1 1 7 4 35     30 133
 141 462 4800 10 10  2 1 1 7 4 50    100                  463
 466 13110830 11 11  2 1 1 4 4 50     40 132              115
 250 245 5250 24 12  6 2 1 8 4 50    100 244
 245 244 3000 24 12  6 2 1 8 4 50    100 243
 244 243 1000 24 12  6 2 1 8 4 50    100 234
 243 234 1000 24 12  6 2 1 8 4 50    100 228              823
 129 464 6000 24 12  6 2 1 5 4 30    100                  465
 456 160 1000 11 11  4 1 1 7 4 35     35 184
 430 890 3000 24 12  6 2 1 8 2 55     20
 431 891 3000 24 12  6 2 1 8 2 55     25
 452 175 3000 24 12  6 2 1 5 2 35     25 176
 227 895 3000 24 12  6 2 1 5 2 35     75
 454 897 3000 24 12  6 2 1 5 2 40     20
 093 090 3000 36 12  6 3 1 8 4 55    100 397
99999
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POPOTP1 Rhode Island Strong Storm Off-Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout1.dat'
outprint='popout1.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=270.0 int1(2)=390.0 int1(3)=400.0 int1(4)=510.0 int1(5)=630.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT2 Rhode Island Strong Storm Off-Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout2.dat'
outprint='popout2.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=120.0 int1(2)=300.0 int1(3)=360.0 int1(4)=480.0 int1(5)=660.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
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POPOPT3 Rhode Island Strong Storm Off-Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout3.dat'
outprint='popout3.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=0.0 int1(2)=240.0 int1(3)=320.0 int1(4)=480.0 int1(5)=720.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT4 Rhode Island Strong Storm Mid-Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout4.dat'
outprint='popout4.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=840.0 int1(2)=960.0 int1(3)=1000.0 int1(4)=1080.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

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POPOPT5 Rhode Island Strong Storm Mid-Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout5.dat'
outprint='popout5.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=660.0 int1(2)=840.0 int1(3)=900.0 int1(4)=1020.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072


POPOPT6 Rhode Island Strong Storm Mid-Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout6.dat'
outprint='popout6.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=480.0 int1(2)=720.0 int1(3)=800.0 int1(4)=960.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
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POPOPT7 Rhode Island Strong Storm Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout7.dat'
outprint='popout7.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=870.0 int1(2)=990.0 int1(3)=1030.0 int1(4)=1110.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072


POPOPT8 Rhode Island Strong Storm Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout8.dat'
outprint='popout8.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=690.0 int1(2)=870.0 int1(3)=930.0 int1(4)=1050.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
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POPOPT9 Rhode Island Strong Storm Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout9.dat'
outprint='popout9.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=510.0 int1(2)=750.0 int1(3)=830.0 int1(4)=990.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072


POPOPT10 Rhode Island Weak Storm Off-Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout10.dat'
outprint='popout10.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=270.0 int1(2)=390.0 int1(3)=430.0 int1(4)=510.0 int1(5)=630.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
```

```
POPOPT11 Rhode Island Weak Storm Off-Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout11.dat'
outprint='popout11.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=120.0 int1(2)=300.0 int1(3)=360.0 int1(4)=480.0 int1(5)=660.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072


POPOPT12 Rhode Island Weak Storm Off-Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout12.dat'
outprint='popout12.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=0.0 int1(2)=240.0 int1(3)=320.0 int1(4)=480.0 int1(5)=720.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
```

POPOPT13 Rhode Island Weak Storm Mid-Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout13.dat'
outprint='popout13.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=840.0 int1(2)=960.0 int1(3)=1000.0 int1(4)=1080.0 int1(4)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT14 Rhode Island Weak Storm Mid-Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout14.dat'
outprint='popout14.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=660.0 int1(2)=840.0 int1(3)=900.0 int1(4)=1020.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT15 Rhode Island Weak Storm Mid-Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout15.dat'
outprint='popout15.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=480.0 int1(2)=720.0 int1(3)=800.0 int1(4)=960.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT16 Rhode Island Weak Storm Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout16.dat'
outprint='popout16.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=870.0 int1(2)=990.0 int1(3)=1030.0 int1(4)=1110.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT17 Rhode Island Weak Storm Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout17.dat'
outprint='popout17.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=690.0 int1(2)=870.0 int1(3)=930.0 int1(4)=1050.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT18 Rhode Island Weak Storm Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout18.dat'
outprint='popout18.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=510.0 int1(2)=750.0 int1(3)=830.0 int1(4)=990.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

Background Traffic

NR1ANB	3	2900	1.00	194	100						
WE1NB	3	10300	1.00	155	100						
WA1NB	3	4000	1.00	331	100						
WE1SB	3	3500	1.00	129	100						
WE1SB	3	3000	1.00	467	100						
PW1SB	3	5000	1.00	092	100						
WA1SB	3	10000	1.00	030	77	370	23				
WAAPR	3	2500	1.00	274	100						
HO95NB	3	17050	1.00	077	100						
PW95SB	3	86000	1.00	086	55	359	10	383	10	381	25
BU102S	3	6300	1.00	078	100						
NK2NB	3	10000	1.00	079	100						
GL44EB	3	3500	1.00	083	100						
SC6EB	3	1000	1.00	084	100						
SC6WB	3	3600	1.00	387	100						
SC14EB	3	1200	1.00	085	100						
NA295S	3	17800	1.00	076	83	072	17				
CR295S	3	5000	1.00	057	100						
NS146S	3	6000	1.00	081	100						
BU7SB	3	1	1.00	082	100						
PR195W	3	30150	1.00	090	100						
RI138E	3	5900	1.00	091	100						
NR138W	3	8700	1.00	098	100						
NK1SB	3	1	1.00	099	100						
WE1NB	3	10000	1.00	126	100						
CHRT1B	3	4000	1.00	185	100						
CHRT1B	3	2500	1.00	167	100						
SKRT1B	3	7000	1.00	209	100						
WART1B	3	4000	1.00	266	100						
WART1B	3	4000	1.00	281	100						
WART1B	3	4000	1.00	280	100						
WART1B	3	4000	1.00	276	100						
WART1B	3	8000	1.00	275	100						
WART1B	3	4000	1.00	325	100						
WART1B	3	4000	1.00	331	100						
CH2SB	3	3300	1.00	151	100						
EG4NB	3	35000	1.00	250	100						
EGQP	3	5000	1.00	235	100						
PR195W	3	20000	1.00	397	100						
SKETL	3	1000	1.00	169	100						
WA95NL	3	12000	1.00	026	100						
WA95NL	3	15000	1.00	027	100						
WA95NL	3	15000	1.00	028	100						
WA95NL	3	15000	1.00	029	100						
NK4NB	3	35000	1.00	242	50	250	50				

Severe Storm Surge Vulneralbe Population File

1	1	333	2.96	378	100						
7	1	4	2.96	379	100						
34	1	33	2.96	225	100						
35	1	166	2.96	093	100						
37	1	374	2.96	093	100						
134	1	1133	2.05	294	50	377	50				
135	1	368	2.05	378	100						
136	1	409	2.05	371	100						
138	1	94	2.05	330	100						
139	1	47	2.05	330	100						
149	1	5	2.26	101	100						

Severe Storm Surge Vulneralbe Population File(con't.)

152	1	3	2.26	101	100								
153	1	54	2.26	393	100								
160	1	21	2.26	393	100								
165	1	2	2.26	393	100								
166	1	87	2.26	393	100								
167.97	1	264	2.26	101	100								
167.98	1	167	2.26	102	100								
209.01	1	1009	1.85	255	50	256	50						
210	1	1498	1.88	293	50	294	50						
211	1	204	1.88	330	100								
213	1	1888	1.88	306	50	293	50						
214.01	1	1288	1.88	215	80	306	20						
214.02	1	751	1.88	273	100								
215.01	1	2473	1.88	283	34	273	33	295	33				
215.02	1	3992	1.88	271	25	284	25	285	25	262	25		
216	1	1324	1.88	282	50	261	50						
217	1	3900	1.88	286	34	159	33	270	33				
218	1	1579	1.88	272	34	270	33	269	33				
219.01	1	230	1.88	268	100								
219.02	1	457	1.88	288	100								
219.03	1	1677	1.88	287	34	291	33	290	33				
220	1	1995	1.88	265	34	267	33	289	33				
221	1	738	1.88	322	100								
222.01	1	166	1.88	265	100								
223	1	230	1.88	279	100								
224	1	1308	1.88	216	50	217	50						
501.02	1	1052	1.83	238	50	236	50						
501.03	1	458	1.83	241	100								
501.04	1	1129	1.83	240	50	239	50						
502	1	623	1.83	240	50	236	50						
503.01	1	39	1.83	233	100								
503.02	1	1626	1.83	230	34	231	33	232	33				
504.02	1	1616	1.83	230	34	220	33	222	33				
508.01	1	1010	1.90	104	33	106	33	139	34				
508.02	1	970	1.90	103	50	105	50						
509	1	161	1.90	124	100								
510	1	3813	1.90	101	20	102	20	122	20	123	20	124	20
511.01	1	969	1.80	141	100								
511.02	1	990	1.80	143	100								
512	1	378	2.30	177	100								
513.01	1	418	2.30	160	100								
513.02	1	4170	2.30	166	34	188	33	189	33				
515.01	1	4556	1.73	190	20	191	20	193	20	201	20	203	20
515.02	1	3558	1.73	211	25	212	25	213	25	214	25		

Weak Storm Surge Vulnerable Population File

1	1	148	2.96	378	100		
7	1	2	2.96	379	100		
34	1	30	2.96	225	100		
35	1	147	2.96	093	100		
37	1	166	2.96	093	100		
134	1	952	2.05	294	50	377	50
135	1	267	2.05	378	100		
136	1	259	2.05	371	100		
138	1	83	2.05	330	100		
139	1	42	2.05	330	100		
149	1	4	2.26	101	100		
152	1	2	2.26	101	100		

Weak Storm Surge Vulnerable Population File(con't.)

153	1	48	2.26	393	100							
160	1	18	2.26	393	100							
165	1	2	2.26	393	100							
166	1	78	2.26	393	100							
167.97	1	234	2.26	101	100							
167.98	1	149	2.26	102	100							
209.01	1	720	1.85	255	50	256	50					
210	1	948	1.88	293	50	294	50					
211	1	97	1.88	330	100							
213	1	1388	1.88	306	50	293	50					
214.01	1	980	1.88	215	80	306	20					
214.02	1	406	1.88	273	100							
215.01	1	1757	1.88	283	34	273	33	295	33			
215.02	1	2469	1.88	271	25	284	25	285	25	262	25	
216	1	752	1.88	282	50	261	50					
217	1	3372	1.88	286	34	159	33	270	33			
218	1	1044	1.88	272	34	270	33	269	33			
219.01	1	182	1.88	268	100							
219.02	1	238	1.88	288	100							
219.03	1	1201	1.88	287	34	291	33	290	33			
220	1	1406	1.88	265	34	267	33	289	33			
221	1	328	1.88	281	50	322	50					
222.01	1	92	1.88	265	100							
223	1	102	1.88	279	100							
224	1	1082	1.88	216	50	217	50					
501.02	1	934	1.83	238	50	236	50					
501.03	1	262	1.83	241	100							
501.04	1	768	1.83	240	50	239	50					
502	1	552	1.83	240	50	236	50					
503.01	1	17	1.83	233	100							
503.02	1	1355	1.83	230	34	231	33	232	33			
504.02	1	1353	1.83	230	34	220	33	222	33			
508.01	1	610	1.90	104	33	106	33	139	34			
508.02	1	634	1.90	103	50	105	50					
509	1	132	1.90	124	100							
510	1	2775	1.90	101	20	102	20	122	20	123	20	124 20
511.01	1	690	1.80	141	100							
511.02	1	638	1.80	143	100							
512	1	302	2.30	177	100							
513.01	1	371	2.30	160	100							
513.02	1	3173	2.30	166	34	188	33	189	33			
515.01	1	3246	1.73	190	20	191	20	193	20	201	20	203 20
515.02	1	2834	1.73	211	25	212	25	213	25	214	25	

Severe Storm Mobile Home and Non-Surge Vulnerable Population File

WESTE	2	1170	1.90	107	20	131	20	113	20	132	20	127 20
CHARL	2	730	1.80	139	25	013	25	140	25	148	25	
S.KIN	2	1720	2.30	022	20	165	20	184	20	179	20	182 20
NARRA	2	550	1.73	198	20	199	20	200	20	204	20	207 20
N.KIN	2	1370	1.83	227	25	228	25	229	25	234	25	
E.GRE	2	650	1.85	244	25	246	25	247	25	403	25	
WARWI	2	3090	1.88	305	20	307	20	318	20	315	20	404 20
CRANS	2	3750	2.05	433	20	434	20	347	20	346	20	345 20
PROVI	2	8090	2.96	386	20	390	20	394	20	395	20	396 20
PAWTU	2	4440	2.26	392	50	416	50					

Weak Storm Mobile Home and Non-Surge Vulnerable Population File

WESTE	2	590	1.90	107	20	131	20	113	20	132	20	127	20		
CHARL	2	490	1.80	139	25	013	25	140	25	148	25				
S.KIN	2	970	2.30	022	20	165	20	184	20	179	20	182	20		
NARRA	2	230	1.73	198	20	199	20	200	20	204	20	207	20		
N.KIN	2	870	1.83	227	25	228	25	229	25	234	25				
E.GRE	2	320	1.85	244	25	246	25	247	25	403	25				
WARWI	2	1360	1.88	305	20	307	20	318	20	315	20	404	20		
CRANS	2	1530	2.05	433	20	434	20	347	20	346	20	345	20		
PROVI	2	3290	2.96	386	20	390	20	394	20	395	20	396	20		
PAWTU	2	2300	2.26	392	50	416	50								

ANNEX B:
EAST BAY/MASSACHUSETTS NETWORK COMPUTER INPUT FILES

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001 848   600 11 11  2 1 1 5 2 25    15
070 00131150 24 12  6 2 1 8 2 55   100 100
100 001 2100 24 12  6 2 1 8 2 55    75 860          848
100 101  500 24 12  6 2 1 8 2 55    25 851          102
101 100  500 11 11  2 1 1 1 2 25    75 001
101 102  500 11 11  2 1 1 1 2 25    25 103          847
102 847 3600 11 11  2 1 1 5 2 25    20
102 10312000 11 11  2 1 1 5 2 30    25 104     821
102 101  500 11 11  2 1 1 5 2 25    55         100  851
103 10212000 11 11  2 1 1 5 2 30    55 101     847
103 821 3000 11 11  2 1 1 5 2 25    02
103 104 2700 11 11  2 1 1 5 2 30    25 105
104 103 3000 11 11  2 1 1 5 2 30    75 102          821
104 105 2700 11 11  2 1 1 5 2 30    25 133     106
105 106 5100 11 11  2 1 1 5 2 30    30 107     822
105 133 5400 11 11  2 1 1 5 2 30    30 131          030
106 105 5100 11 11  2 1 1 5 2 30    40         133  104
106 107 2100 11 11  2 1 1 5 2 30    40 108
106 822  300 11 11  2 1 1 5 2 25    15
107 106 2100 11 11  2 1 1 5 2 30    50 105     133  822
107 108 2100 11 11  2 1 1 5 2 30    50 121     113  124
108 124 2250 22 11  2 2 1 5 2 30    30 127
108 121 2100 11 11  2 1 1 5 2 30    20 122     823
108 113 1800 22 11  2 2 1 5 2 30    30 112
108 107 2100 11 11  2 1 1 5 2 30    20 106
124 127 6900 22 11  4 2 1 6 2 40    40 128
124 108 2250 22 11  2 2 1 5 2 30    40 113
131 129 2250 11 11  2 1 1 5 2 30    15 128
129 128 2250 11 11  2 1 1 5 2 30    50 127
129 131 2250 11 11  2 1 1 1 4 25    20 133          022
130 129 1000 11 11  2 1 1 1 4 25    20         128  131
022 02312000 36 12  6 3 1 8 2 55   100 031
021 022 1000 36 12  6 3 1 8 2 55    90 023
021 131 1000 11 11  2 1 1 5 2 25    10         133  129
130 132 1000 36 12  6 3 1 8 2 55    40 144
131 133 9000 11 11  2 1 1 5 2 30    05 105     030
131 022 1000 11 11  2 1 1 5 2 25    80 023
105 104 2700 11 11  2 1 1 5 2 30    40 103
106 133 5250 11 11  2 1 1 7 2 30    05 030     131
129 132 1000 11 11  2 1 1 1 2 25    30         144
109 002  750 11 11  5 2 1 5 2 30    75         852
109 11512000 11 11  2 1 1 5 2 30    25         116
110 114 8250 36 12  6 3 1 8 2 55   100 125
002 112 3000 22 11  2 2 1 5 2 30    50 113
112 002 3000 22 11  2 2 1 5 2 30    50 852
112 113 1500 22 11  2 2 1 5 2 30    50 108          114
113 112 1500 22 11  2 2 1 5 2 30    40 002
113 108 1800 22 11  2 2 1 5 2 30    40 124     121  107
114 125 6000 36 12  6 3 1 8 2 55    50 130     126
031 850 6000 36 12  6 3 1 8 2 55   100
115 116 3300 11 11  2 1 1 5 2 30    25 120          117
115 122 1800 11 11  2 1 1 5 2 30    75 121
116 115 3300 11 11  2 1 1 5 2 30    25 122
116 117 2700 11 11  2 1 1 5 2 30    75              825
116 120 2100 11 11  2 1 1 5 2 30   100              824
117 825 4500 11 11  2 1 1 5 2 25    02
117 116 2700 11 11  2 1 1 5 2 30    80         115
118 120 5250 11 11  2 1 1 5 2 30   100 116     824
119 117 7000 11 11  2 1 1 5 2 30   100         825  116
120 824 1000 11 11  2 1 1 5 2 30    03
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121 108 1800 11 11  2 1 1 5 2 30    40 107    124     113
121 823 1000 11 11  2 1 1 5 2 25    20
121 122 2700 11 11  2 1 1 5 2 30    40 115
122 115 1800 11 11  2 1 1 5 2 25    30 116
122 121 2700 11 11  2 1 1 5 2 25    30 108            823
122 123 4500 11 11  2 1 1 5 2 30    40 178
123 126 4500 11 11  2 1 1 1 4 25   100 023
124 023 2000 11 11  2 1 1 5 2 25    20 031
023 031 6000 36 12  6 3 1 8 2 55   100 850
125 13012000 36 12  6 3 1 8 2 55    80 132    129
126 023 3900 11 11  2 1 1 1 4 25    30 031
127 128 2100 22 11  2 2 1 5 2 30    50 141            129
127 124 5400 22 11  2 2 1 5 2 30    50 108    023
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128 14112900 22 11  4 2 1 6 4 30    40 142
132 14421000 36 12  6 3 1 8 2 55   100 147
133 131 9000 11 11  2 1 1 5 2 30    10 129
133 105 5400 11 11  2 1 1 5 2 30    10 104            106
133 03030000 12 12  6 1 1 7 4 50    40 039            849
133 106 5250 12 12  6 1 1 7 4 50    40 822    105     107
128 129 2000 12 12  6 1 1 7 4 40    20 131    132
113 114 1000 11 11  2 1 1 1 2 25    20        125
140 145 1000 11 11  4 1 1 4 2 35    10 146    147
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140 142 3300 11 11  2 1 1 5 2 30    40 141
141 12812900 22 11  2 2 1 5 2 30    50 127    129
141 142 3750 22 11  2 2 1 5 2 30    50 140
142 141 3750 22 11  2 2 1 5 2 30    50 128
142 140 3300 22 11  2 2 1 5 2 30    50 152            145
144 147 1000 36 12  6 3 1 8 4 55    50 150
145 146 1000 11 11  4 1 1 4 2 35    50 020
146 020 1000 11 11  2 1 1 1 2 25   100 021
145 147 1000 11 11  2 1 1 1 2 25    50 150
020 02121000 36 12  6 3 1 8 2 55   100 022    131
147 150 1000 36 12  6 3 1 8 2 55    50 153
019 020 1000 36 12  6 3 1 8 2 55    90 021
018 01914400 36 12  6 3 1 8 2 55   100 020
150 153 1000 36 12  6 3 1 8 2 55    50 156
151 018 1000 11 11  2 1 1 1 2 25    30 019
151 152 1000 22 11  4 2 1 4 2 35    30 140
152 153 1000 11 11  2 1 1 1 2 25    10 156
152 14015900 22 11  4 2 1 5 2 30    45 142
152 151 1000 22 11  4 2 1 4 2 35    45 024            018
153 15610000 36 12  6 3 1 8 2 55    50 158
017 018 1000 36 12  6 3 1 8 2 55    90 019
017 151 1000 11 11  2 1 1 1 2 30    10        024     152
143 159 2700 11 11  4 1 1 4 2 40   100 157    158
156 158 1000 36 12  6 3 1 8 2 55    50 358
157 162 7500 11 11  4 1 1 4 2 25   100                 163
015 157 1000 11 11  2 1 1 1 2 30    10        162
015 016 1000 36 12  6 3 1 8 2 55    90 017
158 35824000 36 12  6 3 1 8 2 55    40 341
159 157 1000 11 11  2 1 1 1 2 30    50 162            016
159 158 1000 11 11  2 1 1 1 2 25    50 358
162 163 3000 11 11  4 1 1 4 4 25   100 164    350     024
163 024 8750 22 11  4 2 1 5 2 30    55 151    025
163 16422500 12 12  6 1 1 6 4 45    20 036    810
163 350 1000 24 12  6 2 1 6 2 40    25 351
164 03613500 12 12  6 1 1 4 2 45    95 037            808
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151 024 1000 24 12  6 2 1 6 4 45    40 163              025
164 810 1000 11 11  2 1 1 5 4 25    05
145 146 1000 11 11  4 1 1 4 2 50    80 020
016 01710000 36 12  6 3 1 8 2 55   100 018      151
170 171 3900 11 11  2 1 1 4 4 35    20                  826
170 119 4500 11 11  2 1 1 4 4 35    80          117
171 170 3900 11 11  2 1 1 4 4 35    80                  119
171 826 1000 11 11  2 1 1 5 4 25    20
172 171 3000 11 11  2 1 1 4 4 35    95 170              826
172 179 6750 11 11  2 1 1 4 4 35     5                  058
173 172 3300 11 11  2 1 1 4 4 35   100 171
174 179 1000 11 11  2 1 1 4 4 35    50                  172
174 064 3000 10 10  4 1 1 4 4 30    50 191
175 174 2250 11 11  2 1 1 4 4 35   100 179      064
176 175 2100 11 11  2 1 1 4 4 35   100 174
177 176 1800 11 11  2 1 1 4 4 35   100                  175
178 170 1500 11 11  2 1 1 4 4 35    40 119              171
179 058 5400 11 11  2 1 1 4 4 35    50 178
179 172 6750 11 11  2 1 1 4 4 35    50          171
190 199 1500 11 11  4 1 1 4 4 35    50          057
190 198 6000 11 11  4 1 1 4 4 35    50 143      853
191 200 1000 11 11  4 1 1 4 4 40    40                  199
192 191 1250 11 11  4 1 1 4 2 40    30          200
192 193 3000 11 11  4 1 1 4 2 40    30 828      194     190
192 195 1500 11 11  4 1 1 4 2 40    40 197              827
193 190 1000 11 11  4 1 1 4 2 40    70          198
193 194 1500 11 11  4 1 1 4 2 40    10 196
194 193 1500 11 11  4 1 1 4 2 40    75 190      828
194 19610500 11 11  4 1 1 4 2 40    25 221
195 192 1500 11 11  4 1 1 4 2 40    40 191
195 827 1000 11 11  2 1 1 5 2 25    20
195 197 9900 11 11  4 1 1 4 2 40    40 383
196 194 9600 11 11  2 1 1 4 2 35    80 193
196 221 2100 11 11  2 1 1 4 2 35    20 210      829
193 828 1000 11 11  2 1 1 5 2 25    50
198 853 1000 11 11  2 1 1 4 2 35    50
199 057 2250 11 11  4 1 1 4 2 35    60 140
199 190 2000 11 11  4 1 1 4 2 25    20 198
200 199 2000 11 11  4 1 1 4 2 45    70 057
197 195 9900 11 11  4 1 1 5 4 35    50 192      827
197 383 4500 11 11  4 1 1 5 4 35    50 211
198 190 6000 11 11  2 1 1 5 4 35     5          199
198 143 9900 11 11  4 1 1 5 4 40    80 159
210 221 5100 11 11  2 1 1 5 2 35    75 196              829
210 212 3300 11 11  2 1 1 5 2 35    25 214
211 383 3300 11 11  4 1 1 5 4 35    40 197
211 215 5250 11 11  2 1 1 5 2 35    40 216
211 830 1000 11 11  2 1 1 5 4 25    20
212 210 3600 11 11  2 1 1 5 2 35    95 221
212 214 1500 11 11  2 1 1 5 2 35     5 216
214 212 1500 11 11  2 1 1 5 2 35    95 210
214 216 3750 11 11  2 1 1 5 2 35     5 230
215 211 5250 11 11  2 1 1 5 4 35    60 383      830
215 216 3600 11 11  2 1 1 5 2 35    40 230
216 215 3600 11 11  2 1 1 5 2 35    35 211
216 214 3750 11 11  2 1 1 5 2 35    30 212
216 230 6000 11 11  2 1 1 5 2 35    35 231
221 196 2100 11 11  2 1 1 5 4 35    55 194
221 829 1000 11 11  2 1 1 5 4 25    20
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230 216 6000 11 11  2 1 1 5 2 35     50 215     214
230 231 6750 22 11  2 2 1 5 4 35     50 242                248
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231 242 4500 22 11  2 2 1 5 4 35     40 240
231 248 5250 22 11  2 2 1 5 4 35     20 235     831
234 235 5250 11 11  2 1 1 5 4 35     25 251                248
234 243 3300 11 11  2 1 1 5 4 35     25 245
235 251 7500 11 11  2 1 1 5 4 35      5 252     239
235 234 5250 11 11  2 1 1 5 4 35     25 243
235 248 1000 11 11  2 1 1 5 4 35     75 231                831
237 24615600 24 12  2 2 1 5 2 35     50 261                247
239 25112750 24 12  6 2 1 8 2 55     50 252
239 240 1000 11 11  2 1 1 1 2 25     50 237
240 239 1000 11 11  2 1 1 1 2 25    100 251
240 237 2500 11 11  2 1 1 4 4 35    100 246
238 239 1000 11 11  2 1 1 1 2 25     50 251
238 242 1000 11 11  2 1 1 1 2 25     50 231
242 231 3900 22 11  2 2 1 5 2 35     75 248                230
237 238 1800 11 11  2 1 1 1 2 25     50 239                242
382 383 1200 11 11  4 1 1 5 4 35    100          211      197
242 240 3000 22 11  2 2 1 4 4 35     25 237
243 234 3300 11 11  2 1 1 5 2 35     50 235
243 245 6000 11 11  2 1 1 5 2 35     50 244
244 245 5250 11 11  2 1 1 5 2 35     25 243
244 250 7800 11 11  2 1 1 5 2 35     75 262
244 247 8250 11 11  2 1 1 5 2 35     25 246                832
245 243 6000 11 11  2 1 1 5 2 35     75 234
245 244 5250 11 11  2 1 1 5 2 35     25 250     247
246 247 1000 11 11  2 1 1 5 2 35     20         832
246 23715600 11 11  2 1 1 5 2 35     40 238
246 261 6750 24 12  2 2 1 5 2 35     40 271
247 246 1000 11 11  2 1 1 5 2 35      5          237
247 832 1000 11 11  2 1 1 5 2 25    100
248 231 5250 11 11  2 1 1 4 2 35     40          230
248 235 1000 11 11  2 1 1 4 2 35      5          234
248 831 1000 11 11  2 1 1 5 2 25     40
250 244 7800 11 11  2 1 1 4 2 35     75 245
250 262 8100 11 11  2 1 1 4 2 35     25                    265
251 23912750 24 12  6 2 1 6 4 55      5 240
252 317 4800 24 12  6 2 1 6 4 55     60 319     316
252 251 3750 24 12  6 2 1 6 4 55     40         239
259 243 2250 11 11  2 1 1 4 4 35    100         234
258 245 2250 11 11  2 1 1 4 4 35    100         243
260 261 3750 11 11  2 1 1 4 4 35    100         271       246
261 246 6750 11 11  2 1 1 4 4 35     50 237     247
261 271 8100 24 12  2 2 1 4 4 35     50 269
262 250 8100 11 11  2 1 1 4 4 35     75 244
262 265 1000 11 11  2 1 1 4 4 35     25 266                834
264 263 1200 11 11  2 1 1 4 4 35     75                    835
264 270 1800 11 11  2 1 1 4 4 35     25          269       286
265 262 1000 11 11  2 1 1 4 2 35     75          250
265 266 3600 11 11  2 1 1 4 2 35      5 267                833
265 834 1000 11 11  2 1 1 5 2 25     20
266 265 3600 11 11  2 1 1 4 2 35     75 262     834
266 267 4500 11 11  2 1 1 4 2 35      5          268       837
266 833 1000 11 11  2 1 1 5 2 25     20
263 835 1000 11 11  2 1 1 5 2 25    100
251 252 3750 24 12  6 2 1 6 4 55     80          317
267 268 4250 11 11  2 1 1 5 4 30     75 401
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267 276 1250 11 11  2 1 1 5 4 30     5          292
267 837 1000 11 11  2 1 1 5 4 30    20
268 401 3750 11 11  2 1 1 5 4 30    75 264     836
268 267 4250 11 11  2 1 1 5 4 30    25 276
269 271 3750 11 11  2 1 1 5 4 35    80 261
269 270 1000 11 11  2 1 1 1 4 25    20 286
270 269 1000 11 11  2 1 1 1 4 25    34 271
270 286 3900 11 11  2 1 1 5 4 30    34 287                 839
270 264 3000 11 11  2 1 1 1 4 25    33 263
271 261 8100 11 11  2 1 1 5 4 35    60 246
271 269 3750 24 12  2 2 1 5 4 35    40 270     280
272 271 3300 11 11  2 1 1 5 4 35   100          269       261
273 25019500 11 11  2 1 1 5 4 25   100          244       262
274 275 4500 11 11  2 1 1 5 4 30   100 276
275 276 7500 11 11  2 1 1 5 4 30   100 267                 292
276 292 3000 22 11  2 2 1 6 4 40    50 294
276 267 1250 11 11  2 1 1 5 4 30    50 268     837       268
280 269 5400 11 11  2 1 1 5 4 30   100          270       271
281 282 1500 11 11  2 1 1 5 4 30    50 284
281 283 3000 24 12  2 2 1 5 4 40    50 300
282 284 1000 11 11  2 1 1 5 4 30    50 286                 838
282 281 1500 11 11  2 1 1 5 4 30    50                     283
283 282 3000 11 11  2 1 1 5 4 30    50          281       284
284 286 1000 11 11  2 1 1 5 4 30    40          287       270       839
284 838 1000 11 11  2 1 1 1 4 25    20
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286 287 5100 11 11  2 1 1 5 4 25    25 290                 840
286 284 1000 11 11  2 1 1 5 4 30    25 282                 838
286 270 3900 11 11  2 1 1 5 4 30    30 269     264
287 286 5100 11 11  2 1 1 5 4 25    75 270     839       284
287 290 2100 11 11  2 1 1 5 4 25     5          289
287 840 1000 11 11  2 1 1 5 4 25    20
288 281 2100 11 11  2 1 1 5 4 30    75          282
288 289 1000 11 11  2 1 1 5 4 30    25 290
289 290 2250 11 11  2 1 1 5 4 30    10 291                 287
289 288 1000 11 11  2 1 1 5 4 30    90 281
290 291 1500 22 11  2 2 1 6 4 30    25 294
290 289 2250 11 11  2 1 1 5 4 30    75 288
290 287 2100 11 11  2 1 1 5 4 25     5 286     840
291 290 1500 22 11  2 2 1 6 4 40    75 289     287
291 294 2400 22 11  2 2 1 6 4 40    25 292
283 30015600 11 11  4 1 1 7 4 45    50          301
286 839 1000 11 11  2 1 1 5 4 25    20
292 276 3000 22 11  2 2 1 6 4 40    95                     267
292 294 3300 22 11  2 2 1 6 4 40     5 291
293 295 5100 11 11  2 1 1 5 4 25   100 294
294 291 1800 22 11  2 2 1 5 4 25    50 290
294 292 3300 22 11  2 2 1 5 4 25    50 276
295 294 4500 11 11  2 1 1 5 4 25    50          292       291
295 285 3000 11 11  2 1 1 5 4 25    50 841                 842
285 295 3000 11 11  2 1 1 5 4 25    60                     294
285 842 1000 11 11  2 1 1 5 4 25    20
285 841 1200 11 11  2 1 1 5 4 25    20
310 31111400 11 11  4 1 1 5 4 35   100 312     845
311 845 3900 11 11  4 1 1 5 4 25    20
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312 311 9000 11 11  4 1 1 5 4 35    40                     845
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313 31215750 11 11  4 1 1 5 4 35    40 311
313 31416500 11 11  4 1 1 5 4 35    50 315     380
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314 38012750 11 11   4 1 1 5 4 35     30 321          813
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315 316 1200 11 11   4 1 1 5 4 35     50 318     319
315 314 9000 11 11   4 1 1 5 4 35     50 313          380
316 315 1200 11 11   4 1 1 5 4 35     40 314
316 319 1000 11 11   2 1 1 1 4 25     30         328
316 318 1000 11 11   2 1 1 5 4 35     30 324
317 319 1000 24 12   6 2 1 8 2 55     60 328
317 316 1000 11 11   2 1 1 1 4 25     10         315
318 316 1000 11 11   4 1 1 5 4 35     40 315     319
318 32410500 11 11   4 1 1 5 2 40     50 330          811
318 317 1000 11 11   4 1 1 1 2 30     10 252
319 318 1000 11 11   2 1 1 1 4 25     10         324
319 32815750 24 12   6 2 1 8 2 55     45 326
320 32112600 12 12   4 1 1 5 4 40     40 322     380  482
320 812 1000 11 11   2 1 1 5 4 25     05
320 327 2400 12 12   4 1 1 5 4 40     40         326
321 32012600 12 12   4 1 1 5 4 40     10 327     812
321 380 1000 12 12   4 1 1 5 4 40     40 314     813
321 48218000 11 11   4 1 1 5 4 35     40 484     483
482 484 1000 11 11   4 1 1 5 4 35     30 385     485
482 483 1000 11 11   2 1 1 1 4 25     70 388
482 32118000 11 11   4 1 1 5 4 35     40         320  322
484 385 9000 11 11   4 1 1 5 4 35     50 395
484 482 1000 11 11   4 1 1 5 4 35     40 321     483
321 32233000 11 11   4 1 1 5 4 35     10              890
322 890 1000 11 11   2 1 1 5 4 25     20
322 32133000 11 11   4 1 1 5 4 35     80 320     482  380
296 285 9000 11 11   4 1 1 5 4 25    100 295     841            842
323 32218000 10 10   4 1 1 5 4 40    100 321
086 32218000 10 10   4 1 1 5 4 40    100 321
324 330 9900 11 11   3 1 1 5 2 40     50 329
324 811 1000 11 11   2 1 1 5 4 25     20
324 31810500 11 11   4 1 1 5 2 40     30 316     317
326 340 6900 24 12   6 2 1 8 2 55     80 014     341
326 328 2700 24 12   6 2 1 8 2 55     20 319
327 326 2100 11 11   2 1 1 1 2 25     50 340
327 320 2400 12 12   4 1 1 5 4 40     50 321
328 326 3000 24 12   6 2 1 8 2 55     50 340
328 31915750 24 12   6 2 1 8 2 55     50 317     318
329 351 8100 11 11   4 1 1 7 2 45     90 350     352
329 330 3000 11 11   4 1 1 7 2 45     10 324
330 329 3000 11 11   4 1 1 7 2 45     90 351
330 324 9900 11 11   4 1 1 7 2 45     10 318     811
340 326 6750 24 12   6 2 1 8 2 55     20 328
340 341 1000 11 11   2 1 1 1 2 25     40 346
340 014 2700 11 11   2 1 1 1 2 25     40 015
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342 343 1500 24 12   6 2 1 8 2 55     40 377
343 344 1000 11 11   2 1 1 1 2 25     40 355
343 377 7500 24 12   6 2 1 8 2 55     30 378     376
343 342 1500 22 11   4 2 1 8 2 55     30 353
344 35512000 24 12   6 2 1 8 2 55     20 357
344 342 1000 11 11   2 1 1 1 2 25     20 353
344 343 1000 11 11   2 1 1 1 2 25     20 377
344 012 1000 11 11   2 1 1 1 2 25     20 013
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346 347 1000 36 12  6 3 1 8 2 55     50 370
347 370 7500 36 12  6 3 1 8 2 55     40 375     891
011 344 1000 11 11  4 1 1 1 2 25     25 355
011 012 1000 36 12  6 3 1 8 2 55     40 013
350 163 1500 12 12  6 1 1 6 2 45     50 024     164
350 351 2100 24 12  6 2 1 7 2 45     50 329                352
351 350 2100 11 11  4 1 1 7 2 45     45                    163
351 352 1500 24 12  6 2 1 6 2 35     45 353
351 329 7800 11 11  4 1 1 7 2 45     10 330
352 351 1500 24 12  6 2 1 6 2 35     50         350
352 353 7800 24 12  6 2 1 6 2 35     50 354     342
353 354 1000 24 12  6 2 1 6 2 35     40 357
353 352 7800 12 12  6 1 1 6 2 35     20 351
354 357 4000 11 11  2 1 1 1 4 25     50         359
355 34412000 24 12  6 2 1 8 2 55    100 347     012
354 353 3750 12 12  6 1 1 6 2 35     10 352
357 35910500 24 12  6 2 1 8 2 55    100 365
014 01518000 36 12  6 3 1 8 2 55    100 016     157
358 341 1000 36 12  6 3 1 8 2 55     45 346
358 340 1000 11 11  2 1 1 1 2 25     10 326
359 365 2250 24 12  6 2 1 8 2 55     60 363
359 35711500 24 12  6 2 1 8 2 55     40 355     354
342 344 1000 11 11  2 1 1 1 4 25     30 355
355 357 3000 24 12  6 2 1 8 4 55     90 359
354 357 2500 11 11  2 1 1 1 4 25     50         359
362 363 1000 11 11  2 1 1 1 4 25    100                   035
365 363 1000 11 11  2 1 1 1 4 25     80 035
365 359 2250 24 12  6 2 1 8 2 55     20 357
363 035 9300 24 12  6 2 1 8 4 55     40 805     809
363 365 1000 11 11  2 1 1 1 4 25     40 359
366 362 9750 11 11  2 1 1 5 2 25    100         363
367 366 1000 11 12  2 1 1 5 2 25     50 362
367 36510500 24 12  6 2 1 8 2 55     50 363
010 011 7500 36 12  6 3 1 8 2 55     50 012     344
370 375 6000 36 12  6 3 1 8 2 55     80 398
370 374 1000 11 11  2 1 1 1 4 25     27 379
374 375 1000 11 11  2 1 1 1 4 25     35         398
374 010 7200 11 11  2 1 1 1 4 25     35 011
374 379 3000 22 11  2 2 1 1 4 40     40 376     377
375 39814250 36 12  6 3 1 8 2 55     40 396     892
376 379 2700 11 11  4 1 1 7 4 45     40 374
376 378 1000 11 11  2 1 1 1 4 25     40         385
376 48511000 11 11  4 1 1 7 2 35     30 483     482
377 378 1000 22 11  4 2 1 8 4 55     50 385     379
377 376 1000 11 11  4 1 1 1 3 25     20 485
377 343 9000 22 11  4 2 1 8 3 55     40 342     344
483 38812000 11 11  4 1 1 7 2 35     20 386
378 377 1000 22 11  4 2 1 8 4 55     45 343
378 379 1000 11 11  2 1 1 1 4 25    100 374
379 374 3000 22 11  2 2 1 1 4 40     40 010     375
379 376 2700 11 11  4 1 1 7 4 45     60 485     378
379 377 1000 11 11  2 1 1 1 4 25     10 343
380 321 2250 11 11  4 1 1 5 4 35     40 482     322        320
380 31412750 11 11  4 1 1 5 4 35     40         315        313
380 813 1000 11 11  2 1 1 5 4 25     20
382 383 3000 11 11  4 1 1 5 4 35    100                    197
383 197 4500 11 11  4 1 1 5 4 35    100 195
383 211 3300 11 11  4 1 1 5 4 35    100 215                830
385 37815750 22 12  4 2 1 6 4 55     45 377     379
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385 484 9000 11 11  2 1 1 5 4 35    08 482     485
386 38810800 11 11  4 1 1 7 2 35   100 483               814
386 890 1000 11 11  2 1 1 5 4 25    20
388 38610800 11 11  4 1 1 7 2 35    40         890
387 38621000 11 11  4 1 1 7 2 35   100 388
087 38621000 11 11  4 1 1 7 2 35   100 388
388 48312000 11 11  4 1 1 7 2 35    40 485     484
388 814 1000 11 11  2 1 1 1 4 25    05
389 390 1000 11 11  4 1 1 7 4 35    10                    391
389 394 3900 11 11  4 1 1 7 4 35    90         395
390 389 1000 11 11  4 1 1 7 4 35    90                    394
390 391 9300 11 11  4 1 1 7 4 35    10         400
391 390 9300 11 11  4 1 1 7 4 35    80         389
391 400 6750 11 11  4 1 1 7 4 35    20                    815
392 40025800 11 11  4 1 1 7 4 35   100 391     815
393 392 9600 11 11  4 1 1 7 4 35   100                    400
394 395 3000 11 11  4 1 1 7 4 35   100 399     413        385
395 399 6000 12 12  6 1 1 5 2 45    10 009     396
395 385 2250 22 11  6 2 1 6 2 40    45 378               484
395 41314400 22 11  6 2 1 6 2 40    50 420     411       416
378 38515750 22 11  6 2 1 6 2 40    20 395
385 395 2250 22 11  6 2 1 6 2 40    45 413               399
398 396 2400 36 12  6 3 1 8 4 55    45 417
399 396 1000 11 11  2 1 1 1 4 25    40         417
399 009 1000 11 11  2 1 1 1 4 25    40 010
009 01014250 36 12  6 3 1 8 2 55    45 011
400 815 1000 11 11  2 1 1 5 4 25    20
400 391 6750 11 11  4 1 1 7 4 35    80                    390
401 264 1000 11 11  4 1 1 5 4 35    60         263        270
401 836 1000 11 11  2 1 1 5 4 25    20
401 268 3750 11 11  2 1 1 5 4 35    20 267
410 41218000 11 11  4 1 1 7 4 35   100 411               816
411 412 1500 11 11  4 1 1 7 4 35    20         816
411 41321000 11 11  4 1 1 7 4 35    80 416     420        395
412 816 1000 11 11  2 1 1 5 4 25    29
413 41121000 11 11  2 1 1 7 4 35    10         412
413 420 1000 22 11  6 2 1 6 2 40    45 428     418
413 39514400 22 11  6 2 1 6 2 40    40 385     399
413 416 5250 12 12  6 1 1 5 2 45     5         415
415 430 5100 36 12  6 3 1 8 2 55    30 432
416 415 1000 11 11  2 1 1 1 2 25    50 430
416 008 1500 11 11  2 1 1 1 2 25    50 009
008 00911400 36 12  6 3 1 8 2 55   100 010
417 415 2250 36 12  6 3 1 8 2 55    40 430
396 41711400 36 12  6 3 1 8 2 55    30 415
418 420 7500 11 11  4 1 1 7 4 35    80         428        413
418 817 1000 11 11  2 1 1 1 4 25    20
419 428 3300 10 10  4 1 1 4 2 30    80         429        420
419 818 1000 11 11  2 1 1 1 4 25    20
420 413 1000 22 11  6 2 1 6 2 35    40 395     416
420 428 3300 22 11  6 2 1 6 2 35    40 429
420 418 7500 11 11  4 1 1 7 4 35     5                    817
421 423 6000 11 11  4 1 1 7 4 35   100         447
422 421 7200 11 11  4 1 1 7 4 35   100                    423
423 447 6900 11 11  4 1 1 7 4 35   100 425
424 426 4500 10 10  4 1 1 4 2 30   100 427
426 427 4500 10 10  4 1 1 4 2 30   100         491        419
425 418 7800 11 11  4 1 1 7 4 35   100 420     817
412 411 1500 11 11  4 1 1 7 4 35    80                    413
427 419 6000 10 10  4 1 1 4 2 30    75 428               818
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427 491 1500 10 10  4 1 1 4 2 30    25 490
428 429 1000 22 11  2 2 1 6 4 35    50 452
428 420 3300 22 11  2 2 1 6 4 35    50 413     899
429 428 1000 22 11  2 2 1 6 2 30    45 420
429 433 2700 24 12  4 2 1 8 2 55    10 431     432
429 452 7200 24 12  6 2 1 6 2 35    45 499              453
430 432 2100 36 12  6 2 1 8 2 55    30 032              431      898
431 007 1000 11 11  2 1 1 1 4 25    50 008
007 008 5100 36 12  6 3 1 8 2 55    70 009
431 477 9750 24 12  6 2 1 1 2 55    50 476
006 007 2100 36 12  6 3 1 1 4 50    90 008
432 431 1000 11 11  2 1 1 1 4 25     5 477
432 032 5000 36 12  6 3 1 8 2 55    40 455
032 888 1000 24 12  6 2 1 8 2 55    20
032 455 1000 36 12  6 3 1 8 2 55   100 467
433 431 2100 24 12  6 2 1 8 2 55    75 477
433 432 1000 11 11  2 1 1 1 4 25    25 032
446 447 9900 10 10  4 1 1 4 4 30   100          425
447 425 4500 10 10  4 1 1 4 4 30   100 418
448 496 1000 10 10  4 1 1 4 2 30   100 495
449 452 3600 10 10  4 1 1 4 2 30   100 453     499
450 448 4500 10 10  4 1 1 4 2 30   100 496
451 490 1000 10 10  4 1 1 4 2 30    50 491
451 494 1000 10 10  4 1 1 4 2 30    50 459
452 453 3300 10 10  4 1 1 4 2 30    20          480      819
452 429 7200 22 11  2 2 1 6 2 30    40 428     433
452 499 6750 22 11  2 2 1 6 2 30    40 470
453 452 3300 10 10  4 1 1 4 2 30    30          429      499
453 480 1800 10 10  4 1 1 4 2 30    50                   454
453 819 1000 11 11  2 1 1 5 2 25    20
454 455 1000 11 11  2 1 1 1 2 25   100          467
455 467 9600 36 12  6 3 1 8 2 55    40 466
457 477 6900 12 12  4 1 1 5 2 30   100          476
458 457 5700 12 12  4 1 1 5 2 30   100                   477
459 449 2250 10 10  4 1 1 4 2 30   100 452
460 461 6000 10 10  2 1 1 4 2 30   100          462
461 462 3900 10 10  2 1 1 4 2 30   100 463
462 463 6000 10 10  2 1 1 4 2 30   100 464
463 464 6000 10 10  2 1 1 4 2 30   100 465     469
464 465 5250 10 10  2 1 1 4 2 30    10 004     466
464 469 3300 22 11  4 2 1 6 4 35    90 862
464 497 3300 22 11  4 2 1 6 2 35    55 470
465 466 1000 11 11  2 1 1 1 4 25    40 820
465 004 1000 12 12  6 1 1 1 4 25    50 005
005 006 6000 36 12  6 3 1 8 4 50   100 007     431
006 431 1000 12 12  6 1 1 1 4 25    20          477
465 464 5250 10 10  2 1 1 4 2 30    10          497      469
466 820 5400 24 12  6 2 1 8 4 50    40
003 004 1000 36 12  6 3 1 8 4 50    90 005
003 465 1000 12 12  6 1 1 1 4 25    10 464
467 466 1000 36 12  6 3 1 8 4 50    60 820
467 465 1000 12 12  6 2 1 1 4 25    10 464
004 005 9000 36 12  6 3 1 8 4 50   100 006
469 464 3300 22 11  2 2 1 6 4 35   100 497     465
469 862 6300 22 11  2 2 1 6 4 35   100
470 499 1500 22 11  4 2 1 6 2 35    50 452
470 497 2100 22 11  4 2 1 6 2 35    50 464
471 500 6000 10 10  2 1 1 4 4 30   100 470
472 471 3900 10 10  2 1 1 4 2 30   100 500
473 474 5400 11 11  4 1 1 4 4 30   100                   475
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474 475 3000 11 11  4 1 1 4 4 30    100                    476
475 476 3750 11 11  4 1 1 4 4 30    100 803
476 80372000 24 12  6 2 1 8 4 50     50
477 431 9750 24 12  6 2 1 8 2 50     50          007
477 47612900 24 12  6 2 1 8 4 50     50 803
480 454 1800 10 10  4 1 1 4 2 30    100          455
483 485 1000 11 11  4 1 1 7 2 35     40 376      482
483 484 1000 11 11  4 1 1 1 2 25     10 385
484 485 1000 11 11  4 1 1 1 2 25     10 376
485 37611000 11 11  4 1 1 7 2 35     50 379      378
485 483 1000 11 11  4 1 1 7 2 35     40 388      484
485 482 1000 11 11  4 1 1 1 2 25     10 321
490 451 1200 10 10  4 1 1 4 2 30     50                     494
490 491 3000 10 10  4 1 1 4 2 30     50 427
491 427 1500 10 10  4 1 1 4 2 30     75 419
491 490 1500 10 10  4 1 1 4 2 30     25 451
492 451 1000 10 10  4 1 1 4 2 30    100 490      494
493 494 2100 10 10  4 1 1 4 2 30    100          459
494 459 1000 10 10  4 1 1 4 1 30    100 449
495 492 1000 10 10  4 1 1 4 2 30    100 451
496 495 1000 10 10  4 1 1 4 2 30    100 492
497 470 2250 22 11  4 2 1 6 2 35     50 499
497 464 3300 22 11  4 2 1 6 2 35     50 469                 465
498 500 1000 10 10  2 1 1 4 4 30    100          470
499 470 1500 22 11  4 2 1 6 2 35     50 497
499 452 6750 22 11  4 2 1 6 1 30     50 429
500 470 4500 10 10  2 1 1 4 4 30    100          499       497
071 003 7500 36 12  6 3 1 8 4 50    100 004      465
072 46910000 22 11  4 2 1 6 4 35    100 464
073 47672000 24 12  6 2 1 8 4 50    100 477
074 03536750 24 12  6 2 1 8 4 35    100 363                809
075 03819500 12 12  6 1 1 7 2 50    100 039      802
076 30220100 12 12  4 1 1 7 2 40    100 301
001 86031150 11 11  2 1 1 5 4 25     60
001 100 2100 24 12  6 2 1 8 2 55     25 101
025 026 1000 11 11  2 1 1 5 2 35     75          027
025 02410500 24 12  6 2 1 6 2 55     25          163       151
024 151 1000 12 12  6 1 1 6 2 40     45 152      018
024 02510500 24 12  6 2 1 6 2 40     10                     026
024 16318750 12 12  6 1 1 6 2 40     45 350                 164
026 025 1000 11 11  2 1 1 4 4 35     25          024
026 02713800 11 11  2 1 1 4 4 35     75                     028
027 02613800 11 11  2 1 1 4 4 35    100                     025
027 028 1000 11 11  2 1 1 4 4 35    100          029
028 027 1000 11 11  2 1 1 4 4 35    100          026
028 029 6900 11 11  2 1 1 4 4 35    100 030                846
029 028 6900 11 11  2 1 1 4 4 35     80                    027
029 030 9900 11 11  2 1 1 4 4 35     80 849      039       133
030 03914250 12 12  6 1 1 7 4 50     40 038      801
030 84935250 11 11  2 1 1 4 4 35     10
030 13330000 12 12  6 1 1 7 4 50     40 106      105
030 029 9900 11 11  2 1 1 4 4 35     10 028      846
035 80536750 24 12  6 2 1 8 4 35     45
035 809 1000 11 11  2 1 1 1 1 25     15
035 363 9300 24 12  6 2 1 8 4 55     40 365
036 03718900 12 12  6 1 1 4 4 45     40          807
036 808 1000 11 11  2 1 1 4 4 25     20
036 16413500 12 12  6 1 1 4 2 45     40 163                 810
037 80415000 12 12  6 1 1 4 2 45     40
037 03618900 12 12  6 1 1 4 4 45     40 164      808
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037 807 1000 11 11  2 1 1 5 4 25     20
038 03911100 12 12  6 1 1 4 4 50     40 030              801
038 802 1000 11 11  2 1 1 5 4 25     15
038 80619500 12 12  6 1 1 5 4 50     45
039 03014250 12 12  6 1 1 5 4 50     50 133        849   029
039 03811100 12 12  6 1 1 5 4 50     50 806        802
039 801 1000 11 11  2 1 1 5 4 25     15
029 846 1000 11 11  2 1 1 5 4 25     20
057 14012000 11 11  4 1 1 4 2 35     90 145        152   142
058 178 3300 11 11  4 1 1 4 2 35     40 123              170
059 060 3000 11 11  4 1 1 4 2 35    100                  061
060 061 3000 11 11  4 1 1 4 2 35    100 063
062 061 2100 11 11  4 1 1 4 2 35    100           063
061 063 2250 11 11  4 1 1 4 2 35    100 142              141
063 141 2000 11 11  4 1 1 4 2 35     25                  128
063 142 9000 11 11  4 1 1 4 2 35     75           140
064 174 2100 10 10  4 1 1 4 4 30     50           179
064 191 4500 11 11  4 1 1 4 4 40     50 192              200
300 28315000 24 12  6 2 1 7 4 45     50 281        282
300 301 6000 24 12  4 2 1 7 4 45     50 302
300 305 6200 10 10  4 1 1 4 2 30     10           306
301 302 2200 11 11  4 1 1 7 4 45    100 863              303
302 301 2200 11 11  4 1 1 7 4 45     40           300
302 86310000 11 11  4 1 1 7 4 45     40
303 30210000 10 10  4 1 1 4 4 30     40           301   863
304 30115000 11 11  4 1 1 7 4 45    100 300       302
305 300 6200 10 10  4 1 1 4 4 30    100 301       283
305 306 2800 10 10  4 1 1 4 4 30     50           303
306 305 2800 10 10  4 1 1 4 4 30     50                  300
307 30612000 10 10  4 1 1 4 4 30    100 305              303
303 843 1000 11 11  2 1 1 5 4 25     20
303 844 1000 11 11  2 1 1 5 4 25     20
301 300 6000 24 12  4 2 1 7 4 45     50 283        305
302 30310000 10 10  4 1 1 4 4 30     20           844   843
306 303 2800 10 10  4 1 1 4 4 30     50 302        843   844
101 851  500 11 11  2 1 1 5 4 25    100
080 03715000 12 12  6 1 1 4 2 45    100 036              807
088 133 3000 12 12  6 1 1 7 4 50    100 030
089 10610000 11 11  2 1 1 5 2 30    100 107
093 104 3000 11 11  2 1 1 5 2 30    100 105
090 28610000 11 11  2 1 1 5 4 30    100 270
091 239 3000 24 12  6 2 1 8 2 55    100 251
094 314 3000 11 11  4 1 1 5 4 35    100 380
095 484 3000 11 11  4 1 1 5 4 35    100 482
096 431 3000 24 12  6 2 1 8 2 55    100 477
178 058 4000 12 12  6 1 1 4 2 45     30 179        059
058 179 6000 12 12  6 1 1 4 2 45     40 174
058 059 1000 11 11  4 1 1 4 2 40     20 060
179 174 1000 11 11  2 1 1 4 4 35     20 064
191 192 1250 11 11  4 1 1 4 2 40     30 195              193
178 12315000 11 11  4 1 1 4 2 40     20 126
126 123 6000 11 11  4 1 1 4 2 25     30 178
123 17815000 11 11  4 1 1 4 2 40     30 058
125 126 3900 11 11  2 1 1 1 4 25     20 123
353 34212000 11 11  4 1 1 4 2 40     40 343
357 355 3000 24 12  6 2 1 8 4 55     50 344
357 354 4000 11 11  2 1 1 1 4 25     50 353
319 317 1000 24 12  6 2 1 8 2 55     45 252
317 252 4800 24 12  6 2 1 6 4 55     30 251
092 340 3000 24 12  6 2 1 8 2 55    100 326
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191 064 4500 11 11  4 1 1 4 4 40     30 174
126 124 2500 11 11  2 1 1 1 4 30     40 023     127
123 122 4500 11 11  2 1 1 5 2 30     40         121      115
140 05712000 11 11  4 1 1 4 2 35     10 199
057 199 2250 11 11  4 1 1 4 2 35     40         200      190
199 200 2000 11 11  4 1 1 7 4 45     20 191
200 191 1000 11 11  4 1 1 4 4 40     30         064      192
109 11512000 11 11  2 1 1 5 2 30     50         116      122
111 00210000 11 11  2 1 1 5 2 30    100 112     109
002 109  750 11 11  5 2 1 5 2 30     10 115
002 852 3000 11 11  2 1 1 5 2 30    100
398 399 1000 11 11  2 1 1 1 4 25     15 395
476 47712900 24 12  6 2 1 8 4 50     50 431
399 395 6000 12 12  6 1 1 5 2 45     30         385      413
097 357 3000 24 12  6 2 1 8 2 55    100 359
098 234 3000 11 11  2 1 1 5 4 35    100 231
099 197 3000 11 11  4 1 1 5 4 35    100 383
234 231 6000 11 11  2 1 1 5 4 35     50 230
081 327 6000 12 12  4 1 1 5 4 40    100 320
082 413 3000 22 11  2 2 1 6 2 30    100 395
083 385 3000 22 11  6 2 1 6 2 40    100 395
084 452 3000 22 11  2 2 1 6 2 30    100 499
420 899 3000 22 11  2 2 1 6 4 35     15
430 433 1000 12 12  6 1 1 1 2 35     10 429
433 429 2700 24 12  4 2 1 8 2 55     50                   452
085 396 5000 36 12  6 3 1 8 2 55    100 417
432 898 5000 36 12  6 3 1 8 2 55     15
157 016 1000 11 11  2 1 1 1 2 30    100 017
013 340 1000 11 11  2 1 1 1 2 25     20 326
344 347 1000 36 12  6 3 1 8 2 55     40 370
269 280 5000 24 12  2 2 1 5 4 40     50 281
280 281 3000 24 12  2 2 1 5 4 40     50 283
283 281 3000 24 12  2 2 1 5 4 40     60 280
281 280 3000 24 12  2 2 1 5 4 40     50 269
370 891 1000 24 12  6 2 1 8 2 55     30
398 892 1000 24 12  6 2 1 8 2 55     34
99999
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POPOPT1 Rhode Island Strong Storm Off-Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout1.dat'
outprint='popout1.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=270.0 int1(2)=390.0 int1(3)=400.0 int1(4)=510.0 int1(5)=630.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT2 Rhode Island Strong Storm Off-Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout2.dat'
outprint='popout2.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=120.0 int1(2)=300.0 int1(3)=360.0 int1(4)=480.0 int1(5)=660.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

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POPOPT3 Rhode Island Strong Storm Off-Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout3.dat'
outprint='popout3.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=0.0 int1(2)=240.0 int1(3)=320.0 int1(4)=480.0 int1(5)=720.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT4 Rhode Island Strong Storm Mid-Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout4.dat'
outprint='popout4.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=840.0 int1(2)=960.0 int1(3)=1000.0 int1(4)=1080.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
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POPOPT5 Rhode Island Strong Storm Mid-Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout5.dat'
outprint='popout5.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=660.0 int1(2)=840.0 int1(3)=900.0 int1(4)=1020.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT6 Rhode Island Strong Storm Mid-Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout6.dat'
outprint='popout6.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=480.0 int1(2)=720.0 int1(3)=800.0 int1(4)=960.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
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POPOPT7 Rhode Island Strong Storm Peak Traffic, Rapid Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout7.dat'
outprint='popout7.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=870.0 int1(2)=990.0 int1(3)=1030.0 int1(4)=1110.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT8 Rhode Island Strong Storm Peak Traffic, Moderate Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout8.dat'
outprint='popout8.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=690.0 int1(2)=870.0 int1(3)=930.0 int1(4)=1050.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

```
POPOPT9 Rhode Island Strong Storm Peak Traffic, Slow Response
&files
filename(1)='strong_w.dat'
filename(2)='mnsst_w.dat'
filename(3)='backgr_w.dat'
outfile='popout9.dat'
outprint='popout9.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=510.0 int1(2)=750.0 int1(3)=830.0 int1(4)=990.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT 10 Rhode Island Weak Storm Off-Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout10.dat'
outprint='popout10.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=270.0 int1(2)=390.0 int1(3)=430.0 int1(4)=510.0 int1(5)=630.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
```

POPOPT 11 Rhode Island Weak Storm Off-Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout11.dat'
outprint='popout11.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=120.0 int1(2)=300.0 int1(3)=360.0 int1(4)=480.0 int1(5)=660.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT12 Rhode Island Weak Storm Off-Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout12.dat'
outprint='popout12.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.09 frc(3,2)=0.09 frc(3,3)=0.06 frc(3,4)=0.02
/
&timeint
int1(2)=0.0 int1(2)=240.0 int1(3)=320.0 int1(4)=480.0 int1(5)=720.0
int2(1)=0.0 int2(2)=75.0 int2(3)=150.0 int2(4)=225.0 int2(5)=300.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT13 Rhode Island Weak Storm Mid-Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout13.dat'
outprint='popout13.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=840.0 int1(2)=960.0 int1(3)=1000.0 int1(4)=1080.0 int1(4)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT14 Rhode Island Weak Storm Mid-Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout14.dat'
outprint='popout14.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='backgrnd'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=660.0 int1(2)=840.0 int1(3)=900.0 int1(4)=1020.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

```
POPOPT15 Rhode Island Weak Storm Mid-Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout15.dat'
outprint='popout15.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.34 frc(3,3)=0.13 frc(3,4)=0.10
/
&timeint
int1(2)=480.0 int1(2)=720.0 int1(3)=800.0 int1(4)=960.0 int1(5)=1200.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=690.0 int2(5)=840.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT16 Rhode Island Weak Storm Peak Traffic, Rapid Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout16.dat'
outprint='popout16.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=870.0 int1(2)=990.0 int1(3)=1030.0 int1(4)=1110.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072
```

POPOPT17 Rhode Island Weak Storm Peak Traffic, Moderate Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout17.dat'
outprint='popout17.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=690.0 int1(2)=870.0 int1(3)=930.0 int1(4)=1050.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

POPOPT18 Rhode Island Weak Storm Peak Traffic, Slow Response
&files
filename(1)='weak_w.dat'
filename(2)='mnswk_w.dat'
filename(3)='backgr_w.dat'
outfile='popout18.dat'
outprint='popout18.prt'
/
&poptype
atype(1)='vulnerable'
atype(2)='nonvul+mob'
atype(3)='background'
/
&fraction
frc(1,1)=0.15 frc(1,2)=0.10 frc(1,3)=0.50 frc(1,4)=0.25
frc(2,1)=0.15 frc(2,2)=0.10 frc(2,3)=0.50 frc(2,4)=0.25
frc(3,1)=0.05 frc(3,2)=0.35 frc(3,3)=0.31 frc(3,4)=0.12
/
&timeint
int1(2)=510.0 int1(2)=750.0 int1(3)=830.0 int1(4)=990.0 int1(5)=1230.0
int2(1)=0.0 int2(2)=240.0 int2(3)=540.0 int2(4)=720.0 int2(5)=870.0
/
194,155,331,129,467,092,030,370,274,077,086,359,383,381,078,079,083,084,387,085,076,057,081,082,0
90,091,098,099,126,185,167,209,266,281,280,276,275,325,331,151,250,235,397,169,026,027,028,029,24
2,250,072

Background Traffic

```
114SOUTH  3     15000 1.00 089  15 093  45 099  40
114NORTH  3     12000 1.00 090  50 098  50
24SOUTH   3     22500 1.00 074  70 092  30
24NORTH   3     11500 1.00 091  71 097  29
77SOUTH   3       300 1.00 315 100
77NORTH   3      1600 1.00 310 100
81NORTH   3      1600 1.00 086 100
81SOUTH   3      2000 1.00 081 100
88NORTH   3      3500 1.00 087 100
88SOUTH   3      1000 1.00 376 100
6EAST     3     31000 1.00 111  45 083  13 084 42
6WEST     3     17000 1.00 072  85 082  15
195EAST   3     30150 1.00 110  99 085  01
195WEST   3     16700 1.00 071 100
140SOUTH  3     13000 1.00 073 100
140NORTH  3      7000 1.00 096 100
138NORTH  3     13500 1.00 076  64 164  36
138SOUTH  3      7000 1.00 080 100
44WEST    3      8000 1.00 075 100
44EAST    3      5000 1.00 088 100
177EAST   3      1000 1.00 094 100
177WEST   3      2800 1.00 095 100
95SOUTH   3         0 1.00 070 100
```

Severe Storm Surge Vulnerable Population File

```
101.01    1       91 2.12 103 100
101.02    1      149 2.12 103 100
102       1      193 2.12 110 100
103       1      795 2.12 105  50 125  50
104       1      372 2.12 109 100
105.01    1      611 2.12 124  50 126  50
105.02    1       84 2.12 123 100
106       1     2596 2.12 118  34 119  33 120  33
107.01    1      144 2.12 117 100
107.02    1     1492 2.12 119 100
301       1     2267 1.88 170  25 171  25 172  25 173  25
302       1     2685 1.88 178  34 179  33 058  33
303       1     4127 1.88 059  16 060  16 061  17 062  17 063  17 064 17
304       1     3417 1.88 173  20 174  20 175  20 176  20 177  20
305       1     3256 2.02 190  20 191  20 192  20 193  20 200  20
306.01    1     2129 2.02 190  25 198  25 199  25 057  25
306.02    1     1371 2.02 192  50 193  50
307       1      941 2.12 112 100
308       1     1439 2.12 215 100
309.01    1      502 2.12 196 100
309.02    1     1895 2.12 282  34 283  33 382  33
401.01    1     3535 1.85 230  20 231  20 235  20 251  20 252  20
401.02    1     1213 1.85 251  20 252  20 284  20 258  20 259  20
401.03    1      158 1.85 230 100
402       1      338 2.30 260  50 272  50
403.02    1      291 2.30 267 100
403.03    1      107 2.30 261  50 271  50
404       1      680 2.30 274  25 275  25 276  25 273  25
405       1      860 2.34 281  50 282  50
406       1      156 2.34 287 100
407       1      356 2.34 276  50 292  50
408       1       81 2.34 292 100
409       1     2909 2.34 294  25 295  25 296  25 293  25
```

Severe Storm Surge Vulnerable Population File(con't.)

410	1	1562	2.34	290	50	291	50							
411	1	1795	2.34	283	34	288	33	289	33					
412	1	1809	2.34	280	34	281	33	283	33					
413	1	2131	1.69	304	20	301	20	300	20	305	20	307	20	
414	1	869	1.63	311	100									
416.01	1	337	1.80	324	100									
416.02	1	592	1.80	319	100									
417	1	1197	1.80	313	50	314	50							
6322	1	482	1.83	128	100									
6332	1	579	1.85	141	100									
6403	1	394	2.72	324	100									
6404	1	82	2.72	330	100									
6405	1	257	2.72	330	100									
6409	1	653	2.72	329	25	330	75							
6410	1	841	2.72	329	100									
6420	1	613	2.72	351	100									
6421	1	1392	2.72	366	34	367	33	350	33					
6422	1	138	2.72	366	100									
6441	1	3324	1.90	159	34	162	33	163	33					
6451	1	4807	1.90	142	20	140	20	198	20	153	20	133	20	
6461	1	1744	1.85	387	50	323	50							
6503	1	849	2.84	457	100									
6504	1	372	2.84	458	100									
6506	1	712	2.84	458	100									
6507	1	525	2.84	455	100									
6511	1	23	2.84	455	100									
6512	1	1053	2.84	454	50	455	50							
6513	1	37	2.84	453	100									
6518	1	314	2.84	452	100									
6519	1	1639	2.84	449	50	459	50							
6520	1	1618	2.84	449	50	459	50							
6521	1	100	2.84	449	100									
6524	1	1433	2.84	451	50	490	50							
6525	1	2661	2.84	427	34	490	33	491	33					
6526	1	3006	2.84	492	34	493	33	494	33					
6527	1	2176	2.84	495	34	496	33	448	33					
6528	1	1190	2.84	448	25	450	75							
6532	1	157	2.26	426	50	393	50							
6533	1	3043	2.26	421	16	422	16	423	17	410	17	424	17	446 17
6541	1	681	1.96	473	100									
6542	1	133	1.96	472	100									
6551	1	1161	2.12	465	50	470	50							
6552	1	2890	2.12	498	34	499	33	500	33					
6553	1	2627	2.12	464	25	497	25	499	25	470	25			
6554	1	4419	2.12	460	20	461	20	462	20	463	20	469	20	

Weak Storm Surge Vulnerable Population File

101.01	1	48	2.12	103	100									
101.02	1	66	2.12	103	100									
102	1	91	2.12	110	100									
103	1	353	2.12	105	50	125	50							
104	1	242	2.12	109	100									
105.01	1	470	2.12	124	50	126	50							
105.02	1	74	2.12	123	100									
106	1	2158	2.12	118	34	119	33	120	33					
107.01	1	110	2.12	117	100									
107.02	1	1128	2.12	119	100									
301	1	1270	1.88	170	25	171	25	172	25	173	25			

Weak Storm Surge Vulnerable Population File(con't.)

302	1	1722	1.88	178	34	179	33	058	33								
303	1	3668	1.88	059	16	060	16	061	17	062	17	063	17	064	17		
304	1	2305	1.88	173	20	174	20	175	20	176	20	177	20				
305	1	2210	2.02	190	20	191	20	192	20	193	20	200	20				
306.01	1	1569	2.02	190	25	198	25	199	25	057	25						
306.02	1	869	2.02	192	50	193	50										
307	1	429	2.12	112	100												
308	1	743	2.12	215	100												
309.01	1	400	2.12	196	100												
309.02	1	1410	2.12	282	34	283	33	382	33								
401.01	1	3088	1.85	230	20	231	20	235	20	251	20	252	20				
401.02	1	1078	1.85	251	20	252	20	284	20	258	20	259	20				
401.03	1	117	1.85	230	100												
402	1	226	2.30	260	50	272	50										
403.02	1	129	2.30	267	100												
403.03	1	48	2.30	261	50	271	50										
404	1	438	2.30	274	25	275	25	276	25	273	25						
405	1	714	2.34	281	50	282	50										
406	1	69	2.34	287	100												
407	1	233	2.34	276	50	292	50										
408	1	72	2.34	292	100												
409	1	2188	2.34	294	25	295	25	296	25	293	25						
410	1	962	2.34	290	50	291	50										
411	1	1595	2.34	283	34	288	33	289	33								
412	1	1469	2.34	280	34	281	33	283	33								
413	1	1636	1.69	304	20	301	20	300	20	305	20	307	20				
414	1	652	1.63	311	100												
416.01	1	174	1.80	324	100												
416.02	1	526	1.80	319	100												
417	1	974	1.80	313	50	314	50										
6322	1	328	1.83	128	100												
6332	1	408	1.85	141	100												
6403	1	253	2.72	324	100												
6404	1	46	2.72	330	100												
6405	1	182	2.72	330	100												
6409	1	293	2.72	329	25	330	75										
6410	1	554	2.72	329	100												
6420	1	273	2.72	351	100												
6421	1	855	2.72	366	34	367	33	350	33								
6422	1	61	2.72	366	100												
6441	1	2955	1.90	159	34	162	33	163	33								
6451	1	4273	1.90	142	20	140	20	198	20	153	20	133	20				
6461	1	1550	1.85	387	50	323	50										
6503	1	1	2.84	457	100												
6504	1	1	2.84	458	100												
6506	1	1	2.84	458	100												
6507	1	1	2.84	455	100												
6511	1	1	2.84	455	100												
6512	1	1	2.84	454	50	455	50										
6513	1	1	2.84	453	100												
6518	1	1	2.84	452	100												
6519	1	1	2.84	449	50	459	50										
6520	1	1	2.84	449	50	459	50										
6521	1	1	2.84	449	100												
6524	1	374	2.84	451	50	490	50										
6525	1	1	2.84	427	34	490	33	491	33								
6526	1	1	2.84	492	34	493	33	494	33								
6527	1	243	2.84	495	34	496	33	448	33								

Weak Storm Surge Vulnerable Population File(con't.)

6528	1	1058	2.84	448	25	450	75									
6533	1	2560	2.26	421	16	422	16	423	17	410	17	424	17	446	17	
6541	1	1	1.96	473	100											
6542	1	1	1.96	472	100											
6551	1	1032	2.12	465	50	470	50									
6552	1	1	2.12	498	34	499	33	500	33							
6553	1	1	2.12	464	25	497	25	499	25	470	25					
6554	1	2815	2.12	460	20	461	20	462	20	463	20	469	20			

Severe Storm Mobile Home and Non-Surge Vulnerable Population File

ACUSHN	2	980	1.96	471	33	472	33	473	34	476						
DARTMH	2	1360	2.26	394	20	418	20	412	20	392	20	391	20			
FAIRH	2	300	2.12	463	25	464	25	497	25	469	25					
FALLR	2	4490	2.72	344	20	352	20	035	20	012	20	013	20			
NEWBED	2	4180	2.84	432	20	007	20	431	20	477	20	415	20			
REHOB	2	410	1.85	030	25	029	25	028	25	027	25					
SEEK	2	630	1.83	133	50	128	50									
SOMER	2	750	1.90	164	33	163	33	162	34							
SWAN	2	680	1.90	142	33	025	33	156	34							
WEST	2	770	1.85	388	33	386	33	400	34							
BARR	2	110	1.88	170	20	172	20	176	20	060	20	063	20			
BRIS	2	860	2.12	214	20	210	20	221	20	196	20	197	20			
E.PROV	2	2320	2.12	023	20	021	20	122	20	130	20	125	20			
JAMES	2	200	1.69	304	33	301	33	306	34							
L.COMP	2	340	1.63	311	50	312	50									
MIDDLE	2	1330	2.30	261	25	271	25	266	25	250	25					
NEWP	2	969	2.34	295	20	294	20	287	20	284	20	280	20			
PORT	2	1670	1.85	244	20	247	20	245	20	243	20	230	20			
TIVER	2	1300	1.80	321	33	319	33	320	34							
WAR	2	220	2.02	198	33	057	33	190	34							

Weak Storm Mobile Home and Non-Surge Vulnerable Population File

ACUSHN	2	830	1.96	471	33	472	33	473	34	476						
DARTMH	2	620	2.26	394	20	418	20	412	20	392	20	391	20			
FAIRH	2	150	2.12	463	25	464	25	497	25	469	25					
FALLR	2	1850	2.72	344	20	352	20	035	20	012	20	013	20			
NEWBED	2	1770	2.84	432	20	007	20	431	20	477	20	415	20			
REHOB	2	170	1.85	030	25	029	25	028	25	027	25					
SEEK	2	250	1.83	133	50	128	50									
SOMER	2	290	1.90	164	33	163	33	162	34							
SWAN	2	220	1.90	142	33	025	33	156	34							
WEST	2	360	1.85	388	33	386	33	400	34							
BARR	2	40	1.88	170	20	172	20	176	20	060	20	063	20			
BRIS	2	350	2.12	214	20	210	20	221	20	196	20	197	20			
E.PROV	2	1330	2.12	023	20	021	20	122	20	130	20	125	20			
JAMES	2	80	1.69	304	33	301	33	306	34							
L.COMP	2	250	1.63	311	50	312	50									
MIDDLE	2	800	2.30	261	25	271	25	266	25	250	25					
NEWP	2	390	2.34	295	20	294	20	287	20	284	20	280	20			
PORT	2	1310	1.85	244	20	247	20	245	20	243	20	230	20			
TIVER	2	950	1.80	321	33	319	33	320	34							
WAR	2	90	2.02	198	33	057	33	190	34							

ANNEX C:
WEST BAY/RHODE ISLAND AND EAST BAY/MASSACHUSETTS NETWORK SENSITIVITY ANALYSIS SUPPORT

TABLE AC-1:

SUMMARY OF CLEARANCE TIME SENSITIVITY TO A 20% INCREASE IN EVACUATING TRAFFIC (SEVERE HURRICANE SCENARIO)

	BACKGROUND TRAFFIC CONDITION					
	Off-peak		Mid-peak		Peak	
WEST BAY/RHODE ISLAND NETWORK	B.C.*	S.A.**	B.C.*	S.A.**	B.C.*	S.A.**
Rapid Response	4:35	5:15	4:42	***	5:33	6:57
Moderate Response	6:10	***	6:13	***	7:37	***
Slow Response	8:04	8:06	8:04	***	9:38	10:00
EAST BAY/MASSACHUSETTS NETWORK						
Rapid Response	5:07	5:45	5:33	***	5:44	6:20
Moderate Response	6:06	***	6:47	***	7:15	***
Slow Response	8:03	8:08	8:11	***	8:36	9:35

* B.C. = Base Condition
** S.A. = Sensitivity Analysis
*** = Scenario was not simulated

TABLE AC-2:

SUMMARY OF CLEARANCE TIME SENSITIVITY TO A 2-HOUR DECREASE IN EVACUEE RESPONSE TIME (SEVERE HURRICANE SCENARIO)

	BACKGROUND TRAFFIC CONDITION					
	Off-peak		Mid-peak		Peak	
WEST BAY/RHODE ISLAND NETWORK	B.C.*	S.A.**	B.C.*	S.A.**	B.C.*	S.A.**
2-Hour Decrease In Rapid Response Time	4:35	4:28	4:35	***	5:33	5:33
EAST BAY/MASSACHUSETTS NETWORK						
2-Hour Decrease In Response Time	5:07	4:21	4:26	***	5:44	5:16

* B.C. = Base Condition
** S.A. = Sensitivity Analysis
*** = Scenario was not simulated

TABLE AC-3:

SUMMARY OF CLEARANCE TIME SENSITIVITY TO A 50% REDUCTION IN COMMUNITY SHELTER USE (SEVERE HURRICANE SCENARIO)

	BACKGROUND TRAFFIC CONDITION					
	Off-peak		Mid-peak		Peak	
WEST BAY/RHODE ISLAND NETWORK	B.C.*	S.A.**	B.C.*	S.A.**	B.C.*	S.A.**
Rapid Response	4:35	4:39	4:42	***	5:33	6:09
Moderate Response	6:10	***	6:13	***	7:37	***
Slow Response	8:04	8:06	8:04	***	9:38	10:14
EAST BAY/MASSACHUSETTS NETWORK						
Rapid Response	5:07	5:10	5:33	***	5:44	6:04
Moderate Response	6:06	***	6:47	***	7:15	***
Slow Response	8:03	8:04	8:11	***	8:36	8:41

* B.C. = Base Condition
** S.A. = Sensitivity Analysis
*** = Scenario was not simulated