APPENDIX F

METHODOLOGY TO CALCULATE EVACUATION CAPACITIES

Introduction

The analysis of the evacuation roadway system was performed using the 1985 Highway Capacity Manual (HCM), as it represents the current standard methodology in evaluating travel facilities. The document reflects over two decades of comprehensive research conducted by a variety of research individuals and government agencies and, as such, represents the best available knowledge and guidance to the operational and design analysis of transportation facilities. Methodologies are summarized below for the four categories or roadway facilities and three weather conditions which are to be encountered in the EPZ.

Two-Lane, Two-Way Roadways

The predominant roadway type within the 10-mile emergency planning zone is the two-lane, two-way highway. A two-lane highway can be defined as a two-lane roadway with one lane dedicated for traffic in each direction. These roadways basically serve an accessibility function, usually for low traffic volumes. According to the 1985 Highway Capacity Manual (HCM), the general relationship describing traffic operations on these roadway segments is as follows:

SF_i = (2800 passenger cars per hour) x $(V/C)_i \times f_d \times f_w \times f_{hv}$

Where: SF_i = Total roadway service flow rate in both directions for prevailing roadway and traffic conditions, for a specified level-of-service, in vehicles per hour;

$(V/C)_i$ = ratio of flow rate to ideal capacity for a specified level of service, obtained from Table 8-1 of the HCM;

f_d = adjustment factor for directional distribution of traffic, obtained from Table 8-4 of the HCM;

f_w = adjustment factor for narrow lanes and restricted shoulder width, obtained from Table 8-5 of the HCM; and

f_{hv} = adjustment factor for the presence of heavy vehicles in the traffic stream.

Table 8-1 of the 1985 HCM tabulates $(V/C)_i$ factors for a variety of terrain types and passing zone allowances, each of which was evaluated based on field observations. The analysis for this project assumed the presence of few, if any, no passing opportunities for both levels-of-service D and E conditions (the HCM tables are referenced only). This assumption is valid for an evacuation scenario where virtually no opportunities would exist to pass due to anticipated traffic congestion. Accordingly, the base two-way evacuation capacity (2800 passenger cars per hour) for this type of roadway was adjusted to reflect the respective level-of-service D and E traffic flow conditions by factors of 0.64 and 1.00 (level terrain), 0.62 and 0.97 (rolling terrain), and 0.58 and 0.91 (mountainous terrain).

Each roadway link in the evacuation network is unique in that travel characteristics generally vary, even if only slightly, when proceeding along the particular route in question. As such, various factors must be applied to a link's base capacity to better reflect actual travel conditions experienced by the driver. The analysis accounts for the influence of directional frictions related to the imbalance of vehicular flows in each travel direction.

For an evacuation scenario, a skewed vehicular flow split would be expected -- the analysis used an approximate 90 percent outbound/10 percent inbound directional distribution. This distribution reflects both fewer travel gaps between vehicles in the major outbound flow and the increased inability of the minor flow to identify passing gaps in the opposite flow lane.

Additional factors accounted for travel lane widths of generally 10- to 12-foot wide, and the presence of heavy truck-type vehicles in the general traffic stream. Tables 8.4 and 8.5 of the HCM tabulate the various factors applied in the analysis for directional and lane width adjustments, while a default value of 0.98 was used for the heavy truck factor as few, if any, of these vehicles will be on the road during an emergency situation. Finally, two-way base capacity was adjusted to provide a one-way capacity in the outbound flow away from the JAF/NMP EPZ. (A conservative yet realistic 80 percent of the total flow was assigned to the outbound flow.)

As an example, from the above considerations, the base evacuation service volumes at levels-of-service D and E for Link Number 47 (Route 57 from Kingdom Road to Howard Road) were computed as follows:

$$SF_i = 2800 \times (V/C)_i \times f_d \times f_w \times f_{hv} \times f_{one\ way}$$

$$SF_{LOS\ D} = 2800 \times 0.64 \times 0.75 \times 0.68 \times 0.98 \times 0.80 = 717 vph$$
$$SF_{LOS\ E} = 2800 \times 1.00 \times 0.75 \times 0.81 \times 0.98 \times 0.80 = 1334\ vph$$

Basic Freeway/Multilane Highway Segments

Basic freeway segments make up a relatively small proportion of the total evacuation roadway network. The 1985 HCM defines a freeway as a divided highway facility having two or more lanes for the exclusive use of traffic in each direction and full control of access and egress. These facilities are separated by physical barriers thereby limiting driver discomfort due to oncoming traffic. The methodology uses the following equation to compute the service flow rate under prevailing roadway and traffic conditions:

$$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_p$$

Where: SF_i = Service flow rate or link capacity for a specified level-of-service under prevailing roadway and traffic conditions for N lanes in one direction, in vehicles per hour;

MSF_i = maximum service flow rate per lane for a specified level-of-service under ideal conditions, in passenger cars per hour per travel lane (pcphpl);

N = number of lanes in one direction of the freeway;

f_w = adjustment factor for the effects of restricted lane widths and/or lateral clearances, obtained from Table 3-2 of the HCM;

f_{hv} = adjustment factor for the effect of heavy vehicles (trucks, buses, and recreational vehicles) in the general traffic stream; and

f_p = adjustment factor for the effect of driver population, obtained from Table 3-10 of the HCM.

The analysis begins with the selection of the maximum service flow rate based on a roadway's posted and design speed. In general, roadways with a posted speed limit of 50 mph have a design speed of 60 mph while roads with a posted speed limit of 55 mph have a design speed of 70 mph.

Table 3-1 of the 1985 HCM allows for an evaluation and selection of a maximum capacity per lane associated with a specific design speed as follows:

BASE CAPACITY	DESIGN SPEED
2000 pcphpl	70 MPH
2000 pcphpl	60 MPH
1900 pcphpl	50 MPH

The base evacuation capacities at level-of-service E were further modified by a $(V/C)_i$ factor. The $(V/C)_i$ factor is the maximum volume-to-capacity ratio allowable while maintaining the performance characteristics of the level-of-service and design speed in question. These factors are also shown on Table 3-1 and are summarized below:

LOS E	LOS D
70 MPH Design Speed - 1.00	70 MPH Design Speed - 0.87
60 MPH Design Speed - 1.00	60 MPH Design Speed - 0.80
50 MPH Design Speed - 1.00	50 MPH Design Speed - 0.76

A single adjustment factor (f_w) accounts for the combined effect of lane widths, distances to the nearest obstruction, number of lanes on the freeway, and the presence of obstructions on road sides. For example, a roadway with 11-foot lanes, obstructions on both sides of the roadway at an average of 1-foot from the pavement edge for a four-lane freeway would have a factor of 0.85 -- this suggests that 15 percent of the freeway's ideal capacity is lost due to the lane width and lateral clearance restrictions present. The heavy vehicles factor (fhv) was assumed to be 0.98 because heavy vehicles in an emergency situation will compose a very small proportion of the traffic stream. The ability of motorists to negotiate the roadway is accounted for in the driver population factor (f_p) with values of 0.75 and 1.00 used to respectively reflect least (LOS D) and most (LOS E) efficient traffic stream characteristics.

Multilane Highways are undivided roadways on which opposing traffic flows are separated only by centerline pavement markings and do not have full control of access. The analysis of multilane highways differs slightly from that of freeways by the provision of one additional factor accounting for the friction experienced due to adjacent oncoming traffic as well as the presence of roadside driveways. While all other freeway-associated factors described above are directly applicable for the multilane highway, the

environmental factor (f_e) is required to distinguish and analyze these facilities. Table 7-10 in the HCM lists the environmental adjustment factors for a multilane facility.

Thus, from the above considerations, the base evacuation capacities at levels-of-service D and E for Link Numbers 163 (I-81 from Syracuse to Route 49 -- a freeway segment) and 200 (Route 3 from Route 48 to 1st Street -- a multilane highway segment), as example computations, were computed as follows:

Freeway Link No. 163

$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_p$

$SF_{LOS\ D} = 1850 \times 3 \times 0.98 \times 1.00 \times 0.75 = 4079$ vph

$SFf_{LOS\ E} = 2000 \times 3 \times 1.00 \times 0.98 \times 1.00 = 5880$ vph

Multilane Highway Link No. 200

$SF_i = MSF_i \times N \times f_w \times f_{hv} \times f_e$

$SF_{LOS\ D} = 1450 \times 2 \times 0.94 \times 0.98 \times 0.75 \times 0.95 = 1903$ vph

$SFf_{LOS\ E} = 1900 \times 2 \times 0.94 \times 0.98 \times 1.00 \times 0.95 = 3326$ vph

Signalized Arterials

Several roads within the evacuation network are controlled by signalized intersections with link capacity defined and limited by the link end point -- the intersection itself. Intersection approach capacity, which governs the roadway's ability to carry and process traffic, is the maximum rate of flow which may pass through the subject approach under prevailing traffic, roadway, and signalization conditions.

The basic computation begins with the selection of an "ideal" saturation flow rate, usually 1800 passenger cars per hour of green signal time per lane (pcphpl). The saturation flow rate is the vehicular flow in vehicles per hour which could be accommodated by the specific approach assuming that the green phase is always 1.00 (i.e., no red signal phase occurs). This "ideal" saturation flow rate is adjusted as follows:

$S = S_o \times N \times f_w \times f_{hv} \times f_g \times f_p \times f_{bb} \times f_a \times f_{rt} \times f_{lt} \times G/C$

Where: S = Saturation flow rate for the subject lane group, expressed as a total for all lanes in the lane group under prevailing conditions,, in vehicles per hour of green signal time;

S_o = ideal saturation flow rate per lane, usually 1,800 pcpgpl;

N = number of lanes in the lane group;

f_w = adjustment factor for lane width; 12-ft lanes are standard; given in Table 9-5 of the HCM;

f_{hv} = adjustment factor for heavy vehicles in the traffic stream, given in Table 9-6 of the HCM;

f_g = adjustment factor for approach grade, given in Table 9-7 of the HCM;

f_p = adjustment factor for the existence of a parking lane adjacent to the lane group and the parking activity in that lane, given in Table 9-8 of the HCM;

f_{bb} = adjustment factor for the blocking effect of local buses stopping within the intersection area, given in Table 9-9 of the HCM;

f_a = adjustment factor for area type, given in Table 9-10 of the HCM;

f_{rt} = adjustment factor for right turns in the lane group, given in Table 9-11 of the HCM;

f_{lt} = adjustment factor for left turns in the lane group, given in Table 9-12 of the HCM and;

G/C = ratio of green signal time to total signal cycle length.

The lane width factor (f_w) accounts for the deleterious effect of lanes narrower than the accepted standard of 12 feet wide, while increased flow is provided for on lanes greater than this standard. The heavy vehicle factor (fhv) is assumed to be only slightly affected (i.e., a factor of 0.99 is used to account for terrain conditions) because heavy vehicles in an emergency situation will not make up a significant proportion of the traffic stream. Adjustment factors (f_g) reflecting the effect of roadway grades on the saturation flow are provided for a variety of uphill and downhill conditions. The parking factors (f_p) account for the frictional effect of a parking lane on vehicular flow in the adjacent lanes, as well as for the occasional blocking of an adjacent lane by vehicles moving into and out of curbside parking spaces. Most of the links in this category do not have parking; however, on the links where parking was observed, a minimum number of 10 parking movements per hour was assumed in the analysis. Again, this factor was selected to represent emergency evacuation characteristics when parking would be very minimal. The bus blockage factor (f_{bb}) accounts for the impacts of alighting/boarding activities of local transit buses. Clearly, this type of activity would be minimal under emergency evacuation conditions and, as such, a factor of 1.00 was used. (It must be noted that evacuation bus pickup activity will not be a frequent occurrence during an evacuation and will not affect a change in the use of this factor.) The area type factor (f_a) accounts for the relative inefficiency of business area intersections in comparison to those in other locations. Right and left turn factors (f_{rt} and f_{lt}) depend upon several parameters. However, in an emergency evacuation situation, it is assumed that most vehicles would travel in one direction and not making turns. Furthermore, if a turn was necessary within the route, a predominant turning movement is treated as a through movement. As a result, factors of 0.85 and 0.95 were applied for right and left turn movements -- the least reduction factors allowable in the methodology. The final adjustment to the saturation flow rate accounts for the amount of available green signal time relative to the total signal cycle length (G/C ratio). Factors of approximately 0.75 and 0.90 were chosen to represent levels-of-service D and E, respectively. These different traffic signal adjustment factors reflect varying degrees of preparedness, with the lower level-of-service D factor of 0.75 accounting for the likelihood of fewer traffic control agents in place during an evacuation scenario.

A select number of intersections are regulated by STOP or YIELD controls. It was determined that they would operate similar to signalized intersections with the control and regulation of vehicular flow maintained through traffic control agents. In this manner, these locations were assumed to experience the same frictions as those present any typical signalized intersections, and were thus examined using the above-described traffic signal control criteria.

Thus, from the above considerations, the base evacuation service volumes at levels-of-service D and E for Link Number 205 (Route 104 from East 12th Street to George Street in Oswego), as an example computation, were computed as follows:

$$S = S_o \times N \times f_w \times f_{hv} \times f_g \times f_p \times f_{bb} \times f_a \times f_{rt} \times f_{lt} \times G/C$$

$$S_{LOS\ D} = 1800 \times 1 \times 1.00 \times 0.99 \times 0.99 \times 0.85 \times 1.00 \times 1.00 \times 0.85 \times 0.95 \times 0.75 = 908 \text{ vph}$$

$$S_{LOS\ E} = 1800 \times 1 \times 1.00 \times 0.99 \times 0.99 \times 0.85 \times 1.00 \times 1.00 \times 0.85 \times 0.95 \times 0.90 = 1090 \text{ vph}$$

Adverse Weather Effects

The 1985 Highway Capacity Manual (HCM) does not specifically account for inclement weather conditions in the analysis of roadway travel capacities. In fact, there have been relatively few efforts to quantify the effects of adverse weather on roadway capacity. Under adverse weather conditions such as snow, fog, severe thunder storms which result in heavy rains, localized flooding, or ice, the ability of roadways to carry traffic is further reduced from that of a Level of Service D or E. Two factors account for this reduction -- a decreased quality and amount of physical space on the roadway surface (e.g., snow on shoulders) and a more cautious attitude on the part of the driver (resulting in increased headways). Level of Service D service volumes were further reduced by 20 percent to account for these factors to estimate adverse weather evacuation capacities.

A standard freeway is referenced as an example to illustrate the anticipated capacity of a roadway when adverse weather conditions prevail. At Level of Service E, one lane of a standard freeway can accommodate 2,000 vehicles per hour. 2,000 vehicles is also the theoretical capacity of one freeway lane under normal weather conditions and without incident.

At a Level of Service D, one standard freeway lane can typically accommodate 1,850 vehicles per hour; therefore, it is assumed the theoretical capacity of Level of Service D is 1,850 vehicles. The Level of Service D theoretical capacity is representative of conditions which may result from a light snow, rain, or when some traffic control officers may be unable to fulfill their assignments. A further 20% reduction in level of Service D conditions would result in a theoretical capacity of 1,480 vehicles during adverse weather conditions.

Assuming that 10,000 vehicles were anticipated to traverse this section of freeway, it would take five hours to traverse this road section assuming Level of Service E conditions (10,000 veh ÷ 2,000 veh/hr). Subsequently, it would take almost six hours under Level of Service D conditions and close to seven hours to travel when adverse weather conditions prevail on the same roadway section.

Comparison of 1965 and 1985 Highway Capacity Manual Methodologies

As previously mentioned, the 1985 HCM was used as the basis of computing roadway travel capacities in this current analysis of the JAF/NMP EPZ. Previous analyses of this roadway system used the current manual's predecessor, the 1965 Highway Capacity Manual, that was the accepted standard methodology at that time. While both manuals are theoretically correct, it is the current 1985 version that is gaining widespread acceptance for a variety of reasons.

The 1985 version has a more extensive data base in all chapters of analysis, has provisions for constant updating as warranted and, most importantly, accounts for the numerous operating characteristic and frictions that affect the roadway system and driver behaviors. The summary table below highlights the previous example 1985 HCM link computations versus those same link capacities of prior analyses utilizing the 1965 HCM, under normal conditions (i.e. a 12-foot lane, full shoulder, level terrain, and good weather).

	Facility Service Volumes			
	1965 HCM		1985 HCM	
Facility Type	LOS D	LOS E	LOS D	LOS E
2-Lane, 2-Way	696	1200	844	1516
Freeway	2404	3440	2775	4000
Multilane Highway	2660	3800	1847	3078
Signalized Intersection	659	1136	1112	1334

APPENDIX G

EVACUATION TRAVEL TIMES

BY EMERGENCY RESPONSE PLANNING AREAS

APPENDIX G

EVACUATION TRAVEL TIMES

BY EMERGENCY RESPONSE PLANNING AREAS

This appendix includes evacuation travel time estimates by ERPA for a simultaneous full-EPZ evacuation. Evacuation travel time estimates are presented for the following scenarios, weather conditions, and population groups:

Scenarios

School-in-Session
School-not - in Session
Weekend/Holiday Summer
Weekend/Holiday Winter
Evening
Nighttime
Classic Weekend
Harborfest Weekend

Weather Conditions

Normal
Adverse

Population Groups

Resident Population with Autos
Resident Population without Autos
Special Facilities Population
Transient Population

A total of 19 tables are included in this Appendix. Table G-1 is a summary table that indicates evacuation travel times for all scenarios under normal weather conditions. Similarly, Table G-2 shows evacuation travel times for all scenarios under adverse weather conditions. Tables G-3 through G-18 each show evacuation travel times for a particular scenario under a particular weather condition. Table G-19 shows evacuation travel times for schools in the EPZ to the New York State Fairgrounds for normal and adverse weather conditions. A range of values depict the lower and upperbound limits of the evacuation times for normal weather and dry roadway conditions to a light rain or snow shower which results in wet pavement. Evacuation travel time estimates for adverse weather approximate travel conditions after a severe ice storm or heavy snow once roadway crews have been able to clear the roads.

A suggested approach to read the tables in Appendix G is outlined below:

- Step 1 - Determine the appropriate scenario (i.e. - School-in-Session)

- Step 2 - Determine the approximate weather condition.
  - Lower bound normal weather conditions - dry pavement
  - Upper bound normal weather conditions - wet pavement
  - Adverse weather conditions - pavement conditions after a severe winter storm

- Step 3 - For lower bound normal weather ETTE tables, read the left of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ
  - For upper bound normal weather ETTE tables, read the right of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ
  - Adverse weather ETTEs are documented on separate tables for each scenario

A possible evacuation scenario is detailed as follows:

A full EPZ evacuation scenario has been ordered on a Tuesday at 11:15 AM in October. The weather conditions are observed to be sunny and the forecast is that these weather conditions will continue over the next two days. (See Table G-3 for ETTEs).

Q. How long will it take for the permanent resident population with autos to:

- Fully evacuate ERPA 5? A. 2:10
- Fully evacuate the EPZ? A. 4:10

Q. How long will it take for the permanent resident population without autos to:

- Fully evacuate ERPA 16? A. 0:40
- Fully evacuate the EPZ? A. 4:30

Q. How long will it take for the special facilities population to:

- Fully evacuate ERPA 4? A. 1:10
- Fully evacuate the EPZ? A. 13:20 (Multiple wave evacuations substantially increase special facility evacuation times.)

Q. How long will it take for the transient population to:

- Fully evacuate ERPA 5? A. 1:50 (Transient population can evacuate more quickly than permanent resident population in the same ERPA. This typically occurs when the transient population is located in a traffic zone closer to the EPZ boundary).

• Fully evacuate ERPA 16?	A. 0:40	(Transient population and permanent resident population typically require the same time to evacuate an ERPA when the population dispersion of each is similar throughout the ERPA.
• Fully evacuate ERPA 22?	A. 4:00	
• Fully evacuate the EPZ?	A. 4:10	

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	4:00 - 6:50	4:00 - 7:00	-	4:00 - 6:50
2	2:00 - 3:00	2:00 - 3:00	-	-
3	4:00 - 6:50	4:00 - 7:00	-	-
4	1:50 - 3:00	2:10 - 3:20	1:10 - 1:10	1:00 - 1:00
5	4:00 - 6:50	1:10 - 1:10	-	-
6	4:00 - 6:50	4:40 - 7:50	-	4:00 - 6:50
7	1:50 - 3:00	0:50 - 1:50	-	1:50 - 3:00
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	4:00 - 6:50	4:00 - 6:50	-	4:00 - 6:50
11	3:50 - 6:50	4:40 - 7:50	-	-
12	4:40 - 7:50	5:00 - 7:50	4:40 -11:10	4:30 - 7:40
13	3:00 - 4:40	3:20 - 5:00	12:20 -13:50	3:00 - 4:40
14	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
15	1:50 - 2:50	1:20 - 2:20	-	1:50 - 2:50
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:50 - 6:50	4:20 - 7:20	-	-
20	4:00 - 6.40	4:10 - 7:00	-	-
21	0:50 - 2:00	0.50 - 2:10	-	-
22	3:00 - 4:40	3:00 - 4:40	3:00 - 4:40	3:00 - 4:40
⊥	4:00 - 7:50	4:40 - 7.50	12:20 -13:50	4:30 - 7:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	3:10 - 5:20	3:10 - 5:30	-	3:10 - 5:20
2	1:10 - 2:20	1:10 - 2:20	-	-
3	3:10 - 5:20	3:10 - 5:30	-	-
4	1:00 - 2:10	1:10 - 2:30	1:10 - 1:10	1:00 - 1:00
5	3:10 - 5:20	3:10 - 5 20	-	-
6	3:10 - 5:40	3:40 - 6.00	-	3:10 - 5:20
7	0:50 - 2:10	0:50 - 1:50	-	-
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	3:10 - 5:20	3:10 - 5 20	-	-
11	3:10 - 5.40	3:30 - 5 50	-	-
12	4:30 - 6:30	4:50 - 6 50	11:00 -13 00	4:10 - 6:10
13	7:00 -11:10	7:20 -11:30	13:30 -16:30	6:40 -10:50
14	0:40 - 2:10	0:50 - 2.10	-	0:40 - 2:10
15	0:40 - 2:10	1:20 - 2 20	-	0:40 - 2:10
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	4:10 - 6:10	3:30 - 6:20	-	-
20	4:00 - 6.00	4:10 - 6:10	-	-
21	0:50 - 2:00	0:50 - 2:10	-	-
22	7:00 -11:10	6.40 -11:00	6:30 -10:50	6:40 -10:50
⊥	7:00 -11:10	7:20 -11:30	13:30 -16:30	6:40 -10:50

TABLE G-1

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NORMAL WEATHER

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Normal weather conditions are considered to be clear sky and dry roadway pavement for the above scenario.

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:10 - 3:30	2:10 - 3:40	-	2:10 - 3:30
2	2:00 - 3:20	2:10 - 3:30	-	2:00 - 3:20
3	1:50 - 3:00	1:50 - 2:50	-	-
4	1:00 - 1:40	1:50 - 2:40	1:10 - 1:50	1:00 - 1:40
5	2:00 - 3:20	2:20 - 3:40	-	1:50 - 2:50
6	5:00 - 9:00	5:10 - 9:20	-	5:00 - 9:00
7	1:40 - 2:20	1:50 - 2:40	-	1:40 - 2:20
8	1:40 - 2:20	1:00 - 2:00	-	1:40 - 2:20
9	0:50 - 1:40	1:00 - 1:50	-	0:50 - 1:40
10	2:00 - 3:20	1:50 - 2:50	-	2:00 - 3:20
11	4:50 - 9:00	5:10 - 9:10	-	4:50 - 9:00
12	5:00 - 9:10	5:10 - 9:20	10:50 - 12:50	5:00 - 9:10
13	4:20 - 7:10	4:50 - 7:30	13:20 - 15:20	4:20 - 7:10
14	0:40 - 0:40	0:50 - 0:50	-	-
15	1:40 - 2:20	2:20 - 3:00	-	1:40 - 2:20
16	1:30 - 2:20	1:40 - 2:30	1:30 - 2:20	1:30 - 2:20
17	1:30 - 2:10	1:40 - 2:30	0:40 - 1:40	0:40 - 1:40
18	0:40 - 1:40	0:50 - 1:50	-	0:40 - 1:40
19	4:50 - 9:00	5:10 - 9:20	-	2:40 - 4:00
20	4:50 - 8:50	5:00 - 8:50	-	4:50 - 8:50
21	2:20 - 3:50	2:30 - 4:00	2:20 - 3:50	2:20 - 3:50
22	4:30 - 7:10	4:30 - 7:10	4:30 - 7:10	4:30 - 7:10
ALL	5:00 - 9:10	5:10 - 9:20	13:20 - 15:20	5:00 - 9:10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:00 - 3:00	2:00 - 3:10	-	1:50 - 3:00
2	2:00 - 3:00	2:00 - 3:00	-	-
3	2:00 - 3:00	2:10 - 3:30	-	-
4	1:50 - 3:00	2:10 - 3:20	1:10 - 1:10	1:00 - 1:00
5	1:50 - 3:00	1:10 - 1:10	-	-
6	3:10 - 5:40	3:30 - 6:00	-	2:00 - 3:00
7	1:50 - 3:00	0:50 - 1:50	-	1:50 - 3:00
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:50 - 3:00	1:50 - 3:00	-	1:50 - 3:00
11	3:10 - 5:40	3:20 - 5:50	-	-
12	3:20 - 5:40	3:30 - 5:50	9:10 - 10:40	3:20 - 5:40
13	3:00 - 4:40	3:20 - 5:00	11:50 - 13:00	3:00 - 4:40
14	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
15	1:50 - 2:50	1:20 - 2:20	-	1:50 - 2:50
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:10 - 5:40	3:30 - 5:50	-	-
20	3:00 - 5:30	3:20 - 5:30	-	-
21	0:50 - 2:00	0:50 - 2:10	-	-
22	3:00 - 4:40	3:00 - 4:40	3:00 - 4:40	3:00 - 4:40
ALL	3:20 - 5:40	3:30 - 5:50	11:50 - 13:00	3:20 - 5:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:10 - 2:20	1:10 - 2:30	-	1:10 - 2:20
2	1:10 - 2:20	1:10 - 2:20	-	-
3	1:10 - 2:20	1:10 - 2:40	-	-
4	1:00 - 2:10	1:10 - 2:30	1:10 - 1:10	1:00 - 1:00
5	1:00 - 2:20	1:10 - 1:10	-	-
6	3:10 - 5:40	3:30 - 6:00	-	1:10 - 2:20
7	0:50 - 2:10	0:50 - 1:50	-	-
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:20	1:00 - 2:20	-	-
11	3:10 - 5:40	3:20 - 5:50	-	-
12	3:20 - 5:40	3:30 - 5:50	9:00 - 10:10	3:20 - 5:40
13	3:00 - 4:40	3:20 - 5:00	11:30 - 12:40	3:00 - 4:40
14	0:40 - 2:10	0:50 - 2:10	-	0:40 - 2:10
15	0:40 - 2:10	1:20 - 2:20	-	0:40 - 2:10
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:10 - 5:40	3:30 - 5:50	-	-
20	3:00 - 5:30	3:20 - 5:30	-	-
21	0:50 - 2:00	0:50 - 2:10	-	-
22	3:00 - 4:40	3:00 - 4:50	3:00 - 4:40	3:00 - 4:40
ALL	3:20 - 5:40	3:30 - 6:00	11:30 - 12:40	3:20 - 5:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:10 - 3:30	2:10 - 3:40	-	2:10 - 3:30
2	2:10 - 3:20	2:10 - 3:30	-	2:10 - 3:20
3	2:10 - 3:20	2:20 - 3:40	-	-
4	2:00 - 3:10	2:20 - 3:30	1:10 - 2:00	2:00 - 3:10
5	2:10 - 3:20	2:20 - 3:40	-	2:00 - 3:20
6	4:50 - 8:50	5:10 - 9:10	-	4:50 - 8:50
7	2:00 - 3:10	0:50 - 2:10	-	2:00 - 3:10
8	0:50 - 2:00	1:00 - 2:00	-	0:50 - 2:00
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:20	2:10 - 3:20	-	2:10 - 3:20
11	4:50 - 8:50	5:00 - 9:10	-	4:50 - 8:50
12	5:00 - 9:00	5:10 - 8:10	11:00 - 13:00	5:00 - 9:00
13	4:20 - 7:00	4:50 - 7:30	13:30 - 15:30	4:20 - 7:00
14	1:50 - 3:00	2:00 - 3:00	-	1:50 - 3:00
15	1:50 - 3:00	1:20 - 2:40	-	1:50 - 3:00
16	0:40 - 1:50	0:40 - 2:00	0:40 - 0:40	0:40 - 1:50
17	0:40 - 1:50	1:10 - 2:00	-	0:40 - 0:40
18	0:40 - 1:40	0:50 - 1:40	-	0:40 - 1:40
19	4:50 - 8:50	5:10 - 9:00	-	2:50 - 4:10
20	4:50 - 8:50	5:00 - 8:40	-	4:50 - 8:50
21	2:10 - 3:30	2:20 - 3:40	0:30 - 0:30	2:10 - 3:30
22	4:20 - 7:00	4:30 - 7:10	4:20 - 7:00	4:20 - 7:00
ALL	5:00 - 9:00	5:10 - 9:10	13:30 - 15:30	5:00 - 9:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:00 - 2:10	1:00 - 2:20	-	1:00 - 1:00
2	1:00 - 1:00	1:00 - 1:00	-	-
3	1:10 - 2:10	1:10 - 2:20	-	-
4	1:00 - 1:00	1:10 - 1:50	1:10 - 1:10	-
5	1:00 - 2:10	1:10 - 1:10	-	-
6	3:10 - 5:40	3:30 - 6:00	-	1:00 - 2:10
7	0:50 - 1:40	0:50 - 1:50	-	-
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	3:10 - 5:40	3:20 - 5:50	-	-
12	3:20 - 5:40	3:30 - 5:50	8:50 - 10:00	3:20 - 5:40
13	3:00 - 4:40	3:20 - 5:00	11:20 - 12:30	3:00 - 4:40
14	0:40 - 0:40	0:50 - 0:50	-	0:40 - 0:40
15	0:40 - 1:40	1:20 - 2:20	-	0:40 - 0:40
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:10 - 5:40	3:30 - 5:50	-	-
20	3:00 - 5:30	3:20 - 5:30	-	-
21	0:50 - 2:00	0:50 - 2:10	-	-
22	3:00 - 4:40	3:00 - 4:40	2:50 - 4:40	-
ALL	3:20 - 5:40	3:30 - 6:00	11:20 - 12:30	3:20 - 5:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:00 - 3:00	2:00 - 3:10	-	1:40 - 2:40
2	2:00 - 3:10	2:00 - 3:00	-	-
3	1:50 - 2:40	2:10 - 3:30	-	-
4	1:50 - 3:00	2:10 - 3:20	1:10 - 1:10	1:00 - 1:00
5	1:40 - 2:40	1:10 - 1:10	-	-
6	3:10 - 5:40	3:30 - 6:00	-	1:50 - 2:40
7	1:50 - 3:00	0:50 - 1:50	-	1:50 - 3:00
8	0:50 - 1:40	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:40 - 2:40	1:40 - 2:40	-	1:40 - 2:40
11	3:10 - 5:40	3:20 - 5:50	-	-
12	3:20 - 5:40	3:30 - 5:50	9:20 - 10:40	3:20 - 5:40
13	3:40 - 5:50	4:00 - 6:10	11:50 - 13:10	3:40 - 5:50
14	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
15	1:50 - 2:50	1:20 - 2:20	-	1:50 - 2:50
16	0:40 - 1:30	0:40 - 1:40	-	-
17	0:40 - 1:30	1:10 - 1:40	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:10 - 5:40	3:30 - 5:50	-	-
20	3:00 - 5:30	3:20 - 5:30	-	-
21	0:50 - 2:00	0:50 - 2:10	-	-
22	3:40 - 5:50	3:40 - 5:50	3:40 - 5:50	3:40 - 5:50
ALL	3:40 - 5:50	4:00 - 6:10	11:50 - 13:10	3:40 - 5:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	4:00 - 6:40	1:10 - 2:00	-	4:00 - 6:40
2	2:00 - 3:00	1:00 - 1:50	-	-
3	4:00 - 6:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	4:00 - 6:40	1:10 - 2:00	-	-
6	4:00 - 6:50	4:20 - 7:10	-	4:00 - 6:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	4:00 - 6:40	4:00 - 6:40	-	4:00 - 6:40
11	2:50 - 5:00	4:20 - 7:10	-	-
12	4:20 - 7:20	4:20 - 7:10	9:40 - 11:20	4:10 - 7:00
13	2:30 - 4:00	3:00 - 4:30	12:20 - 14:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:50 - 6:40	4:10 - 6:50	-	-
20	3:50 - 6:40	4:10 - 6:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	4:20 - 7:20	4:20 - 7:10	12:20 - 14:00	4:10 - 7:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	3:10 - 5:10	1:10 - 2:00	-	3:10 - 5:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	3:10 - 5:10	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	3:10 - 5:10	1:10 - 2:00	-	-
6	3:10 - 5:10	3:20 - 5:20	-	3:10 - 5:10
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	3:10 - 5:10	3:10 - 5:10	-	-
11	2:20 - 3:50	3:10 - 5:10	-	-
12	4:40 - 6:50	5:00 - 7:10	10:50 - 12:50	4:20 - 6:20
13	6:40 - 10:30	6:50 - 10:50	13:20 - 16:40	6:10 - 10:10
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	4:20 - 6:20	4:20 - 6:30	-	-
20	4:10 - 6:20	4:20 - 6:30	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	6:30 - 10:30	6:20 - 10:20	6:10 - 10:10	6:10 - 10:10
ALL	6:40 - 10:30	6:50 - 10:50	13:20 - 16:40	6:10 - 10:10

TABLE G-1

EVACUATION TRAVEL TIME ESTIMATES BY ERPA

NORMAL WEATHER

Notes

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents, vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained.
(c) An informed and cooperative public follow directions as instructed
(d) Dry roadway conditions exist

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not t the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minima mobilization of the emergency workforce.
(c) A low degree of cooperation from the public occurs
(d) A light rain or snow shower results in wet pavement

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time

(3) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles),
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table

(6) All times have been rounded to the nearest 10 minutes

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	1:50 - 2:50	2:30 - 4:00	-	-
4	1:00 - 1:50	1:10 - 2:40	1:10 - 2:00	1:00 - 1:50
5	2:10 - 3:40	2:30 - 4:00	-	1:50 - 2:50
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:00 - 2:30	1:00 - 2:40	-	1:00 - 2:30
8	0:50 - 2:30	1:00 - 2:10	-	0:50 - 2:30
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	1:50 - 2:50	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:30	-	4:00 - 7:10
12	4:10 - 7:20	4:20 - 7:30	10:50 -12:40	4:10 - 7:20
13	4:00 - 6:30	4:30 - 6:50	13:20 -15:20	4:00 - 6:30
14	0:40 - 0:40	0:50 - 0:50	-	-
15	0:50 - 2:30	1:20 - 3:00	-	0:50 - 2:30
16	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20
17	0:40 - 2:10	1:20 - 2:20	0:40 - 1:50	0:40 - 1:50
18	0:40 - 1:40	0:50 - 2:00	-	0:40 - 1:50
19	4:00 - 7:10	4:10 - 7:00	-	2:50 - 4:10
20	3:50 - 7:10	4:10 - 7:00	-	3:50 - 7:10
21	2:40 - 4:30	2:50 - 4:40	2:40 - 4:30	2:40 - 4:30
22	4:00 - 6:30	4:10 - 6:40	4:00 - 6:30	4:00 - 6:30
ALL	4:10 - 7:20	4:30 - 7:30	13:20 -15:20	4:10 - 7:20

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:50 - 2:50
2	2:00 - 3:00	1:00 - 1:50	-	-
3	1:50 - 2:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:50 - 2:50	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:50 - 2:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:10 -10:30	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:30 - 3:50	-	-
20	2:10 - 3:40	2:30 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:10 - 2:10	1:10 - 2:00	-	1:10 - 2
2	1:10 - 2:10	1:00 - 1:50	-	-
3	1:10 - 2:20	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:00 -10:00	2:20 - 4
13	2:30 - 4:00	3:00 - 4:30	11:20 -12:30	2:30 - 4
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:40 - 4:00	2:40 - 4:10	2:30 - 4:00	2:40 - 4
ALL	2:40 - 4:00	3:00 - 4:30	11:20 -12:30	2:40 - 4

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	2:10 - 3:20	2:30 - 4:00	-	-
4	2:00 - 3:10	2:10 - 3:20	1:10 - 2:00	2:00 - 3:10
5	2:10 - 3:40	2:30 - 4:00	-	2:00 - 3:10
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:50 - 3:00	1:00 - 2:10	-	1:50 - 3:00
8	0:50 - 2:00	1:00 - 1:00	-	0:50 - 2:00
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	2:00 - 3:10	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:20	-	4:00 - 7:10
12	4:00 - 7:10	4:10 - 7:20	10:50 -12:50	4:00 - 7:10
13	4:00 - 6:20	4:20 - 6:50	13:20 -15:20	4:00 - 6:20
14	1:50 - 3:00	2:00 - 3:00	-	1:50 - 3:00
15	1:50 - 3:00	1:20 - 2:30	-	1:50 - 3:00
16	0:40 - 1:50	0:40 - 2:00	0:40 - 0:40	0:40 - 1:50
17	0:40 - 1:40	1:10 - 2:00	-	0:40 - 0:40
18	0:40 - 1:40	0:50 - 1:40	-	0:40 - 1:40
19	4:00 - 7:10	4:10 - 7:00	-	3:00 - 4:20
20	3:50 - 7:00	4:10 - 7:00	-	3:50 - 7:00
21	2:30 - 4:10	2:40 - 4:20	0:40 - 0:40	2:30 - 4:10
22	4:00 - 6:20	4:00 - 6:30	4:00 - 6:20	4:00 - 6:20
ALL	4:00 - 7:10	4:20 - 7:30	13:20 -15:20	4:00 - 7:10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:00 - 2:10	1:10 - 2:00	-	1:00 - 1:50
2	1:00 - 1:50	1:00 - 1:50	-	-
3	1:00 - 2:10	1:10 - 2:00	-	-
4	1:00 - 1:00	1:10 - 1:10	1:10 - 1:10	-
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:10
7	0:50 - 0:50	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	8:50 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00
14	0:40 - 0:40	0:50 - 0:50	-	0:40 - 0:40
15	0:40 - 0:40	1:20 - 1:20	-	0:40 - 0:40
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:00	2:30 - 4:00	-
ALL	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:40 -
2	2:00 - 3:00	1:10 - 1:50	-	-
3	1:40 - 2:40	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1
5	1:40 - 2:30	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:40 - 2
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:40 - 2:30	1:40 - 2:30	-	1:40 - 2
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:20 -10:40	2:20 - 4
13	3:10 - 5:10	3:40 - 5:30	11:50 -13:00	3:10 - 5
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	3:20 - 5:10	3:20 - 5:10	3:10 - 5:10	3:20 - 5
ALL	3:20 - 5:10	3:40 - 5:30	11:50 -13:00	3:20 - 5

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	6:20	2:20	-	6:20
2	3:40	2:10	-	-
3	6:20	2:20	-	-
4	3:30	3:50	2:00	1:50
5	6:20	2:20	-	-
6	6:20	6:50	-	6:20
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	6:20	6:20	-	6:20
11	6:10	6:50	-	-
12	6:50	6:50	13:30	6:40
13	4:50	5:20	16:30	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	6:10	6:20	-	-
20	6:10	6:20	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	4:50
ALL	6:50	6:50	16:30	6:40

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	6:30	2:20	-	6:30
2	2:40	2:10	-	-
3	6:30	2:20	-	-
4	2:30	2:50	1:20	1:10
5	6:20	2:20	-	-
6	6:30	6:30	-	6:30
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	6:20	6:20	-	-
11	4:40	6:20	-	-
12	8:20	6:40	15:20	7:50
13	13:00	13:20	20:10	12:40
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	7:50	8:00	-	-
20	7:40	8:00	-	-
21	3:10	3:20	-	-
22	13:00	12:40	12:40	12:40
ALL	13:00	13:20	20:10	12:40

TABLE G-2

EVACUATION TRAVEL TIME ESTIMATES BY ERPA

ADVERSE WEATHER

Notes.

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	4:30	4:40	-		4:30
2	4:30	4:40	-		4:30
3	3:30	4:40	-		-
4	2:10	3:10	2:20		2:10
5	4:30	4:40	-		3:20
6	9:00	9:10	-		9:00
7	3:00	3:10	-		3:00
8	3:00	2:30	-		3:00
9	2:00	2:10	-		2:00
10	4:30	3:20	-		4:30
11	9:00	9:10	-		9:00
12	9:00	9:10	15:10		9:00
13	8:00	8:30	18:30		8:00
14	1:40	0:50	-		-
15	3:00	3:20	-		3:00
16	2:50	2:50	2:50		2:50
17	2:30	2:50	2:10		2:10
18	1:50	2:20	-		2:10
19	8:50	8:40	-		5:10
20	8:50	8:40	-		8:50
21	5:30	5:40	5:30		5:30
22	8:00	8:10	8:00		8:00
ALL	9:00	9:10	18:30		9:00

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	3:30	2:20	-		3:30
2	3:40	2:10	-		-
3	3:30	2:20	-		-
4	3:30	3:50	2:00		1:50
5	3:30	2:20	-		-
6	4:40	5:00	-		3:30
7	3:30	2:00	-		3:30
8	1:50	1:00	-		-
9	1:40	1:50	-		-
10	3:30	3:30	-		3:30
11	4:40	4:50	-		-
12	4:50	5:00	12:30		4:50
13	4:50	5:20	15:20		4:50
14	3:20	3:20	-		3:20
15	3:20	2:20	-		3:20
16	1:40	1:50	-		-
17	1:40	1:50	-		-
18	1:40	1:40	-		-
19	4:40	4:40	-		-
20	4:30	4:40	-		-
21	3:10	3:20	-		-
22	4:50	5:00	4:50		-
ALL	4:50	5:20	15:20		4:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	3:30	2:20	-		3:10
2	3:40	2:10	-		-
3	3:10	2:20	-		-
4	3:30	3:50	2:00		1:50
5	3:10	2:20	-		-
6	4:40	5:00	-		3:10
7	3:30	2:00	-		3:30
8	1:50	1:00	-		-
9	1:40	1:50	-		-
10	3:10	3:00	-		3:10
11	4:40	4:50	-		-
12	4:50	5:00	12:30		4:50
13	6:20	6:50	15:30		6:20
14	3:20	3:20	-		3:20
15	3:20	2:20	-		3:[illegible]
16	1:40	1:50	-		-
17	1:40	1:50	-		-
18	1:40	1:40	-		-
19	4:40	4:40	-		-
20	4:30	4:40	-		-
21	3:10	3:20	-		-
22	6:20	6:30	6:20		6:20
ALL	6:20	6:50	15:30		6:20

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	4:30	4:40	-		4:30
2	4:30	4:40	-		4:30
3	4:00	4:40	-		-
4	3:50	4:00	2:20		3:50
5	4:30	4:40	-		4:00
6	8:50	9:10	-		8:50
7	3:40	2:30	-		3:40
8	2:20	2:00	-		2:20
9	2:00	2:20	-		2:00
10	4:30	4:00	-		4:30
11	8:50	9:00	-		8:50
12	8:50	9:00	15:20		8:50
13	7:50	8:20	18:10		7:50
14	3:40	3:30	-		3:40
15	3:40	2:50	-		3:40
16	2:10	2:20	1:30		2:10
17	2:00	2:20	-		1:40
18	2:00	2:00	-		2:00
19	8:50	8:30	-		5:30
20	8:40	8:30	-		8:40
21	5:00	5:20	1:40		5:00
22	7:50	8:00	7:50		7:50
ALL	8:50	9:10	18:10		8:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	2:30	2:20	-		2:10
2	2:10	2:10	-		-
3	2:40	2:20	-		-
4	1:10	2:00	1:20		-
5	2:30	2:20	-		-
6	4:40	5:00	-		2:30
7	1:50	2:00	-		-
8	1:50	1:00	-		-
9	0:50	1:00	-		-
10	2:30	2:30	-		-
11	4:40	4:50	-		-
12	4:50	5:00	11:40		4:50
13	4:50	5:20	14:40		4:50
14	0:40	0:50	-		0:40
15	1:50	2:20	-		0:40
16	1:40	1:50	-		-
17	1:40	1:50	-		-
18	0:40	0:50	-		-
19	4:40	4:40	-		-
20	4:30	4:40	-		-
21	3:10	3:20	-		-
22	4:50	5:00	4:50		-
ALL	4:50	5:20	14:40		4:50

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients	
1	2:40	2:20	-		2:5[illegible]
2	2:40	2:10	-		
3	2:40	2:20	-		
4	2:30	2:50	1:20		1:1[illegible]
5	2:40	2:20	-		
6	4:40	5:00	-		2:4[illegible]
7	2:30	2:00	-		
8	1:50	1:00	-		
9	0:50	1:00	-		
10	2:40	2:40	-		
11	4:40	4:50	-		
12	4:50	5:00	11:50		4:5[illegible]
13	5:00	5:20	14:40		5:0[illegible]
14	2:20	2:30	-		2:2[illegible]
15	2:20	2:20	-		2:2[illegible]
16	1:40	1:50	-		
17	1:40	1:50	-		
18	0:40	0:50	-		
19	4:40	4:40	-		
20	4:30	4:40	-		
21	3:10	3:20	-		
22	5:00	5:00	4:50		5:[illegible]
ALL	5:00	5:20	14:40		5:[illegible]

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	1:50 - 2:50	2:30 - 4:00	-	-
4	1:00 - 1:50	1:10 - 2:40	1:10 - 2:00	1:00 - 1:50
5	2:10 - 3:40	2:30 - 4:00	-	1:50 - 2:50
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:00 - 2:30	1:00 - 2:40	-	1:00 - 2:30
8	0:50 - 2:30	1:00 - 2:10	-	0:50 - 2:30
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	1:50 - 2:50	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:30	-	4:00 - 7:10
12	4:10 - 7:20	4:20 - 7:30	10:50 -12:40	4:10 - 7:20
13	4:00 - 6:30	4:30 - 6:50	13:20 -15:20	4:00 - 6:30
14	0:40 - 0:40	0:50 - 0:50	-	-
15	0:50 - 2:30	1:20 - 3:00	-	0:50 - 2:30
16	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20	0:40 - 2:20
17	0:40 - 2:10	1:20 - 2:20	0:40 - 1:50	0:40 - 1:50
18	0:40 - 1:40	0:50 - 2:00	-	0:40 - 1:50
19	4:00 - 7:10	4:10 - 7:00	-	2:50 - 4:10
20	3:50 - 7:10	4:10 - 7:00	-	3:50 - 7:10
21	2:40 - 4:30	2:50 - 4:40	2:40 - 4:30	2:40 - 4:30
22	4:00 - 6:30	4:10 - 6:40	4:00 - 6:30	4:00 - 6:30
ALL	4:10 - 7:20	4:30 - 7:30	13:20 -15:20	4:10 - 7:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-4

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-IN-SESSION SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	3:30	4:40	-	-
4	2:10	3:10	2:20	2:10
5	4:30	4:40	-	3:20
6	9:00	9:10	-	9:00
7	3:00	3:10	-	3:00
8	3:00	2:30	-	3:00
9	2:00	2:10	-	2:00
10	4:30	3:20	-	4:30
11	9:00	9:10	-	9:00
12	9:00	9:10	15:10	9:00
13	8:00	8:30	18:30	8:00
14	1:40	0:50	-	-
15	3:00	3:20	-	3:00
16	2:50	2:50	2:50	2:50
17	2:30	2:50	2:10	2:10
18	1:50	2:20	-	2:10
19	8:50	8:40	-	5:10
20	8:50	8:40	-	8:50
21	5:30	5:40	5:30	5:30
22	8:00	8:10	8:00	8:00
ALL	9:00	9:10	18:30	9:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	2:20 - 3:50	2:30 - 4:00	-	2:20 - 3:50
2	2:10 - 3:40	2:20 - 3:50	-	2:10 - 3:40
3	2:10 - 3:20	2:30 - 4:00	-	-
4	2:00 - 3:10	2:10 - 3:20	1:10 - 2:00	2:00 - 3:10
5	2:10 - 3:40	2:30 - 4:00	-	2:00 - 3:10
6	4:00 - 7:10	4:20 - 7:30	-	4:00 - 7:10
7	1:50 - 3:00	1:00 - 2:10	-	1:50 - 3:00
8	0:50 - 2:00	1:00 - 1:00	-	0:50 - 2:00
9	0:50 - 1:40	1:00 - 2:00	-	0:50 - 1:40
10	2:10 - 3:40	2:00 - 3:10	-	2:10 - 3:40
11	4:00 - 7:10	4:10 - 7:20	-	4:00 - 7:10
12	4:00 - 7:10	4:10 - 7:20	10:50 -12:50	4:00 - 7:10
13	4:00 - 6:20	4:20 - 6:50	13:20 -15:20	4:00 - 6:20
14	1:50 - 3:00	2:00 - 3:00	-	1:50 - 3:00
15	1:50 - 3:00	1:20 - 2:30	-	1:50 - 3:00
16	0:40 - 1:50	0:40 - 2:00	0:40 - 0:40	0:40 - 1:50
17	0:40 - 1:40	1:10 - 2:00	-	0:40 - 0:40
18	0:40 - 1:40	0:50 - 1:40	-	0:40 - 1:40
19	4:00 - 7:10	4:10 - 7:00	-	3:00 - 4:20
20	3:50 - 7:00	4:10 - 7:00	-	3:50 - 7:00
21	2:30 - 4:10	2:40 - 4:20	0:40 - 0:40	2:30 - 4:10
22	4:00 - 6:20	4:00 - 6:30	4:00 - 6:20	4:00 - 6:20
ALL	4:00 - 7:10	4:20 - 7:30	13:20 -15:20	4:00 - 7:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-6

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SCHOOL-NOT-IN-SESSION SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	4:30	4:40	-	4:30
2	4:30	4:40	-	4:30
3	4:00	4:40	-	-
4	3:50	4:00	2:20	3:50
5	4:30	4:40	-	4:00
6	8:50	9:10	-	8:50
7	3:40	2:30	-	3:40
8	2:20	2:00	-	2:20
9	2:00	2:20	-	2:00
10	4:30	4:00	-	4:30
11	8:50	9:00	-	8:50
12	8:50	9:00	15:20	8:50
13	7:50	8:20	18:10	7:50
14	3:40	3:30	-	3:40
15	3:40	2:50	-	3:40
16	2:10	2:20	1:30	2:10
17	2:00	2:20	-	1:40
18	2:00	2:00	-	2:00
19	8:50	8:30	-	5:30
20	8:40	8:30	-	8:40
21	5:00	5:20	1:40	5:00
22	7:50	8:00	7:50	7:50
ALL	8:50	9:10	18:10	8:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:50 - 2:50
2	2:00 - 3:00	1:00 - 1:50	-	-
3	1:50 - 2:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:50 - 2:50	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:50 - 2:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:50 - 2:50	1:50 - 2:50	-	1:50 - 2:50
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:10 -10:30	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:30 - 3:50	-	-
20	2:10 - 3:40	2:30 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	2:30 - 4:00	3:00 - 4:30	11:40 -13:00	2:30 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-8

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
SUMMER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:30
2	3:40	2:10	-	-
3	3:30	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:30	2:20	-	-
6	4:40	5:00	-	3:30
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:30	3:30	-	3:30
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	4:50	5:20	15:20	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	15:20	4:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:00 - 2:10	1:10 - 2:00	-	1:00 - 1:50
2	1:00 - 1:50	1:00 - 1:50	-	-
3	1:00 - 2:10	1:10 - 2:00	-	-
4	1:00 - 1:00	1:10 - 1:10	1:10 - 1:10	-
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:10
7	0:50 - 0:50	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	8:50 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00
14	0:40 - 0:40	0:50 - 0:50	-	0:40 - 0:40
15	0:40 - 0:40	1:20 - 1:20	-	0:40 - 0:40
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:00	2:30 - 4:00	-
ALL	2:30 - 4:00	3:00 - 4:20	11:20 -12:20	2:30 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-10

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
WINTER WEEKEND/HOLIDAY SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	2:30	2:20	-	2:10
2	2:10	2:10	-	-
3	2:40	2:20	-	-
4	1:10	2:00	1:20	-
5	2:30	2:20	-	-
6	4:40	5:00	-	2:30
7	1:50	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:30	2:30	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:40	4:50
13	4:50	5:20	14:40	4:50
14	0:40	0:50	-	0:40
15	1:50	2:20	-	0:40
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	-
ALL	4:50	5:20	14:40	4:50

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
NORMAL WEATHER

ERPA	Resident Population: With Autos From - To	Resident Population: Without Autos From - To	Special Facilities From - To	Transients From - To
1	1:50 - 3:00	1:10 - 2:00	-	1:40 - 2:30
2	2:00 - 3:00	1:10 - 1:50	-	-
3	1:40 - 2:40	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	1:40 - 2:30	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:40 - 2:40
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:40 - 2:30	1:40 - 2:30	-	1:40 - 2:30
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:20 -10:40	2:20 - 4:00
13	3:10 - 5:10	3:40 - 5:30	11:50 -13:00	3:10 - 5:10
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	3:20 - 5:10	3:20 - 5:10	3:10 - 5:10	3:20 - 5:10
ALL	3:20 - 5:10	3:40 - 5:30	11:50 -13:00	3:20 - 5:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-12

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
EVENING SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	3:30	2:20	-	3:10
2	3:40	2:10	-	-
3	3:10	2:20	-	-
4	3:30	3:50	2:00	1:50
5	3:10	2:20	-	-
6	4:40	5:00	-	3:10
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	3:10	3:00	-	3:10
11	4:40	4:50	-	-
12	4:50	5:00	12:30	4:50
13	6:20	6:50	15:30	6:20
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	6:20	6:30	6:20	6:20
ALL	6:20	6:50	15:30	6:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	1:10 - 2:10	1:10 - 2:00	-	1:10 - 2:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	1:10 - 2:20	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	1:00 - 2:10	1:10 - 2:00	-	-
6	2:20 - 3:50	2:30 - 4:10	-	1:00 - 2:20
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	1:00 - 2:10	1:00 - 2:10	-	-
11	2:20 - 3:50	2:30 - 4:00	-	-
12	2:20 - 4:00	2:30 - 4:10	9:00 -10:00	2:20 - 4:00
13	2:30 - 4:00	3:00 - 4:30	11:20 -12:30	2:30 - 4:00
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	2:20 - 3:50	2:20 - 3:50	-	-
20	2:10 - 3:40	2:20 - 3:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:40 - 4:00	2:40 - 4:10	2:30 - 4:00	2:40 - 4:00
ALL	2:40 - 4:00	3:00 - 4:30	11:20 -12:30	2:40 - 4:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-14

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
NIGHTTIME SCENARIO
ADVERSE WEATHER

ERPA	Resident Population With Autos	Resident Population Without Autos	Special Facilities	Transients
1	2:40	2:20	-	2:50
2	2:40	2:10	-	-
3	2:40	2:20	-	-
4	2:30	2:50	1:20	1:10
5	2:40	2:20	-	-
6	4:40	5:00	-	2:40
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	2:40	2:40	-	-
11	4:40	4:50	-	-
12	4:50	5:00	11:50	4:50
13	5:00	5:20	14:40	5:00
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	4:40	4:40	-	-
20	4:30	4:40	-	-
21	3:10	3:20	-	-
22	5:00	5:00	4:50	5:00
ALL	5:00	5:20	14:40	5:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	4:00 - 6:40	1:10 - 2:00	-	4:00 - 6:40
2	2:00 - 3:00	1:00 - 1:50	-	-
3	4:00 - 6:50	1:10 - 2:00	-	-
4	1:50 - 2:50	2:10 - 3:10	1:10 - 1:10	1:00 - 1:00
5	4:00 - 6:40	1:10 - 2:00	-	-
6	4:00 - 6:50	4:20 - 7:10	-	4:00 - 6:50
7	1:50 - 2:50	0:50 - 0:50	-	1:50 - 2:50
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	4:00 - 6:40	4:00 - 6:40	-	4:00 - 6:40
11	2:50 - 5:00	4:20 - 7:10	-	-
12	4:20 - 7:20	4:20 - 7:10	9:40 -11:20	4:10 - 7:00
13	2:30 - 4:00	3:00 - 4:30	12:20 -14:00	2:30 - 4:00
14	1:40 - 2:50	1:50 - 2:50	-	1:40 - 2:50
15	1:40 - 2:50	1:20 - 1:20	-	1:40 - 2:50
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	3:50 - 6:40	4:10 - 6:50	-	-
20	3:50 - 6:40	4:10 - 6:50	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	2:30 - 4:00	2:40 - 4:10	2:30 - 4:00	2:30 - 4:00
ALL	4:20 - 7:20	4:20 - 7:10	12:20 -14:00	4:10 - 7:00

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-16

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
CLASSIC WEEKEND SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	8:20	2:20	-	8:20
2	3:40	2:10	-	-
3	8:20	2:20	-	-
4	3:30	3:50	2:00	1:50
5	8:20	2:20	-	-
6	8:20	8:50	-	8:20
7	3:30	2:00	-	3:30
8	1:50	1:00	-	-
9	1:40	1:50	-	-
10	8:20	8:20	-	8:20
11	6:10	8:50	-	-
12	8:50	8:50	13:30	8:40
13	4:50	5:20	16:30	4:50
14	3:20	3:20	-	3:20
15	3:20	2:20	-	3:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	1:40	1:40	-	-
19	8:10	8:20	-	-
20	8:10	8:20	-	-
21	3:10	3:20	-	-
22	4:50	5:00	4:50	4:50
ALL	8:50	8:50	16:30	8:40

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
NORMAL WEATHER

	Resident Population		Special Facilities	Transients
	With Autos	Without Autos		
ERPA	From - To	From - To	From - To	From - To
1	3:10 - 5:10	1:10 - 2:00	-	3:10 - 5:10
2	1:10 - 2:10	1:00 - 1:50	-	-
3	3:10 - 5:10	1:10 - 2:00	-	-
4	1:00 - 2:10	1:10 - 2:20	1:10 - 1:10	1:00 - 1:00
5	3:10 - 5:10	1:10 - 2:00	-	-
6	3:10 - 5:10	3:20 - 5:20	-	3:10 - 5:10
7	0:50 - 2:00	0:50 - 0:50	-	-
8	0:50 - 0:50	1:00 - 1:00	-	-
9	0:50 - 0:50	1:00 - 1:00	-	-
10	3:10 - 5:10	3:10 - 5:10	-	-
11	2:20 - 3:50	3:10 - 5:10	-	-
12	4:40 - 6:50	5:00 - 7:10	10:50 -12:50	4:20 - 6:20
13	6:40 -10:30	6:50 -10:50	13:20 -16:40	6:10 -10:10
14	0:40 - 2:00	0:50 - 2:00	-	0:40 - 2:00
15	0:40 - 2:00	1:20 - 1:20	-	0:40 - 2:00
16	0:40 - 0:40	0:40 - 0:40	-	-
17	0:40 - 0:40	1:10 - 1:10	-	-
18	0:40 - 0:40	0:50 - 0:50	-	-
19	4:20 - 6:20	4:20 - 6:30	-	-
20	4:10 - 6:20	4:20 - 6:30	-	-
21	1:40 - 2:40	1:50 - 2:50	-	-
22	6:30 -10:30	6:20 -10:20	6:10 -10:10	6:10 -10:10
ALL	6:40 -10:30	6:50 -10:50	13:20 -16:40	6:10 -10:10

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
- (a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
- (b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
- (c) An informed and cooperative public follow directions as instructed.
- (d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
- (a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
- (b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
- (c) A low degree of cooperation from the public occurs.
- (d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) The population subgroups indicated in this Table are:
- (a) resident population (with and without automobiles);
- (b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
- (c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(4) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(5) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this Table.

(6) All times have been rounded to the nearest 10 minutes.

(7) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-18

EVACUATION TRAVEL TIME ESTIMATES BY ERPA
HARBORFEST WEEKEND SCENARIO
ADVERSE WEATHER

	Resident Population			
ERPA	With Autos	Without Autos	Special Facilities	Transients
1	6:30	2:20	-	6:30
2	2:40	2:10	-	-
3	6:30	2:20	-	-
4	2:30	2:50	1:20	1:10
5	6:20	2:20	-	-
6	6:30	6:30	-	6:30
7	2:30	2:00	-	-
8	1:50	1:00	-	-
9	0:50	1:00	-	-
10	6:20	6:20	-	-
11	4:40	6:20	-	-
12	8:20	8:40	15:20	7:50
13	13:00	13:20	20:10	12:40
14	2:20	2:30	-	2:20
15	2:20	2:20	-	2:20
16	1:40	1:50	-	-
17	1:40	1:50	-	-
18	0:40	0:50	-	-
19	7:50	8:00	-	-
20	7:40	8:00	-	-
21	3:10	3:20	-	-
22	13:00	12:40	12:40	12:40
ALL	13:00	13:20	20:10	12:40

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(4) The population subgroups indicated in this Table are:
(a) resident population (with and without automobiles);
(b) special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, residential facilities such as group homes, convents, and monasteries);
(c) transients (employees, visitors to parks, resident and day camps, hotels, and motels).

(5) Gaps in this Table indicates that there is no special facility or transient population in the given ERPA.

(6) The evacuation travel time ranges presented in this Table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA in a staged evacuation will not exceed the travel time range indicated in this table.

(7) All times have been rounded to the nearest 10 minutes.

(8) Special facility evacuation travel times include the time for the multi-wave trips to evacuate the non-ambulatory population who require transport by ambulance.

TABLE G-19

EVACUATION TRAVEL TIME ESTIMATES
WEEKDAY SCHOOL-IN-SESSION SCENARIO

District	School	ERPA Location	Evacuation Times To The New York State Fairgrounds: Normal Weather	Adverse Weather
Oswego	Fitzhugh Park Elementary	12	5:40 - 8:00	9:50
	Kingsford Park Elementary	13	4:00 - 6:20	7:50
	Charles E. Riley Elementary	12	5:40 - 7:40	9:20
	Frederick Leighton Elementary	13	7:00 - 10:30	13:00
	Minetto Elementary	21	3:50 - 6:10	7:30
	Oswego Middle School	13	4:00 - 6:20	7:50
	Oswego High School	13	7:00 - 10:30	13:00
Mexico Academy	Palermo Elementary	-	5:40 - 7:40	9:30
	New Haven Elementary	4	5:40 - 7:40	9:30
	Mexico Elementary	16	5:30 - 7:20	9:10
	Mexico Middle School	16	5:30 - 7:20	9:10
	Mexico High School	16	5:30 - 7:20	9:10
Private	Bishop Cunningham High School	12	5:40 - 7:40	9:20
	St. Paul's Academy	12	5:40 - 7:40	9:20
	St. Mary's School	13	7:00 - 10:30	13:00
	BOCES	17	5:40 - 7:30	9:20

Notes:

(1) The evacuation travel time ranges presented in this Table are based on operational strategies indicated in the evacuation implementation procedures. Lower bound evacuation travel times (shorter times) can be anticipated when:
(a) Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents,vehicle breakdowns, and highway construction, do not occur;
(b) A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, all buses stationed to begin their initial runs) is attained;
(c) An informed and cooperative public follow directions as instructed.
(d) Dry roadway conditions exist.

Upper bound evacuation travel times (longer times) are representative of a situation where:
(a) Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result;
(b) A low state of operational readiness results from minimal mobilization of the emergency workforce;
(c) A low degree of cooperation from the public occurs.
(d) A light rain or snow shower results in wet pavement.

(2) The evacuation travel time ranges are indicated as hours:minutes, and include 20 minutes of public preparation time.

(3) Normal weather conditions are considered to be clear sky and dry roadway pavement for the above scenario.

(4) Adverse weather conditions are considered to be a slippery roadway surface (e.g., due to snow or ice), and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).

(5) All times have been rounded to the nearest 10 minutes.

(6) Palermo Elementary School is located outside of the EPZ. Evacuation times are consistent with the elementary schools located in Mexico Academy School District.

(7) The location of the schools are listed by ERPA, however, the variations in evacuation times to the New York Fairgrounds for facilities located within the same ERPAs occur because schools are located within different traffic zones which comprise the ERPA.

APPENDIX H

RIDESHARING METHODOLOGY

APPENDIX H

RIDESHARING METHODOLOGY

Experience with both natural and man-made emergencies occurring in communities throughout the country has shown that the great majority of persons in the general population would, in the event of an emergency requiring evacuation, prefer to evacuate by private vehicle with family, neighbors and friends, rather than by some form of mass transportation. Those people with automobiles would use them to self-evacuate, taking along family members, neighbors and coworkers who may themselves not have an automobile.

Ridesharing is defined as the concept whereby those members of the transit dependent portion of the general population who do not own private vehicles would ride with a friend, neighbor or relative who has a vehicle, to a point outside the affected area in the event they are required to evacuate from their homes.

The methodology used to calculate the updated evacuation travel time estimates incorporates the assumption that 50% of the transit dependent population would evacuate by means of ridesharing and therefore would not require any public or emergency transportation resources to evacuate from the affected area.

Using standard and accepted traffic engineering techniques, the number of private vehicles and buses, respectively, using the roadway network in the course of an evacuation must be estimated in order to prepare evacuation time estimates. In preparing the Oswego evacuation time estimate update, it was reasonable to make assumptions on ridesharing, which in turn is used to determine the number of buses which may be required for purposes of servicing the general population. The updated analysis initially started with a determination, using 1990 Census data, of the number of households within each ERPA which did not report ownership of a motor vehicle. Contrasting this data with analogous data derived from the 1980 census as employed in the initial time estimates prepared in 1980 shows an average decline throughout the Oswego EPZ of households not reporting ownership of a vehicle from 10.1% in the 1980 census to 8.9% in the 1990 census. (The 1990 number is an estimate).

The incorporation of the assumption that 50% of the transit dependent population will rideshare is a result of a conservative application of a safety margin to a study which concluded that there would be 66% rideshare, or there would be two persons availing themselves of ridesharing for every person requiring bus transportation. It should be noted that a 12% reduction in permanent resident population without automobiles has occurred over the past seven years within the EPZ. This assumption is based on several factors:

1. Through a telephone survey conducted in 1987 of approximately twenty (20) nuclear sites throughout the country conducted by New York Power Authority and Con Edison representatives for the Indian Point Facility, it was learned that many utilities which are assuming ridesharing in the calculation of their evacuation time estimates assume that 66% or more of the population will rideshare. For example, at Rochester Gas and Electric's Ginna site in upstate New York, which has submitted their time estimates to, and received 350 approval from FEMA, a 50% rideshare assumption is utilized.

2. A survey of 461 household heads residing within the Indian Point EPZ conducted by the firm of Yankelovich, Skelly and White (1980)* showed that 74% of those persons driving their own car would be willing to pick up other persons as necessary. A Roger Seasonwein Associates Inc. survey** of 500 residents in Westchester County (1983) commissioned by Westchester County indicated that only 3% of the population would leave the area by bus, whereas twice that number - 6% of the survey respondents - would effectuate ridesharing with a friend or neighbor. Taken together, these surveys demonstrate that there would be ample opportunity for those seeking a ride to obtain it.

3. Actual historical evacuation experience has shown that ridesharing occurs in very large numbers. The train derailment and resultant tank car explosions which occurred in Mississauga, Canada in 1979 resulted in the evacuation of nearly 217,000 members of the general population. Subsequent surveys of residents who evacuated the area revealed that only 2% used public transit or taxi.*** This means that over 87% of those not using or having their own vehicles evacuated by getting a ride with someone else. It is interesting to note that this occurred despite the absence of any preplanning for such an evacuation.

   An explosion and fire at the Union Carbide Taft Plant near Taft, Louisiana in 1982 necessitated the evacuation of an estimated 16,000 people. Based on 1980 census data, there were an estimated 2,000 people in the evacuated area who did not own cars. Approximately 1,600 to 1,700 of the people without cars (roughly 83%) received rides out of the area with friends and neighbors. Local emergency plans assumed the need for approximately 44 school buses to evacuate those people without cars. However, during the emergency, only three (3) buses were actually needed.****

4. Current literature assumes that ridesharing will occur. Work by Drabek and Stephenson, as cited in studies conducted by Alan M. Voorhees for FEMA, has documented that the transit assistance provided by local authorities may be declined in favor of ridesharing with a friend, neighbor or relative. In these Voorhees studies, evacuation time estimates for eleven (11) of the most densely populated nuclear sites are assessed. Voorhees' analysis includes the assumption that 50% of non-vehicle owning households would be evacuated by friends, relatives or neighbors.*****

5. FEMA has given indication that the use of a ridesharing assumption is acceptable and appropriate.

   KLD Associates, Inc., which on occasion has been contracted by FEMA to perform evacuation related studies, states that in the case of the Seabrook site,

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* A Report on Temporary Housing Needs Related to Evacuation of the Indian Point Power Plant Area, Yankelovich, Skelly and White, Inc., 1980.

** Public Opinion Poll conducted by Roger Seasonwein Associates, Inc., 1983.

*** Mississauga Evacuates: A Report on the Closing of Canada's Ninth Largest City, prepared by NUS Corporation for the Power Authority of the State of New York.

**** Detailed Report on the Evacuation of December 11, 1982, prepared by Environsphere Company for Louisiana Power and Light Company, 1983.

***** National Environmental Studies Project Planning Concepts and Decision Criteria for Sheltering and Evacuation in a Nuclear Power Plant Emergency, AIF/NESP-031, 1985

FEMA has suggested that 80% of the transit dependent population could evacuate by sharing space in their neighbor's private vehicles*. In telephone conversations with the Emergency Planning Manager at the Seabrook site, it was stated that the Regional Assistance Committee (RAC) suggested that Seabrook consider incorporating ridesharing in their evacuation time estimates based on documentation supported by events such as the Mississaugua evacuation. Even though ridesharing was over 80% at Mississaugua, the Seabrook site decided on a conservative factor of 50%. As the result of contentions raised during the Atomic Safety Licensing Board hearings at Seabrook with regard to the validity of the site's evacuation time estimates, FEMA requested the RAC to review the time estimates, specifically evaluating them against the guidance set forth in NUREG-0654. Dr. Thomas Urbanik, a recognized expert in the field, also reviewed the time estimates. The conclusion of the RAC, Dr. Urbanik and FEMA was that the evacuation time estimates (which included a 50% rideshare assumption) sufficiently complied with NUREG-0654 so as to serve as an adequate basis for protective action decision-making.

Based on the foregoing supportive documentation, actual evacuation experience has shown that as much as 87% of the transit dependent population will evacuate an affected area utilizing rideshare arrangements. Personal surveys indicate that ridesharing will occur; i.e., the need for a ride can be met by those willing to provide a ride. It was therefore determined that the best estimate of the transit-dependent population is 33% of the EPZ population from households reporting no automobile ownership in the 1990 census. This ratio of one bus rider to two ridesharers is the same as the ratio found in the Seasonwein survey and is in the mainstream of planning practices nationally. Nonetheless, for the purpose of these evacuation time estimates it was determined that the size of the transit dependent population should be increased by 50% above the base case, resulting in an assumption of 50% (rather than 33%) transit vehicles. In light of this margin, it is concluded that the assumption that 50% of the transit dependent population will rideshare in the event that an evacuation is necessary, is both a valid and conservative assumption.

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* Seabrook Station Evacuation Time Estimates and Traffic Management Plan Update, KLD Associates, Inc., 1986.

APPENDIX I

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

APPENDIX I

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

A. Introduction

This Appendix describes the traffic engineering computer model used to estimate roadway travel times during an evacuation of the JAF/NMP EPZ. The model used in this study has also been applied to the Indian Point (New York), Three Mile Island (Pennsylvania), and Salem/Hope Creek (New Jersey and Delaware) Emergency Planning Zones. To evaluate the computer model used in the aforementioned studies, a separate analysis was conducted using a different model for the purpose of comparing results. The Indian Point EPZ was selected for the comparative study because of the diverse characteristics of its roadway network and population density.

As described later in this Appendix, the comparative study showed that both models provide quite similar estimates of evacuation travel time. Thus, it is concluded that the model used to estimate travel times for the JAF/NMP EPZ can be applied with a high degree of confidence.

The remaining sections of this Appendix discuss the traffic assignment process used for the JAF/NMP EPZ, present the detailed results of the comparative study; and summarize the conclusions drawn from the comparison of traffic models.

B. Static Traffic Assignment Process

1. Inputs

The static traffic assignment process developed to estimate roadway travel times during an evacuation requires three basic types of input. The first type relates to the characteristics of the evacuation roadway network, which is comprised of one-directional links, each having its own attributes. The links are described in terms of their capability to accommodate evacuating traffic (evacuation capacity), length, and free-flow speed (speed limit).

The second type of input required for this assignment process is zonal vehicle trip generation data. The EPZ is disaggregated into traffic zones, and the numbers of trips by each vehicle type (e.g., autos, buses, ambulances) are estimated in terms of passenger car equivalents (PCE's) for each traffic zone. Buses are weighted as the equivalent of two passenger cars in this analysis. In addition, a terminal time for all trip types for each traffic zone is input.

The third input type used in the static assignment process is evacuation path data. Evacuation routes are designated fixed paths extending from the traffic zones to the Sector boundary via specific roadways. Separate paths are developed for each trip type and are expressed in terms of connecting link numbers. Destinations (e.g., reception centers) are defined for each traffic zone and input for the purpose of determining the number of vehicles and passengers expected at each destination. Average vehicle occupancies are used to estimate the number of passengers arriving in vehicles at the destination.

2. Static Assignment Algorithm

A computer program was written to process the above input data and compute roadway travel times for each trip type by traffic zone. A flow chart of the static traffic assignment computer program is included at the end of this Appendix.

Initially, the program calculates the total vehicular demand volume (in PCE's) on each link in the network by aggregating the vehicle trips generated by each traffic zone along the evacuation path. Implicit in this assignment is the assumption that all vehicles from all zones using a given evacuation route are on each link along the designated route concurrently. The assignment process is thus considered "static", because the spatial movement of vehicles across the network is not explicitly recognized as a function of time.

For each link in the network, three additional computations are performed. First, the free-flow speed is calculated as the quotient of the link length and the free flow speed. Second, the total vehicular demand volume is divided by the hourly evacuation capacity (for the appropriate weather condition) of the link to obtain the volume/capacity (V/C) relationship for the link. Finally, the evacuation speed or delay time is computed for each link, depending on whether the V/C ratio is less than or greater than 1.0, respectively. The formula contained in the Federal Highway Administration Traffic Assignment Manual, August 1973, was adopted and modified as follows for use in computing the speed at which evacuees will travel when capacity exceeds demand.

$$\text{Evacuation Speed} = \frac{\text{Free-Flow Speed}}{0.25 \left[\frac{\text{Demand}}{\text{Capacity}}\right]^4 + 1} \quad \text{(for demand} < \text{capacity)}$$

Following these calculations, the model computes the roadway travel time for each traffic zone's evacuation route (or routes since some buses and special vehicles had separate routes) by scanning the links comprising the evacuation route to determine maximum V/C ratio along the route.

When the hourly evacuation capacity exceeds the total demand volume (V/C ratio less than 1.0) for all links along the route, the link evacuation speeds are used to compute link travel time, and the travel times for each link along the path are summed to obtain the traffic zone-to-Sector boundary roadway travel time for the route.

When the total demand volume exceeds the hourly evacuation capacity (V/C ratio greater than 1.0) along any link of a traffic zone's evacuation route, the roadway travel time is represented by the maximum link delay time incurred along the route. Link delay time is calculated as the volume/capacity ratio in hours for each link along the route. The link with the maximum V/C ratio is identified as the bottleneck link for the evacuation route for use in future planning. Other links along the route where the V/C ratio exceeds 1.0 are also identified for planning purposes.

The roadway travel time as determined above is added to the terminal time and the free-flow travel time for each zone trip type to determine the total roadway evacuation travel time. The total roadway evacuation travel time resulting from this analysis represents the time for the last vehicle in the zone to clear the Sector.

3. Outputs

The computer program developed for the static assignment process provides five basic reports which are used in the evacuation planning process. The reports are described below:

a. Summary of link statistics: link number, description, length, free-flow speed and time, vehicular demand volume, evacuation capacity, and volume/capacity ratio.

b. Summary of traffic zone statistics: number of trips, evacuation route, destination, terminal time, free-flow travel time, roadway travel time, total evacuation time, and bottleneck link; for each trip type, sorted in ascending order by total evacuation time.

c. Summary of all bottleneck links and the traffic zones which are routed over them.

d. Summary of all destinations and the estimated number of vehicles (by type) and passengers assigned to each.

e. Distribution of the percent of the total population evacuated as a function of time.

C. Comparison of Static and Dynamic Traffic Assignment Processes

Because of the importance of the assignment process in the overall procedure to estimate evacuation travel times, it was decided to evaluate the static traffic assignment model used in the evacuation planning process. Travel times estimated by the static model were compared with times estimated by a state-of-the-art dynamic traffic assignment model.

The dynamic assignment model used in the comparative analysis is an offspring of the TRANSYT model* presently included in the Federal Highway Administration computer program batteries. The model employs principles of flow continuity and flow dynamics to move traffic on each link in the network towards its ultimate destination. Traffic flow representation changes with time to reflect changes in demand and roadway conditions. Traffic movement on each link in the network is constrained by roadway geometrics, control devices, and other vehicles present on the roadway.

Various types of test routes were selected for this comparison and were located in Rockland and Westchester Counties in the Indian Point EPZ in New York State. Input requirements for both models were basically identical with one exception, which relates to the time varying nature of vehicles entering the evacuation network. The static assignment process assumed a concurrent loading of the entire network; the distribution over time of vehicle trips feeding the network was not addressed by the static model. However, because of the time dependent nature of the dynamic simulation model, it was possible to input trip generation data which varied with time at each load point in the network. This time-based distribution curve used in the comparison of assignment processes was provided by the New York State Office of Disaster Preparedness.

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* The dynamic evacuation model, named DYNEV, was provided by KLD Associates, Inc.

Separate comparative analyses and evaluations of the static and dynamic model results were made using Level of Service D and Level of Service E evacuation capacities. Table I-1 presents a comparison of the percent of total vehicles (in PCEs) evacuated for each route by time in the test network. The comparison was made between the static and dynamic assignment results when one or the other reached a time period when the total vehicles traveling the evacuation route had cleared the EPZ boundary. In all cases, the static assignment evacuation reached 100 percent completion either before or at the same time as the dynamic assignment evacuation. The percentages enclosed by parentheses in Table I-1 correspond to static and dynamic evacuation roadway travel times using Level of Service D capacities. Percentages without parentheses correspond to static and dynamic evacuation roadway travel times estimated using Level of Service E capacities.

Examination of Table I-1 shows a 97 percent correlation between the two assignment model results on an aggregate basis for the sample Indian Point roadway network east of the Hudson River in Westchester County. That is, at the time that the static assignment estimated complete evacuation of vehicles beyond the EPZ, the dynamic assignment estimated 97 percent of the vehicles would have cleared the EPZ. On the west side of the Hudson River near Indian Point, where both Levels of Service E and D were analyzed by both models, the two model results were 99 percent and 98 percent, respectively. Overall, for the entire test evacuation network, comparison of the static and dynamic assignment results at Level of Service E indicated a 99 percent correlation. In other words, when the static model estimated the network would be cleared (total vehicle evacuation), the dynamic model estimated 99 percent of the vehicles would have cleared the EPZ boundary. The dynamic assignment results indicated that complete evacuation of all vehicles beyond the EPZ boundary would occur 15 minutes later than the static assignment estimate at Level of Service E.

In addition to the evacuation times generated by each assignment technique, the location of bottlenecks by each methodology was compared. The critical bottleneck links identified by the static model were identified in the dynamic assignment results as well. The dynamic assignment produced the percent of vehicles topped at each link during the evacuation. This statistic was used as a measure of the congestion level on each link. For the identified bottleneck links, the average percentage of stops as indicated by the dynamic mode output was roughly 45 percent higher than on non-critical links, indicating that an increase in congestion was appropriately simulated by the static model on the critical links.

D. Conclusions

The results of the comparative analysis presented in this Appendix indicate that the static traffic assignment model can be applied to highway networks to estimate evacuation roadway travel times with a high degree of confidence.

Under almost identical circumstances, the static assignment model results have proven comparable with those produced by a state-of-the art, complex dynamic assignment model, which simulates the evacuation process within the framework of time. Roadway travel times were estimated and congested roadways identified with a high degree of correlation using the less complex static assignment methodology. A close correlation between assignment procedures exists for varying roadway types, weather conditions, and loading characteristics. Thus the use of the static assignment model to estimate evacuation travel times in the JAF/NMP EPZ is appropriate.

TABLE I-1

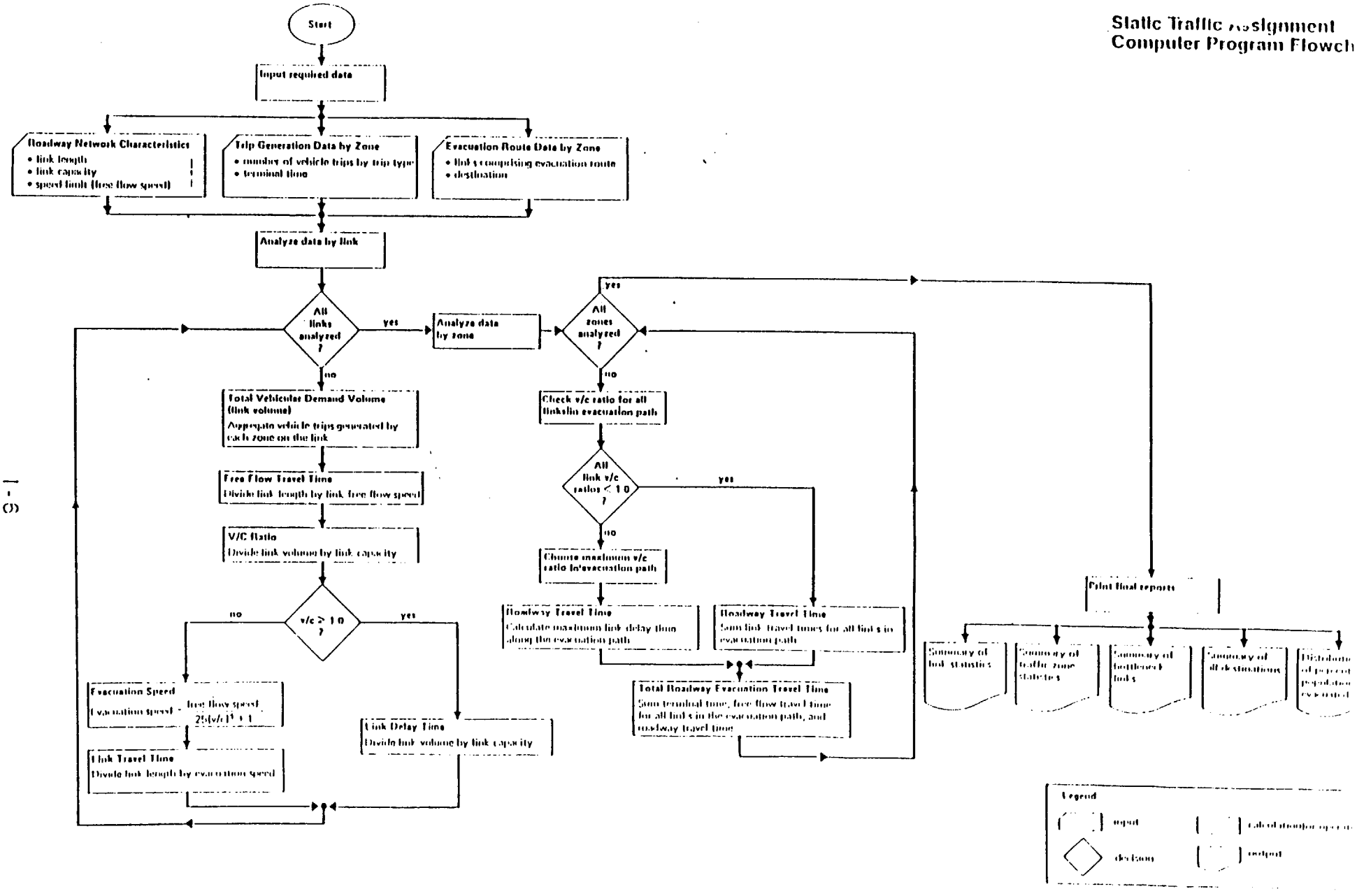
COMPARISON OF STATIC AND DYNAMIC ASSIGNMENT RESULTS

Evacuation Route	Total Vehicles Using Evacuation Route	Traffic Assignment Methodology	Percent of Total Vehicles Evacuated During the Following Time Period*																
			0:45 1:00	1:45 2:00	2:00 2:15	2:15 2:30	2:30 2:45	2:45 3:00	3:00 3:15	3:15 3:30	3:30 3:45	3:45 4:00	4:15 4:30	4:30 4:45	5:30 5:45	5:45 6:00	6:00 6:15	6:15 6:30	7:15 7:30
East of River (Westchester County)																			
Route 6	4,360	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	84	–	100	–	–	–	–	–
Route 120	5	Static	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	33	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–
Route 9A	8,690	Static	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
Taconic Parkway	5,155	Static	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	92	–	–	–	100	–	–	–	–	–	–	–	–	–	–
Amawalk Road	2,575	Static	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	89	–	100	–	–	–	–	–	–	–	–	–
Total East Routes	20,785	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	97	–	100	–	–	–	–	–
West of River (Rockland County)																			
Palisades Parkway	8,655	Static	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	97	100	–	–	–	(97)	–	(100)	–
Route 9W	3,850	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(87)	(100)
Route 303	3,310	Static	–	100	–	–	(100)	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	98	–	–	(90)	100	(100)	–	–	–	–	–	–	–	–	–	–
Route 45	1,920	Static	–	–	–	100	–	–	–	–	(100)	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	98	–	100	–	–	(100)	–	–	–	–	–	–	–	–
Little Tor Road	3,025	Static	–	–	–	–	–	–	–	–	100	–	–	–	(100)	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	99	100	–	–	(95)	–	(100)	–	–
Route 304	3,655	Static	–	–	–	100	–	–	–	–	–	(100)	–	–	–	–	–	–	–
		Dynamic	–	–	–	99	–	100	–	–	–	(100)	–	–	–	–	–	–	–
Total West Routes	24,415	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(98)	(100)
Total Network Routes	45,200	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	–	–

* Note: Numbers enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service D capacities.

Numbers not enclosed by parentheses represent the percent o(l vehicles along a route evacuated during the time period using Level of Service E capacities.

Static Traffic Assignment Computer Program Flowch



Evacuation Travel Time Estimates

Nine Mile Point and James A. FitzPatrick Emergency Planning Zone

June 1999 Update

Airport Special Event Scenario

Final Report

Prepared for

Niagara Mohawk Power Corporation

by

PARSONS BRINCKERHOFF

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1 INTRODUCTION

The US Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) require nuclear power plant licensees and state/local agencies to take necessary actions to prepare for evacuation of populations within a 10-mile radius around nuclear power plants. This area corresponds to a plume exposure pathway referred to as the Emergency Planning Zone (EPZ). Part of these regulatory requirements include the preparation of travel time estimates for the evacuation of the EPZ as outlined in *Criteria for the Preparation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants* (NUREG-0654, FEMA-REP-1: Rev. 1, November 1980 [NUREG-0654]). Specifically, the approach for preparing evacuation time estimates is documented in Appendix 4 of NUREG-0654.

This report is prepared in response to Appendix 4 of NUREG-0654 and represents an update and addition to a report prepared in July 1993 for the Nine Mile Point and James A. FitzPatrick (NMP/JAF) site in Oswego County, New York (PBQD, *Evacuation Travel Time Estimates for the James A. FitzPatrick/Nine Mile Point Emergency Planning Zone*, Rev. July 1993). This previous report presented travel time estimates for eight different evacuation scenarios as follows:

- School-in-Session;
- School-not-in-Session;
- Summer/Holiday Weekend;
- Winter/Holiday Weekend;
- Evening;
- Nighttime;
- A Special Event Scenario for "Classic Weekend" at the Oswego Speedway; and
- A Special Event Scenario for "Harborfest" in the City of Oswego.

This update evaluates an additional Special Event Scenario for venues held at the Oswego County Airport. While the airport is not located within the EPZ, travel routes to and from the facility often coincide with designated evacuation routes. Therefore, traffic generated by event goers at the airport could potentially affect the efficient movement of persons out of the EPZ under current evacuation procedures.

The basis for the Airport Special Event Scenario was developed in response to a planned 2-day concert (7:00 PM Saturday to 11:30 PM on Sunday) at the Oswego County Airport in July 1999. However, the assumptions, methodology, and modeling approach/output would be similar and applicable under any similar type of multi-day venue held at this facility (e.g., festival, air show, etc.).

1.1 Site Location

The JAP/NMF site location is depicted in Figure 1-1. The site is located on the shore of Lake Ontario in the Town of Scriba, Oswego County, New York. The site consists of the Nine Mile Point Nuclear Stations, Units 1 and 2, operated by the Niagara Mohawk Power Corporation and the James A. FitzPatrick Nuclear Power Plant, operated by the New York State Power Authority. . The site is approximately seven miles northeast of the City of Oswego and 36 miles northwest from the City of Syracuse.

The EPZ encompasses a 10-mile radius around the NMP/JAF site. As shown in Figure 1.1, over Lake Ontario, this is comprised of a circle defining the plume exposure pathway. However, over land areas, the perimeter of the 10-mile radius is defined by an irregularly shaped boundary following physical and/or political subdivisions as much as practicable to facilitate recognition by the public.

The Oswego County Airport, the subject of this update of the 1993 report, is located along NYS Rt. 176 in the Town of Volney, New York, immediately northeast of the City of Fulton. While this airport is technically outside the NMP/JAF EPZ, it is within two miles of the 10-mile radius from the site. Given the geography of the Lake Ontario shoreline, regional transportation routes and proximity of adjacent communities that could support residents and visitors in an evacuation, the primary pattern of evacuation would be from north to south, passing in close proximity to the airport.

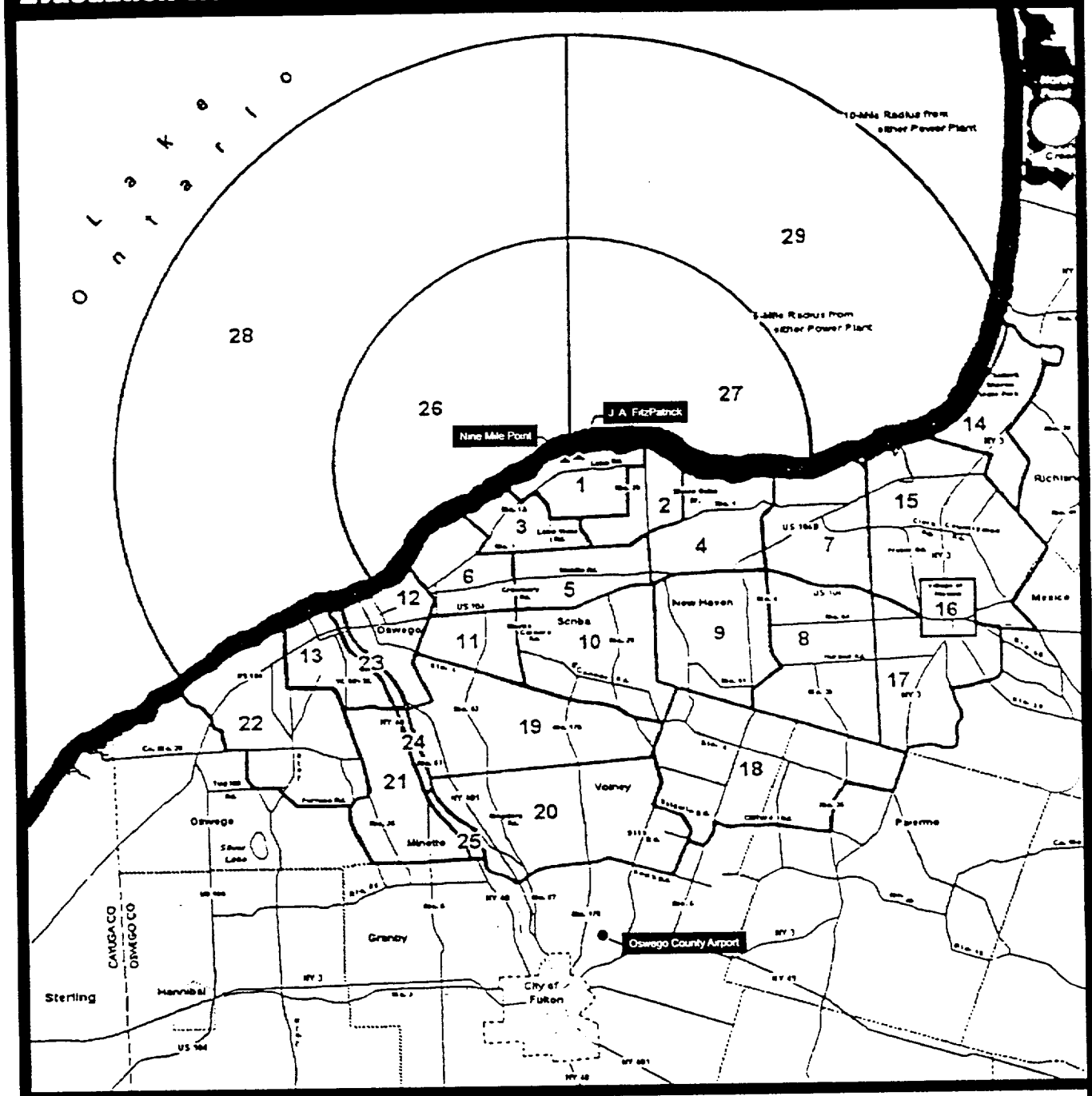
1.2 General Methodology

This update includes the use of a computer modeling technique to estimate evacuation travel time estimates. This model was formulated in 1984 and updated in the 1993 evacuation time estimate report to reflect: the 1990 Census data; changes in assumptions regarding long-term construction worker population at the NMP/JAF site; changes in emergency preparedness procedures employed by Oswego County; and changes in the location of various transient and special facilities populations.

The methodology for developing this update included a review of the inputs and assumptions used in 1993 to determine their continued relevance and accuracy, as well as formulation of reasonable assumptions associated with a special event held at the Oswego County Airport. This included:

- Meetings and contacts with county, local, and NMP/JAF personnel regarding significant changes since 1993 in development in the county, distribution of population, and special facilities/transient population locations;
- Review of the latest update of the Oswego County Radiological Emergency Preparedness Plan (REPP) (i.e., December, 1998), which outlines all procedures undertaken during an evacuation of the NMP/JAF EPZ, as well as updates of the locations and characteristics of various types of populations within the EPZ;

Nine Mile Point / J. A. FitzPatrick
Evacuation Travel Time Estimates



3.0 0 3.0
1.5 miles

Figure 1-1
Generalized Location

PB 100 YEARS

- On-site review of applicable evacuation routes and review of assumptions regarding lane width and capacity; and

- Discussions with the Oswego County Sheriff's Department and review of the NYS Health Department Mass Gathering Permit information for the July, 1999 concert at the Oswego County Airport to determine appropriate assumptions for anticipated attendance, trip generation, anticipated time periods for arrival and departure of event goers, and route selection to ingress and egress at the airport site.

With this information, evacuation travel time estimates were generated for a series of cases under an Airport Special Event Scenario, using the computer modeling technique formulated for the 1993 report. Each case was run for adverse and normal weather conditions for permanent residents, transients, and persons in special facilities, as specified in NUREG-0654. Specifically, the following cases were analyzed:

- **Case 1**, consisting of a concurrent evacuation of all populations in the EPZ and all attendees at an Airport Special Event at the peak period of event attendance;

- **Case 2**, consisting of an evacuation of all populations in the EPZ during the course of the early departure periods immediately following the end of an Airport Special Event (i.e., Sunday night), in which it was assumed that a portion of the special event traffic is already on the road network when the EPZ evacuation begins; and

- **Case 3**, consisting of an evacuation of all populations within the EPZ during the day following the end of the Airport Special Event (i.e., Monday daytime), in which a portion of the special event traffic is already on the road network when the EPZ evacuation begins.

Following review of the estimated travel times, an additional case (**Case 4**) was formulated and assessed as a potential measure to mitigate travel time delays resulting from the interaction of EPZ evacuation and Airport Special Event traffic.

1.3 Report Format

Following the introduction in Section 1, Section 2 outlines and reviews the continued applicability of the basic parameters, inputs, and limitations used in the computer model for evacuation travel time estimates in the 1993 report. Section 3 discusses the parameters/assumptions involved with the conduct of an Airport Special Event and their implications to estimating evacuation travel times in the EPZ. Section 4 describes the specific components of each case analyzed and presents estimated travel time estimates. Section 5 compares these estimates with 1993 estimates.

2 EVACUATION TRAVEL TIME ESTIMATION MODEL DESCRIPTION

In order to understand the assumptions used to generate evacuation travel time estimates under an Airport Special Event Scenario, it is necessary to summarize the basic parameters used in the 1993 report. This section discusses the geographic areas on which the modeling approach is based, describes the various populations that are included in the model, and discusses the transportation network designated to move persons out of the 10-mile NMP/JAF EPZ during an evacuation. A full discussion of the approach used in the 1993 report in presented in Appendix B.

2.1 Sectors, Emergency Response Planning Areas, and Traffic Zones

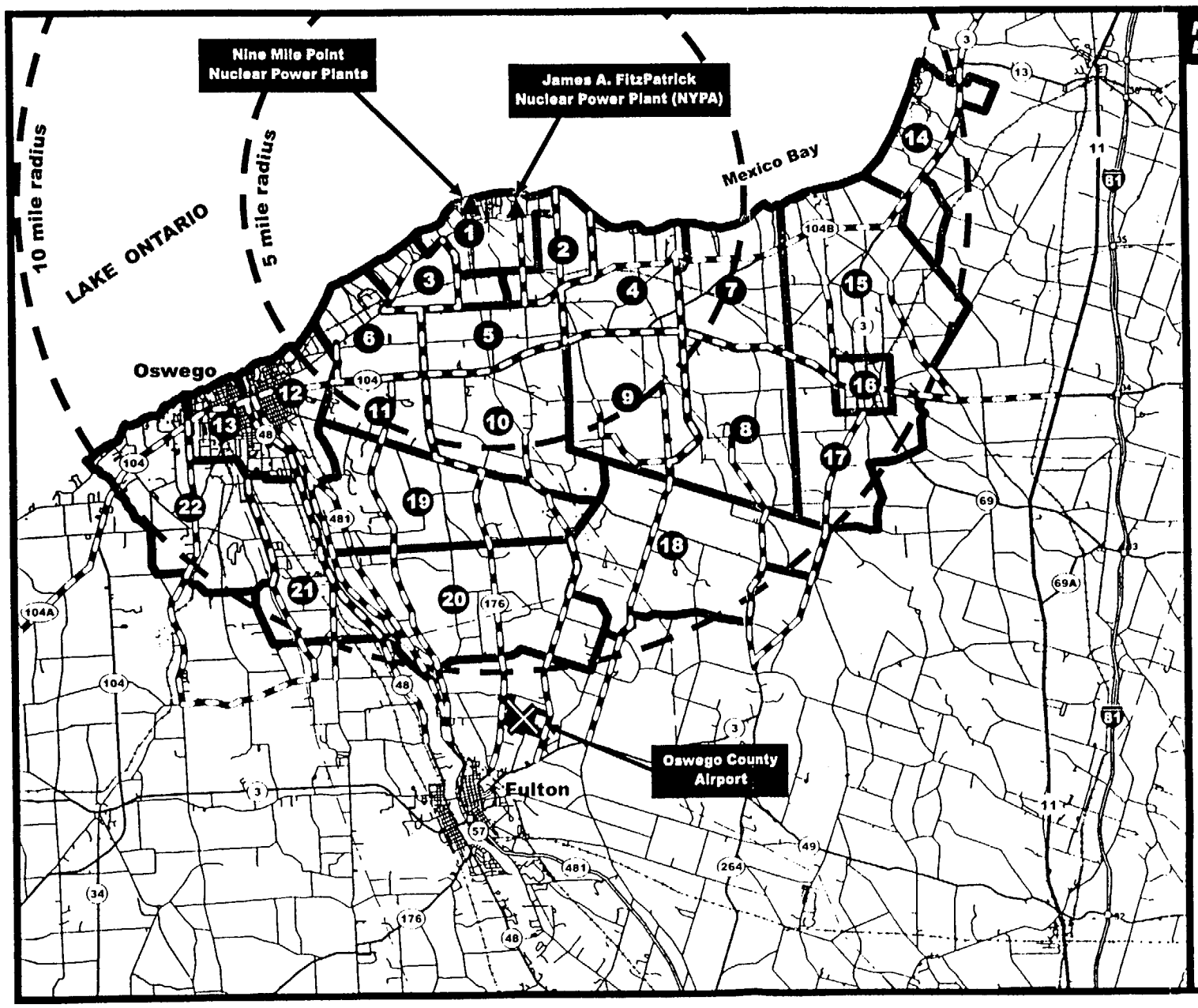
2.1.1 Sectors

In order to allow for the estimate and actions to address various evacuation scenarios, the NMP/JAF EPZ described in Section 1 is subdivided into various types of smaller geographic areas. As discussed in Appendix 4 of NUREG-0654, the EPZ is first subdivided into areas referred to as Sectors. These are defined by first delineating areas within approximately two-, five-, and 10-mile radii from the NMP/JAF site. These radii areas are further subdivided into 90-degree quadrants along north-south and east-west axes.

2.1.2 Emergency Response Planning Areas

Sectors are further comprised of smaller units called Emergency Response Planning Areas (ERPAs), which generally follow political and/or physical boundaries. An ERPA is the fundamental planning area identified in the Oswego County REPP. Under the REPP, each ERPA as a unit follows a specific protective response action in the event of an incident at the NMP/JAF site requiring an evacuation. While identification of evacuation travel time estimates by Sector provide a characterization of the time period necessary to clear the 10-mile EPZ during an incident at the NMP/JAF site, in practice, identification of these estimates by ERPA provide the most critical information in formulating procedures necessary to address a given evacuation scenario. Therefore, this report provides evacuation time estimates by ERPA to characterize an Airport Special Event Scenario.

ERPAs used in the 1993 evacuation travel time estimation report and in the current Oswego County REPP are depicted in Figure 2-1. In total, there are 29 designated ERPAs in the NMP/JAF EPZ. However, it should be noted that the figure and subsequent modeling includes only 22 of these areas (i.e., ERPA Nos. 1 through 22). The remaining ERPAs represent over-water areas. Specifically, ERPA Nos. 23, 24, and 25 are defined as areas within the EPZ along the Oswego River, while ERPA Nos. 18, 19, 26, and 27 include areas over Lake Ontario.



Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 2-1
Emergency Response Planning Areas (ERPAs) and Evacuation Routes

LEGEND

- ▲ Nuclear Power Plant Location
- (15) Emergency Response Planning Area Designation
- Emergency Response Planning Area Boundary
- Evacuation Routes

2.0 0 2.0
1.0 miles

As previously discussed in Section 1, the Oswego County Airport is not located within the EPZ, and thus not located within any of the ERPAs. The nearest ERPA in proximity to the airport is ERPA No. 20, whose southern boundary is located roughly 1.5 miles north of the facility.

2.1.3 Traffic Zones

For modeling purposes, ERPAs are further subdivided into traffic zones. These zones represent population clusters in particular geographic areas, which follow specified evacuation routes leaving the EPZ. In the model, each traffic zone is assigned a primary evacuation route for each mode of travel emanating from that zone. Traffic zone boundaries in the 1993 model were developed to minimize the amount of cross traffic required to access a zone's primary evacuation routes. The primary evacuation routes are depicted in Figure 2-1. It should be noted that individual traffic zones within each ERPA were not displayed to permit readability of the map.

2.2 Populations

The evacuation travel time model used in the 1993 report identified three primary population groups in the NMP/JAF EPZ, as required in NUREG-0654. These population groups include permanent residents, transients, and persons in special facilities. The following sections discuss the characteristics of each population, methods used to estimate these populations in the 1993 report, and rationale used to determine whether these estimates are still reasonable for use in this update for an Airport Special Event Scenario.

2.2.1 Permanent Resident Population

Permanent residents, as defined in Appendix 4 of NUREG-0654, are those persons who reside in the EPZ, including schoolchildren, but excluding persons residing in institutions identified as special facilities in the Oswego County REPP (see Section 2.2.3). Data derived from the 1990 decennial Census of Population, adjusted to exclude institutional population was used for the 1993 report. Specifically, these data were disaggregated to block group data, corresponding to appropriate ERPAs and traffic zones. This was further broken down to households with and without automobiles. This yielded an estimate of 36,450 persons with autos, 3280 persons without autos, or a total of 39,730 permanent residents in the EPZ.

Based upon discussions with NMP/JAF and county/local officials, it was concluded that it was reasonable to continue to use the 1990 Census data as the basis for identifying existing resident population, given that this provides the most detailed breakdown available at this time. The 2000 Census data at the block will likely not be completed for public use until roughly 2002.

2.2.2 Transient Population

The transient population includes employees not residing in the EPZ, people staying at hotels/motels in the EPZ, and visitors to parks and recreational areas within the EPZ. In the 1993 report, the Oswego County Emergency Management Office (EMO) inventoried parks and recreational facilities, such as beaches and campgrounds. Hotel/motel estimates were developed from data from the Oswego Accommodations Guide, using a two person per room estimate for rooms located in the EPZ. Employment within the EPZ was estimated using New York State Department of Labor Employment Statistics.

These estimates yielded a total transient population of 19,005 persons within the EPZ. Following a review of additional background data on transient facilities and discussions with county/local officials, it was determined that no major changes have occurred since 1993 that would require revising this estimate in the model. There have been no major shifts in county employment (e.g., plant openings/closings), or development of any major motels/hotels or recreational facilities that would cause a significant shift in the 1993 estimates.

2.2.3 Special Facilities Population

Special facilities residents include persons in hospitals and other health care facilities, nursing homes, schools (including public and private, day care, nursery, elementary, middle, and high school), universities (i.e., SUNY Oswego), day camps, and correctional facilities. Population in these facilities was estimated at 15,586 in the EPZ in the 1993 report.

The Oswego County EMO maintains inventories of various types of special facilities. EMO officials and the REPP identified some small changes to the inventory of special facilities since 1993, including:

- Expansion of available County Correctional facility beds from 96 to 150; and
- Opening of the Seneca Hill Nursing Facility, a 120-bed facility, on NYS Rt. 481.

Further review of the inventory indicated some concurrent decreases of special facility populations, specifically lower summer student population at SUNY Oswego and the closing of some smaller day care facilities and nursing homes. Therefore, it was determined that the 1993 estimate of special facilities population in the EPZ is still reasonable for modeling purposes.

2.3 Transportation Facilities

As with population estimates used in the 1993 model, the 1993 road network/evacuation route assumptions (e.g., number of lanes, highway capacity, etc.) were reviewed to determine if any significant changes have occurred that would have implications on the modeling results. This was

achieved through site reconnaissance on May 18 and June 9, 1999 and through contacts with local/county and state officials. The only identified road projects included reconstruction/repaving projects without increases in capacity. The most recent in the network in the vicinity of the EPZ included the repaving and striping of NYS Rt. 49 through the Town of Hastings, although this road is not within the EPZ. Therefore, it was concluded that the 1993 assumption for the roadway network was sufficient for use in this update.

2.4 Limitations of the Model Related to an Airport Special Event Scenario

The 1993 model used to generate evacuation travel time estimates exhibits some limitations for the development of an Airport Special Event Scenario. These limitations required some adjustments to the typical application of the model. First, because the Oswego County Airport is actually located outside the 10-mile EPZ, it is not possible to specifically assign special event traffic to the roadway network in the model, because the model operates by assigning blocks of traffic to a specific traffic zone within an ERPA. However, given the proximity of the airport to the EPZ, it is obvious that the occurrence of a concurrent evacuation of the NMP/JAF site and the airport would result in impacts to the travel time estimates.

In order to overcome this limitation, it was necessary to create a new traffic zone within the closest ERPA to the airport, in this case ERPA No. 20. All event-related traffic was assigned on applicable roadway links within this newly created zone and designated as transient population. This resulted in an approach that approximates the interaction of evacuation traffic with special event traffic movements. However, use of this technique created some inordinately high evacuation time estimates for ERPA No. 20, because the model assumes that the special event population is in th area, when in reality, it has already cleared the 10-mile EPZ.

Secondly, the traffic assignment process for special event traffic may somewhat overestimate the negative implications of an evacuation occurring at the same time as a special event evacuation or typical departure after its end. This is because the 1993 model uses a "static" assignment process, which assumes a concurrent loading of the entire network; the distribution over time of vehicle trips progressively feeding the network is not addressed. However, comparison of this technique at other sites indicates an almost 97% correspondence between static and dynamic approaches was determined to still be appropriate (see Appendix B).

3 AIRPORT SPECIAL EVENT SCENARIO ASSUMPTIONS

This section describes the basic assumptions that were used to characterize an Airport Special Event Scenario. As stated in Section 1, these assumptions were based upon the event procedures to be implemented for a two-day concert planned in July 1999. However, similar procedures and parameters would be used for other similarly sized and staged events at the Oswego County Airport.

The parameters discussed in the following sections were derived from meeting with the representatives of the Oswego County Sheriff's, meetings/discussions with NMP/JAF, county, and local officials, and review of information contained within the Mass Gathering Permit application submitted by the concert promoter for the July 1999 concert.

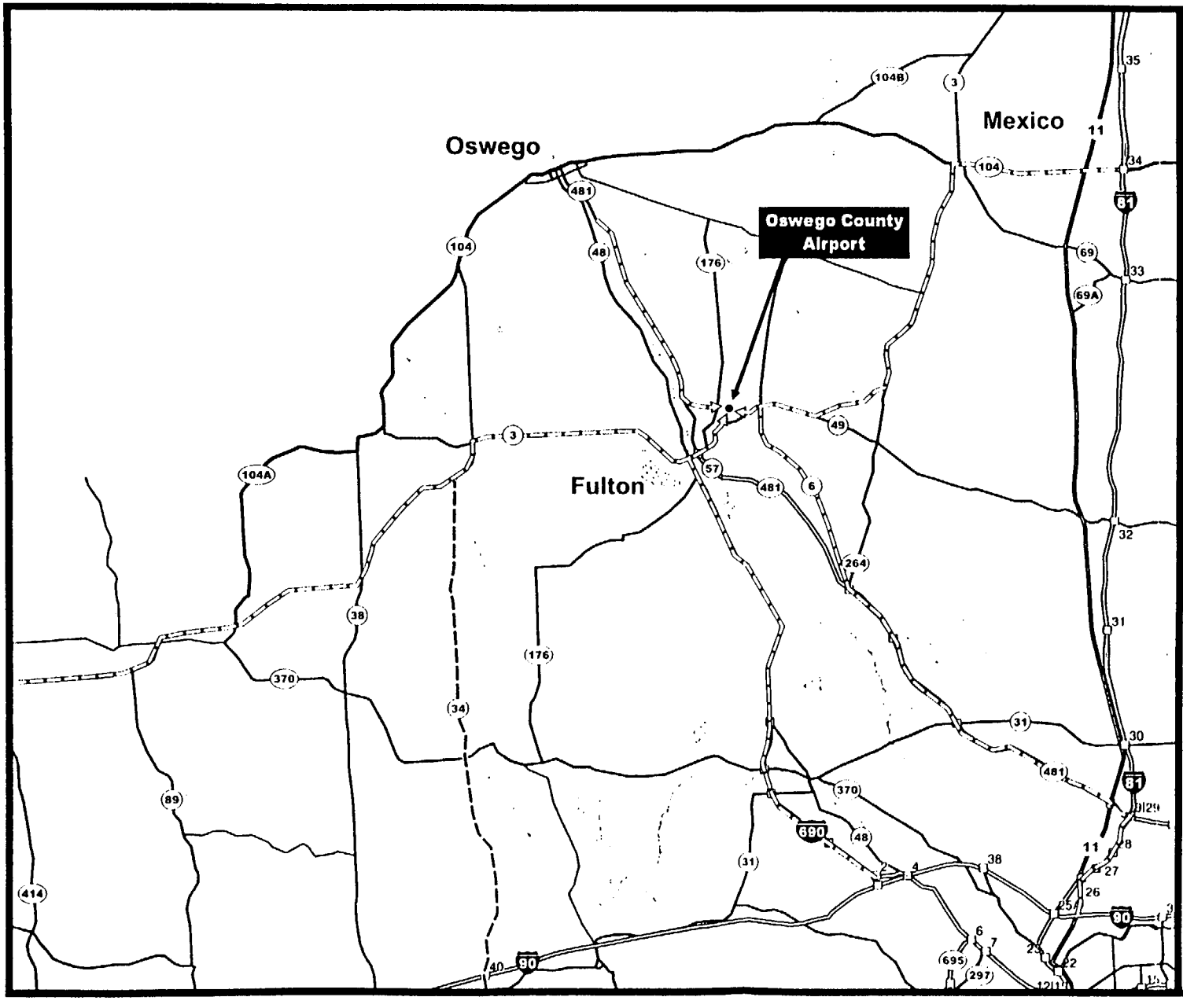
3.1 General Overview

The Airport Special Event Scenario involves the conduct of a two-day venue (i.e., Saturday 7:30 PM to Sunday, 11:30 PM) with parking and camping facilities provided on the airport site. In order to facilitate early attendees at the event, the gates will open on Friday, 12:00 noon. The gates will remain open through Friday evening and all day Saturday to accept event goers. The gates will close roughly one half hour before the official start of the event (Saturday, 7:00 PM). From this point until 11:00 PM on Sunday, the gates will be closed for entry/exit except for emergency departure of event goers.

3.2 Attendance and Trip Generation Assumptions

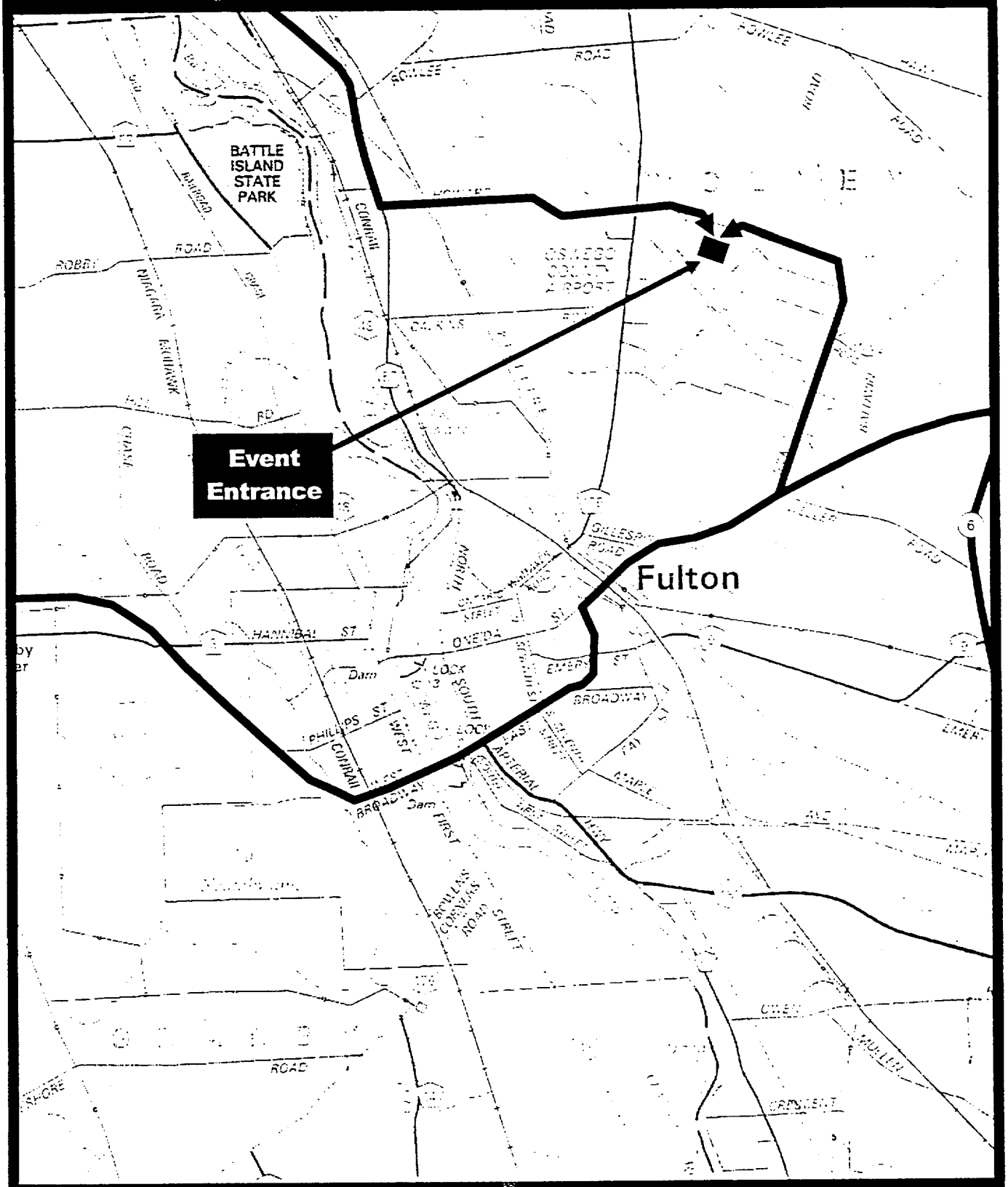
The information contained within the Mass Gathering Permit application for the July 1999 concert event states that the airport will accommodate approximately 65,000 attendees over the two-day event. Notwithstanding, based upon discussions with NMP/JAF and local/county officials, the total attendance that is assumed for this scenario is 100,000 persons. This reflects information on similar events conducted in similarly sized communities in other east coast states. Use of this attendance figure also assumes that a portion of event-goers will not camp on the airport site, but will seek appropriate campsites/lodging in other nearby locations.

Vehicle occupancy rates for this scenario was assumed to average 3.5 persons per vehicle. This rate is consistent with other special event scenarios included in the 1993 evacuation travel time estimates (i.e., for events such as "Harborfest" and "Classic Weekend"). This rate would yield a trip generation assumption of 28,571 vehicles entering and leaving the area for the event.



Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 3-1
Suggested Travel Routes to Special Event at Oswego County Airport



0.5 0 0.5
0.25 miles

Figure 3-2
Ingress Routes to Oswego County Airport During Events

3.3 Ingress/Egress Assumptions

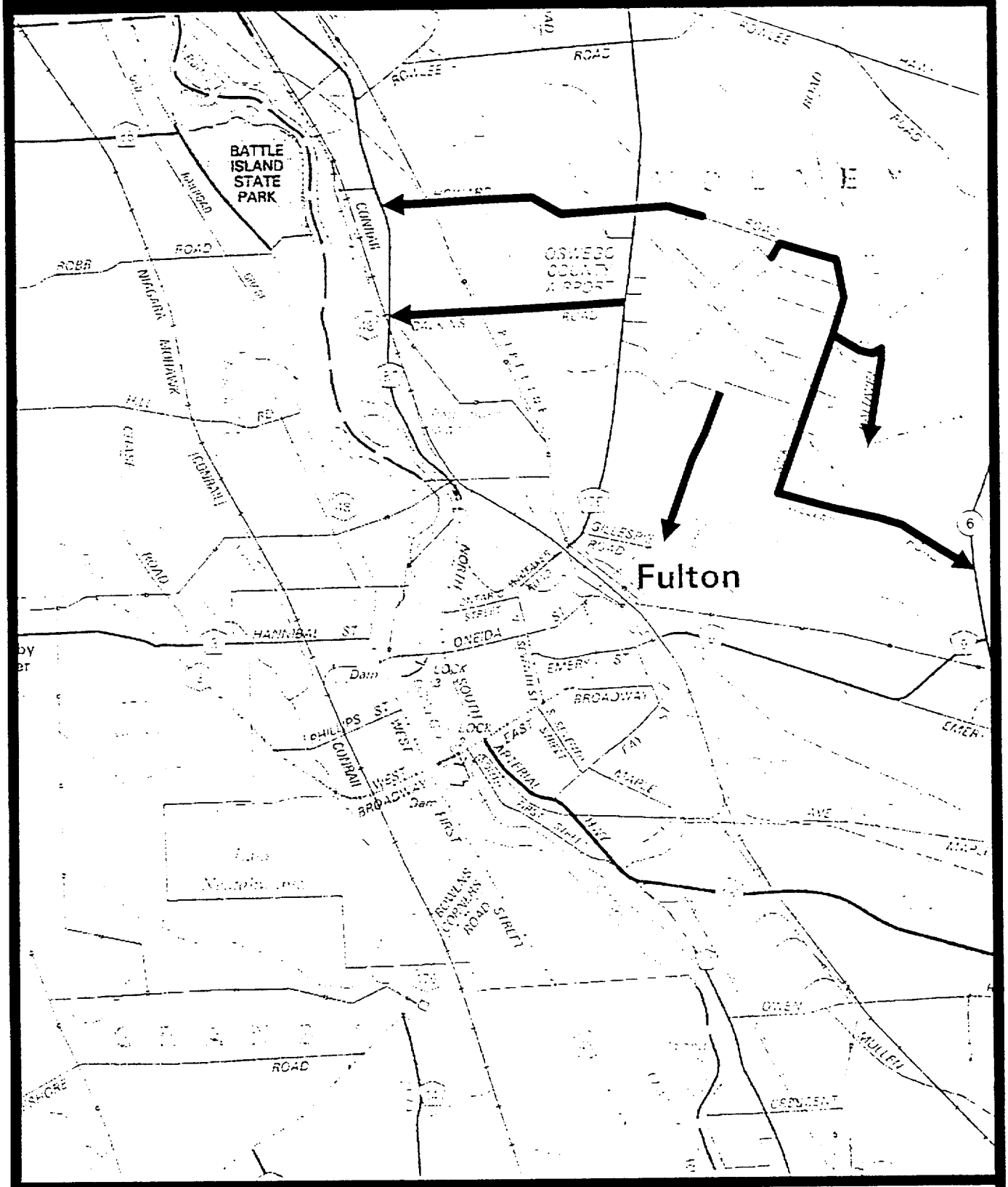
Figure 3-1 depicts the Oswego County Sheriff's Department suggested regional access routes to and from the Oswego County Airport under this scenario. The suggested routes include:

- A route from the north on I-81 south, to Exit 34 (Rt. 104), then proceeding west along NYS Rt. 104 to NYS Rt. 3, then continuing along Rt. 3 to the airport;
- A route from Oswego south along Rt. 481 and 57 to the airport;
- A route from I-90 to Exit 36 (I-81 North), to NYS Rt.481, then north on Rt. 481, to County Rt. 6, then proceeding north along Rt. 6 to Rt. 3, then Rt. 3 to the airport (note; on Friday evening, this route would shift to I-690, then north along NYS Rt. 48 to Rt. 3 in Fulton); and
- A route from the west along Rt. 104 to Rt. 3, then east along Rt. 3 to the airport.

In addition to these routes, one additional route is available from the I-90 at Exit 40 (Weedsport), then north along NYS Rt. 34 to Rt. 3, then east on Rt.3 to the airport. Overall, the Sheriff's Department is discouraging use of this route, yet traffic will not be manually detoured.

While suggested routes to and from the regional road network would be similar for ingress and egress to the Oswego County Airport Facility, access points immediately around the airport would vary for ingress before and egress after the special event (see Figures 3-2 and 3-3). Ingress to the airport would be routed to a single access gate to be located on Howard Road to facilitate payment of admission fees and ticket taking. After the end of the event or during an emergency evacuation, several access points would be utilized, including the main airport gate, Howard Road, Calkins Road, Muckey Road, Baldwin Road, and Weller Road.

Given the nature of the event, an assumption of the progression of traffic into and out of the airport over a five-day period was developed in conjunction with the County Sheriff's Department, based upon information provided by the planned July 1999 event, coupled with information developed for similar events in other east coast communities. These traffic flow assumptions are presented in Tables 3-1 and 3-2. As is shown, the peak ingress period is projected to be in the period between late Friday evening and early Saturday morning. The peak egress period is projected to be between Monday morning and Monday afternoon.



0.5 0 0.5
0.25 miles

Figure 3-3
Egress Routes from Oswego County Airport During Events

Table 3-1 Ingress Distribution Assumptions		
Time Period	**Number of Auto Trips**	**Percent of Total**
Thursday, 11 PM – Friday, 5 AM	1,429	5%
Friday, 5 AM – Friday, 5 PM	2,857	10%
Friday, 5 PM – Saturday, 1 AM	14,285	50%
Saturday, 1 AM – Saturday, 8 AM	1,429	5%
Saturday, 8 AM – Saturday, 12 Noon	5,714	20%
Saturday 12 Noon – Saturday, 7 PM	2,857	10%
Total	**28,571**	**100%**

Table 3-2 Egress Distribution Assumptions		
Time Period	**Number of Auto Trips**	**Percent of Total**
Sunday, 11 PM – Monday, 5 AM	10,000	35%
Monday, 5 AM – Monday, 8 AM	1,429	5%
Monday, 8 AM – Monday 5 PM	17,142	60%
Total	**28,571**	**100%**

4 ANALYSIS OF EVACUATION TRAVEL TIMES

This section presents the evacuation travel time estimates for an Airport Special Event Scenario under the three cases described in Section 1.2. As discussed in Section 2.4, for each of the cases, the Airport Special Event traffic was assigned to a newly created traffic zone in ERPA No. 20, and distributed between two designated evacuation routes that pass the Oswego County Airport. These include Calkins Road and Howard to Rt. 57, which pass to the west of the airport and Silk Road, which passes the airport on the east.

Each case includes a series of runs corresponding to potential conditions/time periods in the NMP/JAF EPZ as follows:

- **Nighttime**, when most persons in the general population are in their residences, institutions have minimal staff, and relatively few businesses are operating;
- **Summer Weekend/Holidays**, during which it is assumed that recreational activities predominate, reflected in increased camp attendance and recreational facility usage;
- **Evenings**, which is distinguished from nighttime conditions because of increased staffing levels at institutional facilities and increased activities for the general population (e.g., shopping, entertainment); and
- **Weekday, School-out-of-Session**, which can be characterized as "normal" workday traffic patterns, except for the fact that school-based trips would not occur, replaced by an increase in recreational activities by school children.

For each case described below, evacuation travel time estimates are summarized in terms of the percentage of population being able to clear the 10-mile EPZ. Full runs of individual travel time estimates from each ERPA are presented in Appendix A.

4.1 Case 1: Concurrent Evacuation of EPZ and Airport Special Event

This case consists of a full evacuation of the NMP/JAF EPZ and a concurrent evacuation of the Airport Special Event during its peak attendance (i.e., between Saturday, 7:00 PM and Sunday, 11:00 PM). This event could be the result of simultaneous occurrence of nuclear incident at the NMP/JAF site and a general emergency at the Airport (e.g., fire, explosion) or a general evacuation of the 10-mile EPZ and adjoining areas in the event of a significant nuclear incident.

Figures 4-1, 4-2, and 4-3 illustrate the estimated evacuation travel times for this case under three separate potential times that this type of case could occur (i.e., Evening, Nighttime, and Summer/Holiday Weekend). It is clear that this case would result in the greatest evacuation times to clear the 10-mile EPZ. For example, under an evening timeframe during adverse weather,

Figure 4-1
Case 1 - 100% Evacuation - Evening

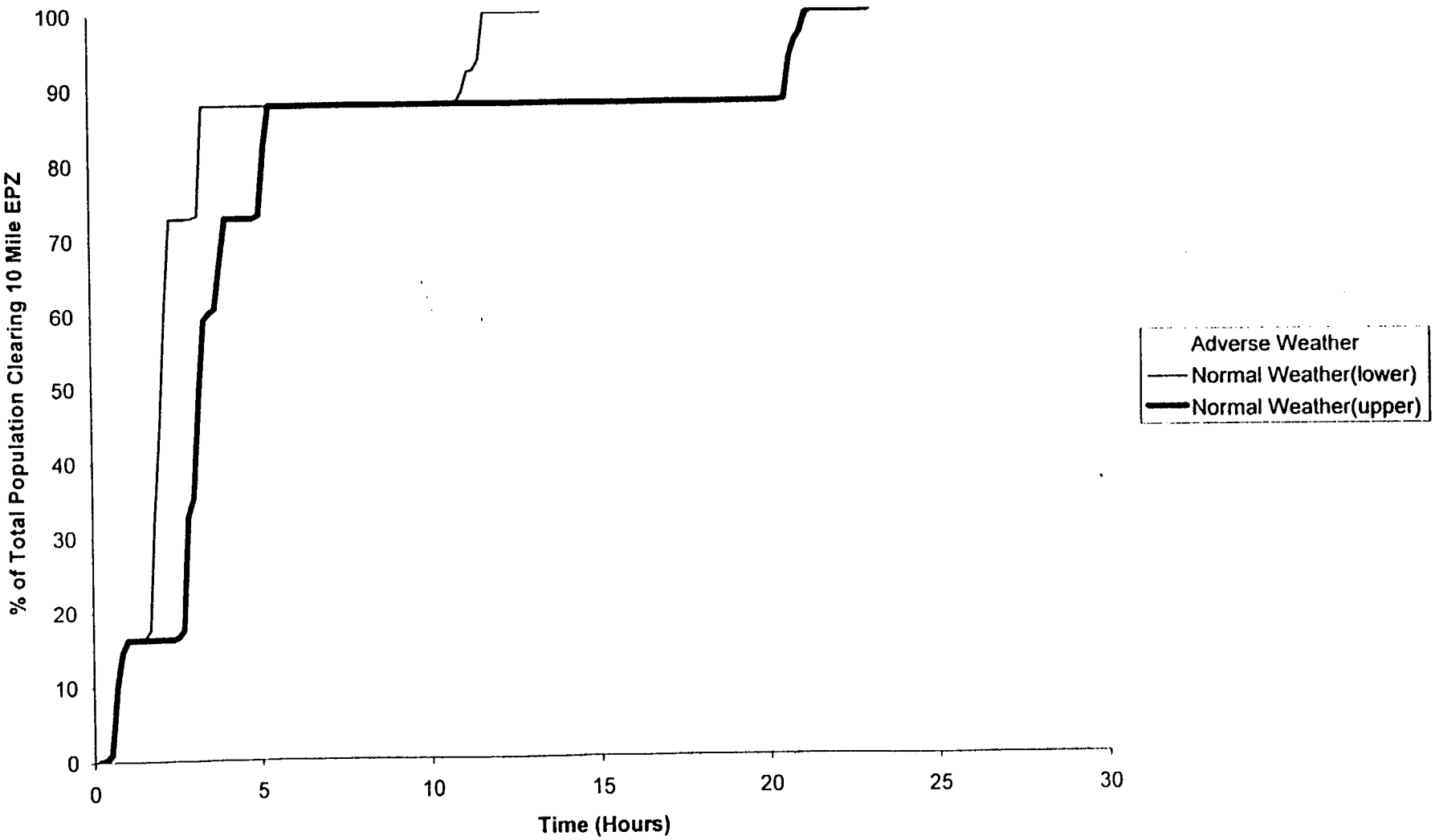


Figure 4-2
Case 1 - 100% Evacuation - Nighttime

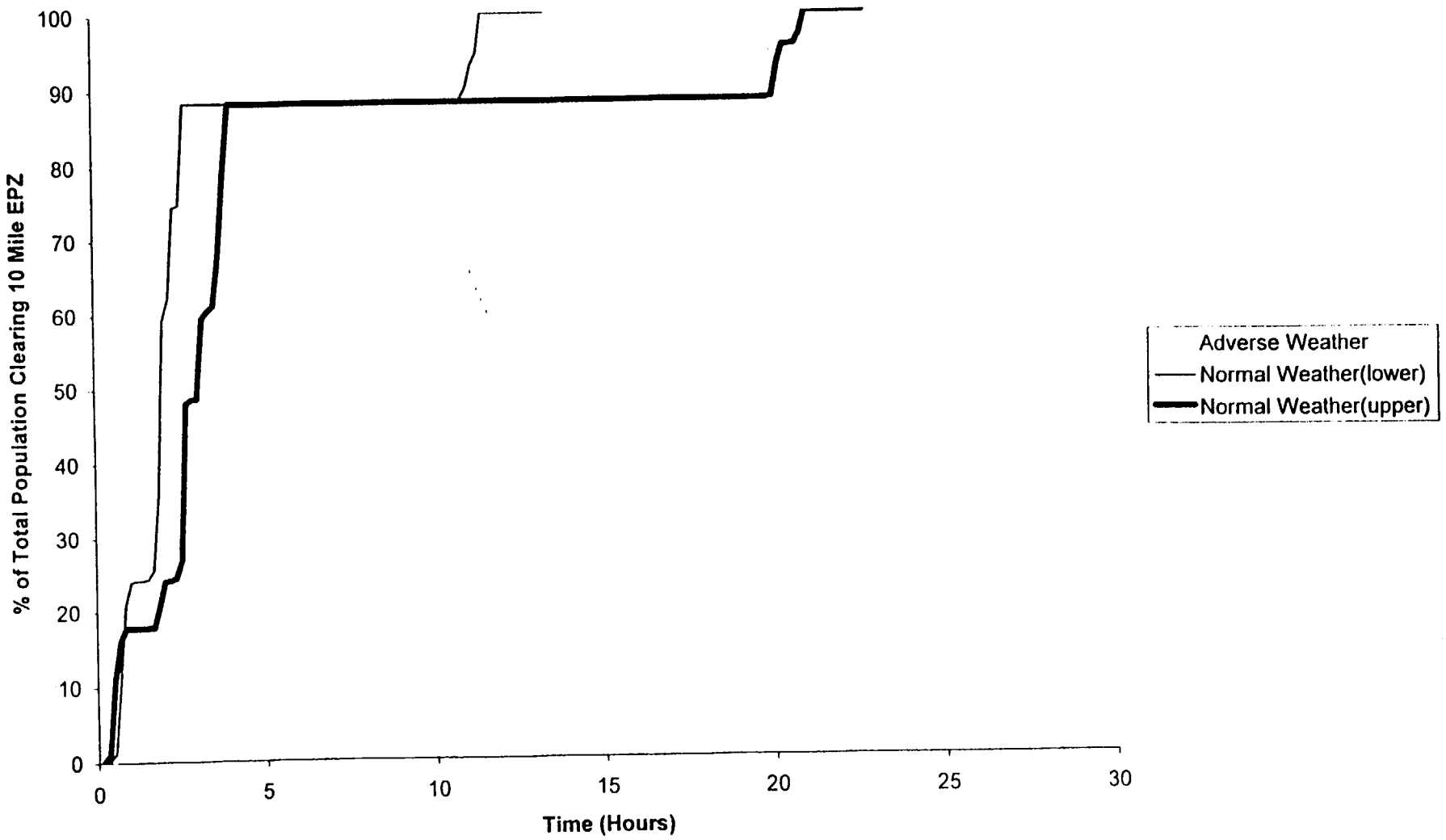
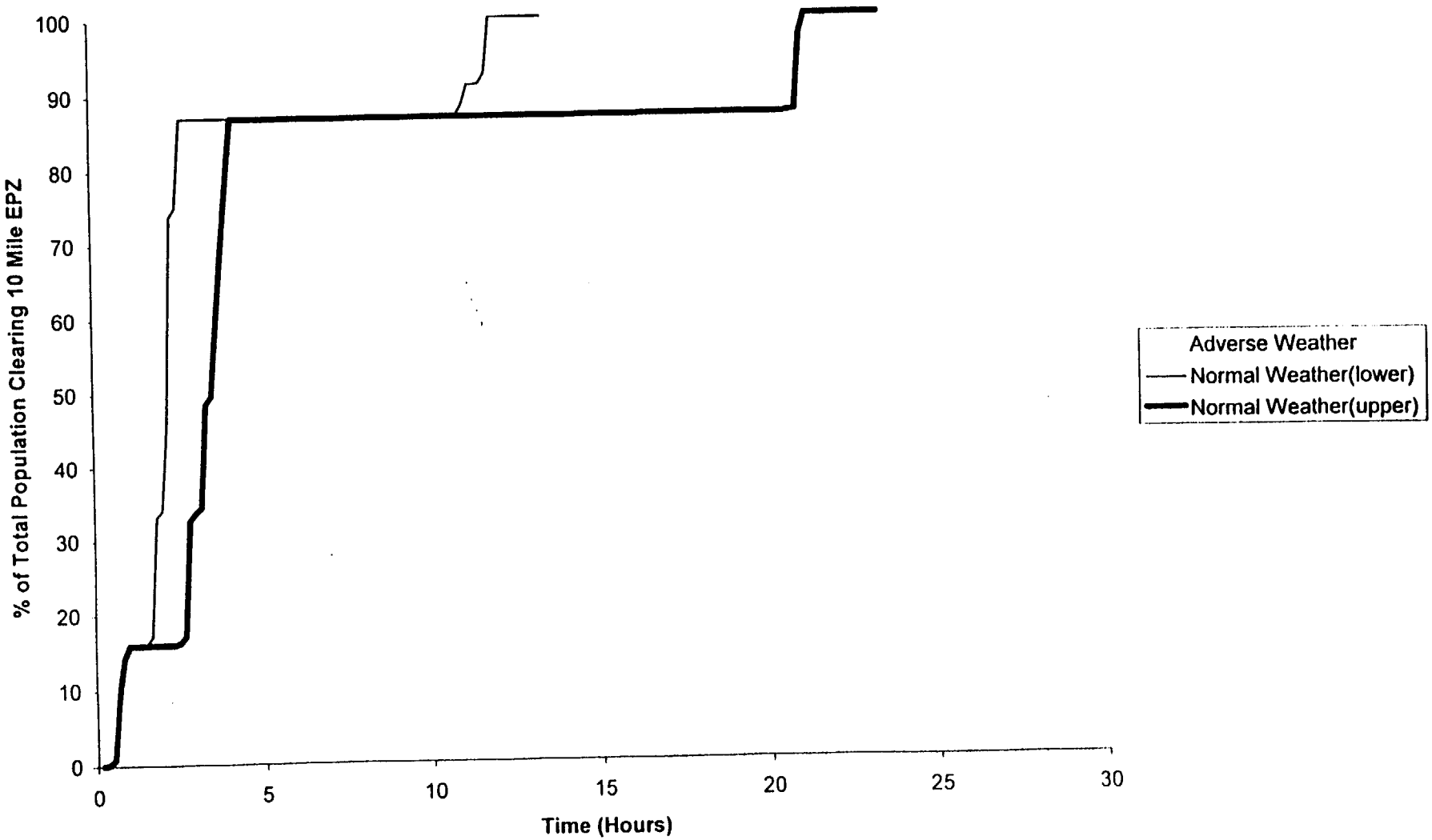


Figure 4-3
Case 1 - 100% Evacuation - Summer/Holiday Weekend



evacuation of roughly 85% of the total EPZ population would occur within 7 hours of the event. However, the last 15% of the EPZ population would require as much as 28 hours to clear the EPZ.

4.2 Case 2: Evacuation of the EPZ Immediately After the End of Airport Special Event

This case consists of a full evacuation of the NMP/JAF EPZ during the period immediately following the end of an Airport Special Event (i.e., between Sunday, 11:00 PM and Monday, 8:00 AM). This case assumes that the Airport Special Event has begun its typical exit procedures discussed in Section 3 and that 40% of event traffic is already on the road network (based upon the assumptions in Table 3-2) when the nuclear incident occurs.

Figures 4-4 and 4-5 illustrate the estimated evacuation travel times for this case under two separate potential times that this type of case could occur (i.e., Nighttime and Weekday, School-out-of-Session). While the least severe among the three cases examined, this case still results in some significantly extended evacuation travel times. Under the School-out-of-Session timeframe, it would take in excess of 14 hours to clear the 10-mile EPZ.

4.3 Case 3: Evacuation of the EPZ the Day Following the End of the Airport Special Event

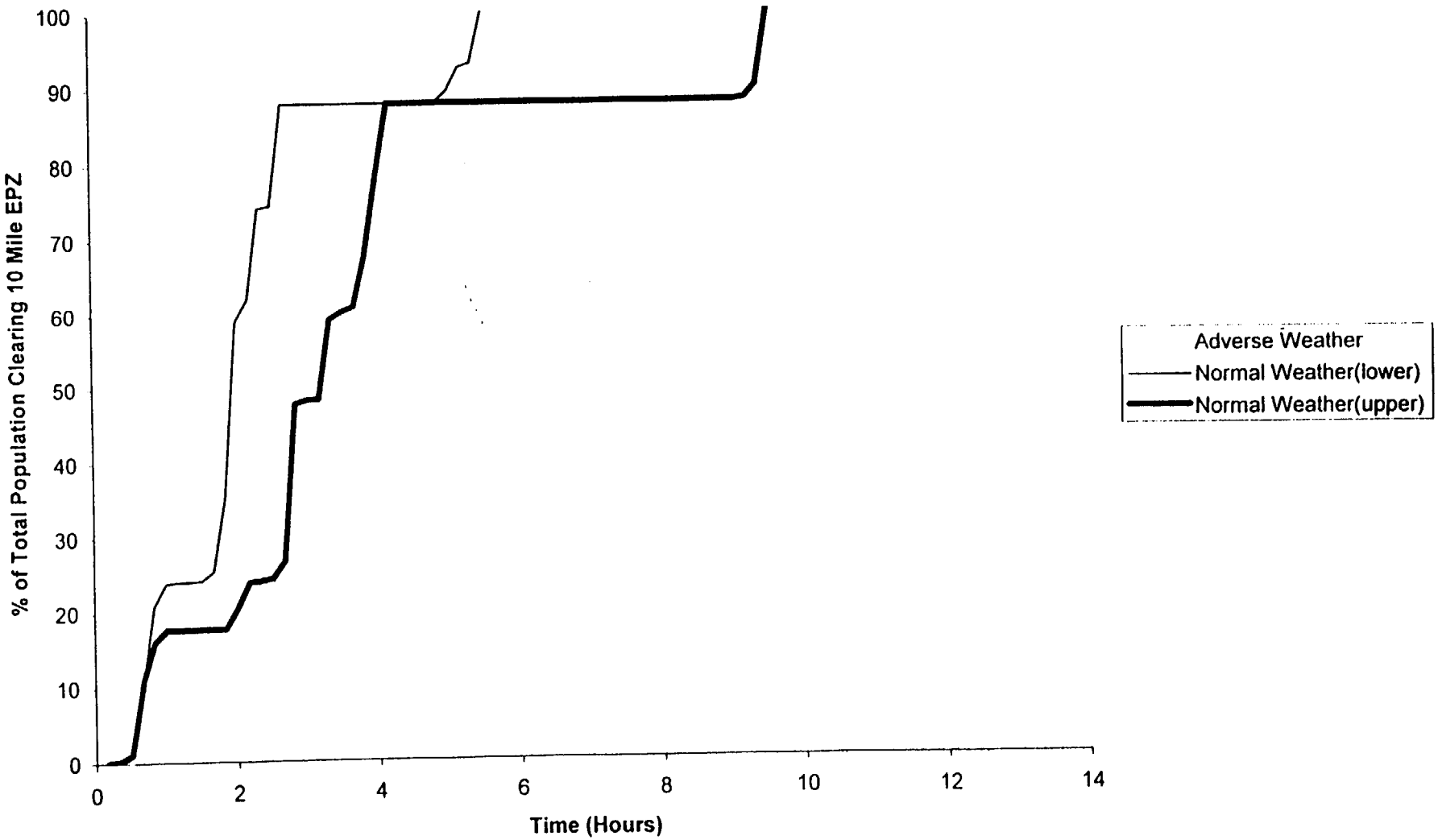
This case consists of a full evacuation of the NMP/JAF EPZ during the period of the day after the end of an Airport Special Event (i.e., between Monday, 8:00 AM and Monday, 5:00 PM). This case assumes that 40% of event traffic have already exited and cleared from the area over the previous nine-hour period. During this period, the 60% remaining event traffic would be proceeding on the road network (based upon the assumptions in Table 3-2) when the nuclear incident occurs.

Figures 4-6 and 4-7 illustrate the estimated evacuation travel times for this case under two separate potential times that this type of case could occur (i.e., Evening and Weekday, School-out-of-Session). This case would also result in significant time being expended to totally clear the EPZ, although not as great as Case 1. For example, for the evening time frame under adverse weather conditions, over 90% of the population would clear the EPZ in roughly 7 hours, but the balance of the population would require as much as 17 hours.

4.4 Case 4: Potential Re-Route of EPZ Evacuation Pattern

In recognition of the potential implications of the evacuation travel time estimates for three cases examined, a fourth case was formulated to assess whether the effects of concurrent evacuations of the EPZ and an Airport Special Event could be mitigated through selective re-directing of

Figure 4-4
Case 2 - 40% on Road - Nighttime



evacuation routes out of the EPZ. The intent of such an approach would be to segregate EPZ and Airport Event traffic to the greatest extent possible.

The assumptions used in the formulation of this case are depicted in Figure 4-7A. As is shown, four designated evacuation routes (Rt. 176, Silk Road, Rt. 6, and Rt. 264) would be re-directed to east along Rt. 3 and Rt. 49 through the positioning of police roadblocks at key locations as follows:

- Rt. 176 and Rowlee Road;
- Silk Road and Rowlee/Hawk Roads;
- Baldwin and Hawk Roads;
- Rt. 6 and Rt. 3; and
- Rt. 264 and Rt. 49.

The Rt. 49 corridor is particularly suited for a re-route of EPZ evacuation traffic, given that it has recently been repaved and striped. It provides a direct connection to I-81 south, where traffic could then be directed to staging areas in Syracuse. This would allow Airport Special Event traffic more flexibility in route selection and flow.

Figures 4-8, 4-9, and 4-10 depict the evacuation travel time estimates of Case 1 (100% Evacuation of both EPZ and Airport Special Event) using the Rt. 49 re-route to segregate the two types of traffic. As is shown, for all time periods examined (i.e., Evening, Nighttime, and Summer/Holiday Weekend) the EPZ could be almost 100% cleared in roughly 6 to 7 hours.

4.5 Estimate of Critical Bottlenecks

One of the key factors used to determine where to place traffic control and emergency personnel and where to specify key backup routes is information from the computer assignment model that identifies critical bottlenecks along each evacuation route in the network. These links represent the locations of potential maximum delays. Figure 4-11 depicts the critical bottlenecks under Case 1 and is generally characteristic of all cases examined. Not surprisingly, these bottlenecks are primarily centered where evacuation routes feed into areas around the Oswego County Airport during an Airport Special Event Scenario.

Figure 4-5
Case 2 - 40% on Road - School-Out-of-Session

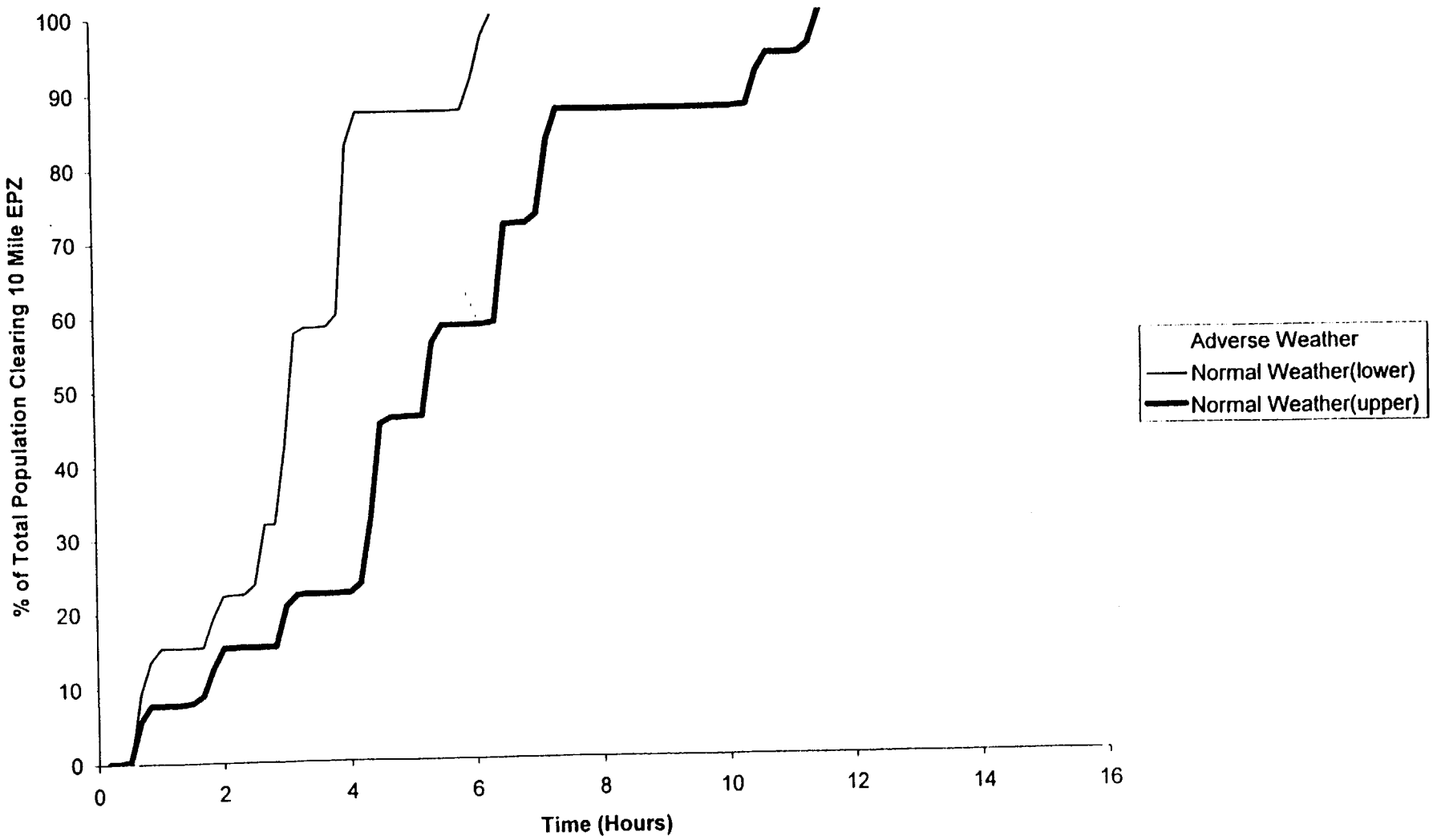


Figure 4-6
Case 3 - 60% on Road - Evening

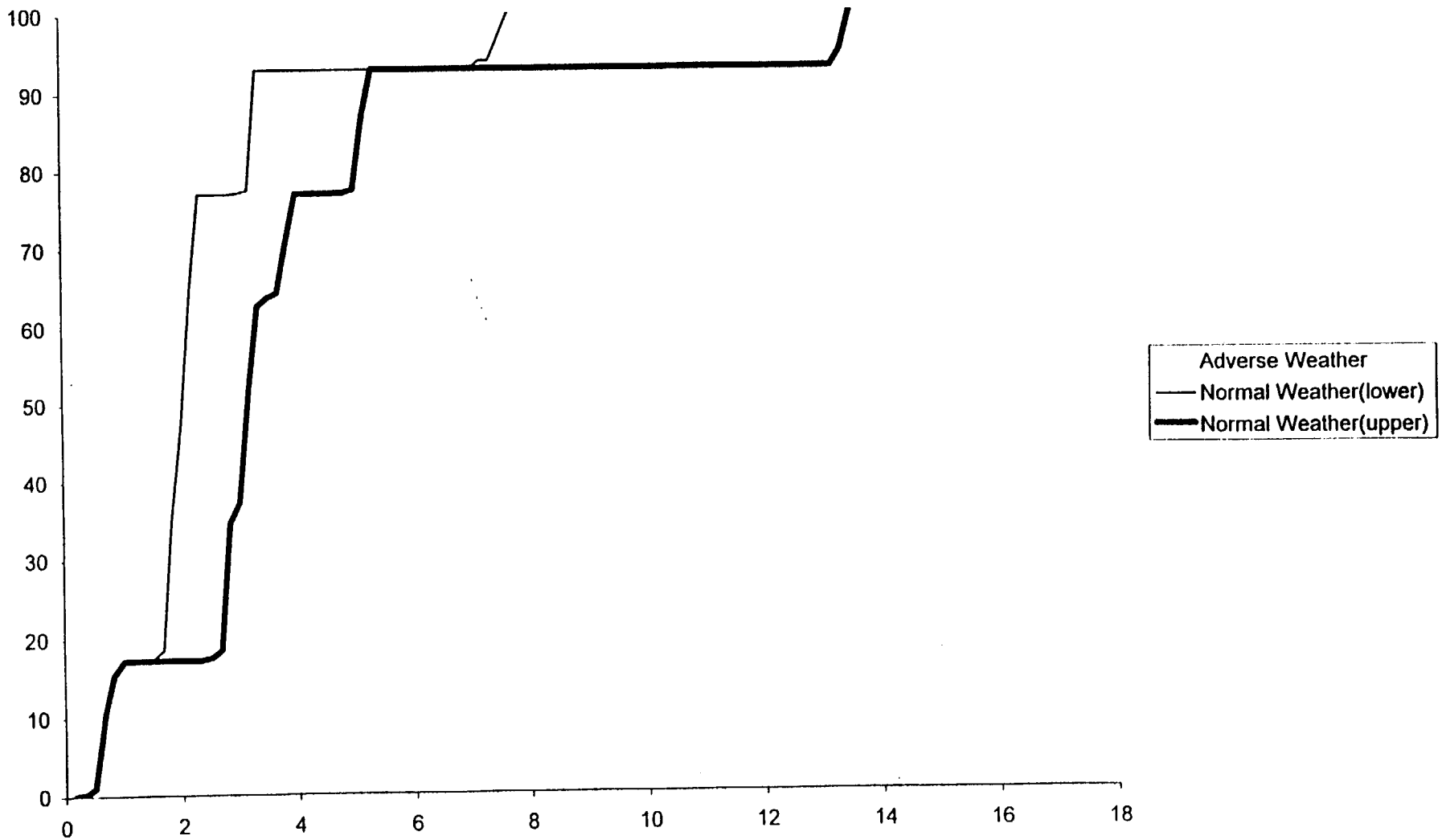
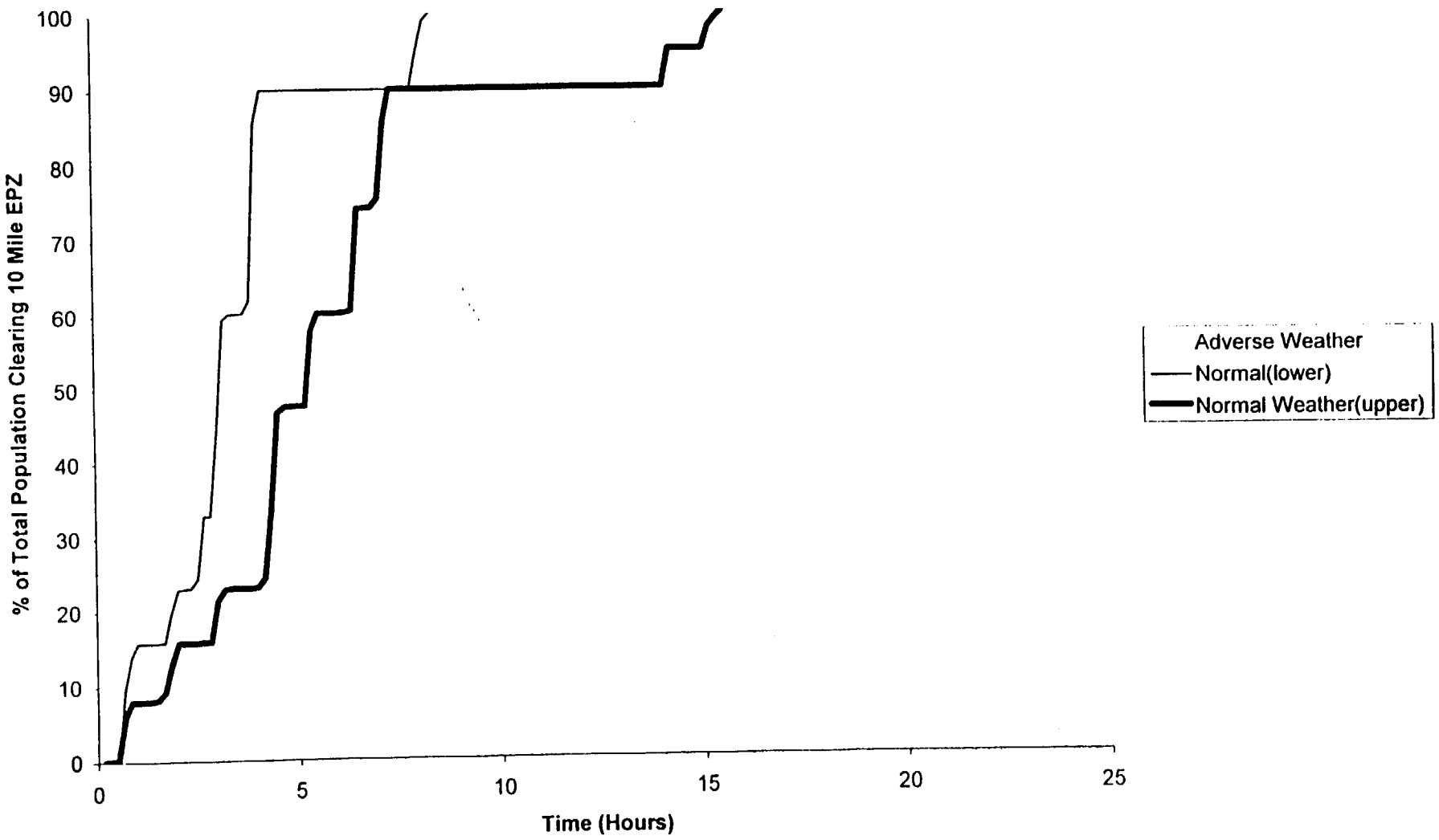
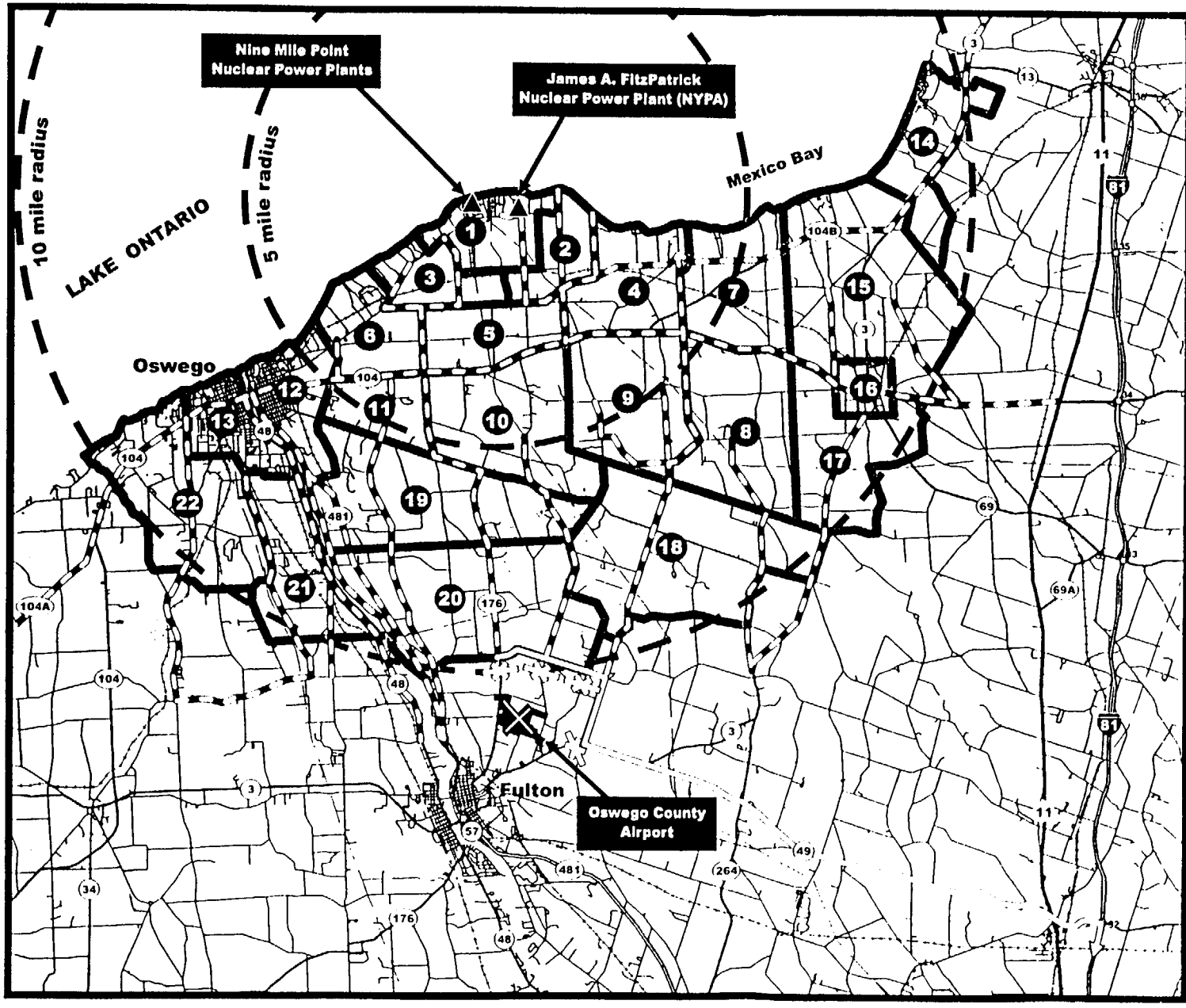


Figure 4-7
Case 3 - 60% on Road - School-out-of-Session





Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 4-7A
Re-Routed Evacuation Routes

LEGEND

- Nuclear Power Plant Location
- Emergency Response Planning Area Designation
- Emergency Response Planning Area Boundary
- Evacuation Routes
- Re-Routed Evacuation Route
- Police Roadblock/ Re-Route

2.0 0 2.0
1.0 miles

Figure 4-8
Case 4 - 100% Evacuation - Re-Route - Evening

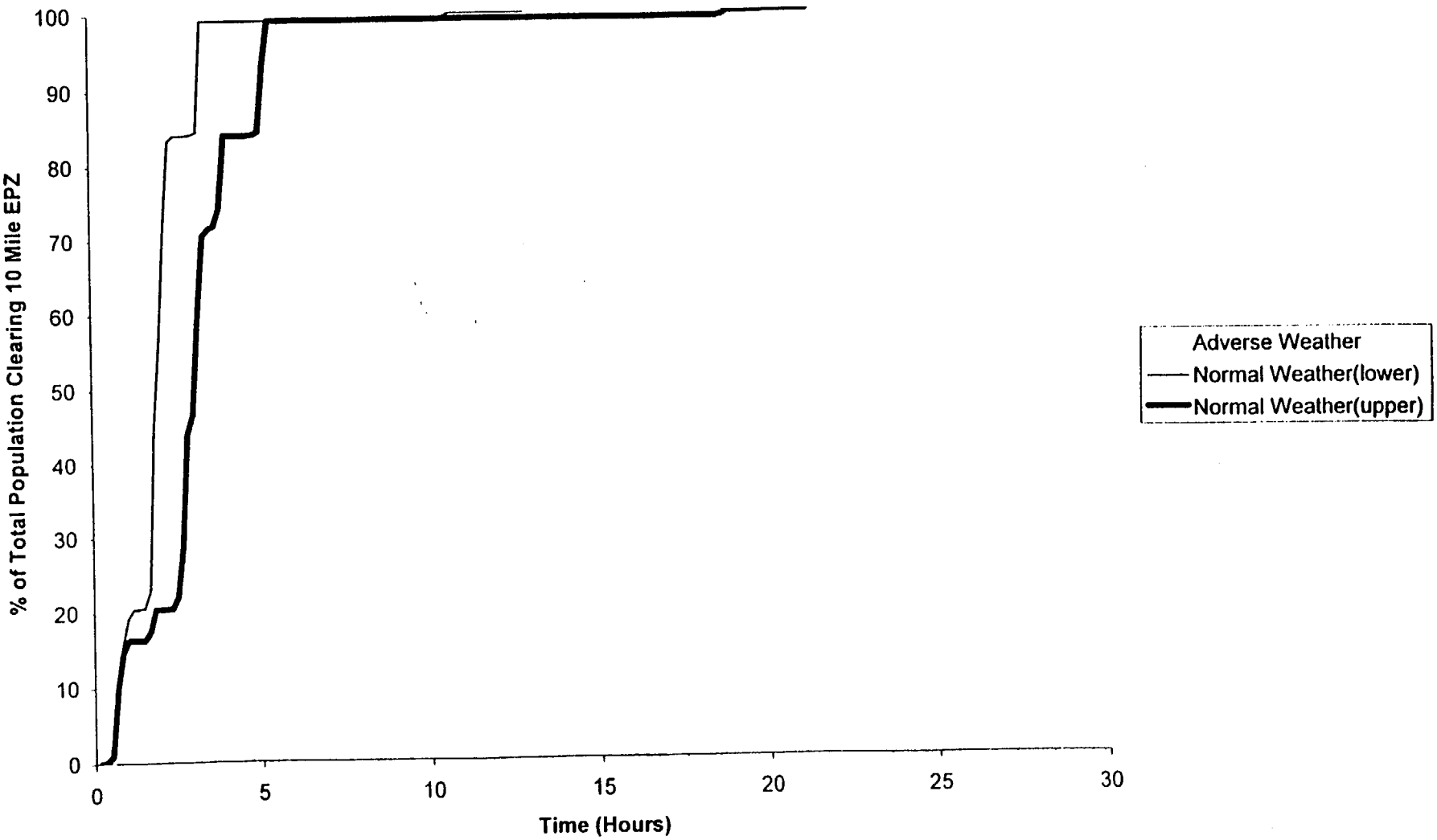


Figure 4-9
Case 4 - 100% Evacuation - Re-Route - Nighttime

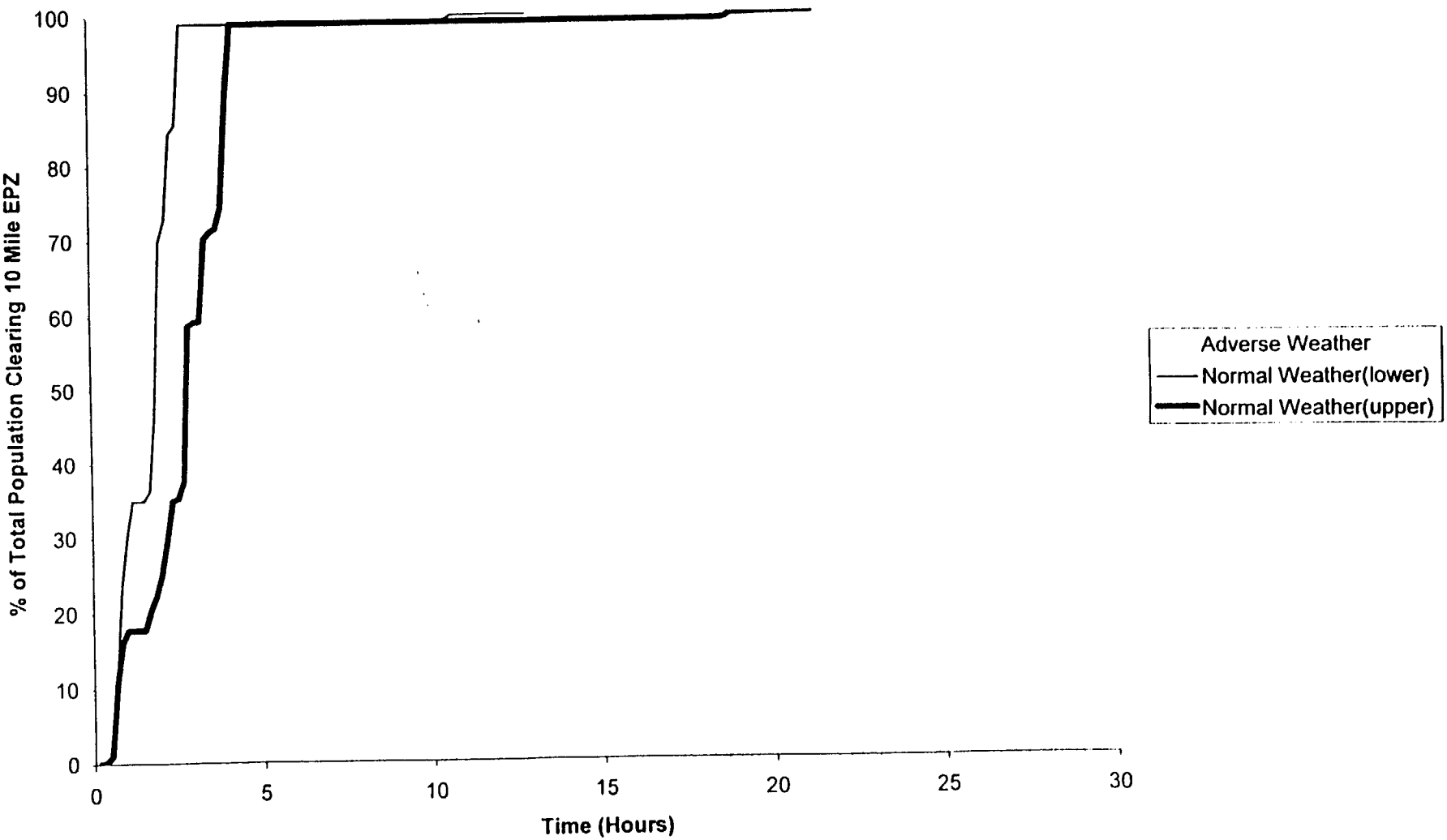
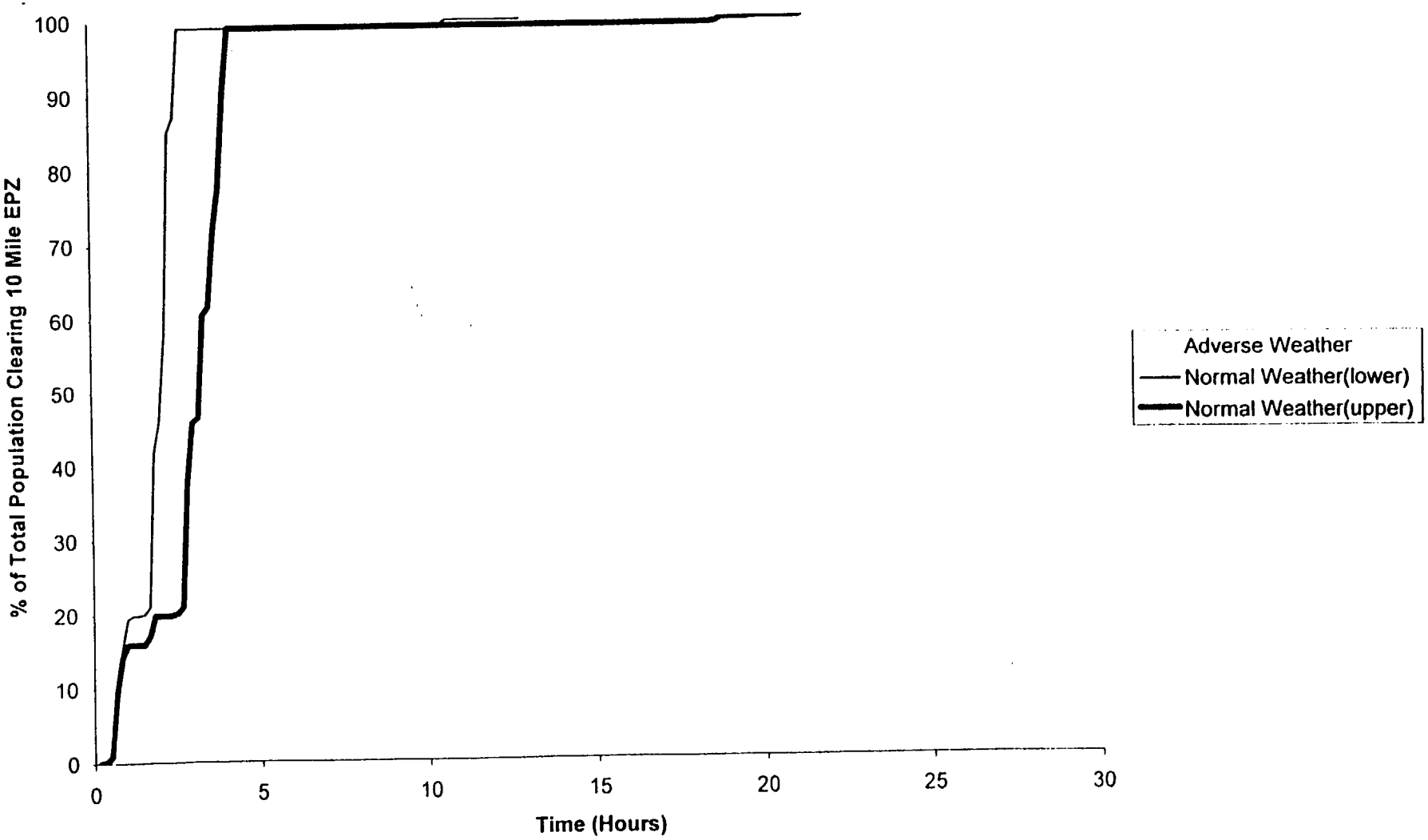
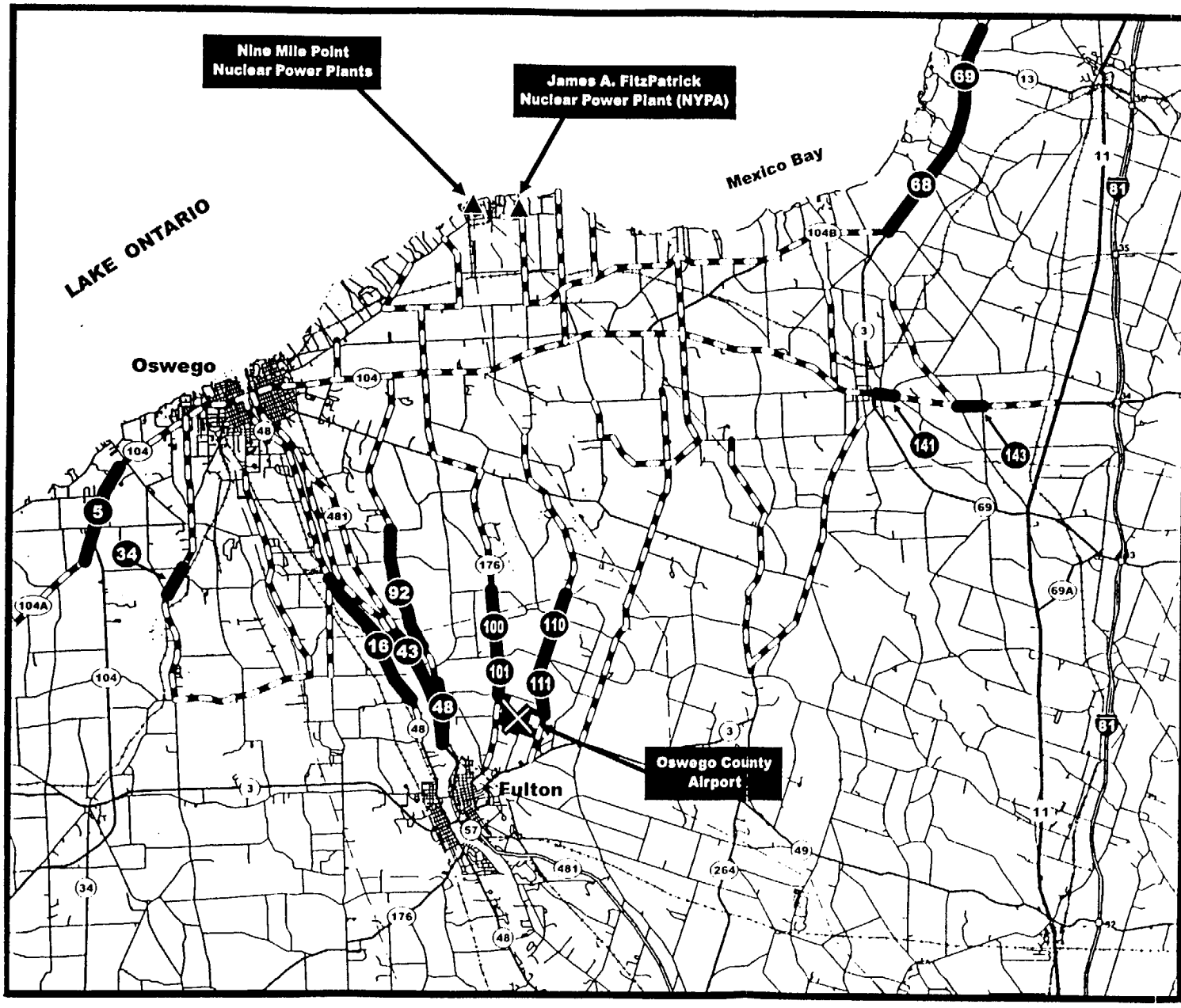


Figure 4-10
Case 4 - 100% Evacuation - Re-Route - Summer/Holiday Weekend





Nine Mile Point / J. A. FitzPatrick Evacuation Travel Time Estimates

Figure 4-11
Critical Bottlenecks
Case 1 - 100% Evacuation of EPZ and Airport Event.

LEGEND

- Nuclear Power Plant Location
- 68 Evacuation Route Link Designation
- Evacuation Route Link Experiencing Critical Bottleneck
- Evacuation Routes

2.0 0 2.0
1.0 miles

PB

APPENDIX A

EVACUATION TRAVEL TIMES BY EMERGENCY RESPONSE PLANNING AREA

EVACUATION TRAVEL TIMES
BY EMERGENCY RESPONSE PLANNING AREAS

This appendix includes evacuation travel time estimates by ERPA for a simultaneous full-EPZ evacuation during a special event at the Oswego County Airport. Evacuation travel time estimates are presented for the following scenarios, weather conditions, and population groups:

- Scenarios

School-not-in Session
Weekend/Holiday Summer
Evening
Nighttime

- Weather Conditions

Normal
Adverse

- Population Groups

Resident Population with Autos
Resident Population without Autos
Special Facilities Population
Transient Population

A total of 20 tables are included in this appendix. A range of values depict the lower and upper bound limits of the evacuation times for normal weather and dry roadway conditions to a light rain which results in wet pavement. Evacuation travel time estimates for adverse weather approximate travel conditions during severe hail storms or thunderstorms.

A suggested approach to read the table in this appendix is outlined below:

Step 1 Determine the appropriate case and scenario (i.e., 100% Evacuation-Evening).

Step 2 Determine the approximate weather condition:

Lower bound normal weather conditions – dry pavement.
Upper bound normal weather conditions – wet pavement.
Adverse weather conditions – pavement conditions during a thunderstorm/hailstorm.

Step 3 For lower bound normal weather ETTE tables, read the left of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ.

For upper bound normal weather ETTE tables, read the right of the two columns to interpret ETTEs by population group for each ERPA and/or the entire EPZ.

Adverse weather ETTEs are documented on separate tables for each scenario.

A possible evacuation scenario is detailed as follows:

A full EPZ evacuation scenario has been ordered on a Saturday at 6:00 PM in July. An evacuation of a special event at the Oswego County Airport is also occurring. The weather conditions are observed to be poor (heavy rain, thunderstorm, hailstorm, or heavy fog) and the

forecast is that these weather conditions will continue over the next two days. (See Table A-1 for ETTEs).

Q. How long will it take for the permanent resident population with autos to:

- Fully evacuate ERPA 5? A. 26:20

Q. How long will it take for the permanent resident population without autos to:

- Fully evacuate ERPA 16? A. 1:30

Q. How long will it take for the special facilities population to:

- Fully evacuate ERPA 4? A. 2:00
- Fully evacuate the EPZ? A. 4:10 (Multiple wave evacuation substantially increase special facility evacuation times.)

Q. How long will it take for the transient population to:

- Fully evacuate ERPA 4? A. 1:50 (Transient population can evacuate more quickly than permanent resident population in the same ERPA. This typically occurs when the transient population is located in a traffic zone closer to the EPZ boundary).
- Fully evacuate ERPA 14? A. 3:20 (Transient population and permanent resident population typically require the same time to evacuate an ERPA when the population dispersion of each is similar throughout the ERPA.
- Fully evacuate ERPA 22? A. 6:20

NOTES FOR EVACUATION TRAVEL TIME ESTIMATES BY ERPA

NORMAL WEATHER

1. The evacuation travel time ranges presented in this table are based on operations strategies indicated in the evacuation implementation procedures.

   Lower bound evacuation travel times (shorter times) can be anticipated when:

   a. Unexpected long-term capacity restrictions on key highway links owing to incidents such as accidents, vehicle breakdowns, and highway construction, do not occur.

   b. A high state of operational readiness (traffic control officers mobilized, traffic control devices operational, al buses stationed to begin their initial runs) is attained.

   c. An informed and cooperative public follow directions as instructed.

   d. Dry roadway conditions exist.

   Upper bound evacuation travel times (longer times) are representative of a situation where:

   a. Capacity restrictions adversely affect traffic flow, but not to the point where a breakdown in traffic flow would result.

   b. A low state of operations readiness results from minimal mobilization of the emergency workforce.

   c. A low degree of cooperation from the public occurs.

   d. A light rain results in wet pavement.

2. The evacuation travel time ranges are indicated as hours: minutes, and include 20 minutes of public preparation time.

3. The population subgroups indicated in this table are:

   a. Resident population (with and without automobiles).

   b. Special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, resident facilities such as group homes, convents, and monasteries).

   c. Transient (employees, visitors to parks, resident and day camps, hotels, and motels).

4. Gaps in this table indicate that there is no special facility or transient population in the given ERPA.

5. The evacuation travel time ranges presented in the table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA is a staged evacuation and will not exceed the travel time range indicated in this table.

6. All times have been rounded to the nearest 10 minutes.

7. Special facility evacuation travel times include time for multi-wave trips to evacuate the population which requires transport by ambulance.

NOTES FOR EVACUATION TRAVEL TIME ESTIMATES BY ERPA

ADVERSE WEATHER

1. The evacuation travel time ranges presented in this table are based on operational strategies indicated in the evacuation implementation procedures.
2. The evacuation travel time ranges are indicated as hours: minutes, and include 20 minutes of public preparation time.
3. Adverse weather conditions are considered to be a slippery roadway surface and/or reduced visibility (e.g., due to fog, heavy rain, or a severe thunderstorm which may create traffic disruptions as a result of downed trees or powerlines).
4. The population subgroups indicated in this table are:
   a. Resident population (with and without automobiles).
   b. Special facilities (schools, colleges, nursing homes, hospitals, other health care facilities, resident facilities such as group homes, convents, and monasteries).
   c. Transient (employees, visitors to parks, resident and day camps, hotels, and motels).
5. Gaps in the table indicate that there is no special facility or transient population in the given ERPA.
6. The evacuation travel time ranges presented in the table assume a simultaneous evacuation of the entire EPZ. The evacuation travel time for any individual ERPA is a staged evacuation and will not exceed the travel time range indicated in this table.
7. All times have been rounded to the nearest 10 minutes.
8. Special facility evacuation travel times include time for multi-wave trips to evacuate the population which requires transport by ambulance.

TABLE A-1

CASE 1 – 100% EVACUATION – EVENING

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:20	26:10		
3	25:50	25:50		
4	3:30	3:30	2:00	1:50
5	26:20	26:10		
6	25:40	4:40		25:40
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	26:20	25:20		25:40
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	26:10	26:10		
20*	26:10	26:10		28:40
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-2

CASE 1 – 100% EVACUATION – EVENING

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:30 – 21:10	11:30 – 21:10		11:30 – 21:10
2	11:10 – 21:10	10:50 – 20:50		
3	11:30 – 20:40	11:30 – 20:40		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	11:30 – 21:10	11:00 – 21:00		
6	11:30 – 20:40	2:10 – 3:50		11:30 – 20:40
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:30 – 21:10	11:10 – 20:20		11:30 – 20:40
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	2:20 – 3:10	2:20 – 3:50
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:30 –21:00	11:30 – 21:00		
20*	11:30 – 21:00	11:20 – 21:00		14:00 – 23:30
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-3

CASE 1 – 100% EVACUATION – NIGHTTIME

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:10	26:00		
3	25:20	25:20		
4	2:30	2:30	1:20	1:10
5	26:10	26:10		
6	25:20	4:40		25:20
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	26:10	25:00		
11	4:40	4:30		
12	4:50	4:40	20:20	4:50
13	5:00	5:00	23:20	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	26:00	26:00		
20*	26:00	26:00		28:30
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-4

CASE 1 – 100% EVACUATION – NIGHTTIME

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:20 – 21:10	11:20 – 21:10		11:20 – 21:10
2	11:00 – 21:10	10:50 – 20:50		
3	11:20 – 20:20	11:20 – 20:20		
4	1:00 – 2:10	0:50 – 2:00	1:10 – 1:10	1:00 – 1:00
5	11:20 – 21:00	11:00 – 21:00		
6	11:20 – 20:20	2:10 – 3:50		11:20 – 20:20
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:20 – 21:00	11:00 – 20:00		
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	13:30 – 16:40	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	16:10 – 19:20	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:20 – 20:50	11:20 – 20:50		
20*	11:20 – 20:50	11:10 – 21:00		13:50 – 23:30
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-5

CASE 1 – 100% EVACUATION – SUMMER/HOLIDAY WEEKEND

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	26:20	26:20		26:20
2	26:20	26:00		
3	26:10	26:10		
4	3:30	3:30	2:00	1:50
5	26:10	26:10		
6	26:10	4:40		26:10
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	26:10	25:40		26:00
11	4:40	4:30		
12	4:50	4:40	20:50	4:50
13	5:00	5:00	23:50	5:00
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	26:00	26:00		
20*	26:00	26:00		28:30
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-6

CASE 1 – 100% EVACUATION – SUMMER/HOLIDAY WEEKEND

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:40 – 21:10	11:40 – 21:10		11:40 – 21:10
2	11:10 – 21:10	10:50 – 20:50		
3	11:40 – 21:00	11:40 – 21:00		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	11:40 – 21:00	11:00 – 21:00		
6	11:40 – 21:00	2:10 – 3:50		11:40 – 21:00
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	11:40 – 21:00	11:20 – 20:40		11:40 – 21:00
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	13:50 – 17:10	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	16:30 – 19:50	2:30 – 4:00
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	11:40 – 21:00	11:40 – 21:00		
20*	11:40 – 21:00	11:30 – 21:00		14:10 – 23:30
21	1:40 – 2: 40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-7

CASE 2 – 40% EVACUATION –NIGHTTIME

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	11:50	11:50		11:50
2	11:40	11:30		
3	11:50	11:50		
4	2:30	2:30	1:20	1:10
5	11:40	11:40		
6	11:50	4:40		11:50
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	11:40	11:20		
11	4:40	4:30		
12	4:50	4:40	15:00	4:50
13	5:00	5:00	18:00	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	11:40	11:40		
20*	11:40	11:30		11:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

TABLE A-8

CASE 2 – 40% EVACUATION –NIGHTTIME

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	5:30 – 9:30	5:30 – 9:30		5:30 – 9:30
2	5:10 – 9:30	4:50 – 9:10		
3	5:30 – 9:30	5:30 – 9:30		
4	1:00 – 2:10	0:50 – 2:00	1:10 – 1:10	1:00 – 1:00
5	5:30 – 9:30	5:00 – 9:20		
6	5:30 – 9:30	2:10 – 3:50		5:30 – 9:30
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	5:30 – 9:30	5:10 – 9:10		
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	10:30 – 12:30	2:20 – 3:50
13	2:30 – 4:00	2:40 – 4:10	13:10 – 15:10	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	5:20 – 9:20	5:20 – 9:20		
20*	5:20 – 9:20	5:10 – 9:20		4:50 – 8:50
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-9

CASE 2 – 40% EVACUATION – SCHOOL OUT-OF-SESSION

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	14:20	14:20		14:20
2	14:10	14:00		14:10
3	13:00	13:00		
4	3:50	3:40	2:20	3:50
5	14:10	14:10		13:00
6	13:00	8:40		13:00
7	3:40	2:10		3:40
8	2:20	1:40		2:20
9	2:00	2:00		2:00
10	14:10	12:40		14:10
11	8:50	8:40		8:50
12	8:50	8:40	18:30	8:50
13	8:00	8:00	21:30	8:00
14	3:40	3:10		3:40
15	3:40	2:30		3:40
16	2:10	2:00	1:30	2:10
17	2:00	2:00		1:40
18	2:00	1:40		2:00
19	14:00	14:00		12:50
20*	14:00	14:00		14:00
21	5:00	5:00	1:40	5:00
22	8:00	7:40	7:50	7:50

*Assumed ERPA where all airport special event traffic initially assigned as transients.

\\BUFF\Common\oswego-erie\erie program\TABLE 3B1 doc

TABLE A-10

CASE 2 – 40% EVACUATION – SCHOOL OUT-OF-SESSION

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	6:10 – 11:30	6:10 – 11:30		6:10 – 11:30
2	6:10 – 11:30	6:00 – 11:10		6:10 – 11:30
3	6:00 – 10:30	6:00 – 10:30		
4	2:00 – 3:10	1:50 – 3:00	1:10 – 2:00	2:00 – 3:10
5	6:10 – 11:30	6:00 – 11:20		6:00 – 10:30
6	6:00 – 10:30	3:50 – 7:00		6:00 – 10:30
7	1:50 – 3:00	0:40 – 1:50		1:50 – 3:00
8	0:50 – 2:00	0:40 – 0:40		0:50 – 2:00
9	0:50 – 1:40	0:40 – 1:40		0:50 – 1:40
10	6:10 – 11:20	5:40 – 10:10		6:10 – 11:20
11	4:00 – 7:10	3:50 – 7:00		4:00 – 7:10
12	4:00 – 7:10	3:50 – 7:00	12:30 – 15:20	4:00 – 7:10
13	4:00 – 6:30	4:00 – 6:30	15:10 – 18:00	4:00 – 6:30
14	1:50 – 3:00	1:40 – 2:40		1:50 – 3:00
15	1:50 – 3:00	1:00 – 2:10		1:50 – 3:00
16	0:40 – 1:50	0:20 – 1:40	0:40 – 0:40	0:40 – 1:50
17	0:40 – 1:40	0:50 – 1:40		0:40 – 0:40
18	0:40 – 1:40	0:30 – 1:20		0:40 – 1:40
19	6:00 – 11:20	6:00 – 11:20		5:50 – 10:20
20*	6:00 – 11:20	6:00 – 11:20		6:00 – 11:20
21	2:30 – 4:10	2:20 – 4:00	0:40 – 0:40	2:30 – 4:10
22	4:00 – 6:30	3:40 – 6:10	4:00 – 6:20	4:00 – 6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

\\BUFF\Common\oswego-ette\ette program\TABLE 3B2-3 doc

TABLE A-11

CASE 3 – 60% EVACUATION – EVENING

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	16:40	16:40		16:40
2	16:40	16:20		3:30
3	16:40	16:40		
4	3:30	3:30	2:00	1:50
5	16:40	16:30		
6	16:40	4:40		16:40
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	16:40	16:20		16:40
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:40	1:20		
19	16:30	16:30		
20*	16:30	16:30		16:00
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

W:\oswego-emergency program\TABLE 4A1.doc

TABLE A-12

CASE 3 – 60% EVACUATION – EVENING

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	7:40 – 13:30	7:40 – 13:30		7:40 – 13:30
2	7:10 – 13:30	7:00 – 13:10		
3	7:40 – 13:30	7:40 – 13:30		
4	1:50 – 2:50	1:50 – 2:50	1:10 – 1:10	1:00 – 1:00
5	7:40 – 13:30	7:00 – 13:20		
6	7:40 – 13:30	2:10 – 3:50		7:40 – 13:30
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:50 – 0:50	0:40 – 0:40		
10	7:40 – 13:30	7:20 – 13:00		7:40 – 13:30
11	2:10 – 3:50	2:10 – 3:40		
12	2:20 – 3:50	2:10 – 3:40	2:20 – 3:10	2:20 – 3:50
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	7:30 – 13:20	7:30 – 13:20		
20*	7:30 – 13:20	7:20 – 13:20		7:00 – 12:50
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all airport special event traffic initially assigned as transients.

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TABLE A-13

CASE 3 – 60% EVACUATION – SCHOOL OUT-OF-SESSION

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	19:10	19:10		19:10
2	19:00	18:50		19:00
3	17:40	17:40		
4	3:50	3:40	2:20	3:50
5	19:00	19:00		17:30
6	17:30	8:40		17:30
7	3:40	2:10		3:40
8	2:20	1:40		2:20
9	2:00	2:00		2:00
10	19:00	17:10		19:00
11	8:50	8:40		8:50
12	8:50	8:40	20:20	8:50
13	8:00	8:00	23:20	8:00
14	3:40	3:10		3:40
15	3:40	2:30		3:40
16	2:10	2:00	1:30	2:10
17	2:00	2:00		1:40
18	2:00	1:40		2:00
19	18:50	18:50		17:20
20*	18:50	18:50		18:50
21	5:00	5:00	1:40	5:00
22	8:00	7:40	7:50	7:50

*Assumed ERPA where all airport special event traffic initially assigned as transients.

\\BUFF\Common\oswego-ettevette program\TABLE 4B1 doc

TABLE A-14

CASE 3 – 60% EVACUATION – SCHOOL OUT-OF-SESSION

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	8:10 – 15:20	8:10 – 15:20		8:10 – 15:20
2	8:10 – 15:20	7:50 – 15:00		8:10 – 15:20
3	8:00 – 14:10	8:00 – 14:10		
4	2:00 – 3:10	1:50 – 3:00	1:10 – 2:00	2:00 – 3:10
5	8:10 – 15:20	8:00 – 15:10		8:00 – 14:10
6	8:00 – 14:10	3:50 – 7:00		8:00 – 14:10
7	1:50 – 3:00	0:40 – 1:50		1:50 – 3:00
8	0:50 – 2:00	0:40 – 0:40		0:50 – 2:00
9	0:50 – 1:40	0:40 – 1:40		0:50 – 1:40
10	8:10 – 15:20	7:40 – 13:50		8:10 – 15:20
11	4:00 – 7:10	3:50 – 7:00		4:00 – 7:10
12	4:00 – 7:10	3:50 – 7:00	13:30 – 16:40	4:00 – 7:10
13	4:00 – 6:30	4:00 – 6:30	16:10 – 19:20	4:00 – 6:30
14	1:50 – 3:00	1:40 – 2:40		1:50 – 3:00
15	1:50 – 3:00	1:00 – 2:10		1:50 – 3:00
16	0:40 – 1:50	0:20 – 1:40	0:40 – 0:40	0:40 – 1:50
17	0:40 – 1:40	0:50 – 1:40		0:40 – 0:40
18	0:40 – 1:40	0:30 – 1:20		0:40 – 1:40
19	8:00 – 15:10	8:00 – 15:10		7:50 – 14:00
20*	8:00 – 15:10	8:00 – 15:10		8:00 – 15:10
21	2:30 – 4:10	2:20 – 4:00	0:40 – 0:40	2:30 – 4:10
22	4:00 – 6:30	3:40 – 6:10	4:00 – 6:20	4:00 – 6:20

*Assumed ERPA where all airport special event traffic initially assigned as transients.

W:\oswego-ette-ette program\TABLE 4B2-3.doc

TABLE A-15

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE EVENING ADVERSE WEATHER EVACUATION TRAVEL TIME SUMMARY IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	3:30	3:30		3:30
2	3:40	1:50		
3	3:10	3:10		
4	3:30	3:30	1:50	1:40
5	3:10	2:00		
6	4:40	4:40		3:10
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	3:10	2:40		3:10
11	4:40	4:30		
12	4:50	4:40	3:50	4:50
13	6:20	6:30	4:10	6:20
14	3:20	3:00		3:20
15	3:20	2:00		
16	1:40	1:30		
17	1:40	1:30		
18	1:30	1:20		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	6:20	6:10	6:20	6:20

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-16

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE EVENING

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:50 – 3:00	1:50 – 3:00		1:50 – 3:00
2	2:00 – 3:00	0:50 – 1:30		
3	1:40 – 2:40	1:40 – 2:40		
4	1:50 – 2:50	1:50 – 2:50	1:00 – 1:00	0:50 – 0:50
5	1:40 – 2:30	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:40 – 2:40
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:40 – 2:30	1:20 – 2:10		1:40 – 2:30
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	2:20 – 3:10	2:20 – 4:00
13	3:20 – 5:10	3:20 – 5:10	2:10 – 3:30	3:20 – 5:10
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	3:20 – 5:10	3:00 – 5:00	3:10 – 5:10	3:20 – 5:10

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

TABLE A-17

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE NIGHTTIME ADVERSE WEATHER EVACUATION TRAVEL TIME SUMMARY IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	2:40	2:40		2:40
2	2:40	1:50		
3	2:40	2:40		
4	2:30	2:30	1:10	1:00
5	2:40	2:00		
6	4:40	4:40		2:40
7	2:30	1:40		
8	1:50	0:40		
9	0:50	0:40		
10	2:40	2:20		
11	4:40	4:30		
12	4:50	4:40	20:20	4:50
13	5:00	5:00	23:20	5:00
14	2:20	2:10		2:20
15	2:20	2:00		2:20
16	1:40	1:30		
17	1:40	1:30		
18	0:40	0:30		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

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TABLE A-18

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE NIGHTTIME

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No:	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:10 – 2:10	1:10 – 2:10		1:10– 2:10
2	1:10 – 2:10	0:50 – 1:30		
3	1:10 – 2:20	1:10 – 2:20		
4	1:00 – 2:10	0:50 – 2:00	1:00 – 1:00	0:50 – 0:50
5	1:00 – 2:10	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:10 – 2:20
7	0:50 – 2:00	0:30 – 0:30		
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:00 – 2:10	0:30 – 1:50		
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	13:30 – 16:40	2:20 – 4:00
13	2:30 – 4:00	2:40 – 4:10	16:10 – 19:20	2:30 – 4:00
14	0:40 – 2:00	0:30 – 1:40		0:40 – 2:00
15	0:40 – 2:00	1:00 – 1:00		0:40 – 2:00
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel times for the existing ERPA population.

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TABLE A-19

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE

SUMMER/HOLIDAY WEEKEND

ADVERSE WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	3:30	3:30		3:30
2	3:40	1:50		
3	3:30	3:30		
4	3:30	3:30	1:50	1:40
5	3:30	2:00		
6	4:40	4:40		3:30
7	3:30	1:40		3:30
8	1:50	0:40		
9	1:40	1:30		
10	3:30	3:10		3:30
11	4:40	4:30		
12	4:50	4:40	20:50	4:50
13	5:00	5:00	23:50	5:00
14	3:20	3:00		3:20
15	3:20	2:00		3:20
16	1:40	1:30		
17	1:40	1:30		
18	1:30	1:20		
19	4:40	4:40		
20*	4:30	24:50		27:10
21	3:10	3:00		
22	5:00	4:40	4:50	5:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

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TABLE A-20

CASE 4 – 100% EVACUATION – EASTERN RE-ROUTE

SUMMER/HOLIDAY WEEKEND

NORMAL WEATHER

EVACUATION TRAVEL TIME SUMMARY

IN HOURS AND MINUTES

ERPA No.	Population Category			
	General Population With Auto (Hrs:Mins)	General Population Without Auto (Hrs:Mins)	Special Facilities (Hrs:Mins)	Transients (Hrs:Mins)
1	1:50 – 3:00	1:50 – 3:00		1:50 – 3:00
2	2:00 – 3:00	0:50 – 1:30		
3	1:50 – 2:50	1:50 – 2:50		
4	1:50 – 2:50	1:50 – 2:50	1:00 – 1:00	0:50 – 0:50
5	1:50 – 2:50	0:50 – 1:40		
6	2:20 – 3:50	2:10 – 3:50		1:50 – 2:50
7	1:50 – 2:50	0:30 – 0:30		1:50 – 2:50
8	0:50 – 0:50	0:40 – 0:40		
9	0:40 – 0:40	0:40 – 0:40		
10	1:50 – 2:50	1:30 – 2:30		1:50 – 2:50
11	2:20 – 3:50	2:10 – 3:40		
12	2:20 – 4:00	2:10 – 3:50	13:50 – 17:10	2:20 – 4:00
13	2:30 – 4:00	2:40 – 4:10	16:30 – 19:50	2:30 – 4:00
14	1:40 – 2:50	1:30 – 2:30		1:40 – 2:50
15	1:40 – 2:50	1:00 – 1:00		1:40 – 2:50
16	0:40 – 0:40	0:20 – 0:20		
17	0:40 – 0:40	0:50 – 0:50		
18	0:40 – 0:40	0:30 – 0:30		
19	2:20 – 3:50	2:20 – 3:50		
20*	2:10 – 3:40	10:20 – 19:50		13:00 – 22:20
21	1:40 – 2:40	1:30 – 2:30		
22	2:40 – 4:00	2:20 – 3:50	2:30 – 4:00	2:40 – 4:00

*Assumed ERPA where all concert traffic initially assigned as transients. Does not reflect actual travel
times for the existing ERPA population.

APPENDIX B

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

METHODOLOGY TO ESTIMATE ROADWAY TRAVEL TIMES DURING AN EVACUATION

A. Introduction

This Appendix describes the traffic engineering computer model used to estimate roadway travel times during an evacuation of the JAF/NMP EPZ. The model used in this study has also been applied to the Indian Point (New York), Three Mile Island (Pennsylvania), and Salem/Hope Creek (New Jersey and Delaware) Emergency Planning Zones. To evaluate the computer model used in the aforementioned studies, a separate analysis was conducted using a different model for the purpose of comparing results. The Indian Point EPZ was selected for the comparative study because of the diverse characteristics of its roadway network and population density.

As described later in this Appendix, the comparative study showed that both models provide quite similar estimates of evacuation travel time. Thus, it is concluded that the model used to estimate travel times for the JAF/NMP EPZ can be applied with a high degree of confidence.

The remaining sections of this Appendix discuss the traffic assignment process used for the JAF/NMP EPZ, present the detailed results of the comparative study; and summarize the conclusions drawn from the comparison of traffic models.

B. Static Traffic Assignment Process

1. Inputs

The static traffic assignment process developed to estimate roadway travel times during an evacuation requires three basic types of input. The first type relates to the characteristics of the evacuation roadway network, which is comprised of one-directional links, each having its own attributes. The links are described in terms of their capability to accommodate evacuating traffic (evacuation capacity), length, and free-flow speed (speed limit).

The second type of input required for this assignment process is zonal vehicle trip generation data. The EPZ is disaggregated into traffic zones, and the numbers of trips by each vehicle type (e.g., autos, buses, ambulances) are estimated in terms of passenger car equivalents (PCE's) for each traffic zone. Buses are weighted as the equivalent of two passenger cars in this analysis. In addition, a terminal time for all trip types for each traffic zone is input.

The third input type used in the static assignment process is evacuation path data. Evacuation routes are designated fixed paths extending from the traffic zones to the Sector boundary via specific roadways. Separate paths are developed for each trip type and are expressed in terms of connecting link numbers. Destinations (e.g., reception centers) are defined for each traffic zone and input for the purpose of determining the number of vehicles and passengers expected at each destination. Average vehicle occupancies are used to estimate the number of passengers arriving in vehicles at the destination.

2. Static Assignment Algorithm

A computer program was written to process the above input data and compute roadway travel times for each trip type by traffic zone. A flow chart of the static traffic assignment computer program is included at the end of this Appendix.

Initially, the program calculates the total vehicular demand volume (in PCE's) on each link in the network by aggregating the vehicle trips generated by each traffic zone along the evacuation path. Implicit in this assignment is the assumption that all vehicles from all zones using a given evacuation route are on each link along the designated route concurrently. The assignment process is thus considered "static", because the spatial movement of vehicles across the network is not explicitly recognized as a function of time.

For each link in the network, three additional computations are performed. First, the free-flow speed is calculated as the quotient of the link length and the free flow speed. Second, the total vehicular demand volume is divided by the hourly evacuation capacity (for the appropriate weather condition) of the link to obtain the volume/capacity (V/C) relationship for the link. Finally, the evacuation speed or delay time is computed for each link, depending on whether the V/C ratio is less than or greater than 1.0, respectively. The formula contained in the Federal Highway Administration Traffic Assignment Manual, August 1973, was adopted and modified as follows for use in computing the speed at which evacuees will travel when capacity exceeds demand.

$$\text{Evacuation Speed} = \frac{\text{Free-Flow Speed}}{0.25 \left(\frac{\text{Demand}}{\text{Capacity}}\right)^4 + 1} \quad \text{(for demand < capacity)}$$

Following these calculations, the model computes the roadway travel time for each traffic zone's evacuation route (or routes since some buses and special vehicles had separate routes) by scanning the links comprising the evacuation route to determine maximum V/C ratio along the route.

When the hourly evacuation capacity exceeds the total demand volume (V/C ratio less than 1.0) for all links along the route, the link evacuation speeds are used to compute link travel time, and the travel times for each link along the path are summed to obtain the traffic zone-to-Sector boundary roadway travel time for the route.

When the total demand volume exceeds the hourly evacuation capacity (V/C ratio greater than 1.0) along any link of a traffic zone's evacuation route, the roadway travel time is represented by the maximum link delay time incurred along the route. Link delay time is calculated as the volume/capacity ratio in hours for each link along the route. The link with the maximum V/C ratio is identified as the bottleneck link for the evacuation route for use in future planning. Other links along the route where the V/C ratio exceeds 1.0 are also identified for planning purposes.

The roadway travel time as determined above is added to the terminal time and the free-flow travel time for each zone trip type to determine the total roadway evacuation travel time. The total roadway evacuation travel time resulting from this analysis represents the time for the last vehicle in the zone to clear the Sector.

3. Outputs

The computer program developed for the static assignment process provides five basic reports which are used in the evacuation planning process. The reports are described below:

a. Summary of link statistics: link number, description, length, free-flow speed and time, vehicular demand volume, evacuation capacity, and volume/capacity ratio.

b. Summary of traffic zone statistics: number of trips, evacuation route, destination, terminal time, free-flow travel time, roadway travel time, total evacuation time, and bottleneck link; for each trip type, sorted in ascending order by total evacuation time.

c. Summary of all bottleneck links and the traffic zones which are routed over them.

d. Summary of all destinations and the estimated number of vehicles (by type) and passengers assigned to each.

e. Distribution of the percent of the total population evacuated as a function of time.

C. Comparison of Static and Dynamic Traffic Assignment Processes

Because of the importance of the assignment process in the overall procedure to estimate evacuation travel times, it was decided to evaluate the static traffic assignment model used in the evacuation planning process. Travel times estimated by the static model were compared with times estimated by a state-of-the-art dynamic traffic assignment model.

The dynamic assignment model used in the comparative analysis is an offspring of the TRANSYT model* presently included in the Federal Highway Administration computer program batteries. The model employs principles of flow continuity and flow dynamics to move traffic on each link in the network towards its ultimate destination. Traffic flow representation changes with time to reflect changes in demand and roadway conditions. Traffic movement on each link in the network is constrained by roadway geometrics, control devices, and other vehicles present on the roadway.

Various types of test routes were selected for this comparison and were located in Rockland and Westchester Counties in the Indian Point EPZ in New York State. Input requirements for both models were basically identical with one exception, which relates to the time varying nature of vehicles entering the evacuation network. The static assignment process assumed a concurrent loading of the entire network; the distribution over time of vehicle trips feeding the network was not addressed by the static model. However, because of the time dependent nature of the dynamic simulation model, it was possible to input trip generation data which varied with time at each load point in the network. This time-based distribution curve used in the comparison of assignment processes was provided by the New York State Office of Disaster Preparedness.

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* The dynamic evacuation model, named DYNEV, was provided by KLD Associates, Inc.

Separate comparative analyses and evaluations of the static and dynamic model results were made using Level of Service D and Level of Service E evacuation capacities. Table I-1 presents a comparison of the percent of total vehicles (in PCEs) evacuated for each route by time in the test network. The comparison was made between the static and dynamic assignment results when one or the other reached a time period when the total vehicles traveling the evacuation route had cleared the EPZ boundary. In all cases, the static assignment evacuation reached 100 percent completion either before or at the same time as the dynamic assignment evacuation. The percentages enclosed by parentheses in Table I-1 correspond to static and dynamic evacuation roadway travel times using Level of Service D capacities. Percentages without parentheses correspond to static and dynamic evacuation roadway travel times estimated using Level of Service E capacities.

Examination of Table I-1 shows a 97 percent correlation between the two assignment model results on an aggregate basis for the sample Indian Point roadway network east of the Hudson River in Westchester County. That is, at the time that the static assignment estimated complete evacuation of vehicles beyond the EPZ, the dynamic assignment estimated 97 percent of the vehicles would have cleared the EPZ. On the west side of the Hudson River near Indian Point, where both Levels of Service E and D were analyzed by both models, the two model results were 99 percent and 98 percent, respectively. Overall, for the entire test evacuation network, comparison of the static and dynamic assignment results at Level of Service E indicated a 99 percent correlation. In other words, when the static model estimated the network would be cleared (total vehicle evacuation), the dynamic model estimated 99 percent of the vehicles would have cleared the EPZ boundary. The dynamic assignment results indicated that complete evacuation of all vehicles beyond the EPZ boundary would occur 15 minutes later than the static assignment estimate at Level of Service E.

In addition to the evacuation times generated by each assignment technique, the location of bottlenecks by each methodology was compared. The critical bottleneck links identified by the static model were identified in the dynamic assignment results as well. The dynamic assignment produced the percent of vehicles topped at each link during the evacuation. This statistic was used as a measure of the congestion level on each link. For the identified bottleneck links, the average percentage of stops as indicated by the dynamic mode output was roughly 45 percent higher than on non-critical links, indicating that an increase in congestion was appropriately simulated by the static model on the critical links.

D. Conclusions

The results of the comparative analysis presented in this Appendix indicate that the static traffic assignment model can be applied to highway networks to estimate evacuation roadway travel times with a high degree of confidence.

Under almost identical circumstances, the static assignment model results have proven comparable with those produced by a state-of-the art, complex dynamic assignment model, which simulates the evacuation process within the framework of time. Roadway travel times were estimated and congested roadways identified with a high degree of correlation using the less complex static assignment methodology. A close correlation between assignment procedures exists for varying roadway types, weather conditions, and loading characteristics. Thus the use of the static assignment model to estimate evacuation travel times in the JAF/NMP EPZ is appropriate.

TABLE I-1

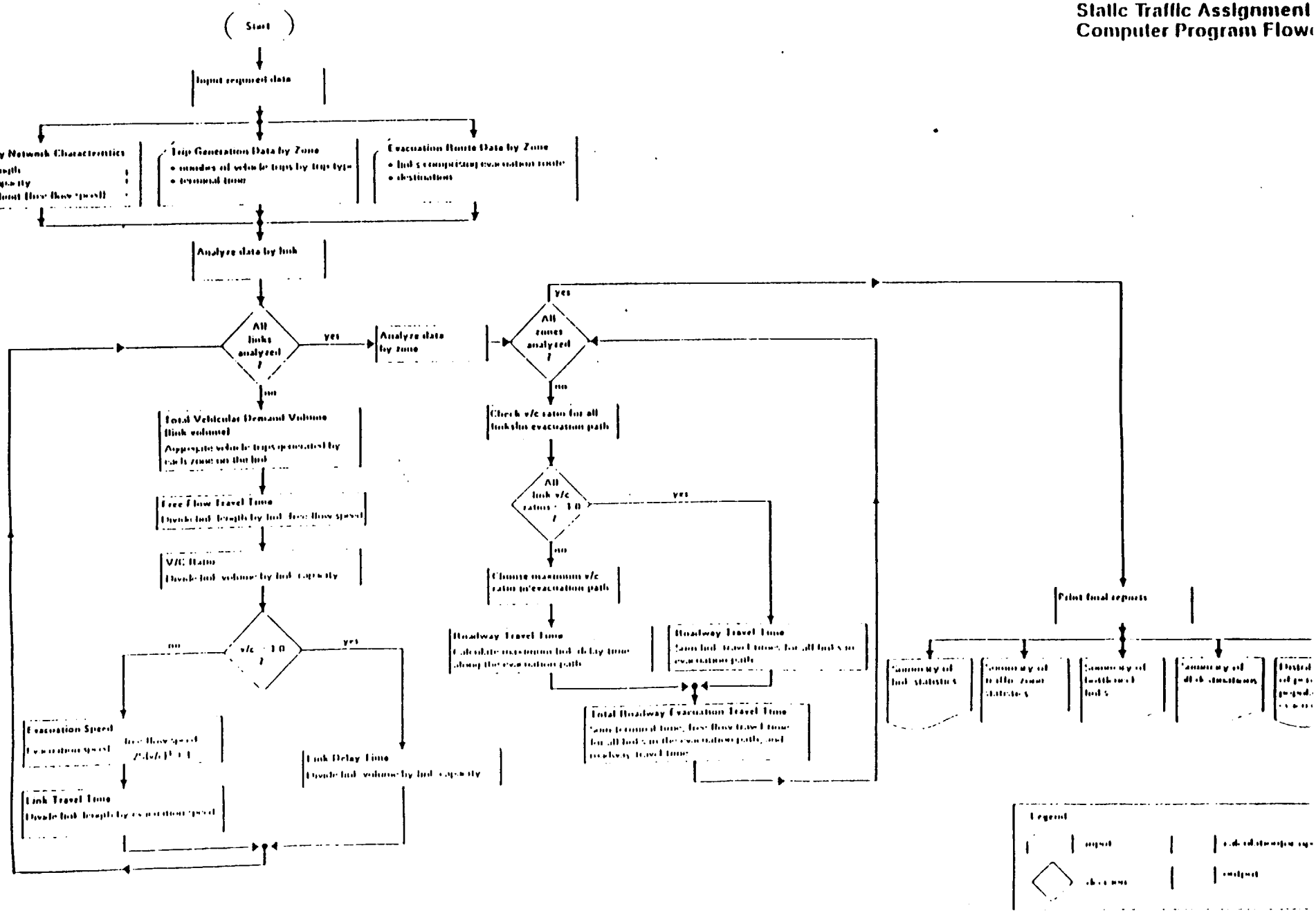
COMPARISON OF STATIC AND DYNAMIC ASSIGNMENT RESULTS

Evacuation Route	Total Vehicles Using Evacuation Route	Traffic Assignment Methodology	Percent of Total Vehicles Evacuated During the Following Time Period*																
			0:45 1:00	1:45 2:00	2:00 2:15	2:15 2:30	2:30 2:45	2:45 3:00	3:00 3:15	3:15 3:30	3:30 3:45	3:45 4:00	4:15 4:30	4:30 4:45	5:30 5:45	5:45 6:00	6:00 6:15	6:15 6:30	7:15 7:30
East of River (Westchester County)																			
Route 6	4,360	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	84	–	100	–	–	–	–	–
Route 120	5	Static	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	33	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–
Route 9A	8,690	Static	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–
Taconic Parkway	5,155	Static	–	–	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	92	–	–	–	100	–	–	–	–	–	–	–	–	–	–
Amawalk Road	2,575	Static	–	–	–	–	–	100	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	89	–	100	–	–	–	–	–	–	–	–	–
Total East Routes	20,785	Static	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	97	–	100	–	–	–	–	–
West of River (Rockland County)																			
Palisades Parkway	8,655	Static	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	97	100	–	–	–	(97)	–	(100)	–
Route 9W	3,850	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(87)	(100)
Route 303	3,310	Static	–	100	–	–	(100)	–	–	–	–	–	–	–	–	–	–	–	–
		Dynamic	–	98	–	–	(90)	100	(100)	–	–	–	–	–	–	–	–	–	–
Route 45	1,920	Static	–	–	–	100	–	–	–	–	(100)	–	–	–	–	–	–	–	–
		Dynamic	–	–	–	98	–	100	–	–	(100)	–	–	–	–	–	–	–	–
Little Tor Road	3,025	Static	–	–	–	–	–	–	–	–	100	–	–	–	(100)	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	99	100	–	–	(95)	–	(100)	–	–
Route 304	3,655	Static	–	–	–	100	–	–	–	–	–	(100)	–	–	–	–	–	–	–
		Dynamic	–	–	–	99	–	100	–	–	–	(100)	–	–	–	–	–	–	–
Total West Routes	24,415	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	(100)	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	(98)	(100)
Total Network Routes	45,200	Static	–	–	–	–	–	–	–	–	–	–	100	–	–	–	–	–	–
		Dynamic	–	–	–	–	–	–	–	–	–	–	99	100	–	–	–	–	–

*Note: Numbers enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period using Level of Service D capacities.

Numbers not enclosed by parentheses represent the percent of total vehicles along a route evacuated during the time period

Static Traffic Assignment Computer Program Flow



ENTERGY NUCLEAR NORTHEAST
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
EMERGENCY PLAN IMPLEMENTING PROCEDURE

PERSONNEL ACCOUNTABILITY*
EAP-8
REVISION 52

REVIEWED BY: PLANT OPERATING REVIEW COMMITTEE
MEETING NO. N/A DATE: N/A

APPROVED BY: _____ DATE: 5/21/01
RESPONSIBLE PROCEDURE OWNER

EFFECTIVE DATE: May 25, 2001

FIRST ISSUE ☐ FULL REVISION ☒ LIMITED REVISION ☐

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PERIODIC REVIEW DUE DATE: May 2006

REVISION SUMMARY SHEET

REV. NO.

52
- Section 4.6 and **NOTE** that follows - changed wording to conform with Security Activity Management System's computer.
- Section 4.9, - change "badges" to "computers".
- Attachment 1 number 2 - changed "badge-out rack cards" to SAMS Computer.
- Attachment 1 number 9 - deleted (check of badges) and added "the (SAMS) or" to the end of sentence.

51
- Quarterly update of the Emergency Response Organization.

50
- Quarterly update of Emergency Response Organization
- Adjusted the cover sheet to reflect the company change.

49
- Update of the Emergency Response Organization

48
- Quarterly update of Emergency Response Organization

47
- Quarterly update of Emergency Response Organization

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- Quarterly update of Emergency Response Organization

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- Quarterly update of Emergency Response Organization

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- Quarterly update of Emergency Response Organization

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- Quarterly update of Emergency Response Organization

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1.0 **PURPOSE**

This procedure provides the instructions necessary to account for plant personnel, visitors, and contractors.

2.0 **REFERENCES**

2.1 **Performance References**

None

2.2 **Developmental References**

2.2.1 EAP-9, SEARCH AND RESCUE OPERATIONS*

2.2.2 EAP-10, PROTECTED AREA EVACUATION*

2.2.3 EAP-11, SITE EVACUATION*

3.0 **INITIATING EVENTS**

3.1.1 Site Area Emergency, **or**

3.1.2 General Emergency, **or**

3.1.3 Emergency Director's request, **or**

3.1.4 Completion of Protected Area Evacuation or Site Evacuation for personnel without emergency assignments.

4.0 **PROCEDURE**

4.1 A list of missing personnel shall be made available within 30 minutes via personnel accountability or other means as determined by the individual assigned to lead accountability. Personnel accountability shall be accomplished in two phases:

Phase 1 - The total number of personnel accounted for in the protected area are compared with the total number of persons indicated as being in the protected area.

Phase 2 - The names of missing persons unaccounted for in the protected area are compared to the names of persons indicated as being in the protected area.

4.2 The Emergency Director shall request the Security Shift Coordinator/Sergeant to initiate accountability.

4.3 The Security Shift Coordinator/Sergeant will enable the accountability readers in accordance with Security procedures and request (when those facilities are activated) the Communications and Records Coordinator to dispatch an accountability clerk to the Control Room, TSC and OSC to assist personnel in completing Attachment 3 and badging in the readers.

4.4 The Emergency Director shall request the Control Room to make the following announcement (twice):

ATTENTION. ATTENTION. ALL PERSONNEL IN THE PROTECTED AREA COMMENCE ACCOUNTABILITY USING BADGE READERS AND SIGN-IN SHEETS.

4.5 The Security Shift Coordinator/Sergeant, who may designate security personnel to lead the accountability process if required, shall use Attachment 1 or Attachment 2 to accomplish personnel accountability.

4.6 The individual assigned to lead accountability shall compile a list of persons on site by name and badge number using either the Security Activity Management System (SAMS) computer or Security Access Computer which is a badge number only list of personnel on site.

NOTE: The (SAMS) computer shall be the primary means of compiling the on site list by name and badge number. The security access computer shall be used as a secondary means and is a "badge number only" list of personnel on site.

The onsite personnel list should also include visitors to the site and shall note their escort names.

Accountability for security personnel may be accomplished by contacting them individually.

4.7 Phase 1 of accountability shall be accomplished in the following manner:

NOTE: Manual method will be used if a computer failure occurs.

4.7.1 The individual assigned to lead accountability shall activate the "Personnel Onsite Report" which will indicate who is onsite.

As personnel badge in the accountability readers, they will be deleted from the "Unaccounted Personnel Report." This report will reflect continually who has not badged in an accountability reader.

4.7.2 Accountability clerks shall be established in the Control Room, Technical Support Center and Operational Support Center and shall contact the Emergency Security Coordinator in the Technical Support Center at extension 6168.

4.7.3 These clerks shall provide the following information to the Emergency Security Coordinator:

A. Total number of persons assembled in that area obtained from Attachment 3.

B. A copy of Attachment 3. The originals shall continue to be used for continuous accountability.

C. Telefax of Attachment 3 forms to EOF Staffing Coordinator (to assist in long-term staffing assessment).

4.7.4 The individual assigned to lead accountability shall compare the total number of personnel accounted for on the Attachment 3 forms to the total number onsite from the security computer. These numbers and any discrepancies shall be reported to the Emergency Director. In addition, the individual assigned to lead accountability shall request the Security Shift Coordinator/Sergeant or designee prepare an "unaccounted for" log from the accountability system reader output.

4.7.5 Security personnel shall establish continuous accountability logs using Attachment 3 at the following locations:

A. 300 ft. elevation of Old Admin. Building near the Control Room entrance. This position shall record personnel who exit or enter via the Fan Room or Turbine building doors.

B. OSC control point near portal monitors. This position shall record personnel who exit or enter the RCA.

C. Old Admin. Building foyer. This position shall record personnel who exit or enter via the foyer.

NOTES:

1. Personnel traveling between the TSC, OSC and Control Room are NOT required to sign in/out on Continuous Accountability Log Sheet, Attachment 3 after the completion of initial accountability.

2. Entry and exit via doors with operable card readers do NOT require sign in on Attachment 3. In the event of a Security computer failure, entry and exit via carded doors that allow access to areas outside the Emergency Response Facilities (combined TSC, OSC and Control Room areas) shall require sign in on Attachment 3.

4.8 Phase 2 of accountability shall be accomplished in the following manner:

4.8.1 The individual assigned to lead accountability shall compare the security computer list of onsite persons against those in the Control Room, TSC and OSC and compile a list of unaccounted for individuals. (The manual method will utilize Attachment 3.)

4.8.2 The individual assigned to lead accountability shall provide to the Emergency Security Coordinator a list of unaccounted badges and names from the readers which should match the list of unaccounted individuals.

4.9 The individual assigned to lead accountability shall verify that persons on the "Unaccounted Personnel Report" lists have not left the protected area by a check of the security computers. The last known location of these persons shall be obtained from the security computer.

4.10 The individual assigned to lead accountability shall attempt to locate any persons unaccounted for by calling them on the plant page system. The page should be repeated every two minutes. If the unaccounted for personnel do not respond within 5 minutes, the following announcement shall be made twice over the P.A. system:

ATTENTION, ATTENTION: IF ANYONE KNOWS THE PRESENT LOCATION OF (name of missing individual), CALL SECURITY AT EXTENSION (specify).

4.11 The individual assigned to lead accountability shall contact the missing individuals' supervisors or co-workers for further information. If these attempts are unsuccessful, the names of the missing persons shall be forwarded to the Emergency Director who shall immediately initiate search and rescue activities in accordance with EAP-9, SEARCH AND RESCUE OPERATIONS*.

5.0 **ATTACHMENTS**

1. ACCOUNTABILITY CHECKLIST - MANUAL METHOD
2. ACCOUNTABILITY CHECKLIST - COMPUTER METHOD
3. ACCOUNTABILITY LOG

ACCOUNTABILITY CHECKLIST - MANUAL METHOD

Initials/Time

1. _____/_____ Received notification from the Emergency Director to implement personnel accountability procedure.

2. _____/_____ Compile list of persons onsite using either the SAMS Computer or the security computer. Total number of persons onsite: _____.

PHASE 1

3. _____/_____ Contact each of the primary assembly areas and obtain a head count:

AREA	EXTENSIONS	PERSON CONTACTED	NUMBER OF PERSONS
Control Room	6665	_____	_____
Technical Support Center	6168	_____	_____
Operational Support Center	6833/6837	_____	_____
Security Bldg	6413/6416	_____	_____

Total number of persons accounted for: _____

4. _____/_____ Difference between total head count and persons onsite as indicated by security (step 3): _____.

5. _____/_____ Report totals from step 2, 3, and 4 to the Emergency Director.

PHASE 2

Initials/Time

6. _____/_____ Contact each assembly area. Using the list of persons onsite, check off each person in the assembly area.

7. _____/_____ List the names and badge numbers of persons unaccounted for:

_____

_____

_____

_____

_____

_____

8. _____/_____ Notify the Emergency Director of the names of persons unaccounted for.

9. _____/_____ Verify that persons unaccounted for have not left the site. Determine last known location using the (SAMS) or the security computer.

10. _____/_____ Call persons unaccounted for on the plant paging system (repeat announcement).

11. _____/_____ Contact supervisors, co-workers. Attempt to determine last known location of persons unaccounted for.

12. _____/_____ Advise Emergency Director of missing persons and information determined in steps 9, 11.

RETAIN THIS FORM. IT SHALL BE TURNED IN TO THE EMERGENCY DIRECTOR.

ACCOUNTABILITY CHECKLIST - COMPUTER

Initials/Time

1. _____/_____ Received notification from the Emergency Director to implement personnel accountability procedure.

2. _____/_____ Security Central Alarm Station (CAS) or Secondary Alarm Station (SAS) operator to activate accountability card readers by activating the (F6) key on the security computer.

PHASE 1/2

3. _____/_____ Individual assigned to lead accountability to activate "Personnel Onsite Report."

4. _____/_____ Individual assigned to lead accountability to activate the "Unaccounted Personnel Report."

5. _____/_____ Advise the Emergency Security Coordinator in the Technical Support Center of missing person(s) unaccounted for.

6. _____/_____ Verify that person(s) unaccounted for have not left the site.

7. _____/_____ Call person(s) unaccounted for on the plant paging system.

8. _____/_____ Contact supervisors and co-workers to attempt to learn last location of the persons unaccounted for.

9. _____/_____ Advise Emergency Director of missing person(s)

ACCOUNTABILITY LOG

DATE _____

FACILITY _____

	NAME	Badge Number	Continuous Accountability Time/DRD Readings					
			IN	OUT	IN	OUT	IN	OUT
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

ENTERGY NORTHEAST NUCLEAR
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
EMERGENCY PLAN IMPLEMENTING PROCEDURE

SITE EVACUATION*
EAP-11
REVISION 16

REVIEWED BY: PLANT OPERATING REVIEW COMMITTEE

MEETING NO. N/A DATE: N/A

APPROVED BY: _____ DATE: 5/21/01
RESPONSIBLE PROCEDURE OWNER

EFFECTIVE DATE: May 25, 2001

FIRST ISSUE ☐ FULL REVISION ☐ LIMITED REVISION ☒

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PERIODIC REVIEW DUE DATE: FEBRUARY 2002

REVISION SUMMARY SHEET

REV. NO.

16
- Section 4.0 - added section to NOTE due to implementation of hand geometry.

15
- Reformat per AP-02.01, Rev. 5.
- Section 4.2.5 (announcement): text added to clarify that dosimetry should be taken to remote assembly area.
- Changed level of use to "informational" in accordance with AP-02.04.

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1.0 **PURPOSE**

This procedure provides instructions for the orderly evacuation of personnel from the site to a remote assembly area, or home.

2.0 **REFERENCES**

2.1 **Performance References**

None

2.2 **Developmental References**

2.2.1 EAP-4, DOSE ASSESSMENT CALCULATIONS*

2.2.2 EAP-8, PERSONNEL ACCOUNTABILITY*

2.2.3 EAP-9, SEARCH AND RESCUE OPERATIONS*

2.2.4 RADIATION PROTECTION PROCEDURES AND PROGRAMS*

2.2.5 Definitions

A. Site Evacuation - Evacuation of all personnel without emergency assignments and/or those with emergency assignments who have been released by the Emergency Director. Personnel shall proceed out of the protected area to their home or to the designated remote assembly area.

B. Remote Assembly Area - Specific location outside of the exclusion area for the assembly of personnel in the event of a Site Evacuation. The primary remote assembly area is the Niagara Mohawk Service Center on Howard Road, Fulton, N.Y.

3.0 **INITIATING EVENTS**

3.1 A site evacuation shall be implemented upon declaration of a General Emergency unless conditions exist that would prevent evacuation, as determined by the Emergency Director;

3.2 It is the determination of the Emergency Director that this procedure be implemented.

3.3 A site evacuation shall be considered upon declaration of a Site Area Emergency.

4.0 **PROCEDURE**

NOTE: In the event of a site evacuation and you have been instructed to turn in your security badge, place the badge in the badge rack or deposit it in exit windows as you leave the site."

The Emergency Director should notify Oswego County, Niagara Mohawk, the Training Building and the Energy Information Center of the site evacuation and evacuation routes selected, if necessary.

If inclement weather prevents evacuation, individuals should be directed to areas of lowest exposure.

4.1 **Site Evacuation - No Offsite Release in Progress or Imminent:**

4.1.1 If the Emergency Director determines that the site should be evacuated and no radiological hazards exist outside the plant based on EAP-4, DOSE ASSESSMENT CALCULATIONS*, the following steps should be followed:

NOTE: The Emergency Director should notify Oswego County, Niagara Mohawk, the Training Building and the Energy Information Center of the site evacuation and evacuation routes selected, if necessary.

4.1.2 The Emergency Director shall notify the security force that personnel are going to be evacuated from the site and that they should stand by to implement EAP-8, PERSONNEL ACCOUNTABILITY* (if EAP-8 has not been previously implemented)

4.1.3 The Emergency Director shall direct the control room operator to sound the evacuation alarm and make the following announcement (twice)

ATTENTION ATTENTION. ALL PERSONNEL WITHOUT EMERGENCY ASSIGNMENTS SHALL EVACUATE THE SITE PROMPTLY AND ORDERLY. PROCEED TO THE (Security Building,or other exit point as directed) TURN IN YOUR SECURITY BADGE AND DOSIMETRY, PROCEED HOME.

4.1.4 After all designated personnel have exited the site, the E.D. shall direct the TSC Emergency Security Coordinator to initiate accountability per procedure EAP-8 if not already done and report the results.

4.1.5 The Emergency Director, when notified by the TSC Emergency Security Coordinator, shall if necessary proceed with EAP-9, SEARCH AND RESCUE OPERATIONS*, to find any person(s) not accounted for.

4.2 **Site Evacuation - Offsite Radiological Release In Progress or Imminent:**

NOTE: Site evacuation routes shall be chosen to lead personnel away from the path of the plume.

4.2.1 If the Emergency Director determines that the site should be evacuated and radiological hazards exist outside the plant, the following steps should be followed.

4.2.2 The Emergency Director should notify Niagara Mohawk Unit 1 Control Room of the need to make the Howard Road facility available for arriving personnel (i.e. Niagara Mohawk security to unlock doors, etc.). In addition, RES technicians shall be dispatched for personnel monitoring.

4.2.3 The Emergency Director shall notify the security force that personnel are going to be evacuated from the site and directed to the remote assembly area (Howard Road, Niagara Mohawk Service Center) using one of the following routes:

A. If wind direction is from 270° through 360° then personnel shall be directed to Howard Road using the "westerly" route (see Attachment 1).

B. If wind direction is from 0° through 90° then personnel shall be directed to Howard Road using the "easterly" route (see Attachment 2).

C. If wind direction is from 90° through 270° then personnel shall be directed to Howard Road using both "easterly" and "westerly" routes to ease traffic congestion.

4.2.4 The Emergency Director shall instruct security to make available copies of the selected evacuation route and dispatch guards at the plant access roads to direct traffic appropriately.

4.2.5 The Emergency Director shall direct the control room operator to sound the evacuation alarm and make the following announcement (twice):

ATTENTION ATTENTION. ALL PERSONNEL WITHOUT EMERGENCY ASSIGNMENTS SHALL EVACUATE THE SITE PROMPTLY AND ORDERLY. PROCEED TO THE (Security Building or other exit point as directed), TURN IN YOUR SECURITY BADGE ONLY, PROCEED TO THE REMOTE ASSEMBLY AREA WITH YOUR DOSIMETRY USING THE MAP OBTAINED UPON EXITING SECURITY.

4.2.6 If the remote assembly area is to be utilized and it is anticipated that radiological monitoring and decontamination will be necessary, the Emergency Director shall direct the Radiological Support Coordinator to dispatch RES technicians with the appropriate equipment and supplies to the designated remote assembly area. Dosimetry should be collected by the technicians.

4.2.7 After all designated personnel have exited the site, the E.D. shall direct the TSC Emergency Security Coordinator to initiate accountability per procedure EAP-8 if not already done and report the results.

4.2.8 The Emergency Director, when notified by the TSC Security Coordinator, shall if necessary proceed with EAP-9, SEARCH AND RESCUE OPERATIONS*, to find any person(s) not accounted for.

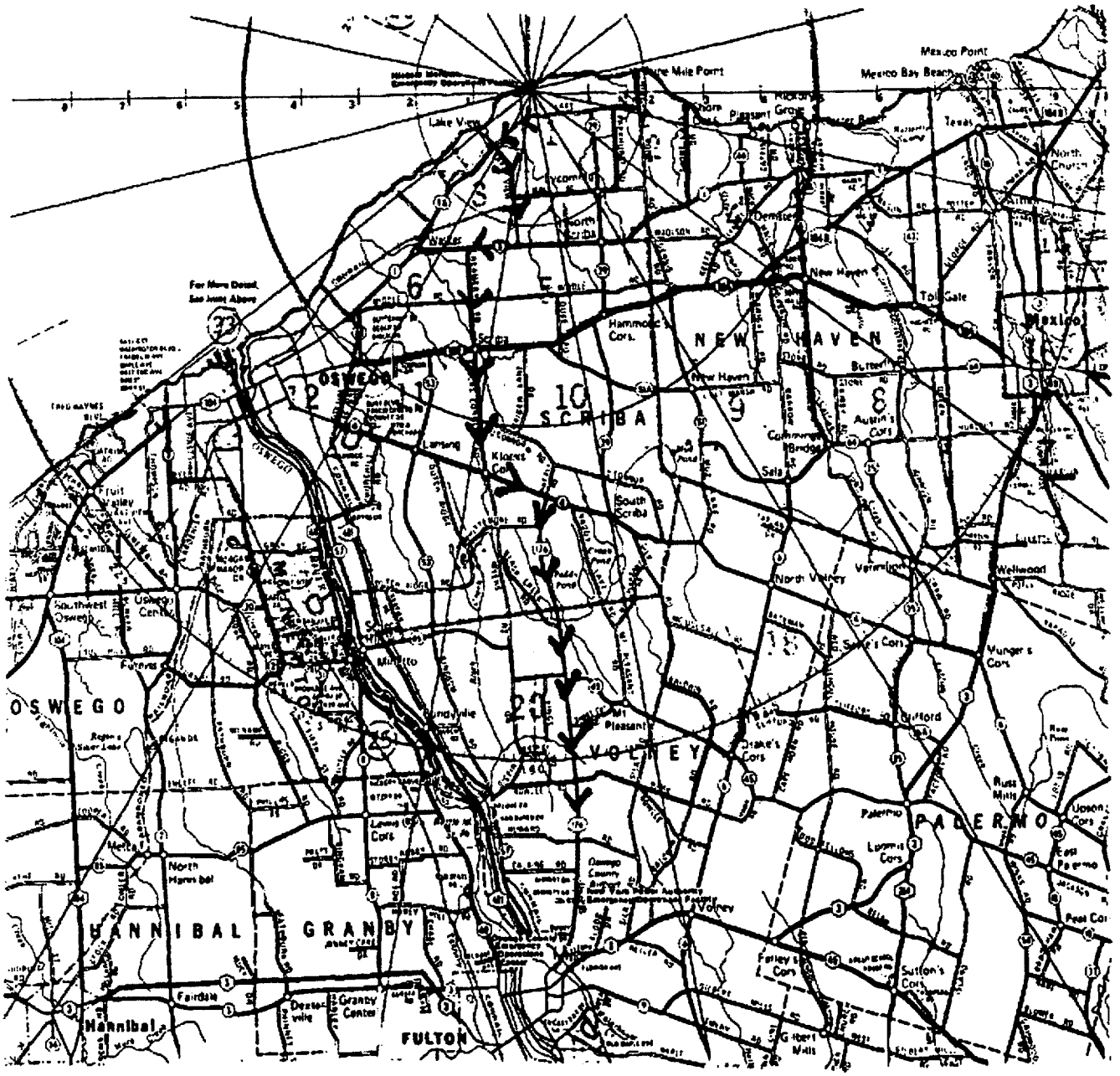
5.0 **ATTACHMENTS**

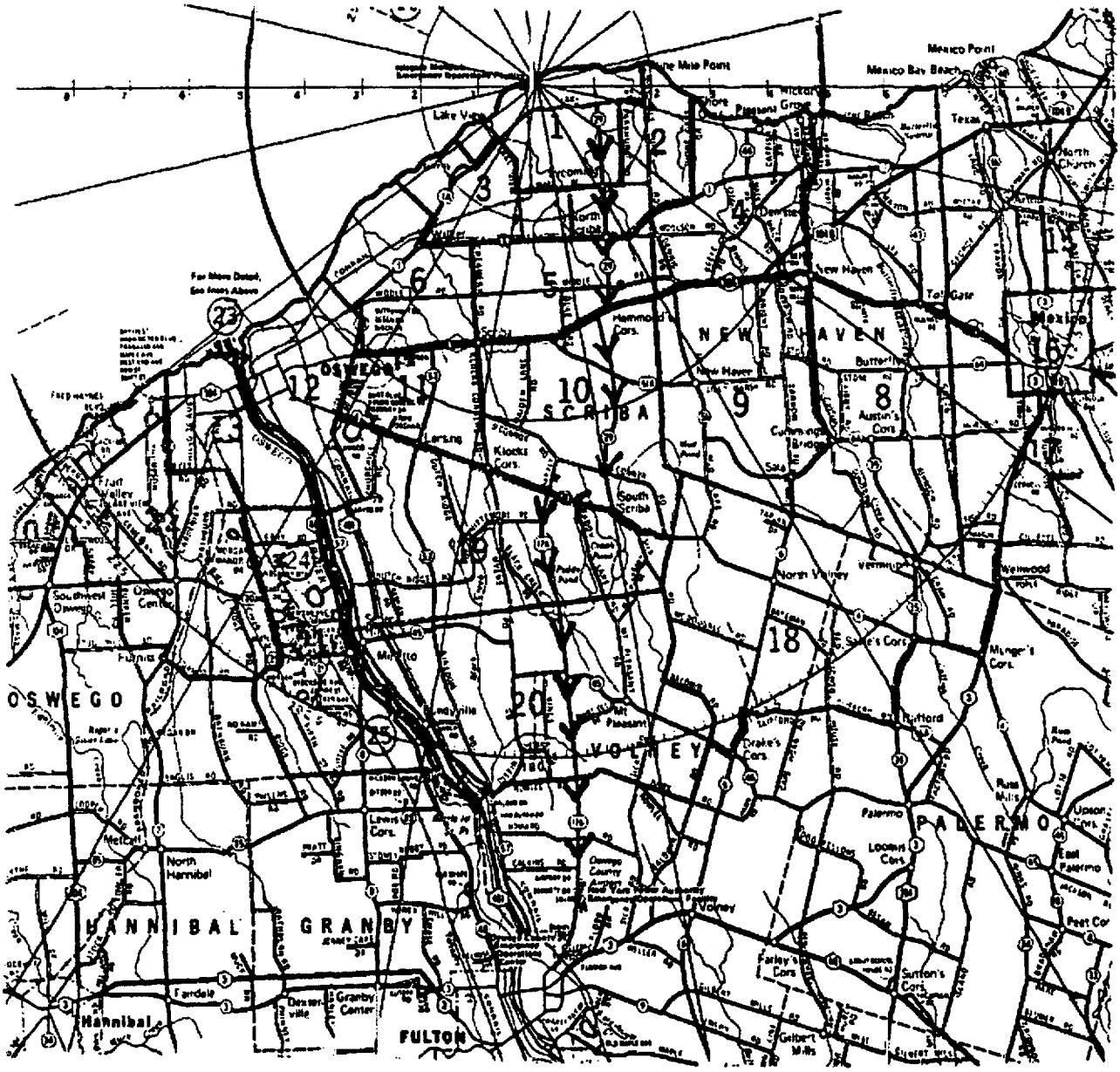
1. WESTERLY EVACUATION ROUTE

2. EASTERLY EVACUATION ROUTE

ATTACHMENT 1

WESTERLY EVACUATION ROUTE



ATTACHMENT 2

EASTERLY EVACUATION ROUTE