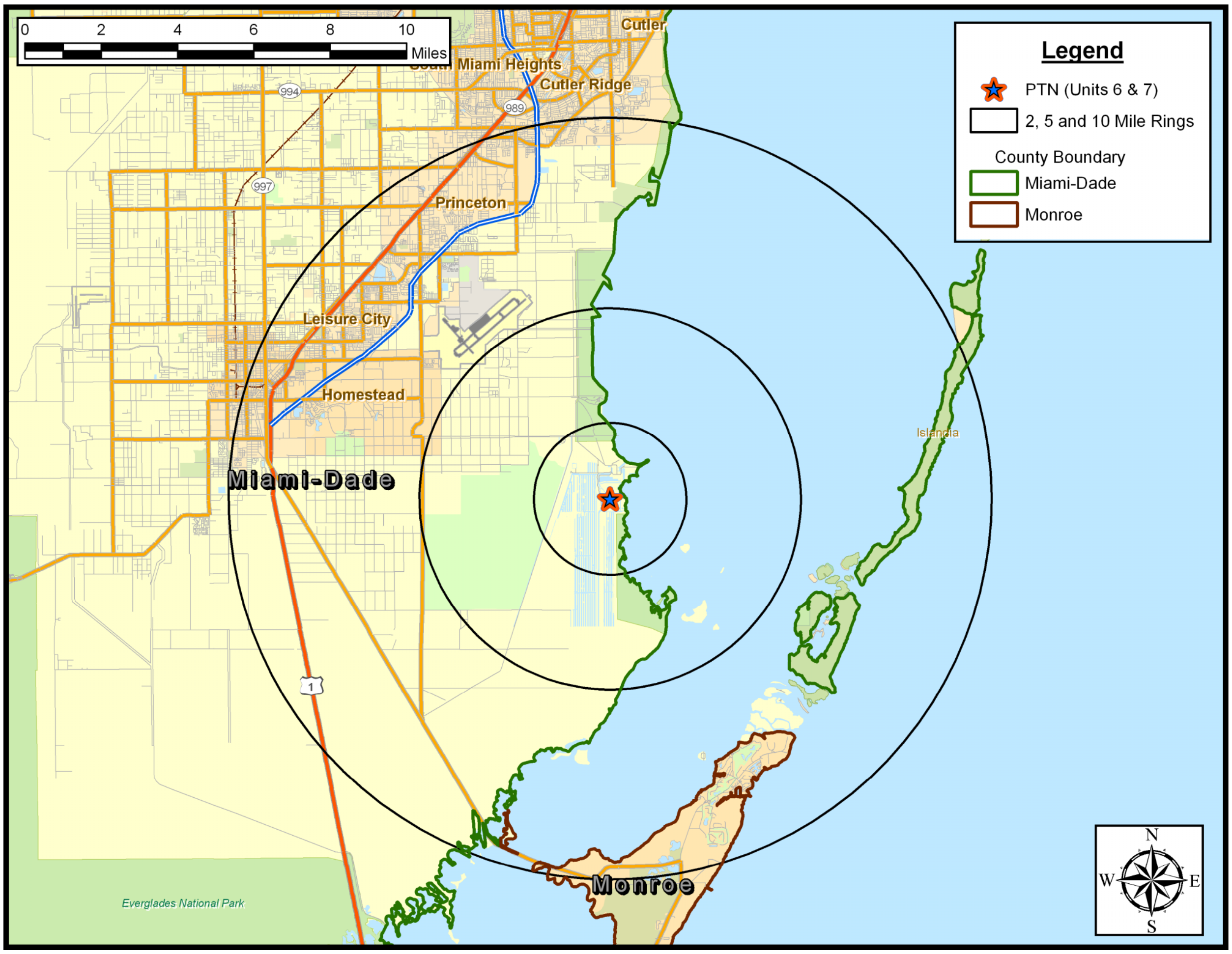
Supplemental Information 1

Turkey Point Units 6 & 7 Evacuation Time Estimate
(Rev. 0, March 2009)

Turkey Point Nuclear Power Plant

Development of Evacuation Time Estimates



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EXECUTIVE SUMMARY

This report describes the analyses undertaken and the results obtained by a study to develop evacuation time estimates (ETEs) for the Turkey Point nuclear power plant located in Miami-Dade County, Florida. ETEs are part of the required planning basis and provide Turkey Point and state and local governments with site-specific information needed for protective action decision-making.

In the performance of this effort, all available previous documentation published by federal government agencies and relevant to ETE was reviewed. Most important of these are:

- *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants*, NUREG-0654/FEMA-REP-1, Rev. 1, November 1980.
- *Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones*, NUREG/CR-1745, November 1980.
- D*evelopment of Evacuation Time Estimates for Nuclear Power Plants*, NUREG/CR-6863, January 2005.

Overview of Project Activities

This project began in April 2008 and extended over a period of 3 months. The major activities performed are briefly described in chronological sequence:

- Attended kick-off meetings with FPL personnel, Bechtel personnel, and emergency management personnel representing state and local governments.
- Reviewed prior ETE reports prepared for Turkey Point.
- Accessed U.S. Census Bureau data files for the year 2000. Studied geographical information systems (GIS) maps of the area in the vicinity of Turkey Point, then conducted a detailed field survey of the highway network.
- Synthesized this information to create an analysis network representing the highway system topology and capacities within the emergency planning zone (EPZ), plus a shadow region extending north to 152nd Street and west to the Everglades National Park.

- Designed and sponsored a telephone survey of residents within the EPZ to gather focused data needed for this ETE study that were not contained within the census database. The survey instrument was reviewed and modified by FPL and county personnel before the survey.

- A data collection survey was conducted to obtain data pertaining to employment, transients, and special facilities within the EPZ.

- The traffic demand and trip-generation rates of evacuating vehicles were estimated from the gathered data. The trip generation rates reflected the estimated mobilization time (i.e., the time required by evacuees to prepare for the evacuation trip) computed using the results of the telephone survey of EPZ residents.

- Following federal guidelines, the EPZ is subdivided into 10 areas. These areas are then grouped within circular areas or "keyhole" configurations (circles plus radial sectors) that define a total of 12 evacuation regions.

- The time-varying external circumstances are represented as evacuation scenarios, each described in terms of the following factors: (1) season (summer, winter); (2) day of week (midweek, weekend); (3) time of day (midday, evening); and (4) weather (good, rain). One special event scenario was considered: the construction of proposed Units 6 & 7 at the Turkey Point site in 2016. A sensitivity study was run to explore the effect on ETE of a NASCAR race at the Homestead-Miami Speedway.

- The Planning Basis for the calculation of ETE is:

  — A rapidly escalating accident at Turkey Point that quickly assumes the status of general emergency such that the advisory to evacuate is virtually coincident with the siren alert.

  — While an unlikely accident scenario, this planning basis will yield ETE, measured as the elapsed time from the advisory to evacuate until the last vehicle exits the impacted region that represent upper bound estimates. This conservative planning basis is applicable for all initiating events.

- If the emergency occurs while schools are in session, the ETE study assumes that the children will be evacuated by bus directly to specified host schools located outside the EPZ. Parents, relatives, and neighbors are advised to not pick up their children at school before the arrival of the buses dispatched for that purpose. The ETE for school children are calculated separately.

- Evacuees who do not have access to a private vehicle will either ride-share with relatives, friends or neighbors, or be evacuated by buses provided as specified in the county evacuation plans. Those in special facilities will likewise be evacuated with public transit, as needed: bus, van, or ambulance, as required. Separate ETEs are calculated for the transit-dependent evacuees and for those evacuated from special facilities.

Computation of ETE

A total of 132 ETEs were computed for the evacuation of the general public. Each ETE quantifies the aggregate evacuation time estimated for the population within one of the 12 evacuation regions to completely evacuate from that region, under the circumstances defined for one of the 11 Evacuation Scenarios (12 x 11 = 132). Separate ETEs are calculated for transit-dependent evacuees, including school children for applicable scenarios.

Except for Region R03, which is the evacuation of the entire EPZ, only a portion of the people within the EPZ would be advised to evacuate. That is, the advisory to evacuate applies only to those people occupying the specified impacted region. It is assumed that 100 percent of the people within the impacted region will evacuate in response to this advisory. The people occupying the remainder of the EPZ outside the impacted region may be advised to take shelter.

The computation of ETE assumes that a portion of the population within the EPZ but outside the impacted region, will elect to voluntarily evacuate. In addition, a portion of the population in the shadow region beyond the EPZ will also elect to evacuate. These voluntary evacuees could impede those who are evacuating from within the impacted region. The impedance that could be caused by voluntary evacuees is considered in the computation of ETE for the impacted region.

The computational procedure is outlined as follows:

- A link-node representation of the highway network is coded. Each link represents a unidirectional length of highway; each node usually represents an intersection or merge point. The capacity of each link is estimated based on the field survey observations and on established procedures.

- The evacuation trips are generated at locations called *zonal centroids* located within the EPZ. The trip generation rates vary over time reflecting the mobilization process, and from one location (centroid) to another depending on population density and on whether a centroid is within, or outside, the impacted area.

- The computer models compute the routing patterns for evacuating vehicles that are compliant with federal guidelines (outbound relative to the location of the plant), then simulate the traffic flow movements over space and time. This simulation process estimates the rate that traffic flow exits the impacted region.

- The ETE statistics provide the elapsed times for 50 percent, 90 percent, 95 percent, and 100 percent, respectively, of the population within the impacted region, to evacuate from within the impacted region. These statistics are presented in tabular and graphical formats.

Traffic Management

This study includes the development of a comprehensive traffic management plan designed to expedite the evacuation of people from within an impacted region. This plan, which was reviewed with state and local law enforcement personnel, is also designed to control access into the EPZ after returning commuters have rejoined their families.

The plan is documented in the form of detailed schematics specifying: (1) the directions of evacuation travel to be facilitated, and other traffic movements to be discouraged; (2) the traffic control personnel and equipment needed (cones, barricades) and their deployment; (3) the locations of these traffic control points; (4) the priority assigned to each traffic control point indicating its relative importance and how soon it should be manned relative to others; and (5) the number of traffic control personnel required.

<u>Selected Results</u>

A compilation of selected information is presented on the following pages in the form of figures and tables extracted from the body of the report; these are described below.

- Figure 3-1 displays a map of the Turkey Point site showing the layout of the 10 areas that comprise, in aggregate, the EPZ. The 2009 estimates of permanent resident population within each area are also provided.

- Table 3-2 presents the estimates of permanent resident population in each area based on the 2000 census data. Extrapolation to the year 2009 reflects population growth rates in each municipality obtained from the census.

- Table 6-1 defines each of the 12 evacuation regions in terms of their respective groupings of areas.

- Table 6-3 lists the 11 evacuation scenarios.

- Table 7-1D presents the times needed to *clear the indicated regions* of 100 percent of the population occupying these regions. These computed ETEs include consideration of mobilization time and of estimated voluntary evacuations from other regions within the EPZ and from the shadow region.

- Table 8-5A presents ETE for the schoolchildren in good weather.

- Table 8-6A presents ETE for the transit-dependent population in good weather.

Table 3-2
EPZ Permanent Resident Population

Area	2000 Population	2009 Population
1	0	0
2	0	0
3	0	0
4	5217	7197
5	33,753	37,152
6	29,087	32,016
7	15,288	16,828
8	55,982	92,883
9	409	450
10	932	848
Total	**140,668**	**187,374**
Population Growth:		33.2%

Table 6-1
Regional Evacuation Groupings

Area	Region											
	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Note: This table was adapted from Figure 2 of the Miami-Dade Emergency Operations Center Procedures Manual. It has been modified to include areas 1 and 10.

Table 6-3
Evacuation Scenario Definitions

Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, weekend	Evening	Good	None
11	Winter	Midweek	Midday	Good	New plant construction

Note: Schools are assumed to be in session for the winter season (midweek, midday).

Table 7-1D
Time to Clear the Indicated Area of 100% of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter	Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend	Midweek
Scenario:	**1**	**2**	**3**	**4**	**5**	**Scenario:**	**6**	**7**	**8**	**9**	**10**	**11**
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	2:00	2:00	2:00	2:00	2:00	R01	2:00	2:00	2:00	2:00	2:00	2:00
R02	6:00	6:00	6:00	6:00	6:00	R02	6:00	6:00	6:00	6:00	6:00	7:00
R03	9:00	10:00	8:30	9:20	7:20	R03	9:10	10:10	8:35	9:30	7:20	11:40
5-Mile Ring and Keyhole to EPZ Boundary												
R04	6:30	7:10	6:10	6:40	6:10	R04	6:40	7:20	6:10	6:50	6:10	7:40
R05	8:40	9:40	8:10	9:00	7:00	R05	8:50	9:50	8:15	9:10	7:05	11:20
R06	6:00	6:00	6:00	6:00	6:00	R06	6:00	6:00	6:00	6:00	6:00	7:10
R07	6:00	6:00	6:00	6:00	6:00	R07	6:00	6:00	6:00	6:00	6:00	7:10
R08	7:20	8:00	6:50	7:30	6:00	R08	7:20	8:10	6:50	7:30	6:00	9:50
R09	7:50	8:30	7:20	8:00	6:30	R09	8:00	8:40	7:30	8:10	6:40	10:20
R10	8:40	9:40	8:10	9:00	7:00	R10	8:50	9:50	8:15	9:10	7:05	11:20
R11	9:00	10:00	8:30	9:20	7:20	R11	9:10	10:10	8:35	9:30	7:20	11:40
R12	6:50	7:25	6:30	7:00	6:10	R12	6:50	7:30	6:30	7:10	6:10	8:10

Table 8-5A
School Evacuation Time Estimates – Good Weather

School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bndry to H.S. (mi.)	Travel Time EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Miami-Dade County Public Schools								
Air Base Elementary	25	5	10.4	31	**1:05**	3.5	10	**1:15**
Avocado Elementary	30	5	11.3	34	**1:10**	2.9	9	**1:20**
Bel-Aire Elementary	40	5	1.0	3	**0:50**	6.9	20	**1:10**
Campbell Drive Elementary	10	5	10.8	32	**0:50**	5.4	16	**1:05**
Campbell Drive Middle	10	5	12.1	36	**0:55**	5.4	16	**1:10**
Carribean Elementary	10	5	2.7	8	**0:25**	8.1	24	**0:50**
Centennial Middle	45	5	2.5	7	**1:00**	4.4	13	**1:10**
Chapman Elementary	25	5	7.6	23	**0:55**	1.4	4	**1:00**
Cooper, Neva King Educational Center	15	5	4.3	13	**0:35**	13.4	40	**1:15**
Corporate Academy South	10	5	13.8	41	**1:00**	2.3	7	**1:05**
Cutler Ridge Elementary	45	5	1.9	6	**1:00**	2.3	7	**1:05**
Cutler Ridge Middle	45	5	1.2	4	**0:55**	2.3	7	**1:05**
Florida City Elementary	5	5	3.7	11	**0:25**	20.3	60	**1:25**
Gulfstream Elementary	50	5	2.5	7	**1:05**	2.3	7	**1:10**
Homestead Middle	15	5	2.9	9	**0:30**	15.5	46	**1:15**
Homestead Senior	10	5	12.3	37	**0:55**	12.2	36	**1:30**
Leisure City K-8 Center	30	5	9.1	27	**1:05**	2.4	7	**1:10**
Mays Middle	15	5	1.8	5	**0:25**	11.2	33	**1:00**
Migrant Education Program	30	5	10.8	32	**1:10**	5.3	16	**1:25**
Naranja Elementary	20	5	7.3	22	**0:50**	3.6	11	**1:00**
Peskoe Elementary	15	5	8.7	26	**0:50**	4.6	14	**1:00**
Pine Villa Elementary	15	5	2.3	7	**0:30**	4.1	12	**0:40**
Redland Elementary	25	5	0.0	0	**0:30**	20.2	60	**1:30**
Redland Middle	20	5	0.0	0	**0:25**	20.8	62	**1:30**
Redondo Elementary	30	5	1.1	3	**0:40**	19.3	57	**1:35**
Saunders, Laura C. Elementary	10	5	3.8	11	**0:30**	15.3	45	**1:15**
South Dade Senior	25	5	2.3	7	**0:40**	16.3	48	**1:25**
West Homestead Elementary	15	5	0.0	0	**0:20**	17.7	53	**1:15**
Whigham, Dr. E.L. Elementary	20	5	2.8	8	**0:35**	6.3	19	**0:55**
Whispering Pines Elementary	15	5	0.8	2	**0:25**	5.1	15	**0:40**
Miami-Dade County Private/Charter Schools								
Aspira Youth Leadership Charter School	30	5	7.9	23	**1:00**	12.3	37	**1:35**
Balere Language Academy	45	5	0.9	3	**0:55**	12.3	37	**1:30**
Coral Reef Montessori Academy Charter School	45	5	1.5	4	**0:55**	12.3	37	**1:35**
Keys Gate Charter School	15	5	11.2	33	**0:55**	12.3	37	**1:30**
Lawrence Academy	10	5	5.3	16	**0:35**	23.0	68	**1:40**
Miami Community Charter School	10	5	3.6	11	**0:30**	25.0	74	**1:40**
Rosa Parks Charter School	10	5	5.1	15	**0:30**	23.0	68	**1:40**
SIA Tech (Homestead Job Corps Center)	15	5	8.7	26	**0:50**	12.3	37	**1:25**
The Charter School at Waterstone	15	5	9.2	27	**0:50**	12.3	37	**1:25**
				Maximum for EPZ:	**1:10**		**Maximum:**	**1:40**

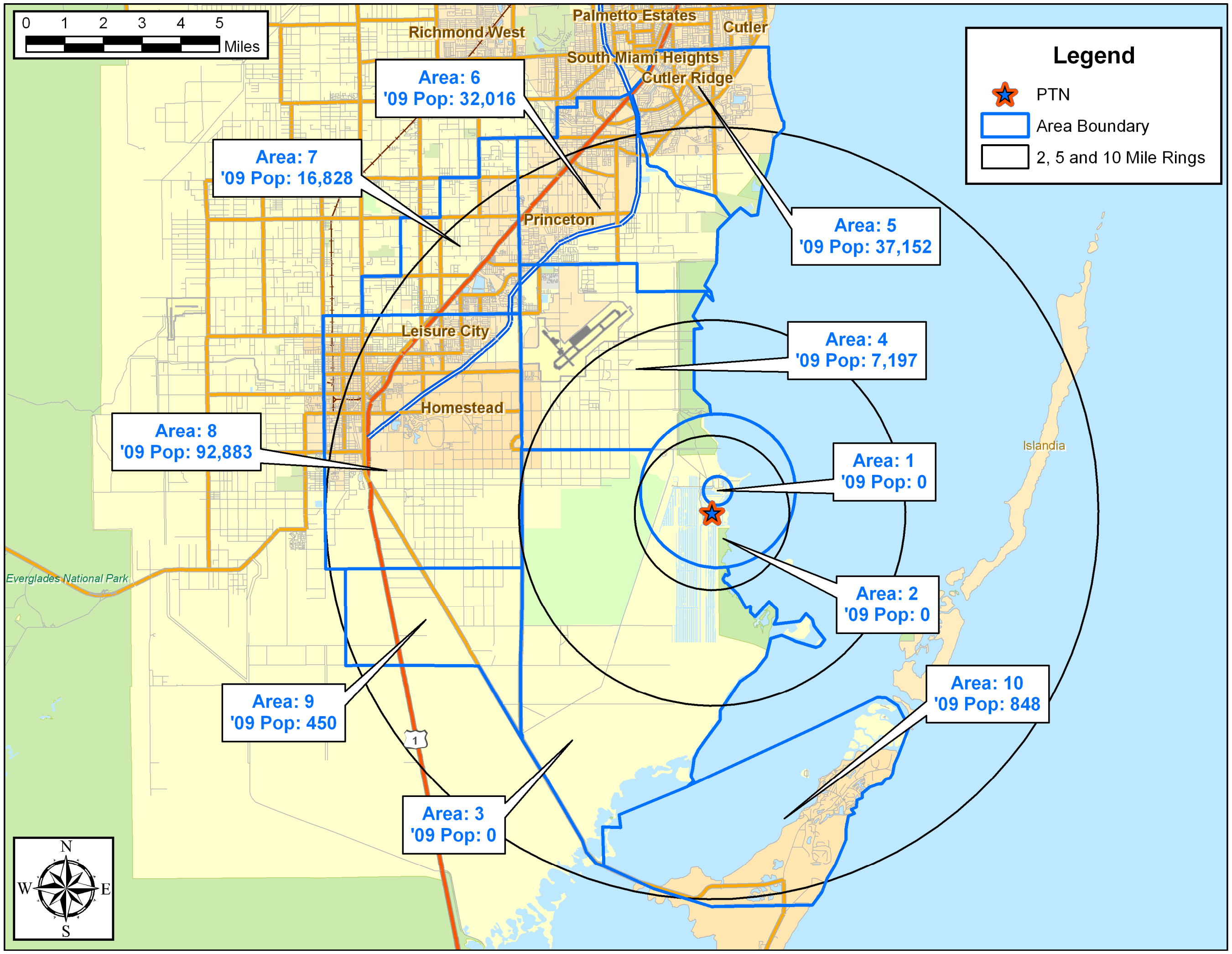
*Travel times computed using the average speed of 20.2 mph (output by DYNEV) at 50 minutes after the advisory to evacuate for an evacuation of Region R03 under Scenario 6 conditions.

HS = Host School

Table 8-6A
Transit-Dependent Evacuation Time Estimates - Good Weather

Pickup Location	Mobilization (minutes)	Loading Time (minutes)	Distance to EPZ Boundary (miles)	Travel Time to EPZ Boundary (minutes)	ETE (hr:min)
Andrew Center	180	15	8.3	106	5:05
East Ridge Retirement Village	180	15	0.8	10	3:25
Florida City, City Hall	180	15	4.8	61	4:20
Four Seasons Mobile Home Park	180	15	3.9	50	4:05
HUD-Pine Island I	180	15	6.3	80	4:35
Laura Saunders Elementary	180	15	3.8	49	4:05
Mays Middle School	180	15	1.8	23	3:40
Naranja Elementary	180	15	7.3	93	4:50
P.A.L. Gym	180	15	2.4	31	3:50
Royal Colonial Trailer Park	180	15	9.1	116	5:15
Senior Citizen Gym	180	15	2.0	26	3:45
South Dade Camp	180	15	9.7	124	5:20
Wayside	180	15	3.1	40	3:55
YMCA Harris Field	180	15	3.4	43	4:00
Maximum for EPZ:					5:20

Figure 3-1. Turkey Point Permanent Resident Population by Area



1. INTRODUCTION

This report describes the analyses undertaken and the results obtained in preparing the evacuation time estimates (ETEs) for the Turkey Point nuclear power plant (Turkey Point), located in Miami-Dade County, Florida. ETEs are part of the required planning basis and provide state and local governments with site-specific information needed for protective action decision-making.

In the performance of this effort, all available documentation published by federal government agencies that are relevant to ETEs was reviewed. Most important of these are:

- *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants*, NUREG 0654/FEMA-REP-1, Rev. 1, November 1980.
- *Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones*, NUREG/CR-1745, November 1980.
- *Development of Evacuation Time Estimate Studies for Nuclear Power Plants*, NUREG/CR-6863, January 2005.

We wish to express our appreciation to all the directors and staff members of the Miami-Dade County Office of Emergency Management and Homeland Security, the Monroe County Office of Emergency Management, and local and state law enforcement and planning agencies who provided valued guidance and contributed information contained in this report.

1.1 Overview of the ETE Determination Process

The following outline presents a brief description of the work effort in chronological sequence:

1. Information gathering:
   - Defined the scope of work in discussion with representatives of Florida Power & Light Company (FPL) and Bechtel Power Corporation (Bechtel)
   - Attended meetings with emergency planners from the two emergency planning zone (EPZ) counties and from the state to identify issues to be addressed

- Conducted a detailed field survey of the EPZ highway system and of area traffic conditions

- Obtained demographic data from the census and from state and county agencies

- Conducted a random sample telephone survey of EPZ residents

- Conducted a data collection effort to identify and describe schools, special facilities, major employers, transportation providers, and other important sources of information

2. Estimated distributions of trip generation times representing the time required by various population groups (permanent residents, employees, and transients) to prepare (mobilize) for the evacuation trip. These estimates are primarily based on the random sample telephone survey.

3. Defined evacuation scenarios. These scenarios reflect the variation in demand, trip generation distribution and in highway capacities associated with different seasons, day of week, time of day, and weather conditions.

4. Defined evacuation regions. The EPZ is partitioned into areas that serve as a basis for the ETE analysis presented here. Evacuation regions are comprised of contiguous areas for which ETEs are calculated. The configuration of these regions reflects the fact that the wind can take any direction and that the radial extent of the impacted area depends on accident-related circumstances. Each region, other than those that approximate circular areas, approximates a keyhole configuration within the EPZ as required by NUREG/CR-6863.

5. Estimated demand for transit services for persons at “special facilities” and for transit-dependent persons at home.

6. Defined a traffic management strategy. Traffic control is applied at specified traffic control points located within the EPZ, and at access control points outside the EPZ. Local and state police personnel should review and approve all final traffic control plans.

7. Prepared the input streams for the interactive dynamic evacuation model (IDYNEV) system.

- Estimated the traffic demand, based on the available information derived from census data, from data provided by local and state agencies and from the telephone survey.

- Applied the procedures specified in the 2000 Highway Capacity Manual[1] (HCM2000) to the data acquired during the field survey to estimate the capacity of all highway segments comprising the evacuation routes within the EPZ and shadow region.

- Developed the link-node representation of the evacuation network, which is used as the basis for the computer analysis that calculates the ETE.

- Calculated the evacuating traffic demands for each evacuation region and for each evacuation scenario. Considered the effects on demand of voluntary evacuation and of the shadow effect.

- Represented the traffic management strategy if special treatments are to be implemented.

- Specified the candidate destinations of evacuation travel consistent with outbound movement relative to the location of Turkey Point.

- Prepared the input stream for the IDYNEV system.

- Executed the IDYNEV models to provide the estimates of evacuation routing and ETE.

8. Generated a complete set of ETEs for all specified evacuation regions and scenarios.

9. Documented ETEs in formats responsive to the cited NUREG reports.

10. Calculated the ETE for all transit activities including those for special facilities (schools, health-related facilities, etc.) and for the transit-dependent population at home.

Steps 6, 7, and 8 are iterated.

[1] Highway Capacity Manual (HCM2000), Transportation Research Board, National Research Council

1.2 The Turkey Point Nuclear Power Plant Location

Turkey Point is located on the shores of Biscayne Bay, approximately 25 miles south of the city of Miami, Florida. The EPZ consists of parts of two counties: Miami-Dade County and Monroe County. Figure 1-1 displays the area surrounding Turkey Point, including major roads and local communities.

1.3 Preliminary Activities

KLD Associates performed preliminary review activities as described below.

Literature Review

KLD was provided with copies of documents describing past studies and analyses leading to the development of emergency plans and of the ETE. We also obtained supporting documents from a variety of sources, which contained information needed to form the database used for conducting evacuation analyses.

Field Surveys of the Highway Network

KLD personnel drove the entire highway system within the EPZ and for some distance outside. A tablet personal computer equipped with global positioning satellite and geographical information systems (GIS) technologies was used during the road survey to acquire and record data. The characteristics of each section of highway were recorded. These characteristics include:

- Number of lanes
- Posted speed
- Pavement width
- Actual free speed
- Shoulder type and width
- Abutting land use
- Intersection configuration
- Control devices
- Lane channelization
- Interchange geometries
- Geometrics: curves, grades
- Street parking

- Unusual characteristics: narrow bridges, sharp curves, poor pavement, flood warning signs, inadequate delineations, etc.

In addition, video and audio recording equipment were used to capture a permanent record of the highway infrastructure. No attempt was made to meticulously measure such attributes as lane width and shoulder width. Estimates of these measures based on visual observation and recorded images were considered appropriate for the purpose of estimating the capacity of highway sections. For example, Exhibit 20-5 in the HCM2000 indicates that a reduction in lane width from 12 feet (the base value) to 10 feet can reduce free flow speed by 1.1 mph (not a material difference) for two-lane highways. Exhibit 12-15 shows no sensitivity for the estimates of service volumes at level of service (LOS) E (near capacity), with respect to free flow speed . The topography of the highway (level, rolling, mountainous) is a far more important factor than lane and shoulder width when estimating capacity.

The data from the audio and video recordings was used to create detailed GIS shape files and databases of the roadway characteristics and of the traffic control devices observed during the road survey; this information was referenced while preparing the input stream for the IDYNEV system.

As documented on page 20-3 of the HCM2000, the capacity of a two-lane highway is 1700 passenger cars per hour for each direction of travel. For freeway sections, a value of 2250 vehicles per hour per lane is assigned. The road survey has identified several segments that are characterized by adverse geometrics that are reflected in reduced values for both capacity and speed. These estimates reflect the service volumes for LOS E presented in HCM2000 Exhibit 12-15. These links may be identified by reviewing Appendix K. Link capacity is an input to IDYNEV which calculates the ETE. The locations of these sections may be identified by reference to the large-scale map showing the link-node diagram with the nodes identified.

Telephone Survey

A telephone survey was undertaken to gather information needed for the evacuation study. Appendix F presents the survey instrument, the procedures used, and tabulations of data compiled from the survey returns.

This data was used to develop estimates of vehicle occupancy and the number of evacuating vehicles and to estimate elements of the mobilization process. This database was also referenced to estimate the number of transit-dependent residents.

Developing the Evacuation Time Estimates

The overall study procedure is outlined in Appendix D. Demographic data was obtained from several sources, as detailed later in this report. This data was analyzed and converted into vehicle demand data.

Highway capacity was estimated for each highway segment based on the field surveys and on the principles specified in the HCM2000. The link-node representation of the physical highway network was developed using GIS mapping software and the observations obtained from the field survey. This network representation of links and nodes is shown in Figure 1-2.

Given the scale of Figure 1-2, it is not feasible to identify the links and nodes to enable the reader to relate to the information presented in Appendix K. Therefore, an annotated map is provided in electronic format that can be printed at a suitable scale, if desired.

Analytical Tools

The IDYNEV system that was employed for this study is comprised of several integrated computer models. One of these is the PC-DYNEV (dynamic network evacuation) macroscopic simulation model that was developed by KLD under contract with the Federal Emergency Management Agency.

IDYNEV consists of three submodels:

- A macroscopic traffic simulation model (for details, see Appendix C).
- An intersection capacity model (for details, see Highway Research Record No. 772, Transportation Research Board, 1980, papers by Lieberman and McShane & Lieberman).
- A dynamic, node-centric routing model that adjusts the base routing in the event of an imbalance in the levels of congestion on the outbound links.

Another model of the IDYNEV system is the traffic assignment and distribution model. This model integrates an equilibrium assignment model with a trip distribution algorithm to compute origin-destination volumes and paths of travel designed to minimize travel time. For details, see Appendix B.

Still another software product, UNITES (unified transportation engineering system), developed by KLD, was used to expedite data entry.

The procedure for applying the IDYNEV system within the framework of developing ETE is outlined in Appendix D. Appendix A is a glossary of terms.

For the reader interested in more details of the model than those provided in Appendices B, C, and D, and in Highway Research Record No. 72, the following references are suggested:

- NUREG/CR-4873 — *Benchmark Study of the IDYNEV Evacuation Time Estimate Computer Code*
- NUREG/CR-4874 — *The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the IDYNEV Computer Code*

The evacuation analysis procedures are based on the need to:

- Route traffic along paths that will expedite their travel from their respective points of origin to points outside the EPZ.
- Restrict movement toward PTN to the extent practicable, and disperse traffic demand so as to avoid focusing demand on a limited number of highways.
- Move traffic in directions that are generally outbound, relative to the location of Turkey Point.

A set of candidate destination nodes on the periphery of the EPZ is specified for each traffic origin (or centroid) within the EPZ. The traffic assignment and distribution model produces output that identifies the best traffic routing, subject to the design conditions outlined above. In addition to this information, rough estimates of travel times are provided together with turn-movement data required by the PC-DYNEV simulation model.

The simulation model is then executed to provide a detailed description of traffic operations on the evacuation network. This description enables the analyst to identify bottlenecks and to consider the development of countermeasures designed to expedite the movement of vehicles. These are discussed in subsequent sections. The outputs of this model are the volume of traffic, expressed as vehicles per hour, which exits the evacuation region along the various highways (links) that cross the region boundaries. These outputs are exported into a spreadsheet that documents the ETE. Intermediate, detailed results are also produced at specified time intervals for each network link. Section 7 presents a further description of this process along with the ETE tables.

As outlined in Appendix D, this procedure consists of an iterative design-analysis-redesign sequence of activities. When properly done, this procedure converges to yield an evacuation plan that best services the evacuating public.

1.4 Comparison with Previous ETE Study

KLD Associates developed ETE for the existing Turkey Point Nuclear Power Plant (Units 3 & 4) in 2005. The major factors contributing to the differences between the ETE values obtained in this study and those of the previous study are listed below and summarized in Table 1-1.

- Significant permanent resident population growth.
- Changes in EPZ demographics.
- Significant increase in the number of employees commuting into the EPZ based on improved employee estimates.
- Shadow area expanded to include the area west of the EPZ between Krome Ave (State Road 997) and the Everglades National Park.
- Changes to highway infrastructure.
- Trip generation rates based on telephone survey of EPZ residents.

Table 1-1 (Sheet 1 of 3)
ETE Study Comparisons

Topic	Treatment	
	2005 ETE Study	**Current ETE Study**
Permanent Resident Population Basis	2000 Census, extrapolated to 2006. Population = 155,163	2000 Census, extrapolated to 2009. Population = 187,374
EPZ Demographics	2.84 persons per household in Miami-Dade County and 2.23 persons per household in Monroe County based on Census data. 1.25 evacuating vehicles per household based on adapted telephone survey results from other nuclear power plants. Dividing household size by the number of evacuating vehicles per household yields 2.27 people per vehicle for Miami-Dade and 1.78 people per vehicle for Monroe.	• 3.13 persons per household and 1.37 evacuating vehicles per household based on a telephone survey of EPZ residents (includes both counties). • Dividing household size by the number of evacuating vehicles per household yields 2.28 people per vehicle.
Employee Population	Total employment within the EPZ obtained from 2000 census traffic analysis zone files. Census journey-to-work data identified the proportion of employees who commute into the EPZ relative to the total number of employees. Employees extrapolated to 2006 using Miami-Dade County employment growth rate. 5,091 total employees commuting into the EPZ.	• Total employees commuting into the EPZ obtained from the journey-to-work Florida edition website, based on analysis of commuter travel patterns from the 2000 census. Employees extrapolated to 2009 using Miami-Dade County employment growth rate. • 19,767 employees commuting into the EPZ.
Shadow Area	Defined as the area to the north between Coral Reef Drive (152nd Street) and the EPZ boundary.	Defined as the area to the north between Coral Reef Drive (152nd Street) and the EPZ boundary and the area to the west between the eastern boundary of the Everglades National Park and the EPZ boundary.

Table 1-1 (Sheet 2 of 3)
ETE Study Comparisons

Topic	Treatment	
	2005 ETE Study	**Current ETE Study**
Changes to Highway Infrastructure	Field surveys conducted in 2004.	Field surveys conducted in 2008. The following roadway changes were observed: • Busway extended south from Bauer Drive (264th Street) to Palm Drive (344th Street) in Florida City. • Signal improvements along Route 1 to accommodate the new intersections with the Busway just west of Route 1. • Campbell Drive (312th Street) widened to two lanes in each direction between 137th Avenue and the Florida Turnpike. • Signal improvements (i.e. turn bays added) along Krome Avenue. • Draw bridge on Route 1 entering the Florida Keys was replaced with a new bridge that will allow all boats to pass through without disrupting the flow of traffic on Route 1. There is ongoing construction on Route 1 between Florida City and the Keys to separate the north and southbound travel lanes and reduce head-on collisions.

Table 1-1 (Sheet 3 of 3)
ETE Study Comparisons

Topic	Treatment	
	2005 ETE Study	**Current ETE Study**
Trip Generation for Evacuation	Based on results adapted from a telephone survey of the EPZ for the Davis-Besse nuclear plant: Residents with commuters returning leave between 15 minutes and 3 hours. Residents without commuters returning leave between 15 minutes and 3 hours. Employees and transients leave between 15 minutes and 1 hour, 15 minutes. All times measured from the advisory to evacuate.	Based on residential telephone survey of specific pre-trip mobilization activities within the Turkey Point EPZ: • Residents with commuters returning leave between 30 minutes and 6 hours. • Residents without commuters returning leave between 15 minutes and 4 hours. • Employees and transients leave between 15 minutes and 2 hours. All times measured from the advisory to evacuate.
Evacuation Time Estimates for the entire EPZ, 100th percentile.	Full EPZ - Winter weekend midday Good weather = 6:35 Full EPZ –Summer midweek midday Good weather = 6:35	Full EPZ - Winter weekend midday Good weather = 8:35 Full EPZ –Summer midweek midday Good weather = 9:00

Figure 1-1. Turkey Point Nuclear Power Plant Site Location

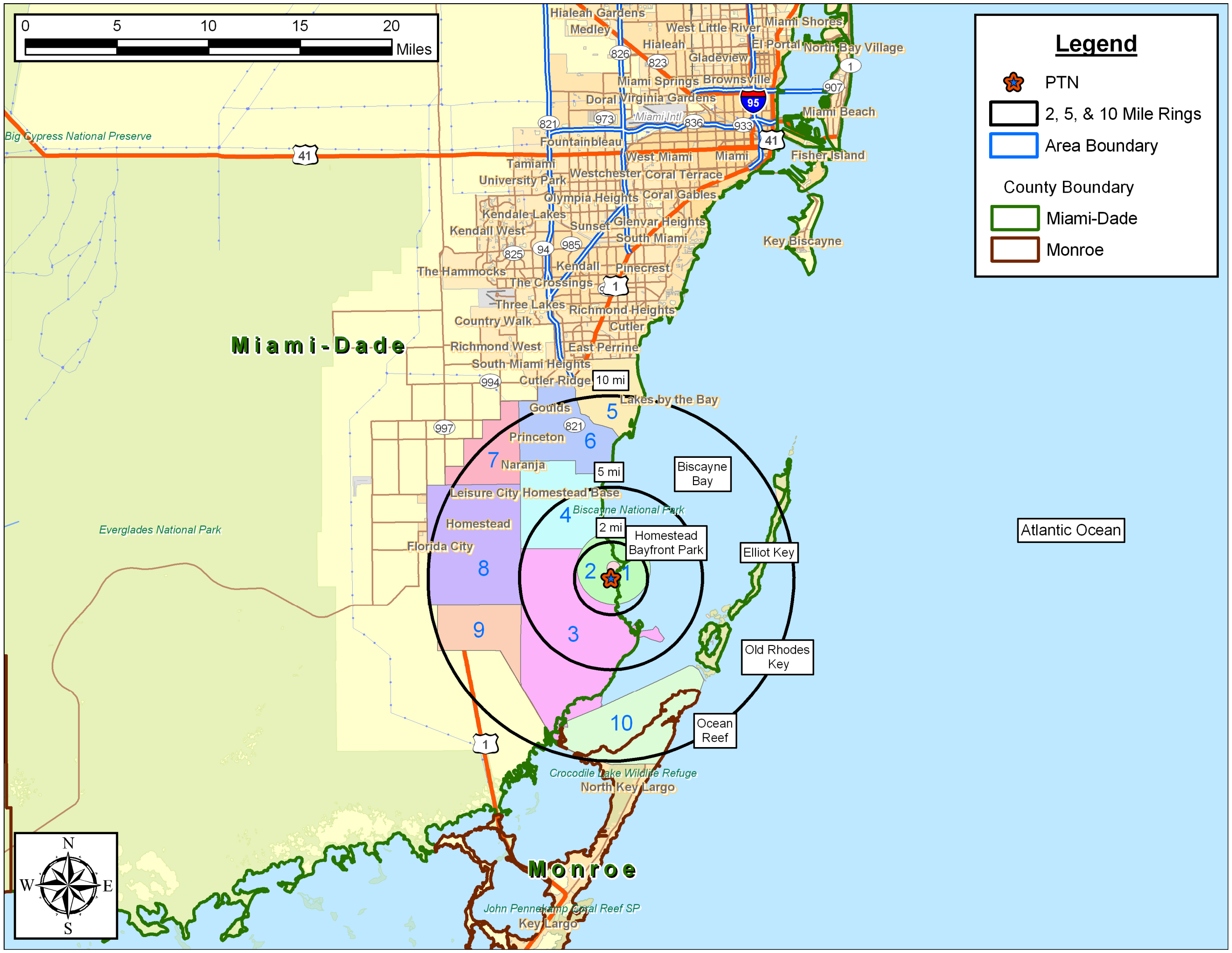
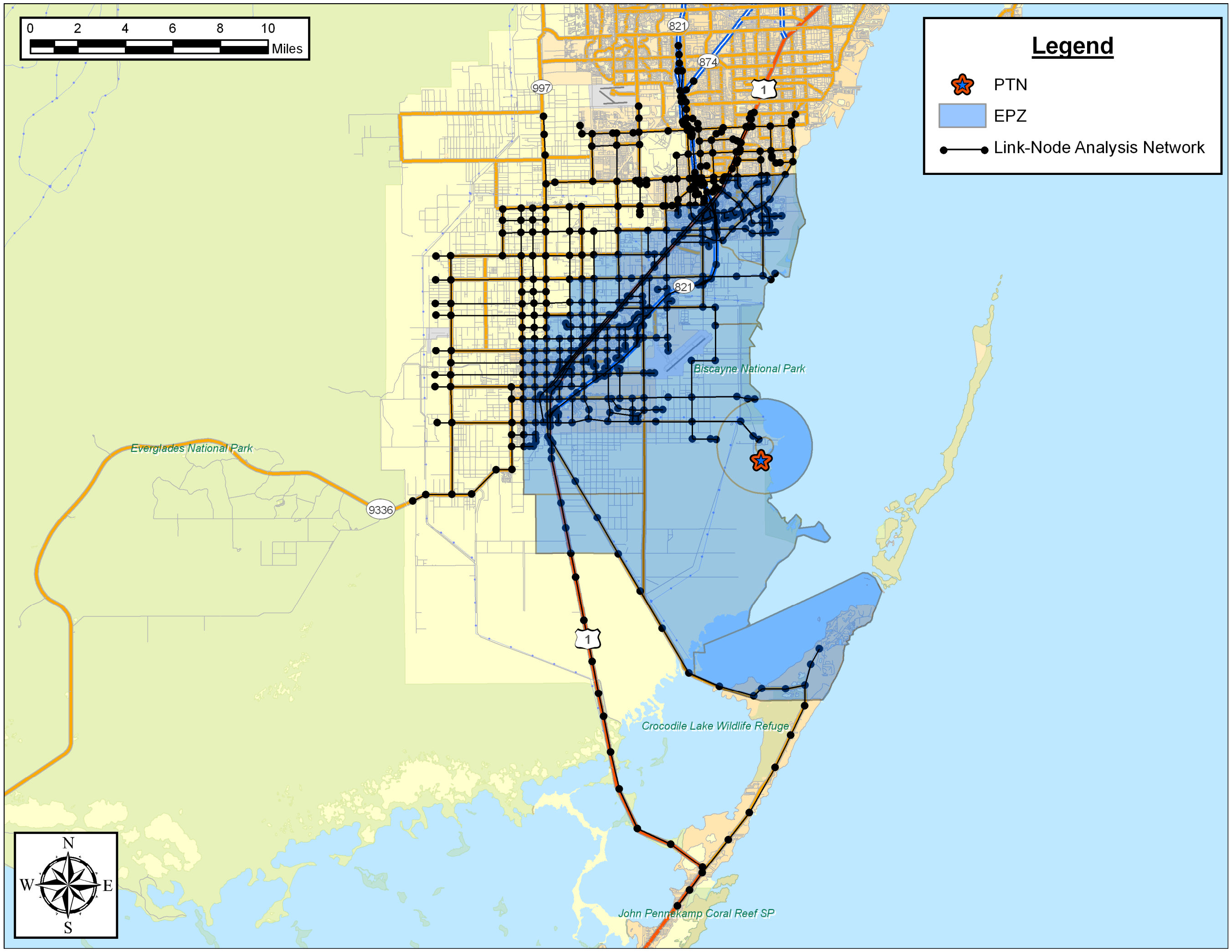


Figure 1-2. Turkey Point Nuclear Power Plant Link-Node Analysis Network



2. STUDY ESTIMATES AND ASSUMPTIONS

This section presents the estimates and assumptions used in developing the ETEs.

2.1 Data Estimates

1. Population estimates are based on census 2000 data, projected to 2009. Municipality-specific projections are based on growth rates obtained from the census website. Estimates of employees who commute into the EPZ to work are based on the journey-to-work Florida Edition website[1].

2. Population estimates at special facilities are based on available data from county emergency management offices and from direct phone calls to the facilities.

3. Roadway capacity estimates are based on field surveys and the application of Highway Capacity Manual 2000 (HCM2000) guidance.

4. Population mobilization times are based on a statistical analysis of data acquired from the telephone survey.

5. The relationship between resident population and evacuating vehicles is developed from the telephone survey. The average values of 3.13 persons per household and 1.37 evacuating vehicles per household are used.

6. The relationship between persons and vehicles for transients is as follows:

   - Transients: 2 to 4 persons per vehicle, depending on the facility being visited

   - Employees: 1.09 employees per vehicle (telephone survey results)

7. The ETEs are presented for the evacuation of the 50th, 90th, 95th, and 100th percentiles of population, for each evacuation region and for each scenario. These ETEs are presented in tabular and graphical formats. An evacuation region is defined as a group of areas that is issued an advisory to evacuate.

8. The number of transit-dependent persons at home and in special facilities is estimated using the results of the telephone survey, census data provided by local agencies, and

[1] http://www.j2w.usf.edu/default.asp?l=f

by direct contact. The number of vehicle trips required is based on these estimates and their status (ambulatory, special needs).

2.2 Study Methodological Assumptions

1. The ETE is defined as the elapsed time from the advisory to evacuate issued to people within a specific evacuation region of the EPZ and the time that region is clear of the indicated percentile of people.

2. The ETEs are computed and presented in a format compliant with the guidance in the cited NUREG documentation. The ETEs for each evacuation region is presented in both statistical and graphical formats.

3. Evacuation movements (paths of travel) are generally outbound relative to the power plant to the extent permitted by the highway network, as computed by the computer models. All available evacuation routes are used in the analysis.

4. Evacuation regions are defined by the underlying keyhole or circular configurations as specified in NUREG/CR-6863. These regions, as defined, display irregular boundaries reflecting the geography of the areas included within these underlying configurations.

5. Voluntary evacuation is considered as indicated in the accompanying Figure 2-1. There are basically two keyhole configurations that form most evacuation regions: (1) a central circular area of a 2-mile radius with a sector with a central angle of 67.5 degrees that extends to a distance of about 5 miles; and (2) a central circular area of a 5-mile radius with a sector extending to a distance of 10 miles (actually, to the EPZ boundary). For the first configuration, pictured in Figure 2-1, there exists an area outside the evacuation region but within 5 miles of the power station. It is assumed that 50 percent of the population within this area will elect to voluntarily evacuate even though they are advised to shelter. In the remaining area that is outside the evacuation region but within the EPZ, it is assumed that 35 percent of that population will elect to evacuate.

   For the second configuration (not shown in Figure 2-1), it is assumed that 50 percent of the population within the EPZ, but outside the evacuation region, will elect to voluntarily evacuate. In the area between the EPZ boundary, 152nd Street to the north and the Everglades to the west (the shadow region), it will be assumed that 30 percent of the people will evacuate voluntarily. Sensitivity studies explored the effect on the ETE, of increasing this percentage of voluntary evacuees in the “shadow region“(see Appendix I for the results of this study).

6. Eleven scenarios representing different seasons, time of day, day of week, and weather are considered. One special event scenario is studied – the peak construction period of the new units at the Turkey Point site. These scenarios are detailed in Table 2-1. A sensitivity study was conducted to explore the impact on the ETE when a NASCAR race is taking place at the Homestead-Miami Speedway (see Appendix I for the results). At other tourist attractions, the ETE assume that parking facilities are fully occupied.

7. The models of the IDYNEV system were recognized as state-of-the-art by Atomic Safety & Licensing Boards in past hearings. (Sources: Atomic Safety & Licensing Board Hearings on Seabrook and Shoreham, Urbanik[1]). The models have been independently validated by a consultant retained by the NRC and have continuously been refined and extended since those hearings.

2.3 Study Assumptions

1. The planning basis assumption for the calculation of the ETE is a rapidly escalating accident that requires evacuation and includes:
   - Advisory to evacuate is announced coincident with the siren notification.
   - Mobilization of the general population will begin within 10 minutes of the advisory to evacuate.
   - ETEs are measured relative to the advisory to evacuate.

2. It is assumed that everyone within the group of areas forming a region that is issued an advisory to evacuate will, in fact, respond in general accord with the planned routes.

3. It is further assumed that:
   - Schools will be evacuated first of those who are transit-dependent.

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[1] Urbanik, T., et. al. Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code, NUREG/CR-4873, NRC, June, 1988

- Sixty-eight percent of households in the EPZ have at least one commuter. Seventy-one percent of those households will await the return of a commuter before beginning their evacuation trip, based on the telephone survey results.

4. The ETE calculations will also include consideration of through (external-external) trips during the time that such traffic is permitted to enter the evacuated region. Normal traffic flow is assumed to be present within the EPZ at the start of the emergency.

5. Access control points will be staffed within approximately 90 minutes of the siren notifications, to divert through-traffic attempting to enter the EPZ. Earlier activation of access control point locations could delay returning commuters. It is assumed that no through-vehicles will enter the EPZ after this 90-minute mobilization time period.

6. Traffic control points within the EPZ will be staffed over time, beginning at advisory to evacuate. Their number and location will depend on the region to be evacuated and personnel resources available. The objectives of these traffic control points are:

   - Facilitate the movements of all (mostly evacuating) vehicles at the location.
   - Discourage inadvertent vehicle movements toward the power station.
   - Provide assurance and guidance to any traveler who is unsure of the appropriate actions or routing.
   - Act as a local surveillance and communications center. Provide information to the emergency operations center as needed, based on direct observation or on information provided by travelers.

   Consistent with these objectives, there is no expectation that the operation of traffic control points will materially shorten evacuation times. In calculating ETEs, it is assumed that drivers will act rationally, travel in the directions identified in the plan (as documented in the public information material), and obey all control devices and traffic guides. Therefore, the traffic control points are not expected to enhance or impede the flow of traffic. Consequently, any shortfall of personnel or equipment will not influence the ETE results. Also, the time needed to mobilize personnel or equipment will not influence the ETE results.

7. Buses will be used to transport those without access to private vehicles:

   - If schools are in session, transport (buses) will evacuate students directly to the assigned reception centers and host schools.
   - Schoolchildren, if school is in session, are given priority in assigning transit vehicles.
   - Bus mobilization time is considered in ETE calculations.
   - Analysis of the number of required “waves” of transit vehicles used for evacuation is presented.

8. It is reasonable to assume that some of the transit-dependent people will ride share with family, neighbors, and friends, thus reducing the demand for buses. We assume that the percentage of people who ride share is 50 percent. This assumption is based upon reported experience for other emergencies[1]. The remaining transit-dependent portion of the general population will be evacuated to reception centers by bus.

9. One type of adverse weather scenario is considered. Rain may occur for either winter or summer scenarios. In the case of rain, it is assumed that the rain begins at about the same time the evacuation advisory is issued. Therefore, no weather-related reduction in the number of transients who may be present in the EPZ is assumed.

   Adverse weather scenarios affect roadway capacity, free flow highway speeds, and possibly, the time required to mobilize the general population. The factors assumed for the ETE study are:

Scenario	Highway Capacity[(a)]	Free Flow Speed[(a)]	Mobilization Time
Rain[2]	90%	90%	No Effect

(a) Adverse weather capacity and speed values are given as a percentage of good weather conditions. Roads are assumed to be passable.

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1 Institute for Environmental Studies, University of Toronto, THE MISSISSAUGA EVACUATION FINAL REPORT, June 1981. The report indicates that 6,600 people of a transit-dependent population of 8600 people shared rides with other residents; a ride share rate of 76 percent (Page 5-10).

2 Agarwal, M. et. Al. Impacts of Weather on Urban Freeway Traffic Flow Characteristics and Facility Capacity, Proceedings of the 2005 Mid-Continent Transportation Research Symposium, August, 2005.

10. School buses used to transport students are assumed to have the capacity to transport 70 children per bus for elementary schools, and 50 children per bus for middle and high schools. Transit buses used to transport the transit-dependent general population are assumed to transport an average of 30 people per bus, taking into account that they will be carrying luggage and allowing for some reserve capacity.

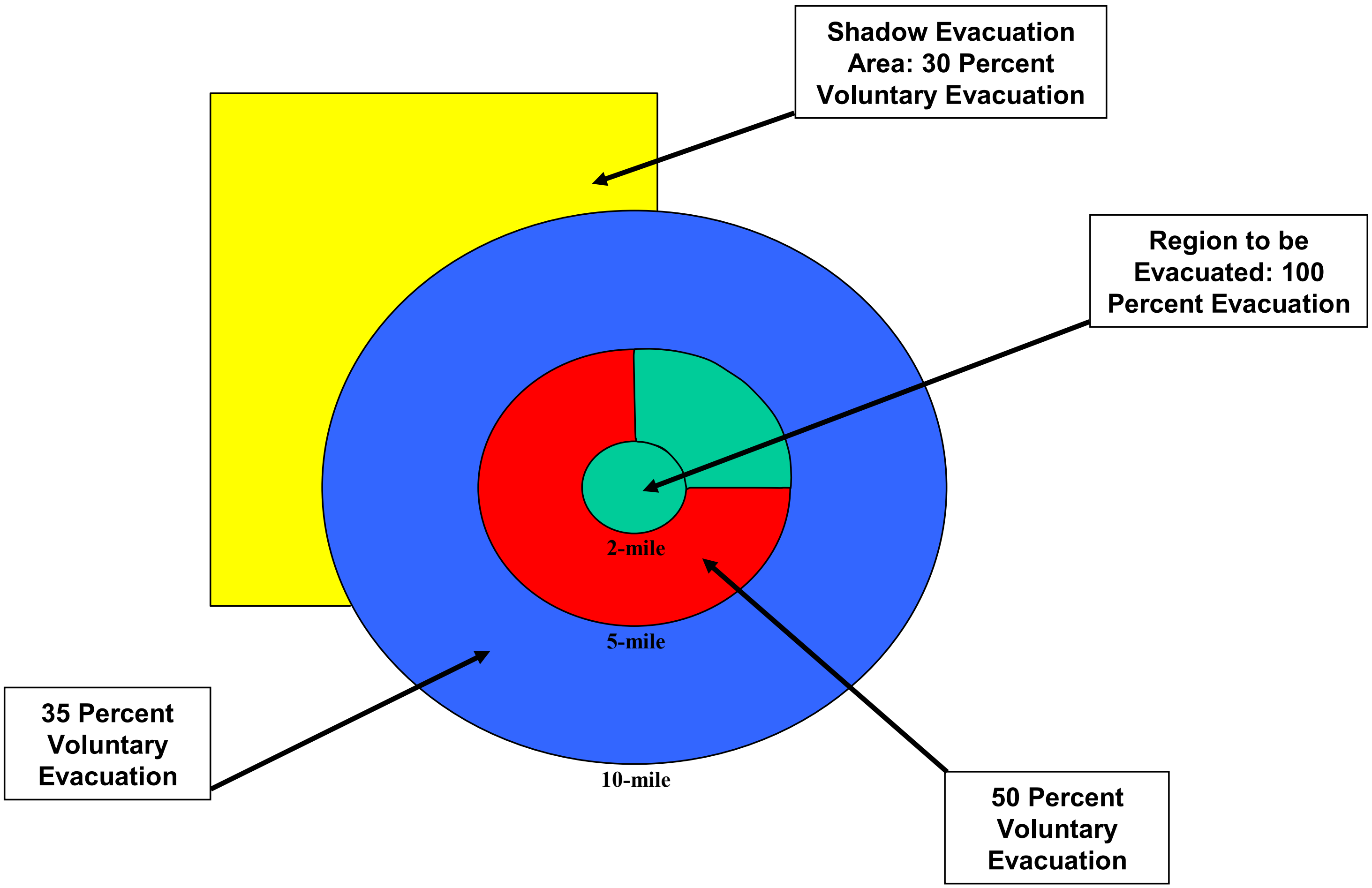
11. The northbound lane of the Miami-Dade Busway is used as an evacuation lane for the general public within the EPZ. The southbound lane will be reserved for transit and emergency vehicles.

12. Only those residents of areas 9 and 10 will be routed southbound on Route 1 out of the EPZ. All other EPZ residents will be routed northbound out of the EPZ.

Table 2-1
Evacuation Scenario Definitions

Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, Weekend	Evening	Good	None
11	Winter	Midweek	Midday	Good	New Plant Construction

Figure 2-1. Voluntary Evacuation Methodology



3. DEMAND ESTIMATION

The estimates of demand, expressed in terms of people and vehicles, constitute a critical element in developing an evacuation plan. These estimates consist of three components:

1. An estimate of population within the EPZ, stratified into groups (resident, employee, transient).

2. An estimate for each population group, of mean occupancy per evacuating vehicle. This estimate is used to determine the number of evacuating vehicles. In developing this estimate, it is necessary to distinguish between those who have access to privately owned vehicles and those who would require transit vehicles be provided. The latter group includes home-based persons and those in special facilities.

3. An estimate of potential double-counting of people and vehicles.

Appendix E presents much of the source material for the population estimates. Our primary source of population data, the 2000 census, however, is not adequate for directly estimating some transient groups.

Throughout the year, vacationers and tourists enter the EPZ. These nonresidents may dwell within the EPZ for a short period (that is, a few days or one or two weeks), or may enter and leave within one day. Estimates of the size of these population components must be obtained so that the associated number of evacuating vehicles can be ascertained.

The potential for double-counting people and vehicles must be addressed. For example:

- A resident who works and shops within the EPZ could be counted as a resident, again as an employee, and once again as a shopper.

- A visitor who stays at a hotel, and spends time at a park, and then goes shopping could be counted three times.

Furthermore, the number of vehicles at a location depends on the time of day. For example, motel parking lots may be full at dawn and empty at noon. Similarly, parking lots at area parks, which are full at noon, may be almost empty at dawn. Estimating counts of vehicles by simply adding up the capacities of different types of parking facilities will tend to overestimate the number of transients and can lead to ETEs that are too conservative.

As outlined above, the population characteristics of the Turkey Point EPZ can be described as three distinct groups:

- Permanent residents — people who are year-round residents of the EPZ.
- Transients — people who reside outside of the EPZ, who enter the area for a specific purpose (that is, shopping, camping), and then leave the area.
- Commuter employees — people who reside outside of the EPZ and commute daily to businesses within the EPZ.

Estimates of the population and number of evacuating vehicles for each of the population groups are presented for each area and by polar coordinate representation (population rose). The Turkey Point EPZ has been subdivided into ten areas as shown in Figure 3-1.

3.1 Permanent Residents

The primary source for estimating permanent population is the latest U.S. census data. The average household size (3.13 persons per household) and the number of evacuating vehicles per household (1.37 vehicles per household) were adapted from the telephone survey results.

The rate of population change for each municipality in the study area was obtained from census data. These growth rates were applied to 2000 census block point data using GIS software to project population within the EPZ and within the shadow region to 2009. The census provides mid-decade updates of population within all counties and selected cities including Florida City and Homestead. Table 3-1 summarizes the yearly rate of population change (using a compound growth methodology) for each municipality in the study area. Table 3-2 shows that the EPZ population increased by a projected 33.2 percent from 2000 to 2009.

Permanent resident population and vehicle estimates for 2009 are presented in Table 3-3. Figures 3-2 and 3-3 present the permanent resident population and permanent resident vehicle estimates by sector and distance from Turkey Point. This “rose” was constructed using GIS software.

3.2 Transient Population

Transient population groups are defined as those people who are not permanent residents and who enter the EPZ for a specific purpose (camping, shopping, etc). Transients may spend less than 1 day or stay overnight or longer at camping facilities, hotels, and motels. There are several locations within the Turkey Point EPZ that attract transients.

1. Biscayne National Park

Biscayne National Park is in Area 4 of the EPZ. Information gathered from a direct phone call to the park indicated that most visitors are tourists, and therefore, not EPZ residents. On a typical day, there are approximately 400 people and 70 vehicles at the facility. Campsites at the park are only accessible by boat.

2. Black Point Park

Black Point Park is in Area 6 of the EPZ. Information obtained from overhead imagery in Google Earth indicates 131 parking spaces and it is assumed that there are two people per vehicle. The park contains a pavilion that can shelter 50–100 people.

3. Black Point Marina

According to the data obtained from the dock master during the previous ETE study, there are 425 regular parking spaces and 18 handicap parking spaces for the 186 in-water slips. There are 203 parking spots for cars with trailers and 10 handicap parking spots for cars with trailers for the boat ramps located at the facility. A passenger car equivalent of two vehicles is used for vehicles with trailers with three people per vehicle, resulting in 869 equivalent passenger cars evacuating from the marina and 1968 people.

4. Camp Owaissa Bauer

Camp Owaissa Bauer is a children's camp. Information obtained from Internet searches indicates the camp can accommodate 150 overnight campers in dormitory-style cabins and has separate staff quarters. Three buses, which hold 50 campers per bus, are provided by the facility. It is located just outside the EPZ north of Area 7, but will also be evacuated in the event of an emergency at the plant because of its proximity to the EPZ.

5. Coral Castle Museum

The Coral Castle Museum is in Area 7 of the EPZ. Data provided from a direct phone call to the museum indicates patrons of the museum are evenly split between local residents and tourists. There are 100 visitors per day during the peak season, 50 of which are transients. There are 40 vehicles at the facility on a peak day, 20 of which are used by transients.

6. Harris Field

Harris Field is in Area 8 of the EPZ. The number of transient vehicles was calculated by counting the number of parking spaces using overhead imagery from Google Earth and then multiplying it by an assumed 25 percent. We assume three people per vehicle (approximates the household size within the EPZ). There are 197 vehicles and 592 people at this facility for a peak day.

7. Keys Gate Golf Club

Keys Gate Golf Club is in Area 8 of the EPZ. Information for this facility was obtained through direct phone calls. They reported that there were 200 people and 80 vehicles at the facility at a given time during the peak season, 50 percent of which are transients.

8. Larry and Penny Thompson Memorial Park

This popular campground is located just outside of the EPZ, north of Area 6, but will also be evacuated in the event of an emergency at the plant because of its proximity to the EPZ. It is adjacent to the Miami Metrozoo and has 270 acres to offer visitors. The campground has 240 separate campsites for recreational vehicles. The campground is assumed to be fully occupied with non-EPZ residents as the Metrozoo and campground are significant attractions for transient persons. There are also 200 additional parking spaces available for day-trippers with two people per vehicle. Based on information gathered from a telephone survey, all day-trippers at the park are transients. Based on the capacity of 240 campsites, 720 evacuating passenger cars were loaded for this site, assuming two passenger car equivalents for each recreational vehicle and one additional vehicle per campsite with four people per site. An additional 200 vehicles with two people per vehicle are used by day-trippers resulting in 920 transient vehicles and 1360 transient people.

9. Prime Outlets of Florida City

The Prime Outlets of Florida City include 40 discount stores and a small food court. It is located in Area 8 on Palm Drive, just east of the junction of U.S. Highway 1 and the Florida Turnpike. Phone calls were made to the facility; however, detailed data was not available. As a result, overhead imagery was used to estimate the parking lot capacity at the outlets which was found to be 1370 parking spaces.

The Prime Outlets is a more significant attraction to non-EPZ residents because it is just off the main route of travel to the Florida Keys. As such, it is estimated that 75 percent of the parking lot capacity will be used by non-EPZ residents resulting in 1028 additional vehicles evacuating from this location with three people per vehicle for a total of 3084 transients.

10. Southland Mall

The Southland Mall (formerly Cutler Ridge Mall) includes several large department stores and over 100 specialty stores. It is located in Area 6, just off the Florida Turnpike at Exit 12. Phone calls were made to the facility; however, detailed data was not available. Overhead photographs were used to estimate the parking lot capacity of the mall which was found to be roughly 5100 parking spaces. Based on discussions with Miami-Dade County during the previous ETE study, the mall is not a significant attraction for non-EPZ residents because there are many other large malls located north of the EPZ. It is, therefore, conservatively estimated that 25 percent of the mall's parking lot capacity will be occupied by non-EPZ residents during a peak day resulting in 1277 transient vehicles and 3831 transients (three people per vehicle).

11. Homestead Bayfront Marina/Herbert Hoover Marina and Park

The marina is located in Area 4 of the EPZ. According to the information provided in a phone call to the facility, the marina has 192 slips plus an additional 32 dry slips. The peak time is on weekends with an average of 2000 people at the marina with 500 parked vehicles. It is assumed that all people at the marina are transients.

12. Lodging Facilities

A list of hotels and motels in the EPZ was created based on Internet searches and on Google Earth's "places of interest." Phone calls were made to each of these facilities to ascertain the number of rooms, the typical percentage of rooms occupied during peak times, and the average number of people and vehicles per room during peak times. Detailed data was not available for all facilities. The average values from the hotels that did provide data was applied to those facilities that did not have data available.

There are several small local parks (Naranja Park, Goulds Park, etc.) located in the EPZ. It is assumed that the visitors to these parks are EPZ residents. A phone call was made to the Homestead Sports Complex which includes a small baseball stadium. It was indicated that all patrons of this facility live locally; therefore, this was not included in the transient analysis.

Table 3-4 is a compilation of estimated transients and their vehicles, segregated by area. As shown later in Section 5, it is estimated that transients require up to 2 hours to prepare for their evacuation trips. Based on observation, the time required by boaters to leave the parking area is well within this estimate.

Some transients staying overnight at lodging facilities may elect to return to these facilities to retrieve their belongings. The analysis reveals from the model output that the average speed of travel exceeds 20 mph over the initial 50 minutes following the advisory to evacuate. Therefore, an average travel distance of 20 miles translates into travel time of less than 30 minutes, well within the estimated mobilization time for transients.

3.3 Employees

Employees who work in the EPZ fall into two categories:

- Those who live and work in the EPZ.
- Those who live outside of the EPZ and commute to jobs in the EPZ.

Those of the first category are already counted as part of the permanent resident population. To avoid double-counting, the focus is on those commuting employees who will evacuate along with the permanent resident population.

Journey-to-work employment data was obtained from census data (via the Florida journey-to-Work website[1]) for the year 2000, with commuter patterns organized by destination. The data was collated for each municipality that is either completely or partially located in the EPZ. The data for all workers in these EPZ municipalities was then analyzed to estimate those workers originating from areas outside of the EPZ. Those who work in the EPZ and have origins outside the EPZ were summed to get total employment figures for the EPZ. For municipalities that are partially located in the EPZ, the proportion of the population living in the EPZ was applied to those workers who have origins in that municipality in order to estimate those who work in the EPZ but reside outside the EPZ. For example, South Miami Heights is partially within the EPZ, while Naranja is completely within the EPZ. There are 35 employees working in Naranja who originate from South Miami Heights. Twenty-five percent of the population within South Miami Heights reside in the EPZ. Thus, of the 35 employees who work in Naranja and live in South Miami Heights, 75 percent (100–25 percent) are non-EPZ residents for a total of 26 employees in Naranja who are non-EPZ residents commuting from South Miami Heights. Differentiating between employees who are EPZ residents and those who are not is necessary to avoid double-counting those people who both live and work in the EPZ. The results of the analysis are presented in Table 3-5.

Land use was examined from overhead imagery using Google Earth to determine the percentage of employment located in the EPZ for those municipalities that are only partially within the EPZ. Overhead imagery was also used to distribute the employment for each municipality. Nearly all major employment centers are located on or close to U.S. Highway 1. Employment figures for the PTN were added to the journey-to-work data to estimate the total employment for the EPZ. It is conservatively assumed that 100 percent of the employees at the plant live outside the EPZ. Finally, it is assumed that there is no employment in the Monroe County portion of the EPZ. Yearly employment statistics for Miami-Dade County were obtained from the U.S. Department of Labor website and used to estimate a yearly employment growth rate, which was in turn used to project employment data to the year 2009.

Appendix E provides a map of the major employers within the EPZ. Total employment for each municipality was divided up evenly among the major employers within the municipality.

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[1] http://www.j2w.usf.edu/default.asp?l=f

An occupancy of 1.09 persons per employee vehicle (some carpooling) obtained from the telephone survey was used to determine the number of evacuating employee vehicles.

There are 19,767 employees commuting daily into the EPZ. These employees use 18,135 vehicles. Table 3-6 summarizes the employees commuting into the EPZ by area. Figures 3-6 and 3-7 present non-EPZ resident employee data by sector.

3.4 Special Events

1. <u>Construction</u>

A special event scenario (Scenario 11) represents a typical winter, midweek, and midday with construction workers at the Turkey Point site constructing the new units (Units 6 & 7) when an emergency occurs at the operational units (Units 3 & 4). Based on discussions with Bechtel, the peak construction will be in 2016 with target dates of operation of 2018 and 2020 for Units 6 & 7, respectively. During the peak, 3515 construction workers will be present and 135 operations personnel for a total workforce of 3650 people. As stated in the *Turkey Point Power Plant Peak Construction Analysis*[1], the workforce will be split amongst two shifts: Shift 1 from 6:00 AM to 4:30 PM will account for 70% of the workforce and Shift 2 from 5:00 PM to 3:00 AM will account for the remaining 30% of the workforce. A conservative vehicle occupancy of 1.0 worker per vehicle is assumed to estimate the additional vehicle demand servicing construction workers. In addition, there will be a maximum of 36 trucks per hour entering and exiting the construction site. The ETE analysis models trucks as two passenger car equivalents to account for their larger size and more sluggish operating characteristics. Thus, there are 3,650 workers x 70% ÷ 1.0 workers per vehicle + 36 trucks x 2.0 vehicles per truck = 2,627 additional vehicles evacuating for the peak construction scenario.

It is assumed that 359th Street will be paved between the construction site and 137th Avenue and that 117th Avenue will be paved between 359th Street and 344th Street; these changes have been modeled in the link-node analysis network used for the ETE analysis (see Figure 1-2). The roadway and intersection improvements identified in Figure 2 and Figures 5 through 10 of the *Turkey Point Power Plant Peak Construction* Analysis have also been modeled in the link-node analysis network. Permanent resident population and shadow population are extrapolated

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[1] *Turkey Point Power Plant Peak Construction Analysis*, Traf Tech Engineering, Inc., April 2009

to 2016 for this scenario assuming the same population growth rates used to extrapolate from 2000 to 2009.

2. Homestead-Miami Speedway

The Homestead-Miami Speedway is in Area 8, approximately 5 miles west of Turkey Point. The speedway annually hosts racing events that can attract as many as 100,000 people. There are fewer than five of these events in a given year. Most of the fans at these races are transients; however, they have not been included in the transient population because this influx of population is not typical. Contra-flow lanes and a detailed traffic management plan are used during major events at the speedway. Given the infrequency of these events and the customized traffic control applied, it was not considered as a scenario. However, sensitivity studies were conducted to explore the effect on ETE of the additional vehicles present within the EPZ for an event at the speedway. Further discussion on the speedway and on the sensitivity study can be found in Appendix I.

3.5 Medical Facilities

There are many medical facilities in the EPZ. Chapter 8 details the ETEs for the patients residing in these facilities. The number and type of evacuating vehicles that need to be provided depends on the state of health of the patients. Buses can transport up to 40 people; vans up to 12 people; ambulances up to two people (patients).

3.6 Pass-Through Demand

Vehicles will be traveling through the EPZ (external-external trips) at the time of an accident. After the advisory to evacuate is announced, these through-travelers will also evacuate. These through-vehicles are assumed to travel on the major pass-through routes in the EPZ (U.S. Highway 1 and the Florida Turnpike). It is assumed that this traffic will continue to enter the EPZ during the first 90 minutes following the advisory to evacuate. Access control points will be manned at 90 minutes, directing the flow of traffic from entering the EPZ. Average annual daily traffic data were obtained from the Florida Department of Transportation website[1]. The data obtained was used to calculate the peak hourly flow for the major pass-through routes in the EPZ. Fifty percent of this peak hourly flow was included in the analysis as pass-through

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[1] http://www.dot.state.fl.us/planning/statistics/trafficdata/maps/default.htm

demand; 2414 vehicles per hour on the Florida Turnpike (State Road 821) southbound, 2280 vehicles per hour on the South Dade Expressway (State Road 874), 1205 vehicle on U.S. Highway 1 southbound, and 430 vehicles per hour on U.S. Highway 1 northbound from the Florida Keys. Thus, over the 90-minute period that pass-through demand is assumed to be flowing, 9492 vehicles pass through the EPZ.

Table 3-1
Yearly Rate of Population Change by Municipality

Municipality	2000 Census Population	2006[(a)] Census Population Estimate	Yearly Rate of Population Change
Florida City	7843	9445	3.10%
Homestead	31,909	53,767	8.70%
Miami-Dade County	1,623,018	1,787,636	1.07%
Monroe County	79,589	74,737	–1.05%

(a) The U.S. Census Bureau provides mid-decade population estimates between the major Census updates (every 10 years); the latest updates provided on the Census website are for 2006. These periodic updates are only available for counties and selected cities. 2006 Census updates are not available for other census designated places (i.e., Naranja, Goulds, etc.) within the study area. County-specific growth rates were used for these areas.

Table 3-2
EPZ Permanent Resident Population

Area	2000 Population	2009 Population
1	0	0
2	0	0
3	0	0
4	5217	7197
5	33,753	37,152
6	29,087	32,016
7	15,288	16,828
8	55,982	92,883
9	409	450
10	932	848
Total	**140,668**	**187,374**
Population Growth:		33.2%

Table 3-3. Permanent Resident Population and Vehicles by Area

Area	2009 Population	2009 Vehicles
1	0	0
2	0	0
3	0	0
4	7197	3151
5	37,152	16,262
6	32,016	14,014
7	16,828	7,365
8	92,883	40,654
9	450	197
10	848	371
Total	**187,374**	**82,014**

Table 3-4
Transient Population and Vehicles by Area

Area	Transients	Transient Vehicles
1	0	0
2	0	0
3	0	0
4	2400	570
5	0	0
6	8851	3590
7	518	166
8	7286	2516
9	0	0
10	0	0
Total	**19,055**	**6,842**

Table 3-5
Turkey Point — Employment by Municipality

	2000 Census — Journey to Work Statistics						2009 Data	
	Total Employment	**Employees who are not EPZ residents**	**Employees who are EPZ residents**	**Percent Employees who reside outside EPZ**	**Percent Municipality Employment Centers in EPZ**	**Adjusted employees who are not EPZ residents[(a)]**	**Non-EPZ resident employees[(b)]**	**Vehicles**
Cutler Ridge	5242	3355	1887	64%	100%	3355	3790	3477
South Miami Heights	4250	3325	925	78%	10%	333	376	345
Goulds	802	522	280	65%	100%	522	590	541
Homestead	14,931	8576	6355	57%	100%	8576	9688	8888
Lakes by the Bay	875	466	409	53%	100%	466	526	483
Princeton	1253	650	603	52%	100%	650	734	674
Leisure City	1354	639	715	47%	100%	639	722	662
Naranja	954	456	498	48%	100%	456	515	473
Florida City	2286	1203	1083	53%	100%	1203	1358	1246
Turkey Point Nuclear Power Plant	**CURRENT EMPLOYMENT FIGURES PROVIDED BY FPL**						1467	1346
TOTAL EMPLOYMENT	31,947	19,192	12,755	60%	N/A	16,200	19,767	18,135

(a) Calculated as the product of “Employees who are not EPZ Residents” and “% Municipality Employment Centers in EPZ”.
(b) U.S. Department of Labor statistics indicate that Miami-Dade County had 967,543 employees at the end of 2003 and 1,007,587 employees at the end of 2006, equivalent to an exponential growth rate of 1.35% per year. This growth rate was used to extrapolate employment data to 2009.

Table 3-6
Employees and Vehicles Commuting into the EPZ by Area

Area	Employees	Employee Vehicles
1	1467	1346
2	0	0
3	0	0
4	0	0
5	2499	2293
6	3517	3227
7	696	639
8	11,588	10,631
9	0	0
10	0	0
Total	**19,767**	**18,135**

Figure 3-1. Turkey Point Plant Permanent Resident Population by Area

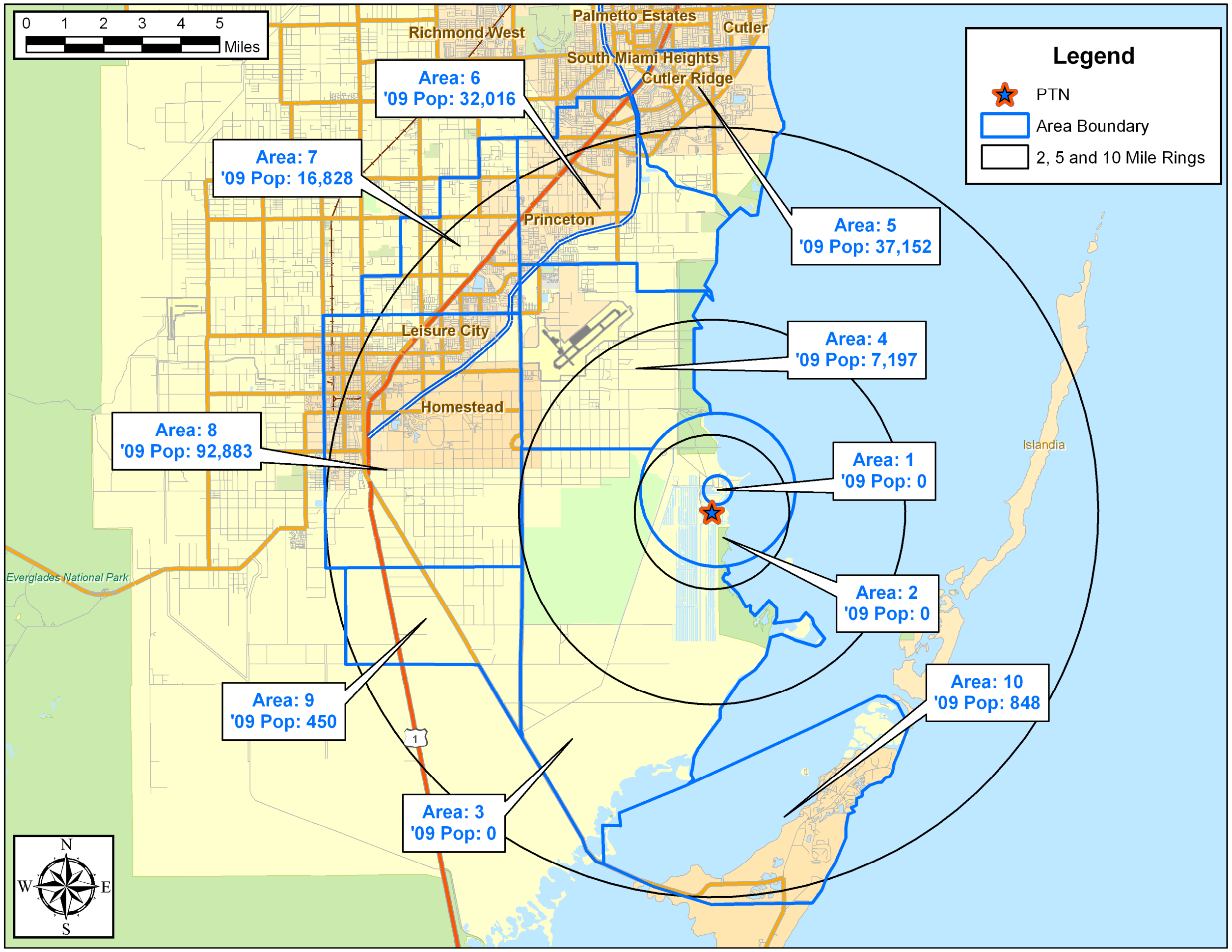
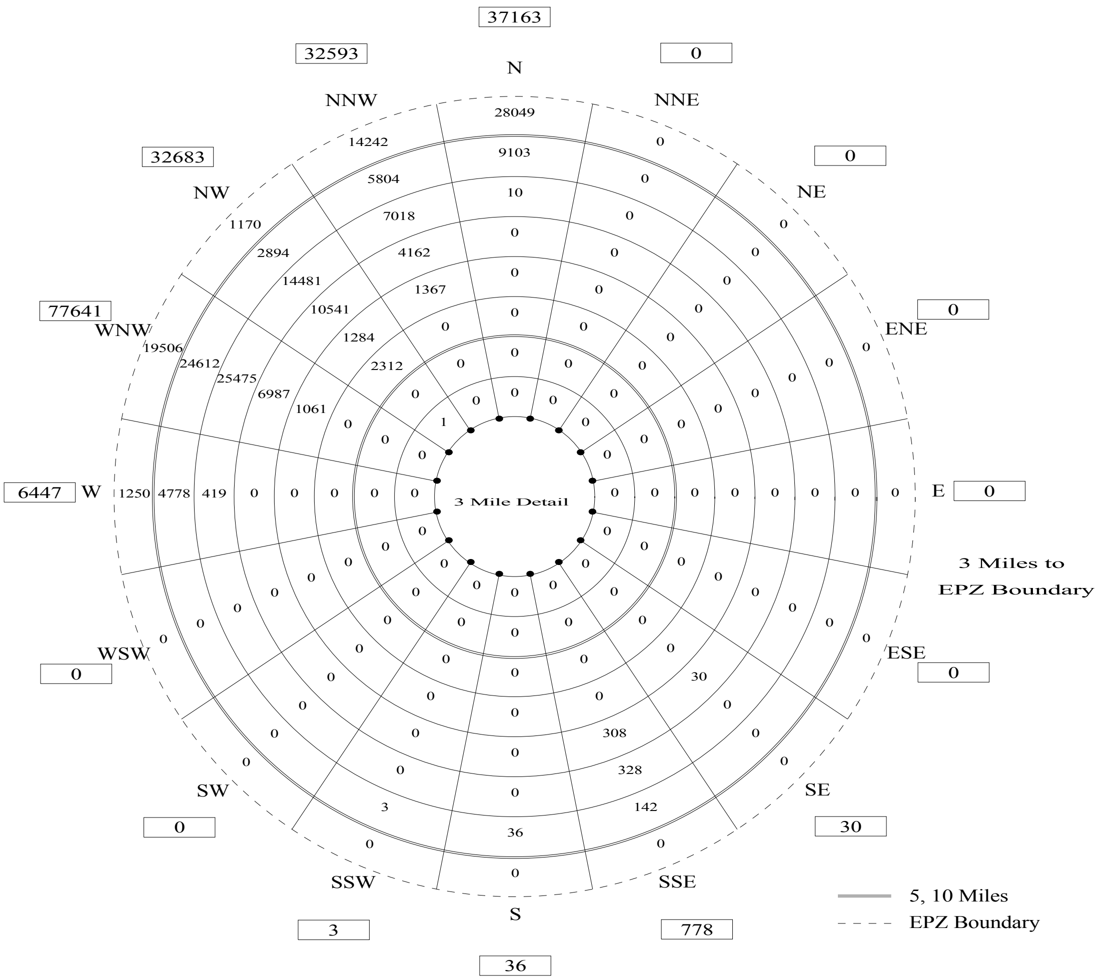


Figure 3-2. Permanent Residents by Sector



Resident Population			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	1	0-3	1
3-4	1	0-4	2
4-5	0	0-5	2
5-6	2312	0-6	2314
6-7	3712	0-7	6026
7-8	22028	0-8	28054
8-9	47731	0-9	75785
9-10	47372	0-10	123157
10-EPZ	64217	0-EPZ	187374

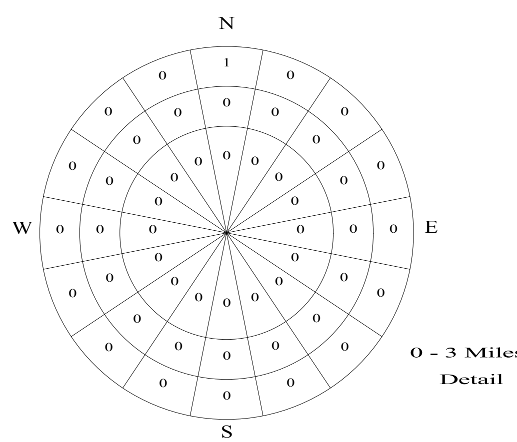
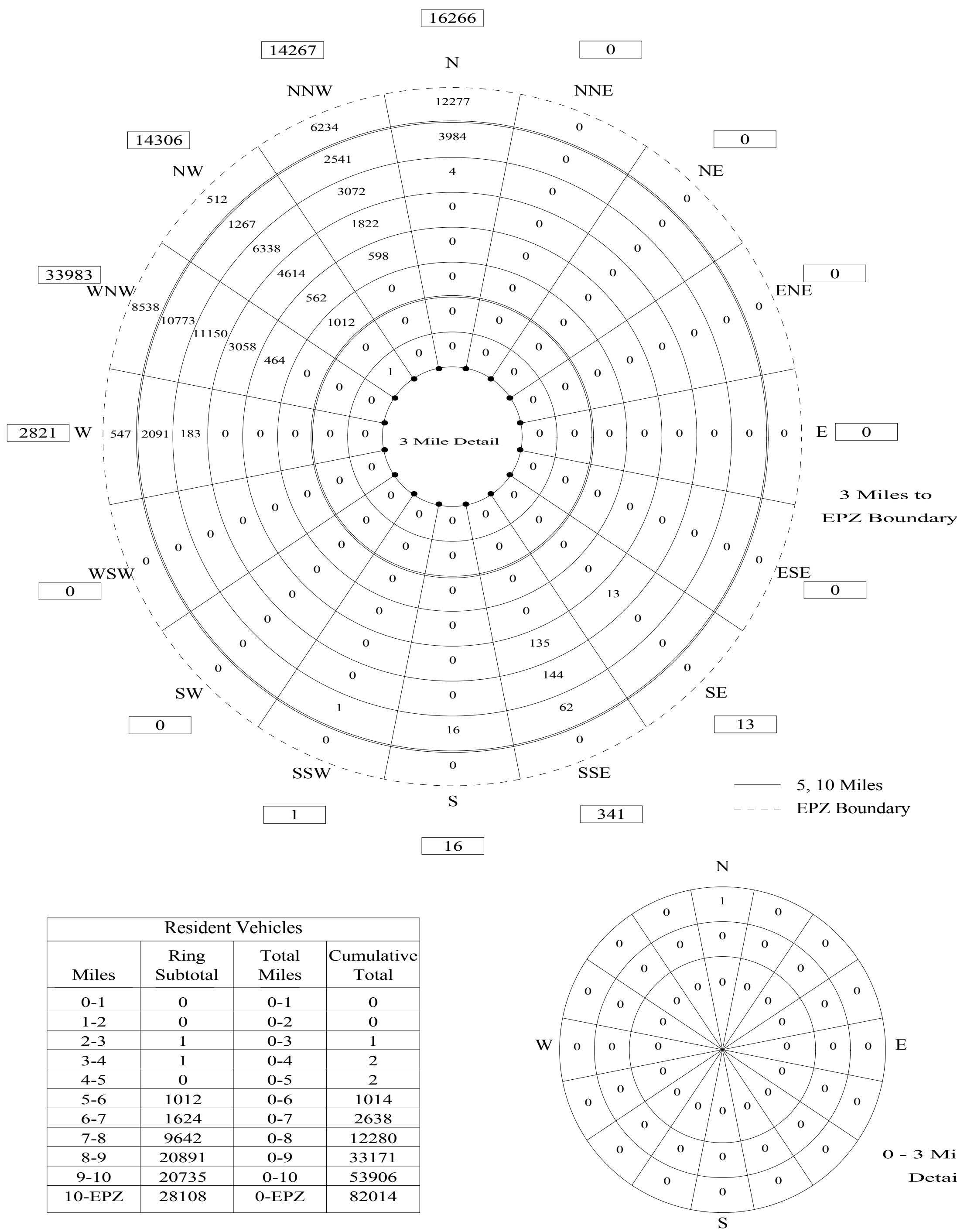
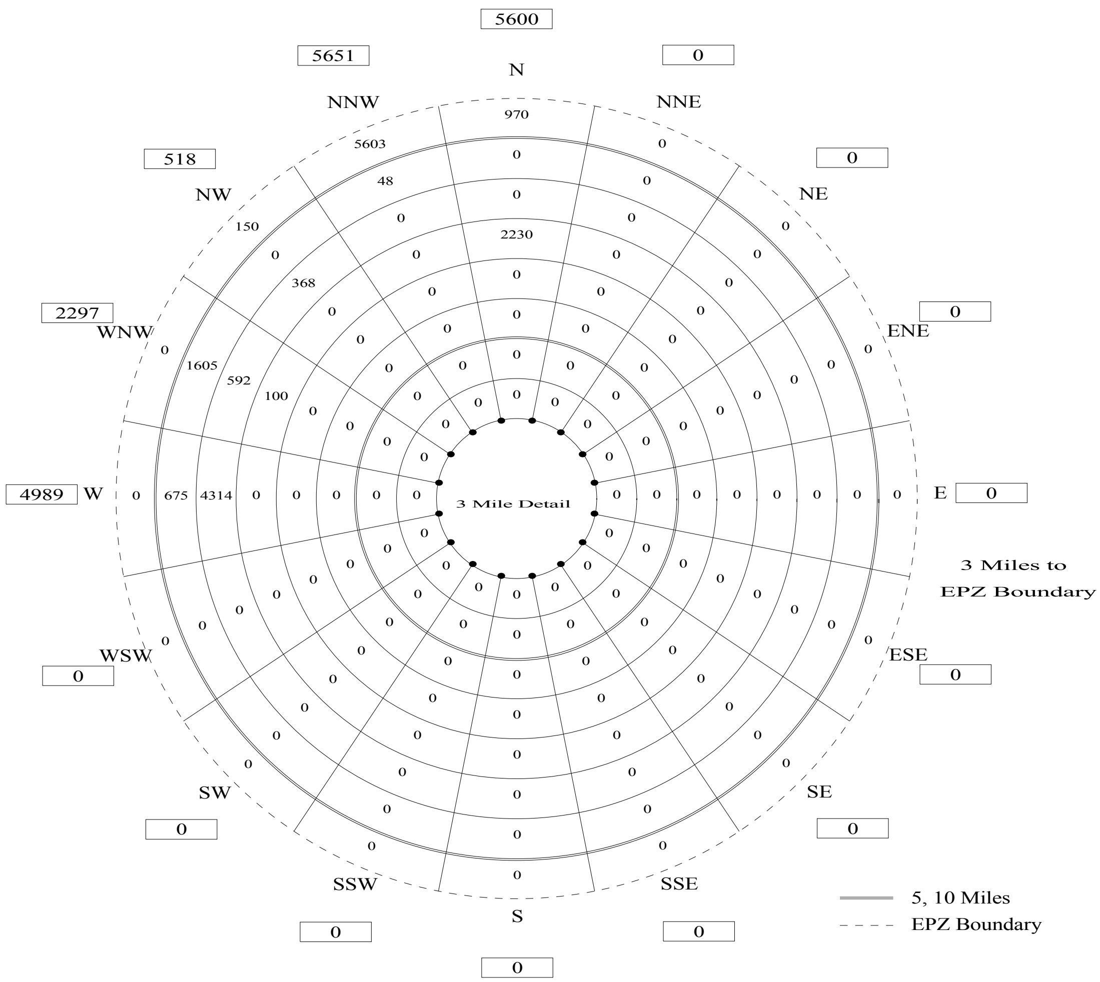


Figure 3-3. Permanent Resident Vehicles by Sector



Resident Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	1	0-3	1
3-4	1	0-4	2
4-5	0	0-5	2
5-6	1012	0-6	1014
6-7	1624	0-7	2638
7-8	9642	0-8	12280
8-9	20891	0-9	33171
9-10	20735	0-10	53906
10-EPZ	28108	0-EPZ	82014

Figure 3-4. Transient Population by Sector



Transient Population			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	2400	0-3	2400
3-4	0	0-4	2400
4-5	0	0-5	2400
5-6	0	0-6	2400
6-7	0	0-7	2400
7-8	2330	0-8	4730
8-9	5274	0-9	10004
9-10	2328	0-10	12332
10-EPZ	6723	0-EPZ	19055

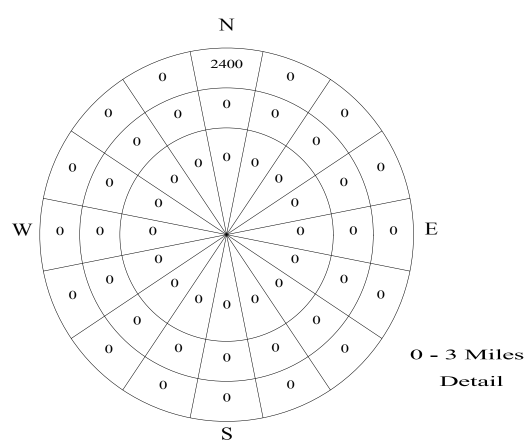
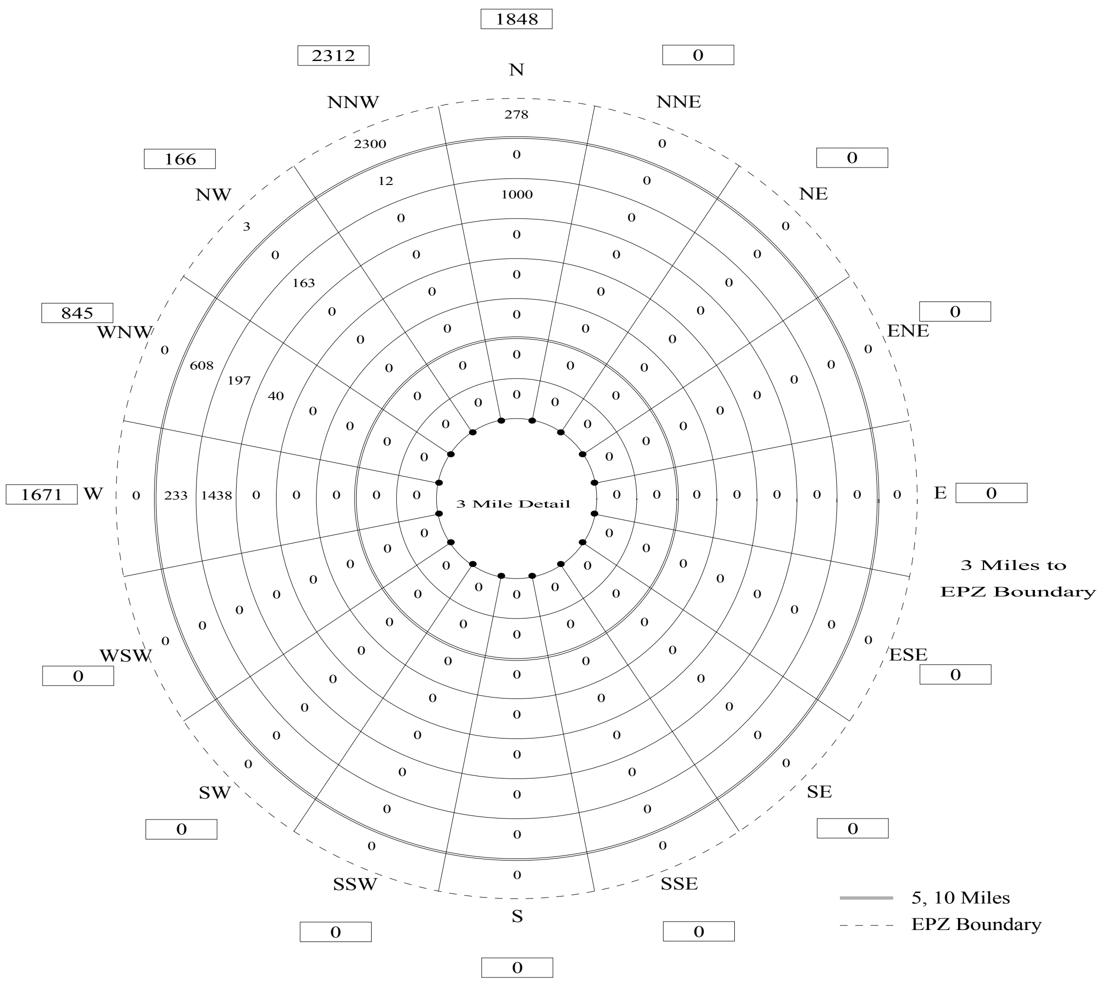


Figure 3-5. Transient Vehicles by Sector



Transient Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	0	0-1	0
1-2	0	0-2	0
2-3	570	0-3	570
3-4	0	0-4	570
4-5	0	0-5	570
5-6	0	0-6	570
6-7	0	0-7	570
7-8	40	0-8	610
8-9	2798	0-9	3408
9-10	853	0-10	4261
10-EPZ	2581	0-EPZ	6842

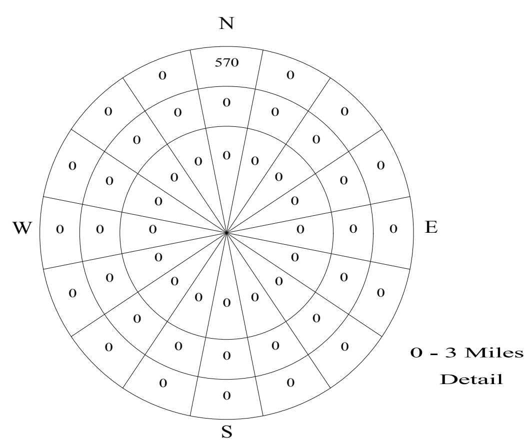
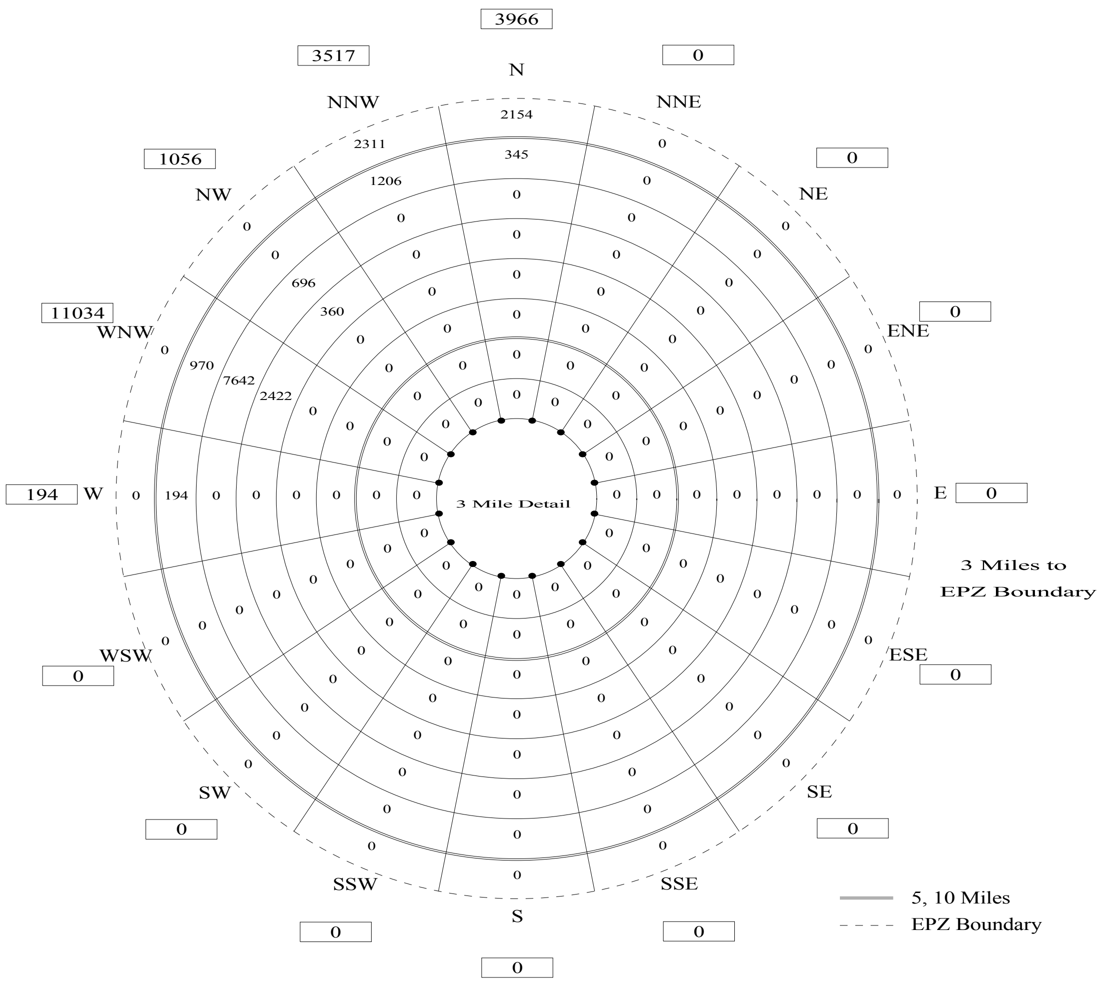


Figure 3-6. Employee Population by Sector



Employees			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	1467	0-1	1467
1-2	0	0-2	1467
2-3	0	0-3	1467
3-4	0	0-4	1467
4-5	0	0-5	1467
5-6	0	0-6	1467
6-7	0	0-7	1467
7-8	2782	0-8	4249
8-9	8338	0-9	12587
9-10	2715	0-10	15302
10-EPZ	4465	0-EPZ	19767

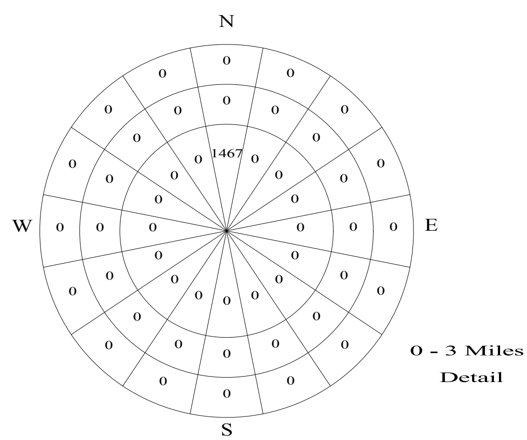
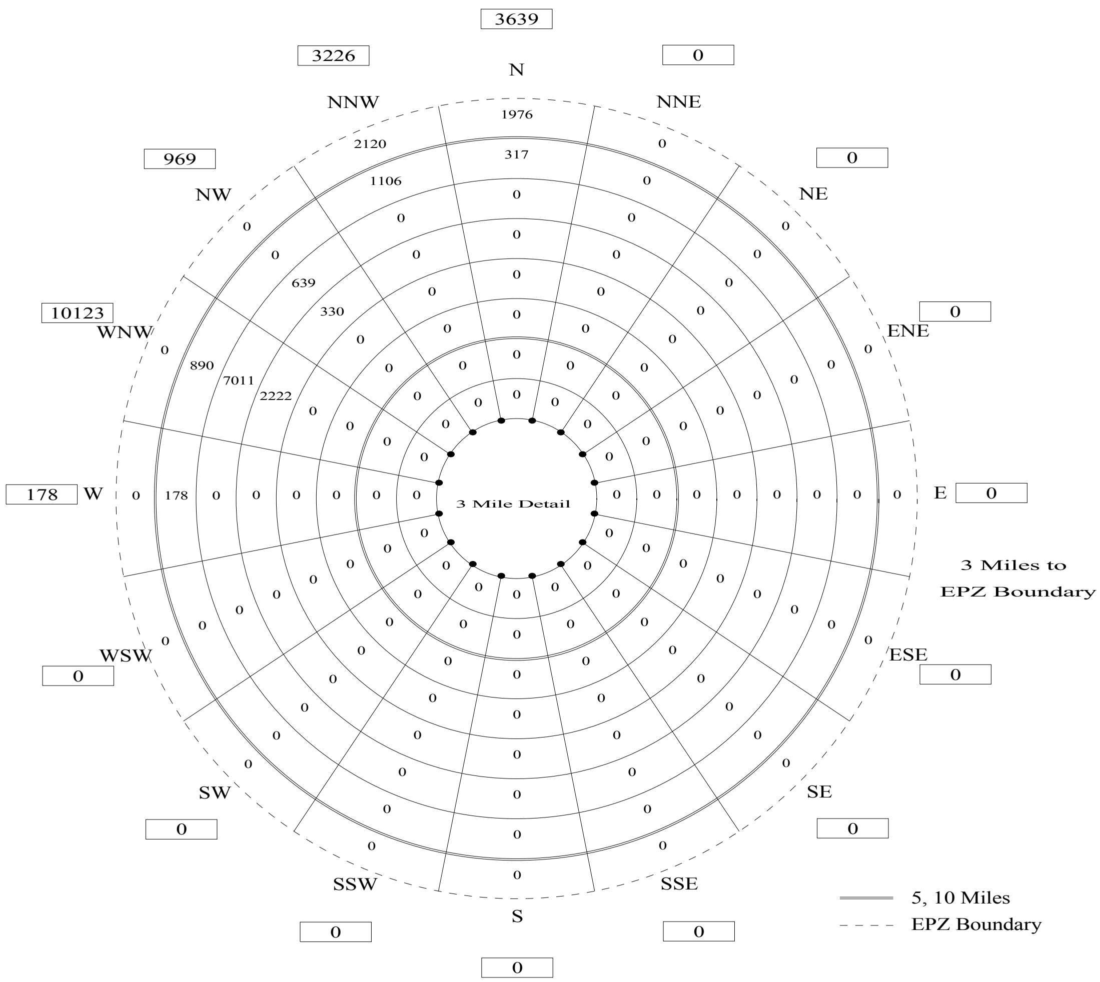
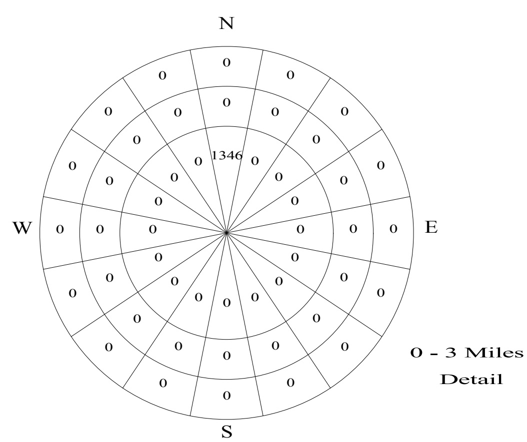


Figure 3-7. Employee Vehicles by Sector



Employee Vehicles			
Miles	Ring Subtotal	Total Miles	Cumulative Total
0-1	1346	0-1	1346
1-2	0	0-2	1346
2-3	0	0-3	1346
3-4	0	0-4	1346
4-5	0	0-5	1346
5-6	0	0-6	1346
6-7	0	0-7	1346
7-8	2552	0-8	3898
8-9	7650	0-9	11548
9-10	2491	0-10	14039
10-EPZ	4096	0-EPZ	18135



4. ESTIMATION OF HIGHWAY CAPACITY

The ability of the road network to service vehicle demand is a major factor in determining how rapidly an evacuation can be completed. The capacity of a road is defined as the maximum hourly rate at which people or vehicles can reasonably be expected to traverse a point or uniform section of a lane of roadway during a given time period under prevailing roadway, traffic, and control conditions as stated in the 2000 Highway Capacity Manual (HCM2000).

In discussing capacity, different operating conditions have been assigned alphabetical designations, A through F, to reflect the range of traffic operational characteristics. These designations have been termed levels of service (LOS). For example, LOS A connotes free-flow and high-speed operating conditions; LOS F represents a forced flow condition. LOS E describes traffic operating at or near capacity.

Another concept, closely associated with capacity, is service volume. Service volume is defined as “the maximum hourly rate at which vehicles, bicycles, or persons reasonably can be expected to traverse a pint or uniform section of a roadway during an hour under specific assumed conditions while maintaining a designated level of service.” This definition is similar to that for capacity. The major distinction is that values of service volume vary from one LOS to another, while capacity is there service volume at the upper bound of LOS E, only.

This distinction is illustrated in Exhibit 12-15 of the HCM2000. As indicated there, the service volume varies with free-flow speed, terrain, and LOS. However, the service volume at LOS E (which approximates capacity) varies only with terrain. This exhibit was referenced when estimating capacity for two-lane rural highways within the EPZ and shadow region. These highways are predominant within the analysis network.

Other factors also influence capacity. These include, but are not limited to:

- Lane width
- Shoulder width
- Pavement condition
- Percent truck traffic
- Weather conditions (rain, snow, fog, wind speed, ice)

These factors are considered during the road survey and in the capacity estimation process. Some factors have greater influence on capacity than others. For example, lane and shoulder width have only a limited influence on free-flow speed according to Exhibit 20-5 of the HCM2000. Consequently, lane and shoulder widths at the narrowest points were observed during the road survey and these observations were recorded, but no detailed measurements of lane or shoulder width were taken. The estimated free-flow speed was measured using the survey vehicle's speedometer.

As described in Section 2.3, it is necessary to adjust capacity figures to represent the prevailing conditions during inclement weather. Based on limited empirical data, weather conditions, such as rain, reduce the values of free speed and of highway capacity by approximately 10 percent. Over the last decade, new studies have been made on the effects of rain on traffic capacity. These studies indicate a range of effects between 5 and 20 percent depending on wind speed and precipitation rates.

Given the suburban character of the EPZ, its high population density in sections of the EPZ (especially between 5 and 10 miles from the plant), and the availability of well-maintained highways, congestion arising from evacuation is likely to be significant in certain areas. As such, estimates of roadway capacity must be determined with great care.

Rural highways generally consist of: (1) one or more uniform sections with limited access (driveways, parking areas) characterized by uninterrupted flow, and (2) approaches to at-grade intersections where flow can be interrupted by a control device or by turning or crossing traffic at the intersection. Because of these differences, separate estimates of capacity must be made for each section. Often, the approach to the intersection is widened by the addition of one or more lanes, to compensate for the lower capacity of the approach due to the factors there that can interrupt the flow of traffic.

Capacity Estimations on Approaches to Intersections

At-grade intersections are apt to become the first bottleneck locations under local heavy traffic volume conditions. This characteristic reflects the need to allocate access time to the respective competing traffic streams by exerting some form of control. During evacuation, control at critical intersections will often be provided by traffic control personnel assigned for that purpose, whose directions may supersede traffic control devices. The traffic management plan identifies these locations, traffic control points, and the management procedures applied.

The per-lane capacity of an approach to a signalized intersection can be expressed (simplistically) in the following form:

$$Q_{cap,m} = \left(\frac{3600}{h_m}\right) \bullet \left[\frac{G-L}{C}\right]_m = \left(\frac{3600}{h_m}\right) \bullet P_m$$

where:

$Q_{cap,m}$ = Capacity of a single lane of traffic on an approach, which executes movement, upon entering the intersection; vehicles per hour

h_m = Mean queue discharge headway of vehicles on this lane that are executing movement, *m*; seconds per vehicle

G = Mean duration of GREEN time servicing vehicles that are executing movement, *m*, for each signal cycle; seconds

L = Mean "lost time" for each signal phase servicing movement, *m*; seconds

C = Duration of each signal cycle; seconds

P_m = Proportion of GREEN time allocated for vehicles executing movement, *m*, from this lane. This value is specified as part of the control treatment

m = The movement executed by vehicles after they enter the intersection: through, left-turn, right-turn, and diagonal

The turn-movement-specific mean discharge headway h_m, depends in a complex way on many factors: roadway geometrics, turn percentages, the extent of conflicting traffic streams, the control treatment, and others. A primary factor is the value of "saturation queue discharge headway", h_{sat}, which applies to through vehicles that are not impeded by other conflicting traffic streams. This value, itself, depends upon many factors including motorist behavior. Formally, we can write,

$$h_m = f_m (h_{sat}, F_1, F_2, ...)$$

where:

h_{sat} = Saturation discharge headway for through vehicles; seconds per vehicle

F_1, F_2 = The various known factors influencing h_m

$f_m(\cdot)$ = Complex function relating h_m to the known (or estimated) values of $h_{sat}, F_1, F_2, \ldots$

The estimation of h_m for specified values of $h_{sat}, F_1, F_2, \ldots$ is undertaken within the personal computer dynamic evacuation model (PC-DYNEV) simulation model and within the traffic assignment and distribution model by a mathematical model[1]. The resulting values for h_m always satisfy the condition:

$$h_m \geq h_{sat}$$

That is, the turn-movement-specific discharge headways are always greater than or equal to the saturation discharge headway for through vehicles. These headways (or its inverse equivalent, saturation flow rate) may be determined by observation or using the procedures of the HCM2000.

The previous discussion is necessarily brief given the scope of this ETE report and the complexity of the subject of intersection capacity. In fact, the two longest chapters in the HCM2000 (16 and 17), each well over 100 pages, address this topic. The factors, F_1, F_2, …, influencing saturation flow rate are indentified in Equation 16-4 and Exhibit 16-7 of the HCM2000; Exhibit 10-12 identifies the required data and Exhibit 10-7 presents representative values of service volume.

Capacity Estimation along Freeway Sections

The capacity of highway sections (as distinct from approaches to intersections) is a function of roadway geometrics, traffic composition (e.g., percent heavy trucks and buses in the traffic stream) and, of course, motorist behavior. There is a fundamental relationship that relates service volume (i.e., the number of vehicles serviced within a uniform highway section in a given time period) to traffic density. Figure 4-1 describes this relationship.

As indicated, there are two flow regimes: (1) free-flow (left side of curve), and (2) forced flow (right side). In the free-flow regime, the traffic demand is fully serviced; the service volume increases as demand volume and density increase, until the service volume attains its

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1 Lieberman, E., "Determining Lateral Deployment of Traffic on an Approach to an Intersection," McShane, W. & Lieberman, E., "Service Rates of Mixed Traffic on the far Left Lane of an Approach." Both papers appear in Transportation Research Record 772, 1980.

maximum value, which is the capacity of the highway section. As traffic demand and the resulting highway density increase beyond this critical value, the rate at which traffic can be serviced (i.e., the service volume) can actually decline below capacity. Therefore, to realistically represent traffic performance during congested conditions (i.e. when demand exceeds capacity), it is necessary to estimate the service volume, V_F, under congested conditions.

The value of V_F can be expressed as:

$$V_F = R \times \text{capacity}$$

where R = reduction factor which is less than unity.

Based on empirical data collected on freeways, a value of R=0.85 was employed. It is important to mention that some investigators, on analyzing data collected on freeways, conclude that little reduction in capacity occurs even when traffic is operating at LOS F. While there is conflicting evidence on this subject, a conservative approach was adopted and a value of service volume, V_F, which is applied during LOS F conditions; V_F, is lower than the specified capacity was used.

The advisability of such a capacity factor is based on empirical studies that identified a fall-off in the service flow rate when congestion occurs at bottlenecks or choke points on a freeway system. Zhang and Levinson[1] describe a research program that collected data from a computer-based surveillance system (loop detectors) installed on the Interstate Highway System with 27 active bottlenecks in the twin cities metropolitan area in Minnesota over a 7-week period. When flow breakdown occurs, queues are formed that discharge at lower flow rates than the maximum capacity before the breakdown is observed. These queue discharge flow rates vary from one location to the next and also vary by day of week and time of day based on local circumstances. The cited reference presents a mean queue discharge flow of 2016 passenger cars per hour per lane. This figure compares with the nominal capacity estimate of 2250 passenger cars per hour per lane estimated for the ETE and indicated in Appendix K for freeway links. The ratio of these two numbers is 0.896, which translates into a capacity reduction factor of 0.90. The data collected in the cited reference indicates that the variation of queue discharge flow at a location is generally in the range of +/- 5 percent about the average queue discharge flow. That is, the lower tail of this distribution would be equivalent to a capacity reduction factor of 0.90 - 0.05 = 0.85 which the figure adopted.

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1 Lei Zhang and David Levinson, “Some Properties of Flows at Freeway Bottlenecks,” Transportation Research Record 1883, 2004.

It can be seen that a conservative view was taken in estimating the capacity at bottlenecks when congestion develops (this capacity, of course, is the queue discharge flow rate previously described). One could argue that a more representative value for this capacity reduction factor could be 0.90 as previously described. Given the emergency conditions, it is believed that a conservative stance is justified. Therefore, a factor of 0.85 was applied only when flow breaks down, as determined by the simulation model.

Rural roads, like freeways, are classified as uninterrupted flow facilities (this is in contrast with urban street systems that have closely spaced signalized intersections and are classified as interrupted flow facilities). As such, traffic flow along rural roads is subject to the same effects as freeways in the event traffic demand exceeds the nominal capacity, resulting in queuing and queue discharge flow rates. As a practical matter, rural roads rarely break down at locations away from intersections. The breakdowns on rural roads that are experienced on this network occur at intersections where other model logic applies. Therefore, the application of a factor of 0.85 is appropriate on rural roads but rarely, if ever, activated.

The estimated value of capacity is based primarily on the type of facility and on roadway geometrics. Sections of roadway with adverse geometrics are characterized by lower free-flow speeds and lane capacity. Table 12-15 in the HCM2000 was referenced to estimate saturation flow rates. The impact of narrow lanes and shoulders on free-flow speed and on capacity is not material, particularly when flow is predominantly in one direction.

The procedure used here was to estimate section capacity, V_E, based on observations made traveling over each section of the evacuation network, by the posted speed limits and travel behavior of other motorists and by reference to the HCM2000. It was then determined for each highway section, represented as a network link, whether its capacity would be limited by the section-specific service volume, V_E , or by the intersection-specific capacity. For each link, the model selects the lower value of capacity.

Application to the Turkey Point EPZ

As part of the development of the Turkey Point EPZ traffic network, an estimate of roadway capacity is required. The source material for the capacity estimates presented here is contained in:

> 2000 Highway Capacity Manual (HCM)
> Transportation Research Board
> National Research Council, Washington, D.C.

The highway system in the Turkey Point EPZ consists primarily of three categories of roads and, of course, intersections:

- Two-lane roads: local, state
- Multilane highways (at-grade)
- Freeways (Florida Turnpike)

Each of these classifications will be addressed.

Two-Lane Roads

Ref: HCM Chapters 12 and 20

Two-lane roads comprise the majority of highways within the EPZ. The per-lane capacity of a two-lane highway is estimated at 1700 passenger cars per hour. This estimate is essentially independent of the directional distribution of traffic volume except that, for extended distances, the two-way capacity will not exceed 3200 passenger cars per hour. The HCM2000 procedures then estimate LOS and average travel speed. The evacuation simulation model accepts the specified value of capacity as input and computes average speed based on the time-varying demand: capacity relations.

Based on the field survey and on expected traffic operations associated with evacuation scenarios:

- Most sections of two-lane roads within the EPZ are classified as Class I with level terrain
- Class II highways are mostly those within city limits

Multilane Highway

Ref: HCM2000 Chapters 12 and 21

Exhibit 21-23 (in the HCM2000) presents a set of curves that indicates a per-lane capacity of approximately 2100 passenger cars per hour, for free-speeds of 55–60 mph. Based on observation, the multilane highways outside of urban areas within the EPZ service traffic with free-speeds in this range. The actual time-varying speeds computed by the simulation model reflect the demand: capacity relationship and the impact of control at intersections.

Chapter 12 presents the basic concepts underlying the procedures in Chapters 20 and 21.

Freeways

Ref: HCM2000 Chapters 13, 22-25

Chapter 22 of the HCM2000 describes a procedure for integrating the results obtained in Chapters 23, 24, and 25, which compute capacity and LOS for freeway components. The discussion also references Chapter 31, which presents a description of simulation models. The simulation model, PC-DYNEV, automatically performs this integration process.

Chapter 23 of the HCM2000 presents procedures for estimating capacity and LOS for basic freeway segments. Exhibit 23-3 of the HCM2000 presents capacity versus free-speed estimates.

Free Speed:	55	60	65	70+
Per-Lane Capacity (passenger cars per hour):	2250	2300	2350	2400

The inputs to the simulation model are highway geometrics, free-speeds and capacity based on field observations. The simulation logic calculates actual time-varying speeds based on demand: capacity relationships.

Chapter 24 of the HCM2000 presents procedures for estimating capacity, speed, density, and LOS. The simulation model contains logic that relates speed to the demand volume: capacity ratio. The value of capacity obtained from Exhibit 24-8 (of the HCM2000), depends on the type and geometrics of the weaving segment and on the volume ratio (ratio of weaving volume to total volume).

Chapter 25 of the HCM2000 presents procedures for estimating capacities of ramps and of merge areas. The capacity of a merge area "is determined primarily by the capacity of the downstream freeway segment." Values of this merge area capacity are presented in Exhibit 25-7 of the HCM2000, and depend on the number of freeway lanes and on the freeway free speed. The KLD simulation model logic simulates the merging operations of the ramp and freeway traffic. If congestion results from an excess of demand relative to capacity, the model allocates service appropriately to the two entering traffic streams and produces LOS F conditions (the HCM2000 does not address LOS F explicitly).

Chapter 13 presents basic concepts underlying the procedures in the later chapters.

Intersections

Ref: HCM2000 Chapters 10, 16, 17

Procedures for estimating capacity and LOS for approaches to intersections are presented in Chapters 16 (signalized intersections) and 17 (un-signalized intersections). As previously mentioned, these are the two longest chapters in the HCM2000, reflecting the complexity of these procedures. The simulation logic is likewise complex, but different; as stated on pages 31-21 of the HCM2000:

> “Assumptions and complex theories are used in the simulation model to represent the real-world dynamic traffic environment.”

Simulation and Capacity Estimation

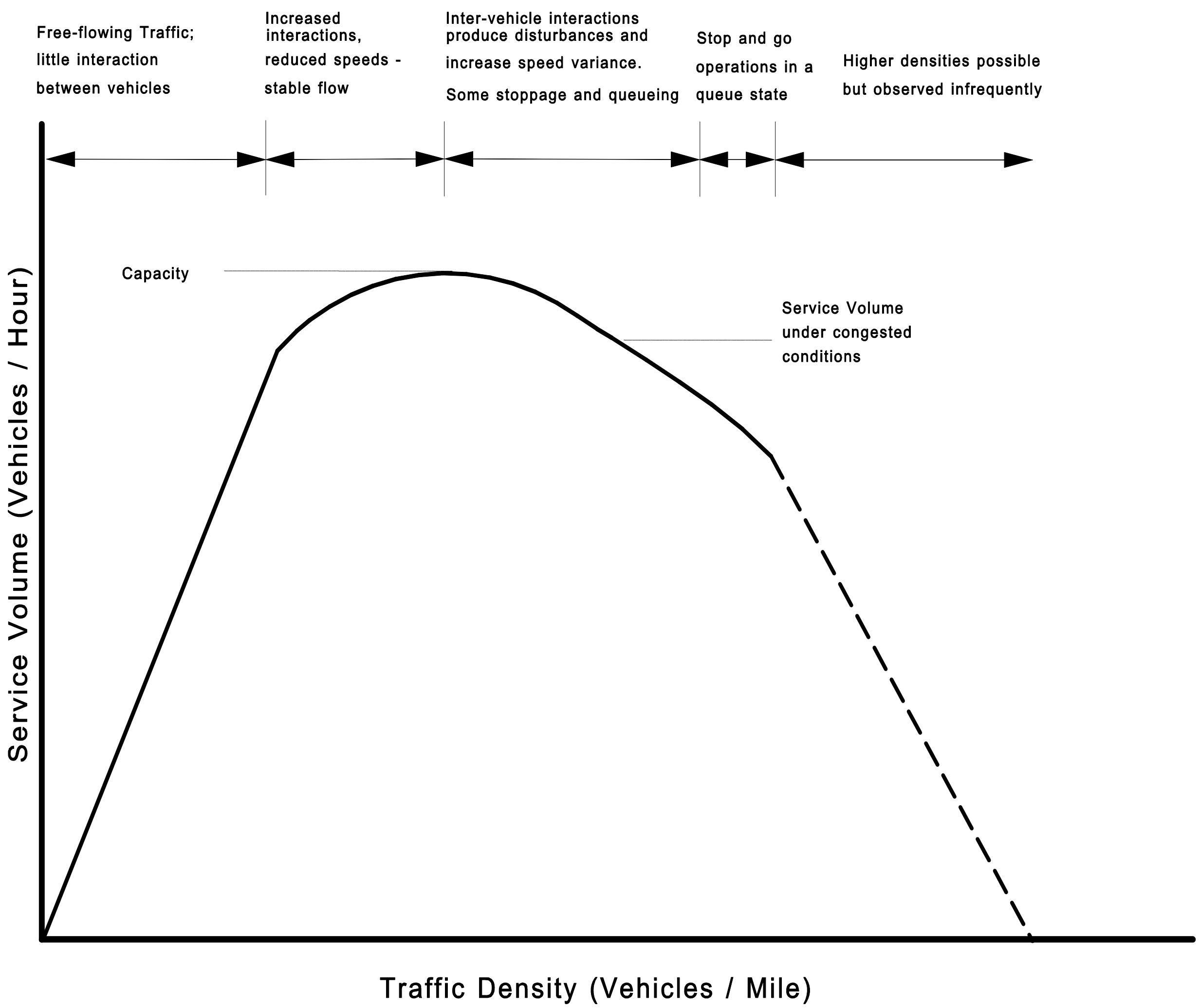
Chapter 31 of the HCM2000 is titled, *Simulation and other Models*. The lead sentence on the subject of traffic simulation models is:

> “Traffic simulation models use numerical techniques on a digital computer to create a description of how traffic behaves over extended periods of time for a given transportation facility or system…by stepping through time and across space, tracking events as the system state unfolds. Traffic simulation models focus on the dynamic of traffic flow.”

In general terms, this description applies to the PC-DYNEV model, which is further described in Appendix C. It is essential to recognize that simulation models do not replicate the methodology and procedures of the HCM2000 — they *replace* these procedures by describing the complex interactions of traffic flow and computing measures of effectiveness detailing the operational performance of traffic over time and by location.

All simulation models must be calibrated properly with field observations that quantify the performance parameters applicable to the analysis network. Two of the most important of these are: (1) free-flow speed, and (2) saturation headway, h_{sat}. The first of these is estimated by direct observation during the road survey. The second is estimated using the concepts of the HCM2000. These parameters are listed in Appendix K for each network link.

Figure 4-1. Fundamental Relationship Between Volume and Density



5. ESTIMATION OF TRIP GENERATION TIME

Federal government guidelines (see NUREG-0654, Appendix 4) specify that the planner estimate the distributions of elapsed times associated with mobilization activities undertaken by the public to prepare for the evacuation trip. The elapsed time associated with each activity is represented as a statistical distribution reflecting differences among members of the public. The quantification of these activity-based distributions relies largely on the results of the telephone survey (Appendix F). The composite of these distributions of elapsed times is defined as the trip generation time distribution.

Background

In general, an accident at a nuclear power plant is characterized by the following emergency action classification levels (see Appendix 1 of NUREG-0654 for details):

- Unusual event
- Alert
- Site area emergency
- General emergency

At each level, the federal guidelines specify a set of actions to be undertaken by the licensee, and by state and local offsite authorities. As a planning basis, a conservative posture will be adopted in accordance with federal regulations, that a rapidly escalating accident will be considered in calculating the trip generation time. It will be assumed that:

- The advisory to evacuate will be announced coincident with the emergency notification.
- Mobilization of the general population will begin up to 10 minutes after the alert notification.
- ETEs are measured relative to the advisory to evacuate.
- If schools are in session, transit assets would first be assigned to evacuate the children directly to host facilities outside the EPZ.

The adoption of this planning basis is not a representation that these events will occur at Turkey Point within the indicated time frame. Rather, these assumptions are necessary to:

- Establish a temporal framework for estimating the trip generation distribution in the format recommended in Appendix 4 of NUREG-0654.
- Identify temporal points of reference that uniquely define clear time and ETE.

It is more likely that a longer time will elapse between the various classes of an emergency at Turkey Point and that the advisory to evacuate is announced somewhat later than the siren alert.

For example, suppose 1 hour will elapse from the siren alert to the advisory to evacuate. In this case, it is reasonable to expect some degree of spontaneous evacuation by the public during this 1-hour period. As a result, the population within the EPZ will be lower when the advisory to evacuate is announced than at the time of the general emergency. Under these circumstances, the time needed to evacuate the EPZ after the advisory to evacuate will be less than the estimates presented in this report.

The notification process consists of two events:

- Transmitting information (e.g., using sirens, EAS broadcasts, and loud speakers).
- <u>Receiving</u> and correctly interpreting the information that is transmitted.

The peak population within the EPZ approximates 217,000 people[1] who are deployed over an area of approximately 190 square miles and engaged in a wide variety of activities. It must be anticipated that some time will elapse between the transmission and receipt of the information advising the public of an accident.

The amount of elapsed time will vary from one individual to the next depending where that person is, what that person is doing, and related factors. Furthermore, some people who will be directly involved with the evacuation process may be outside the EPZ at the time the emergency is declared. These people may be commuters, shoppers, and other travelers who reside within the EPZ and who will return to join the other household members upon receiving notification of an emergency.

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1 This estimate is for a winter midweek scenario and includes 100 percent of permanent residents, 100 percent of employees commuting into the EPZ to work, and 50 percent of transients.

As indicated in NUREG-0654, the estimated elapsed times for the receipt of notification can be expressed as a distribution reflecting the different notification times for different people within and outside the EPZ. By using time distributions, it is also possible to distinguish between different population groups and different day-of-week and time-of-day scenarios, so that accurate ETEs may be obtained.

For example, people at home or at work within the EPZ will be notified by siren. Those well outside the EPZ will be notified by telephone, radio, television, and word of mouth with potentially longer time lags. Furthermore, the spatial distribution of the EPZ population will differ with time of day. Families will be united in the evenings, but dispersed during the day. In this respect, weekends will differ from weekdays.

Fundamental Considerations

The environment leading up to the time that people begin their evacuation trips consists of a sequence of events and activities. Each event for each person, other than the first, occurs at an instant in time and is the outcome of an activity.

Activities are undertaken over a period of time. Activities may be in series (i.e., to undertake an activity implies the completion of all preceding activities) or may be in parallel (two or more activities may take place over the same period of time). Activities conducted in series are functionally dependent on the completion of previous activities; activities conducted in parallel are functionally independent of one another. The relevant events associated with the public's preparation for evacuation are:

Event Number	Event Description
1	No accident condition
2	Awareness of accident situation
3	Depart place of work or elsewhere, to return home
4	Arrive (or be at) home
5	Begin evacuation trip to leave the area.

Associated with each sequence of events are one or more activities, as outlined below:

Event Sequence	Activity	Distribution
1–2	Public receives and understands notification information	1
2–3	Prepare to leave work or other location away from home	2
3–4	Travel home[1]	3
4–5	Prepare to leave for evacuation trip	4

[1]If already at home, this is a null (no-time-consumed) activity.

These relationships are shown graphically for various scenarios in Figure 5-1.

An employee who lives outside the EPZ will follow sequence (d) of Figure 5-1. A resident of the EPZ who is at work and who will return home before beginning the evacuation trip will follow sequence (a) of Figure 5-1. Note that Event 5, leave to evacuate the area, is conditional either on Event 2 or on Event 4. That is, Activity 2–5 by a resident at home can be undertaken in parallel with activities 2–3, 3–4, and 4–5 by a commuter returning to that home, as shown in Figure 5-1 (a). Specifically, one adult member of a household can prepare to leave home (i.e., secure the home, pack clothing, etc.), while others are traveling home from work. In this instance, the household members would be able to evacuate sooner than if such trip preparation was deferred until all household members had returned home. For this study, we adopt the conservative posture that all activities will occur in sequence.

It is seen from Figure 5-1 that the trip generation time (i.e., the total elapsed time from Event 1 to Event 5) depends on the scenario and will vary from one household to the next. Furthermore, Event 5 depends, in a complicated way, on the time distributions of all activities preceding that event. That is, to estimate the time distribution of Event 5, estimates of the time distributions of all preceding activities must be obtained.

Estimated Time Distributions of Activities Preceding Event 5

The time distribution of an activity is obtained by adding the time distributions of all previous contributing activities. This adding process is quite different than an algebraic sum because we are operating on distributions, not scalar numbers.

Time Distribution No. 1, Notification Process: Activity 1–2

It is reasonable to expect that 85 percent of those within the EPZ will be aware of the accident within 30 minutes with the remainder notified within the following 20 minutes. The notification distribution is plotted in Figure 5-2 and given below:

Distribution No. 1, Notification Time: Activity 1–2

Elapsed Time (Minutes)	Percent of Population Notified
0	0
5	7
10	13
15	26
20	46
25	65
30	85
35	90
40	95
45	98
50	100

Distribution No. 2, Prepare to Leave Work: Activity 2–3

It is reasonable to expect that most business enterprises within the EPZ will elect to shut down following notification and most employees would leave work quickly. Commuters who work outside the EPZ could, in all probability, also leave quickly since facilities outside the EPZ would remain open and other personnel would remain. Personnel or farmers responsible for equipment would require additional time to secure their facility. The distribution of Activity 2 through 3 reflects data obtained by the telephone survey and is assumed to include those who require time to shut down equipment before leaving work.

This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	**Cumulative Percent Employees Leaving Work**
0	0
5	24
10	34
15	47
20	55
25	60
30	70
35	79
40	81
45	87
50	90
55	93
60	96
90	98
105	100

NOTE: The survey data was normalized to distribute the "don't know" response. That is, the sample was reduced in size to include only those returns that included responses to this question. The underlying assumption is that the distribution of this activity for the “don’t know” responders, if the event takes place, would be the same as those responders who provided estimates.

Distribution No. 3, Travel Home: Activity 3–4

This data is provided directly by the telephone survey. This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	Cumulative Percent Returning Home
0	0
5	10
10	23
15	36
20	49
25	56
30	67
35	70
40	75
45	81
50	84
55	88
60	91
75	95
90	98
105	99
110	100

NOTE: The survey data was normalized to distribute the "don't know" response.

Distribution No. 4, Prepare to Leave Home: Activity 2, 4–5

This data is provided directly by the telephone survey. This distribution is plotted in Figure 5-2 and listed below.

Elapsed Time (Minutes)	Cumulative Pct. Ready to Evacuate
0	0
5	7
10	13
15	20
20	29
25	37
30	42
35	48
40	52
45	55
50	58
55	60
60	64
75	72
90	75
105	78
120	81
135	84
150	87
165	89
180	91
210	92
240	92
270	93
300	94
330	95
360	100

NOTE: The survey data was normalized to distribute the "don't know" response.

Calculation of Trip Generation Time Distribution

The time distributions for each of the mobilization activities presented here must be combined to form the appropriate trip generation distributions. It is assumed that the stated events take place in sequence such that all preceding events must be completed before the current event can occur. For example, if a household awaits the return of a commuter, the work-to-home trip (Activity 3) must precede Activity 4–5.

To calculate the time distribution of an event that depends on two sequential activities, it is necessary to add the distributions associated with these previous activities. The distribution summing algorithm is applied repeatedly as shown to form the required distribution. New time distributions are formed as an outcome of this procedure. Letter designations are assigned to these intermediate distributions to describe the procedure.

Apply Summing Algorithm To:	Distribution Obtained	Event Defined
Distributions 1 and 2	Distribution A	Event 3
Distributions A and 3	Distribution B	Event 4
Distributions B and 4	Distribution C	Event 5
Distributions 1 and 4	Distribution D	Event 5

Distributions A through D are described below:

Distribution	Description
A	Time distribution of commuters departing place of work (Event 3). Also applies to employees who work within the EPZ who live outside, and to transients within the EPZ.
B	Time distribution of commuters arriving home.
C	Time distribution of residents with commuters leaving home to begin the evacuation trip.
D	Time distribution of residents without commuters returning home to begin the evacuation trip.

Figure 5-3 presents the combined trip generation distributions designated A, C, and D. These distributions are presented on the same time scale.

The PC-DYNEV simulation model is designed to accept varying rates of vehicle trip generation for each origin centroid, expressed in the form of histograms. These histograms, which represent distributions A, C and D, are tabulated in Table 5-1 (Distribution B, arrive home, is omitted since it is intermediate; not needed as input to PC-DYNEV).

The final time period (14) input to the model is 600 minutes long. This time period is added to allow the analysis network to clear in the likely event the evacuation movements persist beyond the trip generation period. Note that there are no trips generated during this final time period.

Table 5-1
Trip Generation for the EPZ Population

Time Period	Duration (Min)	Percent of Total Trips Generated Within Indicated Time Period			
		Residents With Commuters	Residents Without Commuters	Employees	Transients
1	15	0	0	5	5
2	15	0	10	20	20
3	30	8	39	53	53
4	30	17	21	15	15
5	30	25	7	7	7
6	30	15	8	0	0
7	30	11	5	0	0
8	30	6	5	0	0
9	30	6	5	0	0
10	30	2	0	0	0
11	30	2	0	0	0
12	30	3	0	0	0
13	30	5	0	0	0
14	600	0	0	0	0

Figure 5-1. Events and Activities Preceding the Evacuation Trip

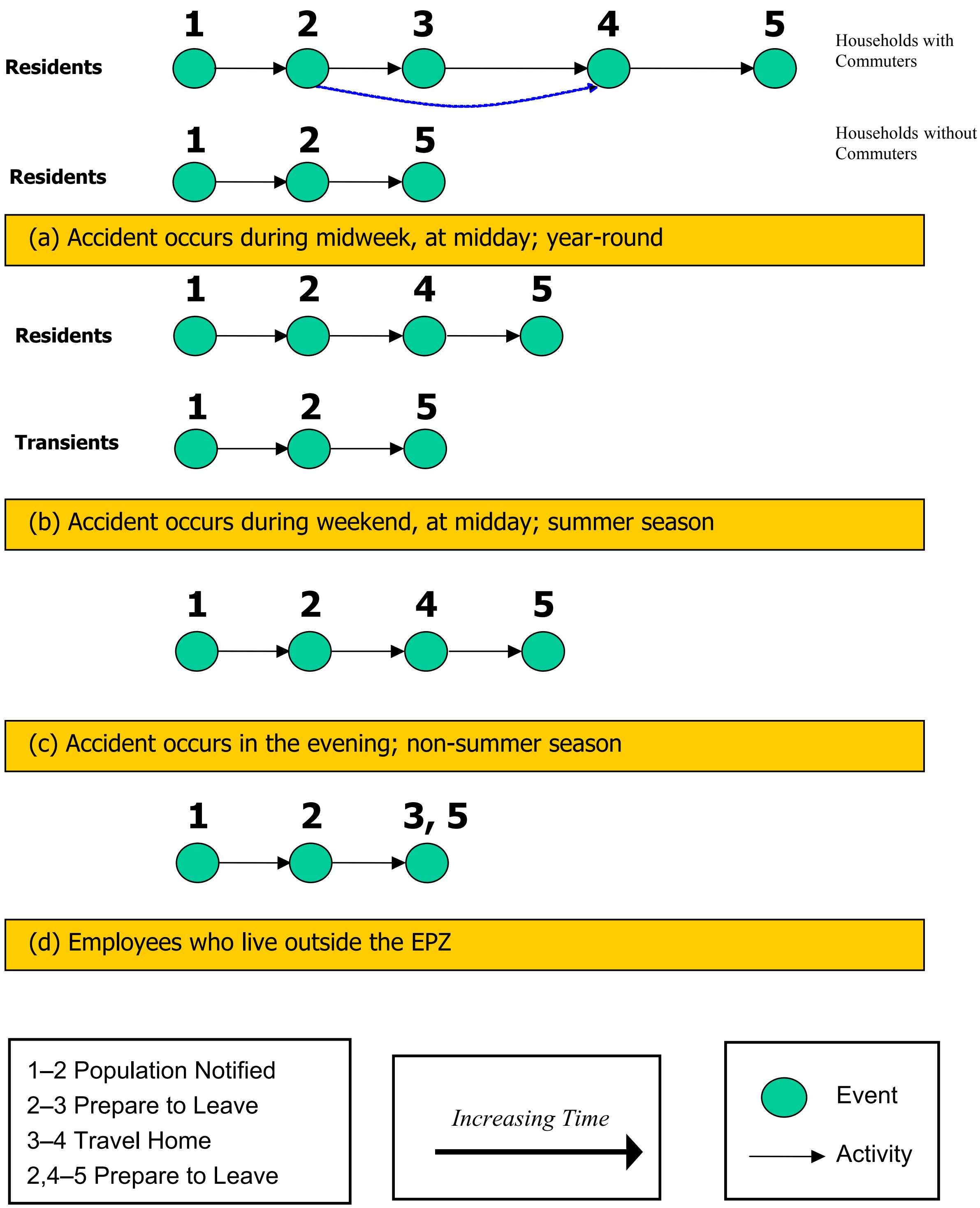


Figure 5-2. Evacuation Mobilization Activities

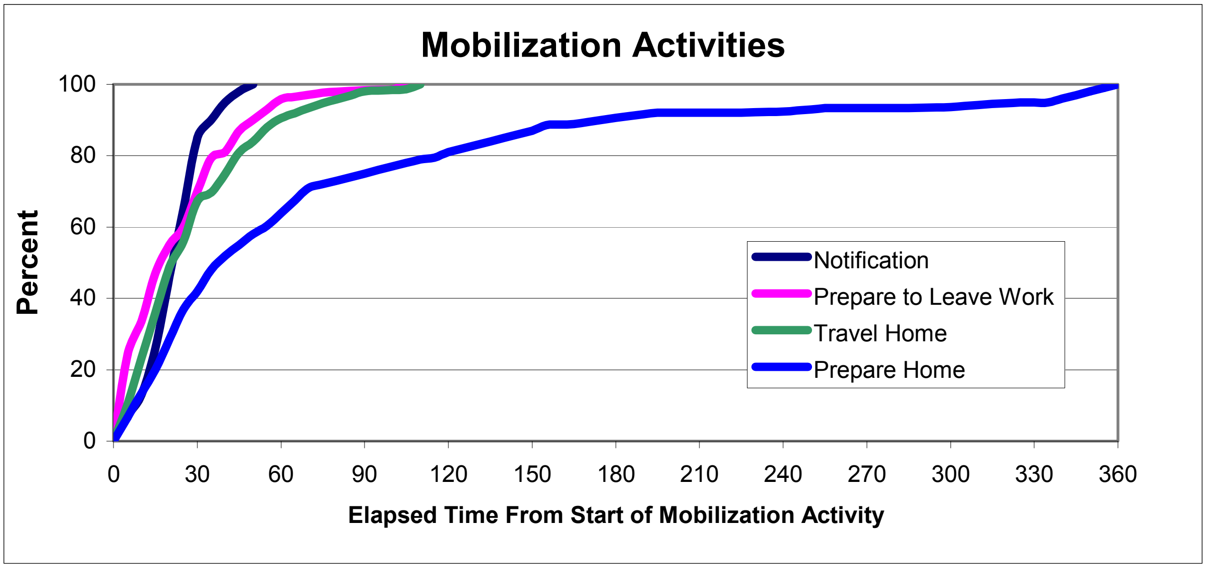
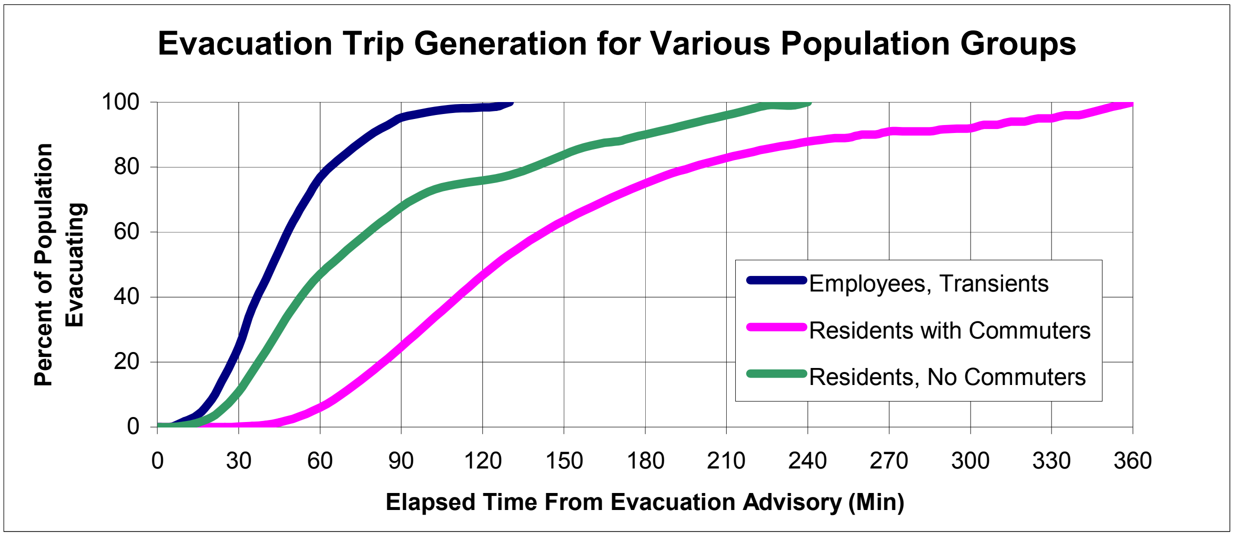


Figure 5-3. Comparison of Trip Generation Distributions



6. DEMAND ESTIMATION FOR EVACUATION SCENARIOS

An evacuation case defines a combination of evacuation region and evacuation scenario. The definitions of region and scenario are:

- Region — A grouping of contiguous areas that forms either a keyhole sector-based area or a circular area within the EPZ that may be evacuated in response to a radiological emergency.

- Scenario — A combination of circumstances, including time of day, day of week, season, and weather conditions. Scenarios define the number of people in each of the affected population groups, their respective mobilization time distributions, and highway operations (calibration).

Twelve regions were defined that encompass all the groupings of areas considered. These regions are defined in Table 6-1. The area configurations are identified in Figure 6-1. Table 6-2 provides a mapping of each region to the appropriate emergency alert system message relayed by Miami-Dade County. Each keyhole sector-based area (Regions R04 through R12) consists of a circular area centered at Turkey Point and either three or four adjoining sectors each with a central angle of 22.5 degrees. These sectors extend to the EPZ boundary.

Eleven scenarios were evaluated for all regions. Thus, there are a total of:

12 x 11 = 132 evacuation cases

Table 6-3 provides a description of all scenarios.

Each combination of region and scenario defines a case that implies a specific population to be evacuated. Table 6-4 presents the percent of population groups that evacuate for each scenario, which applies throughout the EPZ. The number of voluntary evacuees varies by evacuation region, not by scenario. Therefore, voluntary evacuees are not included in Table 6-4. Similarly, Table 6-5 presents vehicle estimates for Region R03 (the entire EPZ) for all scenarios. These estimates do not include voluntary evacuees for the same reason given above.

Table 6-1 identifies those areas that define each of 12 evacuation regions. For a given region, an empty cell along a row in this table represents an area that is not included within the region, but that contributes voluntary evacuees to the evacuating traffic environment. The number of voluntary evacuees depends on the population within the area and on the region that is being evacuated.

For example, consider Area 6. This area, shown in Figure 6-1, lies between the 5-mile ring and the EPZ boundary to the north. If Region R06 were evacuated, then Area 6, which is external to R06 (see row for R06 in Table 6-1), would contribute 50 percent of its population as voluntary evacuees according to Figure 2-1.

If Region R06 is advised to evacuate under the conditions of Scenario 1, the percentages for that scenario that appear in Table 6-4[1] will also apply to the population within Area 6. The trip generation distributions (Section 5) for the voluntary evacuees that originate their trips within Area 6 are the same as though the area were advised to evacuate; the number of evacuees from that area, however, would be 50 percent of the total, as explained above.

To summarize, the number of voluntary evacuees in any given evacuation case is taken into proper account for each empty cell in Table 6-1. The necessary computations to calculate the number of generated trips within each area are performed by the UNITES software. For each case, the output of UNITES is the input stream to the IDYNEV system.

As indicated in Table 6-4, it is assumed that 10 percent of the school buses used when school is in session are used during the summer to transport children to summer school or camp.

[1] Refer to the columns in Table 6-4 labeled “Residents with Commuters in Household,” “Residents with No Commuters in Household,” “Employees,” and “Transients.”

Table 6-1
Regional Evacuation Groupings

Area	Region											
	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12
1	X	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X	X	X
3		X	X	X	X	X	X	X	X	X	X	X
4		X	X	X	X	X	X	X	X	X	X	X
5			X	X							X	X
6			X	X	X					X	X	X
7			X		X				X	X	X	X
8			X		X			X	X	X	X	
9			X		X		X	X	X			
10			X			X	X	X				

Note: This table was adapted from Figure 2 of the Miami-Dade Emergency Operations Center Procedures Manual. It has been modified to include areas 1 and 10.

Table 6-2
Description of Evacuation Regions

Wind Over Sectors	EAS Message	Region	Description	Areas to be Evacuated
Evacuate 2 miles downwind	4	R01	2-mile radius	1,2
Evacuate 5 miles downwind	5	R02	5-mile radius	1-4
Evacuate full EPZ	6	R03	Full EPZ	1-10
ABC; ABCD	7	R04	5-mile radius and downwind to EPZ boundary	1-6
MNPQ	8	R05		1-4, 6-9
BCD;CDE;DEF;EFG;FGH;GHJ;GHJK;HJK	9	R06		1-4, 10
HJKL;JKL	11	R07		1-4, 9-10
JKLM;KLM;LMN	12	R08		1-4, 8-10
LMNP;MNP	13	R09		1-4, 7-9
NPQ;PQR	14	R10		1-4, 6-8
PARQ;QRA;QRAB	15	R11		1-8
RAB	16	R12		1-7

The capital letter designations A - R (O and I are not used) used by Miami-Dade Office of Emergency Management correspond to the 16 major wind directions labeled clockwise with "A" being north and "R" being north-northwest.

Table 6-3
Evacuation Scenario Definitions

Scenarios	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Weekend	Midday	Good	None
9	Winter	Weekend	Midday	Rain	None
10	Winter	Midweek, weekend	Evening	Good	None
11	Winter	Midweek	Midday	Good	New plant construction

Note: Schools are assumed to be in session for the winter season (midweek, midday).

Table 6-4
Percent of Population Groups Evacuating for Various Scenarios

Scenarios	Residents With Commuters in Household[(a)]	Residents With No Commuters in Household[(b)]	Employees[(c)]	Transients[(d)]	Shadow[(e)]	Special Event[(f)]	School Buses[(g)]	Transit Buses[(g)]	External Through Traffic[(h)]
1	68%	32%	96%	50%	36%	0%	10%	100%	50%
2	68%	32%	96%	50%	36%	0%	10%	100%	50%
3	10%	90%	50%	75%	33%	0%	0%	100%	100%
4	10%	90%	50%	75%	33%	0%	0%	100%	100%
5	10%	90%	10%	25%	31%	0%	0%	100%	40%
6	68%	32%	100%	50%	37%	0%	100%	100%	50%
7	68%	32%	100%	50%	37%	0%	100%	100%	50%
8	10%	90%	50%	100%	33%	0%	0%	100%	100%
9	10%	90%	50%	100%	33%	0%	0%	100%	100%
10	10%	90%	10%	35%	31%	0%	0%	100%	40%
11	68%	32%	100%	50%	35%	100%	100%	100%	50%

(a) Households of EPZ residents who await the return of commuters prior to beginning the evacuation trip.
(b) Households of EPZ residents who do not have commuters or will not await the return of commuters prior to beginning the evacuation trip.
(c) Employees: EPZ employees who live outside of the EPZ.
(d) Transients: People who are in the EPZ at the time of an accident for recreational or other (non-employment) purposes.
(e) Shadow: Residents and employees in the Shadow Region (outside of the EPZ) who will spontaneously decide to relocate during the evacuation. The basis for the values shown is a 30% relocation of shadow residents along with a proportional percentage of shadow employees. The percentage of shadow employees is computed using the scenario-specific ratio of EPZ employees to residents. Using Scenario 1 as an example and referencing Table 6-5, the ratio of employee vehicles (17,410) to residents (55,872 + 26,142) is 0.21. Then, multiplying (1+ 0.21) (30%) yields 36%.
(f) Special event additional vehicles in the PTN area for construction workers during the construction on the new units in the year 2016 when construction will be at its peak.
(g) School and transit buses: Vehicle-equivalents present on the road during evacuation servicing schools and transit-dependent people (one bus is equivalent to two passenger vehicles), respectively.
(h) External through traffic: Traffic on local highways and major arterial roads at the start of the evacuation. This traffic is stopped by access control approximately 90 minutes after the evacuation begins.

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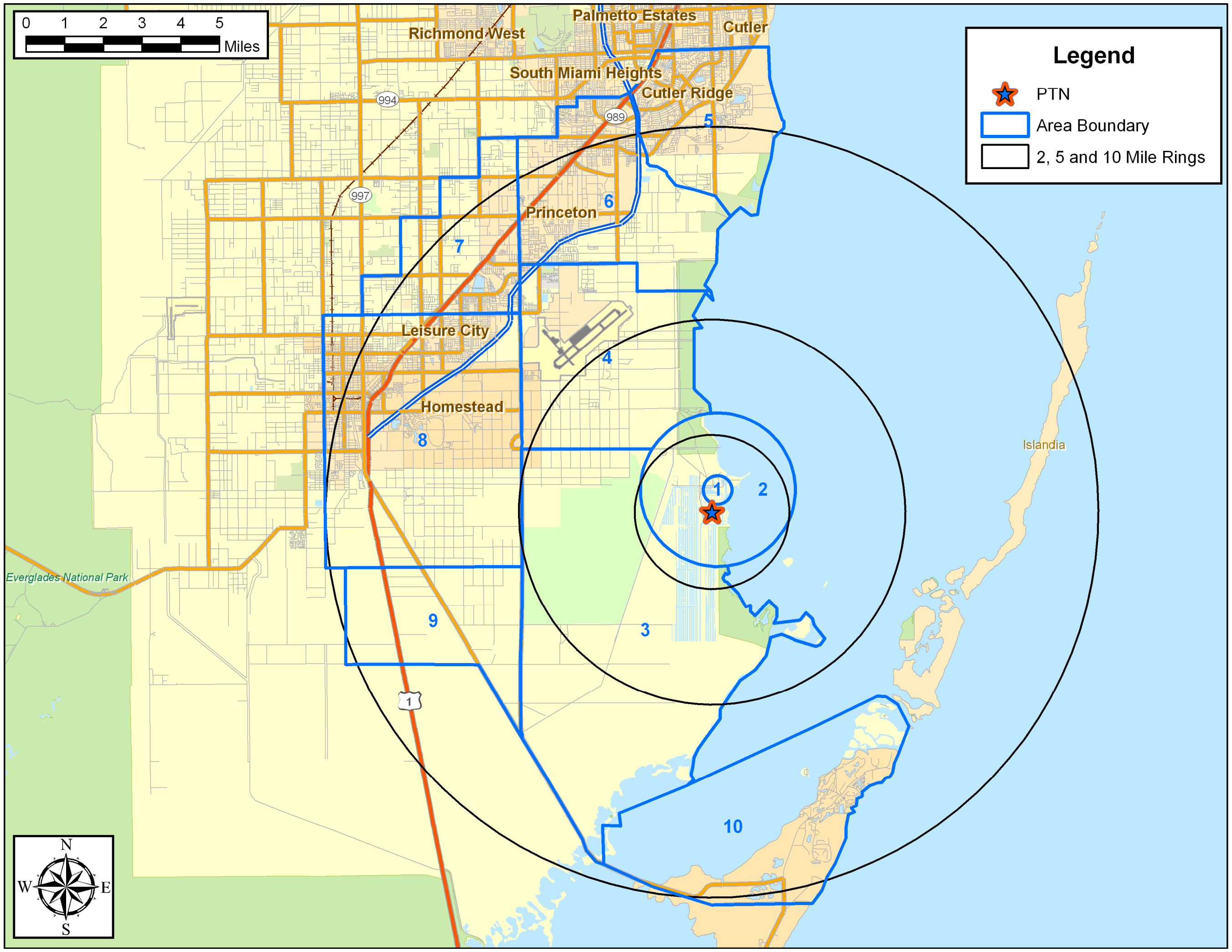
Table 6-5
Vehicle Estimates by Scenario[a]

Scenarios	Residents with Commuters	Residents without Commuters	Employees	Transients	Shadow	Special Event	School Buses[b]	Transit Buses	External Traffic	Total Scenario Vehicles
1	55,872	26,142	17,410	3,421	20,502	—	110	520	4,746	128,723
2	55,872	26,142	17,410	3,421	20,502	—	110	520	4,746	128,723
3	8,381	73,633	9,067	5,132	18,782	—	—	520	9,492	125,007
4	8,381	73,633	9,067	5,132	18,782	—	—	520	9,492	125,007
5	8,381	73,633	1,813	1,711	17,286	—	—	520	3,797	107,141
6	55,872	26,142	18,135	3,421	20,652	—	1,100	520	4,746	130,588
7	55,872	26,142	18,135	3,421	20,652	—	1,100	520	4,746	130,588
8	8,381	73,633	9,067	6,842	18,782	—	—	520	9,492	126,717
9	8,381	73,633	9,067	6,842	18,782	—	—	520	9,492	126,717
10	8,381	73,633	1,813	2,395	17,286	—	—	520	3,797	107,825
11	71,337[c]	33,428[c]	18,135	3,421	21,370[c]	2,627	1,100	520	4,746	156,684

(a) The vehicle estimates presented are for an evacuation of the entire EPZ (Region R03).
(b) School buses and transit buses are expressed in vehicle equivalents (1 bus = 2 vehicles). Therefore, actual number of buses are one-half the value shown.
(c) Permanent resident population and shadow population have been expanded to the year 2016 when construction of the new units will be at its peak.

Figure 6-1. Turkey Point Nuclear Power Plant Areas



7. GENERAL POPULATION EVACUATION TIME ESTIMATES

This section presents the current results of the computer analyses using the IDYNEV system described in Appendices B, C, and D. These results cover 12 regions within the Turkey Point EPZ and the 11 evacuation scenarios presented in Section 6.

The ETEs for all evacuation cases are presented in Tables 7-1A through 7-1D. These tables present the estimated times to clear the indicated percentages of population from the evacuation regions for all evacuation scenarios. The tabulated values of ETE are obtained from the dynamic network evacuation (PC-DYNEV) simulation model outputs of vehicles exiting the specified evacuation regions. This data is generated by the model at 10-minute intervals, then interpolated to the nearest 5 minutes.

7.1 Voluntary Evacuation and Shadow Evacuation

Voluntary evacuees are defined as people who are within the EPZ in areas located outside the evacuation region. An advisory to evacuate *has not* been issued for these areas, yet some percentage of the population elects to evacuate. Shadow evacuation is defined as the movement of people from areas *outside* the EPZ for whom no protective action recommendation has been issued. Both voluntary and shadow evacuations are assumed to take place over the same timeframe as the evacuation from within the impacted evacuation region.

The ETE for Turkey Point addresses the issue of voluntary evacuees as presented in Sections 2.2 and 6 and displayed in Figure 7-1 (repeat of Figure 2-1). Figure 7-2 presents the area identified as the shadow region. This region extends from the EPZ boundary north to 152nd Street (Coral Reef Drive) and to the west to the Everglades National Park. The previous ETE reports did not include the area to the west. This area has been added because the voluntary evacuees in this area can only evacuate north on Krome Avenue, one of the major evacuation routes servicing people in the EPZ. The permanent resident population within the shadow region is 156,157. This estimate was obtained using the same method employed within the EPZ, as addressed in Section 3.

Traffic generated within this shadow region, traveling away from the plant, has the potential for impeding evacuating vehicles from within the evacuation region. It is assumed that the traffic volumes emitted within the shadow evacuation region correspond to 30 percent of the residents there, plus a proportionate number of employees in that region. The ratio of employees to residents for each scenario is computed and multiplied by the base of 30 percent, explaining why the shadow percentage in Table 6-4 exceeds 30 percent for all scenarios. **All ETE calculations include this shadow traffic movement.**

7.2 Patterns of Traffic Congestion During Evacuation

Figures 7-3 through 7-8 illustrate the patterns of traffic congestion that arise for the case when the entire EPZ (Region R03) is advised to evacuate during the summer, midweek, midday period under good weather conditions (Scenario 1).

Traffic congestion, as the term is used here, is defined as LOS F. LOS F is defined as follows (HCM2000):

> LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. LOS F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases, operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow that causes the queue to form, and LOS F is an appropriate designation for such points.

This definition is general and conceptual in nature and applies primarily to uninterrupted flow. LOS for interrupted flow facilities varies widely in terms of both the user's perception of service quality and the operational variables used to describe them.

All highway links that experience LOS F at the indicated times are delineated in these figures by a heavy red line; all others are lightly indicated. Congestion develops in areas with high population density and at traffic bottlenecks. Figure 7-3 presents the traffic congestion patterns at one hour after the advisory to evacuate. There is significant congestion within the EPZ at this time. The Florida Turnpike is congested northbound between the access ramps from 112th Ave and U.S. Highway 1 in Cutler Ridge. The turnpike widens to three lanes in each direction north of the access ramp from U.S. Highway 1. Congestion is pronounced upstream in the two-lane section south of this point. Congestion also exists on the turnpike northbound between the access ramps from Campbell Drive and 137th Avenue. Krome Avenue northbound is congested within the shadow region. 344th Street is congested westbound as those workers evacuating from Turkey Point encounter an all-way stop at the intersection with 117th Avenue U.S. Highway 1, the Miami-Dade Busway, and Old Cutler Rd are also congested northbound.

Figure 7-4 presents the traffic congestion patterns at the peak of congestion, 3 hours after the advisory to evacuate. Congestion now exists northbound on the turnpike from the point at which the roadway widens in Cutler Ridge to the interchange with U.S. Highway 1 in Florida City. Krome Avenue is congested northbound between Florida City and 200th Street. U.S. Highway 1 and the Busway are congested northbound from Florida City to 152nd Street. Old Cutler Road is congested northbound from the intersection with U.S. Highway 1 to 152nd Street. The congestion on 344th Street westbound cleared at one hour and 30 minutes after the advisory to evacuate.

The congestion patterns at 5 hours after the advisory to evacuate are displayed in Figure 7-5. The congestion patterns are similar to those at 3 hours. Congestion is beginning to dissipate on Old Cutler Road northbound and on U.S. Highway 1 and the Busway within the shadow region. Pronounced congestion persists on the Florida Turnpike northbound and on U.S. Highway 1 and the Busway northbound within the EPZ.

Figure 7-6 presents the congestion patterns at 7 hours after the advisory to evacuate. Congestion on Old Cutler Rd has cleared, while congestion continues to dissipate northbound on U.S. Highway 1 and the Busway within the shadow region. Pronounced congestion still exists within the EPZ northbound on Krome Avenue, on U.S. Highway 1, on the Busway, and on the Florida Turnpike.

At 8 hours and 30 minutes after the advisory to evacuate (Figure 7-7), much of the congestion in the EPZ has cleared. Congestion persists on Krome Avenue northbound in the shadow region. Within the EPZ, U.S. Highway 1 and the Busway are congested northbound between 248th Street and 288th Street. Congestion on the Florida Turnpike is dissipating, as northbound congestion extends from the widening of the road in Cutler Ridge to the access ramps from 137th Ave. Figure 7-8 indicates that the last of the congestion clears along the Florida Turnpike northbound at 9 hours after the advisory to evacuate.

These congestion patterns indicate that there is unused capacity available for those people evacuating the EPZ, namely, U.S. Highway 1 southbound toward the Florida Keys and the Florida Turnpike northbound, north of the widening of the road in Cutler Ridge. The narrowing of the Florida Turnpike near Exit 12 is the most significant bottleneck in the EPZ. The shoulder of the turnpike is used as an additional northbound lane between Campbell Drive (312th Street) and the widening of the turnpike in Cutler Ridge when there are major events at the Homestead-Miami Speedway. Sensitivity studies were conducted to explore the effect on ETE of routing evacuees toward the Florida Keys and using the shoulder of the Florida Turnpike as an additional lane (See Appendix I).

7.3 Evacuation Rates

Another format for displaying the dynamics of evacuation is shown in Figure 7-9. This plot indicates the rate at which traffic flows out of the indicated areas for the case of an evacuation of the entire EPZ (Region R03) under the indicated conditions. Appendix J presents these plots for all evacuation scenarios for Region R03.

There is typically a long "tail" to these distributions. Vehicles evacuate an area slowly at the beginning, as people respond to the advisory to evacuate at different rates. Then traffic demand builds rapidly (slopes of curves increase). When the system becomes congested, traffic exits the EPZ at rates somewhat below capacity until some evacuation routes have cleared. As more routes clear, the aggregate rate of egress slows because many vehicles have already left the EPZ. Toward the end of the process, relatively few evacuation routes service the remaining demand. This decline in aggregate flow rate toward the end of the process is characterized by these curves flattening and gradually becoming horizontal.

However, for this EPZ, the major routes all become congested shortly after the advisory to evacuate and most remain congested throughout the evacuation process, servicing traffic at or near capacity levels. For this situation, the curves of Figure 7-9 retain the same slope until near the end.

7.4 Guidance on Using Evacuation Time Estimate Tables

Tables 7-1A through 7-1D present the ETE values for all 12 evacuation regions and all 11 evacuation scenarios. The ETE are the elapsed time required for the indicated percent of the population within the evacuation region to evacuate from that region. The tables are organized as follows:

Table	Contents
7-1A	ETE for 50 percent of the population
7-1B	ETE for 90 percent of the population
7-1C	ETE for 95 percent of the population
7-1D	ETE for 100 percent of the population

The user first determines the percentile of population for which the ETE is sought. The applicable value of ETE within the chosen table may then be identified using the following procedure:

1. Identify the applicable scenario:

   - The season

     — Summer (schools not in session)
     — Winter (also autumn and spring)

   - The day of week

     — Midweek (workday)
     — Weekend, holiday

   - The time of day

     — Midday (work and commuting hours)
     — Evening

   - Weather condition

     — Good weather
     — Rain

   - Special event (if any)

     — Construction of new units

   While these scenarios are designed in aggregate to represent conditions throughout the year, some further clarification is warranted:

   - The conditions of a summer evening (either midweek or weekend) and rain are not explicitly identified in Tables 7-1A through 7-1D. For these conditions, Scenario 4 applies.

- The conditions of a winter evening (either midweek or weekend) and rain are not explicitly identified in Tables 7-1A through 7-1D. For these conditions, Scenario 9 applies.

- The seasons are defined as follows:

  — Summer implies that public schools are not in session.
  — Winter, spring, and autumn imply that public schools are in session.

- Time of day: Midday implies the time over which most commuters are at work.

2. With the scenario (and column in the table) identified, now identify the evacuation region:

   - Determine the sectors and distance over which the wind is blowing. This direction is expressed in terms of compass orientation: North, north-northeast, northeast

   - Determine the distance that the evacuation region will extend from Turkey Point. The applicable distances and their associated candidate regions are given below:

     — Two miles (Region R01)
     — Five miles (Region R02)
     — To EPZ boundary (Regions R03 through R12)

   - Go to Table 7-2 and identify the applicable group of wind directions (A-R) and the distance from Turkey Point. Select the evacuation region identifier from the third column of the table in the appropriate row of the table.

3. Determine the ETE for the scenario identified in Step 1 and the evacuation region identified in Step 2, as follows:

   - The columns of Tables 7-1 are labeled with the scenario numbers. Identify the proper column in the selected table using the scenario number determined in Step 1.

   - Referencing column 1 in this table, identify the row that provides ETE values for the region identified in Step 2.

   - The data cell defined by the column and row so determined contains the desired value of ETE expressed in hours:minutes.

Example

It is preferred to identify the ETE for the following conditions:

- Sunday, August 10 at 4:00 a.m.
- It is raining.
- Wind is over sectors R, A, and B (north-northwest, north, and north-northeast).
- Wind speed is such that the distance to be evacuated is judged to be 10 miles (to EPZ boundary).
- The preferred ETE is that value needed to evacuate 95 percent of the population from within the impacted region.

Table 7-1C is applicable because the 95th percentile population is desired. Proceed as follows:

1. Identify the scenario as summer, weekend, evening, and raining. Going to Table 7-1C, it is seen that there is no match for these descriptors. However, the clarification given above assigns this combination of circumstances to Scenario 4.

2. Go to Table 7-2 and locate the description *5 mile radius and downwind to EPZ boundary*. Under *Wind Over Sectors*, identify the *RAB* entry and read *Region R12* in the third column of that row.

3. Go to Table 7-1C to locate the data cell containing the value of ETE for Scenario 4 and region R12. This data cell is in Column 4 and in the row for Region R12; it contains the ETE value of **6:25**.

7.5 Evacuation Time Estimate Results

Comparison of the ETE in Table 7-1D of this report with those computed in Table 7-1D of the 2005 ETE report indicate that ETEs have increased by as much as 3 hours for an evacuation of the entire EPZ under some scenarios. As presented in Section 3, the population is growing rapidly within Homestead and to a lesser extent in Florida City, resulting in a significant increase in EPZ population. Also, improved employment data was obtained from the state of Florida that resulted in a nearly four-fold increase in the number of employees commuting into the EPZ. The combination of these factors resulted in as many as 40,000 additional vehicles (comparing

Table 6-5 of this study with Table 6-4 of the previous study) for some scenarios. There have been limited changes to the roadway infrastructure in the EPZ, as presented in Table 1-1. The increased vehicle demand within the EPZ combined with the relatively unchanged roadway capacity results in increased congestion within the EPZ and prolonged ETE.

An evacuation of the entire EPZ during the peak construction period of Units 6 & 7 at the Turkey Point site in 2016 results in an increase in ETE of 2 hours and 20 minutes, comparing Scenario 11 with Scenario 6 in Table 7-1C for Region R03. As indicated in Section 3, it is assumed that the growth of population within the EPZ persists until 2016. This further increase in EPZ population explains the increase in ETE. The presence of construction workers at the site does not change the ETE for the 2-mile region (R01), as shown in Table 7-1C. The increases in roadway capacity during peak construction identified in Section 3 sufficiently service the increased vehicle demand, resulting in no change in ETE for the 2-mile region during construction.

The delays experienced by evacuees on representative links in the network at various times are presented below:

Delay per Vehicle (sec.) Statistics on Representative Congested Highway Sections

			Elapsed Time after Advisory to Evacuate (hrs.)				
I.D.	**Link**	**Location**	**1:00**	**3:00**	**5:00**	**7:00**	**8:30**
1	494,215	US 1 @ Caribbean Blvd.	162	108	90	0	0
2	176,178	US 1@ SW 296th St.	0	582	570	504	0
3	450,452	US 1@ SW 152nd St.	234	396	216	0	0
4	113,114	Old Cutler Rd @ SW 176th St.	228	276	246	0	0
5	67,155	US 1 @ E. Lucy St.	594	600	588	558	0
6	1,75	Krome Ave. @ SW 184th St.	168	540	540	540	504
7	161,136	N. Krome Ave. @ SW 312th St.	0	570	570	564	0
8	159,144	SW 172nd Ave. @ SW 288th St.	0	0	498	204	0
9	344,60	Florida Turnpike @ SW 312th St.	54	294	258	204	0

The congested highway section I.D. numbers are annotated in Figure 7-7. See large-scale version of Figure 1-2 (provided electronically) to locate links. All delay estimates are average values experienced by vehicles on the link over a period of 10 minutes leading up to the indicated elapsed times after the advisory to evacuate. Those entries that display an average per-vehicle delay approaching 600 seconds indicate that the link is experiencing pronounced congestion at that time as a result of an excess of demand over-capacity downstream. A "congested highway section" is a link that is operating a LOS F.

All ETE apply to the general population, which is comprised of permanent residents, employees, and transients. Since the evacuating vehicles mix with one another during the trip generation process to form the evacuating traffic stream, it is not feasible to separate ETE by population component, and such separation is not required by guidance.

Table 7-1A
Time to Clear the Indicated Area of 50 Percent of the Affected Population

	Summer		**Summer**		**Summer**		**Winter**		**Winter**		**Winter**	**Winter**
	Midweek		**Weekend**		**Midweek Weekend**		**Midweek**		**Weekend**		**Midweek Weekend**	**Midweek**
Scenario:	**1**	**2**	**3**	**4**	**5**	**Scenario:**	**6**	**7**	**8**	**9**	**10**	**11**
Region	Midday		Midday		Evening	Region	Midday		Midday		Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	0:55	1:00	0:45	0:45	0:45	R01	0:55	1:00	0:45	0:45	0:45	0:55
R02	1:35	1:40	1:15	1:20	1:15	R02	1:40	1:45	1:15	1:20	1:15	1:40
R03	3:55	4:15	3:40	3:55	3:20	R03	4:00	4:20	3:45	4:00	3:20	5:00
5-Mile Ring and Keyhole to EPZ Boundary												
R04	3:05	3:15	2:45	3:00	2:35	R04	3:05	3:20	2:45	3:00	2:35	3:25
R05	3:50	4:10	3:30	3:50	3:10	R05	3:55	4:10	3:35	3:50	3:15	4:55
R06	1:45	1:45	1:25	1:25	1:25	R06	1:45	1:50	1:25	1:25	1:25	1:45
R07	1:45	1:45	1:25	1:25	1:25	R07	1:45	1:50	1:25	1:25	1:25	1:45
R08	3:25	3:40	3:05	3:25	2:45	R08	3:25	3:45	3:10	3:25	2:45	4:40
R09	3:45	4:05	3:30	3:50	3:05	R09	3:50	4:10	3:35	3:50	3:10	5:00
R10	3:50	4:10	3:35	3:50	3:10	R10	3:55	4:10	3:35	3:50	3:15	4:55
R11	3:55	4:15	3:40	3:55	3:20	R11	4:00	4:20	3:45	4:00	3:20	4:55
R12	3:05	3:15	2:45	3:00	2:35	R12	3:05	3:20	2:50	3:05	2:35	3:35

Table 7-1B
Time to Clear the Indicated Area of 90 Percent of the Affected Population

	Summer		**Summer**		**Summer**		**Winter**		**Winter**		**Winter**	**Winter**
	Midweek		**Weekend**		**Midweek Weekend**		**Midweek**		**Weekend**		**Midweek Weekend**	**Midweek**
Scenario:	**1**	**2**	**3**	**4**	**5**	**Scenario:**	**6**	**7**	**8**	**9**	**10**	**11**
Region	Midday		Midday		Evening	Region	Midday		Midday		Evening	Midday
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:30	1:35	1:20	1:20	1:20	R01	1:35	1:45	1:20	1:20	1:20	1:35
R02	3:35	3:50	3:20	3:30	3:20	R02	3:35	3:55	3:20	3:30	3:20	4:40
R03	7:35	8:20	7:10	7:50	6:15	R03	7:45	8:30	7:15	7:55	6:15	9:50
5-Mile Ring and Keyhole to EPZ Boundary												
R04	5:40	6:10	5:20	5:45	4:45	R04	5:45	6:15	5:25	5:50	4:45	6:30
R05	7:25	8:10	7:00	7:40	6:05	R05	7:35	8:15	7:05	7:50	6:05	9:45
R06	4:10	4:30	3:40	4:00	3:20	R06	4:10	4:30	3:50	4:00	3:20	5:20
R07	4:10	4:30	3:40	4:00	3:20	R07	4:10	4:30	3:50	4:00	3:20	5:20
R08	6:25	6:55	5:55	6:30	5:05	R08	6:25	7:05	6:05	6:35	5:05	8:35
R09	6:50	7:30	6:25	7:00	5:35	R09	6:55	7:35	6:30	7:05	5:40	9:05
R10	7:25	8:10	7:00	7:40	6:05	R10	7:35	8:15	7:05	7:50	6:05	9:45
R11	7:35	8:20	7:10	7:50	6:15	R11	7:45	8:30	7:15	7:55	6:15	9:50
R12	5:45	6:15	5:25	5:55	4:50	R12	5:50	6:20	5:30	5:55	4:50	6:40

Table 7-1C
Time to Clear the Indicated Area of 95 Percent of the Affected Population

	Summer		**Summer**		**Summer**		**Winter**		**Winter**		**Winter**	**Winter**
	Midweek		**Weekend**		**Midweek Weekend**		**Midweek**		**Weekend**		**Midweek Weekend**	**Midweek**
Scenario:	**1**	**2**	**3**	**4**	**5**	**Scenario:**	**6**	**7**	**8**	**9**	**10**	**11**
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:40	1:45	1:40	1:40	1:30	R01	1:40	1:45	1:40	1:40	1:30	1:40
R02	4:00	4:10	3:35	3:50	3:35	R02	4:00	4:20	3:35	3:50	3:35	5:30
R03	8:15	9:05	7:45	8:30	6:45	R03	8:20	9:15	7:50	8:40	6:45	10:40
5-Mile Ring and Keyhole to EPZ Boundary												
R04	6:00	6:35	5:40	6:10	5:00	R04	6:05	6:40	5:45	6:15	5:05	7:00
R05	8:00	8:50	7:30	8:20	6:30	R05	8:05	8:55	7:40	8:25	6:35	10:25
R06	4:35	5:00	4:10	4:30	3:40	R06	4:40	5:00	4:10	4:30	3:40	5:55
R07	4:35	5:00	4:10	4:30	3:40	R07	4:40	5:00	4:10	4:30	3:40	5:55
R08	6:45	7:25	6:20	6:55	5:25	R08	6:50	7:35	6:25	7:00	5:25	9:10
R09	7:15	8:00	6:45	7:25	6:00	R09	7:25	8:05	6:55	7:35	6:05	9:40
R10	8:00	8:50	7:30	8:20	6:30	R10	8:05	8:55	7:40	8:25	6:35	10:25
R11	8:15	9:05	7:45	8:30	6:45	R11	8:20	9:15	7:50	8:40	6:45	10:40
R12	6:15	6:45	5:50	6:25	5:10	R12	6:20	6:50	5:55	6:30	5:15	7:20

Table 7-1D
Time to Clear the Indicated Area of 100 Percent of the Affected Population

	Summer		**Summer**		**Summer**		**Winter**		**Winter**		**Winter**	**Winter**
	Midweek		**Weekend**		**Midweek Weekend**		**Midweek**		**Weekend**		**Midweek Weekend**	**Midweek**
Scenario:	**1**	**2**	**3**	**4**	**5**	**Scenario:**	**6**	**7**	**8**	**9**	**10**	**11**
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	2:00	2:00	2:00	2:00	2:00	R01	2:00	2:00	2:00	2:00	2:00	2:00
R02	6:00	6:00	6:00	6:00	6:00	R02	6:00	6:00	6:00	6:00	6:00	7:00
R03	9:00	10:00	8:30	9:20	7:20	R03	9:10	10:10	8:35	9:30	7:20	11:40
5-Mile Ring and Keyhole to EPZ Boundary												
R04	6:30	7:10	6:10	6:40	6:10	R04	6:40	7:20	6:10	6:50	6:10	7:40
R05	8:40	9:40	8:10	9:00	7:00	R05	8:50	9:50	8:15	9:10	7:05	11:20
R06	6:00	6:00	6:00	6:00	6:00	R06	6:00	6:00	6:00	6:00	6:00	7:10
R07	6:00	6:00	6:00	6:00	6:00	R07	6:00	6:00	6:00	6:00	6:00	7:10
R08	7:20	8:00	6:50	7:30	6:00	R08	7:20	8:10	6:50	7:30	6:00	9:50
R09	7:50	8:30	7:20	8:00	6:30	R09	8:00	8:40	7:30	8:10	6:40	10:20
R10	8:40	9:40	8:10	9:00	7:00	R10	8:50	9:50	8:15	9:10	7:05	11:20
R11	9:00	10:00	8:30	9:20	7:20	R11	9:10	10:10	8:35	9:30	7:20	11:40
R12	6:50	7:25	6:30	7:00	6:10	R12	6:50	7:30	6:30	7:10	6:10	8:10

Table 7-2
Description of Evacuation Regions

Wind Over Sectors	EAS Message	Region	Description	Areas to be Evacuated
Evacuate 2 mile downwind	4	R01	2-mile radius	1,2
Evacuate 5 mile downwind	5	R02	5-mile radius	1-4
Evacuate full EPZ	6	R03	Full EPZ	1-10
ABC; ABCD	7	R04	5-mile radius and downwind to EPZ boundary	1-6
MNPQ	8	R05		1-4, 6-9
BCD;CDE;DEF;EFG;FGH;GHJ;GHJK;HJK	9	R06		1-4, 10
HJKL;JKL	11	R07		1-4, 9-10
JKLM;KLM;LMN	12	R08		1-4, 8-10
LMNP;MNP	13	R09		1-4, 7-9
NPQ;PQR	14	R10		1-4, 6-8
PARQ;QRA;QRAB	15	R11		1-8
RAB	16	R12		1-7

The capital letter designations A - R (O and I are not used) used by Miami-Dade Office of Emergency Management correspond to the 16 major wind directions labeled clockwise with "A" being north and "R" being north-northwest.

Figure 7-1. Assumed Evacuation Response

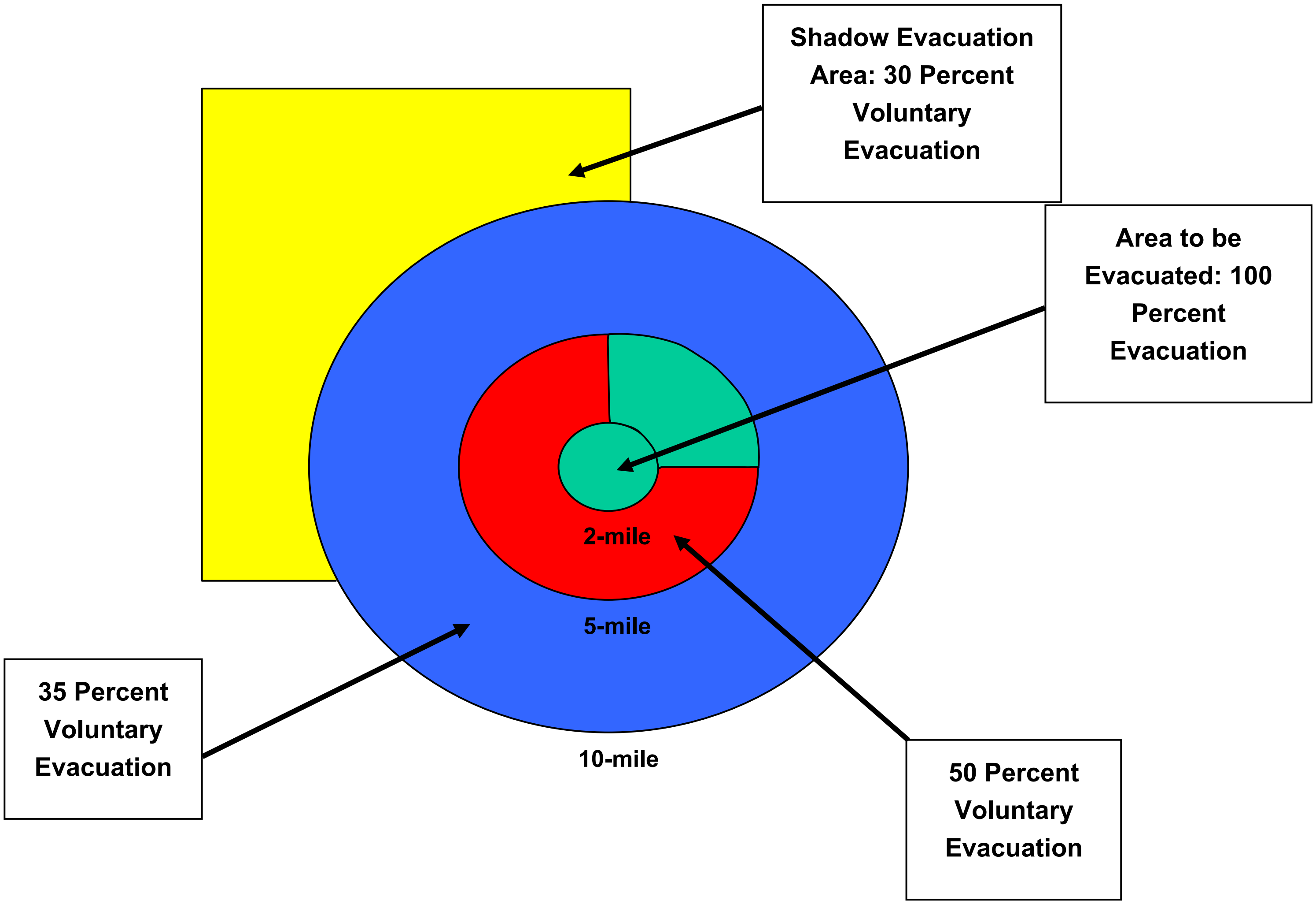


Figure 7-2. Turkey Point Nuclear Power Plant Shadow Region

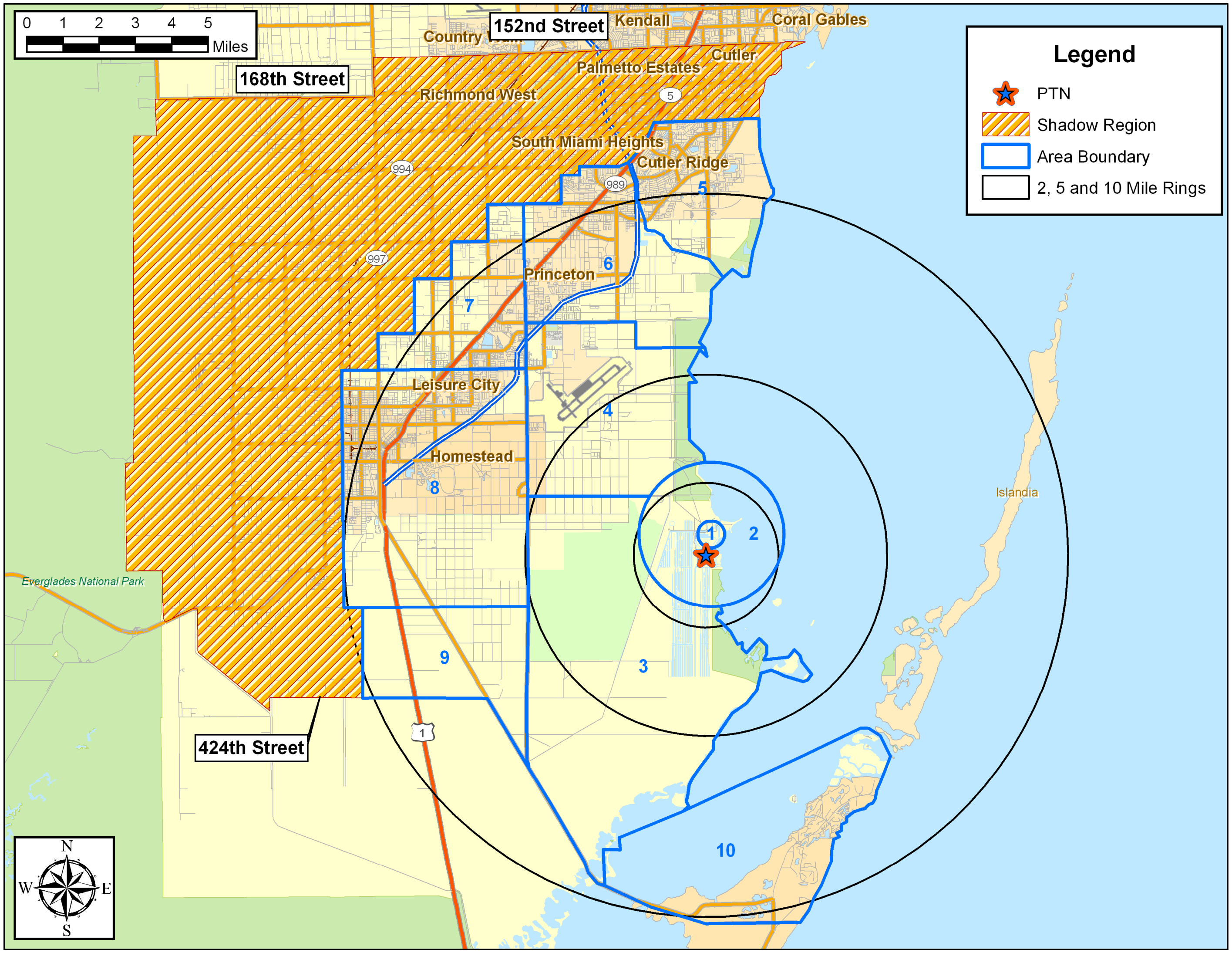


Figure 7-3. Congestion Patterns at 1 Hour After the Advisory to Evacuate (Scenario 1, Region R03)

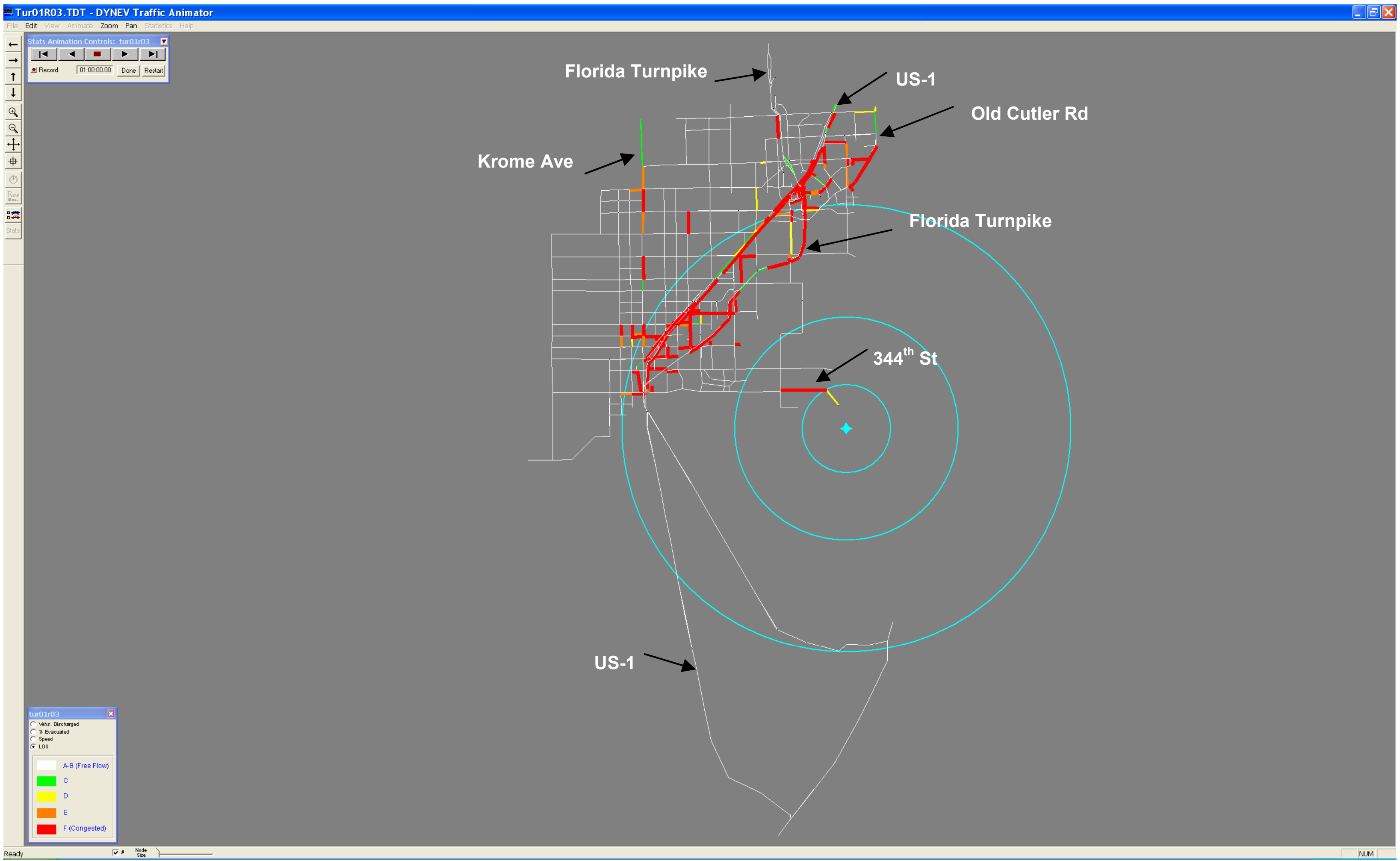


Figure 7-4. Congestion Patterns at 3 Hours After the Advisory to Evacuate (Scenario 1, Region R03)

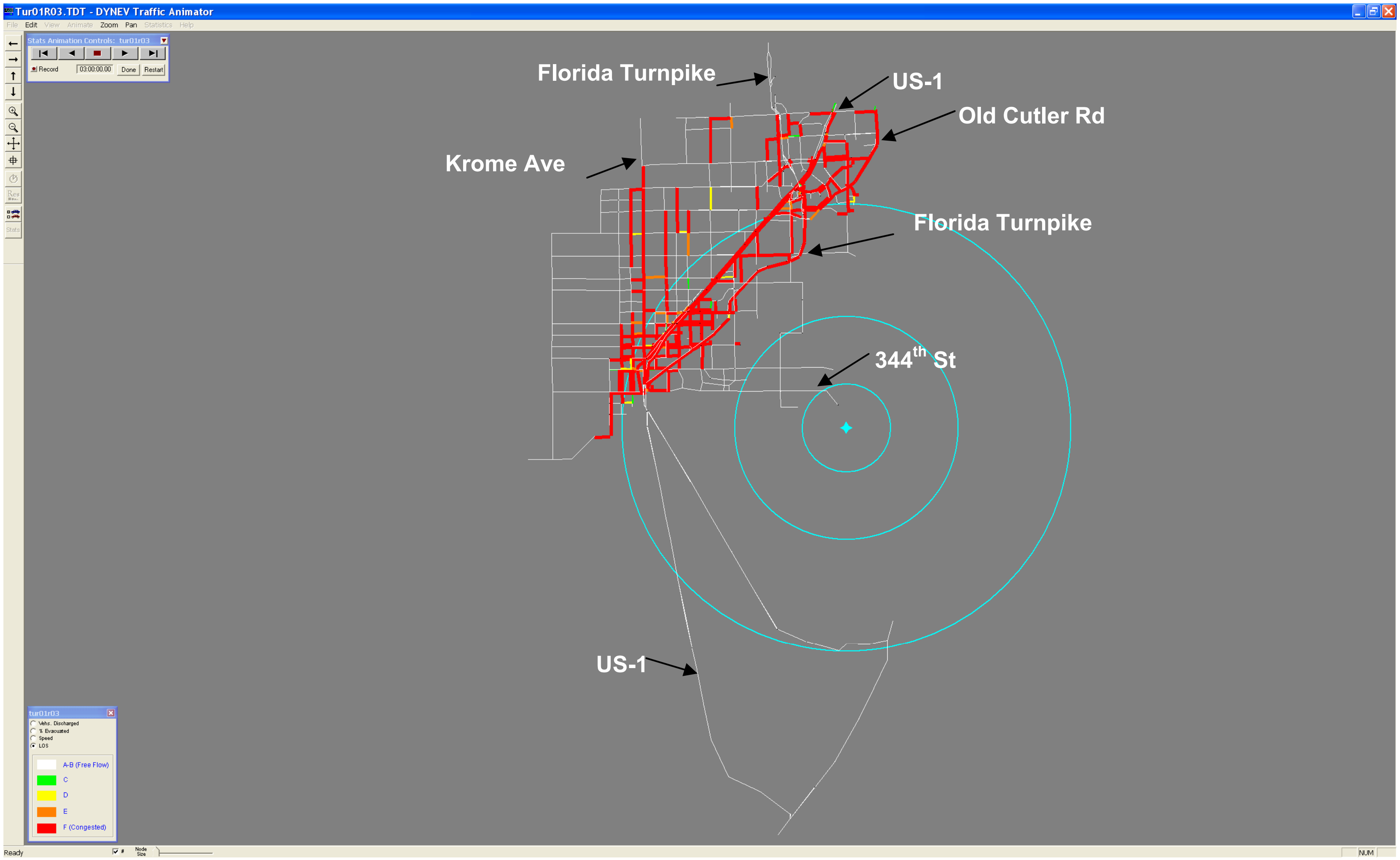


Figure 7-5. Congestion Patterns at 5 Hours After the Advisory to Evacuate (Scenario 1, Region R03)

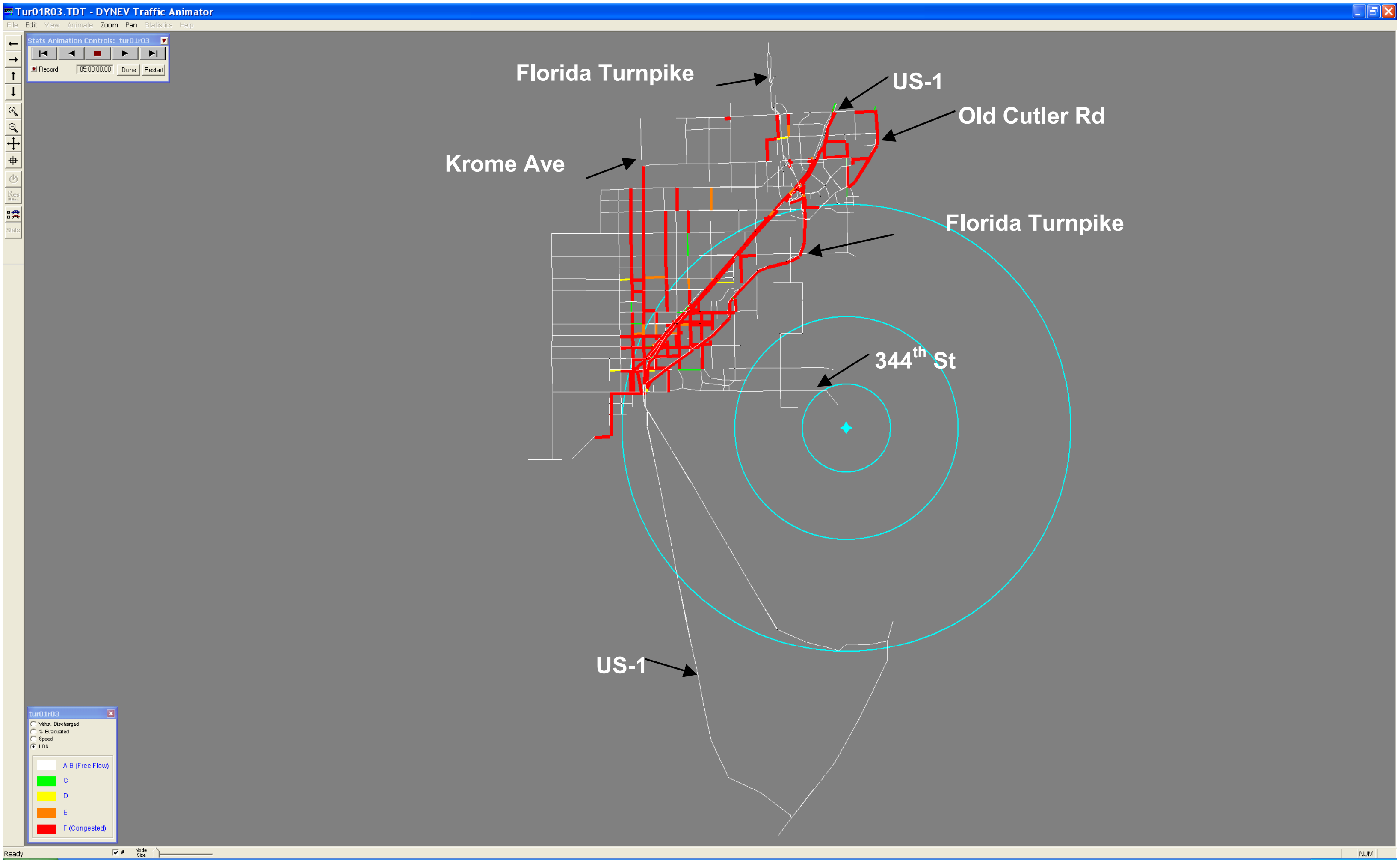


Figure 7-6. Congestion Patterns at 7 Hours After the Advisory to Evacuate (Scenario 1, Region R03)

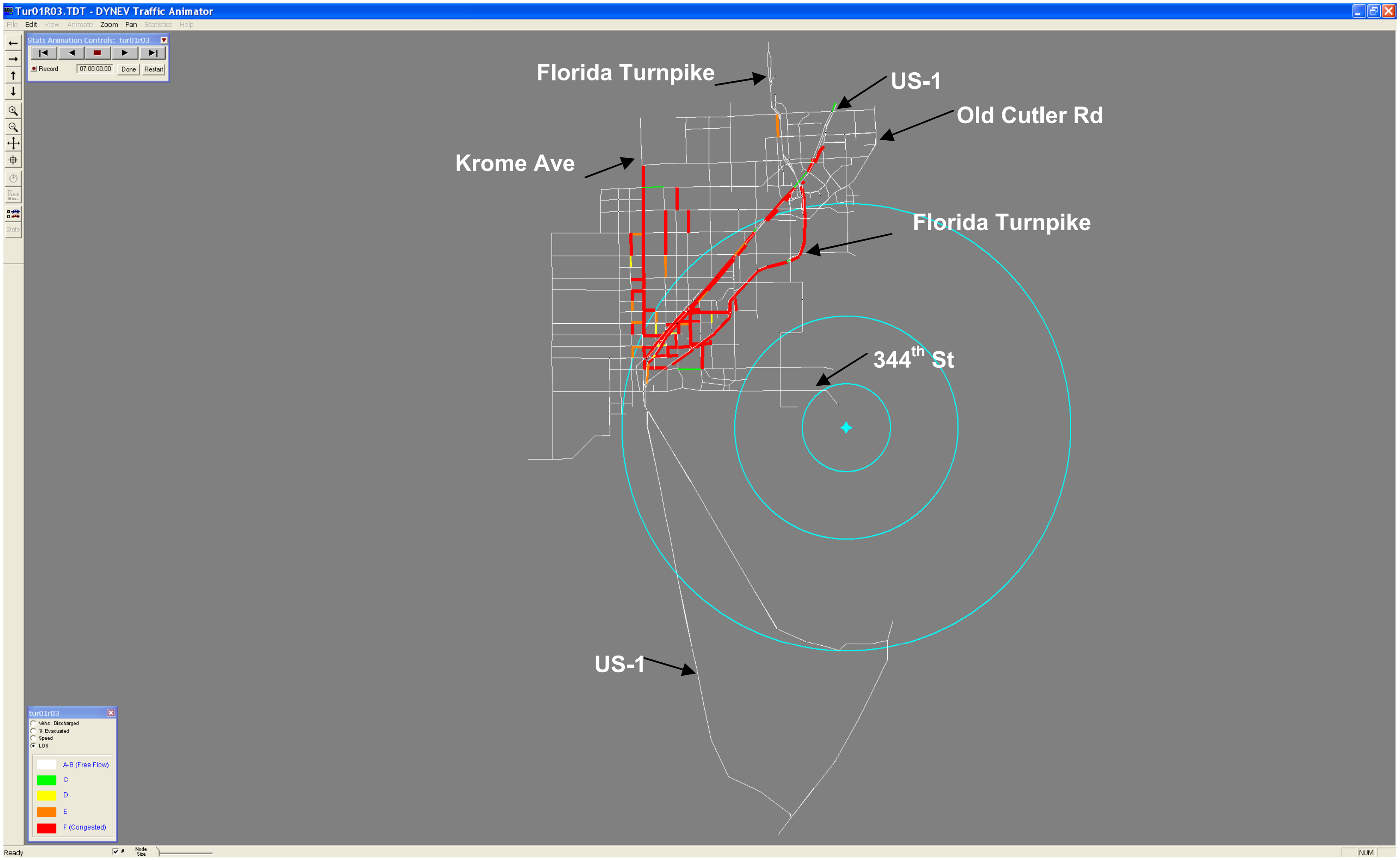


Figure 7-7. Congestion Patterns at 8 Hours, 30 Minutes After the Advisory to Evacuate (Scenario 1, Region R03)

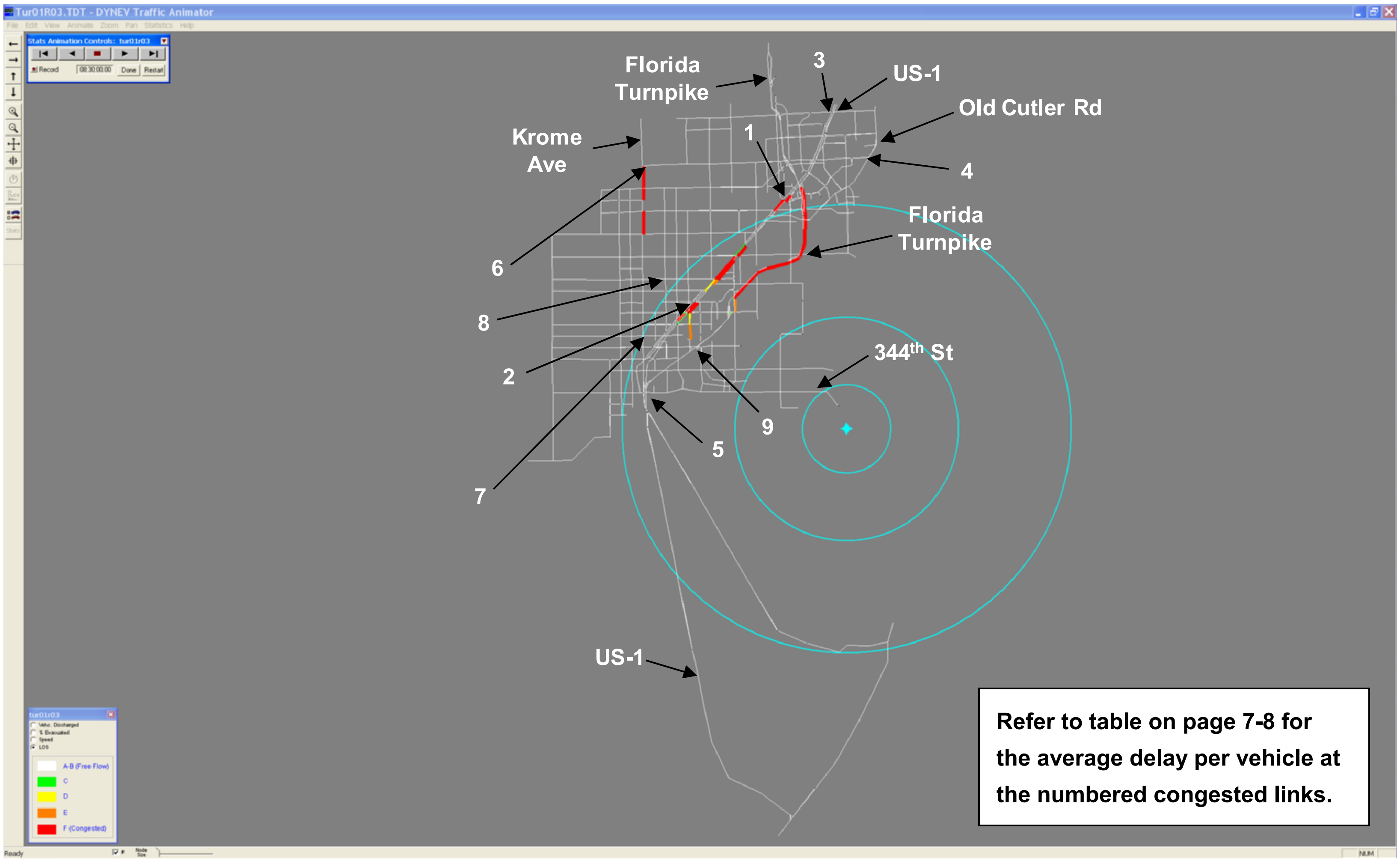


Figure 7-8. Congestion Patterns at 9 Hours After the Advisory to Evacuate (Scenario 1, Region R03)

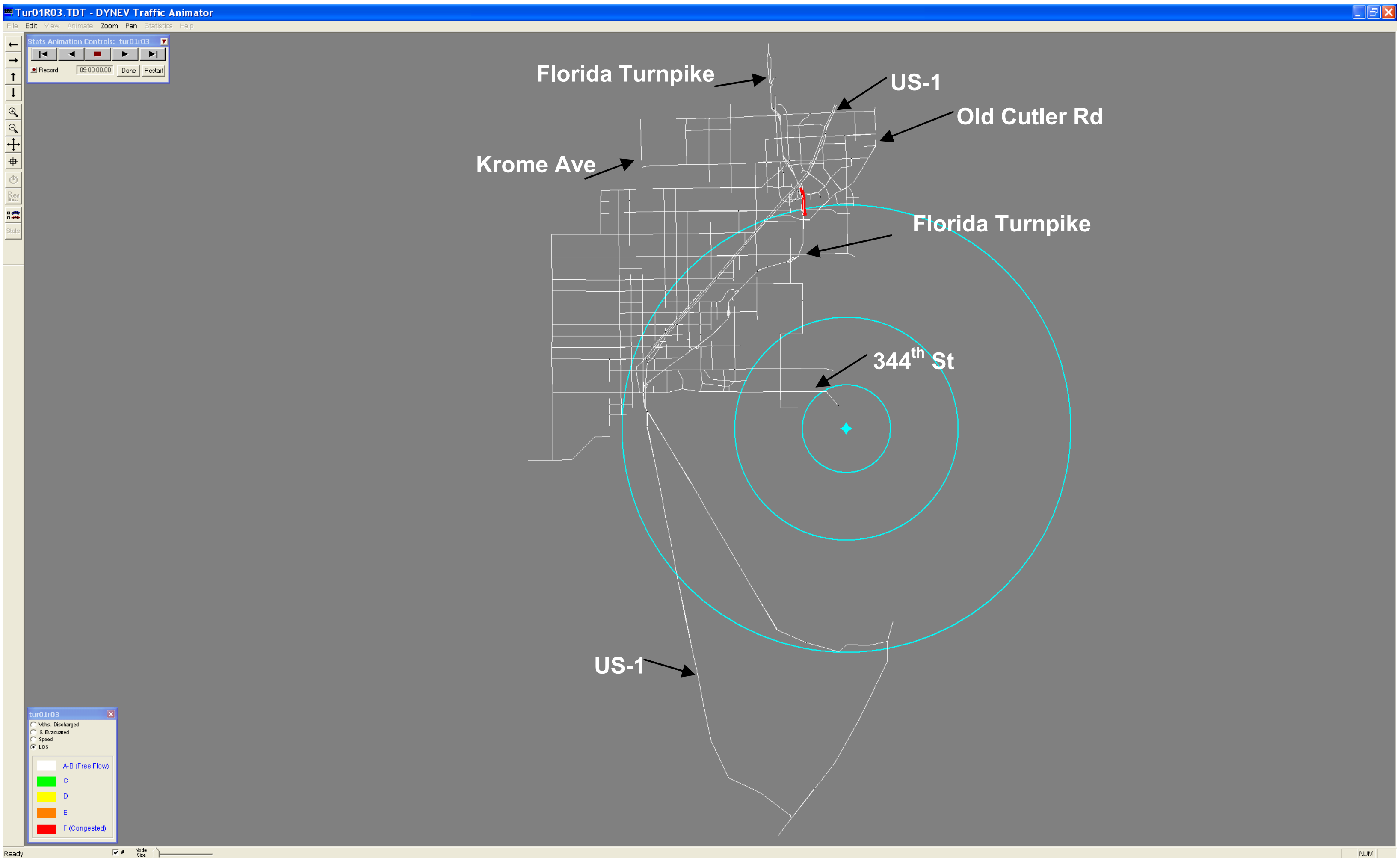
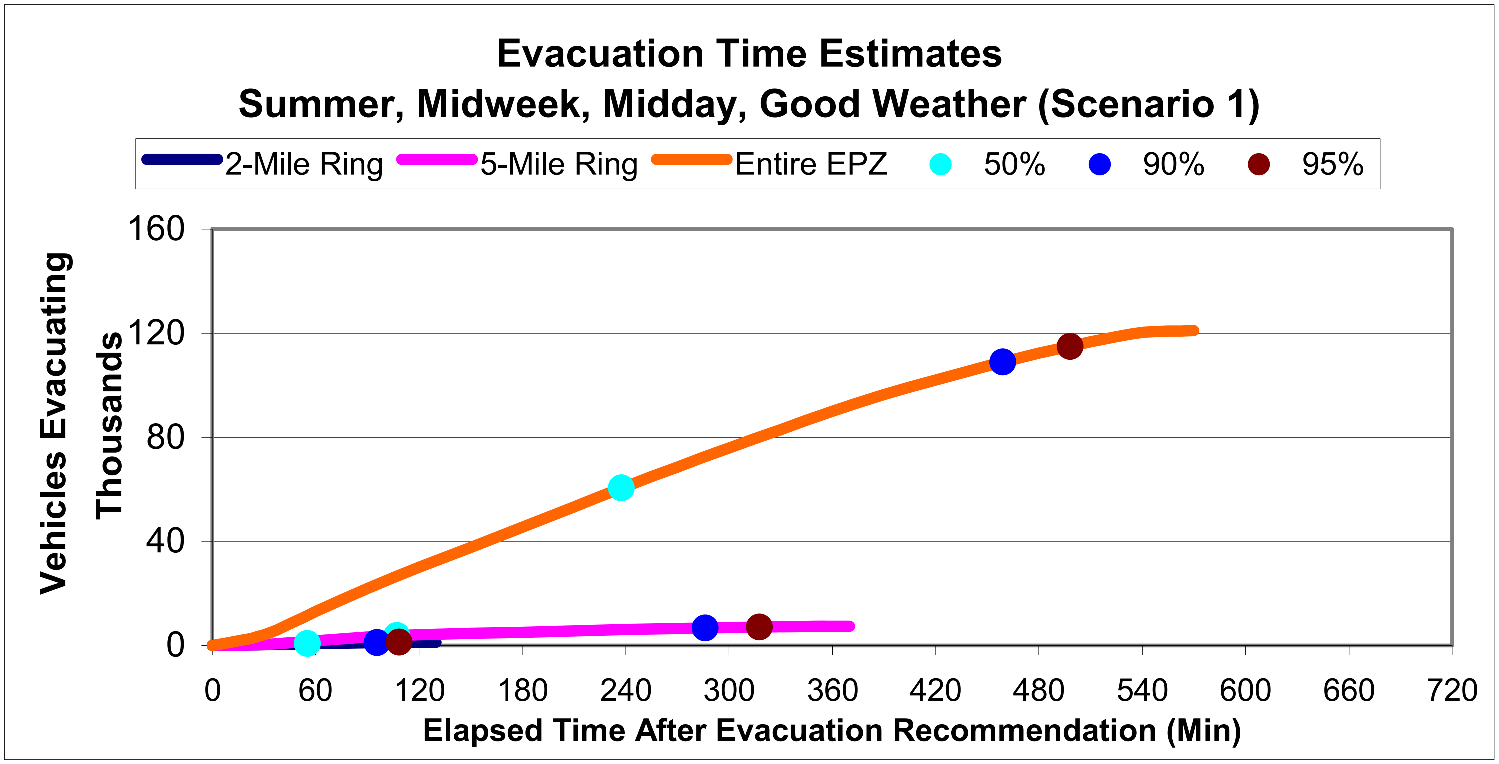


Figure 7-9. Evacuation Time Estimates for Turkey Point Summer, Midweek, Midday, Good Weather Evacuation of Region R03 (Entire EPZ)



8. TRANSIT-DEPENDENT AND SPECIAL FACILITY EVACUATION TIME ESTIMATES

This section details the analyses applied and the results obtained in the form of ETEs for transit vehicles (buses). The demand for transit service reflects the needs of two population groups: (1) residents, employees, and transients with no vehicles available, and (2) residents of special facilities such as schools, health-support facilities, institutions, and child-care facilities.

These transit vehicles merge into and become a part of the general evacuation traffic environment that is comprised mostly of passenger cars. The presence of each transit vehicle in the evacuating traffic stream is represented within the modeling paradigm described in Appendix D as equivalent to two passenger cars. This equivalence factor represents the larger size and more sluggish operating characteristics of a transit vehicle relative to those of a passenger car.

Transit vehicles must be mobilized in preparation for their respective evacuation missions. Specifically:

- Bus drivers must be alerted
- They must travel to the bus depot
- They must be briefed there and assigned to a route or facility

These activities consume time. Based on information provided by the Miami-Dade County Public Schools Transportation Center, it is estimated that bus mobilization time to support school evacuation will range from 5 to 50 minutes extending from the advisory to evacuate to the time when buses arrive at their respective assignments depending on the location of the school and the location of the bus depot servicing that school.

During this mobilization period, other mobilization activities are taking place. One of these is the action taken by parents, neighbors, relatives, and friends to pick up children from school before the buses arrive so that they may join their families. Virtually all studies of evacuations have concluded that this “bonding” process of uniting family members is universally prevalent during emergencies and should be anticipated in the planning process. Miami-Dade County emergency plans, however, call for parents to pick up children at host schools to speed the evacuation of the school children in the event that buses need to return to the EPZ and evacuate transit dependents. Estimates have been provided of buses under the assumption that no children will be picked up at school by their parents as an upper bound estimate of the transit vehicles needed.

The procedure is:

- Estimate demand for transit service
- Estimate time to perform all transit functions
- Estimate route travel times to the EPZ boundary and to the host schools

8.1 Transit-Dependent People - Demand Estimate

The telephone survey (see Appendix F) results were used to estimate the portion of the population requiring transit service:

- Those individuals in households that do not have a vehicle available.
- Those individuals in households that do have vehicle(s) that would not be available at the time the evacuation is ordered.

In the latter group, the vehicle(s) may be used by a commuter(s) who does not return (or is not expected to return) home in a timely manner to evacuate the household.

Table 8-1 presents estimates of transit-dependent people. Note:

- Estimates of individuals requiring transit vehicles include school children. For those evacuation scenarios where children are at school when an evacuation is ordered, separate transportation is provided for the school children. The actual need for transit vehicles by residents is thereby less than the given estimates. However, we will not reduce our estimates of transit vehicles for the house-based transit-dependent since it would add to the complexity of the implementation procedures.
- It is reasonable and appropriate to consider that many transit-dependent individuals will evacuate by ride-sharing with neighbors, friends, or family. For example, nearly 80 percent of those who evacuated from Mississauga, Ontario, who did not use their own cars, shared a ride with neighbors or friends. Other documents report that approximately 70 percent of transit-dependent individuals were evacuated via ride-sharing. A conservative estimate will be adopted that 50 percent of transit-dependent individuals will ride-share.

The estimated number of bus trips needed to service transit-dependent individuals is based on an estimate of average bus occupancy of 30 individuals at the conclusion of the bus run. Transit vehicle seating capacities typically equal or exceed 60 children (equivalent to 40 adults). If transit vehicle evacuees are two-thirds adults and one-third children, the number of adult seats taken by 30 individuals is 20 + (2/3 x10) = 27. On this basis, the average load factor anticipated is (27/40) x 100 = 68 percent. Therefore, if the actual demand for service exceeds the estimates of Table 8-1 by 50 percent, the demand for service can still be accommodated by the available bus seating capacity.

Table 8-1 indicates that transportation must be provided for 7789 people. Therefore, 260 bus runs are required to transport this population to reception centers.

To illustrate this estimation procedure, the number of persons, P, requiring public transit or ride-share, and the number of buses, B, required for the Turkey Point EPZ were calculated:

$$P = 59{,}864 \times (0.069 \times 2.43 + 0.276 \times (2.31 - 1) \times 0.68 \times 0.29 + 0.447 \times (3.22 - 2) \times (0.68 \times 0.29)^2)$$
$$P = 59{,}864 * (0.2601) = 15{,}577$$
$$B = (0.5 \times P) \div 30 = 260$$

These calculations are explained as follows (refer to Table 8-1):

- All members (2.43 average) of households with no vehicles (6.9 percent) will evacuate by public transit or ride-share. The term 59,864 (total households) x 0.069 x 2.43 accounts for these people.

- The number of members of households with one vehicle (27.6 percent) who are at home when the vehicle is away is equal to (2.31-1). The number of households where the commuter will not return home is equal to (59,864 x 0.276 x 0.68 x 0.29), given that 68 percent of the households in the EPZ have at least one commuter, 29 percent of which will not wait for the commuter to return before evacuating. The number of individuals who will evacuate by public transit or ride-share is equal to the product of (2.31- 1) and the above term.

- The number of household members with two vehicles (44.7 percent) that are at home when the others are away equals (3.22 – 2). The number of households where *neither* commuter will return home is equal to 59,864 x 0.447 x $(0.68 \text{ x } 0.29)^2$. The number of individuals who will evacuate by public transit or ride-share is equal to the product of (3.22 – 2) and the above term. (The term (0.68 x 0.29) represents the probability that one vehicle will not return home. The probability that neither of two vehicles will return home is that term squared.)

- Households with three or more vehicles are assumed to have no need for transit vehicles.
- The total number of individuals requiring public transit is the sum of such people in households with no vehicles or with one or two vehicles that are away from home.

8.2 School Population – Transit Demand

Table 8-2A presents the school population and transportation requirements for the direct evacuation of all public schools within the EPZ. The column in Table 8-2A titled *Bus Runs Required* specifies the number of bus runs (trips) required for each school under the following set of assumptions and estimates:

- No students will be picked up by their parents before the arrival of the buses.
- Bus capacity, expressed in students per bus, is set to 70 for primary schools and 50 for middle and high schools.
- Those staff members who do not accompany the students will evacuate in their private vehicles.
- No allowance is made for student absenteeism that is in the neighborhood of 3 percent, daily.

Table 8-2B provides the school population and transportation requirements for the private and charter schools for which Miami-Dade County schools provides buses. There are several other private schools, charter schools, and day cares within the EPZ. However, students at these facilities are typically picked up by parents. It is assumed that these students are picked up by their parents and that the time to perform this activity is included within the trip generation times presented in Section 5.

Table 8-3 presents a list of the host schools for each public school in the EPZ. Charter and private schools will be evacuated to the Miami-Dade reception center at Tamiami Park. Those students not picked up by their parents before the buses arrive will be transported to the host schools or reception center where they will be subsequently retrieved by their respective families.

8.3 Special Facility Demand

Table 8-4 presents the census of special facilities in the EPZ. Approximately 1028 people have been identified as living in or being treated in these facilities. This data was obtained from the Miami-Dade County Office of Emergency Management & Homeland Security, from internet searches, and from direct phone calls to the facilities.

8.4 Evacuation Time Estimate

Evacuation Time Estimates for Transit-Dependent People

There are sufficient buses to evacuate all EPZ schools in a single wave, based on information provided by the Miami-Dade County Public Schools Transportation Center. In general, it is reasonable to assume that these buses will transport the evacuees to the appropriate host school and return to the EPZ for a second trip to service transit dependent people and other special facilities, if needed.

In the event that the allocation of buses dispatched from the depots to the various facilities and to the transit dependent bus pickup points is somewhat inefficient, or if there is a shortfall of available drivers, there may be a need for some buses to return to the EPZ from the host schools after completing their first evacuation trip to complete a second wave of providing transport service to evacuees. Of course, if the impacted evacuation region is other than R03 (the entire EPZ), there will likely be ample transit resources relative to demand in the impacted evacuation region and this discussion of a second wave would likely not apply.

Transit resources will be assigned to schools as a first priority. When these needs are satisfied, subsequent assignments of buses to service the transit-dependent should be sensitive to their mobilization time. Clearly, the buses should be dispatched *after* people have completed their mobilization activities and are in a position to board the buses when they arrive along the pickup routes. Ambulatory evacuees can walk to the bus routes and “wave down” buses when they arrive. Given the circumstances, it is not necessary to establish pickup stations at specific locations along the routes, other than those shown in Figure 8-2. It is assumed that the response agencies will ask the media to broadcast the expected times that these buses will start to be available along the routes. The loading times shown in Tables 8-6A and B apply to buses servicing “flag stops” and those at the pickup stations shown in Figure 8-2. These leading times imply a waiting time of approximately 10 minutes if the bus has available capacity and no other bus is waiting.

The ETEs for transit trips were developed using both good weather and adverse weather conditions. Figure 8-1 presents the chronology of events relevant to transit operations. The elapsed time for each activity will now be discussed with reference to Figure 8-1.

Activity: Mobilize Drivers (A–B–C)

Mobilization is the elapsed time from the advisory to evacuate until the time the buses have arrived at the facility to be evacuated. As previously mentioned, mobilization time for the school evacuation ranges from 5 to 50 minutes, depending on the school. Mobilization time is assumed to be 5 minutes longer when raining to account for slower inbound travel times.

Activity: Board Passengers (C–D)

Studies have shown that passengers can board a bus at headways of 2.0 seconds (Reference HCM2000 Exhibit 27-9). Example 1 on pages 27–36 adopts a headway estimate of 3.0 seconds. Therefore, the total dwell time to service passengers boarding a bus to capacity at a single stop (e.g., at a school) is approximately 5 minutes. The transit-dependent population boarding buses at the bus pickup points will likely have luggage because they may be leaving their home for a period of time and they do not have a vehicle to pack their items in. As a result, a longer loading of time of 10 minutes will be used for boarding a full bus at a single stop.

Buses that travel along routes picking up evacuees at many stops along the way need to slow to a stop, board the people, and then accelerate. These actions consume about 1 minute per stop, assuming two to four individuals board per stop. On this basis, a bus would make approximately 15 stops before proceeding out of the EPZ, for a total delay of 15 minutes per bus run (20 minutes for rain). These estimates are used in Table 8-6.

Activity: Travel to Emergency Planning Zone Boundary (D–E)

<u>School Evacuation</u>

The distance from a school to the EPZ boundary is measured using GIS software along the most likely route out of the EPZ toward the designated host school. The travel times to the EPZ boundary are based on evacuation speeds computed by the model PC-DYNEV. As part of Miami-Dade County emergency plans, schools will either be evacuated before an advisory to evacuate is issued to the general public, if feasible, or immediately following the advisory to evacuate for the immediate emergency envisioned as the planning basis for this ETE (Section 2.3). Thus, traffic congestion will be limited. The model output yields an average speed of 20 mph at 0:50 after the advisory to evacuate. Travel speeds are approximately 18 mph in rain.

Tables 8-5A (good weather) and 8-5B (rain) present the following evacuation time estimates (rounded up to the nearest 5 minutes) for schools in the EPZ: (1) the elapsed time from the advisory to evacuate until the bus exits the EPZ, and (2) the elapsed time until the bus reaches the host school. The evacuation time out of the EPZ can be computed as the sum of travel times associated with Activities A–B–C, C–D, and D–E (For example: 25 minutes + 5 + 16 = 0:50 for Air Base Elementary in good weather). The evacuation time to the host school is determined by adding the time associated with Activity E–F (described below), to this EPZ evacuation time.

<u>Evacuation of Transit-Dependent Population</u>

The buses dispatched from the depots to service the transit-dependent evacuees will be scheduled so that they arrive at their respective pickup points after their passengers have completed their mobilization. As indicated in Section 5, approximately 90 percent of the evacuees who are likely transit-dependent (residents without commuters) will complete their mobilization when the buses will arrive, 180 minutes after the advisory to evacuate.

These buses, when loaded, will travel along the most likely route out of the EPZ toward the reception center. The travel distance to the EPZ boundary is measured using GIS software. The average speed output by the PC-DYNEV model at the projected pickup time is used to estimate the route travel time — 4.7 mph in good weather and 4.1 mph in rain. Congestion is at its peak at 3 hours after the advisory to evacuate, as indicated in Section 7.2, and travel speeds are slow.

Table 8-6 presents the transit-dependent population ETEs. The last buses to leave the EPZ are those buses picking up passengers at South Dade Camp as they have the longest distance to travel to depart the EPZ. The ETE for these buses is computed as 180 + 15 + 124 = 5:20 for good weather. Here, 124 minutes is the time needed to travel 9.7 miles at 4.7 mph (average speed output by PC-DYNEV).

These transit-dependent people who are unable (or unwilling) to walk to the bus routes must either register with the local emergency response agencies before the event or place a phone call requesting a vehicle to pick them up at home.

The implementation details are the responsibility of local emergency response agencies and are outside the scope of this ETE report. Given that some 550 buses (Tables 8-2) will become available for evacuating transit-dependent individuals shortly after 1 hour following the advisory to evacuate, it is reasonable to expect that these special needs individuals can be evacuated within the timeframe discussed below.

Activity: Travel to Host Schools (E–F)

The distance from the EPZ boundary to the host school is also measured using GIS software along the most likely route from the EPZ to the host school. For a one-wave evacuation, this travel time outside the EPZ does not contribute to the ETE. For a two-wave evacuation, the ETE for buses must be considered separately because it could exceed the ETE for the general public.

Activity: Passengers Leave Bus (F–G)

Passengers can unboard within 5 minutes based on typical alighting time of 1.7 – 2.0 sec. headway (HCM Exhibit 27-9). The bus driver takes a 10-minute break.

Activity: Bus Returns to Route for Second Wave Evacuation (G–C)

The buses assigned to return to the EPZ to perform a second wave evacuation of transit-dependent evacuees will be those buses that evacuated the schools. Therefore, the mobilization time for the second wave is the average time that buses arrive at the host school (See Table 8-5). The travel time back to the EPZ is the average of the travel times to the host school as listed in Tables 8-5A and B. These average travel times are calculated separately as 32 minutes for good weather and 35 minutes for rain. The ETE for school buses to reach the host schools is 1 hour and 10 minutes in good weather. These buses can return to the EPZ to perform a second-wave evacuation of transit-dependent evacuees within 2 hours (ETE to host school + unload time + driver rest + return time to EPZ). As previously mentioned, the transit-dependent population will not be mobilized for evacuation until 3 hours after the advisory to evacuate.

The ETE for schoolchildren and for the transit-dependent population do not exceed the ETE for the general population, as seen in Tables 8-5 and 8-6.

Evacuation of Ambulatory Individuals from Special Facilities

Based on discussions with Miami-Dade County emergency management officials, Florida state law dictates that all medical facilities (hospitals, assisted living, etc.) must have detailed evacuation plans and adequate transportation resources to evacuate all residents of their facility in the event of an emergency. As such, these facilities will likely rely on private transportation providers. The Miami-Dade Department of Corrections and Miami-Dade Transit will assist those who may need transportation resources.

Assuming the transportation providers are located in Miami, average travel times will be 45 minutes from the depot to the facility to be evacuated traveling counterflow relative to evacuating traffic. A mobilization time of approximately 90 minutes is also likely for these buses. Passenger loading time will be longer than that for schools and transit-dependents, approximately 30 minutes, to account for the time to move patients from inside the facility to the vehicles. Buses will be ready to begin their evacuation trip at 2:45 (45 minutes + 90 + 30).

Appendix E indicates that the medical facilities are approximately 8 miles from the plant, on average. Therefore, buses evacuating these facilities will have to travel at most 5 miles to leave the EPZ. The average travel speed at 2 hours and 45 minutes after the advisory to evacuate is 4.79 mph. Therefore, the travel time out of the EPZ for buses evacuating special facilities is 63 minutes. The ETE for medical facilities is 3 hours and 50 minutes.

The ETE for the ambulatory patients at special facilities do not exceed the general population ETE.

Emergency Medical Services Vehicles

The previous description focused on transit operations for ambulatory individuals residing at medical facilities within the evacuation region. It is also necessary to provide transit services to non-ambulatory individuals who do not or cannot have access to buses. Ambulances will be provided by emergency medical service providers within the EPZ for acute care and bed-ridden patients. Additional ambulances, if needed, will be provided by neighboring cities.

It is estimated that 30 minutes will be needed to mobilize ambulances and travel to the medical facilities. Loading times for two patients are conservatively estimated as 30 minutes. As with the buses transporting ambulatory patients, ambulances will have to travel 5 miles, on average, to leave the EPZ. The average speed output by the model at 1 hour for Region 3, Scenario 6 is 12.9 mph. Therefore, travel time out of the EPZ is 23 minutes.

The ETE for ambulances is: 30 + 30 + 23 = 1:25 (rounded up to nearest 5 minutes).

If a second wave is required, the additional time includes 45 minutes to travel to a host facility, 15 minutes to unload the patients, and 15 minutes of rest for the driver. The return trip + loading time + travel to EPZ boundary occurs under more severe congestion and is estimated at 45 + 15 + 60 minutes = two hours. Therefore, the total ETE is:

1:25 + 0:45 + 0:15 + 0:15 + 2:15 = 4:00

If additional emergency medical service vehicles are needed, requests to other providers can reasonably be made. Their responses should be completed within the indicated time estimated for the second wave.

Table 8-1
Transit-Dependent Population Estimate

Facility Name	2009 EPZ Population	Survey Average Household Size With indicated No. of Vehicles			Estimated Number of Households	Survey Percent Households with			Survey Percent Households With Commuters	Survey Percent Households With Non-Returning Commuters	Total People Requiring Transport	Estimated Ridesharing Percentage	People Requiring Public Transit	Percent of Population Requiring Public Transit
		0	1	2		0 Vehicle	1 Vehicle	2 Vehicles						
Turkey Point Nuclear Power Plant	187,374	2.43	2.31	3.22	59,864	6.9%	27.6%	44.7%	68%	29%	15,577	50%	7,789	4.2%

Table 8-2A
Miami-Dade County Public Schools

Area	School Name	Enrollment	Bus Runs Required
4	Air Base Elementary	676	10
4	Migrant Education Program	17	1
5	Bel-Aire Elementary	522	8
5	Centennial Middle	976	22
5	Cutler Ridge Elementary	905	13
5	Cutler Ridge Middle	1,008	25
5	Gulfstream Elementary	724	16
5	Whigham, Dr. E.L. Elementary	798	12
5	Whispering Pines Elementary	758	11
6	Caribbean Elementary	811	12
6	Mays Middle	658	14
6	Pine Villa Elementary	623	9
7	Chapman Elementary	940	14
7	Naranja Elementary	637	10
7	Redland Middle	1,175	24
7	South Dade Senior	2,453	52
8	Avocado Elementary	782	12
8	Campbell Drive Elementary	1,246	18
8	Campbell Drive Middle	1,072	23
8	Cooper, Neva King Educational Center	101	18
8	Corporate Academy South	89	2
8	Florida City Elementary	857	13
8	Homestead Middle	966	20
8	Homestead Senior	2,184	45
8	Leisure City K-8 Center	1,318	19
8	Peskoe Elementary	1,114	16
8	Saunders, Laura C. Elementary	919	14
Outside[a]	Redland Elementary	996	15
Outside[a]	Redondo Elementary	753	11
Outside[a]	West Homestead Elementary	768	13
Total		**26,846**	**492**

(a) Redland Elementary, Redondo Elementary, and West Homestead Elementary are located just outside the EPZ. However, they are evacuated in the event of an emergency at Turkey Point because of their proximity to the EPZ boundary.

Table 8-2B
Miami-Dade County Private and Charter Schools

Area	School Name	Enrollment	Bus Runs Required
5	Balere Language Academy	151	3
5	Cutler Ridge Christian Academy	238	[a]
5	Our Lady of the Holy Rosary	460	[a]
6	Children's Rainbow	20	[a]
6	Coral Reef Montessori Academy Charter School	335	5
7	SIA Tech (Homestead Job Corps Center)	357	8
8	Aspira South Youth Leadership Charter School	306	7
8	Barrington Academy	94	2[b]
8	Colonial Christian School	199	(a)
8	First Assembly Christian Academy	75	[a]
8	First Presbyterian Church School	120	[a]
8	Keys Gate Charter School	1,143	17
8	Lawrence Academy	15	1
8	Miami Community Charter School	50	1
8	Redland Christian Academy	215	[a]
8	Rosa Parks Charter School	155	3
8	Sacred Heart	194	[a]
8	Saint John's Episcopal School	176	(a)
8	The Charter School at Waterstone	1,117	16
Total		**5,420**	**61**

(a) Parents pick up students.
(b) Most students are picked up by parents. There are 2 buses (capacity = 15 students for each bus) which evacuate those students who are not picked up.

Table 8-2C
Miami-Dade County Adult Education and Skill Centers

Area	School Name	Enrollment	Bus Runs Required[(a)]
7	South Dade Center	N/A	0
7	South Dade Skill Center	N/A	0
8	Redland Center	N/A	0
8	Region VI Office	N/A	0
8	South Dade Adult Center	N/A	0
Total		**N/A**	**0**

(a) Adults drive to facility; therefore, no buses are required to evacuate the facility.

Table 8-3
Host Schools

School	Host School
Air Base Elementary	Coral Reef Elementary
Avocado Elementary	Pine Lake Elementary
Bel-Aire Elementary	Devon Aire Elementary
Campbell Drive Elementary	Palmetto Elementary
Campbell Drive Middle	Palmetto Senior
Caribbean Elementary	Pinecrest Elementary
Centennial Middle	Palmetto Middle
Chapman Elementary	Richmond Elementary
Cooper, Neva King Educational Center	Pine Lake Elementary
Corporate Academy South	Colonial Drive Elementary
Cutler Ridge Elementary	R. Morgan Voc. Tech.
Cutler Ridge Middle	R. Morgan Voc. Tech
Florida City Elementary	Palmetto Elementary
Gulfstream Elementary	Colonial Drive Elementary
Homestead Middle	Arvida Middle
Homestead Senior	Hommocks Middle
Leisure City K-8 Center	South Miami Heights Elementary
Mays Middle	McMillan Middle
Migrant Education Program	Palmetto Middle
Naranja Elementary	Richmond Heights Middle
Peskoe Elementary	Richmond Heights Middle
Pine Villa Elementary	Martin, F.C. Elementary
Redland Elementary	South Miami Elementary
Redland Middle	South Miami Middle
Redondo Elementary	Winston Park Elementary
Saunders, Laura C. Elementary	Porter, G.L. Elementary
South Dade Senior	Miami Killian Senior
West Homestead Elementary	Pepper, Claude Elementary
Whigham, Dr. E.L. Elementary	Pinecrest Elementary
Whispering Pines Elementary	Howard Drive Elementary

**Table 8-4 (Sheet 1 of 3)
Special Facilities Census**

Facility Name	Area	Population
Diaz Home Care ALF	4	6
Merline's Place	4	6
Mother Golden Years III	4	6
Bel Air ALF	5	6
Bella Luna Retirement Home	5	6
Blue Point Home Care	5	6
Caribbean ALF	5	6
East Ridge Retirement Village	5	60
Harmony Family Home	5	6
Health South Rehabilitation Hospital	5	60
Kenneth Home Inc	5	6
Marlin Retirement ALF	5	6
Old Cutler Retirement Home	5	6
Perdue Medical Center	5	163
Rodeck One Inc	5	6
The Haven	5	7
B & B Home Care, Inc.	6	6
Brisa Azul	6	6
Del Real Home Care, Inc.	6	6
Duran Home Care Corp	6	6
God Is First ALF, Inc	6	6
Grand Court Operations South, LLC	6	105
Ifa Lola ALF	6	6
Ive Home	6	6
Ive Home II ALF	6	6
Jesus Home Services	6	6
Living Well ALF, Co.	6	6
Meadow Wood Homes LLC	6	6
Milagros de Vida ALF	6	6
My Sweet Home	6	6

Table 8-4 (Sheet 2 of 3)
Special Facilities Census

Facility Name	Area	Population
Paula's Mansion ALF	6	6
Peace & Care South Inc	6	6
Quality Care ALF, Inc	6	6
Rafaela's Home ALF II	6	6
Silver Age ALF, Corp	6	6
St. Mary Adult Care II	6	6
Suany's Home	6	6
Sylvia's Senior Home	6	6
Vicky's ALF	6	6
Advance ALF	7	6
Biscayne Senior Housing	7	20
Maria Home Care Corp	7	6
San Rafael Home Health Inc	7	6
Serenity Adult Home Care Services	7	6
Alita and John Haran ALF	8	6
Angele's Assisted Living Facility	8	6
El Viejo Sol ALF Corp	8	6
Heaven Assisted Living Facility	8	6
Homestead Hospital	8	120
Homestead Manor	8	18
Kayleen and Denis Care	8	6
MD ALF	8	6
Mi Renacer ALF	8	6
Mother Golden Years II	8	6
Palace Gardens-North	8	200
Pina & Fuerte Adult Care	8	6
Sara Home Care	8	16
Signature Healthcare of Brookwood Gardens	8	120
Swankridge Care Center	8	8

**Table 8-4 (Sheet 3 of 3)
Special Facilities Census**

Facility Name	Area	Population
Swankridge Holistic Research & Care Center	8	12
Sweet Mansion ALF Inc	8	5
The Gardens ALF	8	6
The Gil Family Home	8	6
Total		**1,208**

Table 8-5A
School Evacuation Time Estimates – Good Weather

School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bndry to H.S. (mi.)	Travel Time EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Miami-Dade County Public Schools								
Air Base Elementary	25	5	10.4	31	**1:05**	3.5	10	**1:15**
Avocado Elementary	30	5	11.3	34	**1:10**	2.9	9	**1:20**
Bel-Aire Elementary	40	5	1.0	3	**0:50**	6.9	20	**1:10**
Campbell Drive Elementary	10	5	10.8	32	**0:50**	5.4	16	**1:05**
Campbell Drive Middle	10	5	12.1	36	**0:55**	5.4	16	**1:10**
Carribean Elementary	10	5	2.7	8	**0:25**	8.1	24	**0:50**
Centennial Middle	45	5	2.5	7	**1:00**	4.4	13	**1:10**
Chapman Elementary	25	5	7.6	23	**0:55**	1.4	4	**1:00**
Cooper, Neva King Educational Center	15	5	4.3	13	**0:35**	13.4	40	**1:15**
Corporate Academy South	10	5	13.8	41	**1:00**	2.3	7	**1:05**
Cutler Ridge Elementary	45	5	1.9	6	**1:00**	2.3	7	**1:05**
Cutler Ridge Middle	45	5	1.2	4	**0:55**	2.3	7	**1:05**
Florida City Elementary	5	5	3.7	11	**0:25**	20.3	60	**1:25**
Gulfstream Elementary	50	5	2.5	7	**1:05**	2.3	7	**1:10**
Homestead Middle	15	5	2.9	9	**0:30**	15.5	46	**1:15**
Homestead Senior	10	5	12.3	37	**0:55**	12.2	36	**1:30**
Leisure City K-8 Center	30	5	9.1	27	**1:05**	2.4	7	**1:10**
Mays Middle	15	5	1.8	5	**0:25**	11.2	33	**1:00**
Migrant Education Program	30	5	10.8	32	**1:10**	5.3	16	**1:25**
Naranja Elementary	20	5	7.3	22	**0:50**	3.6	11	**1:00**
Peskoe Elementary	15	5	8.7	26	**0:50**	4.6	14	**1:00**
Pine Villa Elementary	15	5	2.3	7	**0:30**	4.1	12	**0:40**
Redland Elementary	25	5	0.0	0	**0:30**	20.2	60	**1:30**
Redland Middle	20	5	0.0	0	**0:25**	20.8	62	**1:30**
Redondo Elementary	30	5	1.1	3	**0:40**	19.3	57	**1:35**
Saunders, Laura C. Elementary	10	5	3.8	11	**0:30**	15.3	45	**1:15**
South Dade Senior	25	5	2.3	7	**0:40**	16.3	48	**1:25**
West Homestead Elementary	15	5	0.0	0	**0:20**	17.7	53	**1:15**
Whigham, Dr. E.L. Elementary	20	5	2.8	8	**0:35**	6.3	19	**0:55**
Whispering Pines Elementary	15	5	0.8	2	**0:25**	5.1	15	**0:40**
Miami-Dade County Private/Charter Schools								
Aspira SouthYouth Leadership Charter School	30	5	7.9	23	**1:00**	12.3	37	**1:35**
Balere Language Academy	45	5	0.9	3	**0:55**	12.3	37	**1:30**
Barrington Academy	30	5	2.9	9	**0:45**	25.5	76	**2:00**
Coral Reef Montessori Academy Charter School	45	5	1.5	4	**0:55**	12.3	37	**1:35**
Keys Gate Charter School	15	5	11.2	33	**0:55**	12.3	37	**1:30**
Lawrence Academy	10	5	5.3	16	**0:35**	23.0	68	**1:40**
Miami Community Charter School	10	5	3.6	11	**0:30**	25.0	74	**1:40**
Rosa Parks Charter School	10	5	5.1	15	**0:30**	23.0	68	**1:40**
SIA Tech (Homestead Job Corps Center)	15	5	8.7	26	**0:50**	12.3	37	**1:25**
The Charter School at Waterstone	15	5	9.2	27	**0:50**	12.3	37	**1:25**
				Maximum for EPZ:	**1:10**		**Maximum:**	**2:00**

*Travel times computed using the average speed of 20.2 mph (output by DYNEV) at 50 minutes after the advisory to evacuate for an evacuation of Region R03 under Scenario 6 conditions.

Note: Those schools identified in Tables 8-2B and 8-2C as not requiring buses are not included in the school ETE calculated above. Students at those schools are either picked up by parents or evacuate in their own vehicle and are thus included in the general population ETE.

HS = Host School

Table 8-5B
School Evacuation Time Estimates – Rain

Table 8-5B. School Evacuation Time Estimates - Rain								
School	Driver Mobilization Time(min)	Loading Time (min)	Dist. to EPZ Boundary (mi.)	Travel Time to EPZ Bdry (min)	ETE (hr:min)	Dist. EPZ Bndry to H.S. (mi.)	Travel Time EPZ Bdry to H.S. (min)	ETE to H.S. (hr:min)
Miami-Dade County Public Schools								
Air Base Elementary	30	10	10.4	34	**1:15**	3.5	11	**1:25**
Avocado Elementary	35	10	11.3	37	**1:25**	2.9	9	**1:35**
Bel-Aire Elementary	45	10	1.0	3	**1:00**	6.9	22	**1:20**
Campbell Drive Elementary	15	10	10.8	35	**1:00**	5.4	18	**1:20**
Campbell Drive Middle	15	10	12.1	39	**1:05**	5.4	18	**1:25**
Carribean Elementary	15	10	2.7	9	**0:35**	8.1	26	**1:00**
Centennial Middle	50	10	2.5	8	**1:10**	4.4	14	**1:25**
Chapman Elementary	30	10	7.6	25	**1:05**	1.4	5	**1:10**
Cooper, Neva King Educational Center	20	10	4.3	14	**0:45**	13.4	43	**1:30**
Corporate Academy South	15	10	13.8	45	**1:10**	2.3	7	**1:20**
Cutler Ridge Elementary	50	10	1.9	6	**1:10**	2.3	7	**1:15**
Cutler Ridge Middle	50	10	1.2	4	**1:05**	2.3	7	**1:15**
Florida City Elementary	10	10	3.7	12	**0:35**	20.3	66	**1:40**
Gulfstream Elementary	55	10	2.5	8	**1:15**	2.3	7	**1:20**
Homestead Middle	20	10	2.9	9	**0:40**	15.5	50	**1:30**
Homestead Senior	15	10	12.3	40	**1:05**	12.2	40	**1:45**
Leisure City K-8 Center	35	10	9.1	30	**1:15**	2.4	8	**1:25**
Mays Middle	20	10	1.8	6	**0:40**	11.2	36	**1:15**
Migrant Education Program	35	10	10.8	35	**1:20**	5.3	17	**1:40**
Naranja Elementary	25	10	7.3	24	**1:00**	3.6	12	**1:15**
Peskoe Elementary	20	10	8.7	28	**1:00**	4.6	15	**1:15**
Pine Villa Elementary	20	10	2.3	7	**0:40**	4.1	13	**0:50**
Redland Elementary	30	10	0.0	0	**0:40**	20.2	66	**1:50**
Redland Middle	25	10	0.0	0	**0:35**	20.8	67	**1:45**
Redondo Elementary	35	10	1.1	4	**0:50**	19.3	63	**1:55**
Saunders, Laura C. Elementary	15	10	3.8	12	**0:40**	15.3	50	**1:30**
South Dade Senior	30	10	2.3	7	**0:50**	16.3	53	**1:40**
West Homestead Elementary	20	10	0.0	0	**0:30**	17.7	57	**1:30**
Whigham, Dr. E.L. Elementary	25	10	2.8	9	**0:45**	6.3	20	**1:05**
Whispering Pines Elementary	20	10	0.8	3	**0:35**	5.1	17	**0:50**
Miami-Dade County Private/Charter Schools								
Aspira SouthYouth Leadership Charter School	35	10	7.9	26	**1:15**	12.3	40	**1:55**
Balere Language Academy	50	10	0.9	3	**1:05**	12.3	40	**1:45**
Barrington Academy	35	10	2.9	9	**0:55**	25.5	83	**2:20**
Coral Reef Montessori Academy Charter School	50	10	1.5	5	**1:05**	12.3	40	**1:45**
Keys Gate Charter School	20	10	11.2	36	**1:10**	12.3	40	**1:50**
Lawrence Academy	15	10	5.3	17	**0:45**	23.0	75	**2:00**
Miami Community Charter School	15	10	3.6	12	**0:40**	25.0	81	**2:00**
Rosa Parks Charter School	15	10	5.1	17	**0:45**	23.0	75	**2:00**
SIA Tech (Homestead Job Corps Center)	20	10	8.7	28	**1:00**	12.3	40	**1:40**
The Charter School at Waterstone	20	10	9.2	30	**1:00**	12.3	40	**1:40**
				Maximum for EPZ:	**1:25**		**Maximum:**	**2:20**

*Travel times computed using the average speed of 18.5 mph (output by DYNEV) at 50 minutes after the advisory to evacuate for an evacuation of Region R03 under Scenario 7 conditions

Note: Those schools identified in Tables 8-2B and 8-2C as not requiring buses are not included in the school ETE calculated above. Students at those schools are either picked up by parents or evacuate in their own vehicle and are thus included in the general population ETE.

HS = Host School

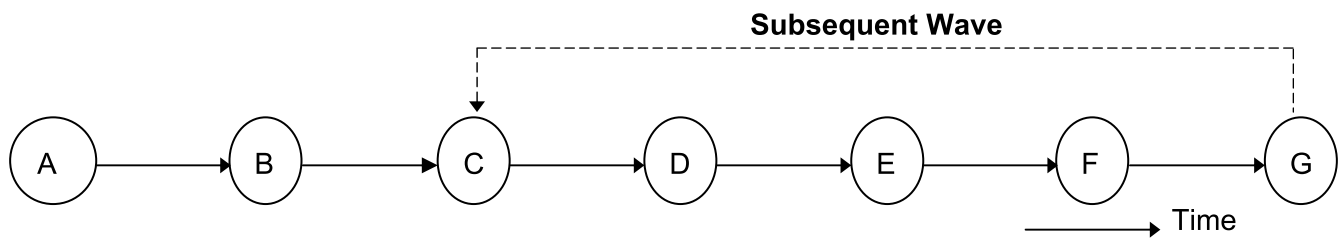
Table 8-6A
Transit-Dependent Evacuation Time Estimates - Good Weather

Pickup Location	Mobilization (minutes)	Loading Time (minutes)	Distance to EPZ Boundary (miles)	Travel Time to EPZ Boundary (minutes)	ETE (hr:min)
Andrew Center	180	15	8.3	106	5:05
East Ridge Retirement Village	180	15	0.8	10	3:25
Florida City, City Hall	180	15	4.8	61	4:20
Four Seasons Mobile Home Park	180	15	3.9	50	4:05
HUD-Pine Island I	180	15	6.3	80	4:35
Laura Saunders Elementary	180	15	3.8	49	4:05
Mays Middle School	180	15	1.8	23	3:40
Naranja Elementary	180	15	7.3	93	4:50
P.A.L. Gym	180	15	2.4	31	3:50
Royal Colonial Trailer Park	180	15	9.1	116	5:15
Senior Citizen Gym	180	15	2.0	26	3:45
South Dade Camp	180	15	9.7	124	5:20
Wayside	180	15	3.1	40	3:55
YMCA Harris Field	180	15	3.4	43	4:00
Maximum for EPZ:					5:20

Table 8-6B
Transit-Dependent Evacuation Time Estimates - Rain

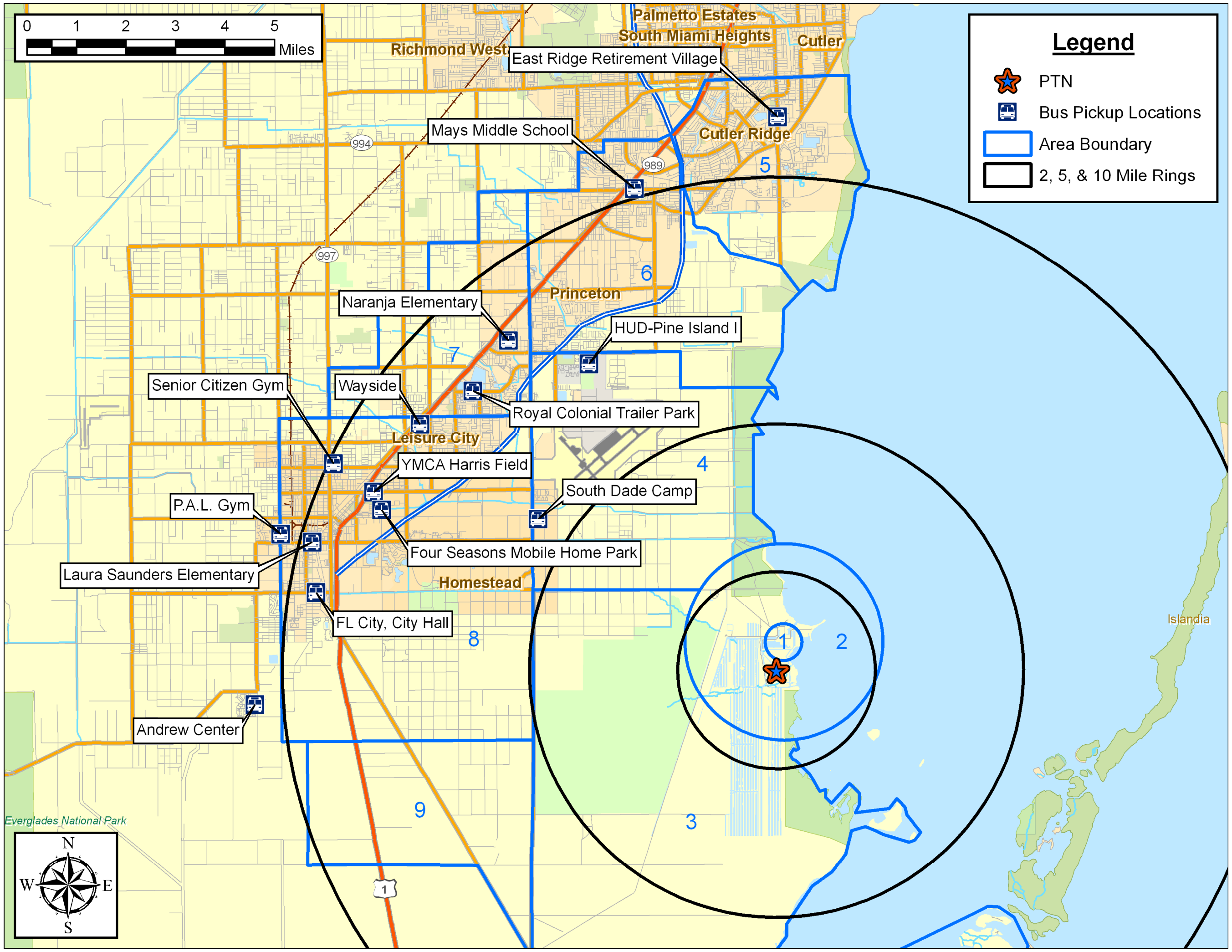
Pickup Location	Mobilization (minutes)	Loading Time (minutes)	Distance to EPZ Boundary (miles)	Travel Time to EPZ Boundary (minutes)	ETE (hr:min)
Andrew Center	180	20	8.3	121	5:25
East Ridge Retirement Village	180	20	0.8	12	3:35
Florida City, City Hall	180	20	4.8	70	4:30
Four Seasons Mobile Home Park	180	20	3.9	57	4:20
HUD-Pine Island I	180	20	6.3	92	4:55
Laura Saunders Elementary	180	20	3.8	56	4:20
Mays Middle School	180	20	1.8	26	3:50
Naranja Elementary	180	20	7.3	107	5:10
P.A.L. Gym	180	20	2.4	35	3:55
Royal Colonial Trailer Park	180	20	9.1	133	5:35
Senior Citizen Gym	180	20	2.0	29	3:50
South Dade Camp	180	20	9.7	142	5:45
Wayside	180	20	3.1	45	4:05
YMCA Harris Field	180	20	3.4	50	4:10
Maximum for EPZ:					5:45

Figure 8-1. Chronology of Transit Evacuation Operations



Event	
A	Advisory to Evacuate
B	Bus Dispatched from Depot
C	Bus Arrives at Facility/Pickup Route
D	Bus Departs for Host School
E	Bus Exits Region
F	Bus Arrives at Host School
G	Bus Available for “Second Wave” Evacuation Service
Activity	
A−B	Driver Mobilization
B−C	Travel to Facility or to Pickup Route
C−D	Passengers Board the Bus
D−E	Bus Travels Towards Region Boundary
E−F	Bus Travels Towards Host School Outside the EPZ.
F−G	Passengers Leave Bus; Driver Takes a Break

Figure 8-2. Transit-Dependent Bus Pickup Points



9. TRAFFIC MANAGEMENT STRATEGY

This section presents the current traffic control and management strategy that is designed to expedite the movement of evacuating traffic. The resources required to implement this strategy include:

- Personnel with the capabilities of performing the planned control functions of traffic guides (preferably, not necessarily, law enforcement officers).

- Traffic control devices to assist these personnel in the performance of their tasks. These devices should comply with the guidance of the Manual of Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration of the U.S. DOT. All state and most county transportation agencies have access to the MUTCD (also available online). Applicable devices include, with reference to the MUTCD:

  — Traffic Barriers: Chapter 6F, Section 6F.61, 62, and Figure 6F-4
  — Traffic Cones: Chapter 3F and Section 6F.56
  — Signs: Chapter 21

- A plan that defines all necessary details and is documented in a format that is readily understood by those assigned to perform traffic control.

The functions to be performed in the field are:

1. Facilitate evacuating traffic movements that serve to expedite travel out of the EPZ along routes that the analysis has found to be most effective.

2. Discourage traffic movements that permit evacuating vehicles to travel in a direction that takes them significantly closer to the power plant or interferes with the efficient flow of other evacuees.

The terms "facilitate" and "discourage" are employed rather than "enforce" and "prohibit" to indicate the need for flexibility in performing the traffic control function. There are always legitimate reasons for a driver to prefer a direction other than the one indicated. For example:

- A driver may be traveling home from work or from another location to join other family members before evacuating.

- An evacuating driver may be taking a detour from the evacuation route in order to pick up a relative or other evacuees.
- The driver may be an emergency worker en route to perform an important activity.

The implementation of a plan must also be flexible enough for the application of sound judgment by the traffic guide.

The traffic management strategy is the outcome of the following process:

1. A field survey of these critical locations.

   The schematics describing traffic control, which are presented in Appendix G, are based on data collected during field surveys, on large-scale maps, and on overhead photos.

2. Computer analysis of the evacuation traffic flow environment.

   This analysis identifies the best routing and the locations that experience pronounced congestion.

3. Consultation with emergency management and enforcement personnel.

   Trained personnel who are experienced in controlling traffic and are aware of the likely evacuation traffic patterns have extensively reviewed these control tactics.

4. Prioritization of traffic control points.

   Application of traffic control at some traffic control points will have a more pronounced influence on expediting traffic movements than at other traffic control points. For example, traffic control points controlling traffic originating from areas in close to the power plant could have a more beneficial effect on minimizing potential exposure to radioactivity than those traffic control points located far from the power plant. Thus, during the mobilization of personnel to respond to the emergency situation, those traffic control points that are assigned a higher priority should be manned earlier. These priorities have been developed in conjunction with county emergency management representatives and law enforcement personnel.

The control tactic at each traffic control point is presented in each schematic that appears in Appendix G.

The use of intelligent transportation systems technologies, if available, could reduce manpower and equipment needs while still facilitating the evacuation process. Dynamic message signs could be placed within the EPZ to provide information to travelers regarding traffic conditions, route selection, and reception center information. Dynamic message signs can also be placed outside of the EPZ to warn other motorists to avoid using routes that may conflict with the flow of evacuees away from the nuclear power plant. Highway advisory radio could broadcast information to evacuees en route through their vehicle stereo systems. Automated traveler information systems could also provide evacuees with information. Internet websites could provide traffic and evacuation route information before the evacuee begins his trip, while on board navigation systems (global positioning system units) could provide information en route. These are only several examples of how intelligent transportation systems technologies that are in the process of being deployed, if available, could benefit evacuees.

Chapter 21 of the MUTCD presents guidance on emergency management signing. Specifically, the evacuation route sign, EM-1 on page 2I-3, with the word “hurricane” removed, could be installed selectively within the EPZ, if considered advisable by local and state authorities. Similar comments apply to sign EM-3, which identifies traffic control point locations.

As presented in Section 2.3, these traffic control points are not expected to influence the ETE results. Access control points are deployed near the periphery of the EPZ to divert “through” trips. The ETE calculations reflect the assumption that all “external-external” trips are interdicted after 90 minutes have elapsed after the advisory to evacuate.

All transit trips and other responders entering the EPZ to support the evacuation are assumed to be unhindered by personnel manning traffic control points.

Study Assumptions 5 and 6 in Section 2.3 discuss access control point and traffic control point staffing schedules and operations.

10. EVACUATION ROUTES

Evacuation routes are composed of two distinct components:

- Routing from an area being evacuated to the boundary of the evacuation region and out of the EPZ.
- Routing of evacuees from the EPZ boundary to the reception centers.

Evacuees should be routed within the EPZ in such a way as to *minimize their exposure to risk*. This primary requirement is met by routing traffic to move away from the Turkey Point location, to the extent practicable, and by delineating evacuation routes that expedite the movement of evacuating vehicles. This latter objective is addressed by developing evacuation routes to achieve a balancing of traffic demand relative to the available highway capacity to the extent possible, subject to satisfying the primary requirement noted above. This is achieved by carefully specifying candidate destinations for all origin centroids where evacuation trips are generated, and applying the trip assignment and distribution model effectively. See Appendices A through D for further descriptions.

The routing of evacuees from the EPZ boundary to the reception centers should be responsive to two considerations:

- Minimize the amount of travel outside the EPZ from the points where these routes cross the EPZ boundary to the reception centers.
- Relate the anticipated volume of traffic destined to the reception center to the capacity of the reception center facility.

Figure 10-1 maps each of the general population reception centers. The major evacuation routes for each area are presented in Figures 10-2 through 10-9. The ETE analysis network is not limited to the primary evacuation routes. All highways other than local roads are represented in the following figures. Some local roads used by traffic to access the primary evacuation routes are included in the analysis network, as shown in Figure 1-2.

Figure 10-1. Turkey Point General Population Reception Centers

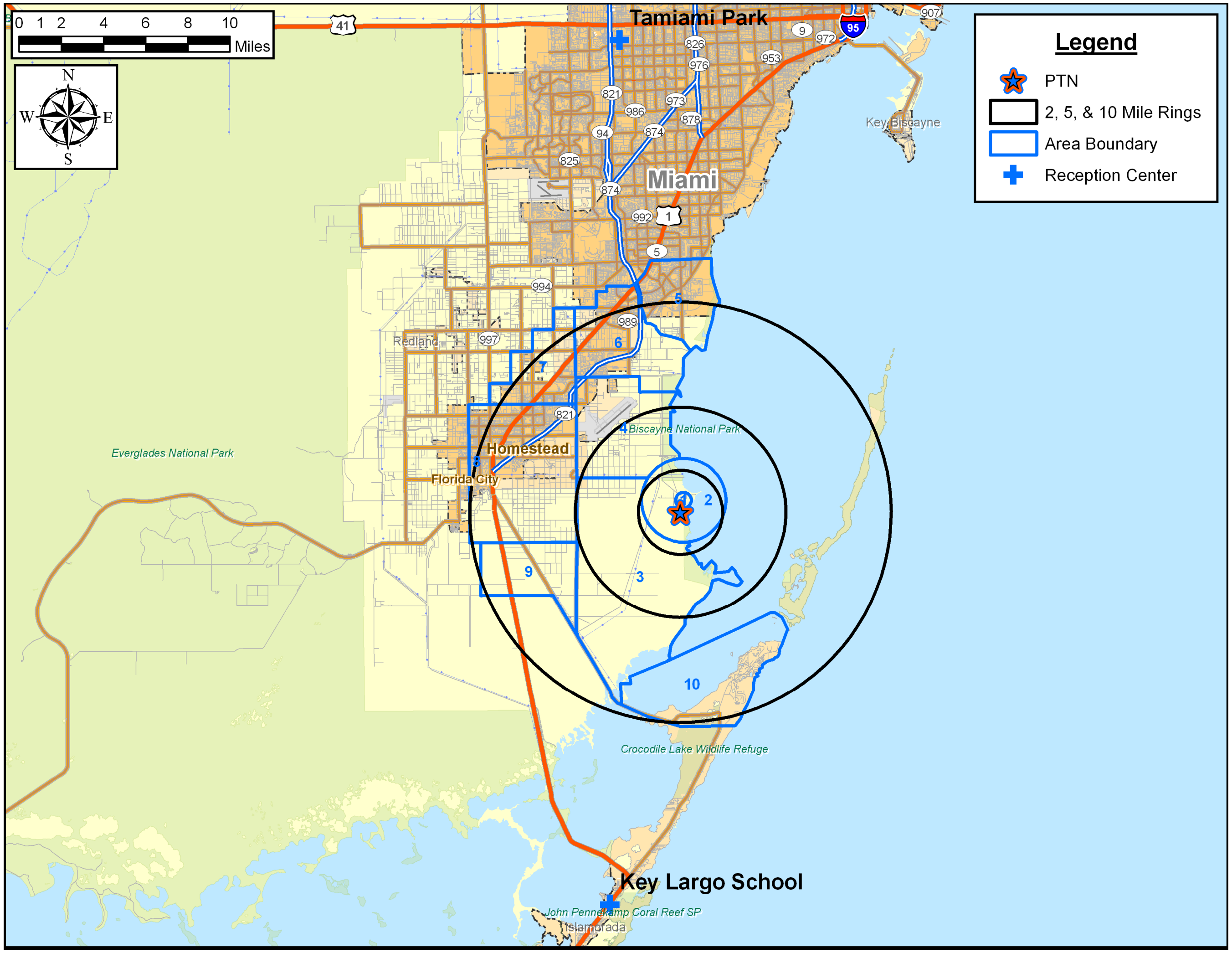


Figure 10-2. Evacuation Routes for Areas 1 Through 3

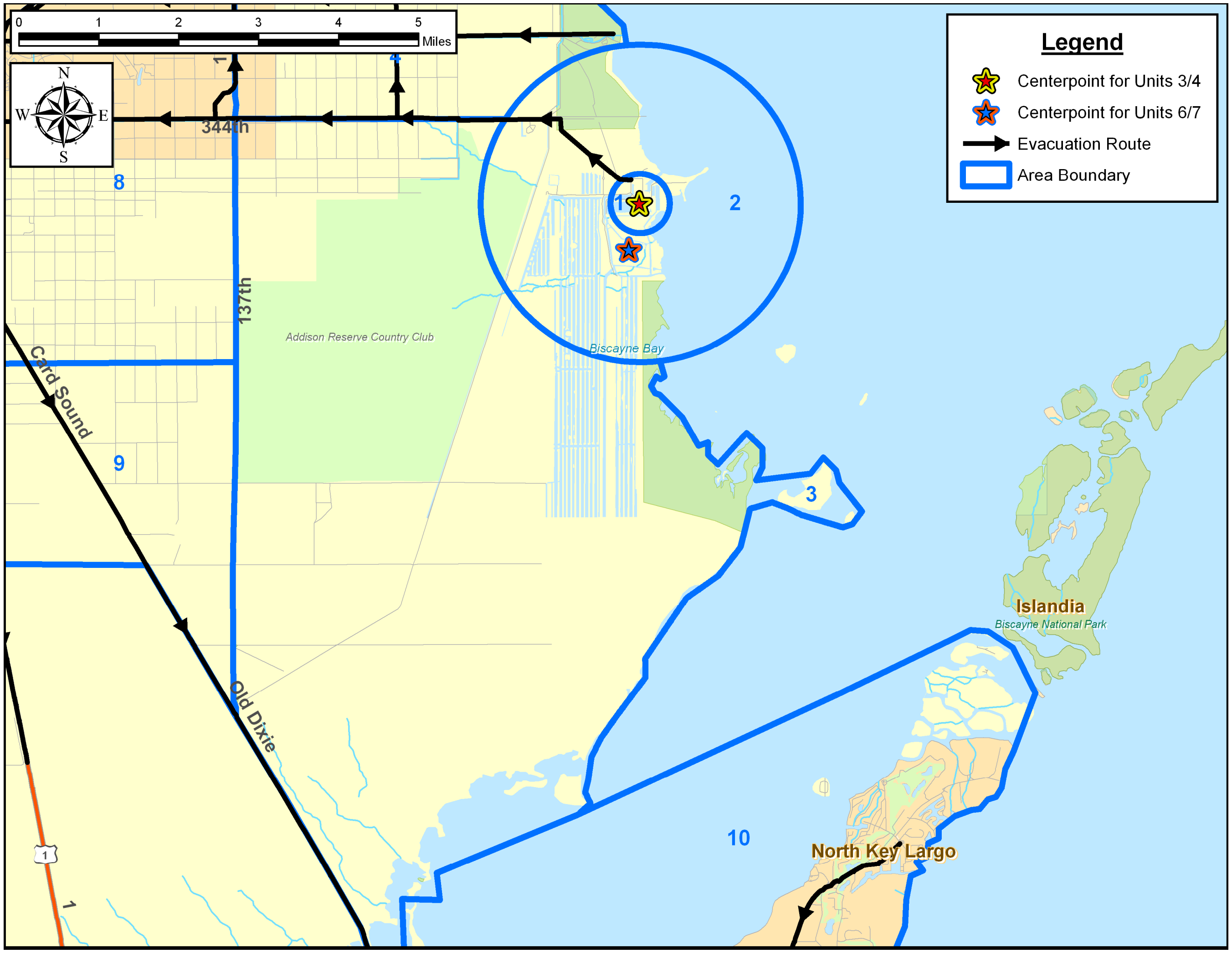


Figure 10-3. Evacuation Routes for Area 4

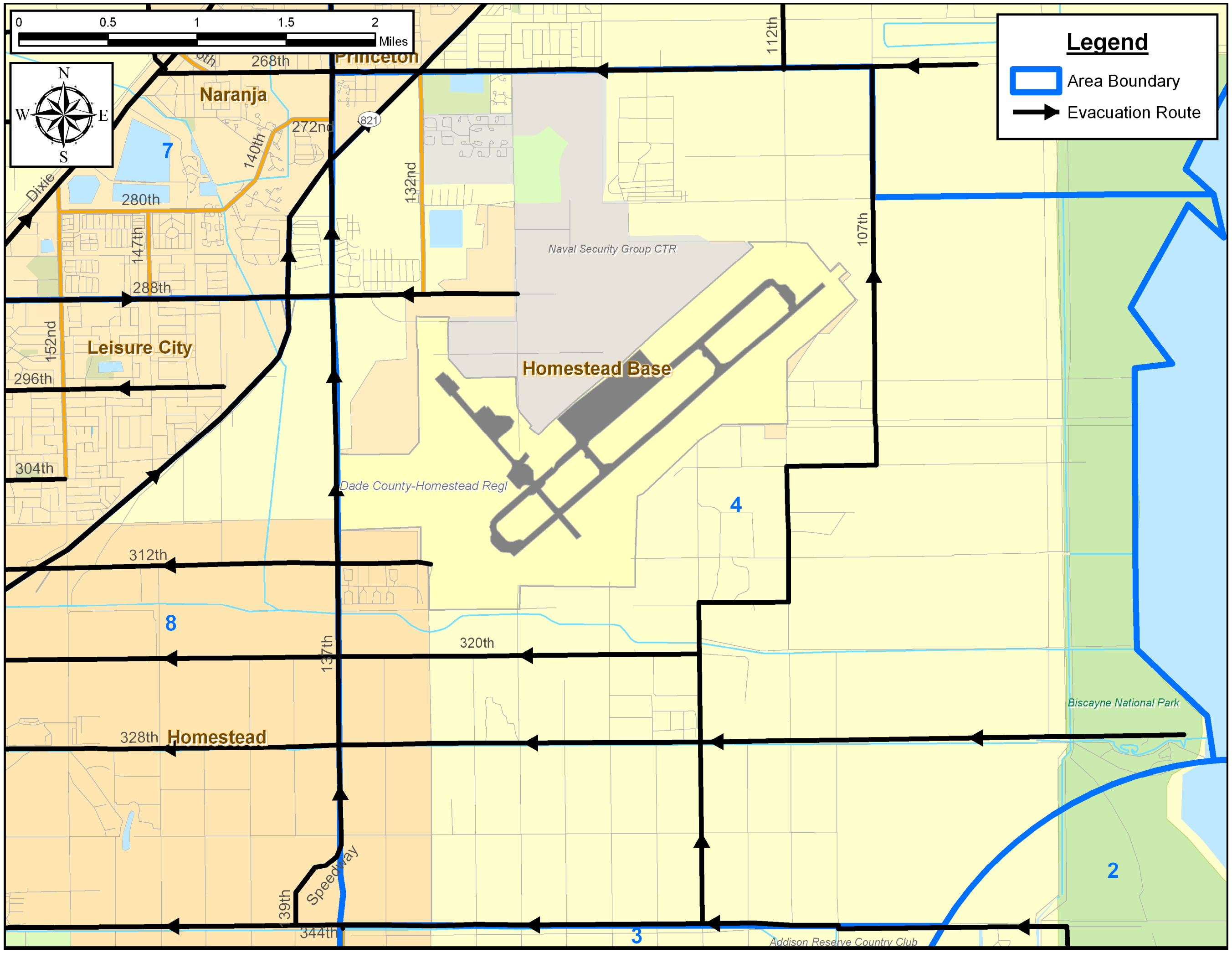


Figure 10-4. Evacuation Routes for Area 5

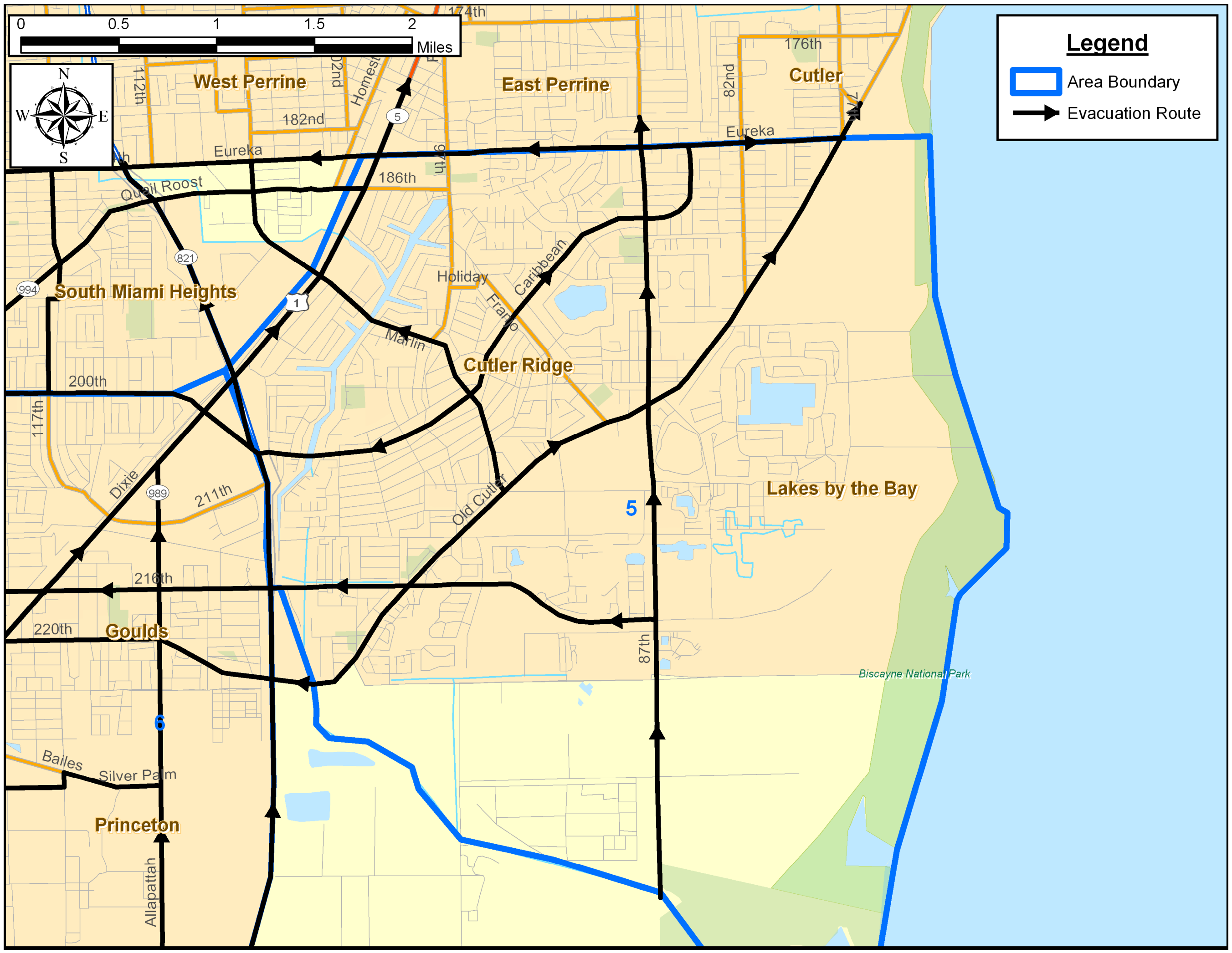


Figure 10-5. Evacuation Routes for Area 6

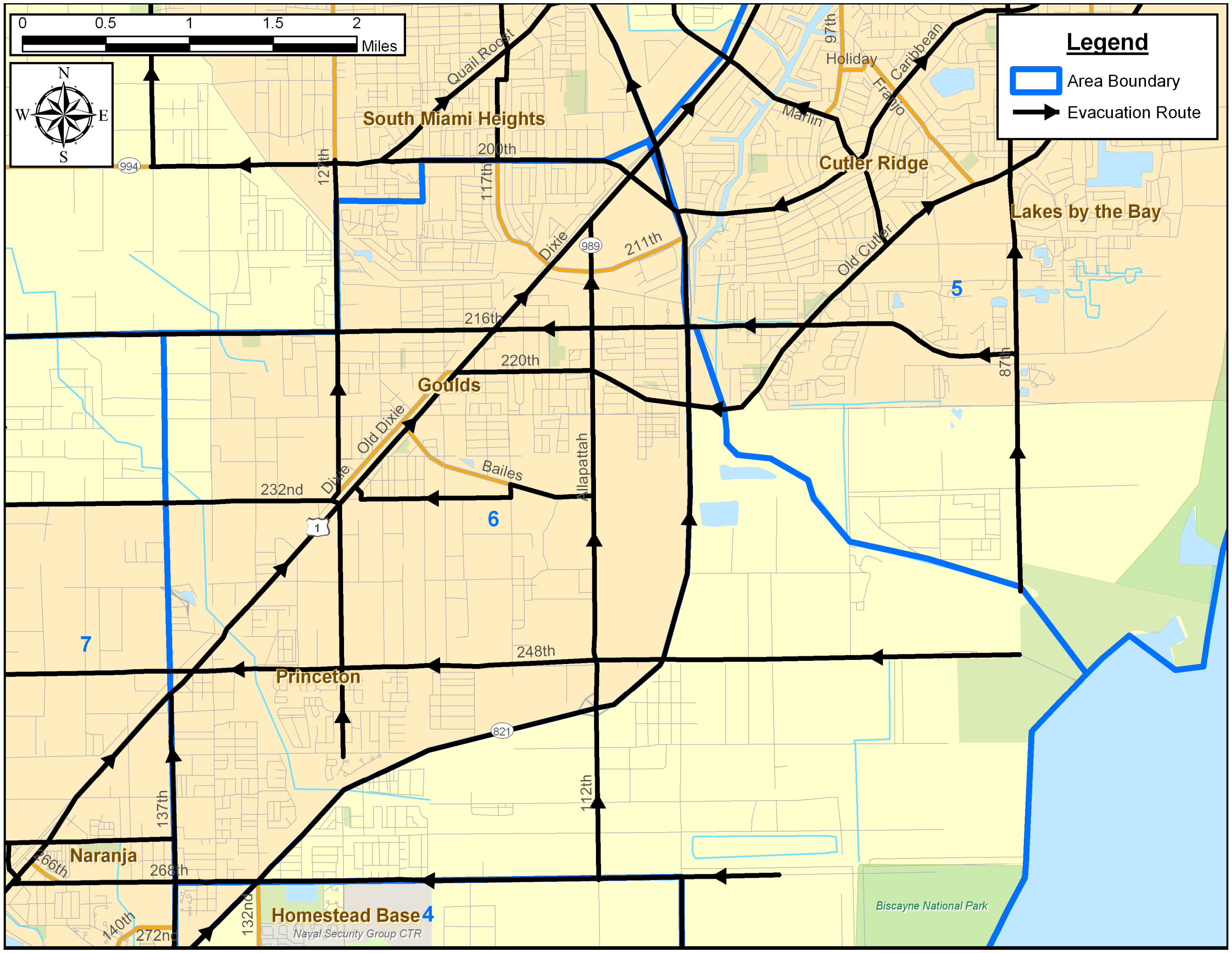


Figure 10-6. Evacuation Routes for Area 7

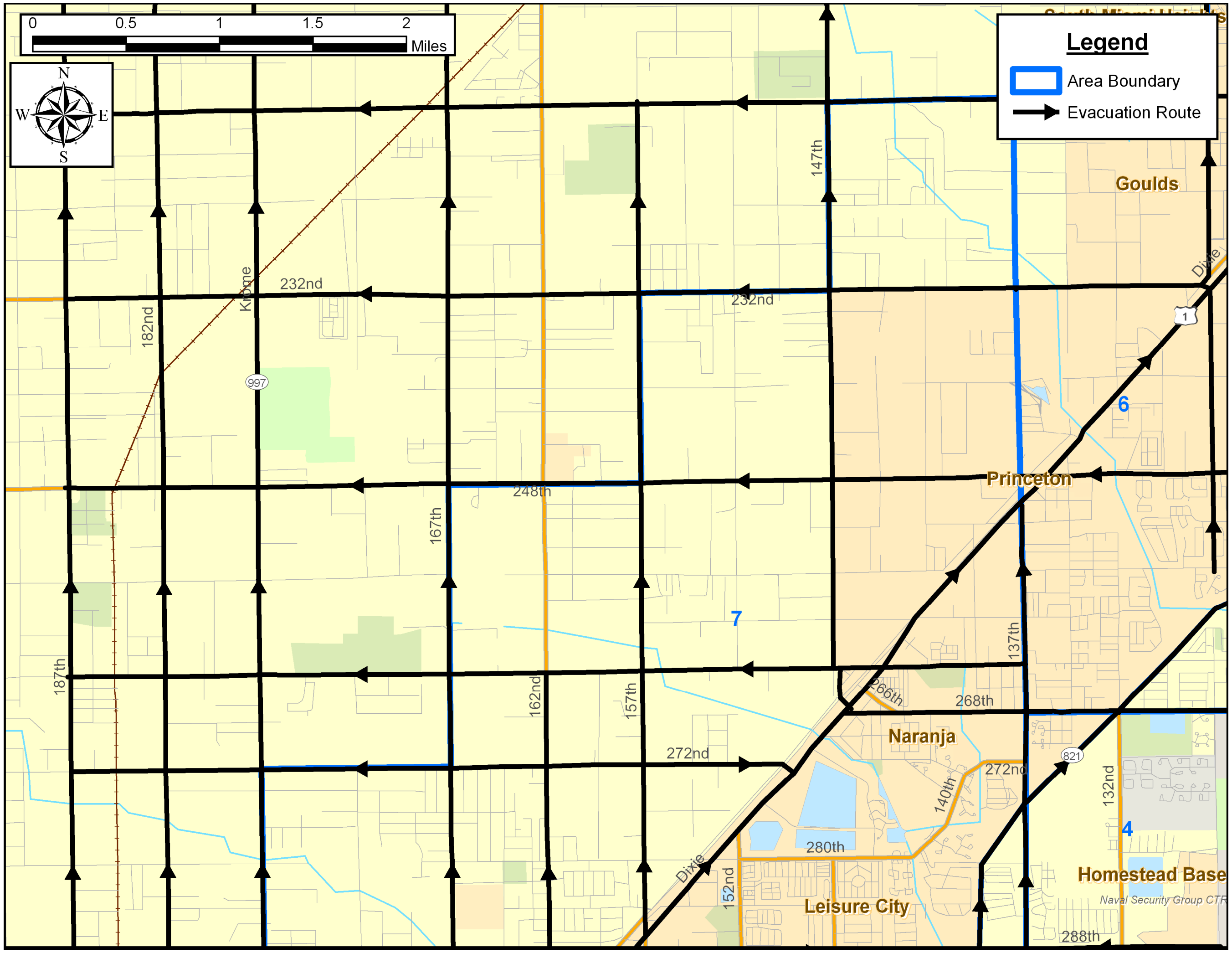


Figure 10-7. Evacuation Routes for Area 8

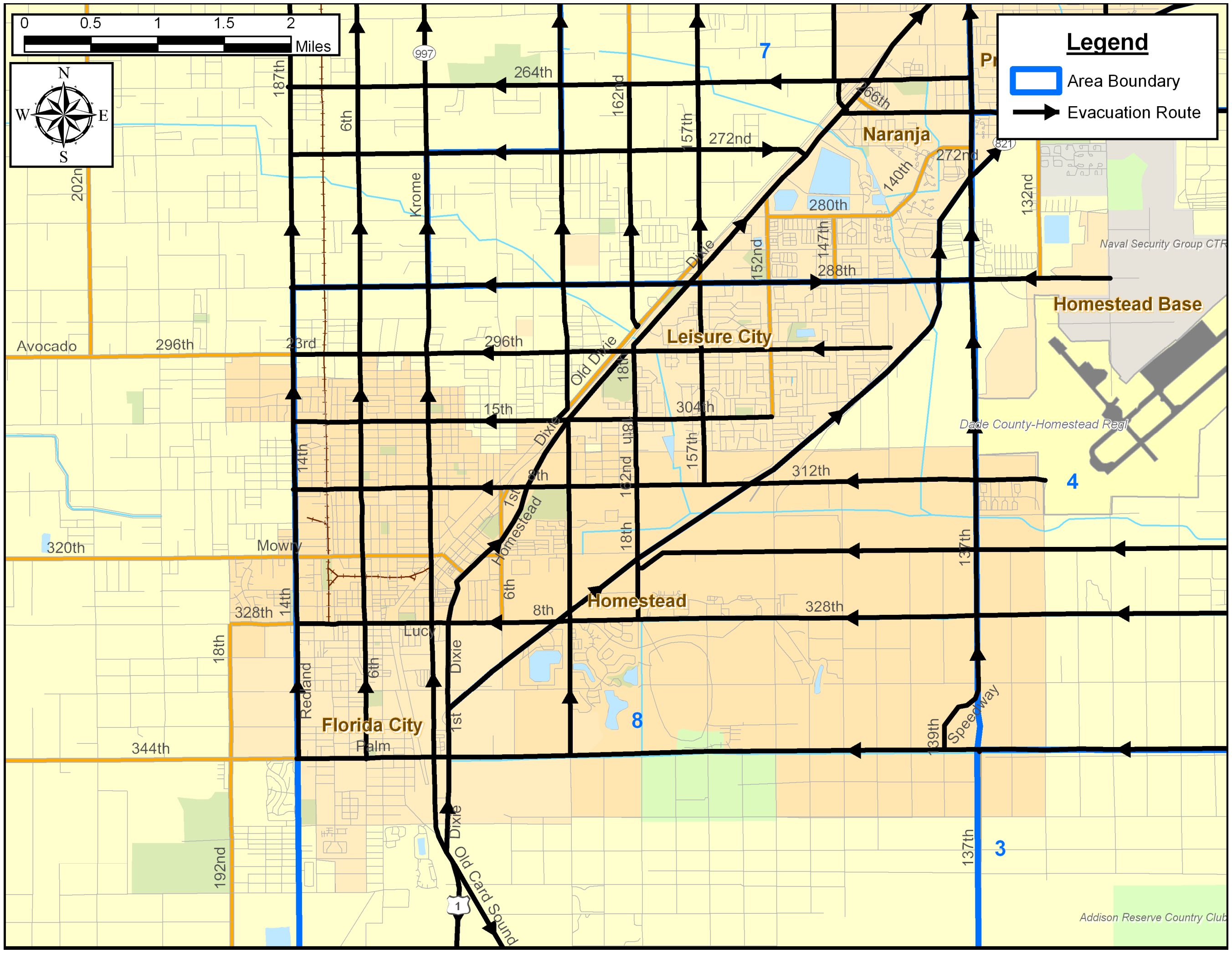


Figure 10-8. Evacuation Routes for Area 9

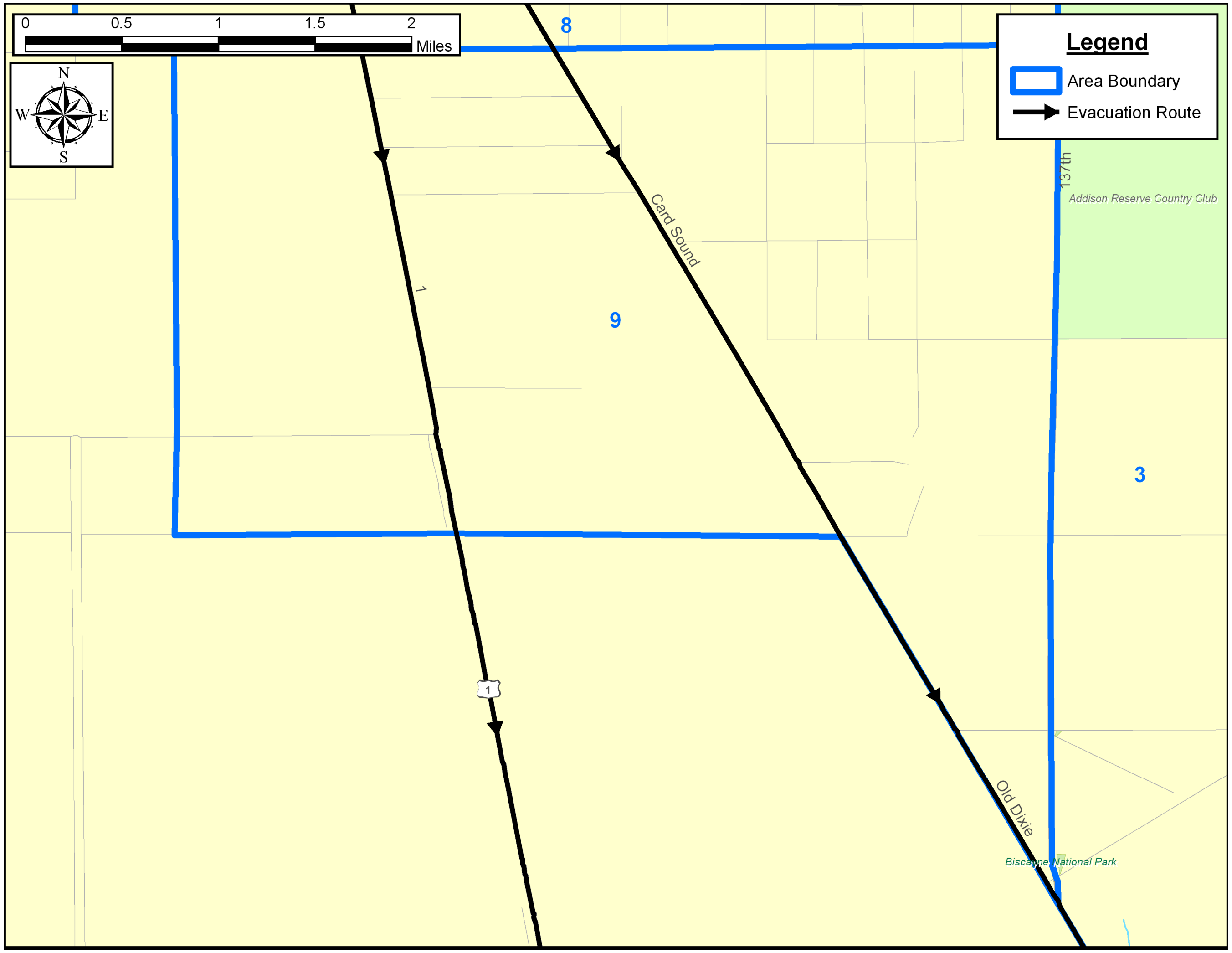
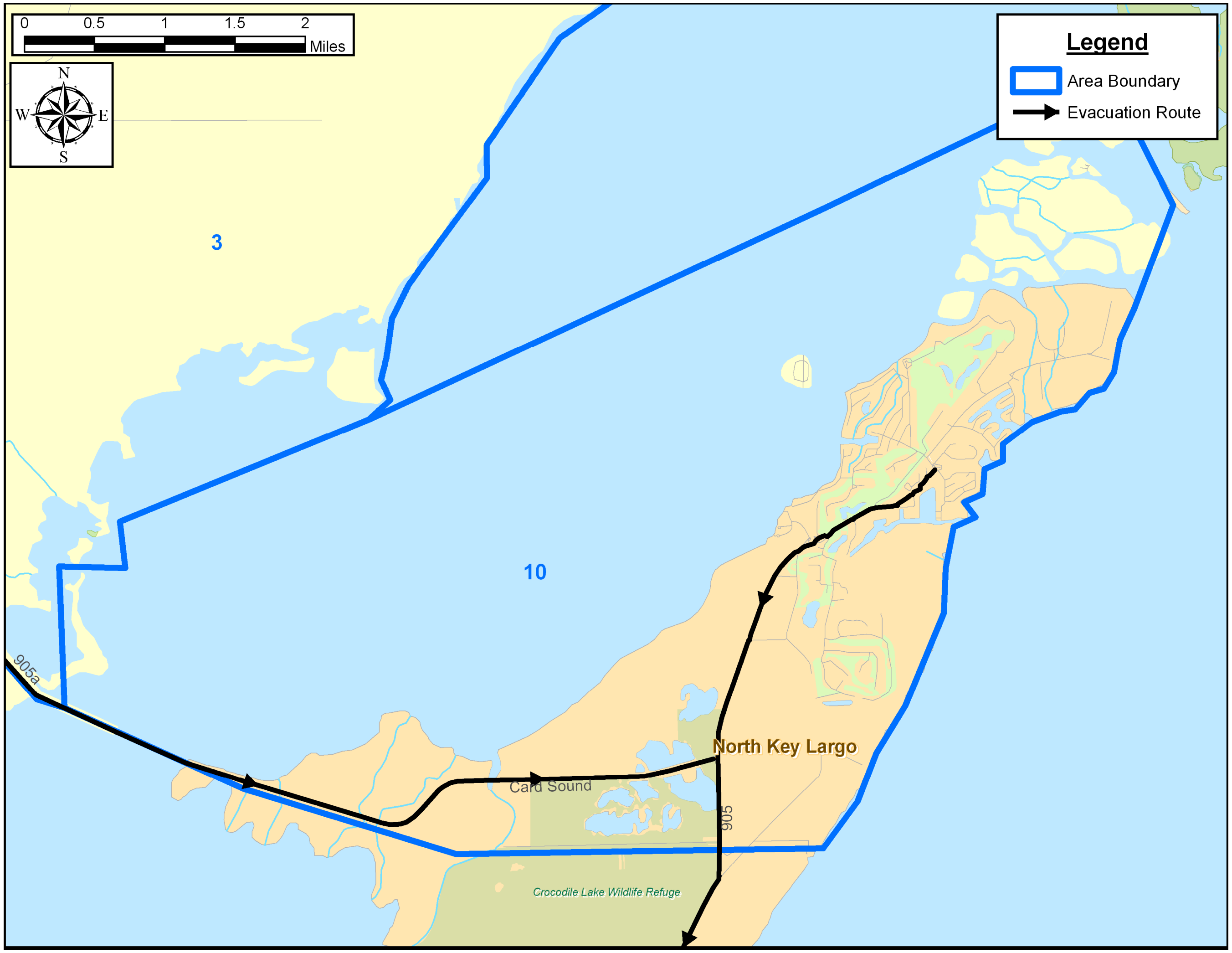


Figure 10-9. Evacuation Routes for Area 10



11. SURVEILLANCE OF EVACUATION OPERATIONS

There is a need for surveillance of traffic operations during the evacuation. There is also a need to clear any blockage of roadways arising from accidents or vehicle disablement. Surveillance can take several forms:

- Traffic control personnel, located at traffic control and access control points, provide fixed-point surveillance.

- Ground patrols may be undertaken along well-defined paths to ensure coverage of those highways that serve as major evacuation routes.

- Aerial surveillance of evacuation operations may also be conducted using helicopter or fixed-wing aircraft.

- Cellular phone calls (if cellular coverage exists) from motorists may also provide direct field reports of road blockages.

These concurrent surveillance procedures are designed to provide coverage of the entire EPZ as well as the area around its periphery. It is the responsibility of the counties to support an emergency response system that can receive messages from the field and be in a position to respond to any reported problems in a timely manner. This coverage should quickly identify and expedite the response to any blockage caused by a disabled vehicle.

Tow Vehicles

In a low-speed traffic environment, any vehicle disablement is likely to arise as a result of a low-speed collision, mechanical failure, or the exhaustion of its fuel supply. In any case, the disabled vehicle can be pushed onto the shoulder, thereby restoring traffic flow. Experience in other emergencies indicates that evacuees who are leaving an area often perform activities such as pushing a disabled vehicle to the side of the road without prompting.

While the need for tow vehicles is expected to be low under the circumstances described above, it is still prudent to be prepared for such a need. Tow trucks with a supply of gasoline may be deployed at strategic locations within, or just outside, the EPZ. These locations should be selected so that:

- They permit access to key, heavily loaded, evacuation routes.
- Responding tow trucks would most likely travel counterflow relative to evacuating traffic.

12. CONFIRMATION TIME

Guidance in Appendix 4 of NUREG-0654 requires that the time required for confirmation of evacuation be estimated. Although the counties in the EPZ may use their own procedures for confirmation, it is suggested that an alternative or complementary approach be used that does not depend on visual observation from a vantage point outside of residences.

The suggested procedure employs a stratified random sample and a telephone survey. The size of the sample depends on the expected number of households that do not comply with the advisory to evacuate. It is reasonable to assume, for the purpose of estimating sample size, that at least 80 percent of the population within the EPZ will comply with the advisory to evacuate. On this basis, an analysis could be undertaken (see Table 12-1) to yield an estimated sample size of approximately 300.

The confirmation process should start approximately 4 hours after the advisory to evacuate, which is when 90 percent of evacuees have completed their mobilization activities. At this time, virtually all evacuees will have departed on their respective trips and the local telephone system will be largely free of traffic.

As indicated in Table 12-1, approximately 7.5 people-hours are needed to complete the telephone survey. If six people are assigned to this task, each dialing a different set of telephone exchanges (e.g., each person can be assigned a different set of municipalities), the confirmation process will extend over a timeframe of approximately 75 minutes. Assigning three people would require 2.5 hours. In either case, the confirmation should be completed before the evacuated area is cleared. Of course, fewer people would be needed for this survey if the evacuation region were only a portion of the EPZ. Use of modern automated computer-controlled dialing equipment can significantly reduce the manpower requirements and the time required to undertake this type of confirmation survey.

Should the number of telephone responses (i.e., people still at home) exceed 20 percent, the emergency response agency should be notified and the telephone survey should be repeated after an interval of 1 hour until the confirmation process is completed.

The list of resident and business telephone numbers, including cell phone and land lines, should be compiled and archived by local response agencies for this purpose. Such lists can be purchased from vendors at a modest cost. For ease of access, this list should be broken down by evacuation region. This approach should be supplemented with other confirmation techniques:

- Patrol cars equipped with loud speakers (route alerting)
- Helicopters or fixed-wing aircraft (if available) equipped with loud speakers

Table 12-1 (Sheet 1 of 2)
Estimated Number of Telephone Calls Required for Confirmation of Evacuation

Problem Definition

Estimate number of phone calls, n, needed to ascertain the proportion, F of households that have not evacuated.

Reference: Burstein, H., *Attribute Sampling*, McGraw Hill, 1971

Given:

Number of households plus other facilities, N, within the EPZ (est.) = 60,000

Estimated proportion, F, of households that have not evacuated = 0.20

Allowable error margin, e: 0.05

Confidence level, α: 0.95 (implies A = 1.96)

Applying Table 10 of cited reference,

$$p = F + e = 0.25; \; q = 1 - p = 0.75$$

$$n = \frac{A^2 pq + e}{e^2} = 308$$

Finite population correction:

$$n_F = \frac{nN}{n + N - 1} = 306$$

Consequently, some 300 telephone calls will confirm that approximately 20 percent of the population has not evacuated. If only 10 percent of the population does not comply with the advisory to evacuate, then the required sample size, n_F = 215.

**Table 12-1 (Sheet 2 of 2)
Estimated Number of Telephone Calls Required
for Confirmation of Evacuation**

<u>Estimated Person Hours to Complete 300 Telephone Calls</u>

Assume: Time to dial using touch-tone (random selection of listed numbers): 30 seconds

Time for 6 rings (no answer): –36 seconds

Time for 4 rings plus short conversation: –60 seconds

Interval between calls: –20 seconds

Person Hours: 300[30+20+0.8(36)+0.2(60)]/3600 = 7.6

APPENDIX A
GLOSSARY OF TRAFFIC ENGINEERING TERMS

Appendix A
Glossary of Traffic Engineering Terms

Term	Definition
Link	A network link represents a specific, one-directional section of roadway. A link has both physical (length, number of lanes, topology, etc.) and operational (turn movement percentages, service rate, free-flow speed) characteristics.
Measures of Effectiveness	Statistics describing traffic operations on a roadway network.
Node	A network node generally represents an intersection of network links. A node has control characteristics, i.e., the allocation of service time to each approach link.
Origin	A location attached to a network link, within the emergency (EPZ) or shadow area, where trips are generated at a specified rate in vehicles per hour. These trips enter the roadway system to travel to their respective destinations.
Network	A graphical representation of the geometric topology of a physical roadway system, which is comprised of directional links and nodes.
Prevailing roadway and traffic conditions	Relates to the physical features of the roadway, the nature (e.g., composition) of traffic on the roadway, and the ambient conditions (weather, visibility, pavement conditions, etc.)
Service Rate	Maximum rate at which vehicles, executing a specific turn maneuver, can be discharged from a section of roadway at the prevailing conditions, expressed in vehicles per second or vehicles per hour.
Service Volume	Maximum number of vehicles that can pass over a section of roadway in one direction during a specified time period with operating conditions at a specified level of service. (The service volume at the upper bound of level of service, E, equals capacity). Service volume is usually expressed as vehicles per hour.
Signal Cycle Length	The total elapsed time to display all signal indications in sequence. The cycle length is expressed in seconds.
Signal Interval	A single combination of signal indications. The interval duration is expressed in seconds. A signal phase is comprised of a sequence of signal intervals.
Signal Phase	A set of signal indications (and intervals) that services a particular combination of traffic movements on selected approaches to the intersection. The phase duration is expressed in seconds.
Traffic (Trip) Assignment	A process of assigning traffic to paths of travel in such a way to satisfy the trip objectives (i.e., the desire of each vehicle to travel from a specified origin in the network to a specified destination) and to optimize some stated objective or combination of objectives. In general, the objective is stated in terms of minimizing a generalized cost. For example, cost may be expressed in terms of travel time.

Term	Definition
Traffic Density	The number of vehicles that occupy one lane of a roadway section of specified length at a point in time, expressed as vehicles per mile.
Traffic (Trip) Distribution	A process for determining the destinations of the traffic generated at the origins. The result often takes the form of a trip table, which is a matrix of origin-destination traffic volumes.
Traffic Simulation	A computer model designed to replicate the real-world operation of vehicles on a roadway network to provide statistics describing traffic performance. These statistics are called Measures of Effectiveness.
Traffic Volume	The number of vehicles that pass over a section of roadway in one direction, expressed in vehicles per hour. Where applicable, traffic volume may be stratified by turn movement.
Travel Mode	Distinguishes between private auto, bus, rail, pedestrian, and air travel modes.
Trip Table or Origin-Destination Matrix	A rectangular matrix or table, whose entries contain the number of trips generated at each specified origin, during a specified time period, that are attracted to (and travel toward) each of its specified destinations. These values are expressed in vehicles per hour or in vehicles.
Turning Capacity	The capacity associated with that component of the traffic stream which executes a specified turn maneuver from an approach at an intersection.

APPENDIX B
TRAFFIC ASSIGNMENT MODEL

Appendix B
Traffic Assignment Model

This section describes the integrated trip assignment and distribution model named TRAD that is expressly designed for use in analyzing evacuation scenarios. This model employs equilibrium traffic assignment principles and is one of the models of the IDYNEV System.

To apply TRAD, the analyst must specify the highway network, link capacity information, the volume of traffic generated at all origin centroids, a set of accessible candidate destination nodes on the periphery of the EPZ for each origin, and the capacity (i.e., attraction) of each destination node. TRAD calculates the optimal trip distribution and the optimal trip assignment (i.e., routing) of the traffic generated at each origin node traveling to the associated set of candidate destination nodes to minimize evacuee travel times.

Overview of Integrated Distribution and Assignment Model

The underlying premise is that the selection of destinations and routes is intrinsically coupled in an evacuation scenario. That is, people in vehicles travel out of an area of potential risk as rapidly as possible by selecting their best route. The model is designed to identify these best routes in a manner that distributes vehicles from origins to destinations and routes them over the highway network in a consistent and optimal manner.

The adopted approach is to extend the basic user-equilibrium assignment methodology to embrace the distribution process as well. Specifically, the analyst assigns a set of candidate destination nodes to each origin node that reflects the general outward-bound direction of travel relative to the location of the power station. The selection of specific destination nodes by travelers from each origin node, and the selection of the connecting paths of travel, are both determined by the integrated model. This determination is subject to specified highway capacity constraints to satisfy the stated objective function. This objective function is the statement of the User Optimization Principle by Wardrop[1].

To accomplish this integration, the equilibrium assignment model was left intact, changing the form of the objective function. The model creates a fictional augmentation of the real highway network. This augmentation consists of pseudolinks and pseudonodes configured to permit the

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[1] Wardrop, J.G., 1952. Some Theoretical Aspects of Road Traffic Research, *Proceedings, Institute of Civil Engineers*, Part II, Vol. 1, pp. 325-378.

extended network to embed an equilibrium distribution model within the fabric of the assignment model. Additional discussion may be found in NUREG/CR-4873, *Benchmark Study of the I-DYNEV Evacuation Time Estimate Computer Code,* and NUREG/CR-4874, *The Sensitivity of Evacuation Time Estimates to Changes in Input Parameters for the I-DYNEV Computer Code*.

Specification of TRAD Model Inputs

The analyst must specify, for each origin node, the average hourly traffic volume generated as well as a set of candidate accessible destinations. A destination is accessible to traffic originating at an origin node if there is at least one path connecting the origin to the destination node. There must be at least one destination node specified for each origin centroid. The number of trips generated at the origin node, which are distributed to each specified, accessible destination node within this set, is determined by the model in a way that satisfies the network-wide objective function (Wardrop's Principle).

The analyst must also specify the total number of trips that can be accommodated by each destination node. This value reflects the capacities of the road(s) immediately servicing the destination node. We call this number of trips the attraction of the destination node, consistent with conventional practice. Clearly, it is required that the total number of trips traveling to a destination, j, from the origin nodes, i, cannot exceed the attraction of destination node, j. By summing over the destination nodes, this constraint also states that the total trips generated at the origin nodes must not exceed the total capacity to accommodate these trips at all of the specified destinations.

In summary, the analyst must specify the total trips generated at each of the origin nodes, the maximum number of trips that can be accommodated by each of the specified destination nodes, and the highway network attributes that include the traffic control tactics. The TRAD model includes a function that expresses travel time on each network link in terms of traffic volume and link capacity. This function drives the underlying trip distribution and trip assignment decision making process. The TRAD model satisfies the objectives of evacuees to select destination nodes and travel paths to minimize evacuation travel time. As such, this integrated model is classified as a behavioral model.

At the outset, it may appear that there is an intractable problem:

- If TRAD retains the basic assignment algorithm, it must be provided a trip table (a matrix defining origin-destination traffic volume) as input.

- On the other hand, if the distribution model is embedded in the assignment model rather than preceding it, a trip table is not available as input.

The resolution of this problem is as follows:

1. The model constructs an augmentation network that allows the user to specify only the volume for each origin node. The allocation of trips from the origin node to each candidate destination node is not specified and will be determined internally by the model.

2. Pseudolinks are constructed that enforce the specified values of attraction, A_j, for the destination nodes, j, by suitably calibrating the relationship of the travel time vs. volume and capacity.

This augmented network is comprised of three subnetworks:

1. The real highway subnetwork, which consists of Class I links and nodes.

2. A subnetwork of Class II pseudolinks that acts as an interface between the highway subnetwork and the network augmentation.

3. The subnetwork of Class III pseudolinks and nodes that comprises the network augmentation described above.

The need for these Class II links will become clear later. The classifications are described below:

Class I Links and Nodes

These links and nodes represent the physical highway network: sections of highway and intersections. Trips generated at each origin (centroid) node are assigned to a specified Class I link via a connector link. These connector links are transparent to the user and offer no impedance to the traveler; they represent the aggregation of local streets that service the centroidal generated trips and feed them onto the highway network. The real-world destination nodes are part of this network. The immediate approaches to these destination nodes are Class I links.

Class II Links

These pseudolinks are constructed to connect each specified destination node with its Class III pseudonode (P-N) counterpart on a one-to-one basis. The capacities of these Class II links are set equal to the capacities at their respective destination nodes.

Class III Links and Nodes

Class III links and nodes form the augmentation to the basic network. These pseudolinks provide paths from the Class II links servicing traffic traveling from the specified set of (real) candidate destination nodes to the super-nodes, which collect the traffic travelling through the specified set of destination nodes associated with each origin node.

Each Class of links provides a different function:

- Class I links represent the physical highway network. As such, each link has a finite capacity, a finite length, and an estimated travel time for free-flowing vehicles. The nodes generally represent intersections, interchanges and, possibly, changes in link geometry. The topology of the Class I network represents that of the physical highway system.

- The Class II links represent the interface between the real highway subnetwork and the augmentation subnetwork. These pseudolinks are needed to represent the specified attractions of each destination node, i.e., the maximum number of vehicles that can be accommodated by each destination node. Instead of explicitly assigning a capacity limitation to the destination nodes, we assign this capacity limitation of the Class II pseudolinks. This approach is much more suitable computationally.

- The topology of the network augmentation (i.e., Class III links and nodes) is designed so that the traffic from an origin node can only travel to the single super node by flowing through its specified set of real destination nodes, along the links of the augmented network.

The Class II pseudolinks and the network augmentation of Class III pseudonodes and links represent logical constructs of fictitious links created internally by the model, which allows the user to specify the identity of the destination nodes in each origin-based set, without specifying the distribution of traffic volumes from the origin to each destination node in that set.

Calculation of Capacities and Impedances

Each class of links exhibits different properties. Specifically, the relationship between travel impedance (which is expressed in terms of travel time) and both volume and capacity will differ:

- For Class I links, the capacity represents the physical limitation of the highway sections. Travel impedance is functionally expressed by relating travel time with respect to the traffic volume-link capacity relationship.

- For Class II links, link capacity represents the maximum number of vehicles that can be accommodated at the (real) destination nodes that form the upstream nodes of each Class II link. Because Class II links are pseudolinks, there should be virtually no difference in impedance to traffic along Class II links when the assigned traffic volume on these links is below their respective capacities. That is, the assignment of traffic should not be influenced by differences in travel impedance on those Class II links where the assigned volumes do not exceed their respective capacities.

- For Class III links, both capacity and impedance have no meaning. Because the Class II links limit the number of vehicles entering the Class III subnetwork at all entry points (i.e., at the Class II pseudonodes), and because all these links are pseudolinks, it follows that the Class III network is, by definition, an incapacitated network.

Specification of the Objective Function

It is computationally convenient to be able to specify a single impedance (or cost) function relating the travel time on a link, to its capacity and assigned traffic volume, for all classes of links. To achieve this, the following form based on the original Bureau of Public Roads Formula[1] will be adopted:

$$T = T_o\{\alpha[1+a_1(\frac{v}{c})^{b_1}]+\beta[1+a_2(\frac{v}{c})^{b_2}]\}+I$$

[1] Bureau of Public Roads (1964). Traffic Assignment Manual. U.S. Dept. of Commerce, Urban Planning Division, Washington D.C.

Whereas, for the present traffic assignment model in TRAD,

T	=	Link travel time, seconds
T_o	=	Unimpeded link travel time, seconds
V	=	Traffic volume on the link, vehicles/hour
C	=	Link capacity, vehicles/hour
a_i, b_i	=	Calibration parameters
α, ß	=	Coefficients defined below
I	=	Impedance term, expressed in seconds that could represent turning penalties, or any other factor that is justified in the user's opinion

The assignment of coefficients varies according to the class in which a link belongs:

Class	**α**	**ß**	**T_o**
I	1	0	L/U_f
II	0	1	W
III	0	0	1

Here, L is a highway link length and U_f is the free flow speed of traffic on a highway link. The values of a_1 and b_1, which are applicable only for Class I links, are based on experimental data:

$a_1 = 0.8$ $\qquad$ $b_1 = 5.0$

The values of a_2 and b_2, which are applicable for each Class II link, are based on the absolute requirement that the upstream destination node can service no more traffic than the user-specified value of the maximum attraction. In addition, these parameters must be chosen so that these pseudolinks all offer the same impedance to traffic when their assigned volumes are less than their respective specified maximum attractions.

The weighting factor, W, is computed internally by the software.

Of course, it is still possible for the assignment algorithm within TRAD to distribute more traffic to a destination node than that node can accommodate. (Note that there is no upper bound constraint in the Bureau of Public Roads formula. Of course, when v/c >1, the exponential terms grow very rapidly, degrading operational performance and discouraging trips from accessing those links.) For emergency planning purposes, this is a desirable model feature. Such a result will be flagged by the model to alert the user that some factor is strongly motivating travelers to move to that destination node, despite its capacity limitations. This factor can take many forms: inadequate highway capacity to other destinations, improper specification of candidate destinations for some of the origins, or some other design inadequacy. The planner can respond by modifying the control tactics, changing the origin-destination distribution pattern, providing more capacity at the overloaded destinations, etc.

APPENDIX C
TRAFFIC SIMULATION MODEL: PC-DYNEV

Appendix C
Traffic Simulation Model: PC-DYNEV

A model PC-DYNEV, is an adaptation of the TRAFLO Level II simulation model[1] developed by KLD for the Federal Highway Administration. Extensions in scope were introduced to expand the model's domain of application to include all types of highway facilities, to represent the evacuation traffic environment, and to increase its computational efficiency. This model produces the extensive set of output measures of effectiveness shown in Table C-1.

The traffic stream is described internally in the form of statistical flow profiles. These profiles, expressed internally as statistical histograms, describe the platoon structure of the traffic stream on each network link. The simulation logic identifies five types of histograms:

- The ENTRY histogram describes the platoon flow at the upstream end of the subject link. This histogram is simply an aggregation of the appropriate OUTPUT turn-movement-specific histograms of all feeder links.

- The INPUT histograms describe the platoon flow pattern arriving at the stop line. These are obtained by first disaggregating the ENTRY histogram into turn-movement-specific component ENTRY histograms. Each component is modified to account for the platoon dispersion which results as traffic traverses the link. The resulting INPUT histograms reflect the specified turn percentages for the subject link.

- The SERVICE histogram describes the service rates for each turn movement. These service rates reflect the type of control device servicing traffic on this approach; if it is a signal, then this histogram reflects the specified movement-specific signal phasing. A separate model estimates service rates for each turn movement, given that the control is GO.

These data are provided for each network link:

- The QUEUE histograms describe the time-varying ebb and growth of the queue formation at the stop line. These histograms are derived from the interaction of the respective IN histograms with the SERVICE histograms.

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[1] Lieberman, E. et al. 1980. Macroscopic Simulation for Urban Traffic Management: The TRAFLO Model, Volume 3: Analytical Developments for TRAFLO. Federal Highway Administration Report No. FHWA-RD-80-113.

- The OUT histograms describe the pattern of traffic discharging from the subject link. Each of the IN histograms is transformed into an OUT histogram by the control applied to the subject link. Each of these OUT histograms is added into the (aggregate) ENTRY histogram of its receiving link. This approach provides the model with the ability to identify the characteristics of each turn-movement-specific component of the traffic stream. Each component is serviced at a different saturation flow rate as is the case in the real world. The logic recognizes when one component of the traffic flow encounters saturation conditions even if the others do not.

Algorithms provide estimates of delay and stops reflecting the interaction of the IN histograms with the SERVICE histograms. The logic also provides for properly treating spillback conditions reflecting queues extending from its host link into its upstream feeder links.

A valuable feature is the ability to internally generate functions that relate mean speed to density on each link, given user-specified estimates of free-flow speed and saturation service rates for each link. Such relationships are essential in order to simulate traffic operations on freeways and rural roads, where signal control does not exist, or where its effect is not the dominant factor in impeding traffic flow.

All traffic simulation models are data-intensive. Table C-2 outlines the input data elements. This input describes:

- Topology of the roadway system
- Geometrics of each roadway component
- Channelization of traffic on each roadway component
- Motorist behavior that, in aggregate, determines the operational performance of vehicles in the system
- Specification of the traffic control devices and their operational characteristics
- Traffic volumes entering and leaving the roadway system
- Traffic composition

To provide an efficient framework for defining these specifications, the physical environment is represented as a network. The unidirectional links of the network generally represent roadway components: either urban streets or freeway segments. The nodes of the network generally represent urban intersections or points along the freeway where a geometric property changes (e.g., a lane drop, change in grade, or ramp).

Figure C-1 is an example of a small network representation. The freeway is defined by the sequence of links (20, 21), (21, 22), and (22, 23). links (8001, 19) and (3, 8011) are entry and exit links, respectively. An arterial extends from node 3 to node 19 and is partially subsumed within a grid network. Note that links (21, 22) and (17, 19) are grade-separated.

Table C-1
Measures of Effectiveness Output by PC-DYNEV

Measure	Units
Travel	Vehicle-Miles and Vehicle-Trips
Moving Time	Vehicle-Minutes
Delay Time	Vehicle-Minutes
Total Travel Time	Vehicle-Minutes
Efficiency: Moving Time/Total Travel Time	Percent
Mean Travel Time per Vehicle	Seconds
Mean Delay per Vehicle	Seconds
Mean Delay per Vehicle-Mile	Seconds/Mile
Mean Speed	Miles/Hour
Mean Occupancy	Vehicles
Mean Saturation	Percent
Vehicle Stops	Percent

Table C-2
Input Requirements for the PC-DYNEV Model

GEOMETRICS

- Links defined by upstream and downstream node numbers
- Link lengths
- Number of lanes (up to six)
- Turn pockets
- Grade
- Network topology defined in terms of target nodes for each receiving link

TRAFFIC VOLUMES

- On all entry links and sink/source nodes stratified by vehicle type: auto, car pool, bus, truck
- Link-specific turn movements

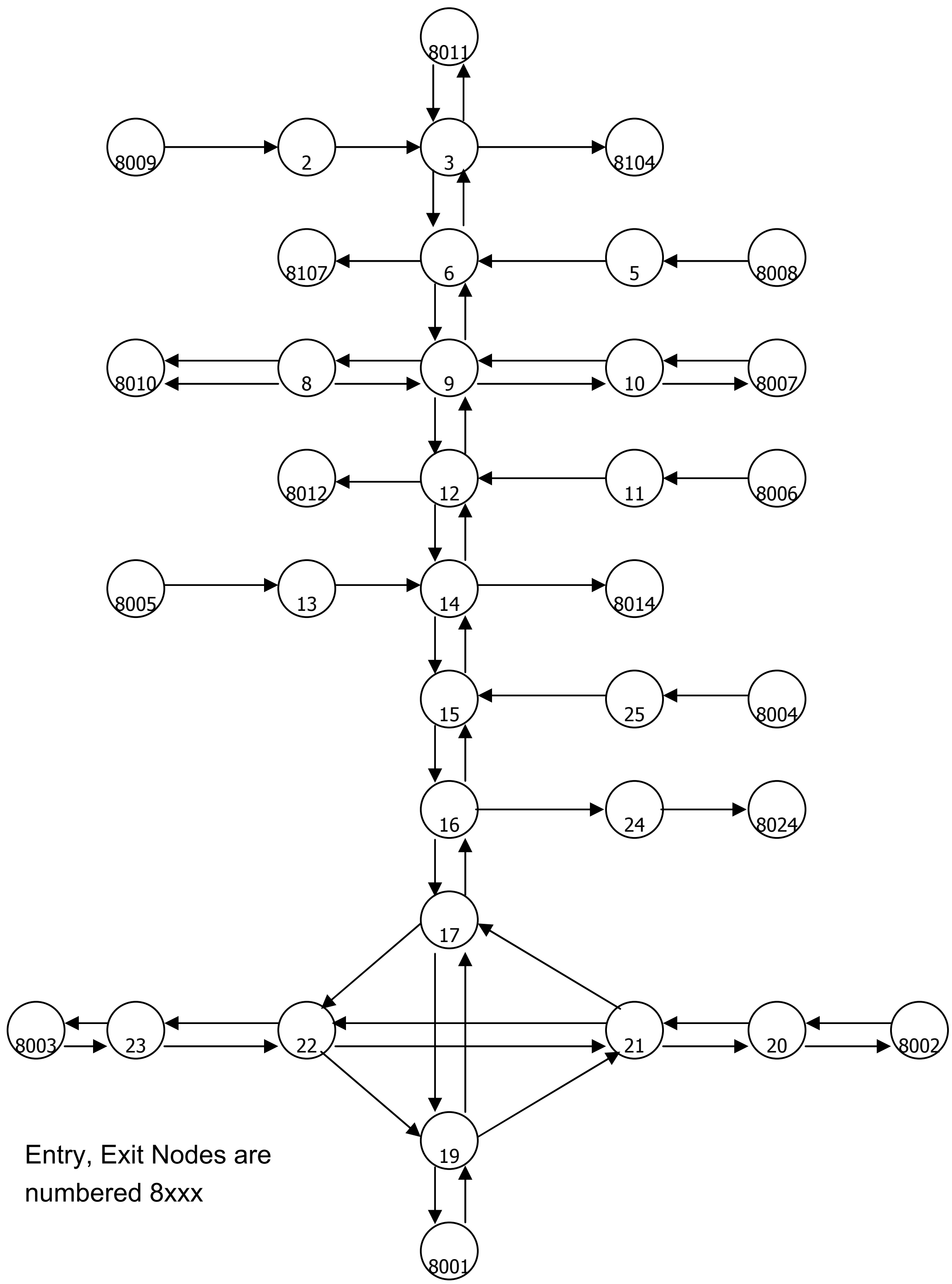
TRAFFIC CONTROL SPECIFICATIONS

- Traffic signals: link-specific, turn movement-specific
- Signal control treated as fixed time
- Stop and yield signs
- Right-turn-on-red
- Route diversion specifications
- Turn restrictions
- Lane control (e.g., lane closure, movement-specific)

DRIVERS' AND OPERATIONAL CHARACTERISTICS

- Drivers (vehicle-specific) response mechanisms: free-flow speed, aggressiveness, discharge headway
- Link-specific mean speed for free-flowing (unimpeded) traffic
- Vehicle-type operational characteristics: acceleration, deceleration
- Such factors as bus route designation, bus station location, dwell time, headway, etc.

Figure C-1. Representative Analysis Network



APPENDIX D
DETAILED DESCRIPTION OF STUDY PROCEDURE

Appendix D
Detailed Description of Study Procedure

This appendix describes the activities that were performed to compute accurate evacuation time estimates. The individual steps of this effort are represented as a flow diagram in Figure D-1. Each numbered step in the description that follows corresponds to the numbered element in this flow diagram.

Step 1

The first activity is to obtain data defining the spatial distribution and demographic characteristics of the population in the EPZ. The data was obtained from U.S. Census files and from the results of a telephone survey conducted in the EPZ. Lists of recreational areas, schools, and other facilities were provided by the Miami-Dade County Department of Emergency Management & Homeland Security. Data for these facilities were obtained through phone calls to the facilities and through Internet searches. Employment data was estimated by analyzing the 2000 census journey-to-work data.

Step 2

The next activity is to examine large-scale maps of the EPZ in both hard copy form and using geographical information system software. These maps were used to identify the analysis highway network and the access roads from each residential and employment development to the adjoining elements of this network. This information is used to plan a field survey of the highway system and later, to assign generated evacuation trips to the correct destinations at the periphery of the EPZ.

Step 3

The next step is to conduct a physical survey of the roadway system. The purpose of this survey is to determine the geometric properties of the highway elements, the channelization of lanes on each section of roadway, whether there are any turn restrictions or special treatment of traffic at intersections, the type and functioning of traffic control devices, and to make the necessary observations needed to estimate realistic values of roadway capacity. A tablet computer equipped with global positioning satellite technology, together with video and audio recording equipment, are used during the road survey to accurately record the position of traffic control devices and record other roadway data.

Step 4

With this information, develop the evacuation network representation of the physical roadway system.

Step 5

With the network created, proceed to estimate the capacities of each link and to locate the origin centroids where trips would be generated during the evacuation process.

Step 6

With this information at hand, the data was entered into the computer to create the input stream for the TRaffic Assignment and Distribution (TRAD) model. This model was designed to be compatible with the PC-DYNEV traffic simulation model used later in the project; the input stream required for one model is entirely compatible with the input stream required by the other. Using a software system developed by KLD named UNITES, the data entry activity is performed interactively directly on the computer.

Step 7

The TRAD model contains software that performs diagnostic testing of the input stream. These assist the user in identifying and correcting errors in the input stream.

Step 8

After creating the input stream, execute the TRAD model to compute evacuating traffic routing patterns consistent with the guidelines of NUREG-0654, Appendix 4. The TRAD model also provides estimates of traffic loading on each highway link as well as rough estimates of operational performance.

Step 9

Critically examine the statistics produced by the TRAD model. This is a labor-intensive activity, requiring the direct participation of skilled engineers, who possess the necessary practical experience to interpret the results, and to determine the causes of any problems reflected in the results.

Essentially, the approach is to identify those hot spots in the network that represent locations where congested conditions are pronounced and to identify the cause of this congestion. This cause can take many forms: excess demand; improper routing; a shortfall of capacity; and a quantitative error in the way the physical system was represented in the input stream. This examination leads to one of two conclusions:

- The results are as satisfactory as could be expected at this stage of the analysis process
- The input stream must be modified accordingly

This decision requires, of course, the application of the analyst's judgment based on the results obtained in previous applications of the TRAD model and a comparison of the results of this last case with the previous ones. If the results are satisfactory in the opinion of the analyst, then the process continues with Step 12. Otherwise, proceed to Step 10.

Step 10

There are many treatments available to the user in resolving such problems. These treatments range from decisions to reroute the traffic by imposing turn restrictions where they can produce significant improvements in capacity, changing the control treatment at critical intersections to provide improved service for one or more movements, or in prescribing specific treatments for channelizing the flow to expedite the movement of traffic along major roadway systems or changing the trip table. Such treatments take the form of modifications to the original input stream.

Step 11

As noted above, the changes to the input stream must be implemented to reflect the modifications undertaken in Step 10. At the completion of this activity, the process returns to Step 8 where the TRAD model is again executed.

Step 12

The output of the TRAD model includes the computed turn movements for each link. This data is required and accessed by the PC-DYNEV simulation model. This step completes the specification of the PC-DYNEV input stream.

Step 13

After the PC-DYNEV input stream has been debugged, the simulation model is executed to provide detailed estimates, expressed as statistical measures of effectiveness, which describe the detailed performance of traffic operations on each link of the network.

Step 14

In this step, the detailed output of the simulation model is examined to identify whether problems exist on the network. The results of the simulation model are extremely detailed and far more accurately describe traffic operations than those provided by the TRAD model. Consequently, it is possible to identify the cause of any problems by carefully studying the output.

Again, corrective treatments can be implemented to expedite the flow of traffic on the network in the event that the results are considered to be less efficient than is possible to achieve. If input changes are needed, the analysis process proceeds to Step 15. On the other hand, if the results are satisfactory, return to Step 8 to again execute the TRAD model and repeat the whole process, or accept the simulation results. If there were no changes indicated by the activities of Step 14 because the results were satisfactory, then document them in Step 17. Otherwise, return to Step 8 to determine the effects of the changes implemented in Step 14 on the optimal routing patterns over the network. This determination can be ascertained by executing the TRAD model.

Step 15

This activity implements the changes in control treatments or in the assignment of destinations associated with one or more origins in order to improve the representation of traffic flow over the network. These treatments can also include the consideration of adding roadway segments to the existing analysis network to improve the representation of the physical system.

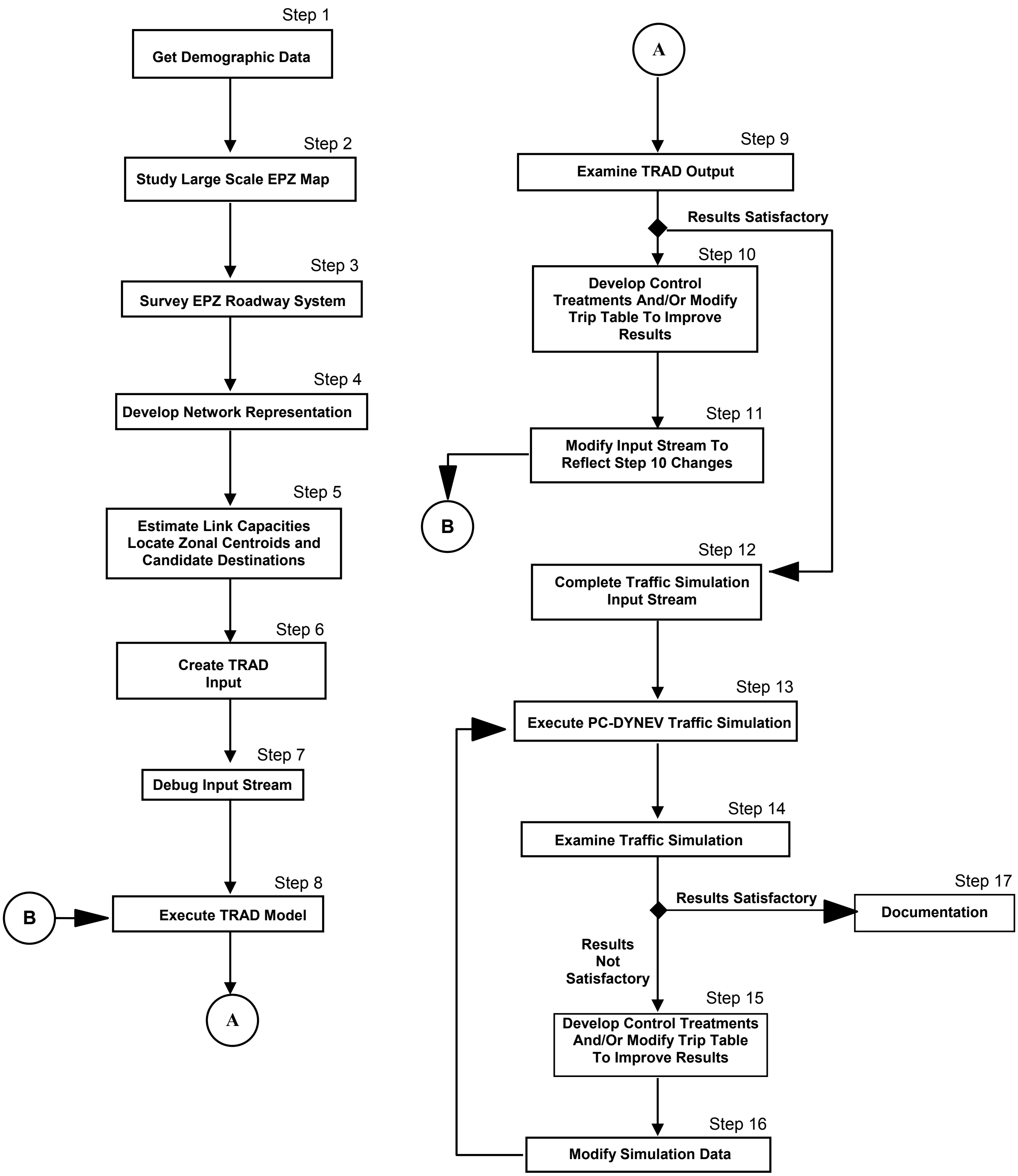
Step 16

Once the treatments have been identified, it is necessary to modify the simulation model input stream accordingly. At the completion of this effort, the procedure returns to Step 13 to execute the simulation model again.

Step 17

The simulation results are analyzed, tabulated, and graphed. The results are then documented, as required.

Figure D-1. Flow Diagram of Activities



APPENDIX E
SPECIAL FACILITY DATA

Appendix E
Special Facility Data

The following tables list population information for special facilities that are located within the Turkey Point EPZ. Special facilities are defined as schools, hospitals and other medical care facilities, correctional facilities, and major employers. Transient population data is included in the tables for parks, hotels and motels, marinas, golf courses, and major retail facilities. The location of the facility is described by its straight-line distance (miles) and direction (magnetic bearing) from the center point of the proposed Units 6 & 7 at the Turkey Point site.

As indicated in Figure 5-2, it is estimated that employees may require up to 2 hours to shut down equipment and leave work. Given the major employers in the EPZ, located and identified in Figures E-5, E-6 and E-7, this estimate is reasonable.

Table E-1 (Sheet 1 of 3)
Turkey Point EPZ: Miami-Dade County Schools

Area	Distance (miles)	Direction	School Name	Street Address	Municipality	Phone	Enrollment
8	7.5	NW	Aspira South Youth Leadership Charter School	14112-14114 SW 288th St	Leisure City	305-246-1111	306
5	10.6	N	Balere Language Academy	10600 Caribbean Blvd	Miami	305-232-9797	151
6	10.0	NNW	Coral Reef Montessori Academy Charter School	10853 SW 216 St	Miami	305-255-0064	335
8	6.7	WNW	Keys Gate Charter School	2000 SE 28th Ave	Homestead	305-230-1616	1,143
8	9.8	W	Lawrence Academy	777 West Palm Dr	Florida City	305-247-4800	15
8	10.1	W	Miami Community Charter School	101 S Redland Rd	Florida City	305-245-2552	50
8	9.8	W	Rosa Parks Charter School	713 W Palm Dr	Florida City	305-246-3336	155
7	8.1	NW	SIA Tech (Homestead Job Corps Center)	12350 SW 285th St	Homestead	305-258-9477	357
8	6.8	NW	The Charter School at Waterstone	855 Waterstone Way	Homestead	305-248-6206	1,117
4	7.5	NW	Air Base Elementary	12829 SW 272nd St	Homestead	305-258-3676	676
8	9.6	WNW	Avocado Elementary	16969 SW 294th St	Homestead	305-247-4942	782
5	11.3	N	Bel-Aire Elementary	10205 SW 194th St	Miami	305-233-5401	522
8	8.1	WNW	Campbell Dr Elementary	15790 SW 307th St	Leisure City	305-245-0270	1,246
8	8.0	WNW	Campbell Dr Middle	900 NE 23rd Ave	Homestead	305-248-7911	1,072
6	11.2	NNW	Caribbean Elementary	11990 SW 200th St	Miami	305-233-7131	811
5	10.2	N	Centennial Middle	8601 SW 212th St	Miami	305-235-1581	976
7	8.1	NW	Chapman Elementary	27190 SW 140th Ave	Homestead	305-245-1055	940
8	9.3	WNW	Cooper, Neva King Educational Center	151 NW 5th St	Homestead	305-247-4307	101
8	8.1	WNW	Corporate Academy South	2351 SE 12 Ave	Homestead	305-246-4348	89

Table E-1 (Sheet 2 of 3)
Turkey Point EPZ: Miami-Dade County Schools

Area	Distance (miles)	Direction	School Name	Street Address	Municipality	Phone	Enrollment
5	10.8	N	Cutler Ridge Elementary	20210 Coral Sea Rd	Miami	305-235-4611	905
5	11.3	N	Cutler Ridge Middle	19400 Gulfstream Rd	Miami	305-235-4761	1,008
8	9.6	WNW	Florida City Elementary	364 NW 6th Ave	Florida City	305-247-4676	857
5	10.3	N	Gulfstream Elementary	20900 SW 97th Ave	Miami	305-235-6811	724
8	9.9	WNW	Homestead Middle	650 NW 2nd Ave	Homestead	305-247-4221	966
8	8.1	WNW	Homestead Senior	2351 SE 12th Ave	Homestead	305-245-7000	2,184
8	8.1	NW	Leisure City K-8 Center	14950 SW 288th St	Homestead	305-247-5431	1,318
6	10.2	NNW	Mays Middle	11700 SW 216th St	Miami	305-233-2300	658
4	6.7	NNW	Migrant Education Program	28205 SW 125th Ave	Homestead	305-258-4115	17
7	8.5	NW	Naranja Elementary	13990 SW 264th St	Naranja	305-258-3401	637
8	7.6	NW	Peskoe Elementary	29035 SW 144 Ave	Homestead	305-242-8340	1,114
6	10.1	NNW	Pine Villa Elementary	21799 SW 117th Court	Miami	305-258-5366	623
outside[(a)]	10.9	NW	Redland Elementary	24501 SW 162nd Ave	Homestead	305-247-8141	996
7	10.7	NW	Redland Middle	16001 SW 248th St	Homestead	305-247-6112	1,175
outside[(a)]	11.0	WNW	Redondo Elementary	18480 SW 304th St	Homestead	305-247-5943	753
8	9.8	WNW	Saunders, Laura C. Elementary	505 SW 8th St	Homestead	305-247-3933	919
7	9.6	NW	South Dade Senior	28401 SW 167th Ave	Homestead	305-247-4244	2,453
outside[(a)]	10.7	WNW	West Homestead Elementary	1550 SW 6th St	Homestead	305-248-0812	768
5	9.7	N	Whigham, Dr. E.L. Elementary	21545 SW 87th Ave	Miami	305-234-4840	798
5	11.5	N	Whispering Pines Elementary	18929 SW 89th Rd	Miami	305-238-7382	758
8	9.8	WNW	Barrington Academy	344 SW 4 Ave	Homestead	305-248-3400	94

Table E-1 (Sheet 3 of 3)
Turkey Point EPZ: Miami-Dade County Schools

Area	Distance (miles)	Direction	School Name	Street Address	Municipality	Phone	Enrollment
6	9.7	WNW	Children's Rainbow	22940 Old Dixie Hwy	Miami	305-258-0194	20
8	9.6	WNW	Colonial Christian School	17105 SW 296th St	Homestead	305-246-8606	199
5	10.7	WNW	Cutler Ridge Christian Academy	10301 Caribbean Blvd	Miami	305-251-1534	238
8	10.0	WNW	First Presbyterian Church School	47 NW 16th St	Homestead	305-246-4094	120
5	12.1	N	Our Lady of the Holy Rosary	18455 Franjo Rd	Homestead	305-235-5442	460
8	10.7	WNW	Redland Christian Academy	17700 SW 280th St	Homestead	305-247-7399	215
8	9.3	WNW	Sacred Heart	300 SE 1st Dr	Homestead	305-247-2678	194
8	9.6	WNW	Saint John's Episcopal School	145 NE 10th St	Homestead	305-247-5445	176
8	9.9	W	First Assembly Christian Academy	824 West Palm Dr	Florida City	305-248-2273	75
8	8.8	WNW	Redland Center	29355 Dixie Hwy	Miami	N/A	N/A
8	8.0	WNW	Region VI Office	30910 SW 8th St	Homestead	N/A	N/A
7	8.1	NW	South Dade Center	28520 SW 148th Ave	Homestead	N/A	N/A
7	8.5	NW	South Dade Skill Center	28300 SW 152nd Ave	Leisure City	N/A	N/A
8	9.6	WNW	South Dade Adult Center	109 NE 8th St	Homestead	N/A	N/A
						Total	**32,266**

(a) According to Miami-Dade County, Redland Elementary, Redondo Elementary, and West Homestead Elementary are outside of the EPZ, but are nonetheless evacuated because they are close to the EPZ boundary. They have been included in Areas 7, 8, and 8, respectively, for the ETE analysis.

Table E-2 (Sheet 1 of 2)
Turkey Point EPZ: Major Employers

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Employees[(a)]
8	9.2	WNW	Applebee's	33009 S Dixie Hwy	Homestead	305-246-1004	194
5	11.5	N	Best Buy	19191 S Dixie Hwy	Cutler Bay	305-256-9552	344
8	8.8	WNW	BJ's Wholesale	650 NW 8th Ave	Homestead	305-248-7538	2422
6	9.4	NNW	Cemax		Princeton		734
7	8.8	NW	CVS	28740 South Dixie Hwy	Homestead	305-248-1761	181
8	9.3	W	DiMare Homestead, Inc.	258 NW 1st Ave	Florida City	305-245-4211	194
5	9.8	N	Doris Ison South Dade Community Health Center	10300 Southwest 216th St	Miami	305-253-5100	345
8	9.2	WNW	Florida City State Farmers' Market	300 North Krome Ave	Florida City	305-246-6334	194
5	10.4	N	Health South Rehabilitation Hospital	20601 Old Cutler Rd	Miami	305-251-3800	263
8	9.1	WNW	Home Depot	33001 South Dixie Hwy	Florida City	786-243-9370	180
8	7.2	NW	Home Depot	13895 SW 288th St	Homestead	305-247-1179	194
8	7.1	WNW	Homestead Hospital	975 Baptist Way	Homestead	786-243-8000	2422
6	10.8	NNW	Kmart	20505 S Dixie Hwy	Cutler Bay	305-254-0455	345
8	8.6	WNW	Lowe's	1850 NE Campbell Dr	Homestead	305-508-3020	2422
6	10.3	NNW	Miami Dade Government Center	10710 SW 211th St	Miami	305-275-1155	345
8	9.2	WNW	Office Depot	32955 S Dixie Hwy	Florida City	786-243-1550	194
5	11.3	N	Office Max	19650 South Dixie Hwy	Cutler Bay	305-254-8077	125
5	11.4	N	PRC	19500 S Dixie Hwy	Cutler Bay	786-293-4000	126
8	9.0	WNW	Prime Outlets of Florida City	250 East Palm Dr	Florida City	305-248-4736	195

Table E-2 (Sheet 2 of 2)
Turkey Point EPZ: Major Employers

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Employees[(a)]
6	10.6	NNW	Publix Super Market	20711 S Dixie Hwy	Miami	305-256-3140	180
8	7.1	NW	Publix Super Market	3060 NE 41st Ter	Homestead	305-242-5530	344
6	10.7	NNW	R C Comprehensive Medical Center	10700 Caribbean Blvd	Cutler Bay	305-252-1022	344
6	10.5	NNW	Sears	20701 SW 112th Ave	Cutler Bay	305-378-5195	345
5	12.0	N	Shopping Center - Cutler Ridge	S Dixie Hwy	East Perrine		344
6	9.8	NNW	Shopping Center I - Goulds	S Dixie Hwy	Goulds		118
6	9.9	NNW	Shopping Center II - Goulds	S Dixie Hwy	Goulds		118
6	10.0	NNW	Shopping Center III - Goulds	S Dixie Hwy	Goulds		118
6	10.2	NNW	Shopping Center IV- Goulds	S Dixie Hwy	Goulds		118
6	9.7	NNW	Shopping Center V- Goulds	S Dixie Hwy	Goulds		118
8	9.0	WNW	Shopping Center - Homestead	S Dixie Hwy	Homestead		2422
5	10.5	N	Shopping Center - Lakes by the Bay	Old Cutler Rd	Cutler Ridge		263
6	10.6	NNW	Southland Mall	20505 S Dixie Hwy	Cutler Bay	305-235-8880	345
6	10.8	NNW	Target	20500 SW 112th Ave	Cutler Bay	305-235-0839	125
5	11.3	N	Toys R Us	19525 So. Dixie Hwy	Cutler Ridge	305-233-6122	344
8	8.8	WNW	Walgreens	29601 S Dixie Hwy	Homestead	305-248-2451	181
8	9.0	WNW	Wal-Mart	33501 S Dixie Hwy	Homestead	305-242-4447	194
1	0.9	N	Turkey Point Nuclear Plant	SW 344th St	Homestead		1467
7	8.7	NW	Winn Dixie	27359 S Dixie Hwy	Homestead	305-248-0660	515
5	11.5	N	Winn Dixie	19167 South Dixie Hwy	Cutler Bay		345
						Total	**19,767**

(a) The employment for each municipality in Table 3-5 was evenly distributed among major employers listed for that municipality in the table above. There are many large shopping centers with multiple stores along S Dixie Hwy; the employee estimates above are for the entire shopping center which has been identified by the major store in that shopping center.

Table E-3 (Sheet 1 of 2)
Turkey Point EPZ: Lodging Facilities

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	People	Vehicles
8	9.0	WNW	A-1 Budget Motel	30600 S Dixie Hwy	Homestead	305-247-7032	49	17
8	9.5	WNW	Anhinga Motel	250 S Krome Ave	Homestead	305-247-3590	99	34
6	10.8	N	Best Western Floridian Hotel	10775 Caribbean Blvd	Miami	305-253-9960	600	150
8	9.1	W	Best Western Gateway to the Keys	411 S Krome Ave	Florida City	305-246-5100	281	97
7	8.7	NW	Budget Express	27707 S Dixie Hwy	Naranja	305-245-4330	217	108
8	9.3	WNW	Budget Host (Roadway Inn)	815 N Krome Ave	Florida City	305-248-2741	90	45
8	9.7	WNW	Caribe Motel	841 N Krome Ave	Homestead	305-247-2442	103	34
8	8.9	W	Comfort Inn Florida City Hotel	333 SE First Ave	Florida City	305-248-4009	372	124
8	9.3	WNW	Coral Roc Motel	1100 N Krome Ave	Florida City	305-246-2888	30	10
8	9.7	WNW	Country Lodge	651 N Krome Ave	Florida City	305-245-2376	89	31
8	9.2	WNW	Days Inn	51 S Homestead Blvd	Homestead	305-245-1260	187	94
7	8.7	NW	Deluxe Inn Motel	28475 S Dixie Hwy	Homestead	305-248-5622	44	15
8	9.1	WNW	Econo Lodge	553 NE First Ave	Florida City	305-248-9300	104	36
8	9.4	WNW	Everglades Motel	605 S Krome Ave	Homestead	305-247-4117	25	8
8	9.0	W	Fairway Inn	100 SE 1st Ave	Florida City	305-248-4202	394	136
8	9.0	WNW	Floridian Hotel of Homestead	990 N Homestead Blvd	Homestead	305-247-7020	345	119
8	9.6	WNW	Green Stone Motel	304 N Krome Ave	Homestead	305-247-8334	62	21
8	8.9	W	Holiday Inn Express	35200 S Dixie Hwy	Florida City	305-247-3414	200	100
8	9.3	WNW	Holiday Motel	1405 N Krome Ave	Florida City	305-248-8681	30	15
6	10.8	N	Howard Johnson Plaza (Floridian Hotel Cutler Ridge)	10779 Caribbean Blvd	Cutler Bay	305-253-9960	370	128
8	9.1	WNW	Inn at Homestead (Villager Lodge)	1020 N Homestead Blvd	Homestead	305-248-2121	123	43

Table E-3 (Sheet 2 of 2)
Turkey Point EPZ: Lodging Facilities

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	People	Vehicles
6	9.9	NNW	Kent Motel	22345 S Dixie Hwy	Miami	305-258-2114	48	12
8	9.2	WNW	Knights Inn Florida City–Hotel (Sea Glades Hotel)	1223 NE First Ave	Florida City	305-247-6633	70	35
6	10.9	NNW	La Quinta Inn	10821 Caribbean Blvd	Cutler Bay	305-278-0001	412	103
8	9.4	WNW	Park Motel	600 S Krome Ave	Homestead	305-247-6731	52	18
8	9.0	W	Ramada Inn Florida City (Hampton Inn)	124 East Palm Dr	Florida City	305-247-8833	394	98
8	9.4	WNW	Redland Hotel	5 S Flagler Ave	Homestead	305-246-1904	22	11
7	8.8	NW	America's Best Inn & Suites (Royal Tern Motel)	26476 S Dixie Hwy	Homestead	305-258-3034	57	20
8	9.3	WNW	Super 8-Florida City (Bel Air Motel)	1202 N Krome Ave	Florida City	305-245-0311	104	26
8	9.8	WNW	Tradewinds Motel	846 N Krome Ave	Homestead	305-247-5050	21	11
8	8.9	W	Travelodge–Florida City	409 SE 1st Ave	Florida City	305-248-9777	264	88
						Total	**5,258**	**1,787**

Note: People and vehicles per room varied by hotel. Peak occupancy rates were obtained through direct phone calls to the facilities. An average occupancy rate was used for hotels that did not provide data.

Table E-4
Turkey Point EPZ: Miami-Dade County Parks, Golf Courses, and Major Retail Establishments

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	People	Total Vehicles
4	2.7	N	Biscayne National Park (Homestead Bayfront Park)	9700 SW 328 St	Homestead	305-230-7275	400	70
6	7.8	N	Black Point Park	24775 SW 87th Ave	Cutler Bay	305-258-4092	262	131
outside[(a)]	10.7	NW	Camp Owaissa Bauer	17001 SW 264 St	Miami	305-247-6016	150	3
7	8.7	NW	Coral Castle Museum	28655 S Dixie Hwy	Homestead	305-248-6344	50	20
8	8.9	WNW	Harris Field (Homestead Championship Rodeo)	1034 NE 8th St	Homestead	305-248-5189	592	197
8	7.2	WNW	Keys Gate Golf Club	2300 Palm Dr	Homestead	305-230-0362	100	40
8	8.9	W	Prime Outlets of Florida City	250 East Palm Dr	Florida City	305-248-4736	3,084	1,028
6	10.7	NNW	Southland Mall	20505 South Dixie Hwy	Miami	305-235-8880	3,831	1,277
outside[(a)]	12.7	NNW	Larry & Penny Thompson Memorial Park	12451 SW 184th St	Miami	305-232-1049	1,360	920
						Total	**9,829**	**3,686**

(a) Based on discussions with Miami-Dade County emergency management officials, Camp Owaissa Bauer and Larry & Penny Thompson Memorial Park will be evacuated in the event of an incident at Turkey Point because they are close to the EPZ boundary. Camp Owaissa Bauer and Larry & Penny Thompson Park were included in Areas 5 and 7, respectively, for the ETE analysis.

Table E-5
Turkey Point EPZ: Miami-Dade County Marinas

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	People	Total Vehicles
6	7.9	N	Black Point Marina	24775 SW 87 Ave	Cutler Ridge	305-258-4092	1,968	869
4	8.3	N	Homestead Bayfront Marina/Herbert Hoover Marina and Park	9698 SW 328th St	Homestead	305-230-3033	2,000	500
						Total	**3,968**	**1,369**

Table E-6 (Sheet 1 of 3)
Turkey Point EPZ: Miami-Dade County Medical Facilities and Nursing Homes

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Capacity
7	7.7	NW	Advance ALF	14335 SW 288 St	Homestead	305-242-6461	6
8	8.0	WNW	Alita and John Haran ALF	1532 Flamingo Ct	Homestead	305-242-5620	6
8	7.8	NW	Angele's Assisted Living Facility	29921 SW 151st Ave	Homestead	305-247-7171	6
6	10.7	NNW	B& B Home Care, Inc.	20625 SW 114th Pl	Miami	305-235-9510	6
5	11.6	N	Bel Air ALF	8830 Caribbean Blvd	Miami	305-255-8737	6
5	11.6	N	Bella Luna Retirement Home	18700 SW 93rd Ct	Miami	305-969-7482	6
7	8.4	NW	Biscayne Senior Housing	28655 SW 153rd Ave	Homestead	305-246-7744	20
5	9.6	N	Blue Point Home Care	21910 SW 97th Ct	Miami	305-971-5826	6
6	7.5	NNW	Brisa Azul	26770 SW 124th Ave	Miami	786-553-0199	6
5	10.6	N	Caribbean ALF	9860 Caribbean Blvd	Miami	305-971-9667	6
6	8.2	NNW	Del Real Home Care, Inc.	13071 SW 260th Ter	Homestead	305-257-0041	6
4	8.0	NW	Diaz Home Care ALF	13481 SW 268th Ter	Homestead	305-258-7790	6
6	7.7	NNW	Duran Home Care Corp	26775 SW 129th Ave	Homestead	305-726-5782	6
5	11.2	N	East Ridge Retirement Village	19301 SW 87th Ave	Miami	305-238-2623	60
8	6.9	NW	El Viejo Sol ALF Corp	4163 NE 16th St	Homestead	305-986-8104	6
6	8.3	NNW	God Is First ALF, Inc	11316 SW 246th Ter	Miami	305-508-8412	6
6	8.8	NNW	Grand Court Operations South, LLC	25268 SW 134th Ave	Princeton	305-258-2222	105
5	10.3	N	Harmony Family Home	9245 SW 208th Ter	Miami	786-242-5577	6
8	7.5	NW	Heaven Assisted Living Facility	30136 SW 148th Pl	Homestead	305-245-2290	6
5	10.4	N	Health South Rehabilitation Hospital	20601 Old Cutler Rd	Miami	305-251-3800	60
8	10.0	WNW	Homestead Manor	1330 NW 1st Ave	Homestead	305-248-0271	18
8	7.1	WNW	Homestead Hospital	975 Baptist Way	Homestead	786-243-8000	120

Table E-6 (Sheet 2 of 3)
Turkey Point EPZ: Miami-Dade County Medical Facilities and Nursing Homes

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Capacity
6	10.1	NNW	Ifa Lola ALF	12230 SW 220th St	Cutler Ridge	786-308-9915	6
6	11.1	NNW	Ive Home	20020 SW 113th Pl	Miami	305-255-7934	6
6	9.9	NNW	Ive Home II ALF	22636 SW 125th Ave	Cutler Ridge	305-804-3183	6
6	8.2	NNW	Jesus Home Services	28425 SW 131st Ct	Homestead	786-355-3611	6
8	8.4	WNW	Kayleen and Denis Care	15700 SW 296th St	Homestead	305-248-5046	6
5	10.5	N	Kenneth Home Inc	10051 Haitian Dr	Miami	786-543-0325	6
6	8.3	NNW	Living Well ALF, Co.	24151 SW 107th Ave	Homestead	305-431-2586	6
7	7.9	NW	Maria Home Care Corp	14615 SW 288th St	Miami	786-385-5415	6
5	10.4	N	Marlin Retirement ALF	20610 Marlin Rd	Miami	305-519-8517	6
8	8.2	WNW	MD ALF	15735 SW 303rd Ter	Miami	305-247-0260	6
6	8.0	NNW	Meadow Wood Homes LLC	25799 SW 122nd Pl	Homestead	305-283-5034	6
4	7.3	NW	Merline's Place	28412 SW 135th Ave	Homestead	305-274-4326	6
8	7.2	WNW	Mi Renacer ALF	1305 SE 7th St	Homestead	786-295-2913	6
6	9.2	NNW	Milagros de Vida ALF	10762 SW 228th Ter	Miami	786-317-0141	6
8	7.4	NW	Mother Golden Years II	29332 SW 143rd Ct	Homestead	305-551-3160	6
4	7.5	NW	Mother Golden Years III	13621 SW 281st Ter	Miami	305-807-7138	6
6	10.9	NNW	My Sweet Home	11312 SW 203rd Ter	Miami	305-251-1119	6
5	9.8	N	Old Cutler Retirement Home	21640 Old Cutler Rd	Miami	305-232-1411	6
8	9.9	WNW	Palace Gardens-North	1351 N Krome Ave	Homestead	305-247-0446	200
6	9.9	NNW	Paula's Mansion ALF	13206 SW 218th Ter	Miami	786-306-4819	6
6	10.0	NNW	Peace & Care South Inc	24027 SW 111th Ave	Homestead	305-450-9457	6
5	11.1	N	Perdue Medical Center	19590 Old Cutler Rd	Cutler Bay	786-466-3500	163
8	7.8	NW	Pina & Fuerte Adult Care	14935 SW 297th St	Homestead	305-242-0871	6

Table E-6 (Sheet 3 of 3)
Turkey Point EPZ: Miami-Dade County Medical Facilities and Nursing Homes

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Capacity
6	8.3	NNW	Quality Care ALF, Inc	11381 SW 247th Ter	Homestead	305-799-2782	6
6	10.8	NNW	Rafaela's Home ALF II	20560 SW 113th Rd	Miami	305-259-3607	6
5	10.4	N	Rodeck One Inc	9700 Montego Bay Dr	Miami	305-969-4446	6
7	7.8	NW	San Rafael Home Health Inc	13373 SW 283rd St	Homestead	786-470-7927	6
8	9.6	WNW	Sara Home Care	29100 SW 172nd Ave	Homestead	305-246-4034	16
7	9.0	NW	Serenity Adult Home Care Services	15401 SW 277th St	Homestead	786-853-8880	6
8	7.7	WNW	Signature Healthcare of Brookwood Gardens	1990 S Canal Dr	Homestead	305-246-1200	120
6	9.0	NNW	Silver Age ALF, Corp	23187 SW 108th Ct	Miami	305-378-5610	6
6	9.2	NNW	St. Mary Adult Care II	11271 SW 229th Ter	Miami	305-238-5594	6
6	10.9	NNW	Suany's Home	20411 SW 116th Rd	Miami	305-252-0734	6
8	10.1	WNW	Swankridge Care Center	120 NW 17th St	Homestead	305-248-9662	8
8	9.8	WNW	Swankridge Holistic Research & Care Center	122 NW 7th St	Homestead	305-248-9662	12
8	9.4	WNW	Sweet Mansion ALF Inc	16925 SW 300th St	Homestead	786-486-4902	5
6	9.5	NNW	Sylvia's Senior Home	23025 SW 120th Ave	Miami	305-257-2880	6
8	6.9	WNW	The Gardens ALF	2835 SE 4th Pl	Homestead	305-230-6789	6
8	8.0	NW	The Gil Family Home	15201 SW 297th St	Miami	305-248-0308	6
5	10.7	N	The Haven	10601 Caribbean Blvd	Miami	305-235-5872	7
6	7.6	NNW	Vicky's ALF	12438 SW 266th Ln	Homestead	305-257-3039	6
						Total	**1,208**

Table E-7
Turkey Point EPZ: Miami-Dade County Correctional Facilities

Area	Distance (miles)	Direction	Facility Name	Street Address	Municipality	Phone	Capacity	Census
9	9.8	WSW	Dade Juvenile Residential Facility	18500 SW 424th St	Florida City	305-247-6492	56	55
						Total	**56**	**55**

Figure E-1. Overview of Schools within the Turkey Point EPZ

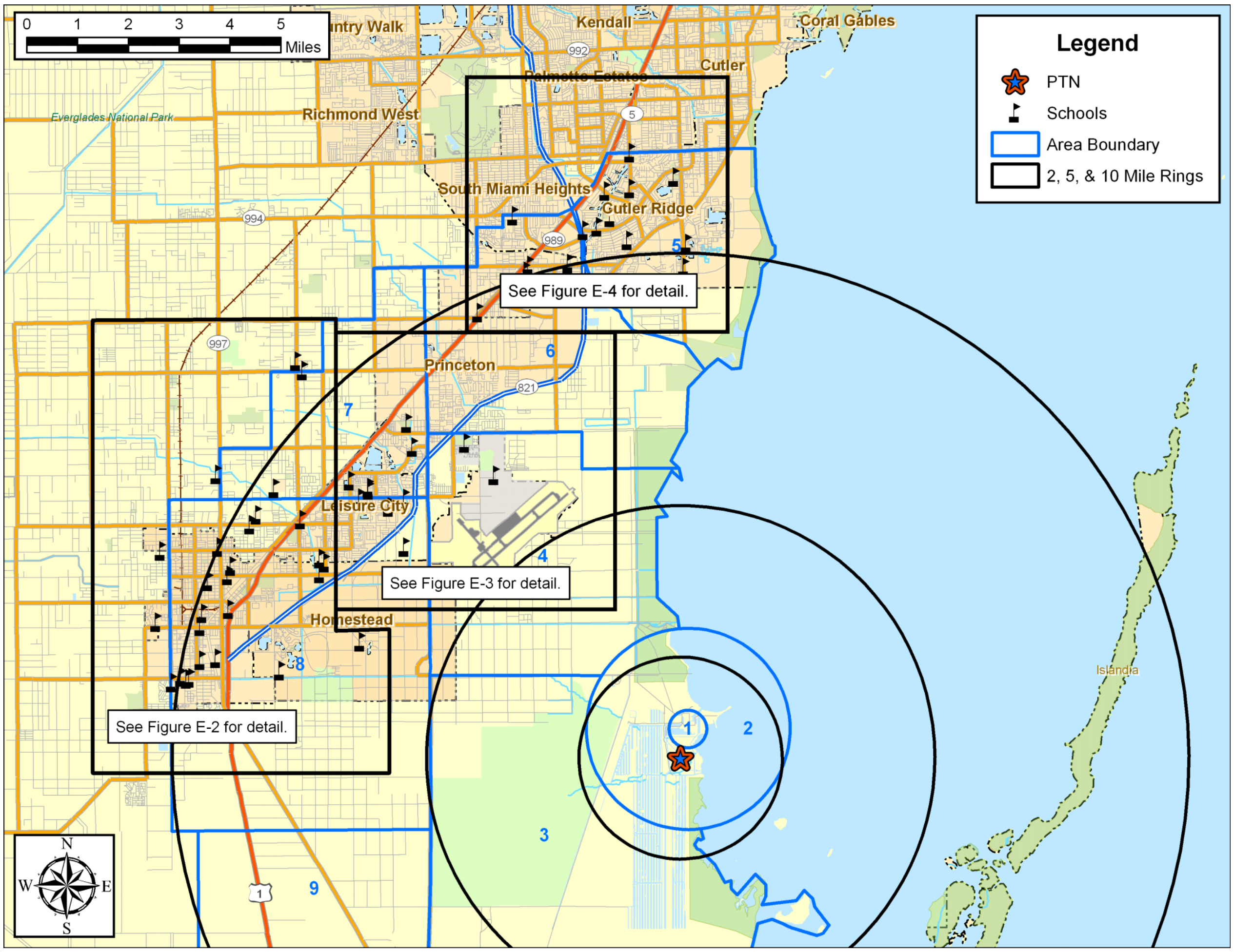


Figure E-2. Schools within Homestead and Florida City

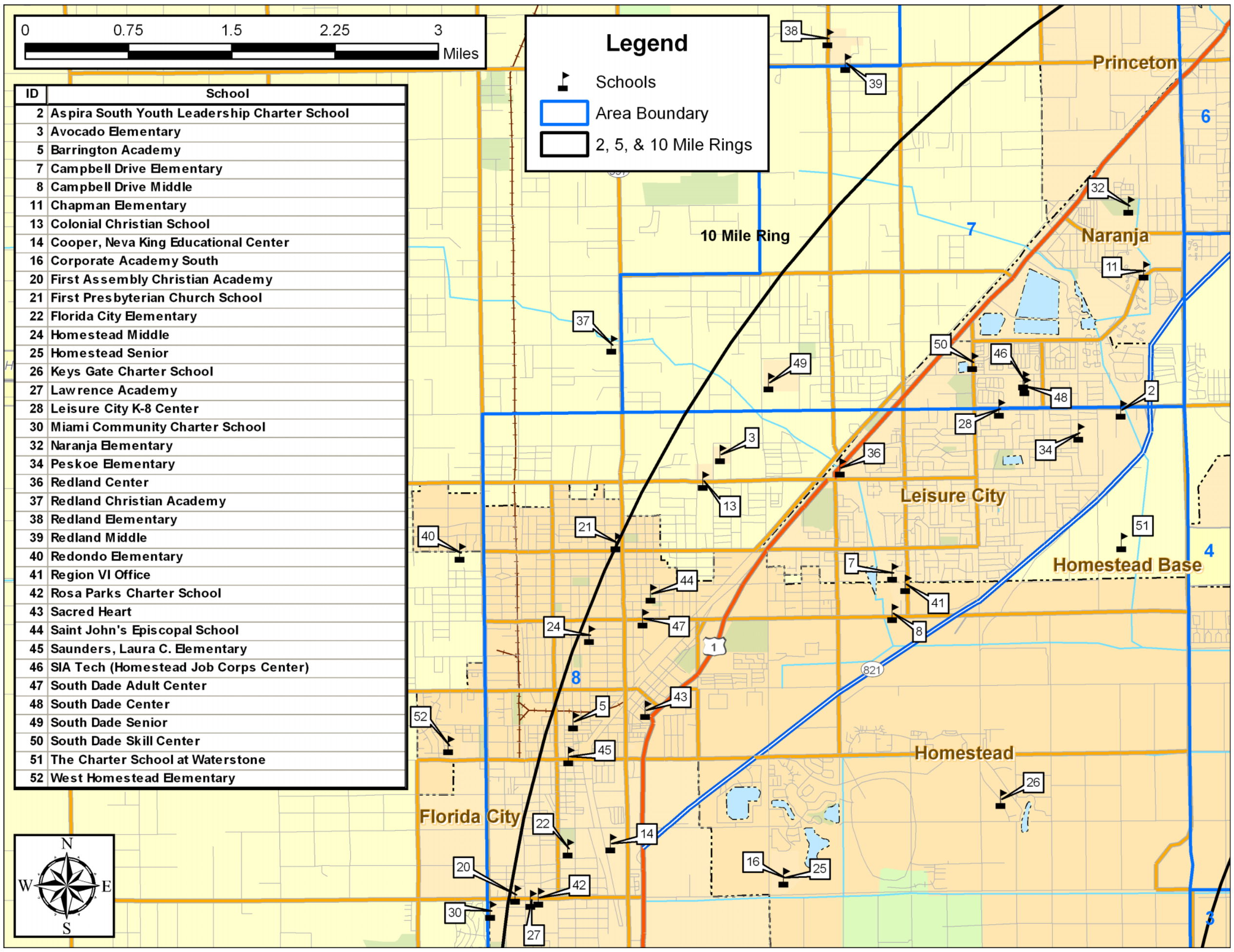
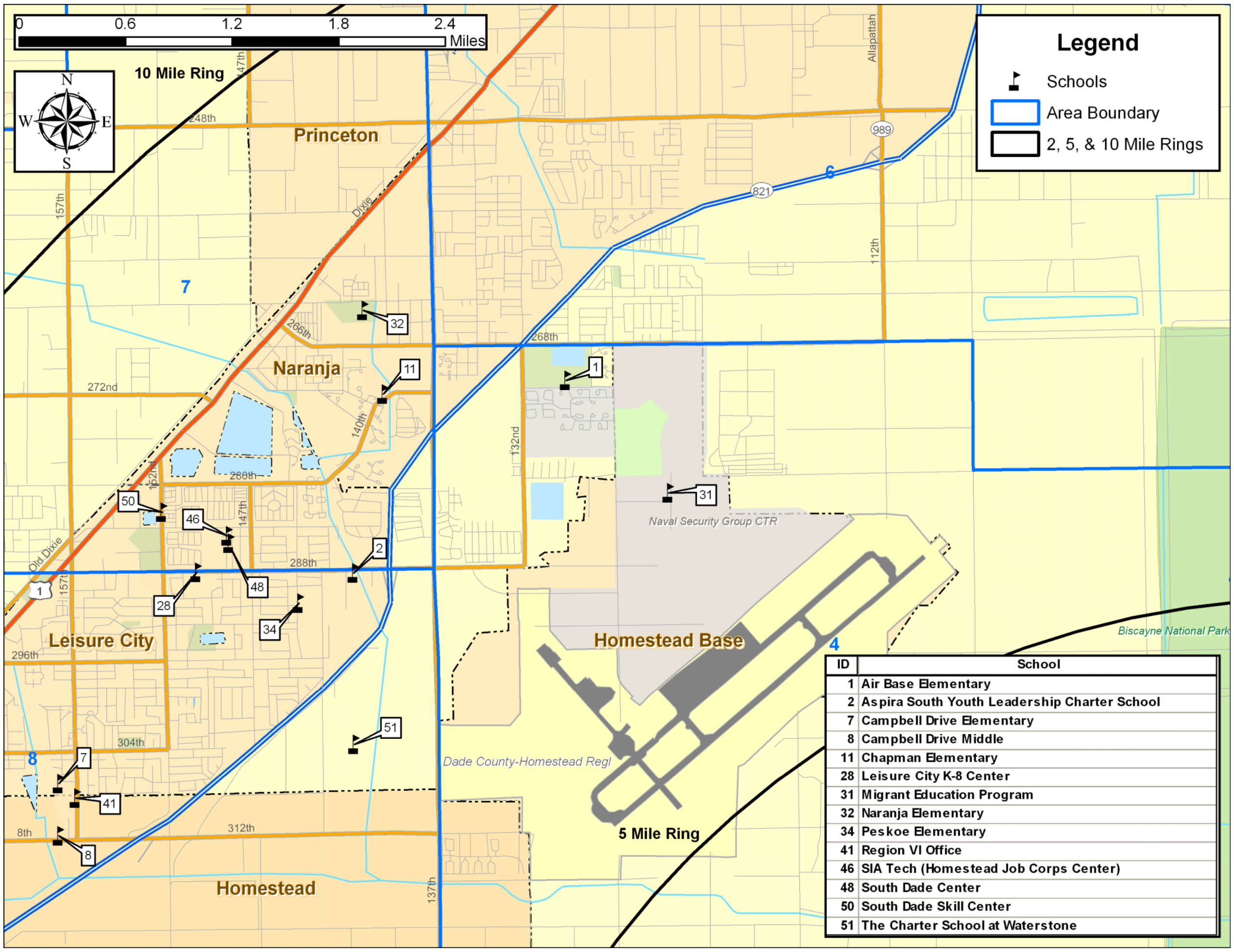


Figure E-3. Schools within Leisure City and Naranja



ID	School
1	Air Base Elementary
2	Aspira South Youth Leadership Charter School
7	Campbell Drive Elementary
8	Campbell Drive Middle
11	Chapman Elementary
28	Leisure City K-8 Center
31	Migrant Education Program
32	Naranja Elementary
34	Peskoe Elementary
41	Region VI Office
46	SIA Tech (Homestead Job Corps Center)
48	South Dade Center
50	South Dade Skill Center
51	The Charter School at Waterstone

Figure E-4. Schools within Cutler Ridge

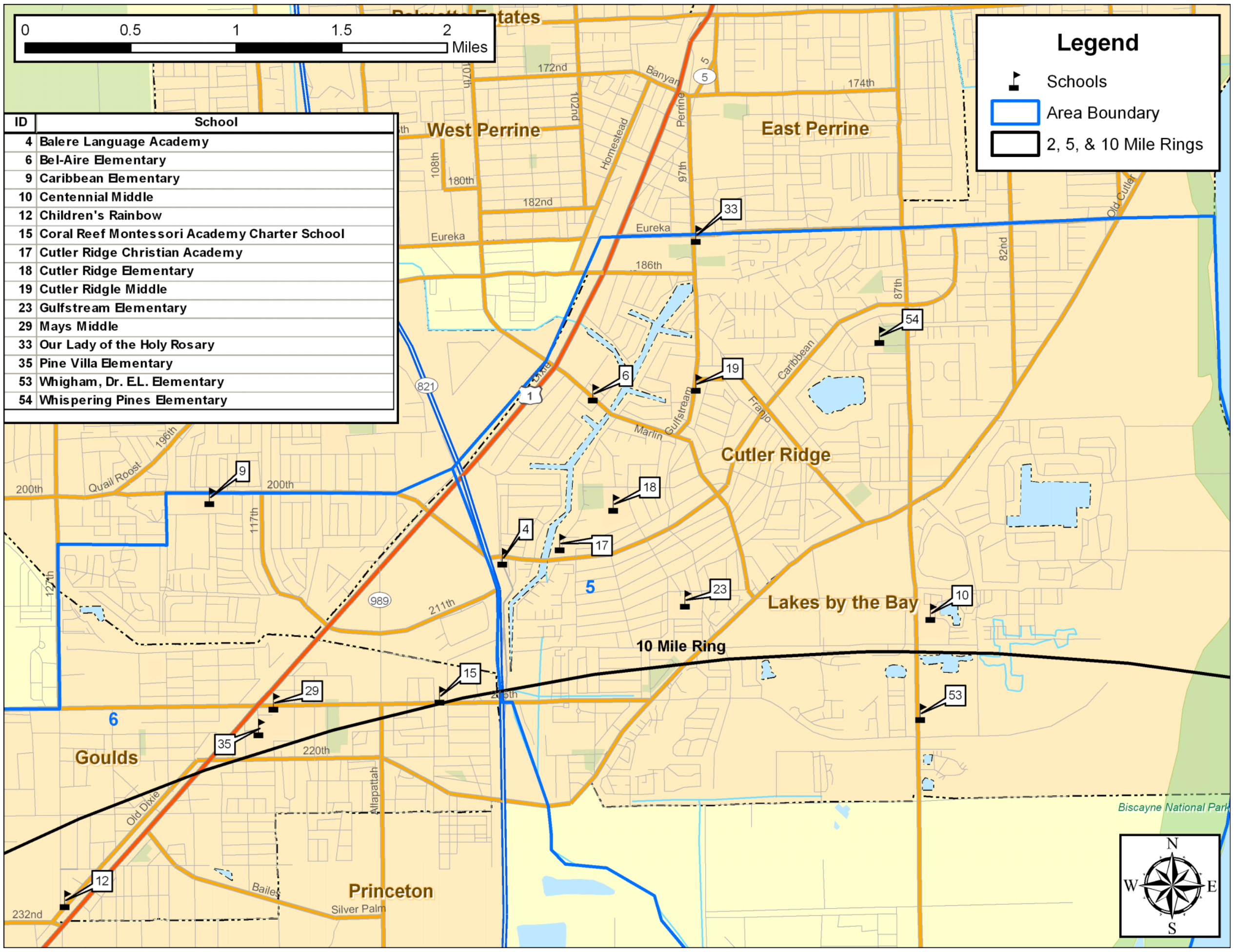


Figure E-5. Overview of Major Employers within the Turkey Point EPZ

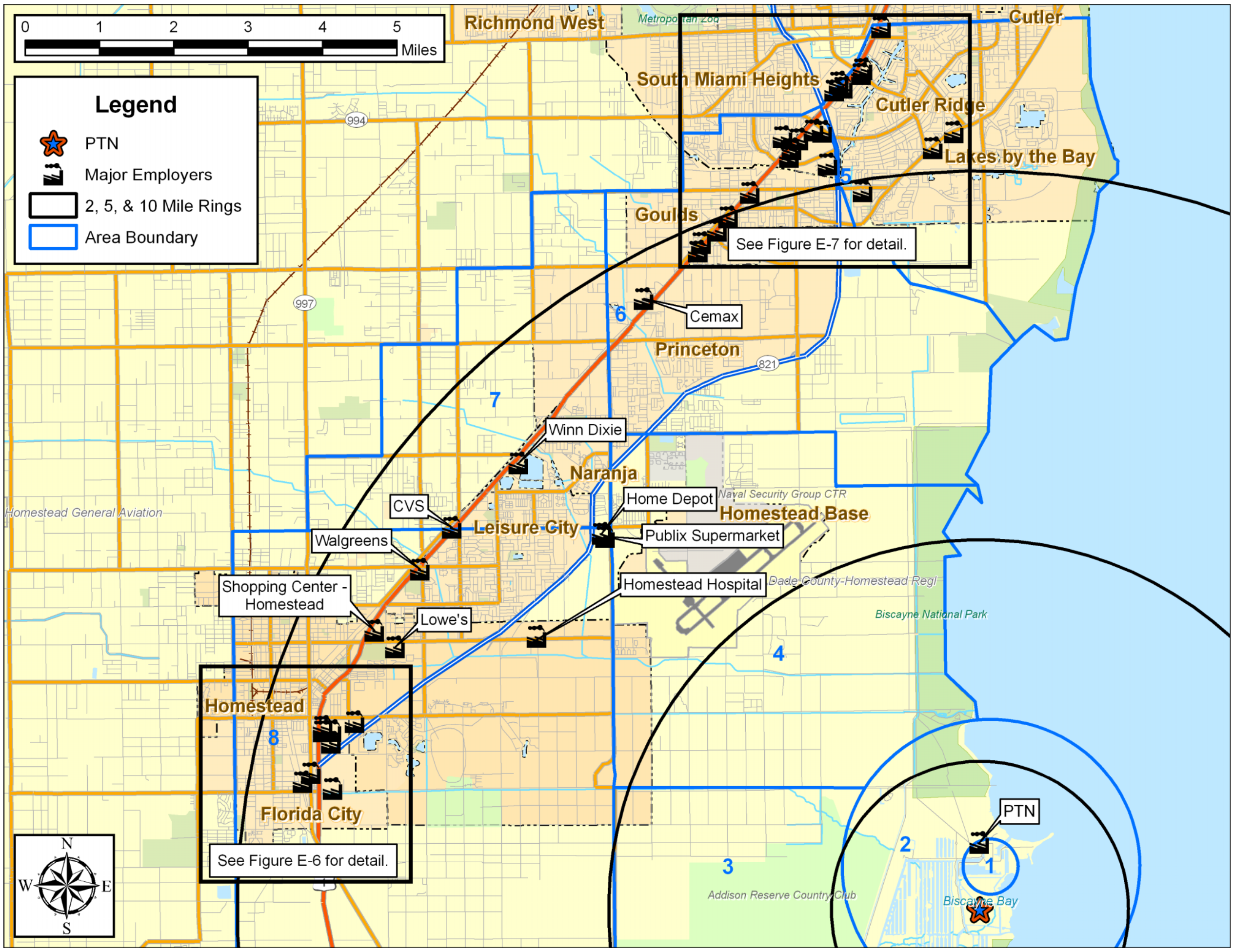


Figure E-6. Major Employers within Homestead and Florida City

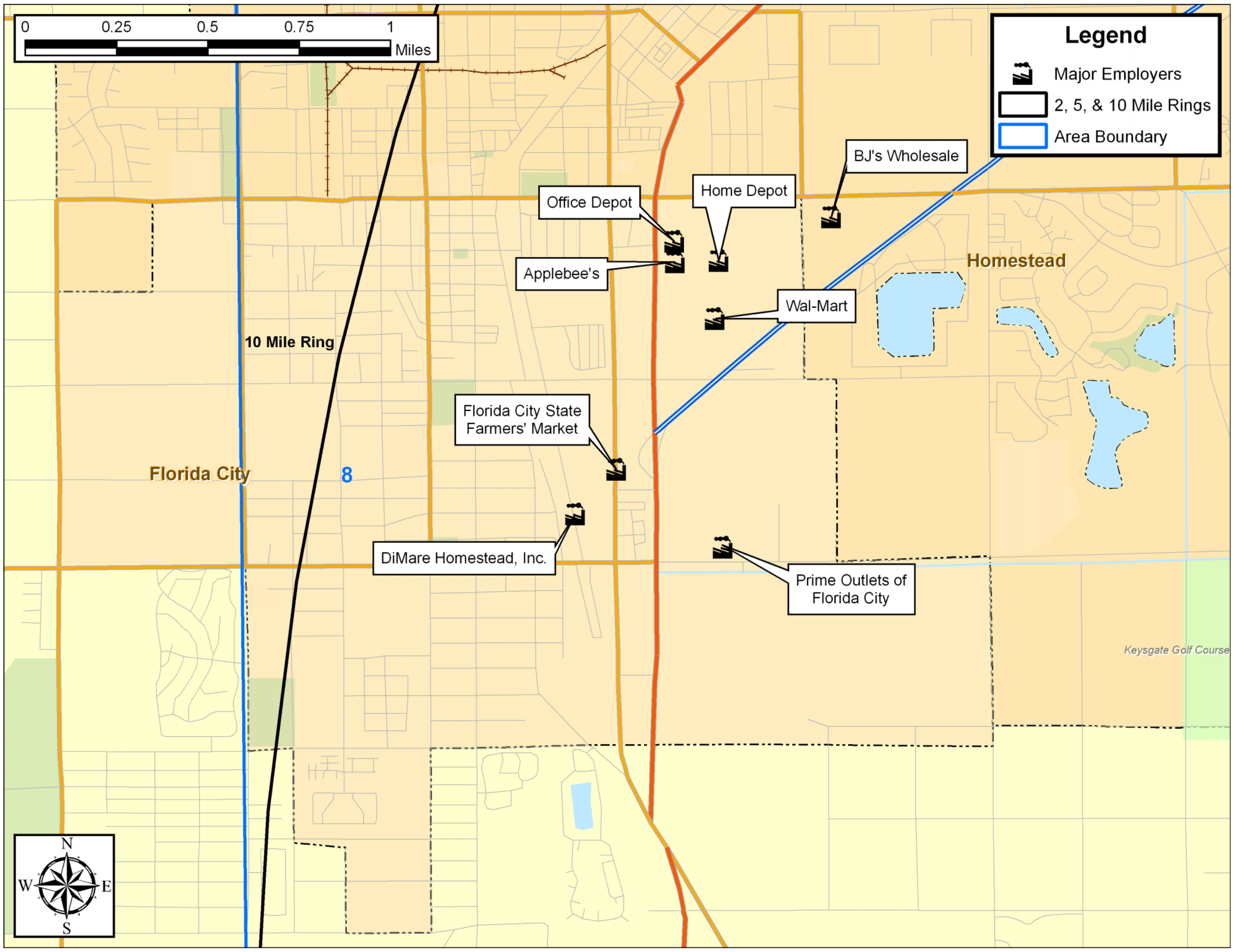


Figure E-7. Major Employers within Cutler Ridge

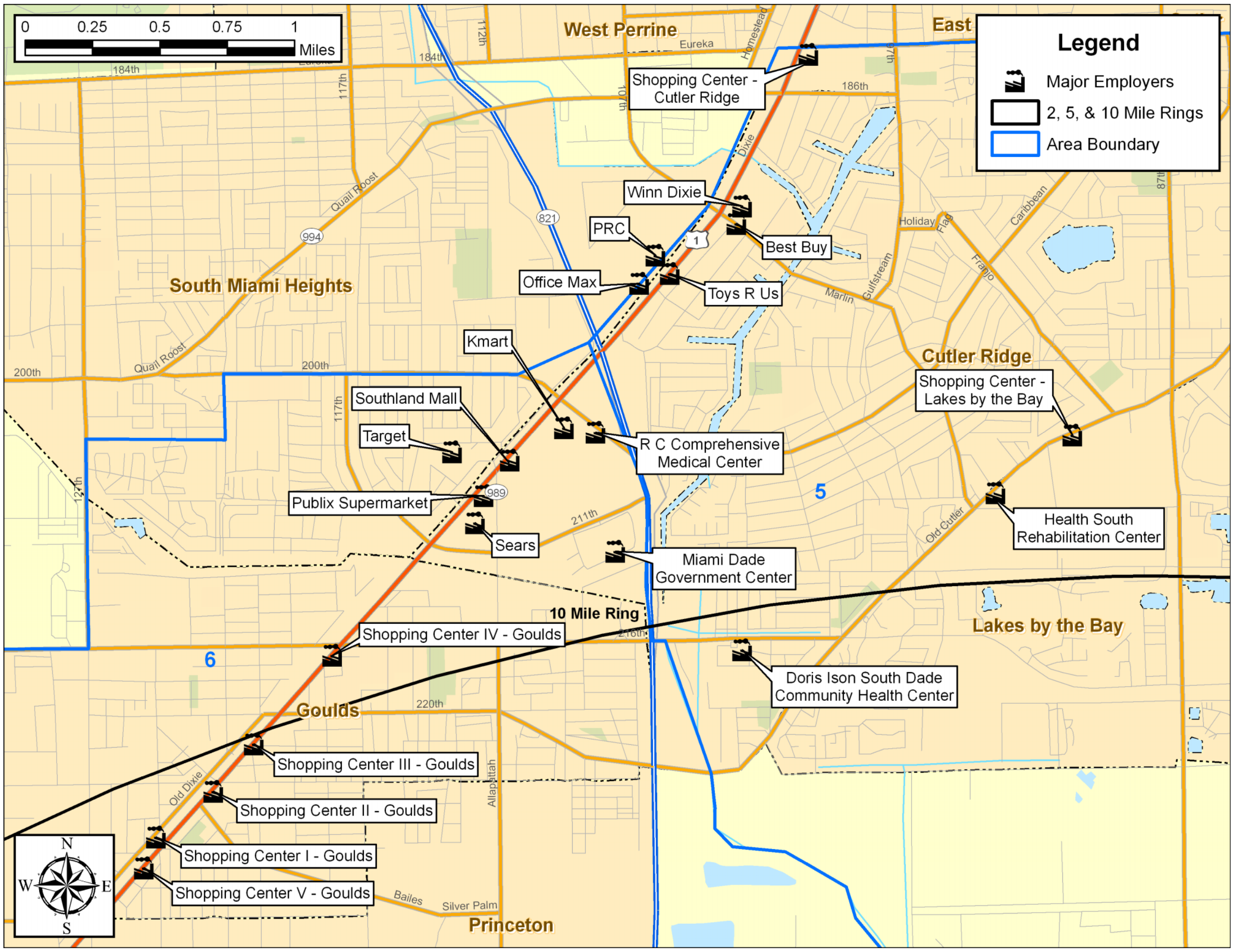


Figure E-8. Lodging Facilities within the Turkey Point EPZ

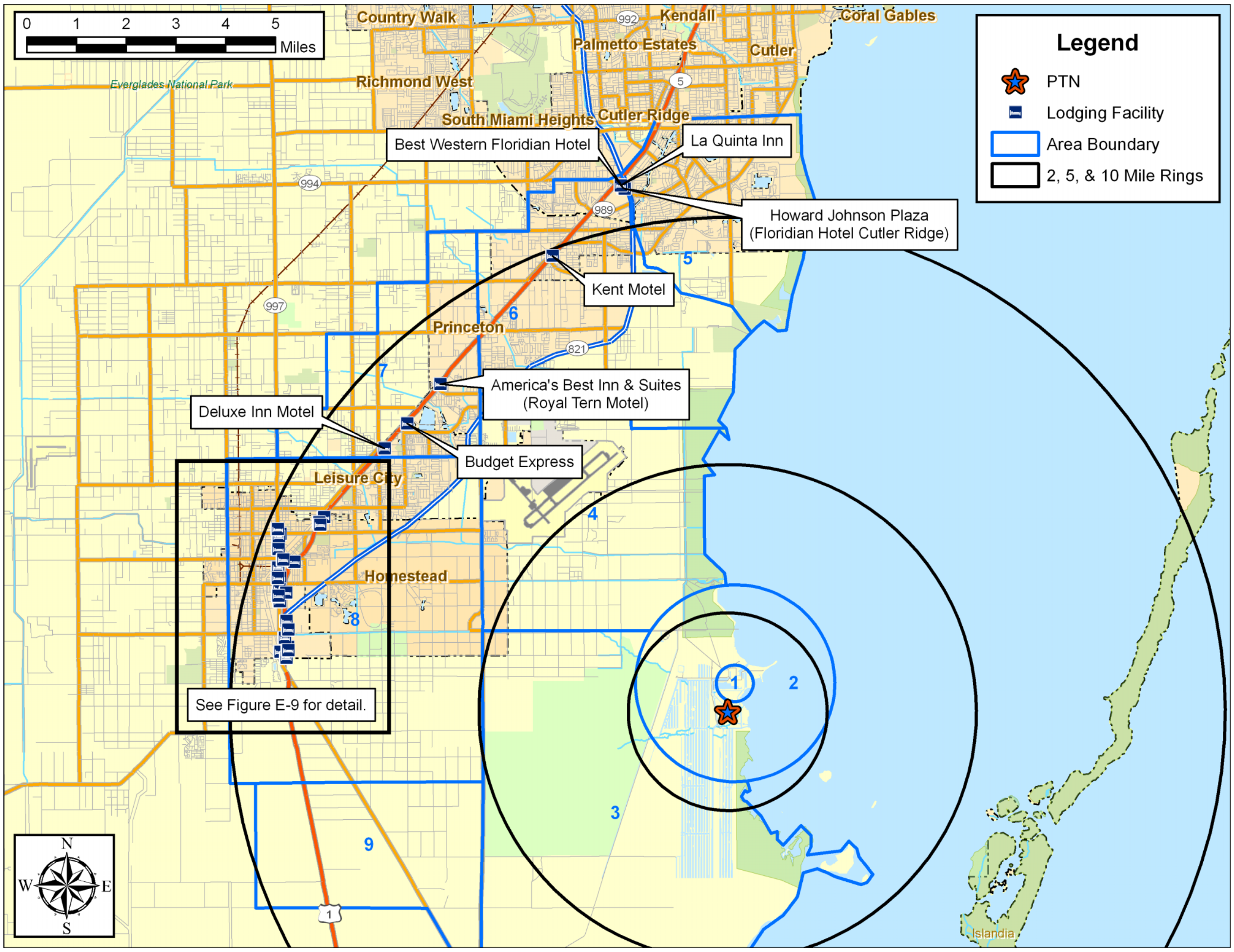


Figure E-9. Lodging Facilities within Homestead and Florida City

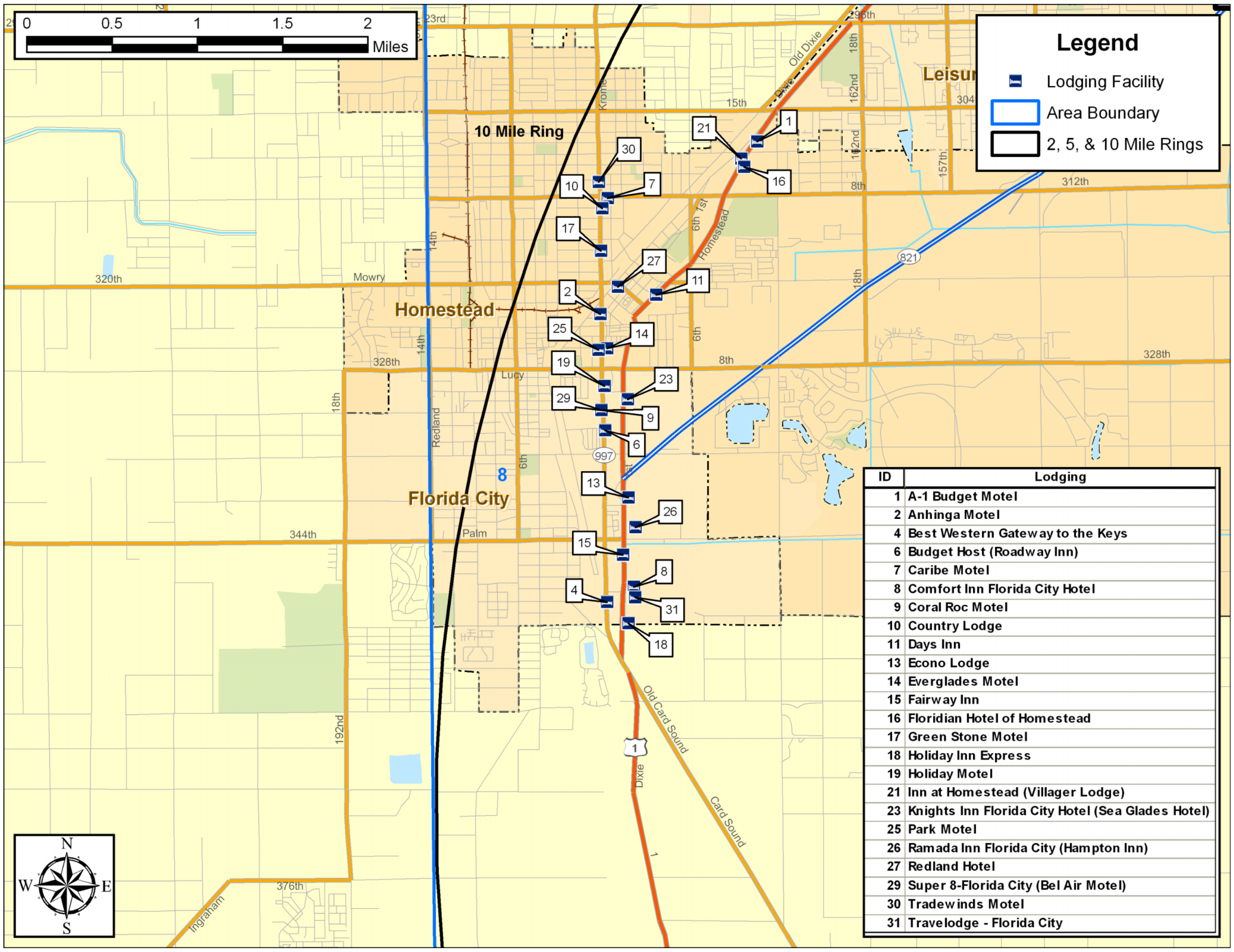


Figure E-10. Parks, Golf Courses, and Major Retail Facilities within the Turkey Point EPZ

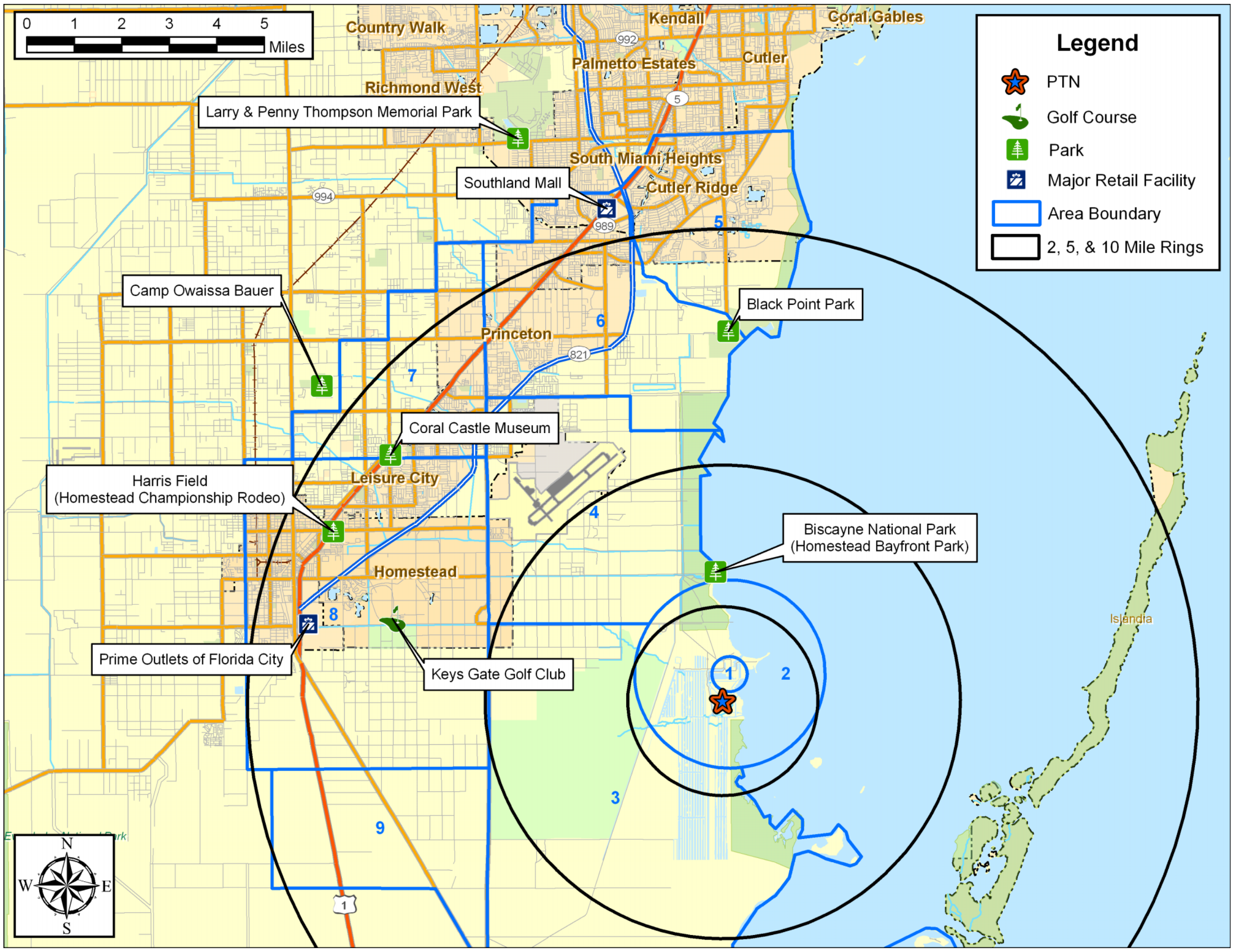


Figure E-11. Marinas within the Turkey Point EPZ

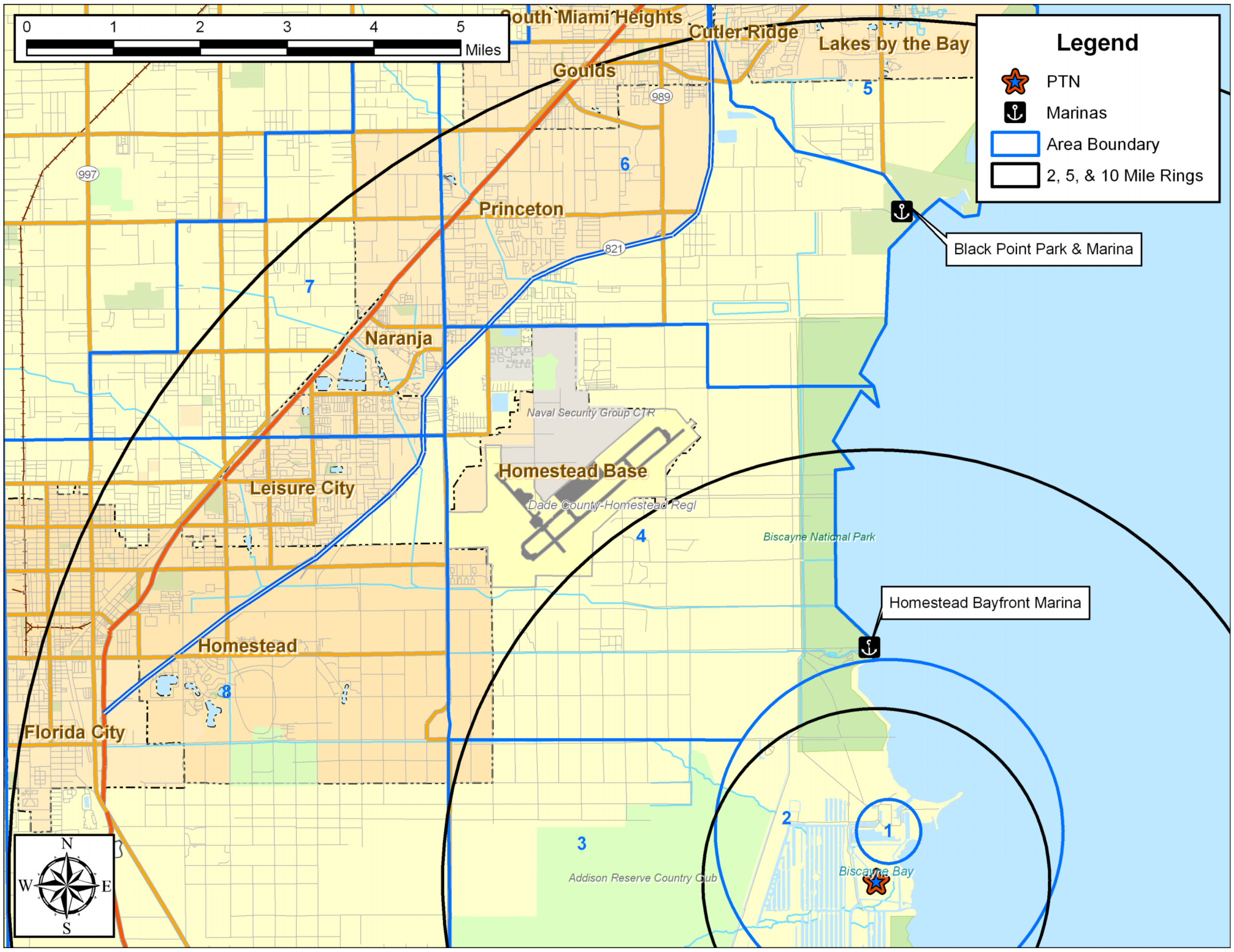


Figure E-12. Medical Facilities, Nursing Homes, and Correctional Facilities within the Turkey Point EPZ

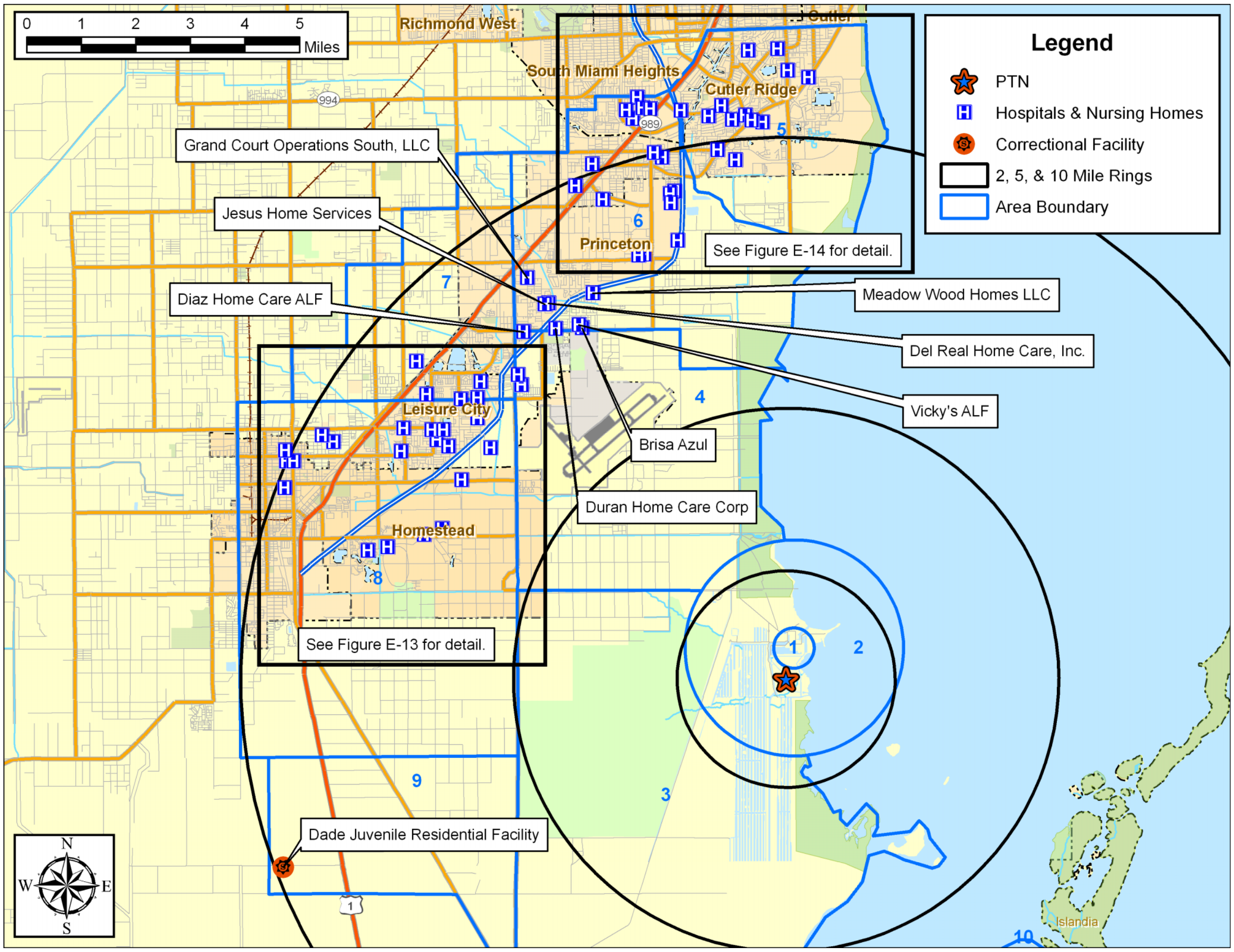


Figure E-13. Medical Facilities, Nursing Homes, and Correctional Facilities within Leisure City, Homestead, and Florida City

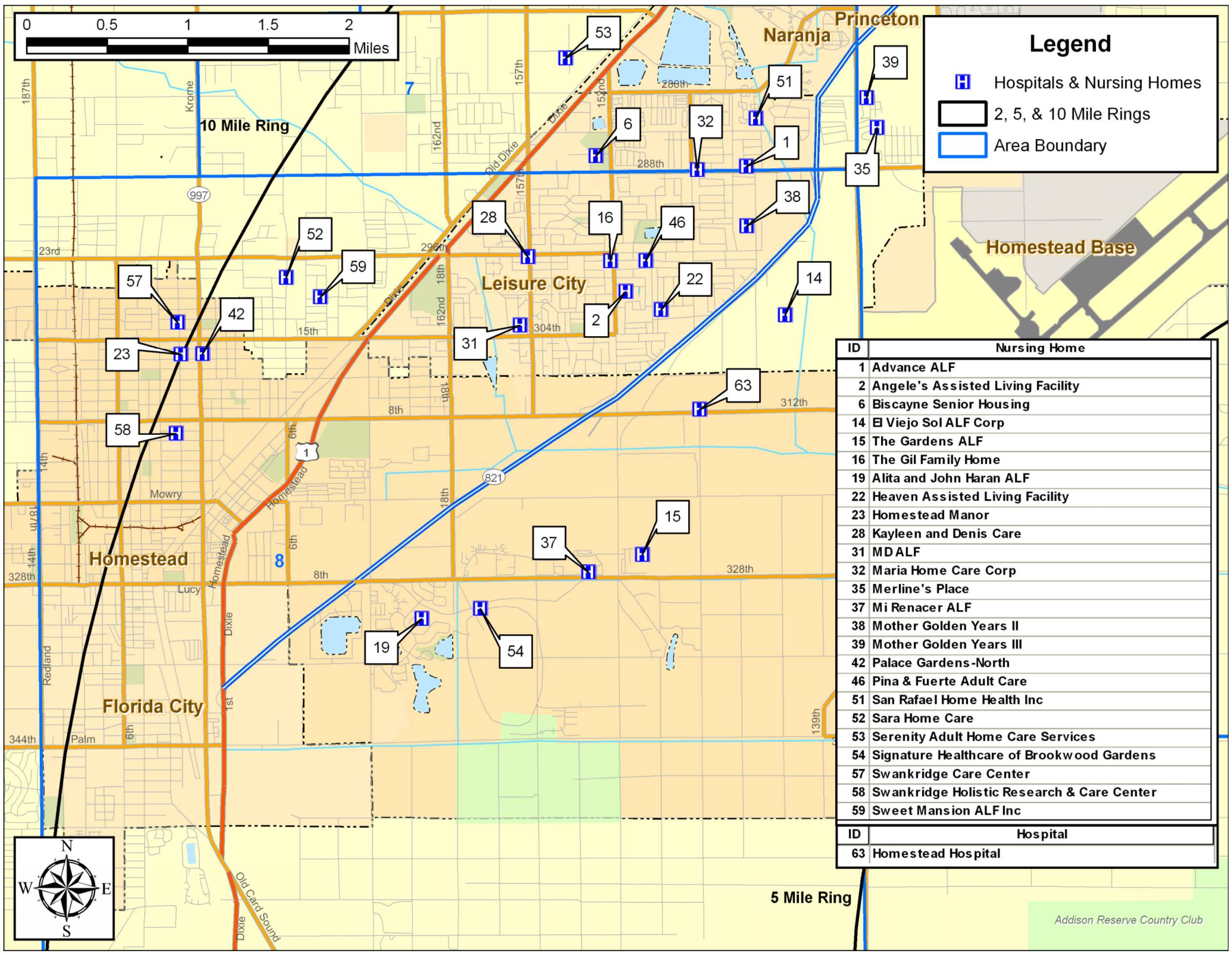
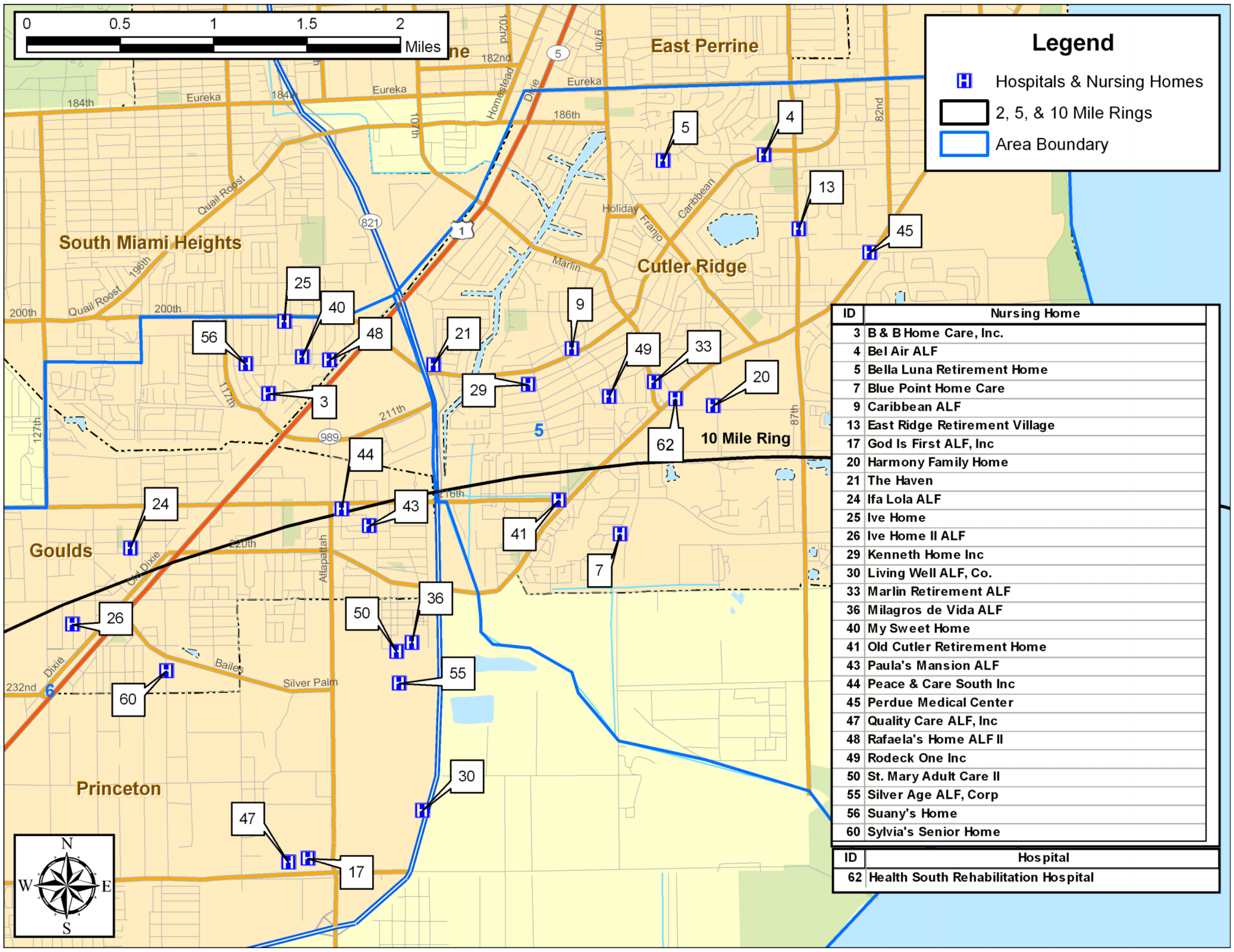


Figure E-14. Medical Facilities, Nursing Homes, and Correctional Facilities within Cutler Ridge



APPENDIX F
TELEPHONE SURVEY

Appendix F
Telephone Survey

Introduction

The development of evacuation time estimates for the EPZ of the Turkey Point Nuclear Power Plant requires the identification of travel patterns, car ownership, and household size of the population in the EPZ. Demographic information is provided by Census data. The use of this data has several limitations when applied to emergency planning. First, the Census data does not encompass the range of information needed to identify the time required for preliminary activities that must be undertaken before evacuating the area. Secondly, the Census data does not contain attitudinal responses needed from the population of the EPZ and consequently may not accurately represent the anticipated behavioral characteristics of the evacuating populace.

These concerns are addressed by a telephone survey. The survey is designed to elicit information from the public concerning family demographics and estimates of response times to well-defined events. The design of the survey includes a limited number of questions on the form, *What would you do if …?* and other questions regarding activities with which the respondent is familiar (*How long does it take you to …?*).

Survey Instrument And Sampling Plan

Attachment A presents the final survey instrument. A draft of the instrument was submitted to the EPZ counties and to FPL for comment. Comments were received and the survey instrument was modified accordingly.

Following the completion of the instrument, a sampling plan was developed. A sample size of approximately 550 completed survey forms yields results with an acceptable sampling error. The sample must be drawn from the EPZ population. Consequently, a list of EPZ zip codes was developed. This list is shown in Table F-1. Along with each zip code, an estimate of the population in each area was determined. The proportional number of the desired completed survey interviews for each area was identified as shown in Table F-1. The completed survey adhered to the sampling plan.

Survey Results

The results of the survey fall into two categories. First, the household demographics of the area can be identified. Demographic information includes such factors as household size, automobile ownership, and automobile availability. The distributions of the time to perform certain pre-evacuation activities are the second category of survey results. This data is processed to develop the trip generation distributions used in the evacuation modeling effort.

Household Demographic Results

Household Size

Figure F-1 presents the distribution of household size in the EPZ. The average household contains 3.13 people. The estimated household size (3.25 people) used to determine the survey sample (Table F-1) was drawn from Census data. The close agreement between the average household size obtained from the survey and the Census value is an indication of the reliability of the survey.

Automobile Ownership

The average number of automobiles per household in the EPZ is 1.89. It should be noted that approximately 7 percent of households do not have access to an automobile. The distribution of automobile ownership is presented in Figure F-2. Figures F-3 and F-4 present the automobile availability by household size. Note that the majority of households without access to a car are single person households. As expected, nearly all households of two or more people have access to at least one vehicle.

School Children

The average number of school children per household identified by the survey is 0.81. Figure F-5 presents the distribution of school children.

Commuters

Figure F-6 presents the distribution of the number of commuters in each household. The data shows an average of 1.19 commuters in each household in the EPZ.

Commuter Travel Modes

Figure F-7 presents the mode of travel that commuters use on a daily basis. The vast majority of commuters use their private automobiles to travel to work or school.

Evacuation Response

Several questions were asked which are used to gauge the population's response to an emergency. The first of these asked, *How many of the vehicles that are usually available to the household would your family use during an evacuation?* The response is shown in Figure F-8. On average, 1.37 vehicles per household would be used for evacuation purposes.

The second evacuation response question asked was, *When the commuters are away from home, is there a vehicle at home that is available for evacuation during an emergency?* Of the survey participants who responded, 59 percent said that there was another vehicle available to evacuate, while 41 percent answered that there would be no vehicle available for evacuation.

The third evacuation response question was, *Would your family await the return of other family members prior to evacuating the area?* Of the survey participants who responded, 71 percent said they would wait for the return of other family members before evacuating, and 29 percent indicated that they would not wait for the return of other family members.

The fourth evacuation response question was, *Would you take household pets with you if you were asked to evacuate the area?* As shown in Figure F-9, 49 percent of respondents said they would take their pets; 16 percent would not; and the remaining 35 percent either did not have a pet, or did not give a definitive answer.

Time Distribution Results

The survey asked several questions about the amount of time it takes to perform certain pre-evacuation activities. These activities involve actions taken by residents during the course of their day-to-day lives. Consequently, the answers fall within the realm of the responder's experience.

How long does it take the commuter to complete preparation for leaving work?

Figure F-10 presents the cumulative distributions for the EPZ. In nearly all cases, the activity is completed by about 90 minutes. Fifty percent can leave in 15 minutes.

How long would it take the commuter to travel home?

Figure F-11 presents the work-to-home travel time for the EPZ. In all cases, over 80 percent of commuters can arrive home in approximately 45 minutes after leaving work; nearly everybody in 90 minutes.

How long would it take the family to pack clothing, secure the house, and load the car?

Figure F-12 presents the time required to prepare for leaving on an evacuation trip. In many ways, this activity mimics a family's preparation for a short holiday or weekend away from home. The responses represent the experience of the responder in performing similar activities.

The distribution shown in Figure F-12 has a long tail. Sixty-four percent of households can be ready to leave home in an hour and 90 percent of households can be ready to leave in 3 hours. The remaining households require up to an additional 3 hours to complete home preparation.

Conclusions

The telephone survey provides valuable, relevant data that has been used to quantify mobilization time that can influence evacuation time estimates.

Table F-1
Turkey Point Telephone Survey Sampling Plan

Zip Code	Population (2000)	Households in EPZ	Required Sample
33030	21,955	6,518	83
33031	1,574	519	7
33032	19,520	5,488	70
33033	32,224	9,485	120
33034	9,900	3,001	38
33035	2,763	1,091	14
33037	932	511	6
33039	446	13	1
33157	13,378	4,679	59
33170	5,667	1,607	20
33177	6,265	1,643	21
33189	22,051	7,392	94
33190	3,993	1,356	17
TOTAL	140,668	43,303	550
Average Household Size			3.25
Total Sample Required			550

Figure F-1. Household Size in the EPZ

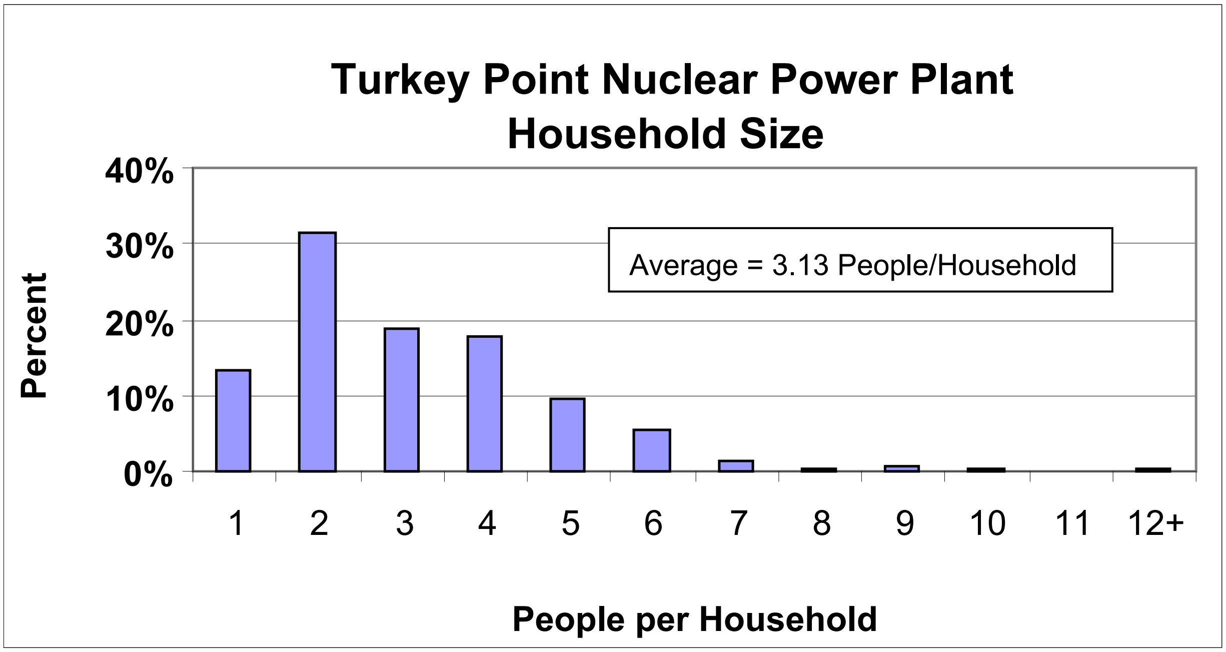


Figure F-2. Household Vehicle Availability

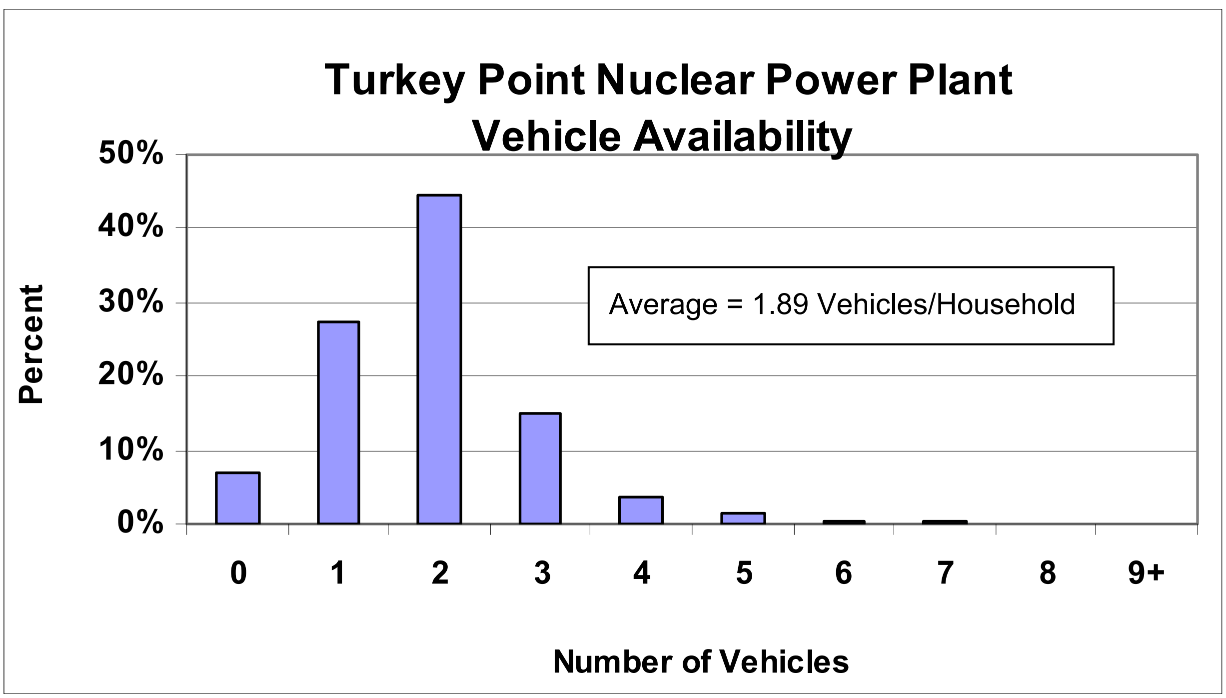


Figure F-3. Vehicle Availability — 1- to 4-Person Households

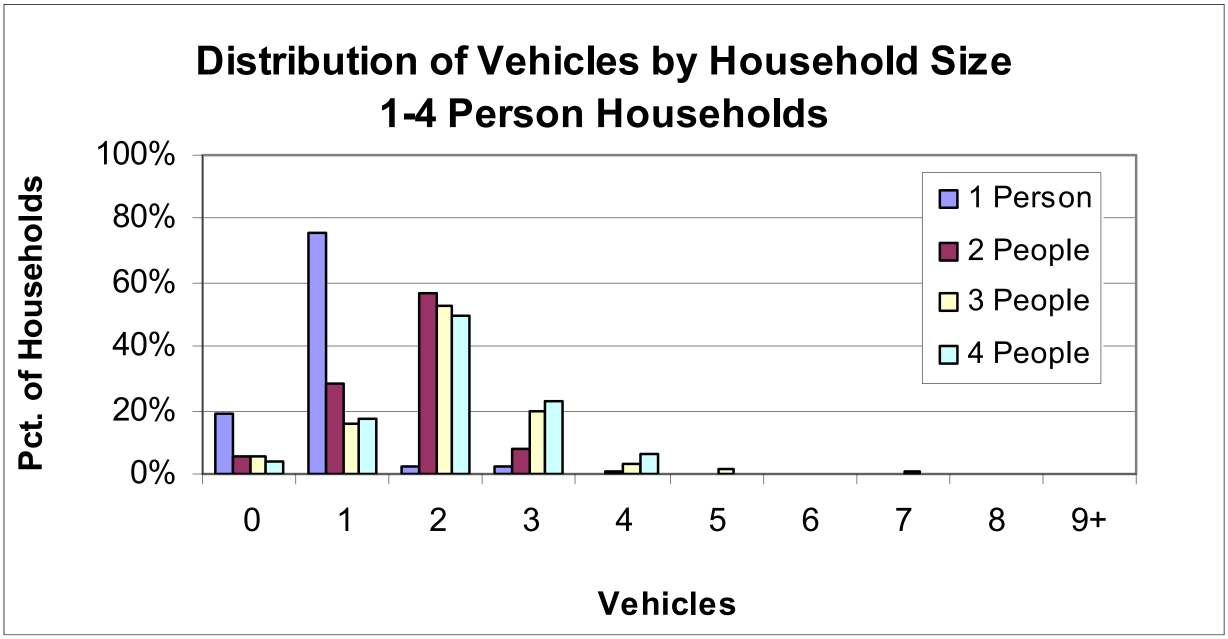


Figure F-4. Vehicle Availability — 5- to 8-Person Households

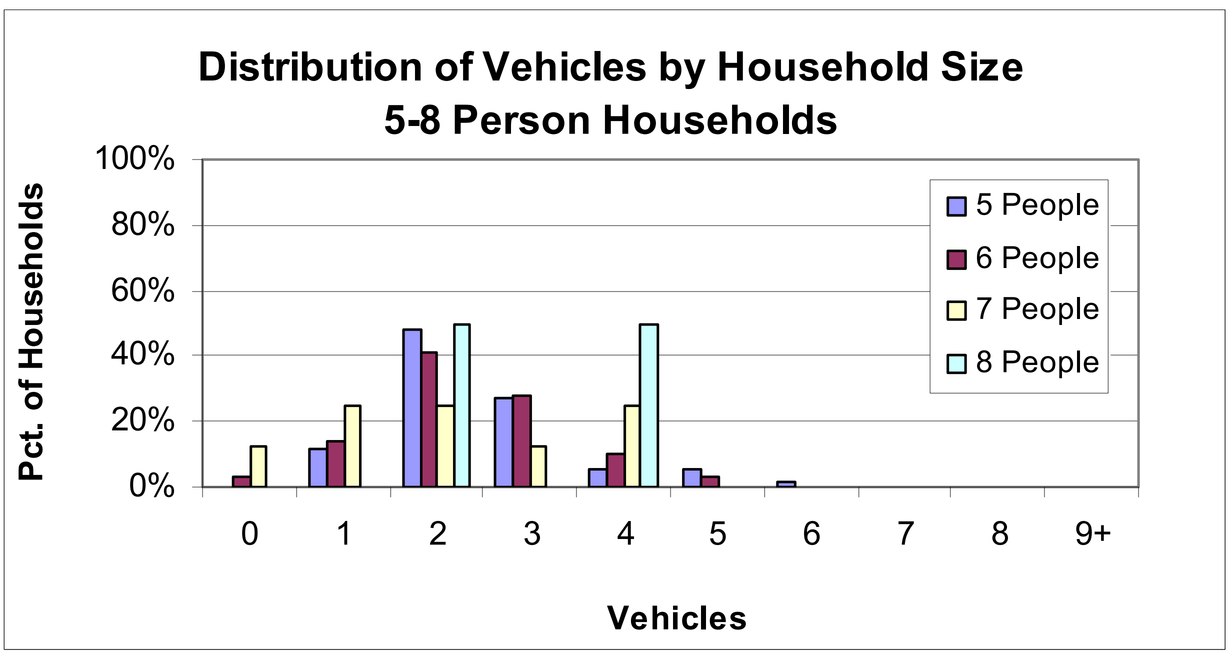


Figure F-5. School Children in Households

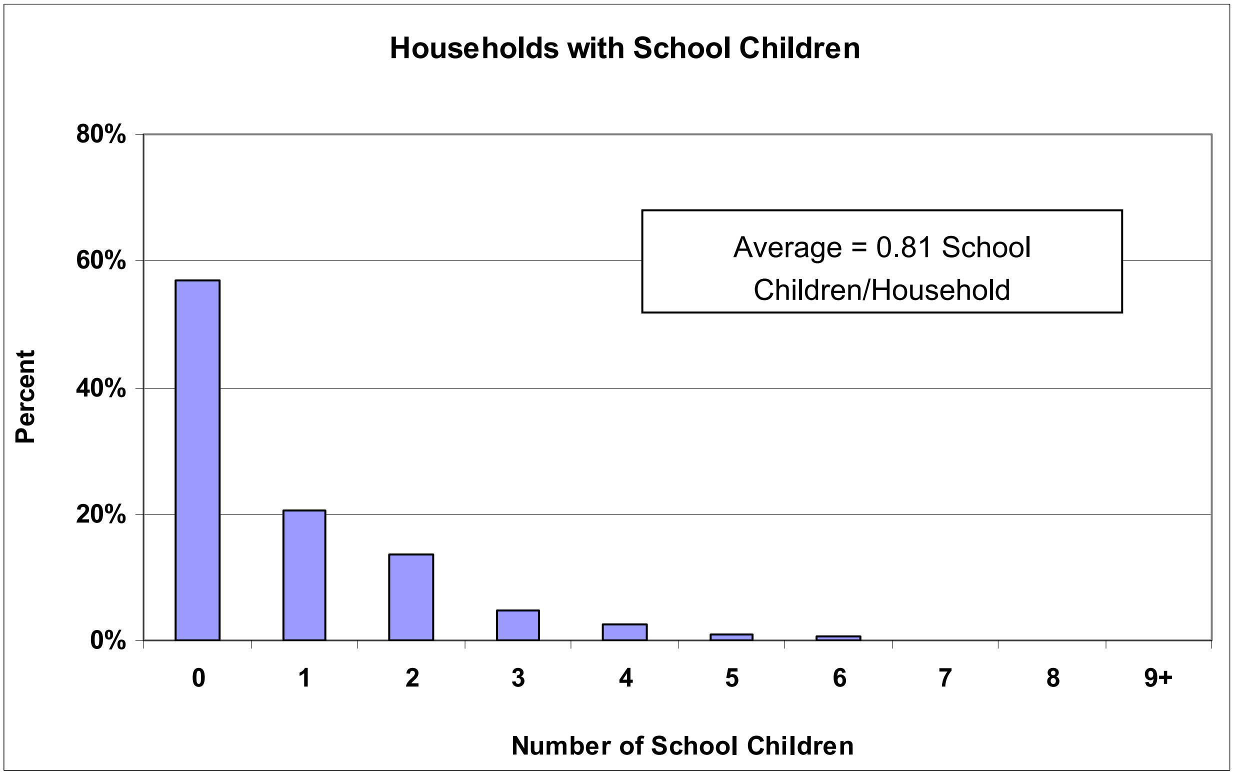


Figure F-6. Commuters in Households in the EPZ

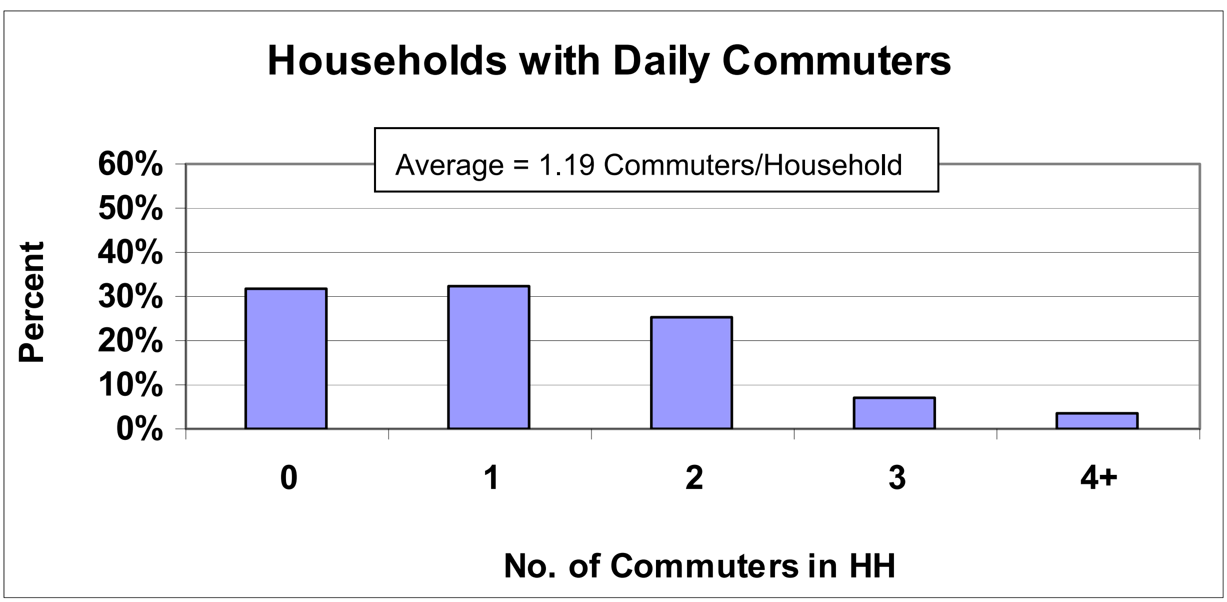


Figure F-7. Modes of Travel in the EPZ

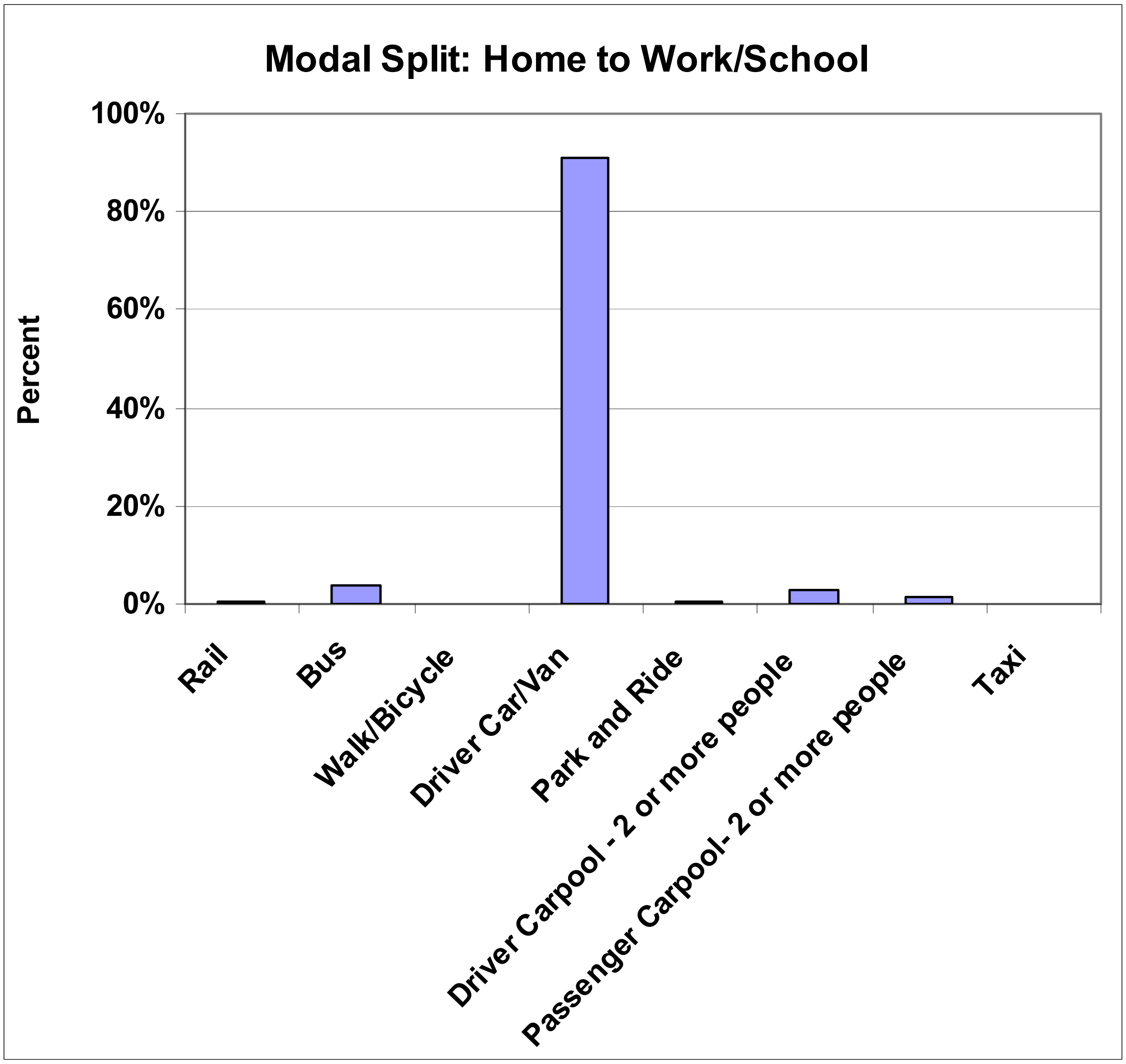


Figure F-8. Number of Vehicles Used for Evacuation

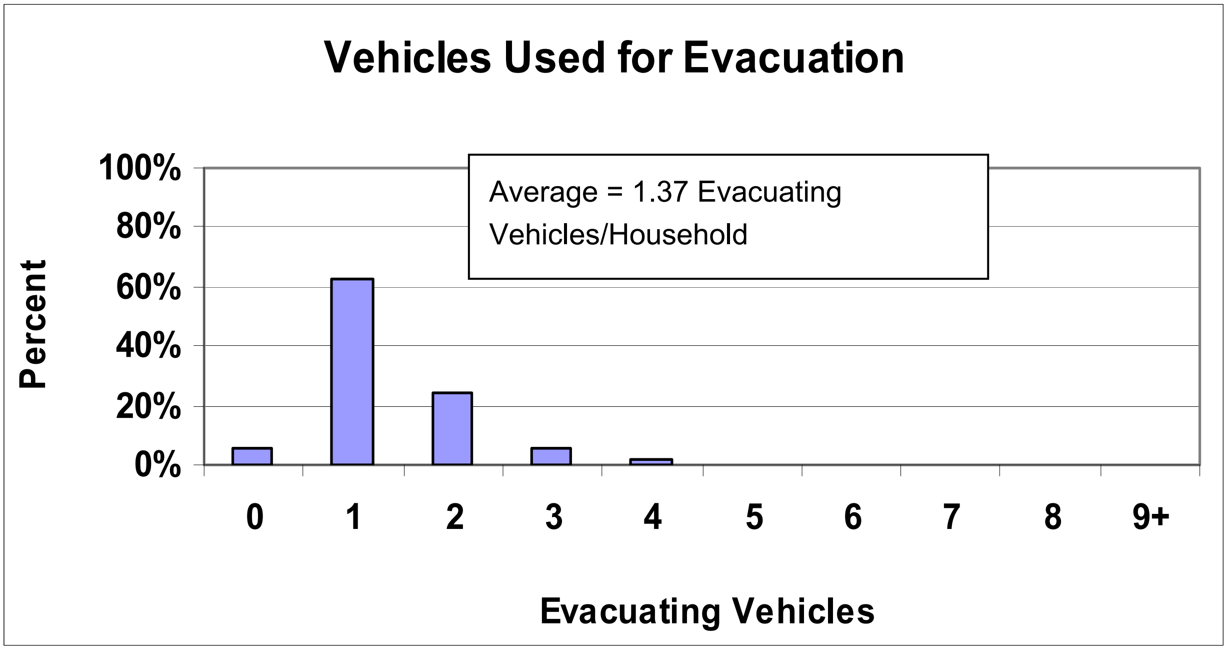


Figure F-9. Households Evacuating with Pets

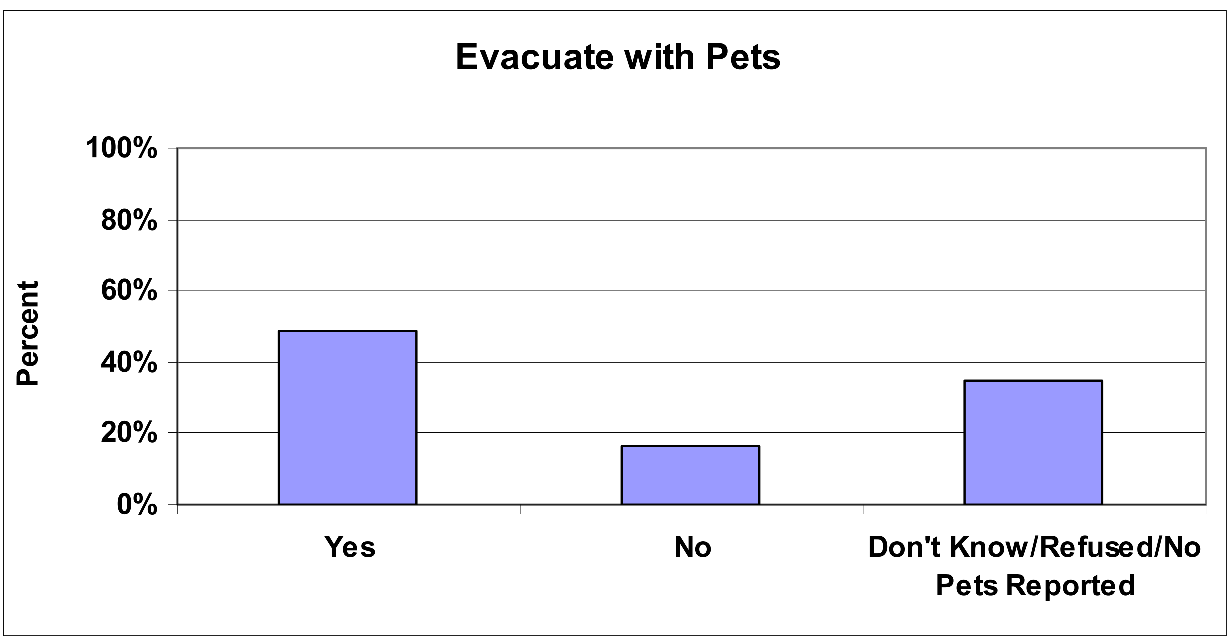


Figure F-10. Time Required to Prepare to Leave Work/School

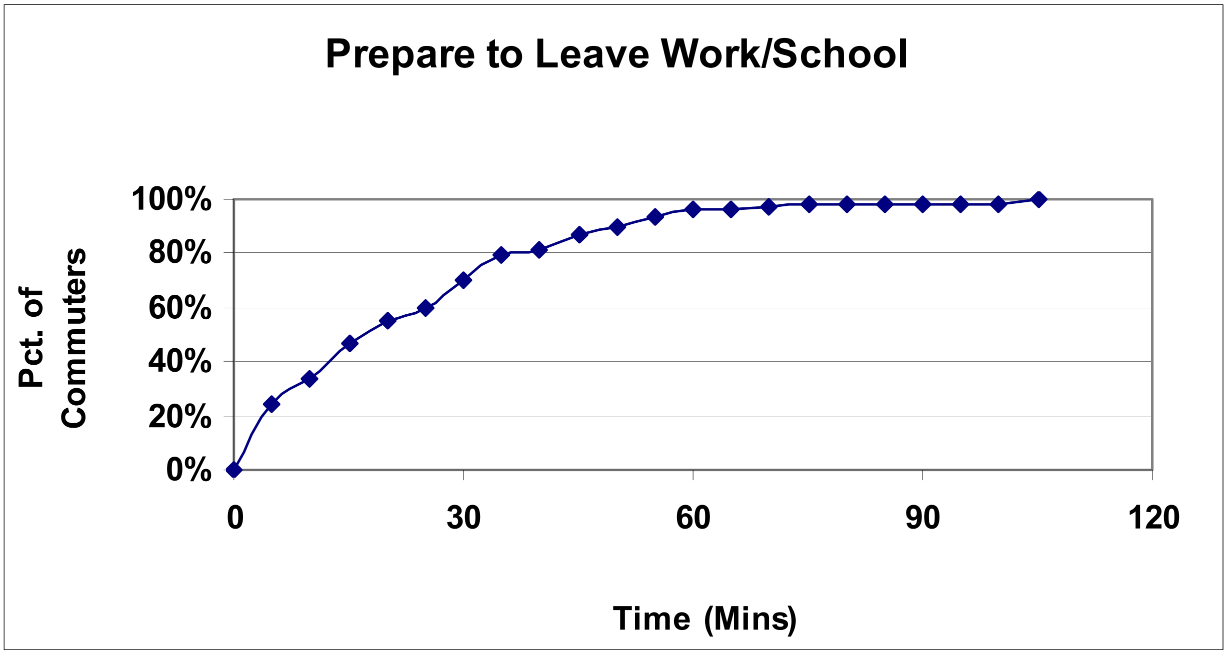


Figure F-11. Work-to-Home Travel Time

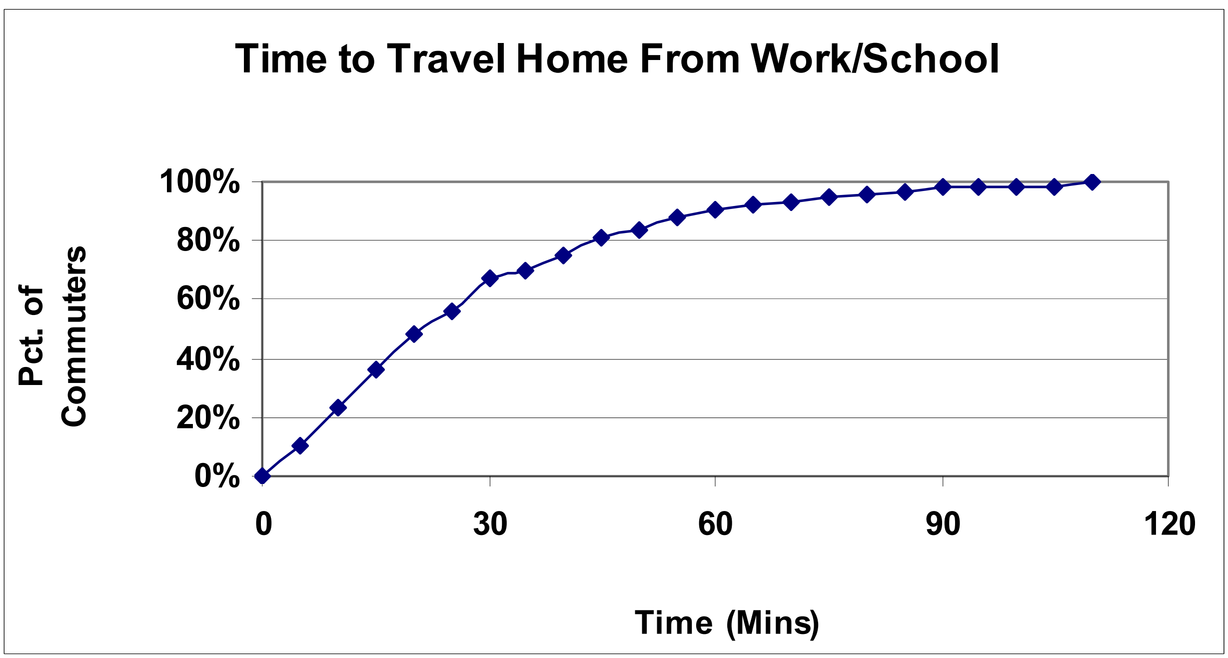
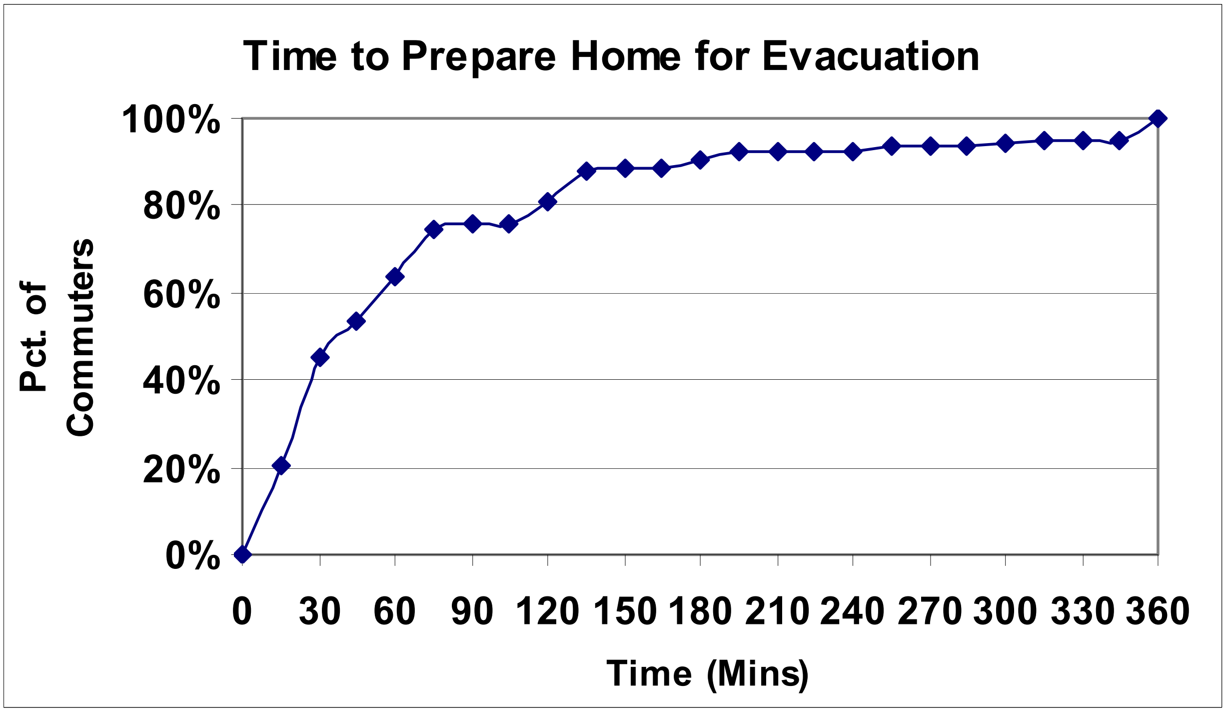


Figure F-12. Time to Prepare Home for Evacuation



Attachment A
Telephone Survey Instrument

Survey Instrument

Hello, my name is _______________ and I'm doing a survey to be used for emergency plans in response to hazards that **are not weather-related**.	**COL.1**	Unused
	COL.2	Unused
	COL.3	Unused
I am working for [INSERT MARKETING FIRM NAME]. Your answers will help identify local travel patterns.	**COL.4**	Unused
The information obtained will be used in a traffic engineering study and in connection with an update of the county's emergency response plans.	**COL.5**	Unused
Your participation in this survey will greatly enhance the county's emergency preparedness program.	Sex	**COL. 8** 1 Male 2 Female

INTERVIEWER: ASK TO SPEAK TO THE HEAD OF HOUSEHOLD OR THE SPOUSE OF THE HEAD OF HOUSEHOLD. (Terminate call if not a residence)

DO NOT ASK:

1A. Record area code. To Be Determined **COL. 9-11**

1B. Record exchange number. To Be Determined **COL. 12-14**

---

2. What is your home Zip Code **Col. 15-19**

3. In total, how many cars, or other vehicles are usually available to the household? (DO NOT READ ANSWERS.)

COL.20
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
0 ZERO (NONE)
X REFUSED

---

4. How many people usually live in this household? (DO NOT READ ANSWERS.)

COL.21	**COL.22**
1 ONE	0 TEN
2 TWO	1 ELEVEN
3 THREE	2 TWELVE
4 FOUR	3 THIRTEEN
5 FIVE	4 FOURTEEN
6 SIX	5 FIFTEEN
7 SEVEN	6 SIXTEEN
8 EIGHT	7 SEVENTEEN
9 NINE	8 EIGHTEEN
9 NINETEEN OR MORE	X REFUSED

5. How many children living in this household go to local public, private, or parochial schools? (DO NOT READ ANSWERS.)

COL.23
0 ZERO
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
X REFUSED

---

6. How many people in the household commute to a job, or to college, at least 4 times a week?

COL.24		SKIP TO
0	ZERO	Q. 12
1	ONE	Q. 7
2	TWO	Q. 7
3	THREE	Q. 7
4	FOUR OR MORE	Q. 7
5	DON'T KNOW/REFUSED	Q. 12

INTERVIEWER: For each person identified in Question 6, ask Questions 7, 8, 9, and 10.

7. Thinking about commuter #1, how does that person usually travel to work or college? (REPEAT QUESTION FOR EACH COMMUTER.)

	Commuter #1 **COL.25**	Commuter #2 **COL.26**	Commuter #3 **COL.27**	Commuter #4 **COL.28**
Rail	1	1	1	1
Bus	2	2	2	2
Walk/Bicycle	3	3	3	3
Driver Car/Van	4	4	4	4
Park & Ride (Car/Rail, Xpress_bus)	5	5	5	5
Driver Carpool-2 or more people	6	6	6	6
Passenger Carpool-2 or more people	7	7	7	7
Taxi	8	8	8	8
Refused	9	9	9	9

---

8. What is the name of the city, town or community in which Commuter #1 works or attends school? (REPEAT QUESTION FOR EACH COMMUTER.) (FILL IN ANSWER.)

COMMUTER #1			COMMUTER #2			COMMUTER #3			COMMUTER #4		
City/Town		State	City/Town		State	City/Town		State	City/Town		State
COL.29	**COL.30**	**COL.31**	**COL.32**	**COL.33**	**COL.34**	**COL.35**	**COL.36**	**COL.37**	**COL.38**	**COL.39**	**COL.40**
0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

9. How long would it take Commuter #1 to travel home from work or college? (REPEAT QUESTION FOR EACH COMMUTER.) (DO NOT READ ANSWERS.)

COMMUTER #1

COL.41
1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.42
1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

COMMUTER #2

COL.43
1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.44
1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

COMMUTER #3

COL.45
1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.46
1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES –
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

COMMUTER #4

COL.47
1 5 MINUTES OR LESS
2 6-10 MINUTES
3 11-15 MINUTES
4 16-20 MINUTES
5 21-25 MINUTES
6 26-30 MINUTES
7 31-35 MINUTES
8 36-40 MINUTES
9 41-45 MINUTES

COL.48
1 46-50 MINUTES
2 51-55 MINUTES
3 56 - 1 HOUR
4 OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5 BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6 BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7 BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8 OVER 2 HOURS (SPECIFY _____)
9
0
X DON'T KNOW/REFUSED

10. Approximately how long does it take Commuter #1 to complete preparation for leaving work or college prior to starting the trip home? (REPEAT QUESTION FOR EACH COMMUTER.) (DO NOT READ ANSWERS.)

COMMUTER #1

COL. 49		COL. 50	
1	5 MINUTES OR LESS	1	46-50 MINUTES
2	6-10 MINUTES	2	51-55 MINUTES
3	11-15 MINUTES	3	56 - 1 HOUR
4	16-20 MINUTES	4	OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5	21-25 MINUTES	5	BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6	26-30 MINUTES	6	BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7	31-35 MINUTES	7	BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8	36-40 MINUTES	8	OVER 2 HOURS (SPECIFY _____)
9	41-45 MINUTES	9	
		0	
		X	DON'T KNOW/REFUSED

COMMUTER #2

COL.51		COL. 52	
1	5 MINUTES OR LESS	1	46-50 MINUTES
2	6-10 MINUTES	2	51-55 MINUTES
3	11-15 MINUTES	3	56 - 1 HOUR
4	16-20 MINUTES	4	OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5	21-25 MINUTES	5	BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6	26-30 MINUTES	6	BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7	31-35 MINUTES	7	BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8	36-40 MINUTES	8	OVER 2 HOURS (SPECIFY _____)
9	41-45 MINUTES	9	
		0	
		X	DON'T KNOW/REFUSED

COMMUTER #3

COL. 53		COL. 54	
1	5 MINUTES OR LESS	1	46-50 MINUTES
2	6-10 MINUTES	2	51-55 MINUTES
3	11-15 MINUTES	3	56 - 1 HOUR
4	16-20 MINUTES	4	OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES -
5	21-25 MINUTES	5	BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6	26-30 MINUTES	6	BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7	31-35 MINUTES	7	BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8	36-40 MINUTES	8	OVER 2 HOURS (SPECIFY _____)
9	41-45 MINUTES	9	
		0	
		X	DON'T KNOW/REFUSED

COMMUTER #4

COL. 55		COL. 56	
1	5 MINUTES OR LESS	1	46-50 MINUTES
2	6-10 MINUTES	2	51-55 MINUTES
3	11-15 MINUTES	3	56 - 1 HOUR
4	16-20 MINUTES	4	OVER 1 HOUR, BUT LESS THAN 1 HOUR 15 MINUTES
5	21-25 MINUTES	5	BETWEEN 1 HOUR 16 MINUTES AND 1 HOUR 30 MINUTES
6	26-30 MINUTES	6	BETWEEN 1 HOUR 31 MINUTES AND 1 HOUR 45 MINUTES
7	31-35 MINUTES	7	BETWEEN 1 HOUR 46 MINUTES AND 2 HOURS
8	36-40 MINUTES	8	OVER 2 HOURS (SPECIFY _____)
9	41-45 MINUTES	9	
		0	
		X	DON'T KNOW/REFUSED

---

11. When the commuters are away from home, is there a vehicle at home that is available for evacuation during any emergency?

Col. 57	
1	Yes
2	No
3	Don’t Know/Refused

12. Would you await the return of family members prior to evacuating the area?

Col. 58
1 Yes
2 No
3 Don't Know/Refused

---

13. How many of the vehicles that are usually available to the household would your family use during an evacuation? (DO NOT READ ANSWERS.)

COL.59
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT
9 NINE OR MORE
0 ZERO (NONE)
X REFUSED

---

14. If time permits, how long would it take the family to pack clothing, secure the house, load the car, and complete preparations prior to evacuating the area? (DO NOT READ ANSWERS.)

COL.60
1 LESS THAN 15 MINUTES
2 15-30 MINUTES
3 31-45 MINUTES
4 46 MINUTES - 1 HOUR
5 1 HOUR TO 1 HOUR 15 MINUTES
6 1 HOUR 16 MINUTES TO 1 HOUR 30 MINUTES
7 1 HOUR 31 MINUTES TO 1 HOUR 45 MINUTES
8 1 HOUR 46 MINUTES TO 2 HOURS
9 2 HOURS TO 2 HOURS 15 MINUTES
0 2 HOURS 16 MINUTES TO 2 HOURS 30 MINUTES
X 2 HOURS 31 MINUTES TO 2 HOURS 45 MINUTES
Y 2 HOURS 46 MINUTES TO 3 HOURS

COL.61
1 3 HOURS TO 3 HOURS 15 MINUTES
2 3 HOURS 16 MINUTES TO 3 HOURS 30 MINUTES
3 3 HOURS 31 MINUTES TO 3 HOURS 45 MINUTES
4 3 HOURS 46 MINUTES TO 4 HOURS
5 4 HOURS TO 4 HOURS 15 MINUTES
6 4 HOURS 16 MINUTES TO 4 HOURS 30 MINUTES
7 4 HOURS 31 MINUTES TO 4 HOURS 45 MINUTES
8 4 HOURS 46 MINUTES TO 5 HOURS
9 5 HOURS TO 5 HOURS 15 MINUTES
0 5 HOURS 16 MINUTES TO 5 HOURS 30 MINUTES
X 5 HOURS 31 MINUTES TO 5 HOURS 45 MINUTES
Y 5 HOURS 46 MINUTES TO 6 HOURS

COL.62
1 DON'T KNOW

---

15. Would you take household pets with you if you were asked to evacuate the area?

Col. 58
1 Yes
2 No
3 Don't Know/Refused

Thank you very much. ____
(TELEPHONE NUMBER CALLED)

If requested:
For Additional information
Contact your County Emergency Management Office

County	Phone Number
Miami-Dade County	(305) 468-5415
Monroe County	(305) 289-6018

ANNEX B
Code of Data Collection Standards With Notes Section
Market Research Association

P.O. Box 230 • Rocky Hill, CT 06067-0230 • 860-257-4008 • Fax: 860-257-3990

Code Approved May 1997
Notes Added September 1999

RESPONSIBILITIES TO RESPONDENTS

Data Collection Companies ...

1. will make factually correct statements to secure cooperation and will honor promises to respondents, whether verbal or written;
2. will not use information to identify respondents without the permission of the respondent, except to those who check the data or are involved in processing the data. If such permission is given, it must be recorded by the interviewer at the time the permission is secured;
3. will respect the respondent's right to withdraw or to refuse to cooperate at any stage of the study and not use any procedure or technique to coerce or imply that cooperation is obligatory;
4. will obtain and document respondent consent when it is known that the name and address or identity of the respondent may be passed to a third party for legal or other purposes, such as audio or video recordings;
5. will obtain permission and document consent of a parent, legal guardian or responsible guardian before interviewing children 12 years old or younger;
6. will give respondents the opportunity to refuse to participate in the research when there is a possibility they may be identifiable even without the use of their name or address (e.g., because of the size of the population being sampled).

Interviewers ...

1. will treat the respondent with respect and not influence him or her through direct or indirect attempts, including the framing of questions and/or a respondent's opinion or attitudes on any issue;
2. will obtain and document permission from a parent, legal guardian or responsible guardian before interviewing children 12 years old or younger. Prior to obtaining permission, the interviewer should divulge the subject matter, length of the interview and other special tasks that will be required.

RESPONSIBILITIES TO CLIENTS

Data Collection Companies ...

1. will ensure that each study is conducted according to the client's exact specifications;
2. will observe confidentiality with all research techniques or methodologies and with information considered confidential or proprietary. Information will not be revealed that could be used to identify clients or respondents without proper authorization;
3. will ensure that companies, their employees and subcontractors involved in data collection take all reasonable precautions so that more than one survey is not conducted in one interview without explicit permission from the Client
4. will report research results accurately and honestly;
5. will not misrepresent themselves as having qualifications, experience, skills or facilities that they do not possess;
6. will refrain from referring to membership in the Marketing Research Association as proof of competence, since the Association does not certify any person's or organization's competency or skill level.

RESPONSIBILITIES TO DATA COLLECTORS

Clients ...

1. will be responsible for providing products and services that are safe and fit or their intended use and disclose/label all product contents;
2. will provide verbal or written instructions;
3. will not ask our members who subcontract research to engage in any activity that is not acceptable as defined in this Code or that is prohibited under any applicable federal, state, local laws, regulations

and/or ordinances.

RESPONSIBILITIES TO THE GENERAL PUBLIC AND BUSINESS COMMUNITY

Data Collection Companies ...

1. will not intentionally abuse public confidence in marketing and opinion research;
2. will not represent a non-research activity to be marketing and opinion research, such as:
    - questions whose sole objective is to obtain personal information about respondents, whether for legal, political, private or other purposes,
    - the compilation of lists, registers or data banks of names and addresses for any non-research purposes (e.g., canvassing or fundraising),
    - industrial, commercial or any other form of espionage,
    - the acquisition of information for use by credit rating services or similar organizations,
    - sales or promotional approaches to the respondent,
    - the collection of debts;
3. will make interviewers aware of any special conditions that may be applicable to any minor (18 years old or younger).

These notes are intended to help users of the Code to interpret and apply it in practice. Any questions about how to apply the Code in a specific situation should be addressed to MRA Headquarters.

RESPONSIBILITIES TO RESPONDENTS

Data Collection Companies ...

1. will make factually correct statements to secure cooperation and honor promises to respondents, whether oral or written; *Interviewers will not knowingly provide respondents with information that misrepresents any portion of the interviewing process, such as; length of the interview, scope of task involved, compensation, or intended use of the information collected.*
2. will not use information to identify respondents without the permission of the respondent, except to those who check the data or are involved in processing the data. If such permission is given, it must be recorded by the interviewer at the time the permission is secured; *Respondent information will be linked to data collected only for research purposes such as validation, evaluating data in aggregate based on demographic information, modeling. Providing respondent information is not permissible for any purpose other than legitimate research purposes as mentioned above. If anyone requests respondent identifiable information it will only be provided upon receipt of written declaration of and agreement of some intended use. Such use shall be determined by the provider to qualify as legitimate research use. (i.e. validation, planned recalls, modeling, demographic analysis.) No other use of this information falls within the boundaries of the Code. This applies to all types of respondent sample sources including client supplied lists.*
3. will respect the respondent's right to withdraw or to refuse to cooperate at any stage of the study and not use any procedure or technique to coerce or imply that cooperation is obligatory. *Respondent cooperation is strictly on a voluntary basis. Respondents are entitled to withdraw from an interview at any stage or to refuse to cooperate in a research project. Interviewers should never lead respondents to believe they have no choice in their participation.*
4. will obtain and record respondent consent when it is known that the name and addresses or identity of the respondent may be passed to a third party for legal or other purposes, such as audio or video recordings; *By documenting the respondent's consent for a defined specific use of his/ her name and address we are confirming the respondent realizes we are asking something new of them, i.e., possible participation in another research project.*
5. will obtain permission and document consent of a parent, legal guardian or responsible guardian before interviewing children 12 years old or younger; *Interviewers must take special care when interviewing children or young people. The informed consent of the parent or responsible adult must first be obtained for interviews with children.*
6. will give respondents the opportunity to refuse to participate in the research when there is a possibility they may be identifiable even without the use of their name or address (e.g., because of the size of the population being sampled.) *Respondent cooperation is strictly on a voluntary basis. Respondents are*

entitled to withdraw from a research project. Company policies and/or interviewer instructions should state the interviewer must give respondents the opportunity to not participate for any reason.

Interviewers ...

1. will treat the respondent with respect and not influence him or her through direct or indirect attempts, including the framing of questions, a respondent's opinion or attitudes on any issue. *Interviewers cannot ask questions in a way that leads or influences respondents' answers, nor can they provide their own opinions, thoughts or feelings that might bias a respondent and therefore impact the answers they give.*
2. will obtain and document permission of a parent, legal guardian or responsible guardian before interviewing children 12 years old or younger. Prior to obtaining permission, the interviewer should divulge the subject matter, length of interview and other special tasks that will be required. *Interviewers must take special care when interviewing children and young people. The informed consent of the parent or responsible adult must first be obtained for interviews with children. Parents or responsible adults must be told some specifics about the interview process and special tasks, such as audio or video recording, taste testing, respondent fees and special tasks, before permission is obtained.*

RESPONSIBILITIES TO CLIENTS

Data Collection Companies ...

1. will ensure that each study is conducted according to the client's specifications; *Procedures are implemented to conform or verify that client specifications are being followed.*
2. will observe confidentiality with all research techniques or methodologies and with information considered confidential or proprietary. Information will not be revealed that could be used to identify clients or respondents without proper authorization; *Respondent information will be linked to data collected only for research purposes and will not be used for any purpose other than legitimate research. Protect the confidentiality of anything learned about the respondent and/or his or her business.*
3. will ensure that companies, their employees and subcontractors involved in data collection take all reasonable precautions so that no more than one survey is conducted in one interview without explicit permission from the sponsorship company or companies; *Company policies or procedures indicate the practice of conducting more than one survey within an interview is not done without specific permission from the relevant clients.*
4. will report research results accurately and honestly; *Describe how the research was done in enough detail that a skilled researcher could repeat the study; provide data representative of a defined population or activity and enough data to yield projectable results; present the results understandably and fairly, including any results that may seem contradictory or unfavorable.*
5. will not misrepresent themselves as having qualifications, experience, skills or facilities that they do no possess; *If regularly subcontracting data collection, should not infer to clients and prospective clients that they possess this capability "in house"; claim only legitimate academic degrees, clients and other qualifications.*
6. will refrain from referring to membership in the Marketing Research Association as proof of competence, since the Association does not certify any person's or organization's competency or skill level. *MRA does not currently have a certification program for marketing research competency, therefore while members can state their membership in the Association, they cannot claim that this automatically conveys a message of their competency to carry out the marketing research process.*

RESPONSIBILITIES TO DATA COLLECTORS

Clients ...

1. will be responsible for providing products and services that are safe and fit for their intended use and disclose/label all product contents; *It is the client's responsibility to ensure that all test products are in compliance with all safety standards and that all product contents information is provided to the data collectors. Data Collectors should request in writing all pertinent information as well as emergency numbers for respondents and themselves.*
2. will provide oral or written instructions; *To ensure the success of the research, detailed instructions are*

to be provided prior to the start of any project. These instructions must be written and then confirmed orally for: understanding, ability of the agency to implement and agreement to comply.

3. will not ask our members who subcontract research to engage in any activity that is not acceptable as defined in this Code or that is prohibited under any applicable federal, state and local laws, regulations and ordinances. *All MRA Members have agreed to comply with the Code as written and thus will not agree to, or ask anyone else to, knowingly violate any of the points of the Code.*

RESPONSIBILITIES TO THE GENERAL PUBLIC AND BUSINESS COMMUNITY
Data Collection Companies ...

1. will not intentionally abuse public confidence in marketing and opinion research; *Marketing research shall be conducted and reported for the sole purpose of providing factual information upon which decisions will be made. At no time is marketing research information to be used to intentionally mislead public opinion. Instances of abuse of public confidence undermine the credibility of our Industry.*
2. will not represent a non-research activity to be marketing and opinion research, such as:
    - questions whose sole objective is to obtain personal information about respondents, whether for legal, political, private or other purposes,
    - the compilation of lists, registers or data banks of names and addresses for any non-research purposes (e.g., canvassing or fundraising),
    - industrial, commercial or any other form of espionage,
    - the acquisition of information for use by credit rating services or similar organizations,
    - sales or promotional approaches to the respondent,

APPENDIX G
TRAFFIC MANAGEMENT

Appendix G
Traffic Management

This appendix presents suggested traffic control measures to facilitate the evacuation of the Turkey Point EPZ. Table G-1 and Figure G-1 (31 sheets) detail traffic control points, which are typically intersections within the EPZ. These points are established to facilitate the flow of evacuee traffic in the EPZ. Table G-1 summarizes the traffic control points and the manpower and equipment needed to implement traffic control. Figure G-1 provides detailed mapping of the location of each traffic control point.

Table G-2 and Figure G-2 (10 sheets) detail the traffic control points needed to facilitate access to the Miami-Dade Reception Center at Tamiami Park. Table G-2 summarizes the manpower and equipment needed, while Figure G-2 maps each point.

Table G-3 and Figure G-3 (12 sheets) detail the access control points, which are typically on the periphery of the EPZ. These points are established to divert vehicles from entering the EPZ, and in doing so, provides the available roadway capacity in the EPZ to the evacuees. Table G-3 summarizes the access control points and the manpower and equipment needed to establish access control, while Figure G-3 provides a detailed map of the location of each access control point.

This traffic management plan should be submitted to state and local police. The traffic management plan has been greatly simplified from the version presented in the 2005 ETE report in an effort to reduce the manpower and equipment needed. Nonetheless, there are likely to be concerns about manpower and equipment shortages. As such, prioritizing traffic control points and access control points is established to make the most efficient use of manpower and equipment in the event of an emergency. The use of ITS technologies, as outlined in Section 9, could aid in mitigating manpower shortages.

Traffic control points and access control points that are not in the EPZ have been labeled as Area 11, which for this purpose, would be the shadow region because there are only 10 areas in the EPZ. Traffic control points have been set up along the major intersections on Krome Avenue, on U.S. Highway 1, and at the access points to the Florida Turnpike. The objective is to keep traffic flowing along the major evacuation routes in an effort to facilitate the evacuation process.

With reference to the discussion of Section 2.3, these traffic control points serve many vital functions, but are not considered in specifying the inputs to the I-DYNEV system used to calculate ETE. Consequently, the results presented in Section 7 and in Appendix J do no reflect the presence of these traffic control points.

Table G-1 (Sheet 1 of 2)
Summary of Traffic Control Points

TCP ID	MUNICIPALITY	INTERSECTION	PRIORITY	CONES	BARRICADES	GUIDES	DMS
KLD – 4	Homestead	U.S. Highway 1 & Campbell (SW 312/NW 8)	1	15	0	2	0
KLD – 7	Leisure City	U.S. Highway 1 & Biscayne Dr (SW 288)	1	12	0	2	0
KLD – 23	Unincorporated	Krome Ave & Quail Roost Dr (SW 200/994)	1	9	0	1	0
KLD – 25	Unincorporated	Krome Ave & Silver Palm Dr (SW 232)	1	9	0	1	0
KLD – 26	Unincorporated	Krome Ave & Coconut Palm Dr (SW 248)	1	9	0	1	0
KLD – 27	Homestead	Krome Ave & Avocado Dr (SW 296)	1	9	0	1	0
KLD – 28	Homestead	Krome Ave & Kings Hwy (SW 304)	1	9	0	1	0
KLD – 29	Homestead	Krome Ave & Campbell Dr (SW 312/ NW 8)	1	15	0	2	0
KLD – 32	Homestead	Krome Ave & Moody Dr (SW 320)	1	9	0	1	0
KLD – 34	Homestead/Florida City	Krome Ave & Lucy St SW (328)	1	12	0	1	0
KLD – 35	Florida City	Krome Ave & Palm Dr (SW 344)	1	9	0	2	0
KLD – 37	South Miami Heights/West Perrine	Florida Turnpike & Quail Roost Dr (SW 186)	1	0	6	2	0
RB10 – 10E	Homestead	Florida Turnpike & Campbell Dr (SW 312)	1	0	12	1	0
RB10 – 12E	Leisure City	Florida Turnpike & Biscayne Dr (SW 288)	1	0	8	2	0
RB10 – 13E	Naranja/Princeton	Florida Turnpike & Tallahassee Rd (SW 137)	1	0	4	1	0
RB10 – 17E	Princeton	Florida Turnpike & Allapattah Rd (SW 112)	1	0	8	2	0
RB10 – 22E	Cutler Ridge	Florida Turnpike & Hainlin Mill Dr (SW 216)	1	0	10	2	0
TC10 –4E	Unincorporated	Start Florida Turnpike & U.S. Highway 1	1	0	8	1	0
TC10 – 23E	Cutler Ridge	Florida Turnpike & SW 211 St	1	0	4	2	0
TC10 – 24E	Cutler Ridge/South Miami Heights	Florida Turnpike & Caribbean Blvd (SW 200)	1	0	10	2	0
TC10 – 24S	East/West Perrine	U.S. Highway 1 & Eureka Dr (SW 184)	1	18	0	3	0
TC10 – 62E	Princeton	U.S. Highway 1 & Coconut Palm Dr (SW 248)	1	12	0	3	0
TC10 – 69E	Goulds	U.S. Highway 1 & Hainlin Mill Dr (SW 216)	1	9	0	3	0
TC10 – 74E	Cutler Ridge	U.S. Highway 1 & All American Way (SW 211)	1	9	0	3	0

Table G-1 (Sheet 2 of 2)
Summary of Traffic Control Points

TCP ID	MUNICIPALITY	INTERSECTION	PRIORITY	CONES	BARRICADES	GUIDES	DMS
TC10 – 77E	Cutler Ridge	U.S. Highway 1 & Caribbean Blvd (SW 200)	1	18	0	3	0
TC10 – 90E	Unincorporated	Krome Ave & Biscayne Dr (SW 288)	1	9	0	1	0
TC10 –81E	Cutler Ridge	Eureka Dr (SW 184) & Franjo Rd (SW 97)	2	6	0	1	0
TC10 –82E	Cutler Ridge	Eureka Dr (SW 184) & Galloway Rd (SW 87)	2	3	0	1	0
KLD – 36	South Miami Heights/West Perrine	Florida Turnpike & U.S. U.S. Highway 1	3	0	0	0	0
KLD – 46	Cutler Ridge	Eureka Dr (SW 184) & Marlin Rd (SW 107)	3	3	0	1	0
TOTAL MANPOWER/EQUIPMENT NEEDED				**204**	**70**	**49**	**0**

Table G-2
Summary of Traffic Control Points at Reception Center

TCP ID	CITY	INTERSECTION	PRIORITY	CONES	BARRICADES	GUIDES	DMS
TCRC – 1	Miami	Florida Turnpike & Bird Rd (SW 40 ST/976)	1	0	0	1	1
TCRC – 2	Miami	Florida Turnpike & SW 8 St (41) INTCHG	1	0	0	1	1
TCRC – 3	Miami	Tamiami Trail & Snapper Creek Rd	1	0	0	1	0
TCRC – 4	Miami	SW 117 Ave & Coral Way	1	0	0	2	0
TCRC – 5	Miami	SW 115 Ave & Coral Way	1	0	0	2	0
TCRC – 6	Miami	SW 114 Ave & Coral Way	1	0	0	2	0
TCRC – 8	Miami	SW 112 Ave & Coral Way	1	0	0	2	0
TCRC – 9	Miami	SW 100 Ave & Coral Way	1	0	0	2	0
TCRC – 7	Miami	SW 113 Ct & Coral Way	3	0	0	1	0
TOTAL MANPOWER/EQUIPMENT NEEDED				0	0	14	2

Table G-3
Summary of Access Control Points

ACP ID	TOWN	INTERSECTION	PRIORITY	CONES	BARRICADES	GUIDES	DMS
ACP – 3	Unincorporated	Quail Roost Dr (SW 200) & Lindgren Rd (SW 137)	1	0	4	2	0
ACP – 4	South Miami Heights	Eureka Dr (SW 184) & SW 117 Ave	1	0	6	2	0
KLD – 23	Unincorporated	Krome Ave (997) & Quail Roost Dr (SW 200)	1	0	4	1	0
RB10 – 29S	East/West Perrine	U.S. Highway 1 & Eureka Dr (SW 184)	1	3	4	3	0
RB10 – 34S	Cutler Ridge	Old Cutler Rd & Eureka Dr (SW 184)	1	3	2	1	0
ACP – 1	Unincorporated	Quail Roost Dr (SW 200) & Tennessee Dr (SW 167)	2	3	2	1	0
ACP – 2	Unincorporated	Quail Roost Dr (SW 200) & Farmlife School Rd (SW 162)	2	3	2	1	0
KLD –- 46	Cutler Ridge	Eureka Dr (SW 184) & Marlin Rd (SW 107)	2	0	2	1	0
KLD – 84	Unincorporated	Naranja Rd (SW 147) & Quail Roost Dr (SW 200)	2	0	2	1	0
RB10 – 30S	Cutler Ridge	Eureka Dr (SW 184) & Franjo Rd (SW 97)	2	0	4	1	0
RB10 – 32S	Cutler Ridge	Eureka Dr (SW 184) & Galloway Rd (SW 87)	2	0	2	1	0
TOTAL MANPOWER/EQUIPMENT NEEDED				**12**	**34**	**15**	**0**

Figure G-1. Turkey Point Nuclear Power Plant Traffic Control Points (Sheet 1 of 31)

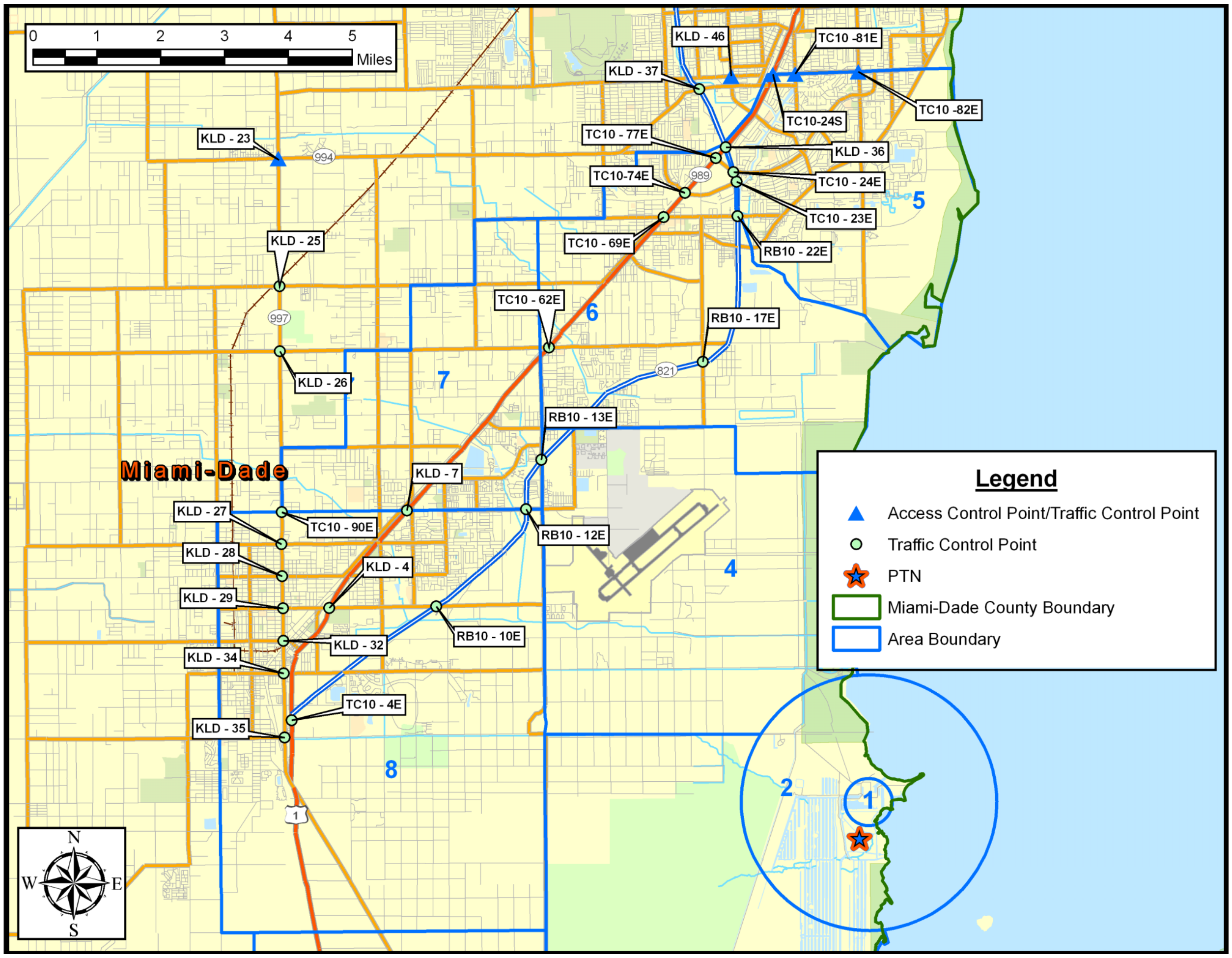


Figure G-1. Traffic Control Points — Homestead (Sheet 2 of 31)

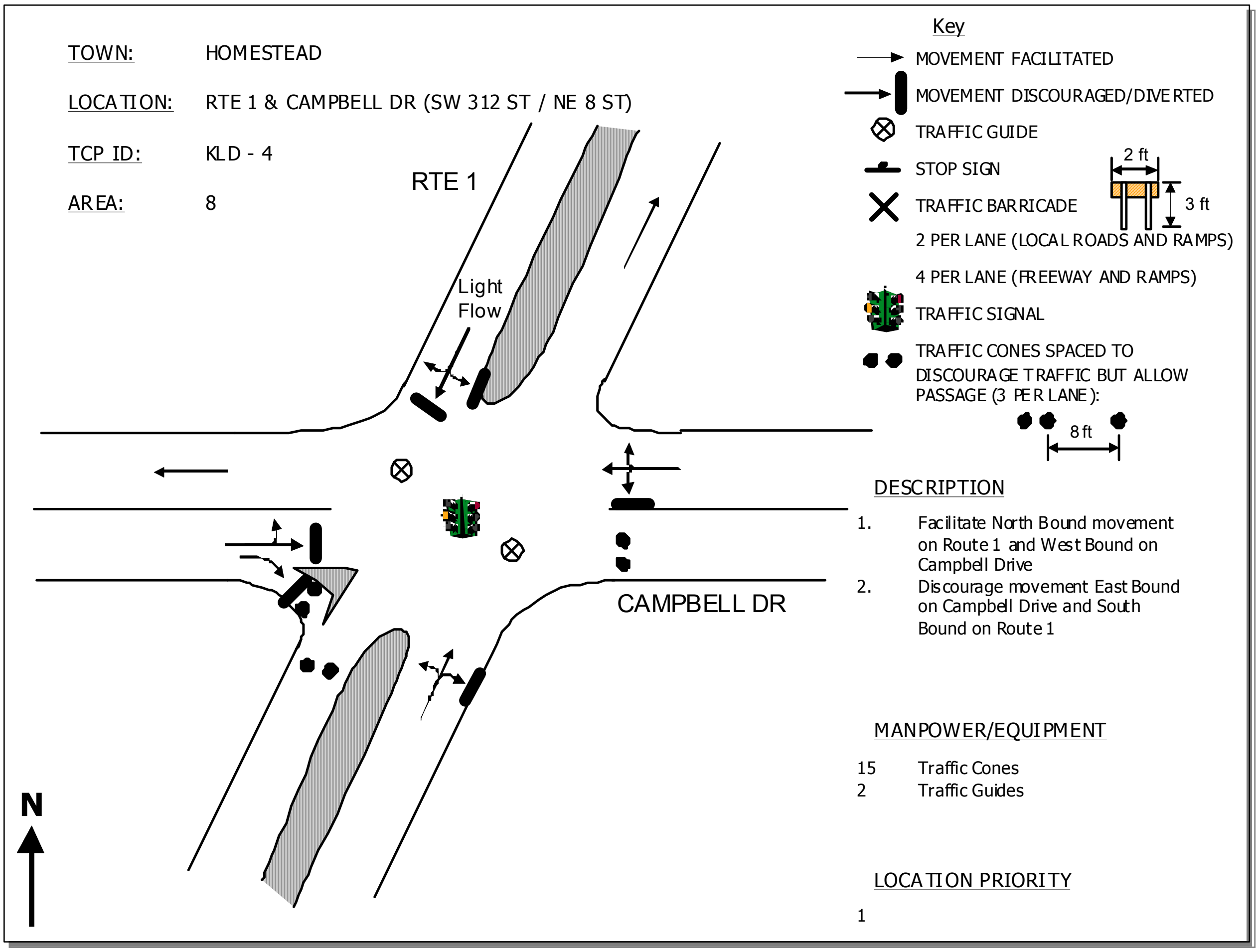


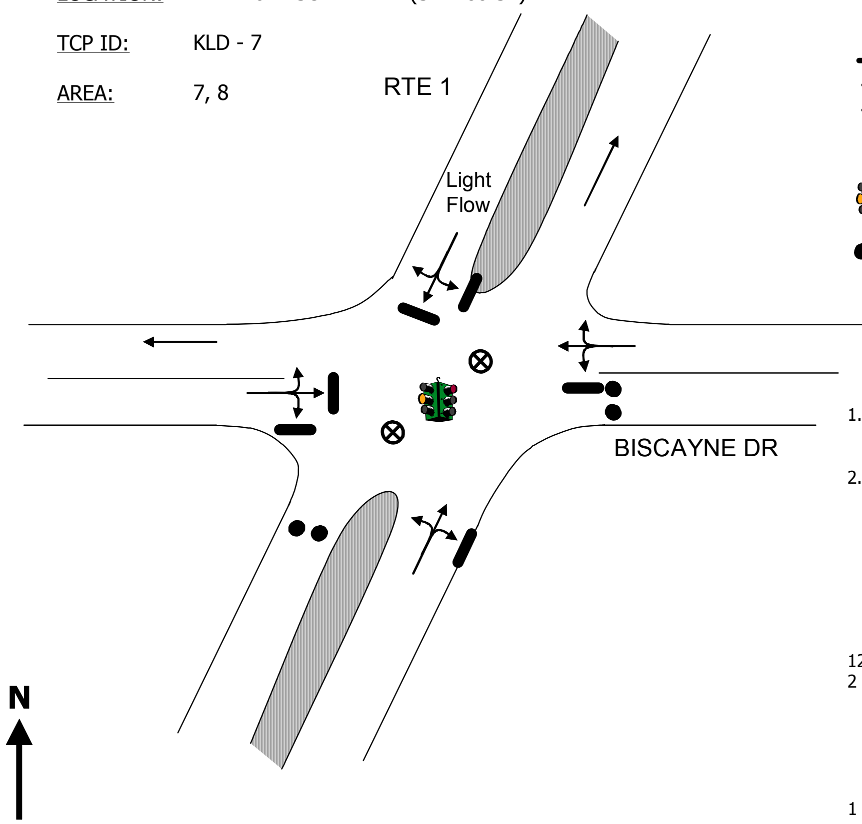
Figure G-1. Traffic Control Points — Leisure City (Sheet 3 of 31)
U.S. Highway 1 and Biscayne Drive (SW 288 Street)

TOWN: LEISURE CITY

LOCATION: RTE 1 & BISCAYNE DR (SW 288 ST)

TCP ID: KLD - 7

AREA: 7, 8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate North Bound movement on Route 1 and West Bound on Biscayne Drive
2. Discourage movement East Bound on Biscayne Drive and South Bound on Route 1

MANPOWER/EQUIPMENT

12 Traffic Cones
2 Traffic Guides

LOCATION PRIORITY

1

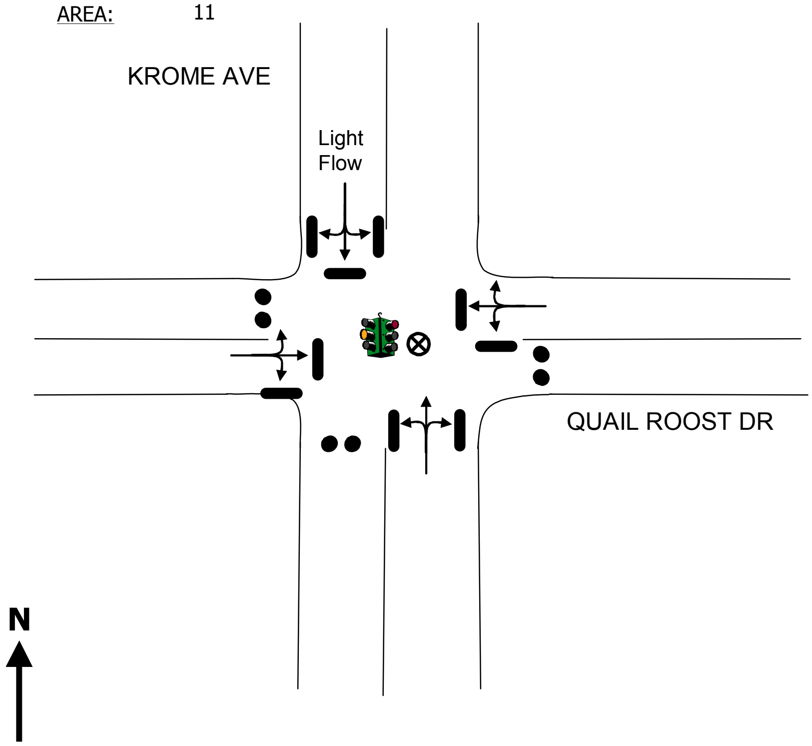
Figure G-1. Traffic Control Points — Unincorporated Miami-Dade (Sheet 4 of 31)
Krome Avenue (997) & Quail Roost Drive (SW 200 Street/994)

TOWN: UNINCORPORATED MIAMI-DADE

LOCATION: KROME AVE (997) & QUAIL ROOST DR (SW 200 ST / 994)

TCP ID: KLD - 23

AREA: 11



Key

MOVEMENT FACILITATED

MOVEMENT DISCOURAGED/DIVERTED

TRAFFIC GUIDE

STOP SIGN

TRAFFIC BARRICADE (2 ft, 3 ft)

2 PER LANE (LOCAL ROADS AND RAMPS)

4 PER LANE (FREEWAY AND RAMPS)

TRAFFIC SIGNAL

TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

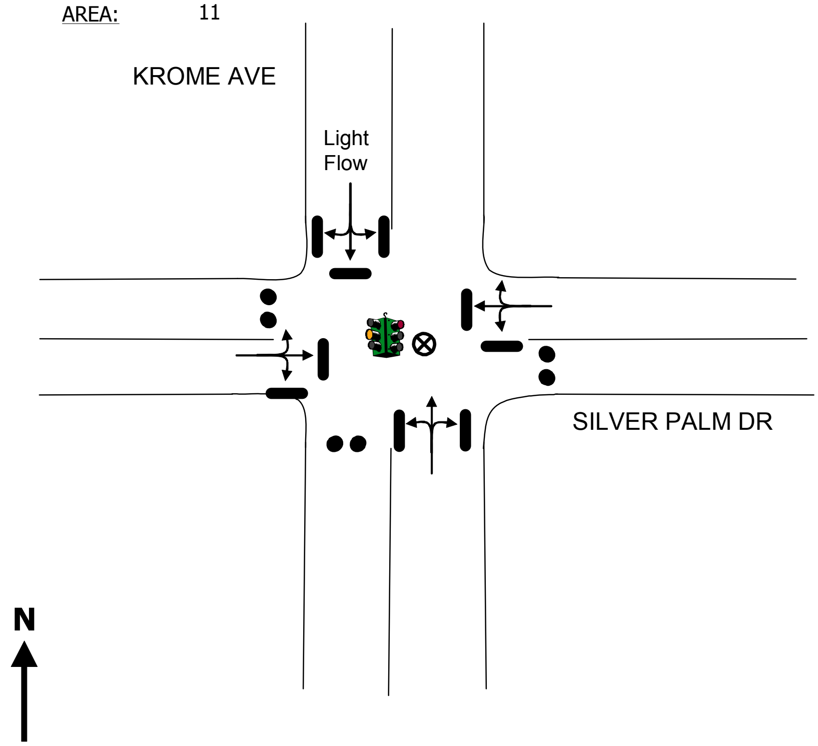
**Figure G-1. Traffic Control Points — Unincorporated Miami-Dade (Sheet 5 of 31)
Krome Avenue (997) & Silver Palm Drive (SW 232 Street)**

TOWN: UNINCORPORATED MIAMI-DADE

LOCATION: KROME AVE (997) & SILVER PALM DR (SW 232 ST)

TCP ID: KLD - 25

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
- 2 PER LANE (LOCAL ROADS AND RAMPS)
- 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

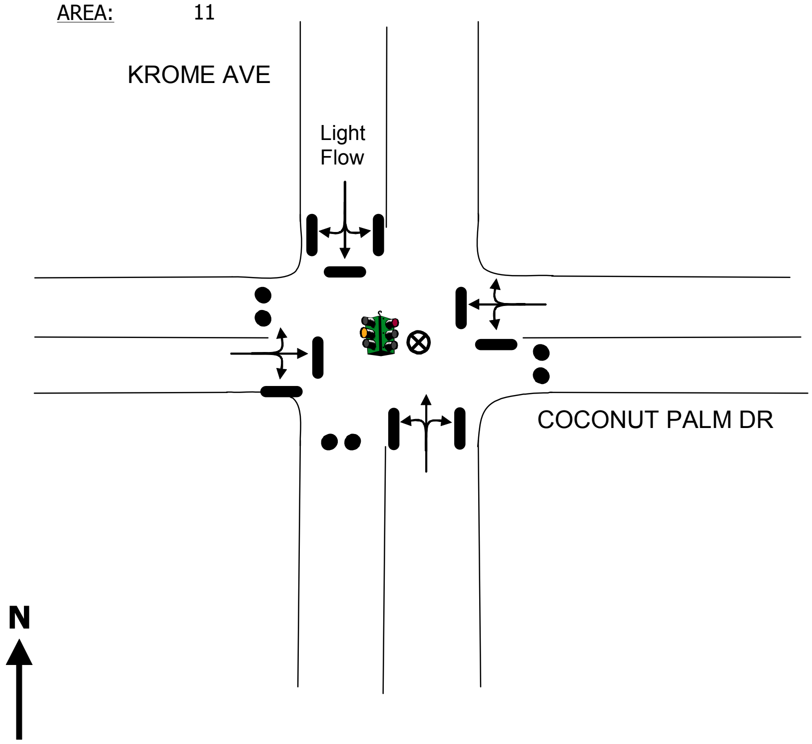
Figure G-1. Traffic Control Points — Unincorporated Miami-Dade (Sheet 6 of 31) Krome Avenue (997) & Coconut Palm Drive (SW 248 Street)

TOWN: UNINCORPORATED MIAMI-DADE

LOCATION: KROME AVE (997) & COCONUT PALM DR (SW 248 ST)

TCP ID: KLD - 26

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
- 2 PER LANE (LOCAL ROADS AND RAMPS)
- 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

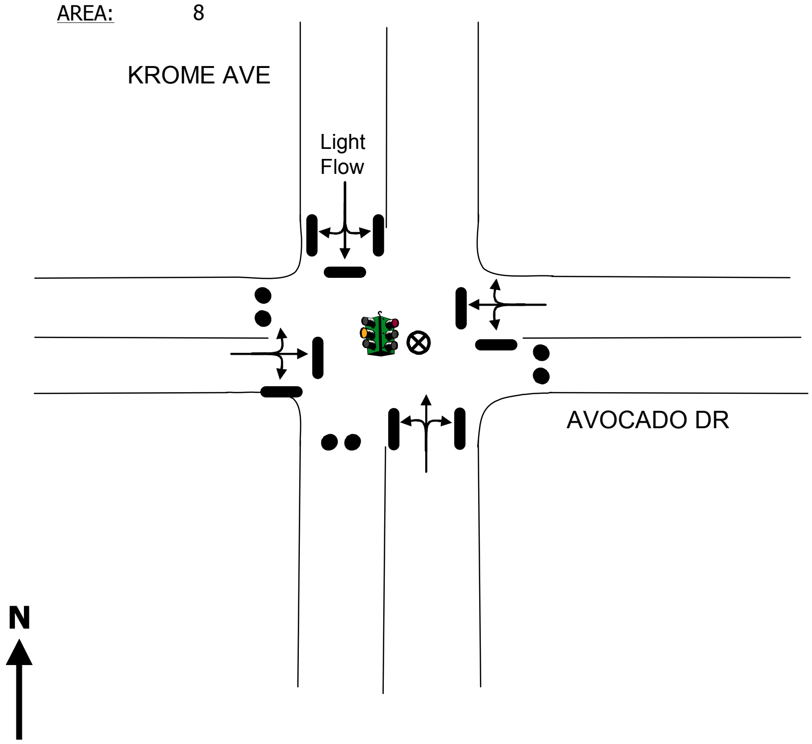
Figure G-1. Traffic Control Points — Homestead (Sheet 7 of 31)
Krome Avenue (997) & Avocado Drive (SW 296 Street)

TOWN: HOMESTEAD

LOCATION: KROME AVE (997) & AVOCADO DR (SW 296 ST)

TCP ID: KLD - 27

AREA: 8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

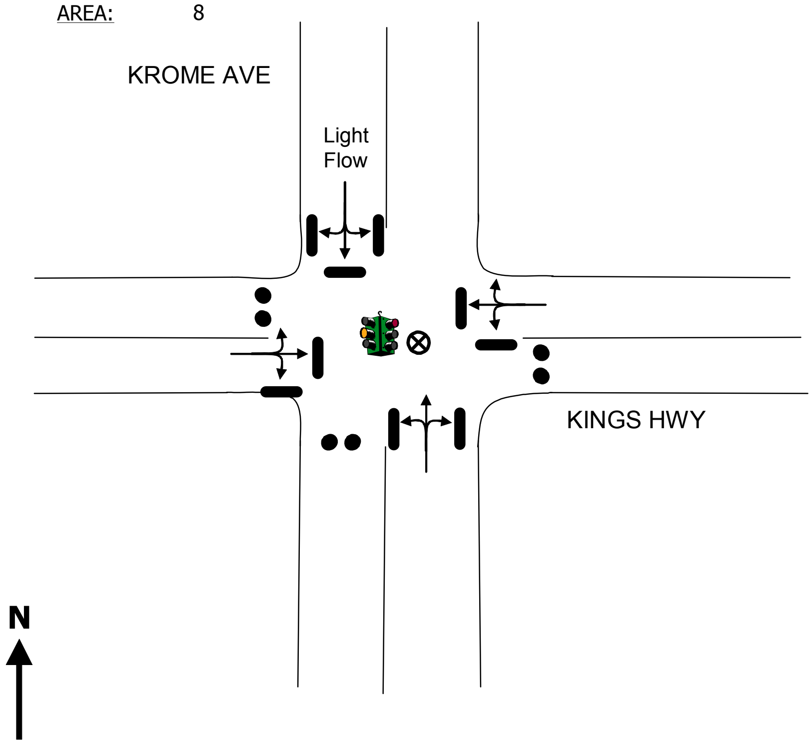
Figure G-1. Traffic Control Points — Homestead (Sheet 8 of 31)
Krome Avenue (997) & Kings Highway (SW 304 ST/NW 15 Street)

TOWN: HOMESTEAD

LOCATION: KROME AVE (997) & KINGS HWY (SW 304 ST / NW 15 ST)

TCP ID: KLD - 28

AREA: 8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

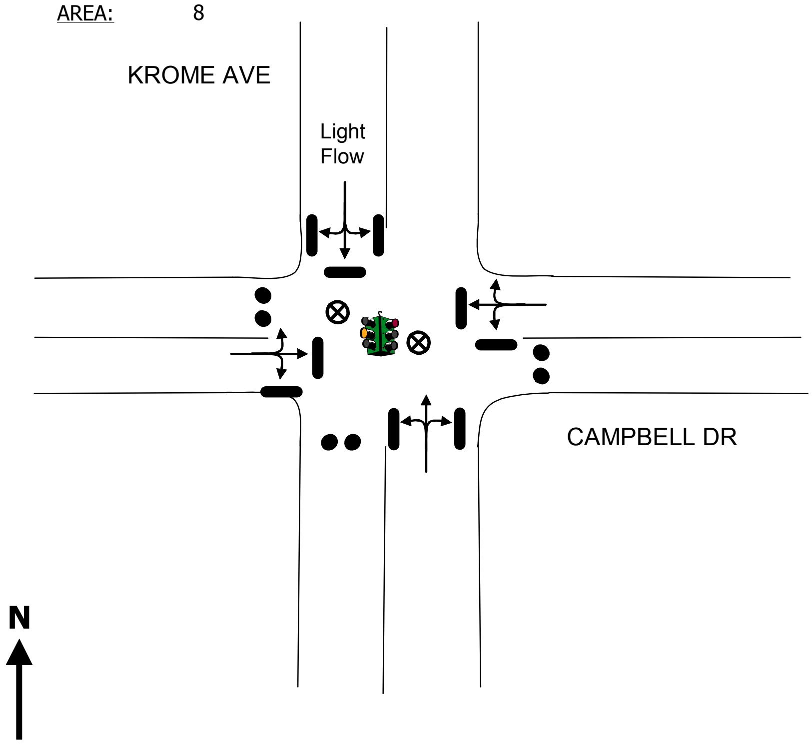
Figure G-1. Traffic Control Points — Homestead (Sheet 9 of 31)
Krome Avenue (997) & Campbell Drive (SW 312 ST/NW 8 Street)

TOWN: HOMESTEAD

LOCATION: KROME AVE (997) & CAMPBELL DR (SW 312 ST / NW 8 ST)

TCP ID: KLD – 29

AREA: 8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

15 Traffic Cones
2 Traffic Guide

LOCATION PRIORITY

1

Figure G-1. Traffic Control Points — Homestead (Sheet 10 of 31)
Krome Avenue (997) & Mowry Drive (SW 320 Street)

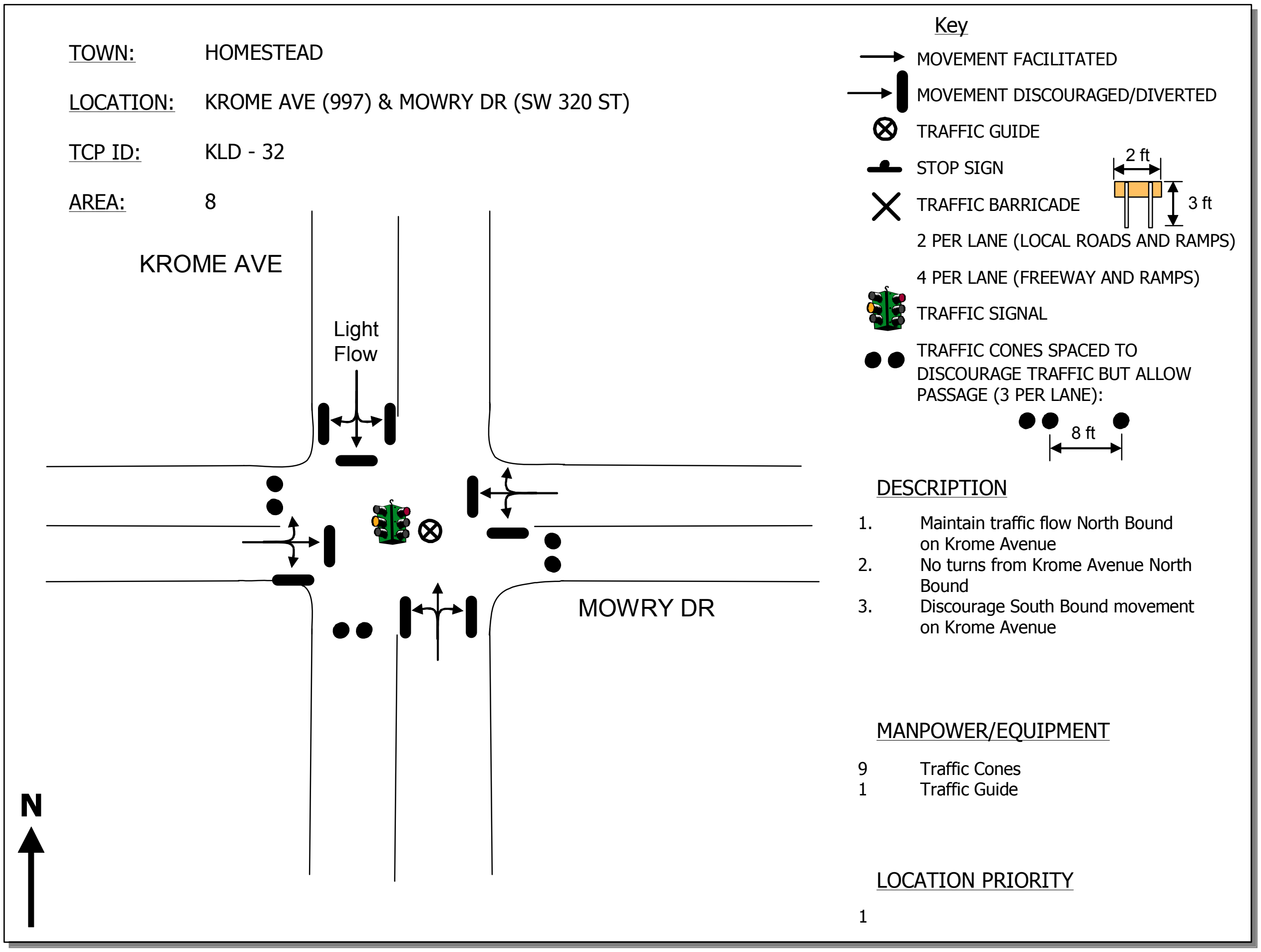


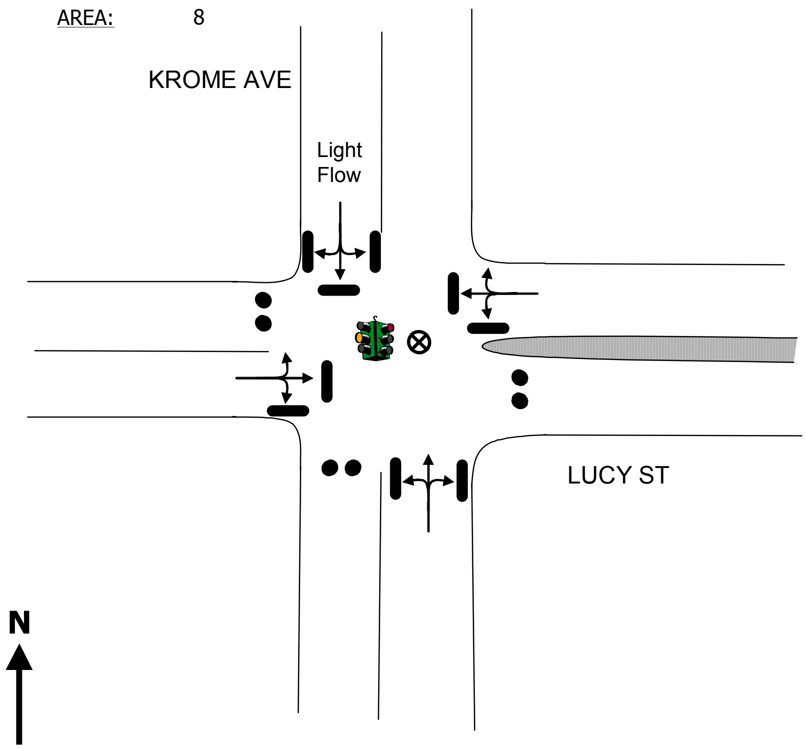
Figure G-1. Traffic Control Points — Homestead (Sheet 11 of 31)
Krome Avenue (997) & Lucy Street (SW 328 Street)

TOWN: HOMESTEAD / FLORIDA CITY

LOCATION: KROME AVE (997) & LUCY ST (SW 328 ST)

TCP ID: KLD - 34

AREA: 8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

12 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

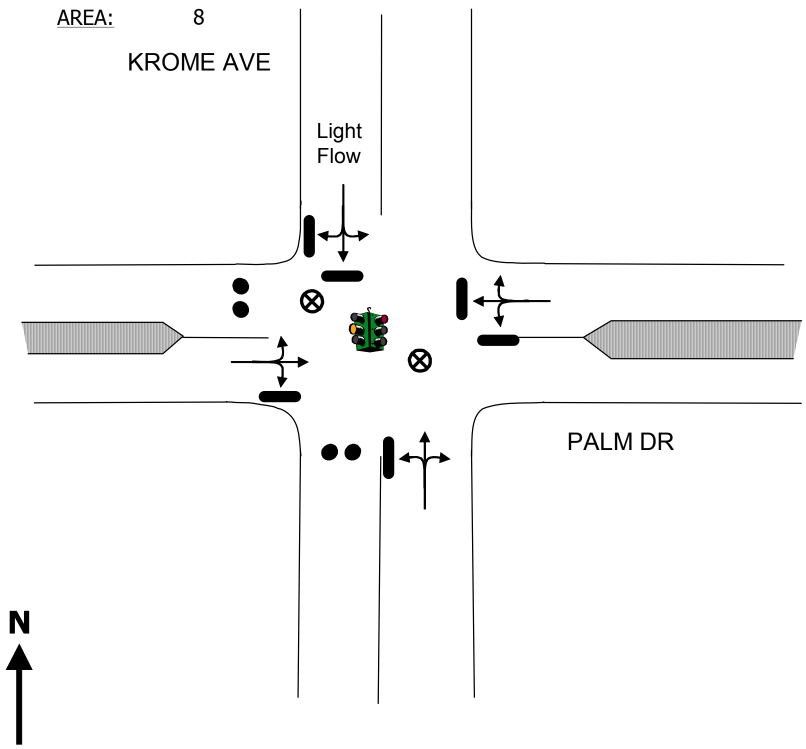
Figure G-1. Traffic Control Points — Florida City (Sheet 12 of 31)
Krome Avenue (997) & Palm Drive (SW 344 Street)

TOWN: FLORIDA CITY

LOCATION: KROME AVE (997) & PALM DR (SW 344 ST)

TCP ID: KLD - 35

AREA: 8



Key

MOVEMENT FACILITATED

MOVEMENT DISCOURAGED/DIVERTED

TRAFFIC GUIDE

STOP SIGN

TRAFFIC BARRICADE
2 ft
3 ft
2 PER LANE (LOCAL ROADS AND RAMPS)
4 PER LANE (FREEWAY AND RAMPS)

TRAFFIC SIGNAL

TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE):
8 ft

DESCRIPTION

1. Facilitate North Bound movement on Krome Avenue
2. Discourage movement South Bound on Krome Avenue and West Bound on Palm Drive

MANPOWER/EQUIPMENT

9 Traffic Cones
2 Traffic Guides

LOCATION PRIORITY

1

Figure G-1. Traffic Control Points — South Miami Heights/West Perrine (Sheet 13 of 31)

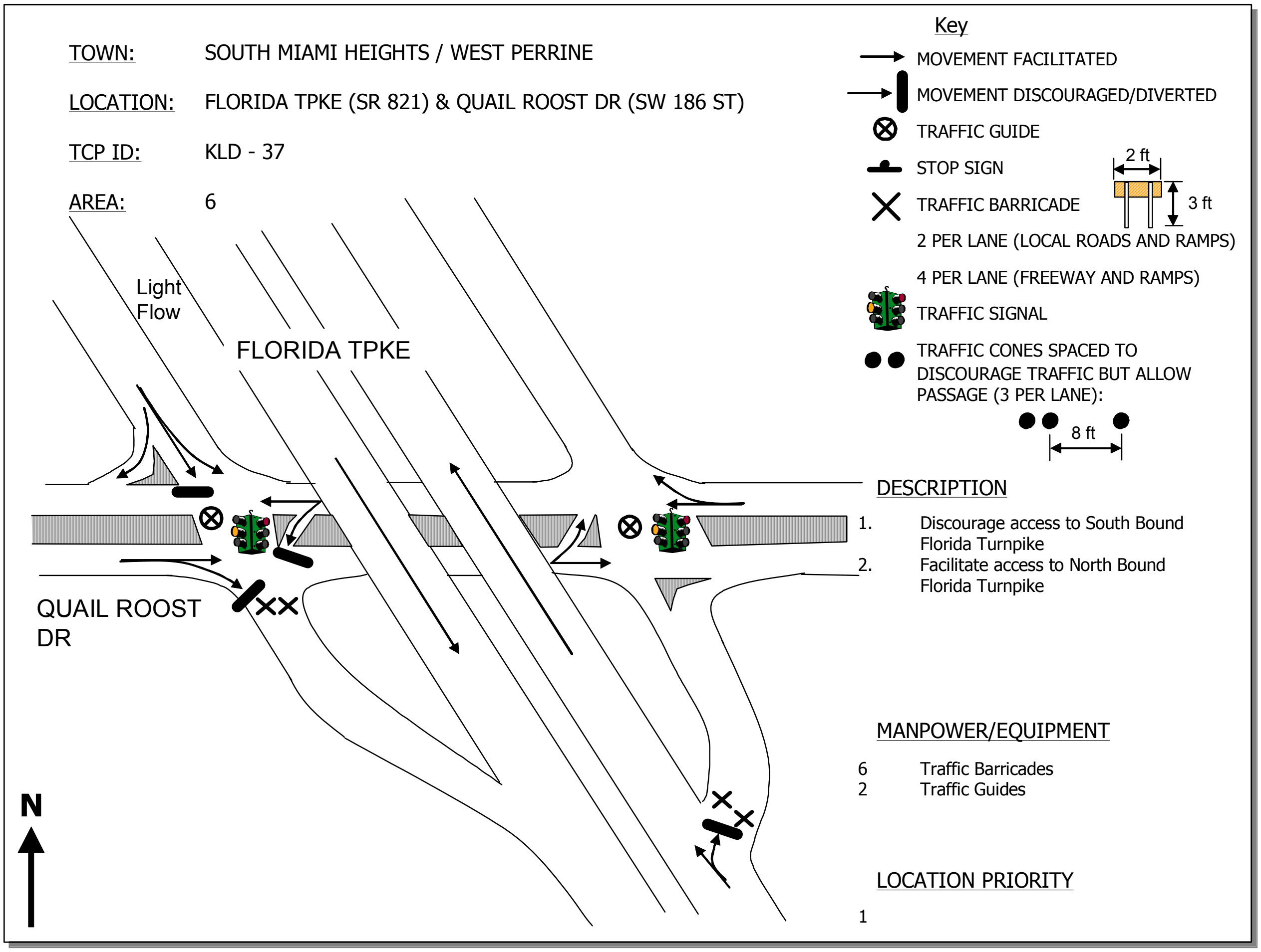


Figure G-1. Traffic Control Points — Homestead (Sheet 14 of 31)
Florida Turnpike (SR 821) & Campbell Drive (SW 312 Street)

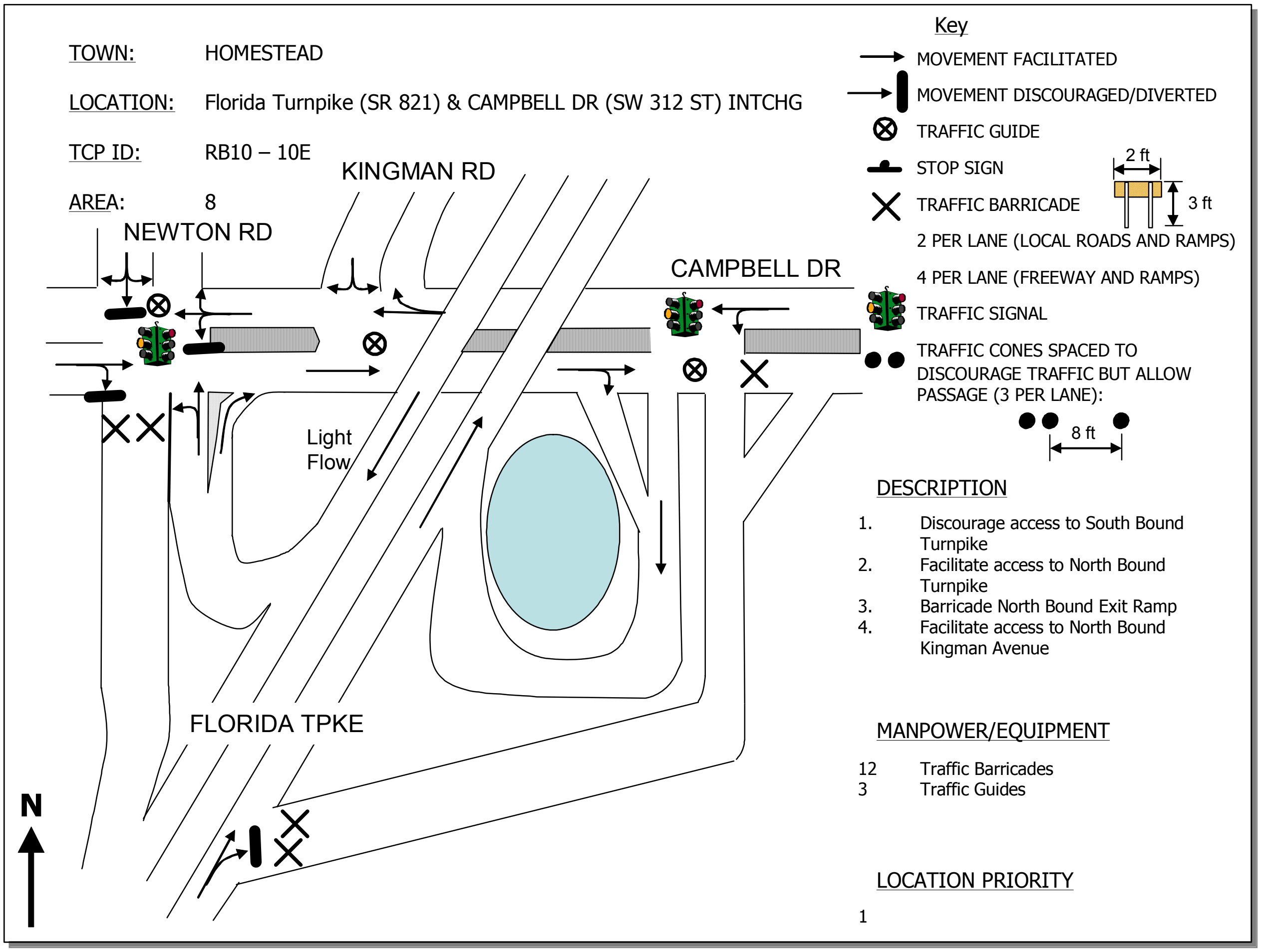


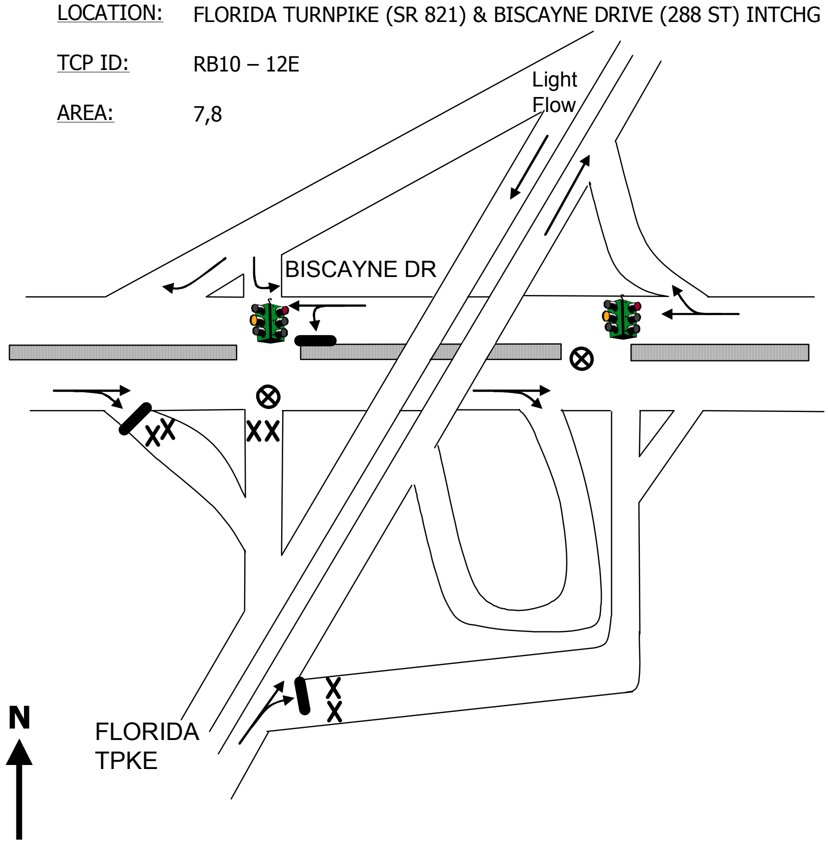
Figure G-1. Traffic Control Points — Leisure City (Sheet 15 of 31)
Florida Turnpike (SR 821) & Biscayne Drive (288 Street)

TOWN: LEISURE CITY

LOCATION: FLORIDA TURNPIKE (SR 821) & BISCAYNE DRIVE (288 ST) INTCHG

TCP ID: RB10 – 12E

AREA: 7,8



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage access to South Bound Turnpike
2. Barricade North Bound exit ramps
3. Facilitate access to North Bound Turnpike
4. Discourage East Bound movement on Biscayne Drive after Turnpike entrance

MANPOWER/EQUIPMENT

8 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

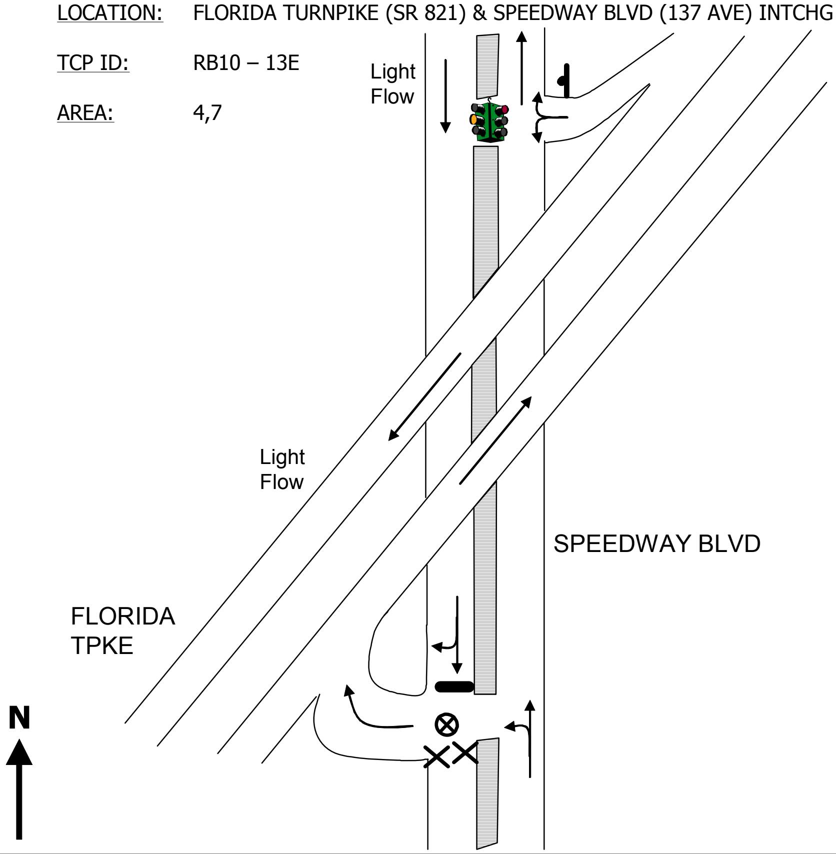
Figure G-1. Traffic Control Points — Naranja/Princeton (Sheet 16 of 31)

TOWN: NARANJA / PRINCETON

LOCATION: FLORIDA TURNPIKE (SR 821) & SPEEDWAY BLVD (137 AVE) INTCHG

TCP ID: RB10 – 13E

AREA: 4,7



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage South Bound movement on Speedway Boulevard after Turnpike entrance
2. Facilitate access to Turnpike North Bound

MANPOWER/EQUIPMENT

4 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

1

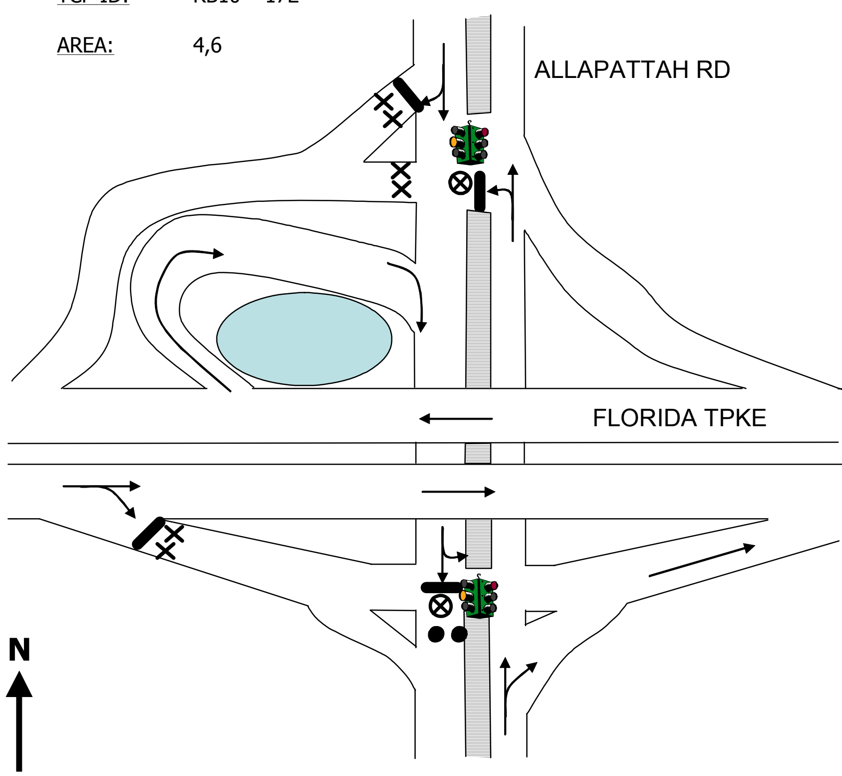
Figure G-1. Traffic Control Points — Princeton (Sheet 17 of 31)
Florida Turnpike & Allapattah Road (SW 112 Avenue)

TOWN: PRINCETON

LOCATION: FLORIDA TPKE & ALLAPATTAH RD (SW 112 AVE)

TCP ID: RB10 – 17E

AREA: 4,6



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  2 PER LANE (LOCAL ROADS AND RAMPS)
  4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage access to South Bound Turnpike
2. Facilitate North Bound movement on Allapattah Road
3. Facilitate access to North Bound Turnpike
4. Barricade North Bound exit ramps
5. Discourage South Bound movement on Allapattah Road after Turnpike entrance

MANPOWER/EQUIPMENT

6 Traffic Barricades
2 Traffic Guides
3 Traffic Cones

LOCATION PRIORITY

1

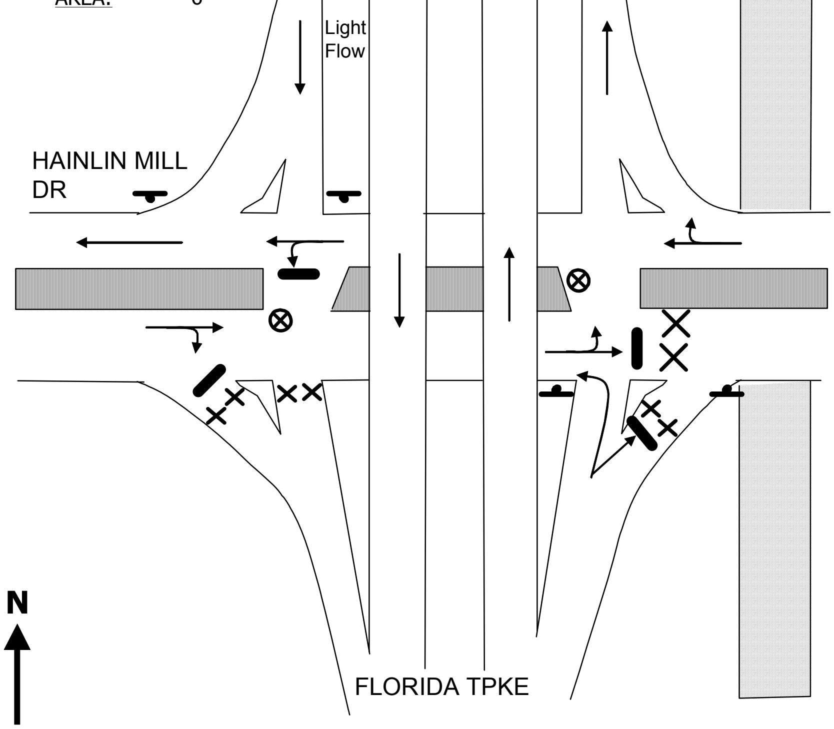
Figure G-1. Traffic Control Points — Cutler Ridge/Goulds (Sheet 18 of 31)

TOWN: CUTLER RIDGE / GOULDS

LOCATION: FLORIDA TPKE (SR 821) & HAINLIN MILL DR (SW 216 ST) INTCHG

TCP ID: RB10 – 22E

AREA: 6



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage access to South Bound Turnpike
2. Discourage East Bound movement on Hainlin Mill Road after Turnpike entrance
3. Facilitate West Bound movement on Hainlin Mill Road
4. Facilitate access to North Bound Turnpike

MANPOWER/EQUIPMENT

10 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

Figure G-1. Traffic Control Points — Florida City (Sheet 19 of 31)
Florida Turnpike (SR 821) & U.S. Highway 1

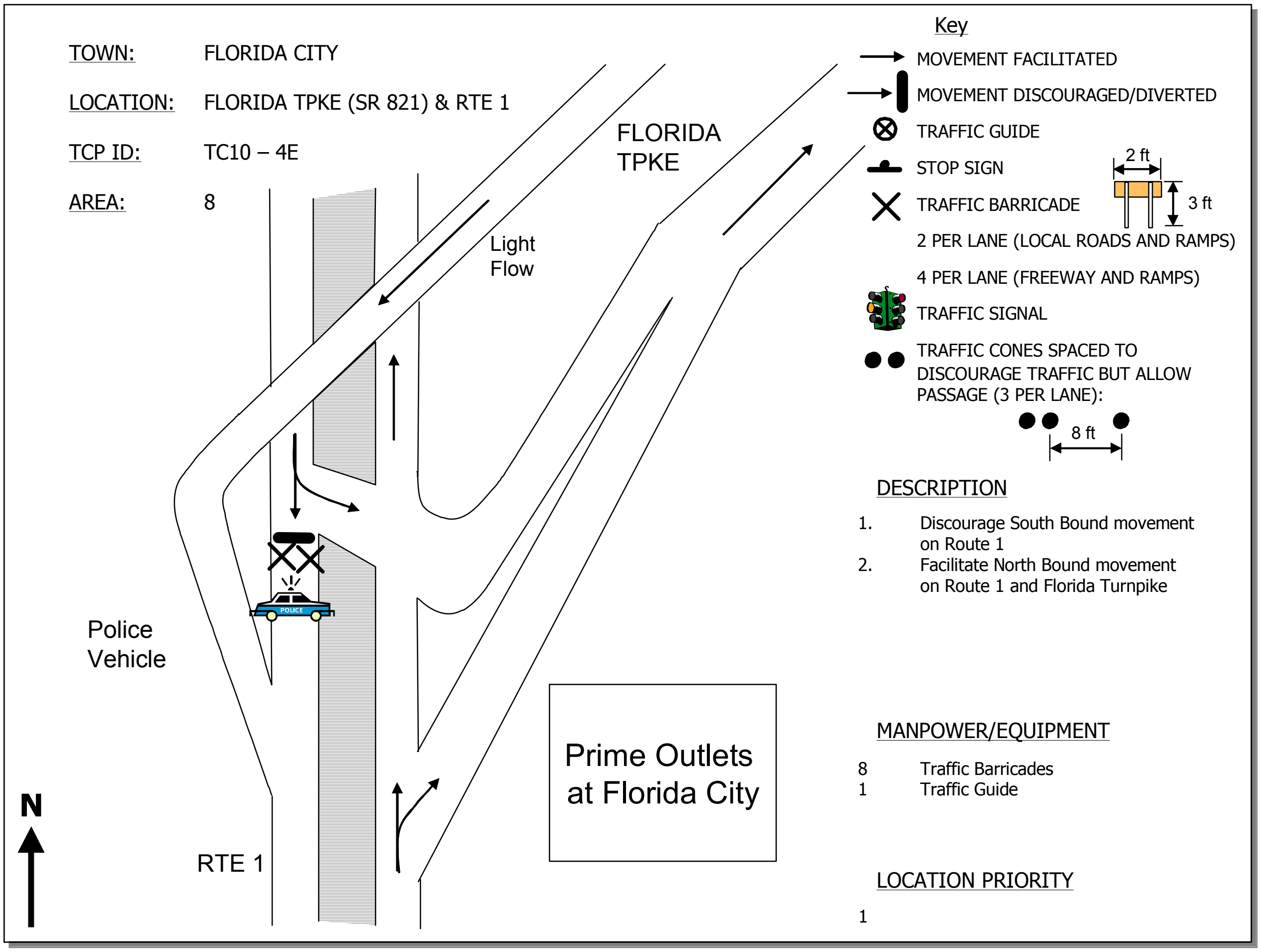


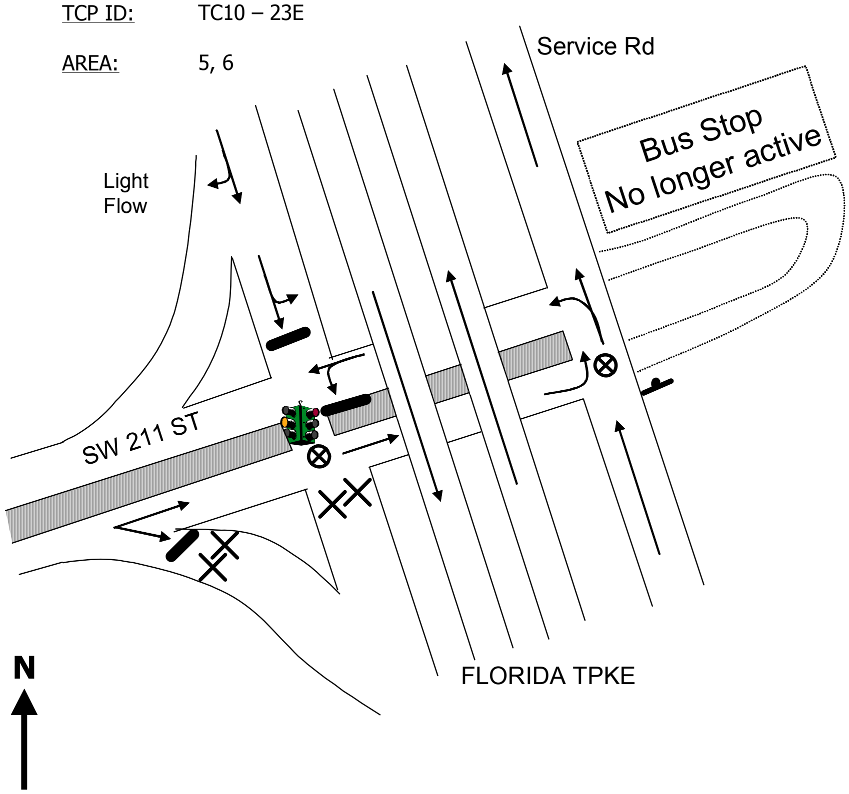
Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 20 of 31)
Florida Turnpike (SR 821) & SW 211 Street

TOWN: CUTLER RIDGE

LOCATION: FLORIDA TURNPIKE (SR 821) & SW 211 ST INTCHG

TCP ID: TC10 – 23E

AREA: 5, 6



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  2 PER LANE (LOCAL ROADS AND RAMPS)
  4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage access to South Bound Turnpike
2. Facilitate West Bound Movement on South West 211 Street
3. Facilitate North Bound movement on Service Road

MANPOWER/EQUIPMENT

4 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

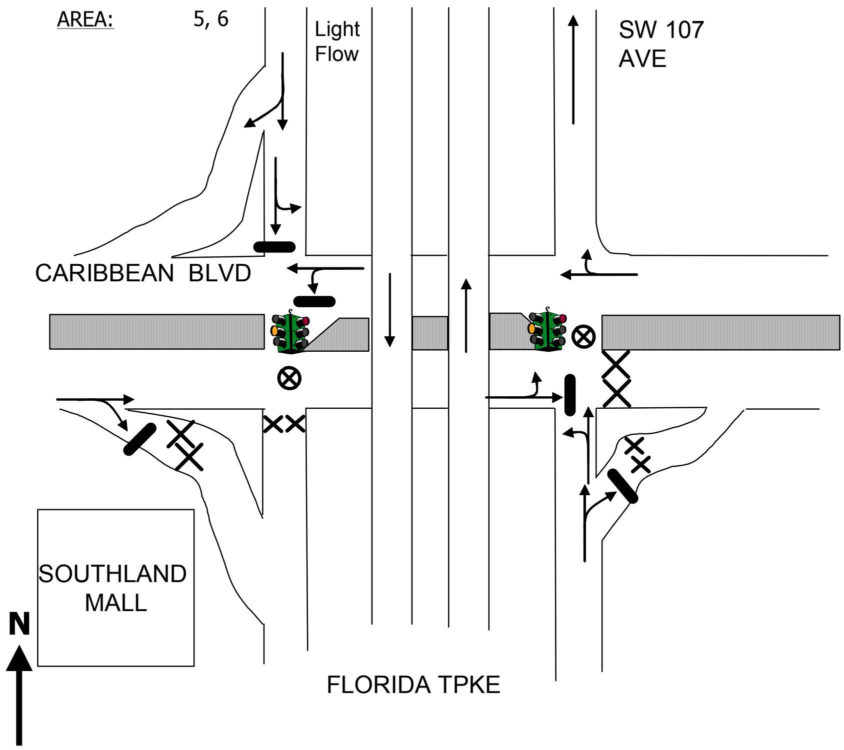
Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 21 of 31)
Florida Turnpike (SR 821) & Caribbean Boulevard

TOWN: CUTLER RIDGE

LOCATION: FLORIDA TURNPIKE (SR 821) & CARIBBEAN BLVD INTCHG

TCP ID: TC10 – 24E

AREA: 5, 6



Key

MOVEMENT FACILITATED

MOVEMENT DISCOURAGED/DIVERTED

TRAFFIC GUIDE

STOP SIGN

TRAFFIC BARRICADE (2 ft, 3 ft)

2 PER LANE (LOCAL ROADS AND RAMPS)

4 PER LANE (FREEWAY AND RAMPS)

TRAFFIC SIGNAL

TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): (8 ft)

DESCRIPTION

1. Discourage access to South Bound Turnpike
2. Discourage East Bound movement on Caribbean Boulevard
3. Facilitate West Bound movement on Caribbean Boulevard
4. Facilitate North Bound movement on South West 107 Street

MANPOWER/EQUIPMENT

10 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

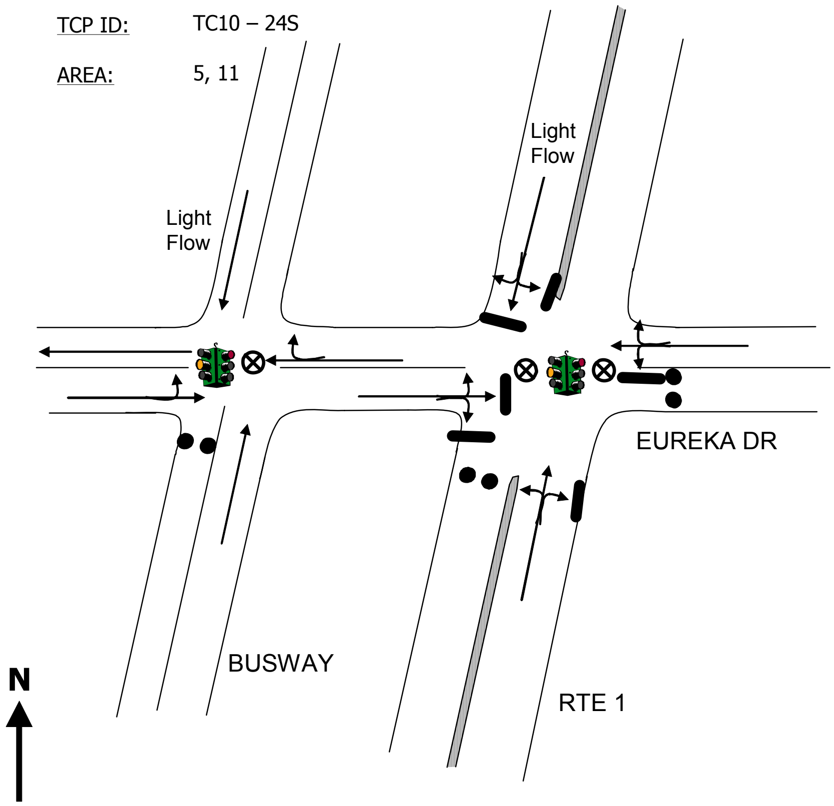
Figure G-1. Traffic Control Points — East Perrine/West Perrine (Sheet 22 of 31)

TOWN: EAST PERRINE / WEST PERRINE

LOCATION: RTE 1 & EUREKA DR (SW 184 ST)

TCP ID: TC10 – 24S

AREA: 5, 11



Key
- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft × 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage South Bound movement on Route 1
2. Discourage East Bound movement on Eureka Drive
3. Facilitate movement on North Bound Route 1 & West Bound Eureka Drive
4. Permit Vehicles to enter Busway North Bound

MANPOWER/EQUIPMENT

18 Traffic Cones
3 Traffic Guides

LOCATION PRIORITY

1

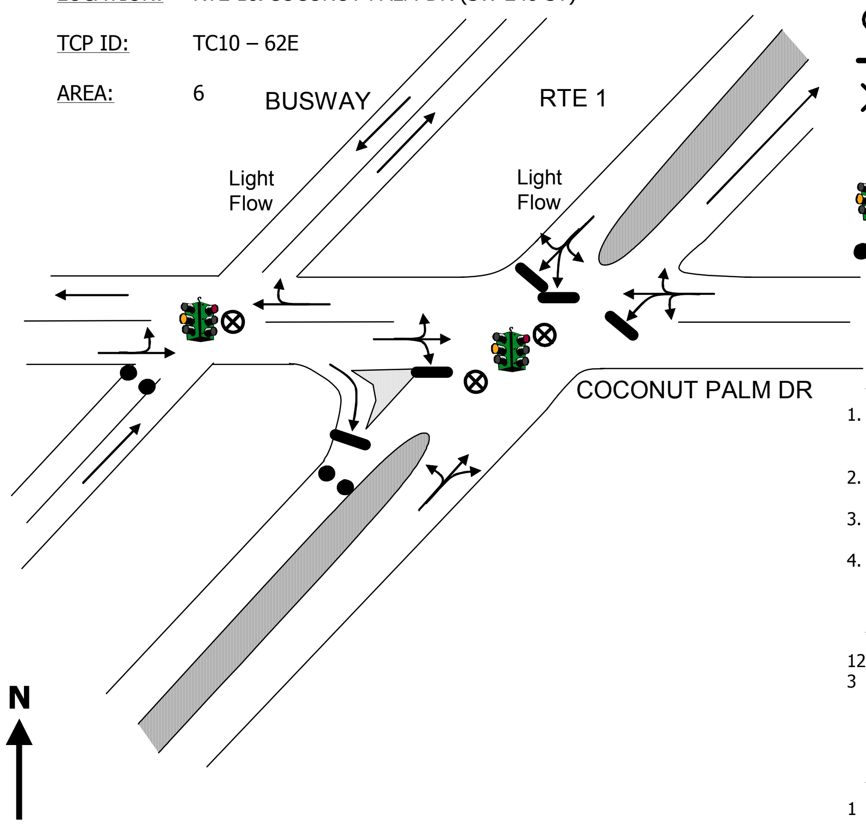
Figure G-1. Traffic Control Points — Princeton (Sheet 23 of 31)
U.S. Highway 1 & Coconut Palm Drive (SW 248 Street)

TOWN: PRINCETON

LOCATION: RTE 1& COCONUT PALM DR (SW 248 ST)

TCP ID: TC10 – 62E

AREA: 6



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
- 2 PER LANE (LOCAL ROADS AND RAMPS)
- 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate East Bound movement on Coconut Palm Drive to access Florida Turnpike.
2. Discourage South Bound movement on Route 1 and North Street
3. Facilitate North Bound movement on Route 1
4. Permit vehicles to enter Busway North Bound

MANPOWER/EQUIPMENT

12 Traffic Cones
3 Traffic Guides

LOCATION PRIORITY

1

Figure G-1. Traffic Control Points — Goulds (Sheet 24 of 31)

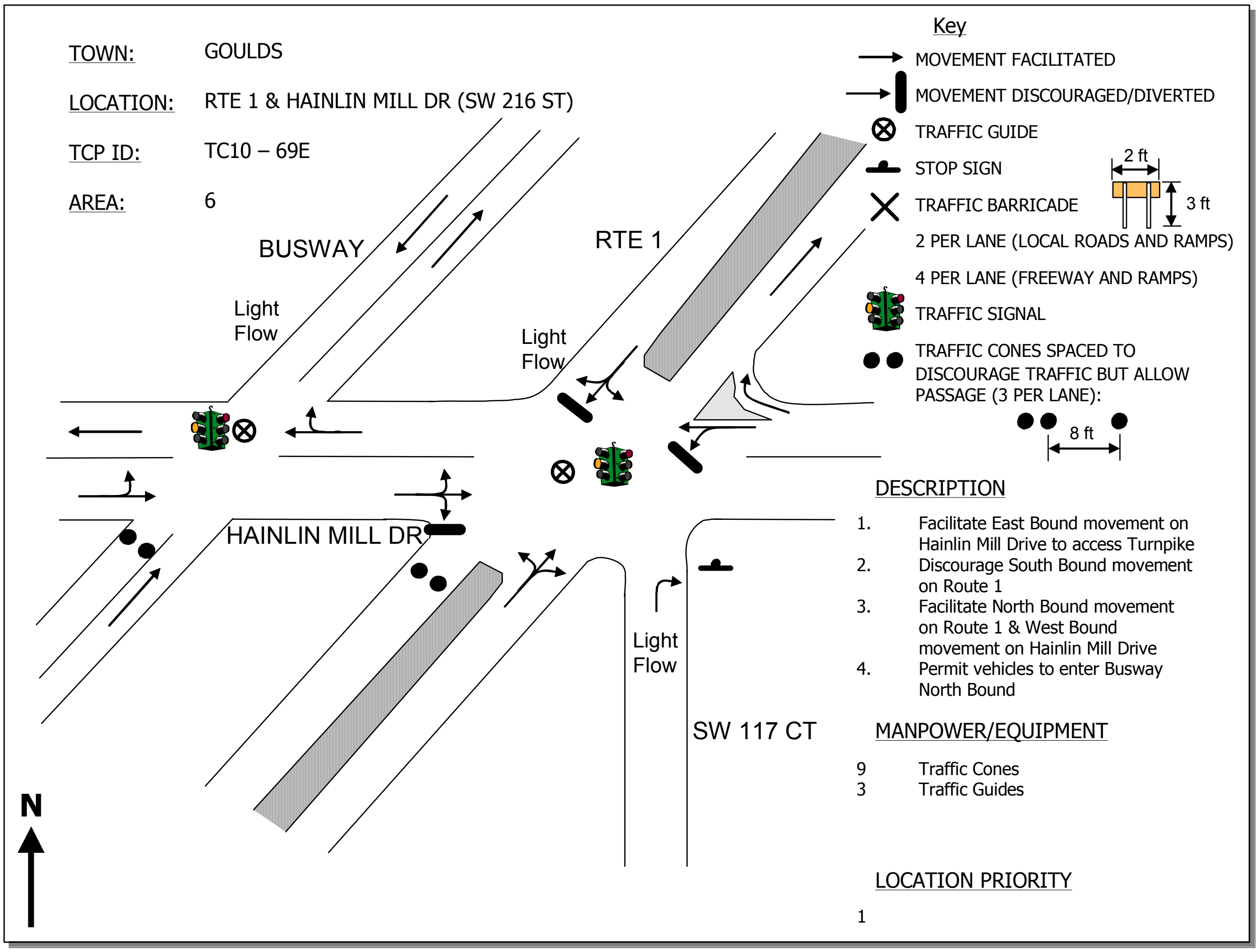


Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 25 of 31)
U.S. Highway 1 & All American Way (SW 211 Street)

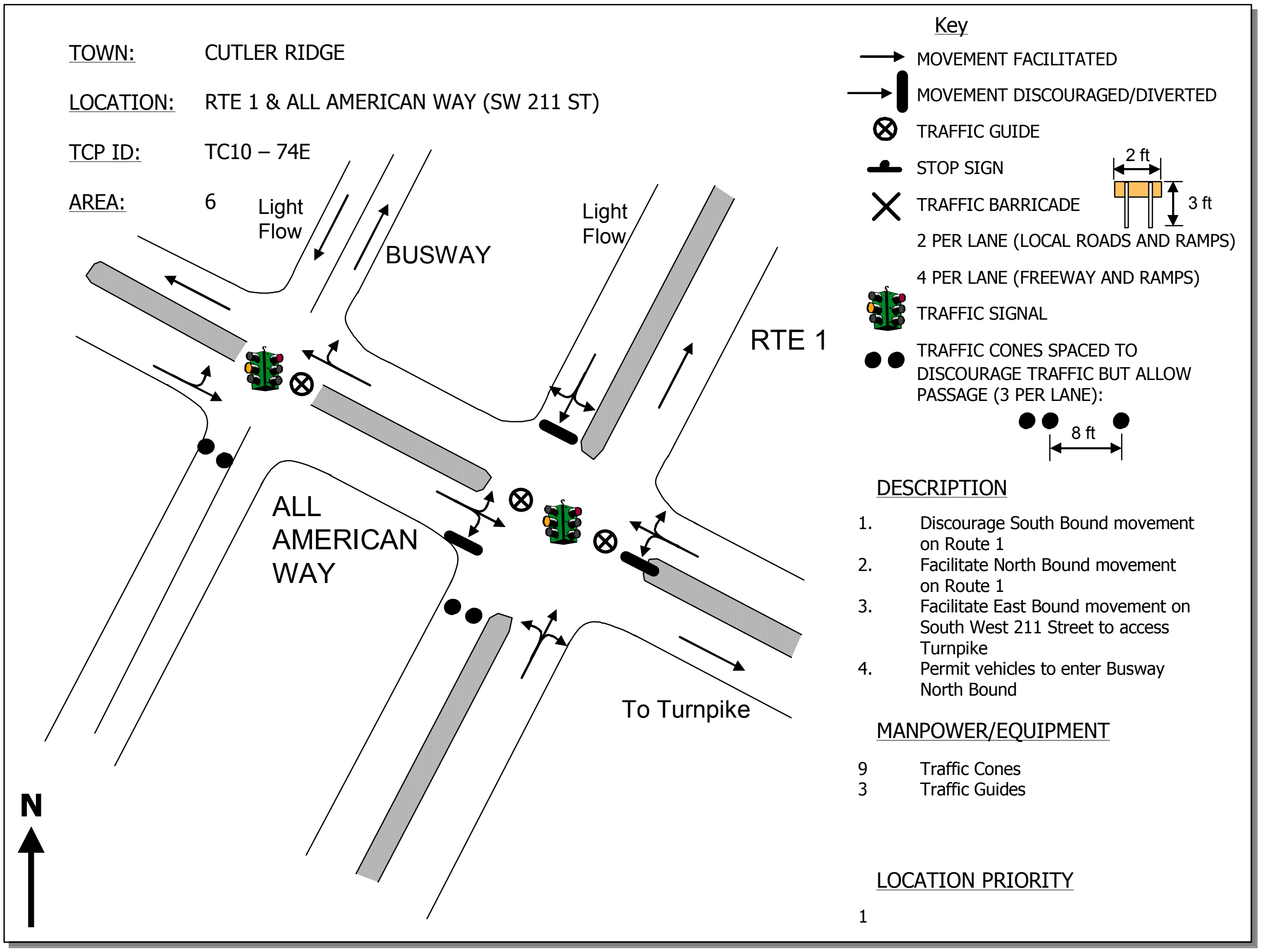
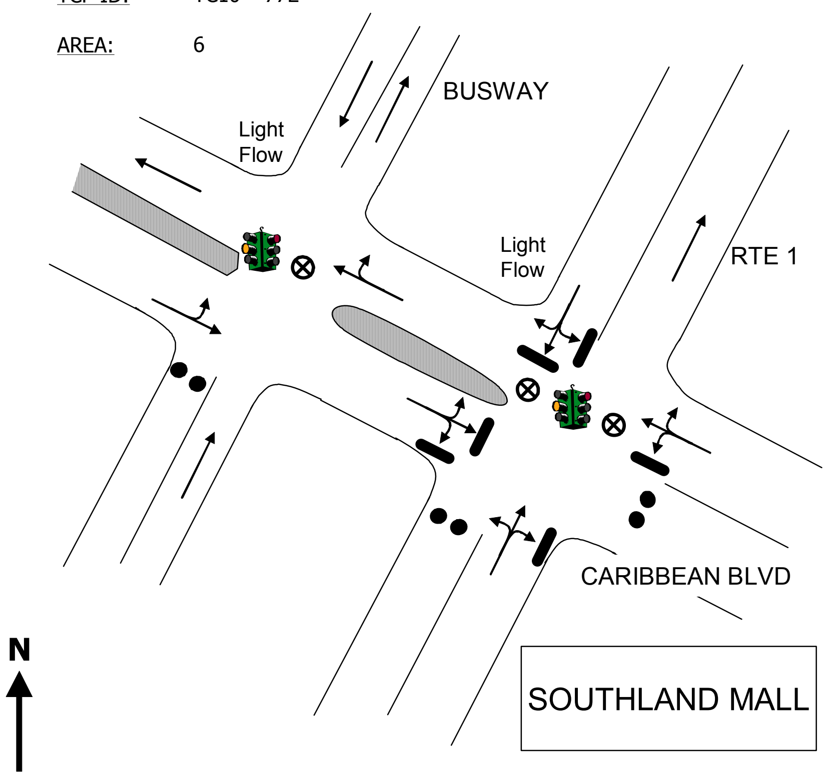


Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 26 of 31)
U.S. Highway 1 & Caribbean Boulevard (SW 200 Street)

TOWN:	CUTLER RIDGE
LOCATION:	RTE 1 & CARIBBEAN BLVD (SW 200 ST)
TCP ID:	TC10 – 77E
AREA:	6



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Discourage South Bound movement on Route 1
2. Discourage East Bound movement on Caribbean Boulevard
3. Facilitate movement on North Bound Route 1 & West Bound Caribbean Boulevard
4. Permit Vehicles to enter Busway North Bound

MANPOWER/EQUIPMENT

18 Traffic Cones
3 Traffic Guides

LOCATION PRIORITY

1

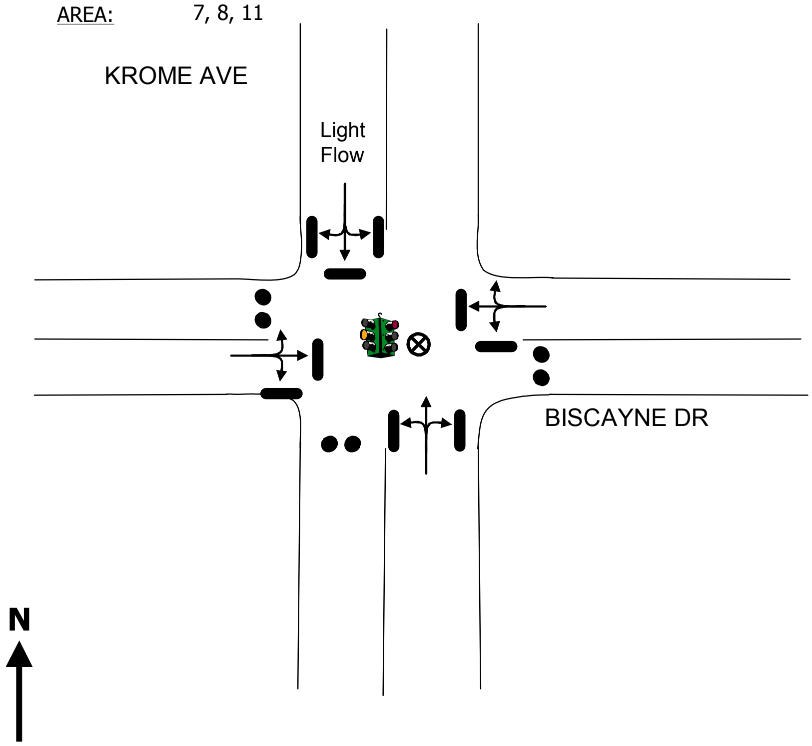
Figure G-1. Traffic Control Points — Unincorporated Miami-Dade (Sheet 27 of 31) Krome Avenue (997) & Biscayne Drive (SW 288 Street)

TOWN: UNINCORPORATED MIAMI-DADE

LOCATION: KROME AVE (997) & BISCAYNE DR (SW 288 ST)

TCP ID: TC10 – 90E

AREA: 7, 8, 11



Key

MOVEMENT FACILITATED

MOVEMENT DISCOURAGED/DIVERTED

TRAFFIC GUIDE

STOP SIGN

TRAFFIC BARRICADE (2 ft, 3 ft)

2 PER LANE (LOCAL ROADS AND RAMPS)

4 PER LANE (FREEWAY AND RAMPS)

TRAFFIC SIGNAL

TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Maintain traffic flow North Bound on Krome Avenue
2. No turns from Krome Avenue North Bound
3. Discourage South Bound movement on Krome Avenue

MANPOWER/EQUIPMENT

9 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

1

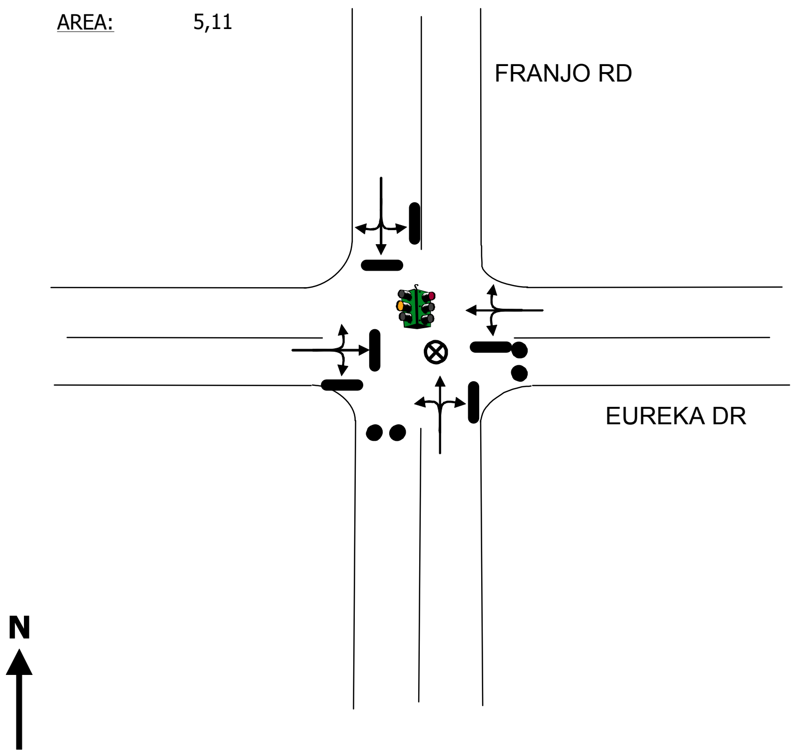
Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 28 of 31)
Eureka Drive (SW 184 Street) & Franjo Road (SW 97 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & FRANJO RD (SW 97 AVE)

TCP ID: TC10 – 81E

AREA: 5,11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate West Bound movement on Eureka Drive towards Route 1, and North Bound on Franjo Road towards Route 1
2. Discourage movement South Bound on Franjo Road and East Bound on Eureka Drive

MANPOWER/EQUIPMENT

6 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

2

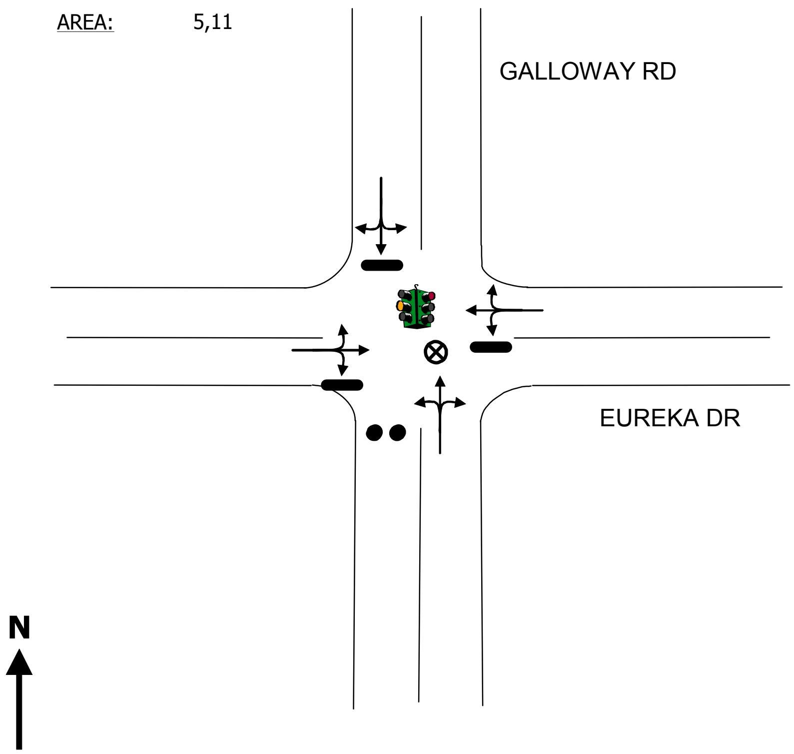
Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 29 of 31)
Eureka Drive (SW 184 Street) & Galloway Road (SW 87 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & GALLOWAY RD (SW 87 AVE)

TCP ID: TC10 – 82E

AREA: 5,11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate East Bound movement on Eureka Drive towards Old Cutler Road, and West Bound towards Route 1
2. Discourage movement South Bound on Galloway Road

MANPOWER/EQUIPMENT

3 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

2

Figure G-1. Traffic Control Points — Cutler Ridge/South Miami Heights (Sheet 30 of 31)

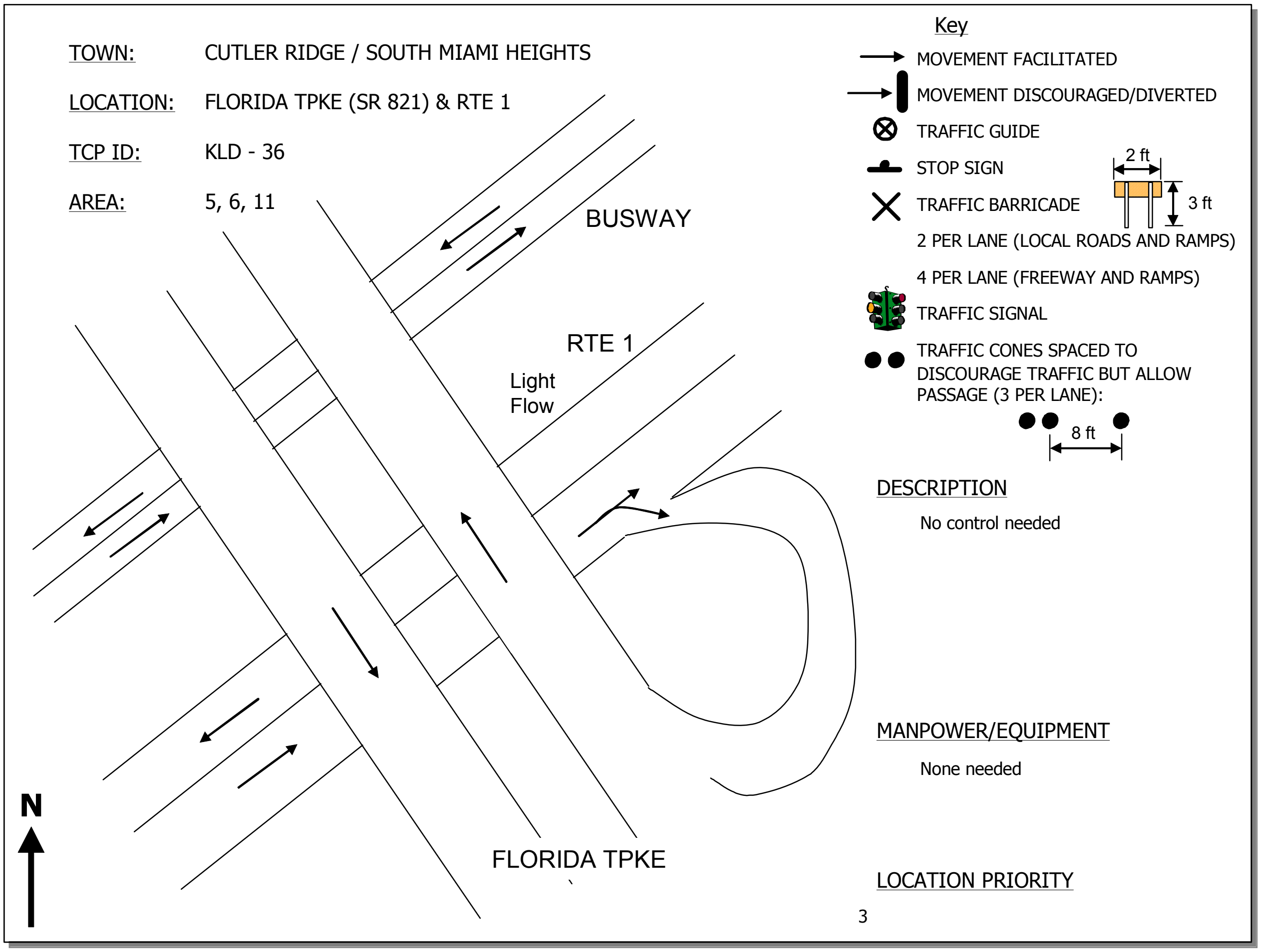


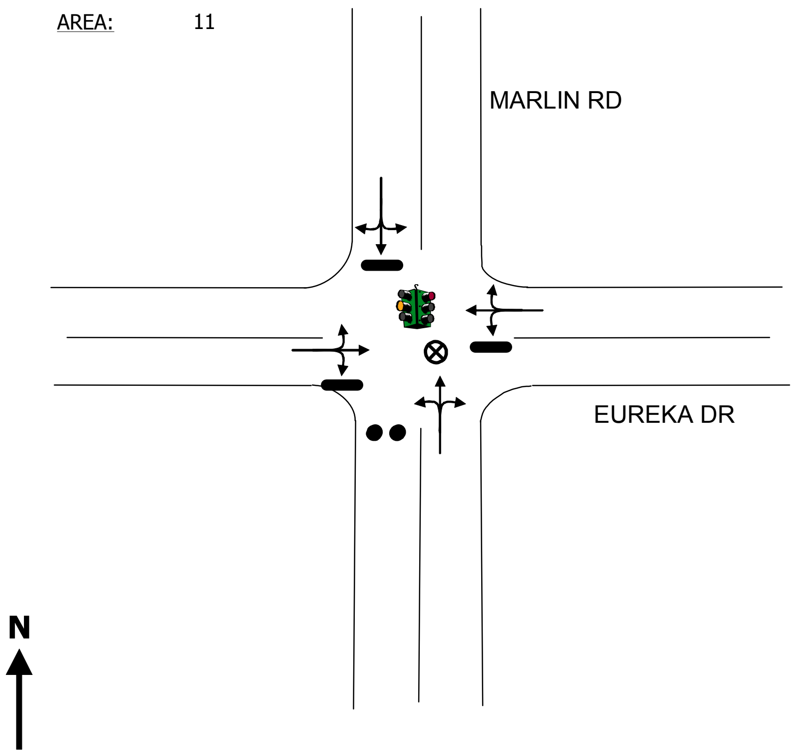
Figure G-1. Traffic Control Points — Cutler Ridge (Sheet 31 of 31)
Eureka Drive (SW 184 Street) & Marlin Road (SW 107 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & MARLIN RD (SW 107 AVE)

TCP ID: KLD - 46

AREA: 11



Key

MOVEMENT FACILITATED
MOVEMENT DISCOURAGED/DIVERTED
TRAFFIC GUIDE
STOP SIGN
TRAFFIC BARRICADE (2 ft, 3 ft)
2 PER LANE (LOCAL ROADS AND RAMPS)
4 PER LANE (FREEWAY AND RAMPS)
TRAFFIC SIGNAL
TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate East Bound movement on Eureka Drive towards Route 1, and West Bound towards Florida Turnpike
2. Facilitate North Bound movement on Marlin Road towards Route 1
3. Discourage movement South Bound on Marlin Road

MANPOWER/EQUIPMENT

3 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

3

Figure G-2. Turkey Point Nuclear Power Plant Reception Center Traffic Control Points (Sheet 1 of 10)

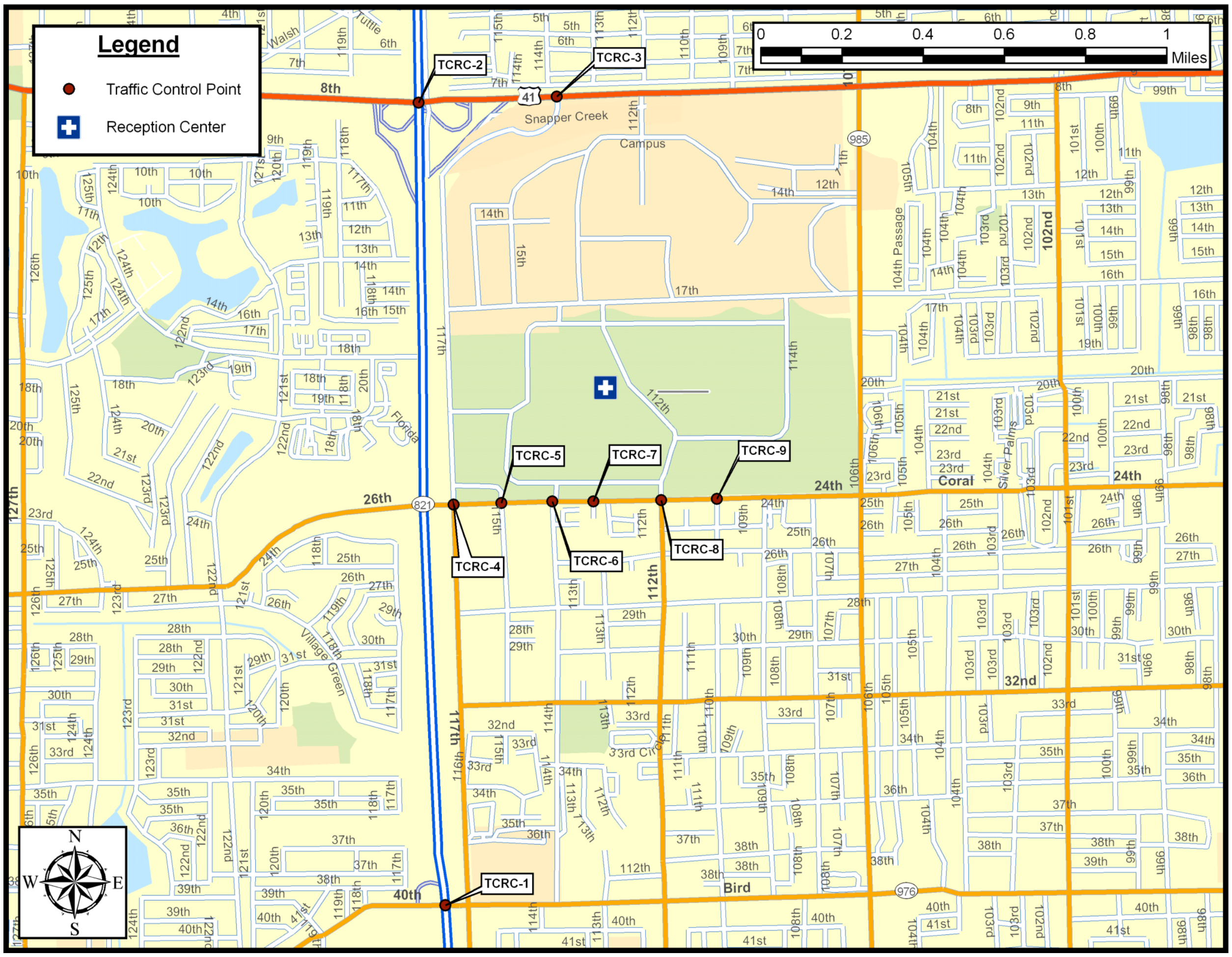


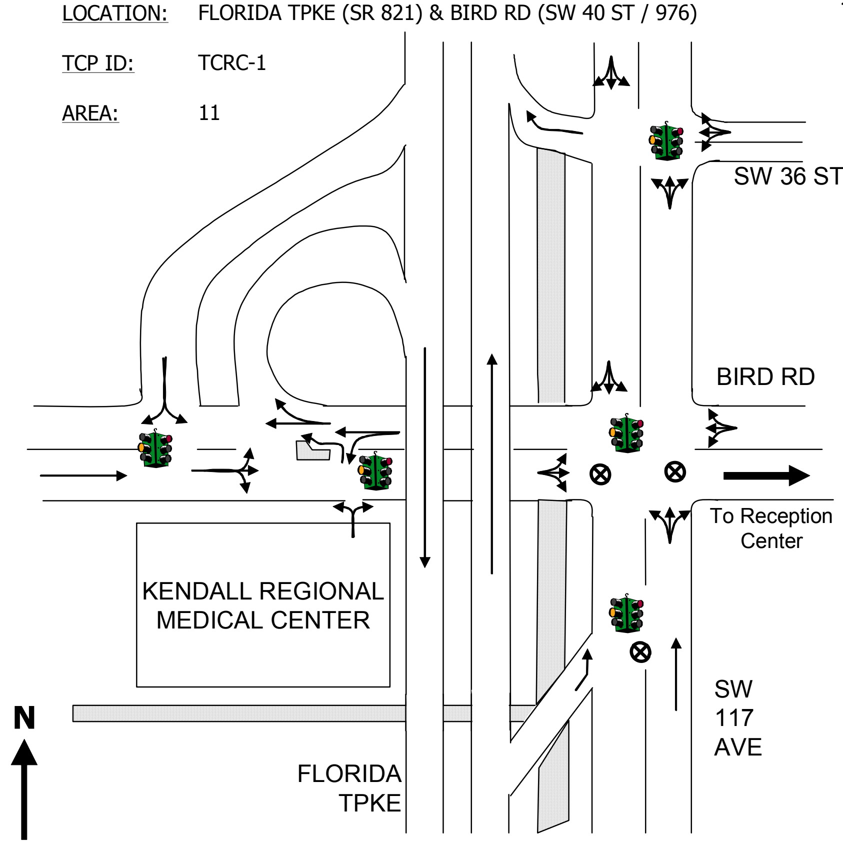
Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 2 of 10)
Florida Turnpike (SR 821) & Bird Road (SW 40 Street/976)

TOWN: MIAMI

LOCATION: FLORIDA TPKE (SR 821) & BIRD RD (SW 40 ST / 976)

TCP ID: TCRC-1

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate flow East Bound on Bird Road towards Reception Center
2. **Position dynamic message signs (DMS) directing traffic to exit at Exit 23 (Bird Road) or Exit 25 (Tamiami Trail) to access Reception Center**

MANPOWER/EQUIPMENT

3 Traffic Guides
1 Dynamic Message Sign

LOCATION PRIORITY

1

Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 3 of 10)
Florida Turnpike (SR 821) & SW 8 Street (31)

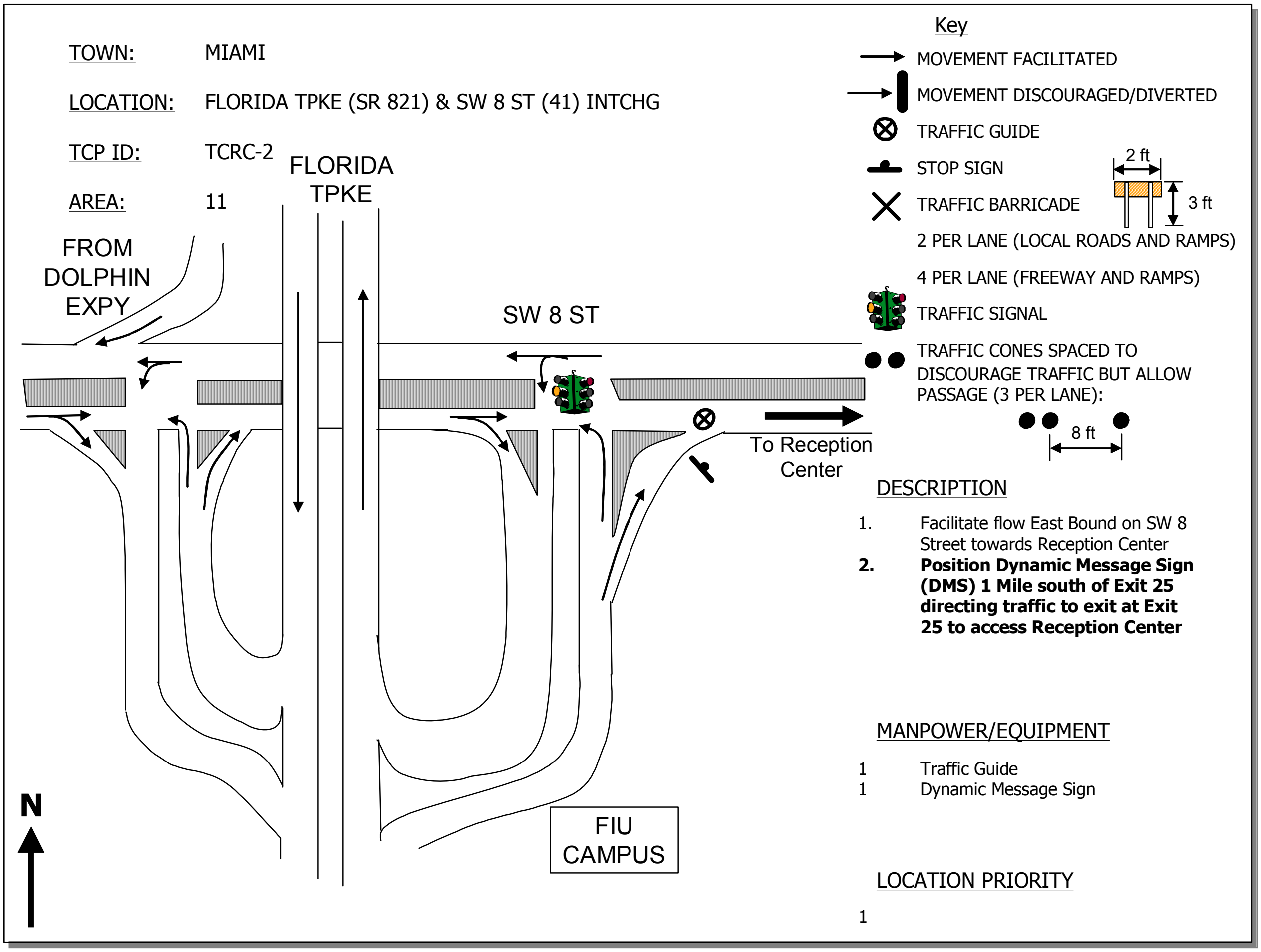


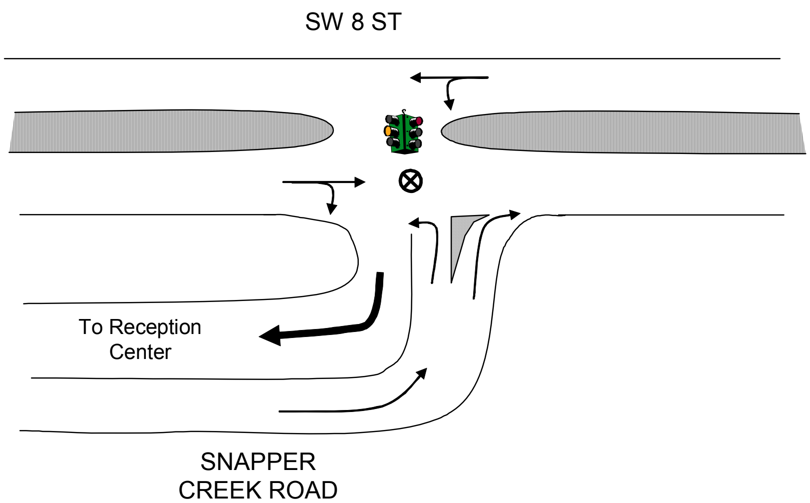
Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 4 of 10)
Tamiami Trail (SW 8 Street) & Snapper Creek Road

TOWN: MIAMI

LOCATION: TAMIAMI TRAIL (SW 8 ST) & SNAPPER CREEK ROAD

TCP ID: TCRC-3

AREA: 11



N

Key
- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
- 2 PER LANE (LOCAL ROADS AND RAMPS)
- 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate flow onto Snapper Creek Road towards Reception Center

MANPOWER/EQUIPMENT

1 Traffic Guide

LOCATION PRIORITY

1

Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 5 of 10)
SW 117 Avenue & Coral Way

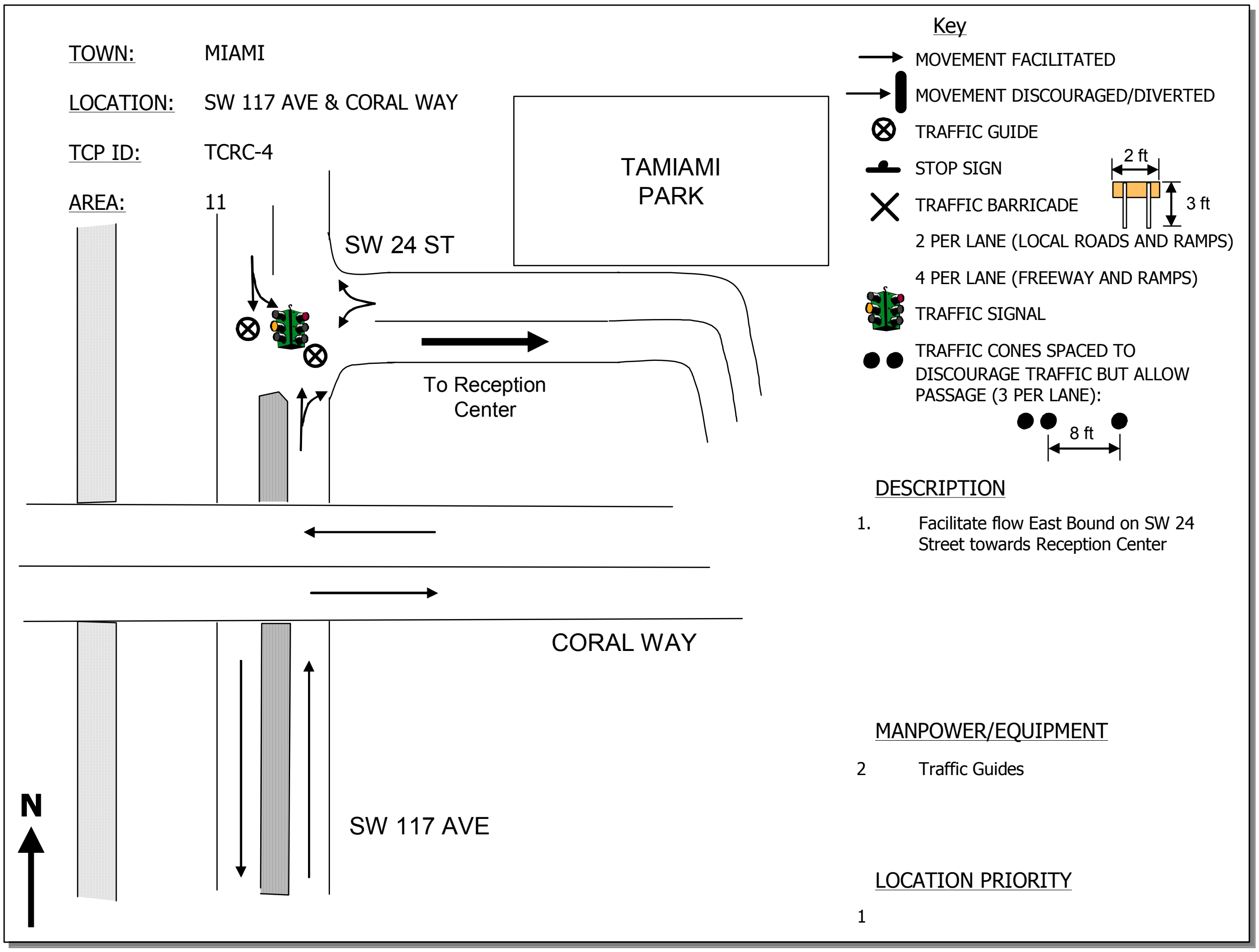


Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 6 of 10)
SW 115 Avenue & Coral Way

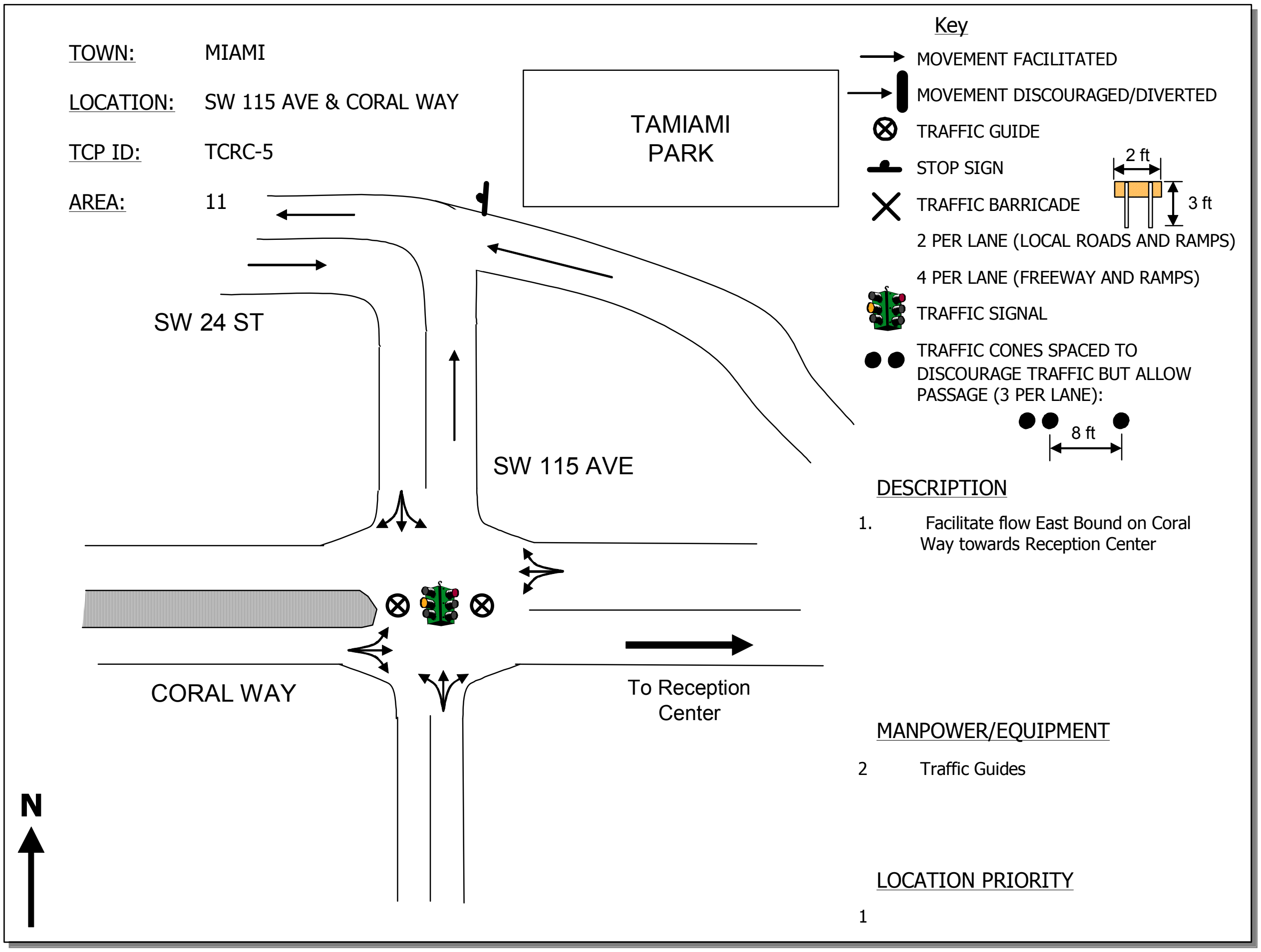


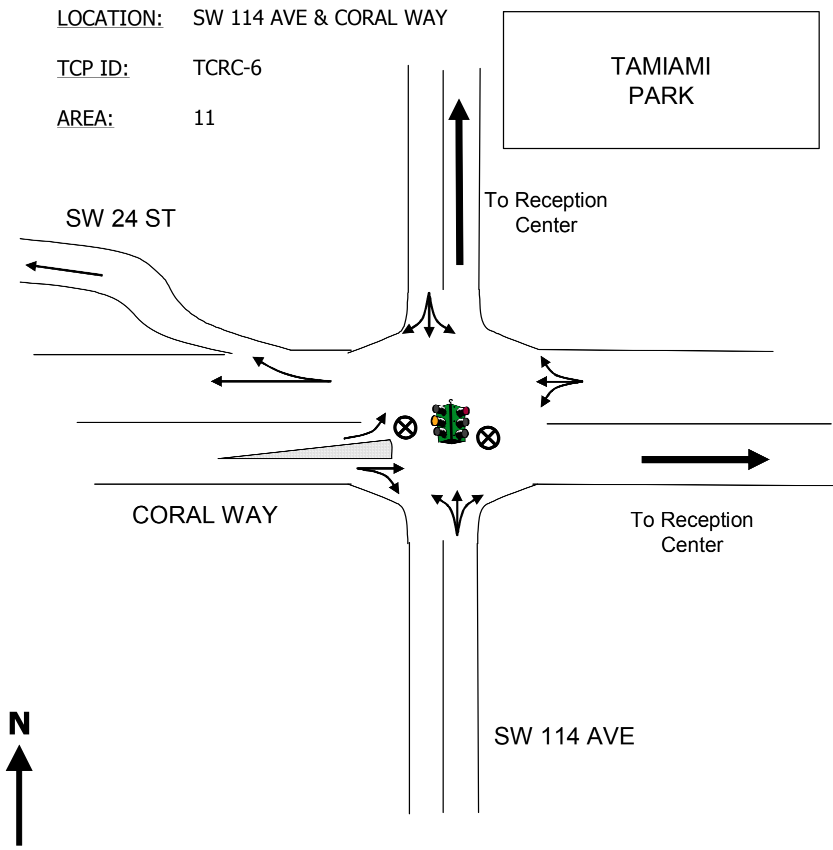
Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 7 of 10)
SW 114 Avenue & Coral Way

TOWN: MIAMI

LOCATION: SW 114 AVE & CORAL WAY

TCP ID: TCRC-6

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Facilitate flow East Bound on Coral Way towards Reception Center
2. Facilitate flow North Bound towards Tamiami Park

MANPOWER/EQUIPMENT

2 Traffic Guides

LOCATION PRIORITY

1

Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 8 of 10)
SW 113 Court & Coral Way

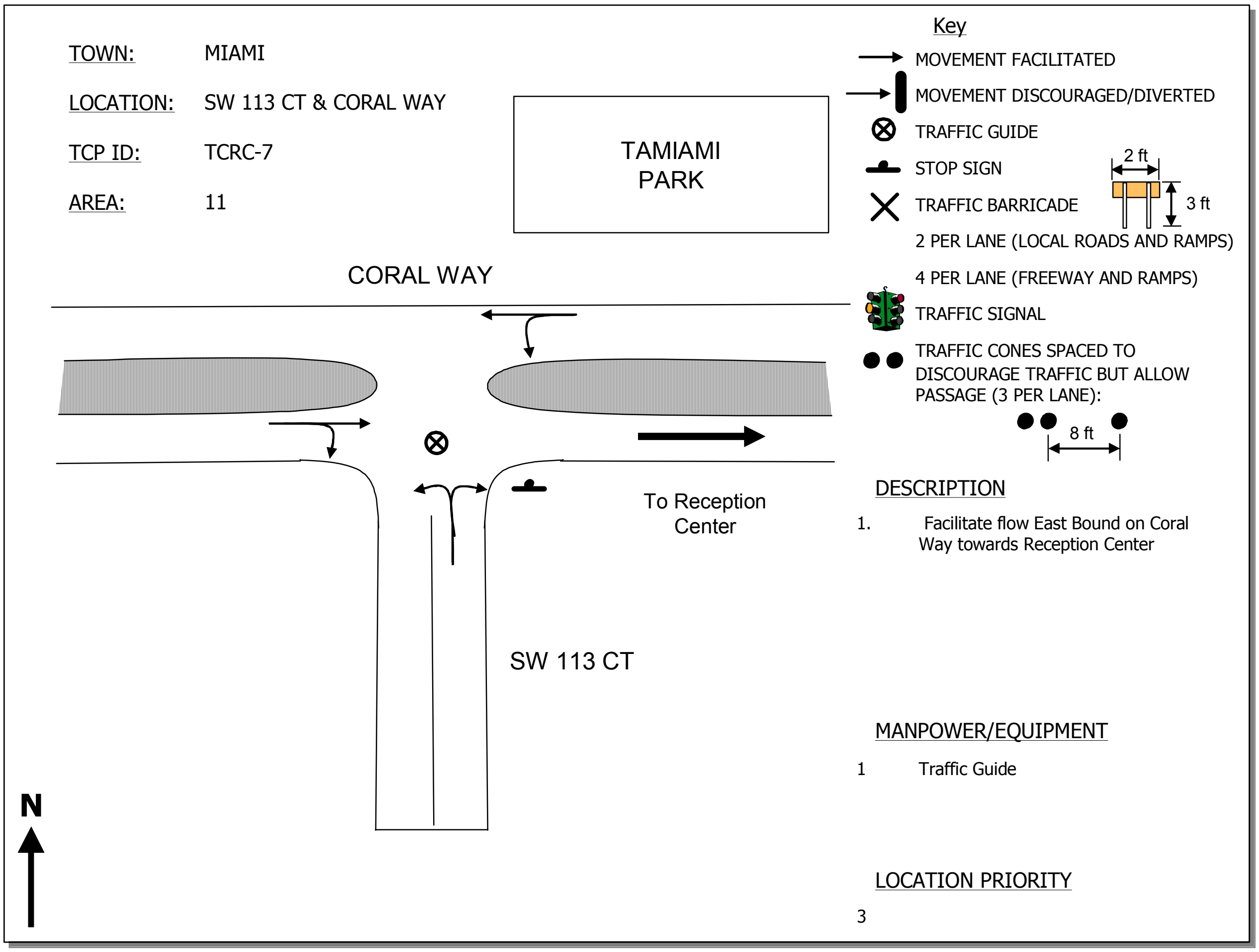


Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 9 of 10)
SW 112 Avenue & Coral Way

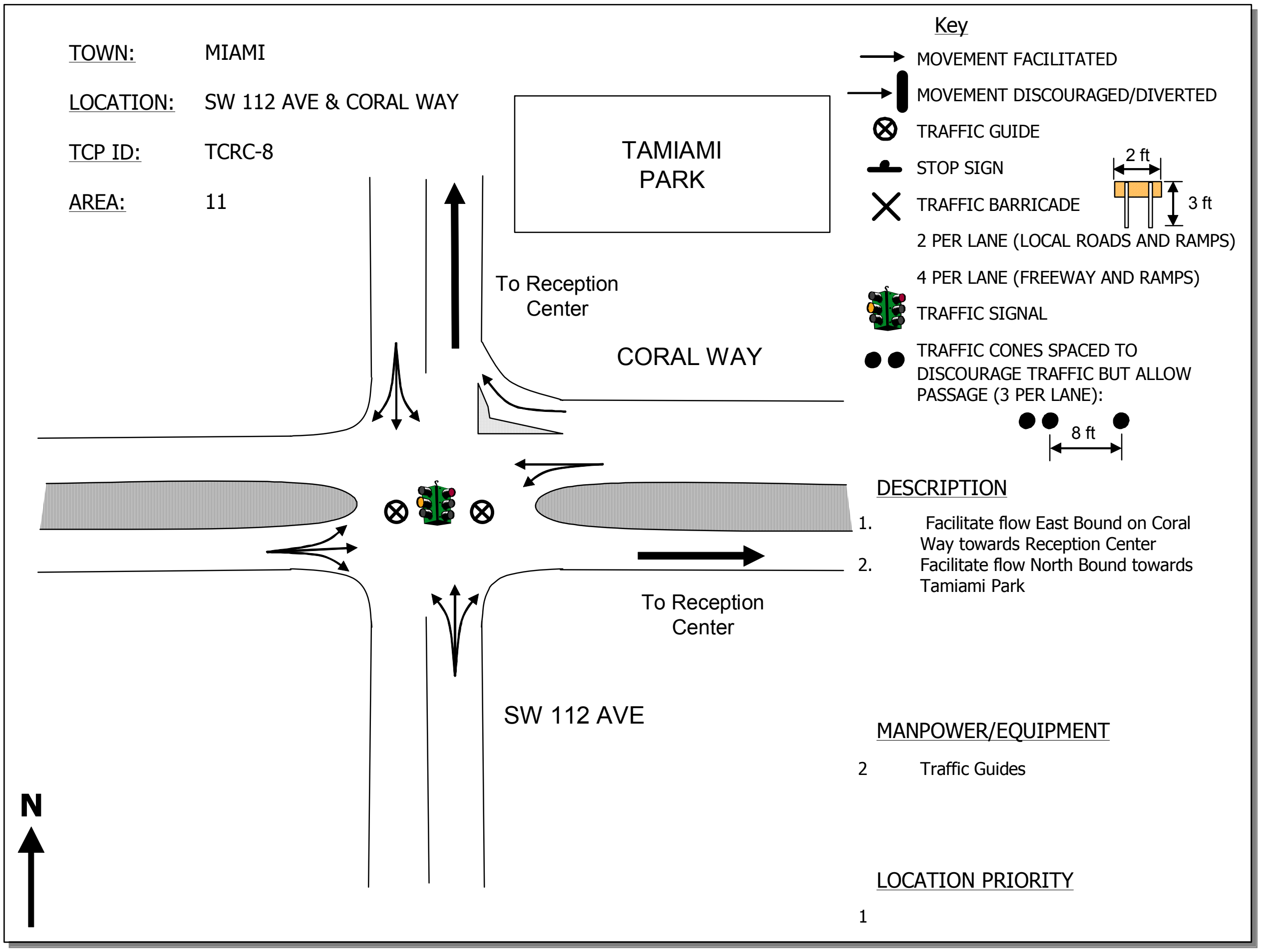
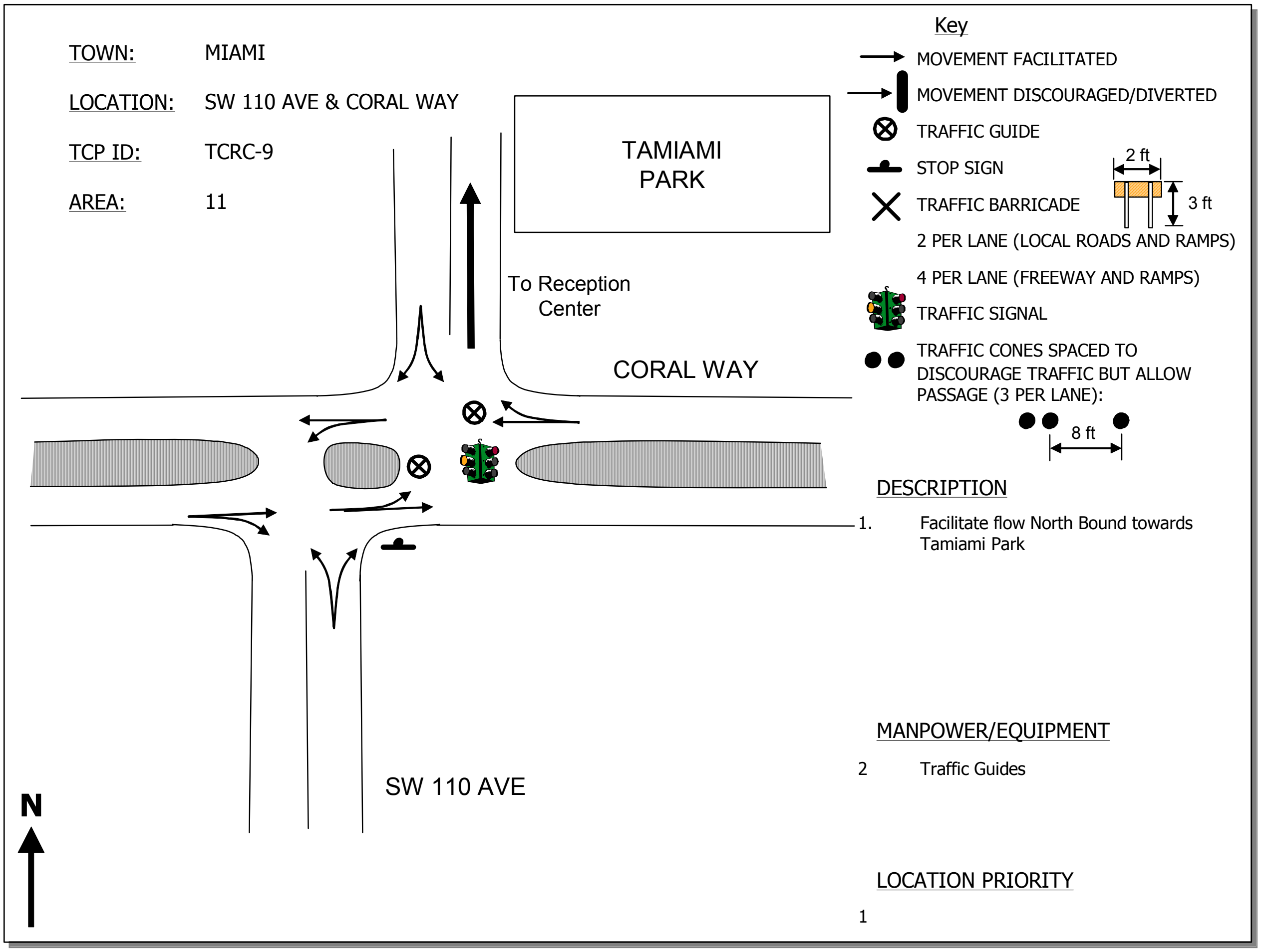


Figure G-2. Reception Center Traffic Control Points — Miami (Sheet 10 of 10)
SW 110 Avenue & Coral Way



DESCRIPTION

1. Facilitate flow North Bound towards Tamiami Park

MANPOWER/EQUIPMENT

2 Traffic Guides

LOCATION PRIORITY

1

Figure G-3. Turkey Point Nuclear Power Plant Access Control Points (Sheet 1 of 12)

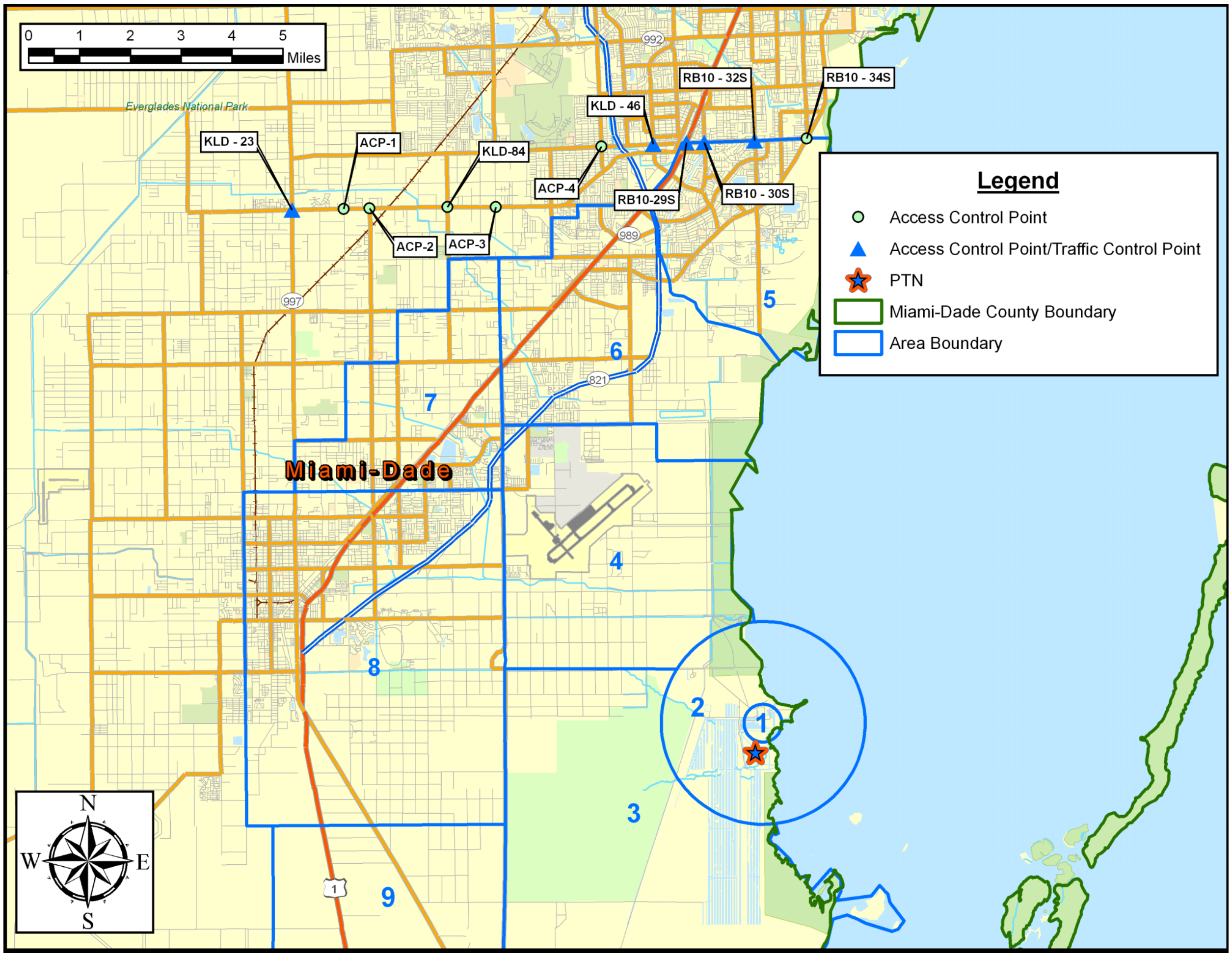


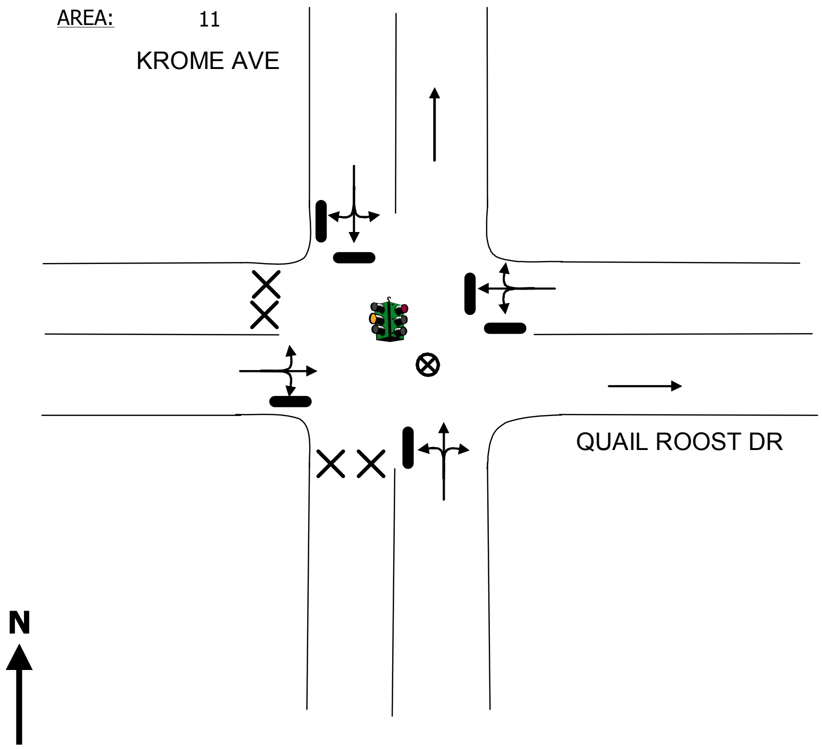
Figure G-3. Access Control Points — Unincorporated Miami-Dade (Sheet 2 of 12)
Krome Avenue (997) & Quail Roost Drive (SW 200 Street/994)

TOWN: UNINCORPORATED MIAMI-DADE

LOCATION: KROME AVE (997) & QUAIL ROOST DR (SW 200 ST / 994)

ACP ID: KLD - 23

AREA: 11



Key

MOVEMENT FACILITATED
MOVEMENT DISCOURAGED/DIVERTED
TRAFFIC GUIDE
STOP SIGN
TRAFFIC BARRICADE (2 ft, 3 ft)
2 PER LANE (LOCAL ROADS AND RAMPS)
4 PER LANE (FREEWAY AND RAMPS)
TRAFFIC SIGNAL
TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): (8 ft)

DESCRIPTION

1. Interdict and divert South Bound traffic on Krome Avenue and West Bound traffic on Quail Roost Drive

MANPOWER/EQUIPMENT

4 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

1

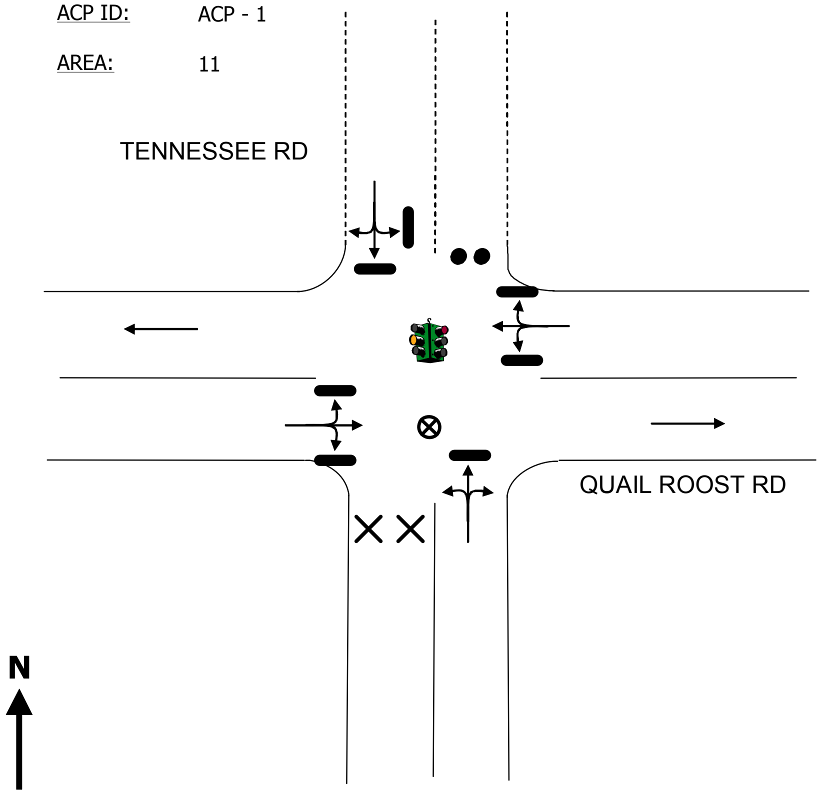
Figure G-3. Access Control Points — Unincorporated Miami-Dade (Sheet 3 of 12)
Quail Roost Drive & Tennessee Road (SW 167 Street)

TOWN: UNINCORPORATED MIAMI - DADE

LOCATION: QUAIL ROOST DR & TENNESSEE RD (SW 167 ST)

ACP ID: ACP - 1

AREA: 11



Key

MOVEMENT FACILITATED
MOVEMENT DISCOURAGED/DIVERTED
TRAFFIC GUIDE
STOP SIGN
TRAFFIC BARRICADE
2 ft
3 ft
2 PER LANE (LOCAL ROADS AND RAMPS)
4 PER LANE (FREEWAY AND RAMPS)
TRAFFIC SIGNAL
TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE):
8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Tenessee Road
2. Discourage movement North Bound on Tennesee Road

MANPOWER/EQUIPMENT

2 Traffic Barricades
3 Traffic Cones
1 Traffic Guide

LOCATION PRIORITY

2

**Figure G-3. Access Control Points — Unincorporated Miami-Dade (Sheet 4 of 12)
Quail Roost Drive & Farmlife School Road (SW 162 Street)**

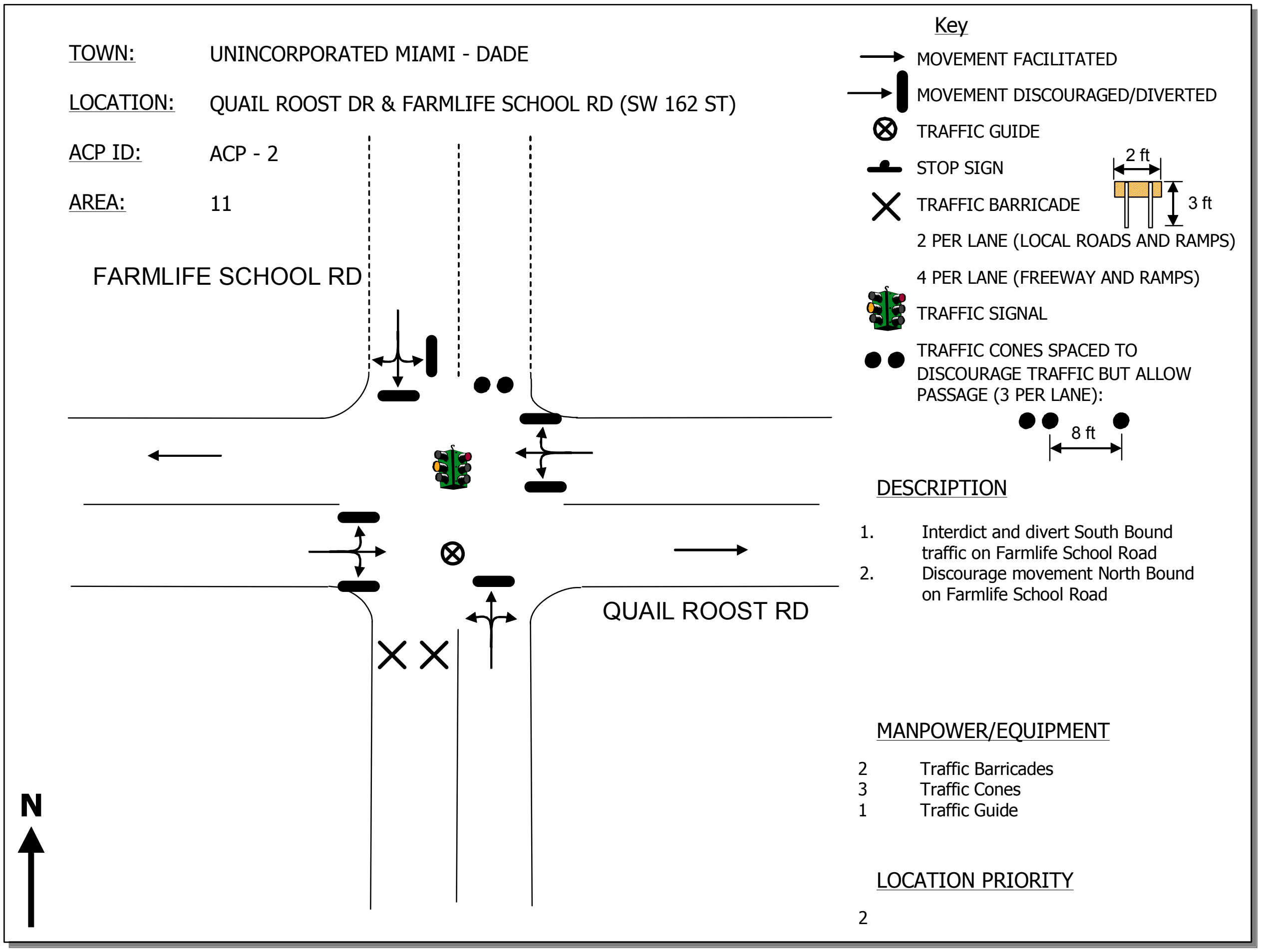


Figure G-3. Access Control Points — Unincorporated Miami-Dade (Sheet 5 of 12)
Naranjard (SW 147 Street) & Quail Roost Drive (SW 200 Street)

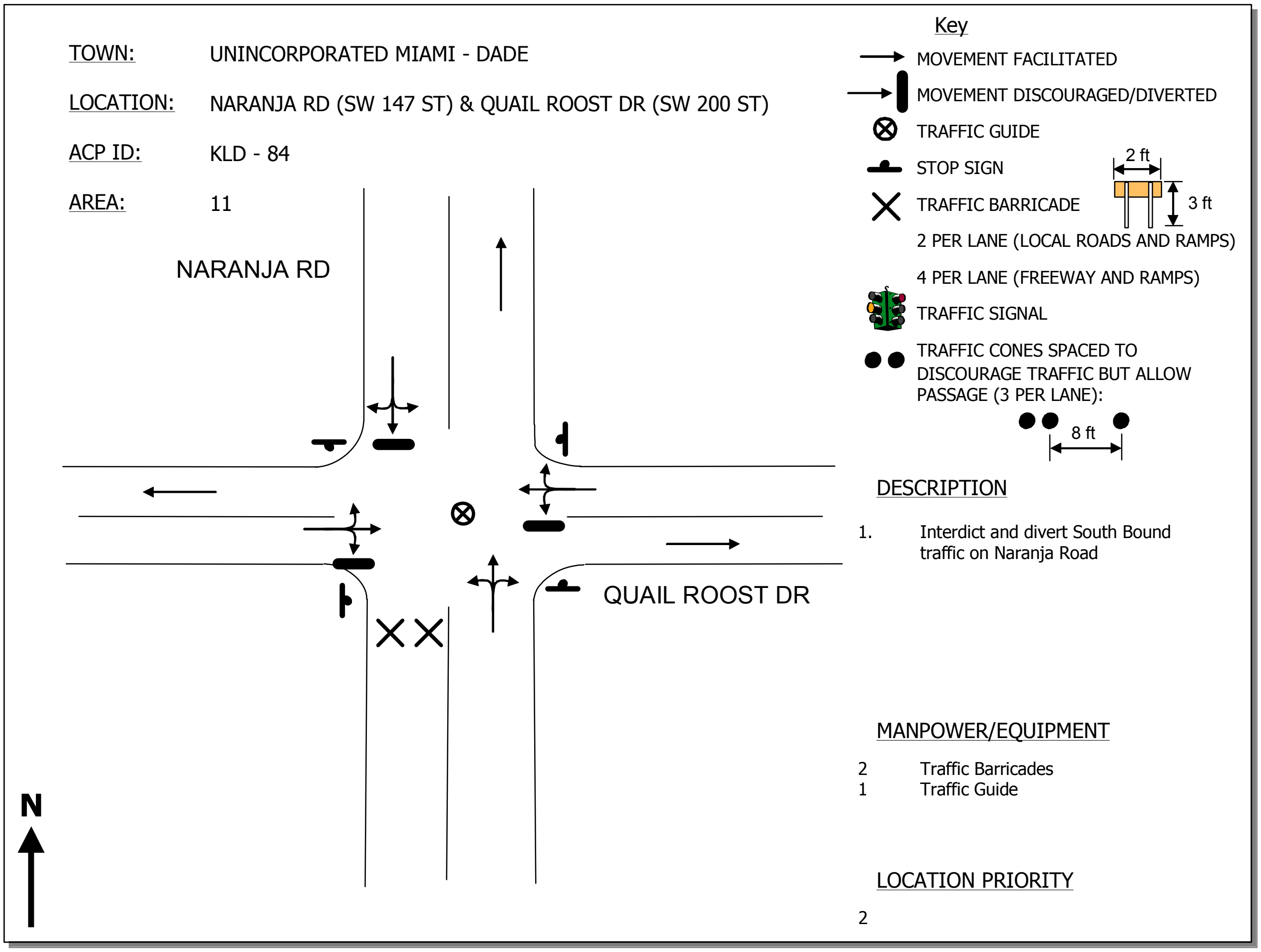


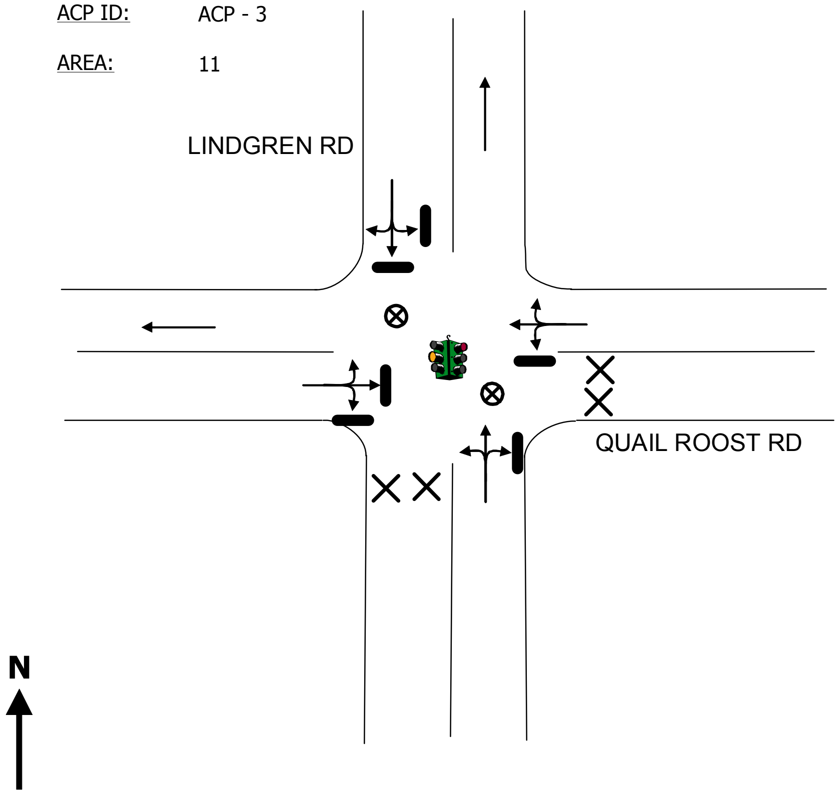
Figure G-3. Access Control Points — Unincorporated Miami-Dade (Sheet 6 of 12)
Quail Roost Drive & Lindgren Road (SW 137 Street)

TOWN: UNINCORPORATED MIAMI - DADE

LOCATION: QUAIL ROOST DR & LINDGREN RD (SW 137 ST)

ACP ID: ACP - 3

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Lindgren Road and East Bound traffic on Quail Roost Drive

MANPOWER/EQUIPMENT

4 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

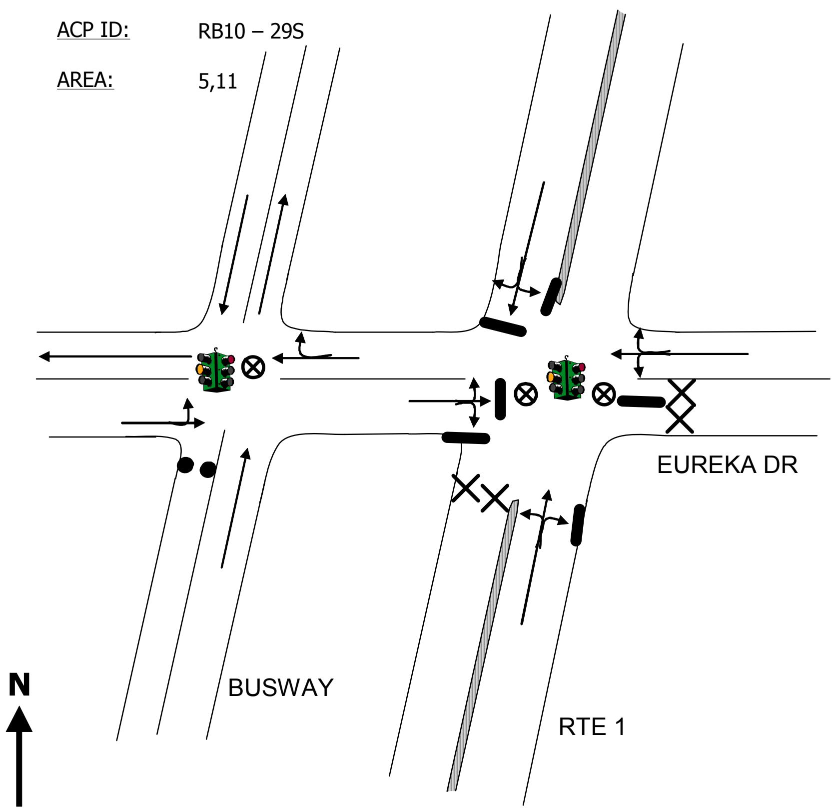
Figure G-3. Access Control Points — East Perrine/West Perrine (Sheet 7 of 12)

TOWN: EAST PERRINE / WEST PERRINE

LOCATION: RTE 1 & EUREKA DR (SW 184 ST)

ACP ID: RB10 – 29S

AREA: 5,11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Route 1 and East Bound traffic on Eureka Drive

MANPOWER/EQUIPMENT

4 Traffic Barricades
3 Traffic Cones
3 Traffic Guides

LOCATION PRIORITY

1

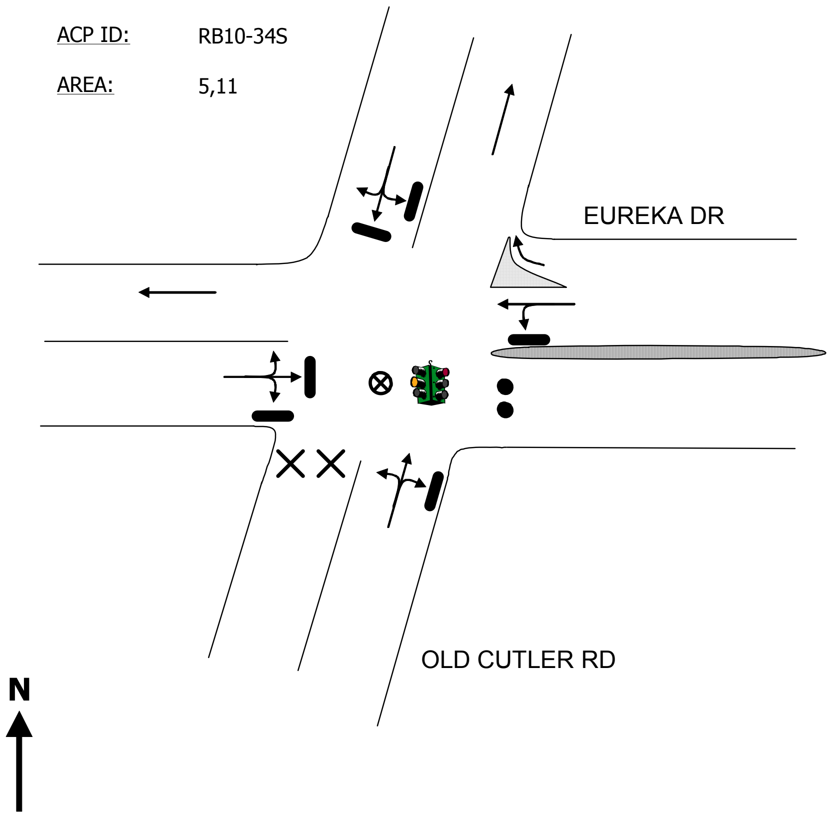
Figure G-3. Access Control Points — Cutler Ridge (Sheet 8 of 12)
Old Cutler Road & Eureka Drive (SW 184 Street)

TOWN: CUTLER RIDGE

LOCATION: OLD CUTLER RD & EUREKA DR (SW 184 ST)

ACP ID: RB10-34S

AREA: 5,11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Old Cutler Road
2. Discourage movement East Bound on Eureka Drive

MANPOWER/EQUIPMENT

3 Traffic Cones
2 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

1

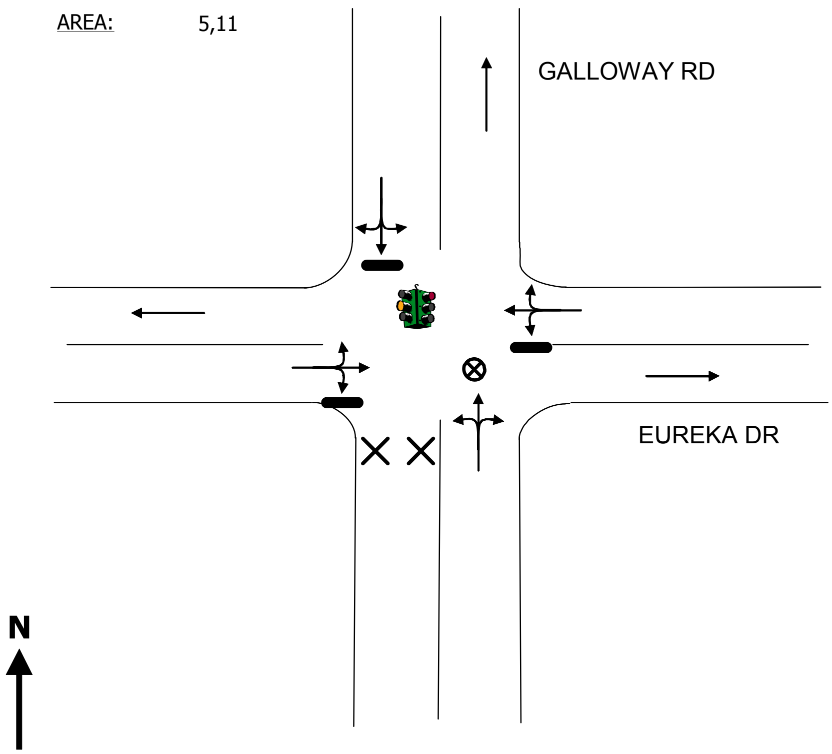
Figure G-3. Access Control Points — Cutler Ridge (Sheet 9 of 12)
Eureka Drive (SW 184 Street) & Galloway Road (SW 87 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & GALLOWAY RD (SW 87 AVE)

ACP ID: RB10-32S

AREA: 5,11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Galloway Road

MANPOWER/EQUIPMENT

2 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

2

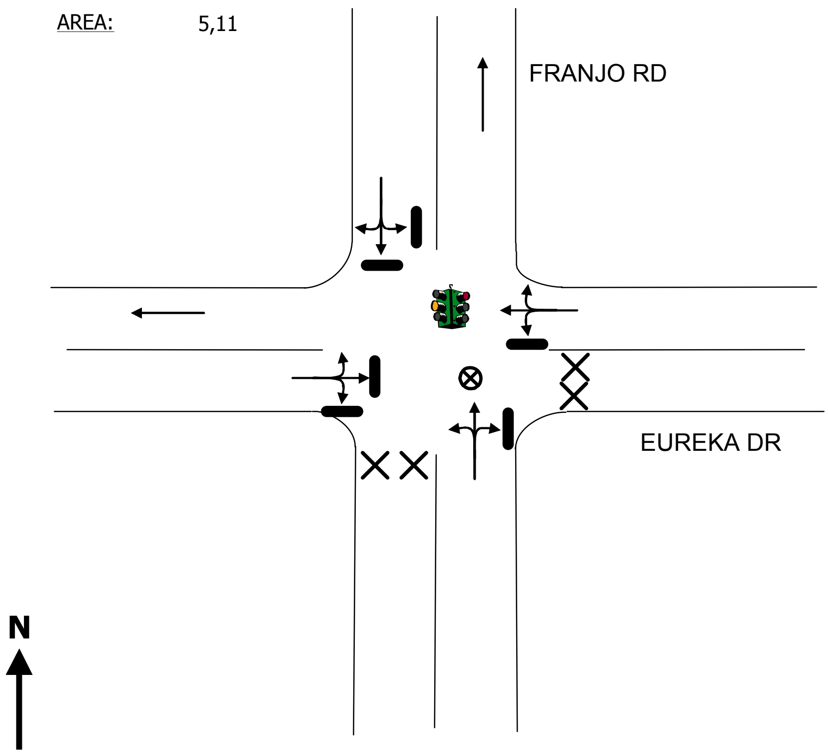
Figure G-3. Access Control Points — Cutler Ridge (Sheet 10 of 12)
Eureka Drive (SW 184 Street) & Franjo Road (SW 97 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & FRANJO RD (SW 97 AVE)

ACP ID: RB10-30S

AREA: 5,11



Key
- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft × 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Franjo Road and East Bound traffic on Eureka Drive

MANPOWER/EQUIPMENT

4 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

2

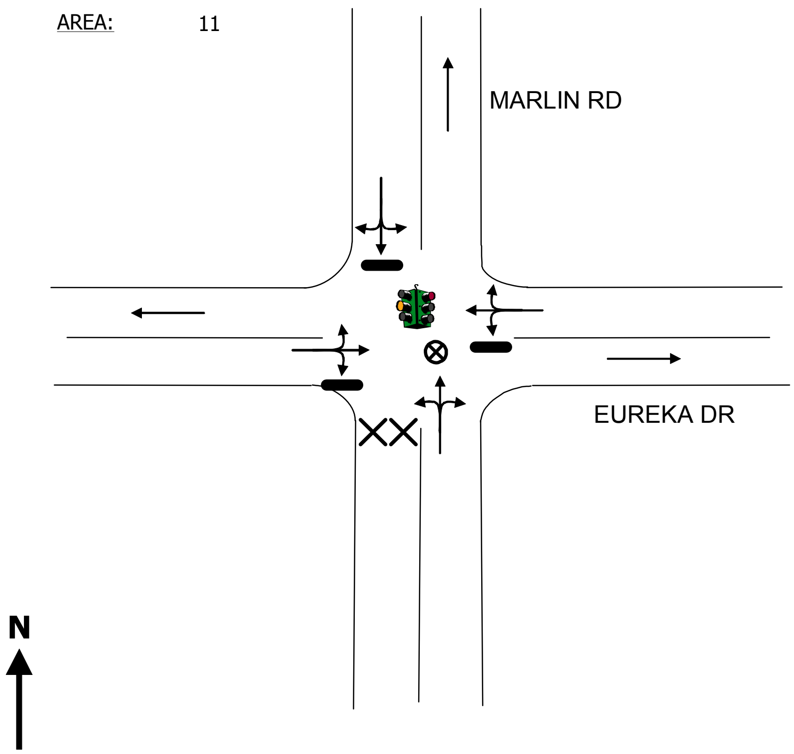
Figure G-3. Access Control Points — Cutler Ridge (Sheet 11 of 12)
Eureka Drive (SW 184 Street) & Marlin Road (SW 107 Avenue)

TOWN: CUTLER RIDGE

LOCATION: EUREKA DR (SW 184 ST) & MARLIN RD (SW 107 AVE)

ACP ID: KLD - 46

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
- 2 PER LANE (LOCAL ROADS AND RAMPS)
- 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on Marlin Road

MANPOWER/EQUIPMENT

2 Traffic Barricades
1 Traffic Guide

LOCATION PRIORITY

2

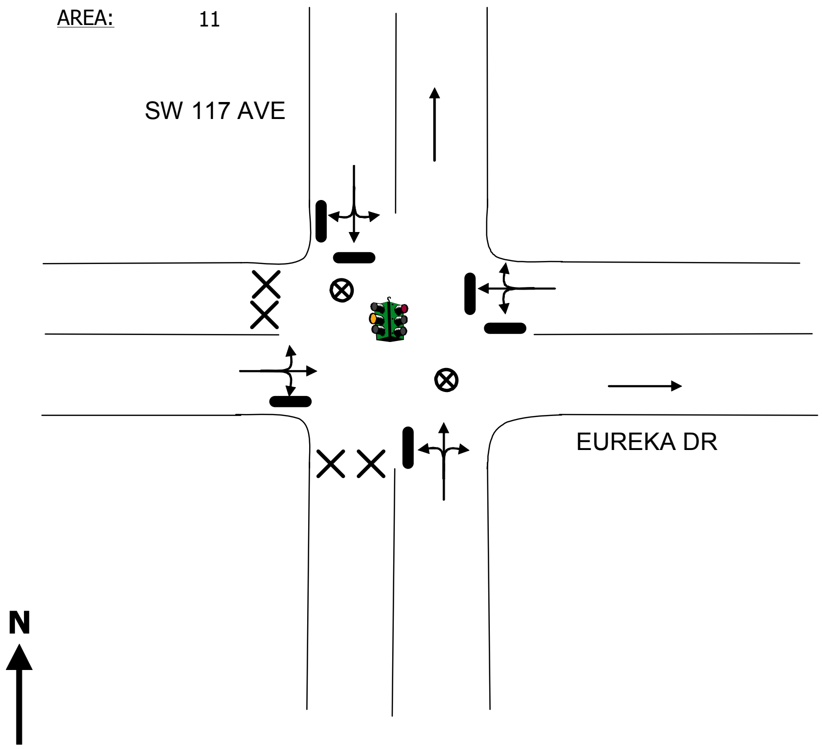
Figure G-3. Access Control Points — South Miami Heights (Sheet 12 of 12)

TOWN: SOUTH MIAMI HEIGHTS

LOCATION: SW 117 AVE & EUREKA DR (SW 184 ST)

ACP ID: ACP - 4

AREA: 11



Key

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE (2 ft, 3 ft)
  - 2 PER LANE (LOCAL ROADS AND RAMPS)
  - 4 PER LANE (FREEWAY AND RAMPS)
- TRAFFIC SIGNAL
- TRAFFIC CONES SPACED TO DISCOURAGE TRAFFIC BUT ALLOW PASSAGE (3 PER LANE): 8 ft

DESCRIPTION

1. Interdict and divert South Bound traffic on SW 117 Avenue and West Bound traffic on Eureka Drive

MANPOWER/EQUIPMENT

6 Traffic Barricades
2 Traffic Guides

LOCATION PRIORITY

1

APPENDIX H
EVACUATION REGION MAPS

Appendix H
Evacuation Region Maps

This appendix presents maps of the evacuation regions. The location of Turkey Point shown is the center point of the proposed new units (Units 6 and 7). The 2-mile, 5-mile, and 10-mile rings are centered at this point. The EPZ and area boundaries will remain the same when the new units are operational. The area boundaries are shown slightly offset as the center point of the operational units (Units 3 and 4) is offset from the center point of the proposed units.

Figure H-1. Evacuation Region R01

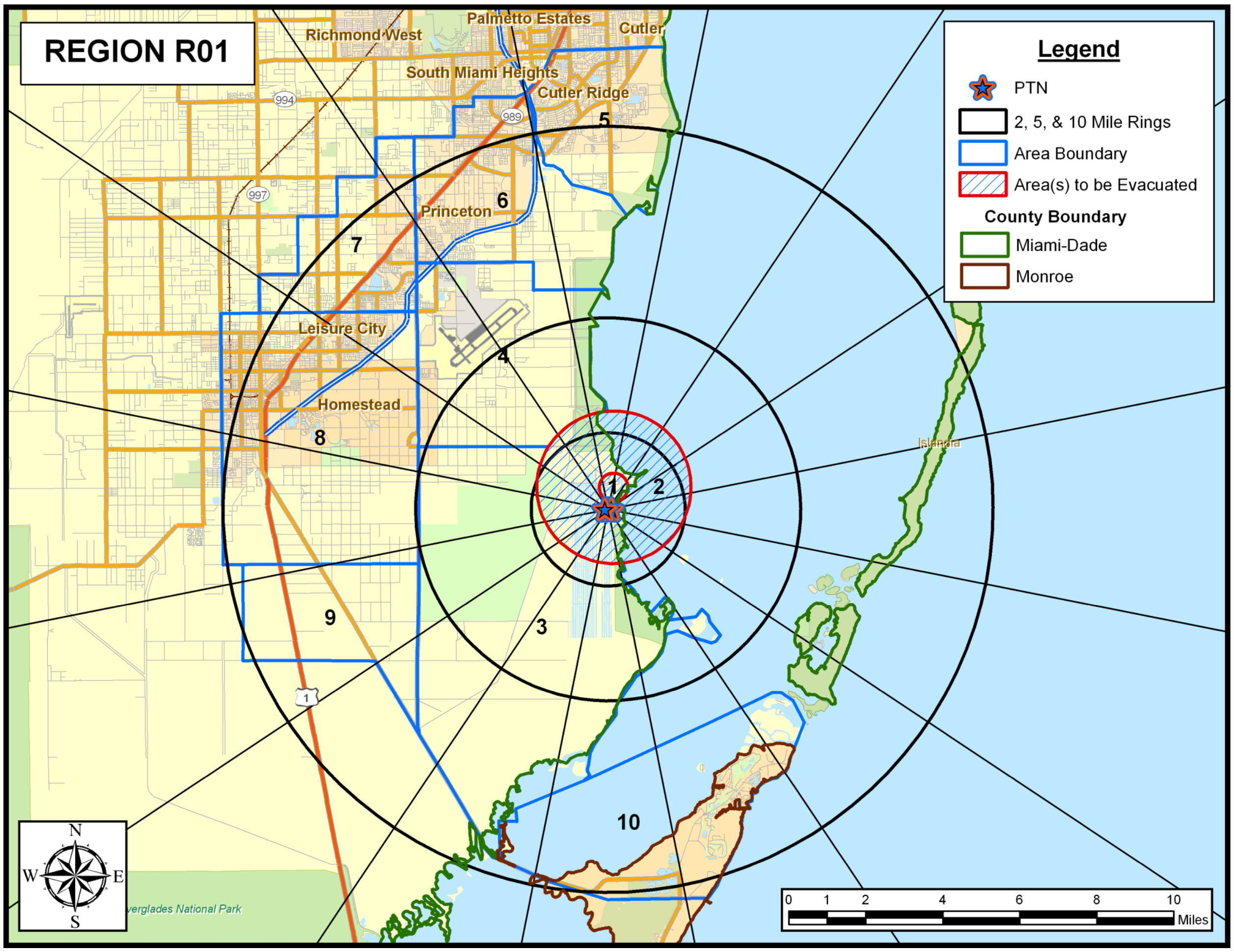


Figure H-2. Evacuation Region R02

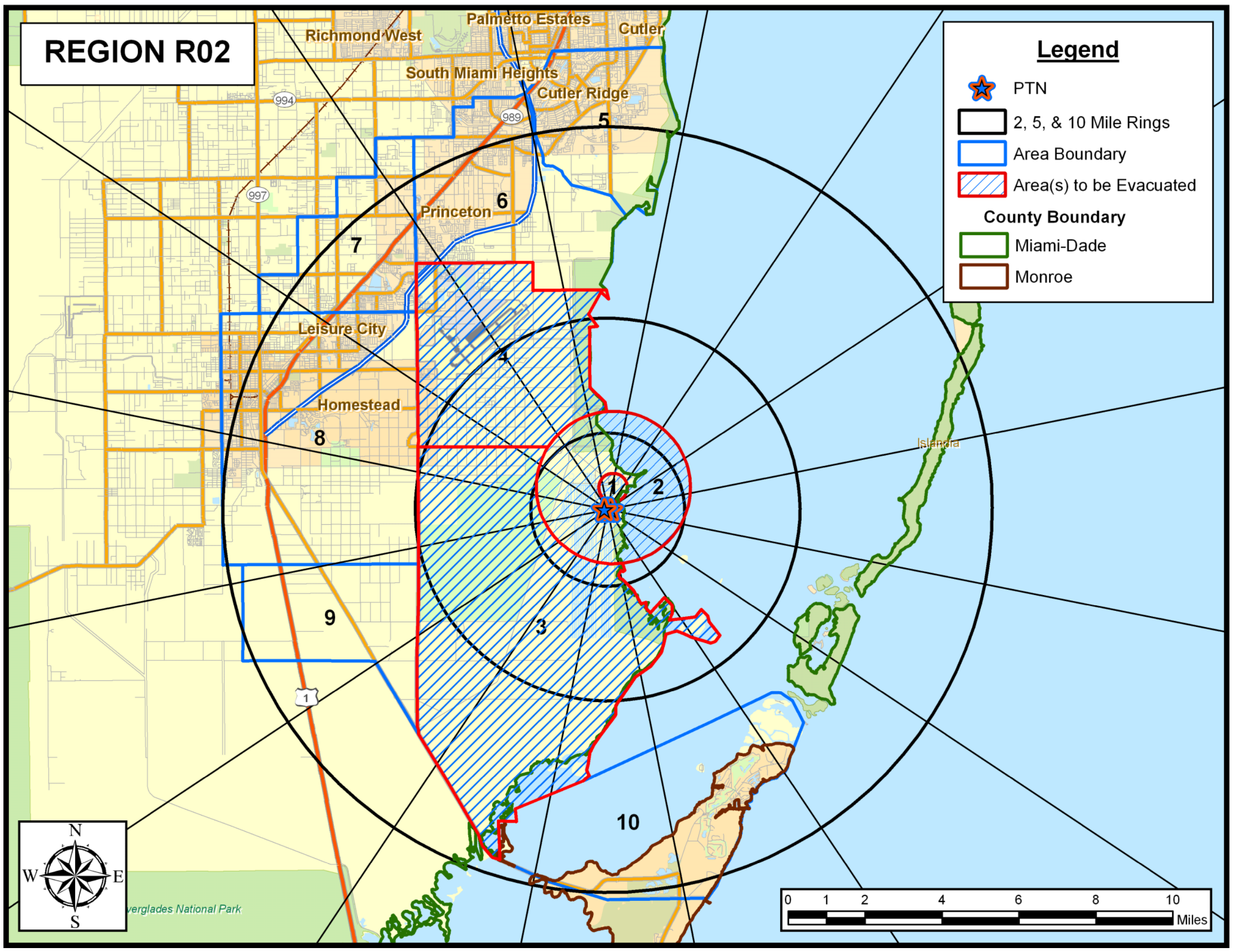


Figure H-3. Evacuation Region R03

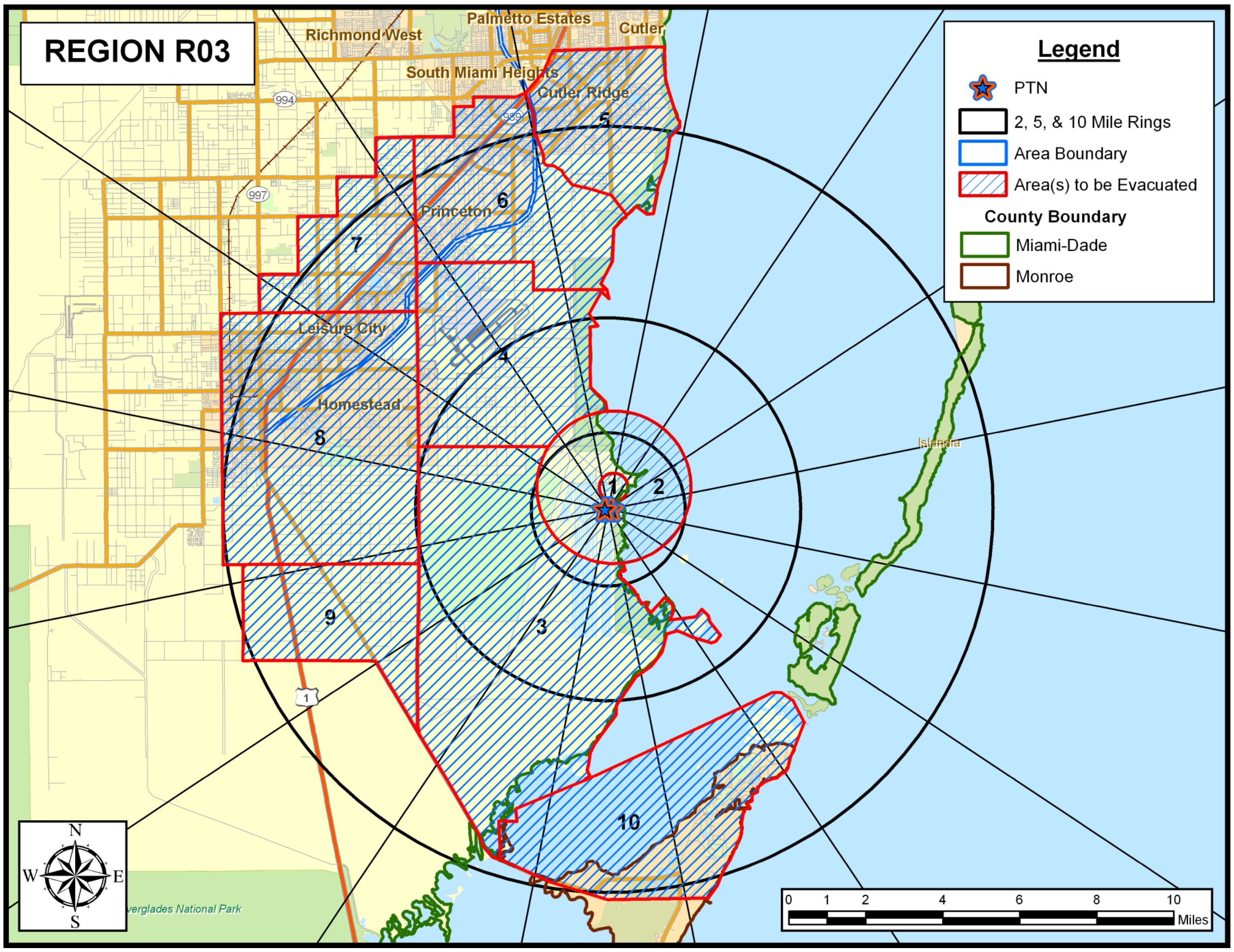


Figure H-4. Evacuation Region R04

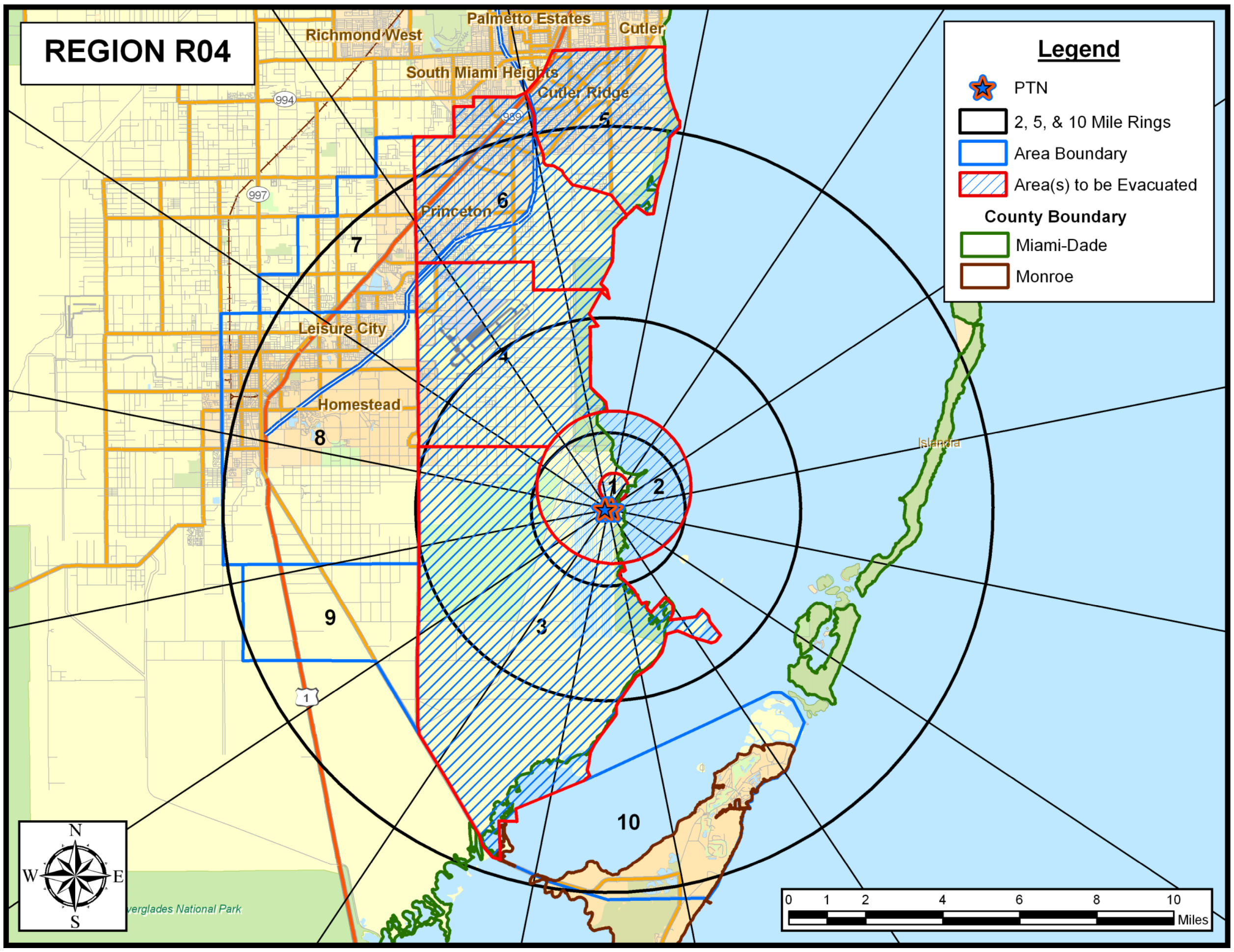


Figure H-5. Evacuation Region R05

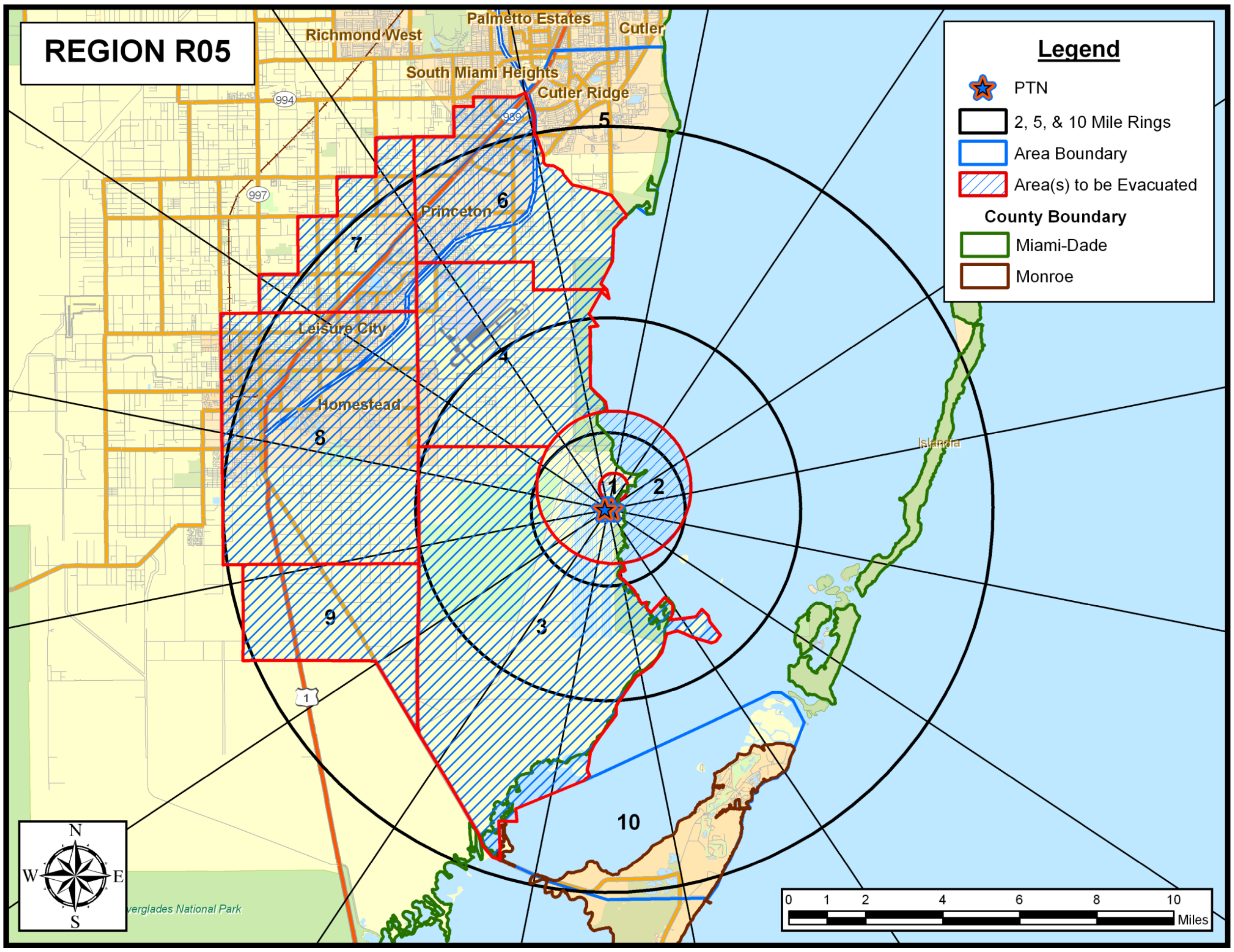


Figure H-6. Evacuation Region R06

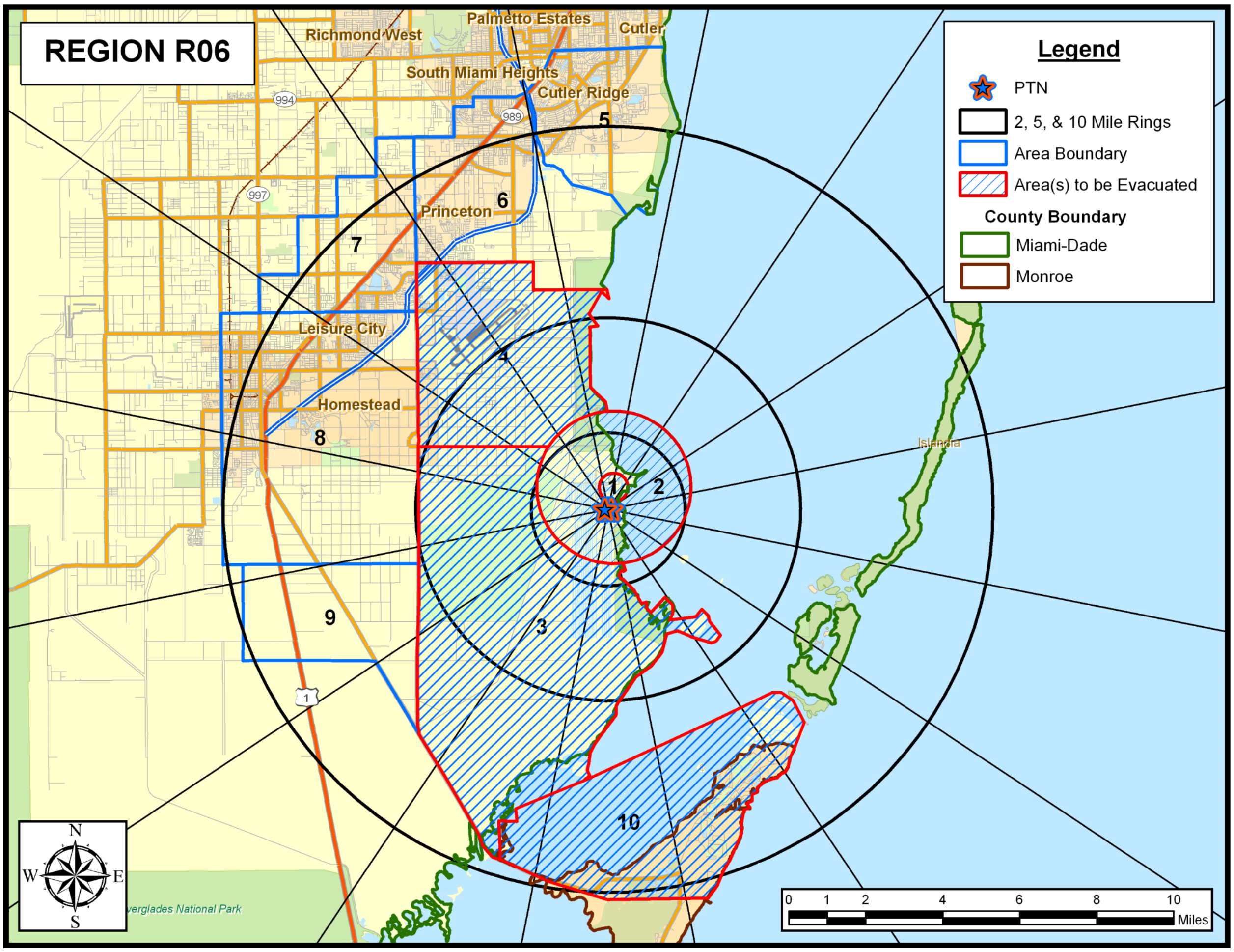


Figure H-7. Evacuation Region R07

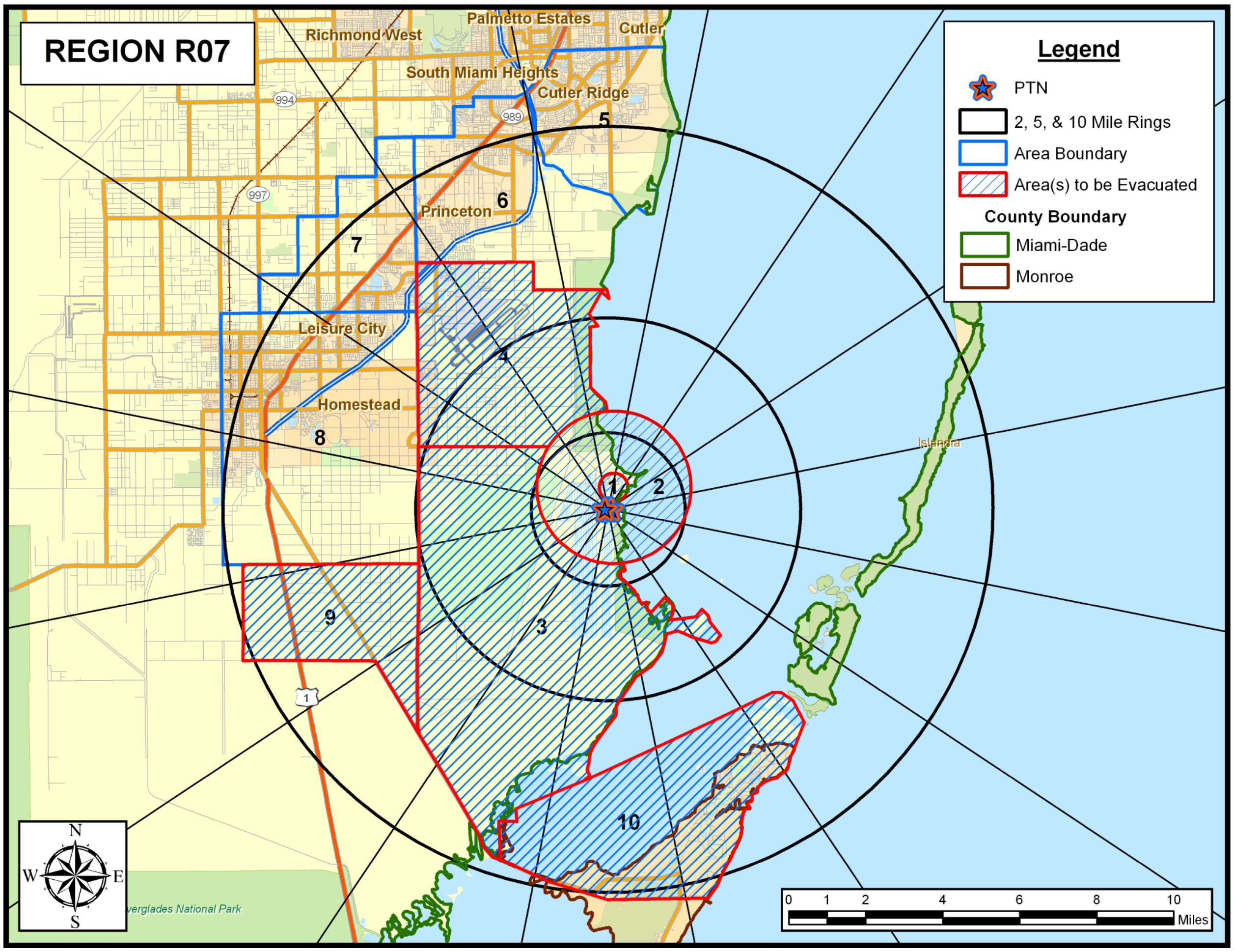


Figure H-8. Evacuation Region R08

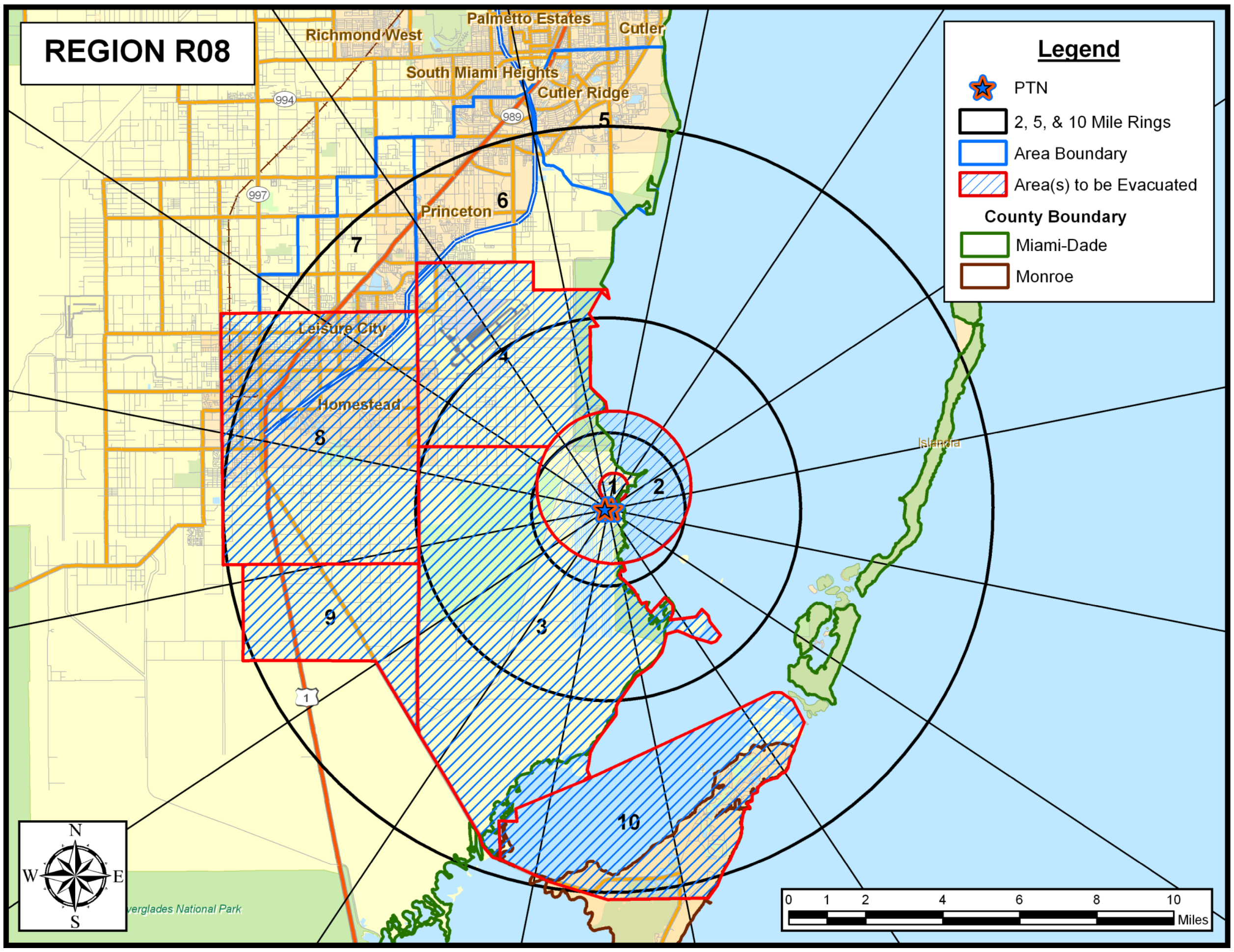


Figure H-9. Evacuation Region R09

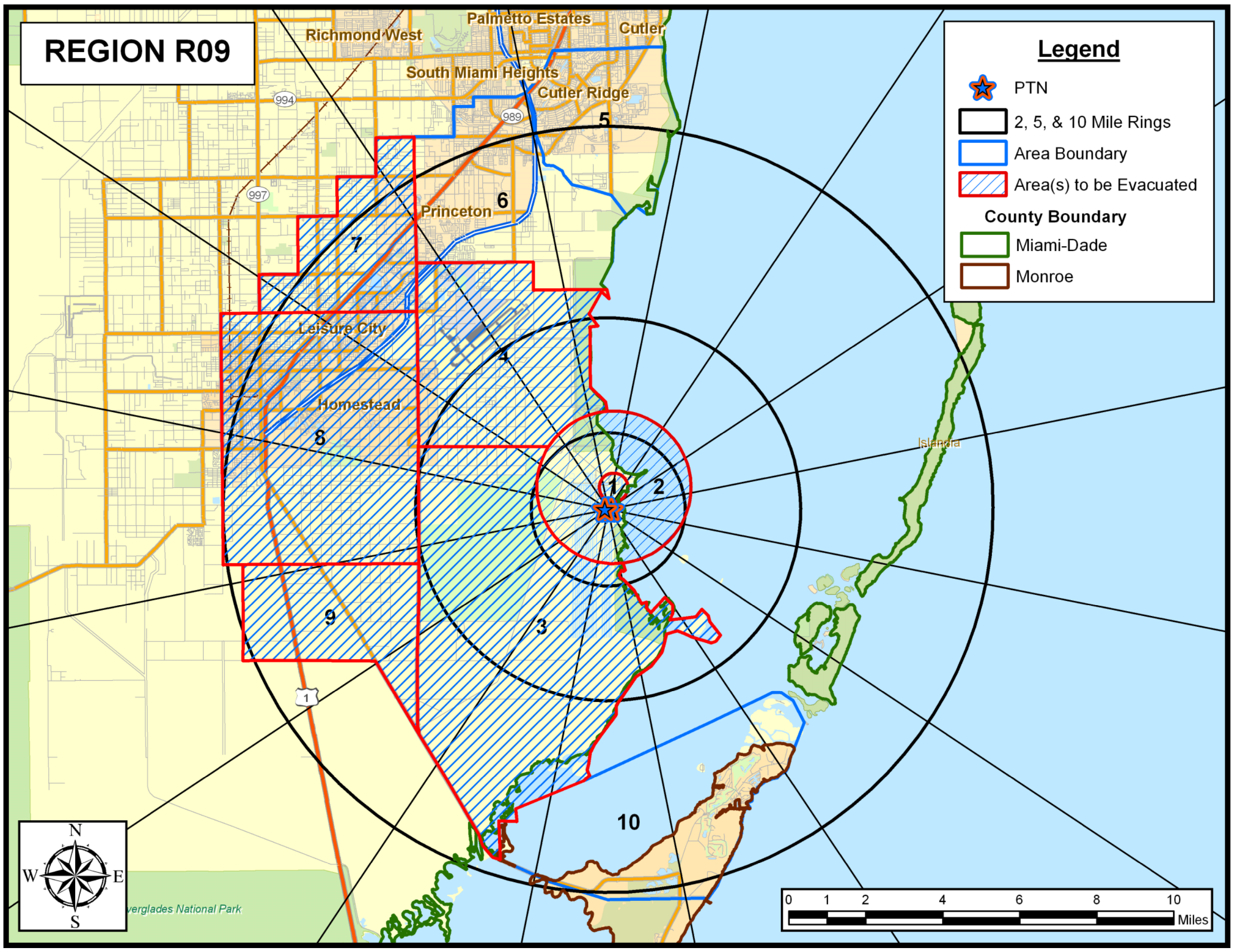


Figure H-10. Evacuation Region R10

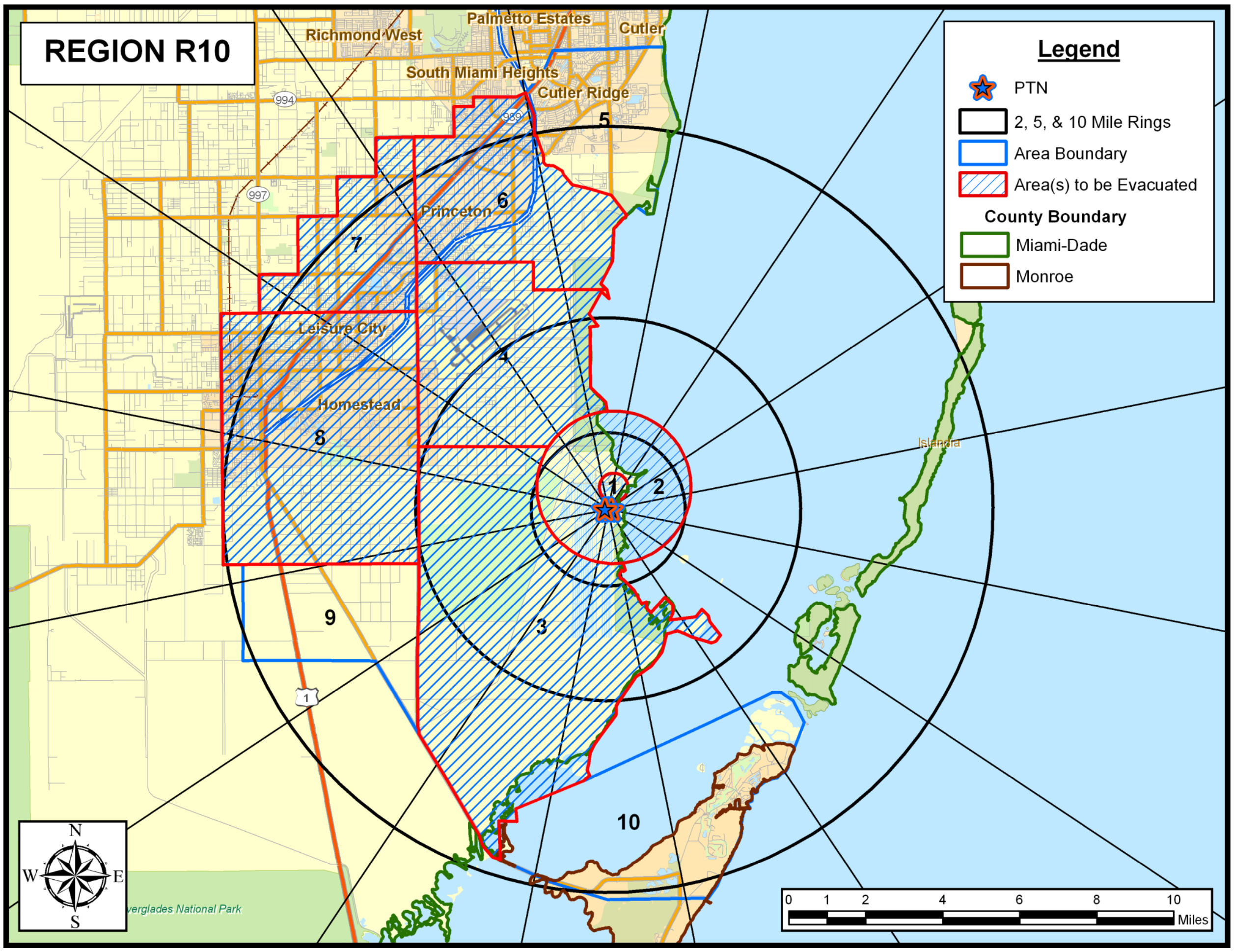


Figure H-11. Evacuation Region R11

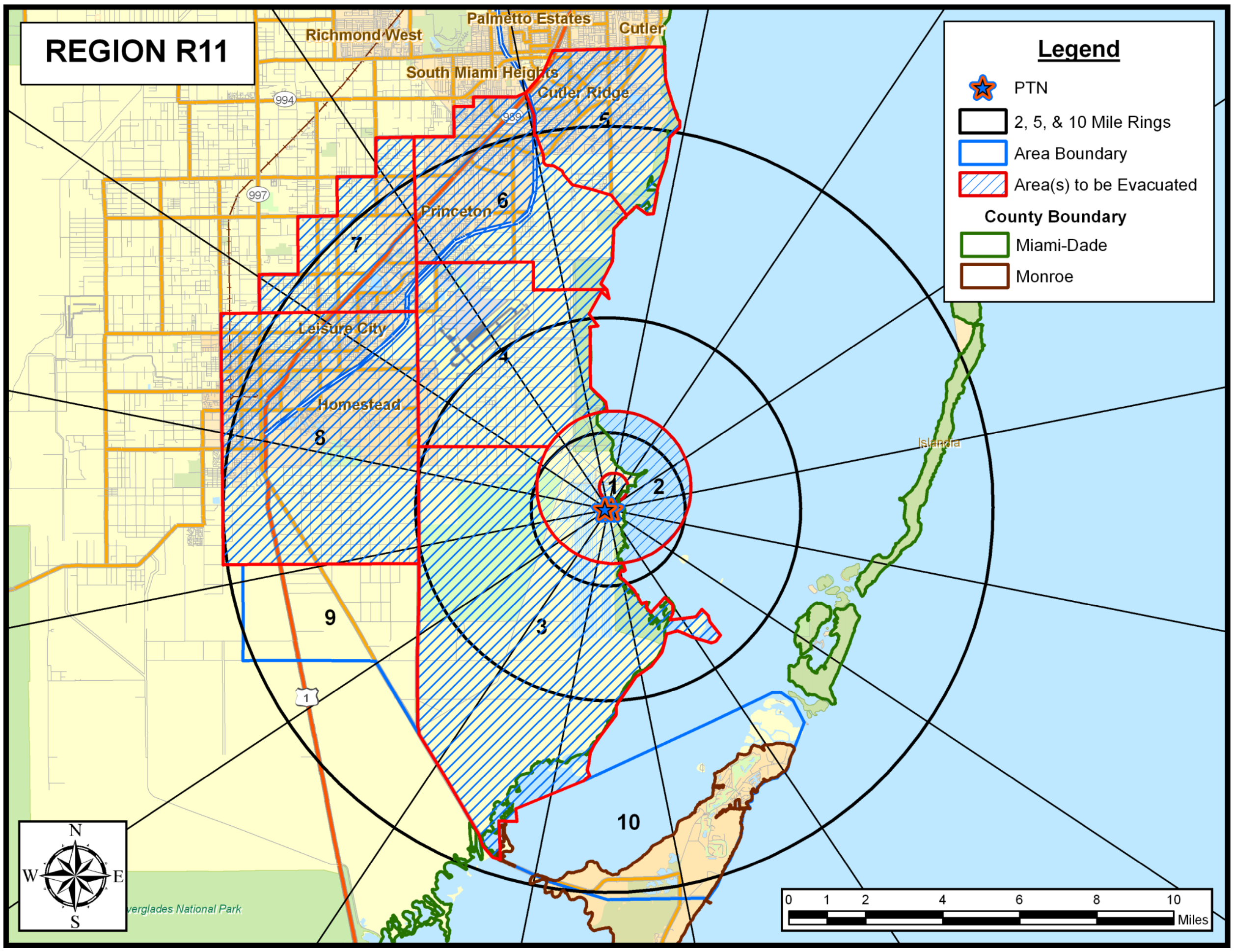
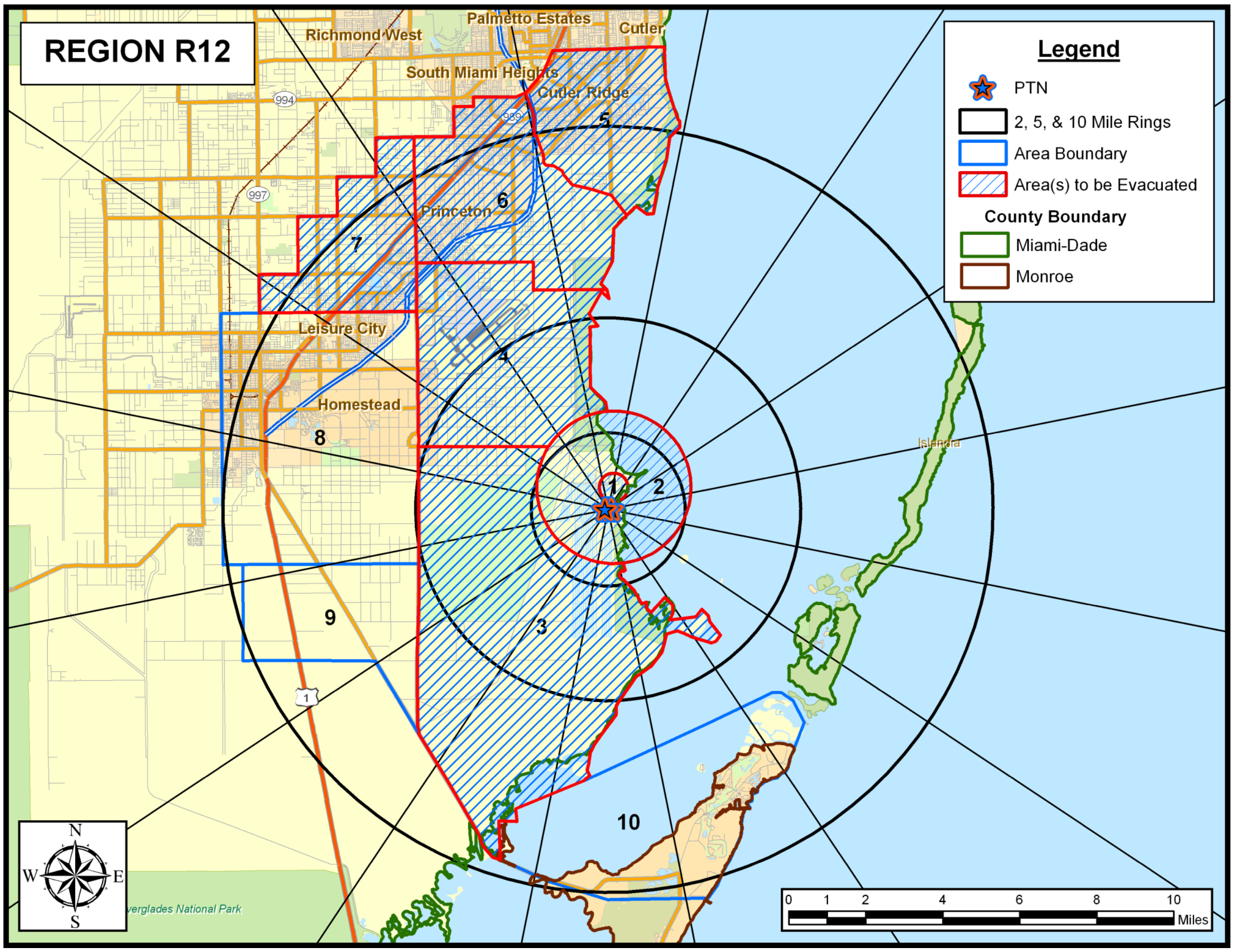


Figure H-12. Evacuation Region R12



APPENDIX I
EVACUATION SENSITIVITY STUDIES

Appendix I
Evacuation Sensitivity Studies

NASCAR Racing

A sensitivity study was conducted to determine the effect of a race at the Homestead-Miami Speedway on ETEs for the Turkey Point EPZ. The speedway attracts a large transient population to the EPZ on race days. There are several events at the race track throughout the year. The largest influx of transients occurs for the annual NASCAR championship race held in November.

Based on discussions with representatives of the speedway, the facility provides parking for approximately 30,000 vehicles and a separate lot with capacity for 1300 recreational vehicles. The current capacity of the grandstands is 65,000 people; however, as many as 100,000 people typically show up for the race. Overhead imagery was used to determine the boundaries of the parking lots for the speedway and geographical information systems software was used to estimate the square footage of each parking lot. Table H-1 estimates the capacity of each lot by multiplying the ratio of square footage of the lot to total square footage of all lots and the total capacity of 30,000 vehicles. A recreational vehicle is represented as two passenger car equivalents in the simulation model based on its larger size and more sluggish operating characteristics. Figure H-1 shows a map of the parking lots surrounding the speedway.

A detailed traffic control manual was created for the 1999 Winston Cup Race to help facilitate the flow of traffic to and from the speedway. The traffic management procedures outlined in the manual are used for the major events at the speedway. Fifty-four intersections are identified as traffic control points in the plan. The control tactic at each of these intersections was input to the simulation model for this sensitivity study. Special lane treatments are also used on the roads surrounding the speedway:

- Contra-flow is used on Speedway Boulevard (SW 137th Avenue) to provide four lanes northbound after the race.

  — One lane turns west on SW 288th Street to access the Florida Turnpike northbound.

  — One lane accesses the turnpike northbound at the entrance ramp from SW 137th Avenue north of SW 288th Street

— The remaining two northbound lanes continue through to the intersection with SW 268th Street .One lane turns left toward U.S. Highway 1, while the other lane can go through or turn right to access the turnpike via Allapatah Road.

- The shoulder of the Florida Turnpike northbound is used as an additional lane from the entrance ramps from Campbell Drive to the toll booths north of Exit 9.

These lane treatments are not indicated in the 1999 manual; however they were used in this sensitivity study. Traffic control should be established at the intersection of SW 137th Avenue and SW 268th Street to prevent southbound movement on SW 137th Avenue, which would conflict with the northbound contra-flow. Figure H-2 shows the locations of the traffic control points and the special traffic control treatments. For details of the traffic control tactics at each intersection, refer to the Homestead Police Department's Operations Plan for the 1999 Winston Cup Race.

The NASCAR championship at the speedway is usually in mid-November on a Sunday. Scenario 8 (winter, weekend, midday, good weather) is used as the base case for this sensitivity study. The region being considered is R03, an evacuation of the entire EPZ. Two cases are considered:

- NASCAR race attendees are ordered to leave 2 hours before the order to evacuate is issued to the general public.

- NASCAR race attendees are evacuated at the order to evacuate, coincident with issuance of an order to evacuate to the general public.

These cases provide a lower and upper bound estimate for the effect on ETE of a large influx of population at the speedway. Table H-2 provides the ETE for the base case, the 2-hour lead time case and the no lead time case. The presence of an extra 32,600 vehicles at the speedway adds between 2 hours and 55 minutes and 4 hours and 15 minutes to the ETE for the entire EPZ.

It is assumed that distribution of vehicle loading over the 2-hour lead time for race attendees is as follows: 10 percent are ready to evacuate in 15 minutes, 25 percent are ready each subsequent 30 minutes, and the final 10 percent evacuate in the final 15 minutes. It is further assumed that some of the permanent population would also be evacuating over the 2 hours of lead time. The races at the speedway are nationally televised events; if the event is suddenly canceled and the racetrack is evacuated, it is reasonable to assume that some of the general public would also elect to evacuate. Ten percent of the residents and 5 percent of the employees and transients will begin their evacuation trips over the same 2-hour period.

Table I-1
Homestead-Miami Speedway Parking Lot Capacities

LOT	Square Footage of Lot	Percent of Total Square Footage	Vehicle Capacity (PCE's)
A	1,236,457	11.2%	3,372
B	2,178,675	19.8%	5,942
C	1,106,421	10.1%	3,017
D	1,082,053	9.8%	2,951
E	1,230,875	11.2%	3,357
I	227,426	2.1%	620
J	77,128	0.7%	210
K	381,971	3.5%	1,042
L	1,841,352	16.7%	5,022
Blue	495,551	4.5%	1,351
Green/Red	1,142,457	10.4%	3,116
RV	N/A	N/A	2,600
Total	11,000,366	100%	32,600

Table I-2
NASCAR ETE Sensitivity

Case	Evacuating Vehicles	ETE (hr:min)
Base -Scenario 8, Region R03	126,717	8:35
NASCAR - 2 hour lead time	159,317	11:30
NASCAR - no lead time	159,317	12:50

Shadow Region

A sensitivity study was also conducted to determine the effect on ETE of changes in the percentage of people who decide to evacuate from the shadow region. The movement of people in the shadow region addressed earlier as the region between the EPZ boundary, the

Everglades National Park to the west, and SW 152nd Street to the north, has a potential to impede vehicles evacuating from an evacuation region in the EPZ.

Table H-3 presents the number of vehicles originating trips in the shadow region over a range of assumed percent shadow traffic. The case selected for this study is Scenario 1 (summer, midweek, midday, good weather) and evacuation Region R03, the entire EPZ. Note that the evacuating vehicles remain constant as the number of shadow vehicles varies.

Table I-3
Numbers of Vehicles for Various Shadow Percentages

Percent Shadow Traffic	Evacuating Vehicles	Shadow Vehicles	Total Vehicles
15	108,221	10,251	118,472
30	108,221	20,502	128,723
60	108,221	41,004	149,225

Table H-4 presents the evacuation time estimates for each of these cases. The ETE for the entire EPZ increases from 8 hours and 50 minutes to 9 hours and 25 minutes as the percent shadow traffic increases from 15 to 60 percent. Table H-4 shows that the ETE for the 2-mile and 5-mile circular evacuation regions are not affected by the change in shadow traffic. This reflects the relatively sparse population in these inner regions and their ETE is driven by the mobilization time of the evacuees. The ETE for the entire EPZ is somewhat impacted by the change in shadow traffic. EPZ evacuees enter the major evacuation routes (U.S. Highway 1, Krome Avenue, Florida Turnpike) south of the shadow area. As a result, much of the capacity of these roadways is consumed by the EPZ evacuees and the shadow evacuees who can enter these highways do exert some impedance on evacuating traffic.

Table I-4
Evacuation Time Estimates for Shadow Sensitivity Study

Percent Shadow Evacuation	2-Mile Region	5-Mile Region	Entire EPZ
15	2:00	6:00	8:50
30	2:00	6:00	9:00
60	2:00	6:00	9:25

Special Traffic Treatments

As addressed in Section 7, there is pronounced congestion in the EPZ which causes the ETE to exceed the mobilization time by several hours, on average. Two special traffic treatments were applied to the evacuation network in an effort to increase available roadway capacity and reduce ETE: (1) routing some traffic to evacuate southbound on U.S. Highway 1 toward the Florida Keys, and (2) using the shoulder of the Florida Turnpike as an evacuation lane from the interchange with Campbell Drive (312th Street) to the interchange with U.S. Highway 1 in Cutler Ridge. As addressed in Section 7, the narrowing of the Florida Turnpike from three lanes in each direction to two lanes, north of the interchange with U.S. Highway 1 near Cutler Ridge presents a significant bottleneck to evacuating traffic. An evacuation of the entire EPZ (Region R03) for a summer, midweek, midday, good weather scenario (Scenario 1) was used as the base for this study. Table H-5 presents the results of this sensitivity study.

Table I-5
Evacuation Time Estimates for Special Traffic Treatments Sensitivity Study

Traffic Treatment	ETE (hr:min)
Base – Scenario 1 – no treatments	9:00
Allow southbound traffic to Florida Keys	8:15
Use of Turnpike shoulder as an additional lane	7:40
Allow southbound traffic to Florida Keys, and use of turnpike shoulder as an additional lane	7:10

As indicated in the table, these treatments will reduce ETE. The routing of traffic towards the Florida Keys reduces the ETE by 45 minutes, as the demand is reduced along Krome Avenue, U.S. Highway 1, and the Florida Turnpike northbound. The separate use of the shoulder on the Florida Turnpike as an additional evacuation lane reduces the ETE by 1 hour and 20 minutes. As shown in Section 7, the Florida Turnpike northbound is the last evacuation route to clear because of the bottleneck previously described. The use of the shoulder as an additional lane enables evacuating traffic to make use of the additional capacity on the turnpike north of the interchange with U.S. Highway 1 near Cutler Ridge. Finally, the combined effect of both of these treatments applied concurrently reduces the ETE by nearly 2 hours.

Figure I-1. Homestead-Miami Speedway Parking Lots

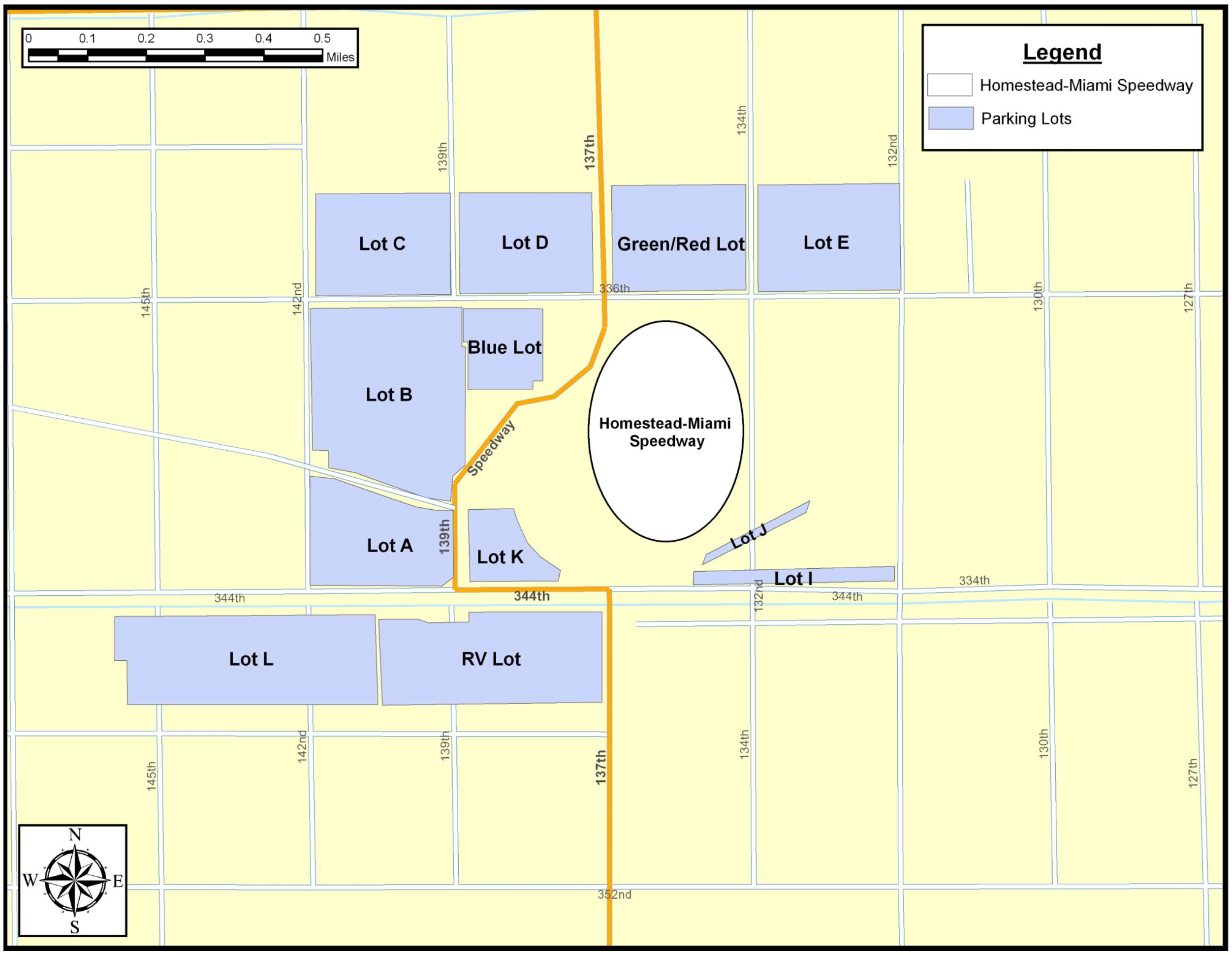
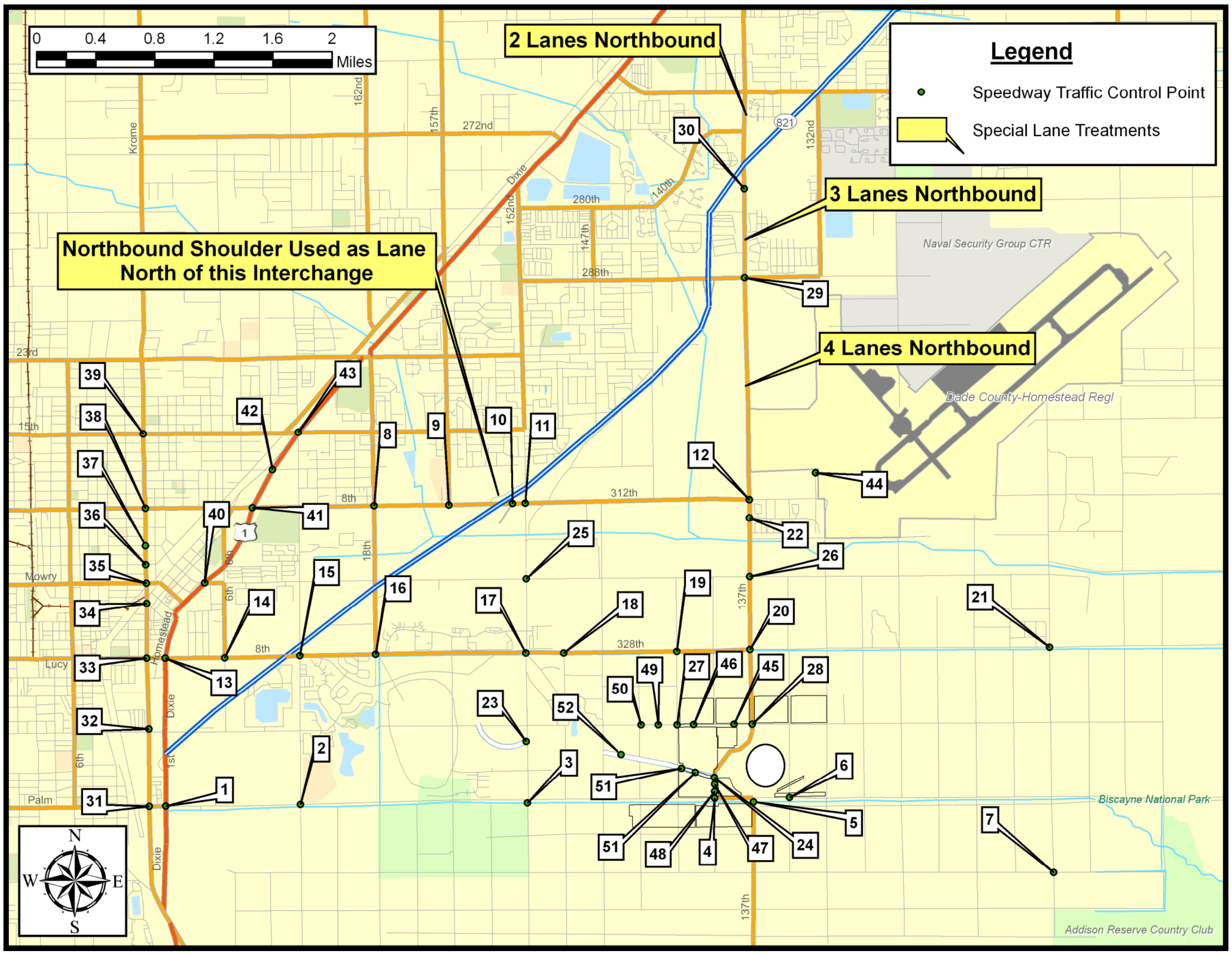


Figure I-2. Homestead-Miami Speedway Traffic Control Points



APPENDIX J
EVACUATION TIME ESTIMATES FOR ALL EVACUATION REGIONS AND SCENARIOS AND EVACUATION TIME GRAPHS FOR REGION R03, FOR ALL SCENARIOS

Appendix J
Evacuation Time Estimates for all Evacuation Regions and Scenarios and Evacuation Time Graphs for Region R03, for all Scenarios

This appendix presents the ETE results for all 12 regions and all 11 scenarios (Tables J-1A through J-1D).

Plots of evacuating vehicles versus elapsed time leaving the 2-mile and 5-mile circular areas around Turkey Point and the entire EPZ for an evacuation of Region R03, for all 11 scenarios are presented. Each plot has points indicating the evacuation times corresponding to the 50th, 90th, and 95th percentiles of evacuated vehicles.

Guidance on Using ETE Tables

Tables J-1A through J-1D present the ETE values for all 12 evacuation regions and all 11 evacuation scenarios. The ETEs are the elapsed time required for the indicated percent of the population in the evacuation region to evacuate from that region. The tables are organized as follows:

Table	Contents
J-1A	ETE for 50 percent of the population
J-1B	ETE for 90 percent of the population
J-1C	ETE for 95 percent of the population
J-1D	ETE for 100 percent of the population

The user first determines the percentile of population for which the ETE is sought. The applicable value of ETE in the chosen table may then be identified using the following procedure:

1. Identify the applicable scenario:

- The season

  - — Summer (schools not in session)
  - — Winter (also autumn and spring)

- The day of week
  - Midweek (workday)
  - Weekend, holiday
- The time of day
  - Midday (work and commuting hours)
  - Evening
- Weather condition
  - Good weather
  - Rain
- Special event (if any)
  - Construction of new units

While these scenarios are designed, in aggregate, to represent conditions throughout the year, some further clarification is warranted:

- The conditions of a summer evening (either midweek or weekend) and rain are not explicitly identified in Tables J-1A through J-1D. For these conditions, Scenario 4 applies.
- The conditions of a winter evening (either midweek or weekend) and rain are not explicitly identified in Tables J-1A through J-1D. For these conditions, Scenario 9 applies.
- The seasons are defined as follows:
  - Summer implies that public schools are not in session
  - Winter, spring, and autumn imply that public schools are in session
- Time of Day: Midday implies the time that most commuters are at work.

2. With the scenario (and column in the table) identified, now identify the evacuation region:

   - Determine the sectors and distance that the wind is blowing. This direction is expressed in terms of compass orientation: North, north-northeast, northeast

   - Determine the distance that the evacuation region will extend from Turkey Point. The applicable distances and their associated candidate regions are given below:

     — Two miles (Region R01)
     — Five miles (Region R02)
     — To EPZ boundary (Regions R03 through R12)

   - Go to Table J-2 and identify the applicable group of wind directions (A-R) and the distance from Turkey Point. Select the evacuation region identifier from the third column of the table in the appropriate row of the table.

3. Determine the ETE for the scenario identified in Step 1 and the evacuation region identified in Step 2, as follows:

   - The columns of Tables 7-1 are labeled with the scenario numbers. Identify the proper column in the selected table using the scenario number determined in Step 1.

   - Referencing Column 1 in this table, identify the row that provides ETE values for the region identified in Step 2.

   - The data cell defined by the column and row so determined contains the desired value of ETE expressed in hours:minutes.

<u>Example</u>

It is preferred to identify the ETE for the following conditions:

- Sunday, August 10 at 4:00 a.m.

- It is raining.

- Wind is over sectors R, A, and B (north-northwest, north, and north-northeast).

- Wind speed is so that the distance to be evacuated is judged to be 10 miles (to EPZ boundary).
- The preferred ETE is that value needed to evacuate 95 percent of the population from the impacted region.

Table J-1C is applicable because 95 percent of the population is preferred. Proceed as follows:

1. Identify the scenario as summer, weekend, evening, and raining. Going to Table J-1C, it is seen that there is no match for these descriptions. However, the clarification given above assigns this combination of circumstances to Scenario 4.

2. Go to Table J-2 and locate the description *5 mile radius and downwind to EPZ boundary*. Under *Wind Over Sectors*, identify the *RAB* entry, and read *REGION R12* in the third column of that row.

Go to Table J-1C to locate the data cell containing the value of ETE for Scenario 4 and Region R12. This data cell is in Column 4 and in the row for Region R12; it contains the ETE value of 6:25.

Table J-1A
Time To Clear The Indicated Area of 50 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter	Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	**Scenario:**	(6)	(7)	(8)	(9)	(10)	(11)
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	0:55	1:00	0:45	0:45	0:45	R01	0:55	1:00	0:45	0:45	0:45	0:55
R02	1:35	1:40	1:15	1:20	1:15	R02	1:40	1:45	1:15	1:20	1:15	1:40
R03	3:55	4:15	3:40	3:55	3:20	R03	4:00	4:20	3:45	4:00	3:20	5:00
5 Mile Ring and Keyhole to EPZ Boundary												
R04	3:05	3:15	2:45	3:00	2:35	R04	3:05	3:20	2:45	3:00	2:35	3:25
R05	3:50	4:10	3:30	3:50	3:10	R05	3:55	4:10	3:35	3:50	3:15	4:55
R06	1:45	1:45	1:25	1:25	1:25	R06	1:45	1:50	1:25	1:25	1:25	1:45
R07	1:45	1:45	1:25	1:25	1:25	R07	1:45	1:50	1:25	1:25	1:25	1:45
R08	3:25	3:40	3:05	3:25	2:45	R08	3:25	3:45	3:10	3:25	2:45	4:40
R09	3:45	4:05	3:30	3:50	3:05	R09	3:50	4:10	3:35	3:50	3:10	5:00
R10	3:50	4:10	3:35	3:50	3:10	R10	3:55	4:10	3:35	3:50	3:15	4:55
R11	3:55	4:15	3:40	3:55	3:20	R11	4:00	4:20	3:45	4:00	3:20	4:55
R12	3:05	3:15	2:45	3:00	2:35	R12	3:05	3:20	2:50	3:05	2:35	3:35

Table J-1B
Time To Clear The Indicated Area of 90 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter	Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	**Scenario:**	(6)	(7)	(8)	(9)	(10)	(11)
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:30	1:35	1:20	1:20	1:20	R01	1:35	1:45	1:20	1:20	1:20	1:35
R02	3:35	3:50	3:20	3:30	3:20	R02	3:35	3:55	3:20	3:30	3:20	4:40
R03	7:35	8:20	7:10	7:50	6:15	R03	7:45	8:30	7:15	7:55	6:15	9:50
5 Mile Ring and Keyhole to EPZ Boundary												
R04	5:40	6:10	5:20	5:45	4:45	R04	5:45	6:15	5:25	5:50	4:45	6:30
R05	7:25	8:10	7:00	7:40	6:05	R05	7:35	8:15	7:05	7:50	6:05	9:45
R06	4:10	4:30	3:40	4:00	3:20	R06	4:10	4:30	3:50	4:00	3:20	5:20
R07	4:10	4:30	3:40	4:00	3:20	R07	4:10	4:30	3:50	4:00	3:20	5:20
R08	6:25	6:55	5:55	6:30	5:05	R08	6:25	7:05	6:05	6:35	5:05	8:35
R09	6:50	7:30	6:25	7:00	5:35	R09	6:55	7:35	6:30	7:05	5:40	9:05
R10	7:25	8:10	7:00	7:40	6:05	R10	7:35	8:15	7:05	7:50	6:05	9:45
R11	7:35	8:20	7:10	7:50	6:15	R11	7:45	8:30	7:15	7:55	6:15	9:50
R12	5:45	6:15	5:25	5:55	4:50	R12	5:50	6:20	5:30	5:55	4:50	6:40

Table J-1C
Time To Clear The Indicated Area of 95 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter	Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	**Scenario:**	(6)	(7)	(8)	(9)	(10)	(11)
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	1:40	1:45	1:40	1:40	1:30	R01	1:40	1:45	1:40	1:40	1:30	1:40
R02	4:00	4:10	3:35	3:50	3:35	R02	4:00	4:20	3:35	3:50	3:35	5:30
R03	8:15	9:05	7:45	8:30	6:45	R03	8:20	9:15	7:50	8:40	6:45	10:40
5 Mile Ring and Keyhole to EPZ Boundary												
R04	6:00	6:35	5:40	6:10	5:00	R04	6:05	6:40	5:45	6:15	5:05	7:00
R05	8:00	8:50	7:30	8:20	6:30	R05	8:05	8:55	7:40	8:25	6:35	10:25
R06	4:35	5:00	4:10	4:30	3:40	R06	4:40	5:00	4:10	4:30	3:40	5:55
R07	4:35	5:00	4:10	4:30	3:40	R07	4:40	5:00	4:10	4:30	3:40	5:55
R08	6:45	7:25	6:20	6:55	5:25	R08	6:50	7:35	6:25	7:00	5:25	9:10
R09	7:15	8:00	6:45	7:25	6:00	R09	7:25	8:05	6:55	7:35	6:05	9:40
R10	8:00	8:50	7:30	8:20	6:30	R10	8:05	8:55	7:40	8:25	6:35	10:25
R11	8:15	9:05	7:45	8:30	6:45	R11	8:20	9:15	7:50	8:40	6:45	10:40
R12	6:15	6:45	5:50	6:25	5:10	R12	6:20	6:50	5:55	6:30	5:15	7:20

Table J-1D
Time To Clear The Indicated Area of 100 Percent of the Affected Population

	Summer		Summer		Summer		Winter		Winter		Winter	Winter
	Midweek		Weekend		Midweek Weekend		Midweek		Weekend		Midweek Weekend	Midweek
Scenario:	(1)	(2)	(3)	(4)	(5)	**Scenario:**	(6)	(7)	(8)	(9)	(10)	(11)
	Midday		Midday		Evening		Midday		Midday		Evening	Midday
Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Region	Good Weather	Rain	Good Weather	Rain	Good Weather	Construction
Entire 2-Mile Region, 5-Mile Region, and EPZ												
R01	2:00	2:00	2:00	2:00	2:00	R01	2:00	2:00	2:00	2:00	2:00	2:00
R02	6:00	6:00	6:00	6:00	6:00	R02	6:00	6:00	6:00	6:00	6:00	7:00
R03	9:00	10:00	8:30	9:20	7:20	R03	9:10	10:10	8:35	9:30	7:20	11:40
5 Mile Ring and Keyhole to EPZ Boundary												
R04	6:30	7:10	6:10	6:40	6:10	R04	6:40	7:20	6:10	6:50	6:10	7:40
R05	8:40	9:40	8:10	9:00	7:00	R05	8:50	9:50	8:15	9:10	7:05	11:20
R06	6:00	6:00	6:00	6:00	6:00	R06	6:00	6:00	6:00	6:00	6:00	7:10
R07	6:00	6:00	6:00	6:00	6:00	R07	6:00	6:00	6:00	6:00	6:00	7:10
R08	7:20	8:00	6:50	7:30	6:00	R08	7:20	8:10	6:50	7:30	6:00	9:50
R09	7:50	8:30	7:20	8:00	6:30	R09	8:00	8:40	7:30	8:10	6:40	10:20
R10	8:40	9:40	8:10	9:00	7:00	R10	8:50	9:50	8:15	9:10	7:05	11:20
R11	9:00	10:00	8:30	9:20	7:20	R11	9:10	10:10	8:35	9:30	7:20	11:40
R12	6:50	7:25	6:30	7:00	6:10	R12	6:50	7:30	6:30	7:10	6:10	8:10

Table J-2
Description of Evacuation Regions

Wind Over Sectors:	EAS Message	Region	Description	Areas to be Evacuated
Evacuate 2 mi. Downwind	4	R01	2-mile radius	1,2
Evacuate 5 mi. Downwind	5	R02	5-mile radius	1-4
Evacuate Full EPZ	6	R03	Full EPZ	1-10
ABC; ABCD	7	R04	5-mile radius and downwind to EPZ boundary	1-6
MNPQ	8	R05		1-4, 6-9
BCD;CDE;DEF;EFG;FGH;GHJ;GHJK;HJK	9	R06		1-4, 10
HJKL;JKL	11	R07		1-4, 9-10
JKLM;KLM;LMN	12	R08		1-4, 8-10
LMNP;MNP	13	R09		1-4, 7-9
NPQ;PQR	14	R10		1-4, 6-8
PARQ;QRA;QRAB	15	R11		1-8
RAB	16	R12		1-7

The Capital Letter designations A - R (O and I are not used) used by Miami-Dade Office of Emergency Management, correspond to the 16 major wind directions labeled clockwise with "A" being north and "R" being north-northwest.

Figure J-1. Evacuation Time Estimates — Scenario 1 for Region R03 (Entire EPZ)

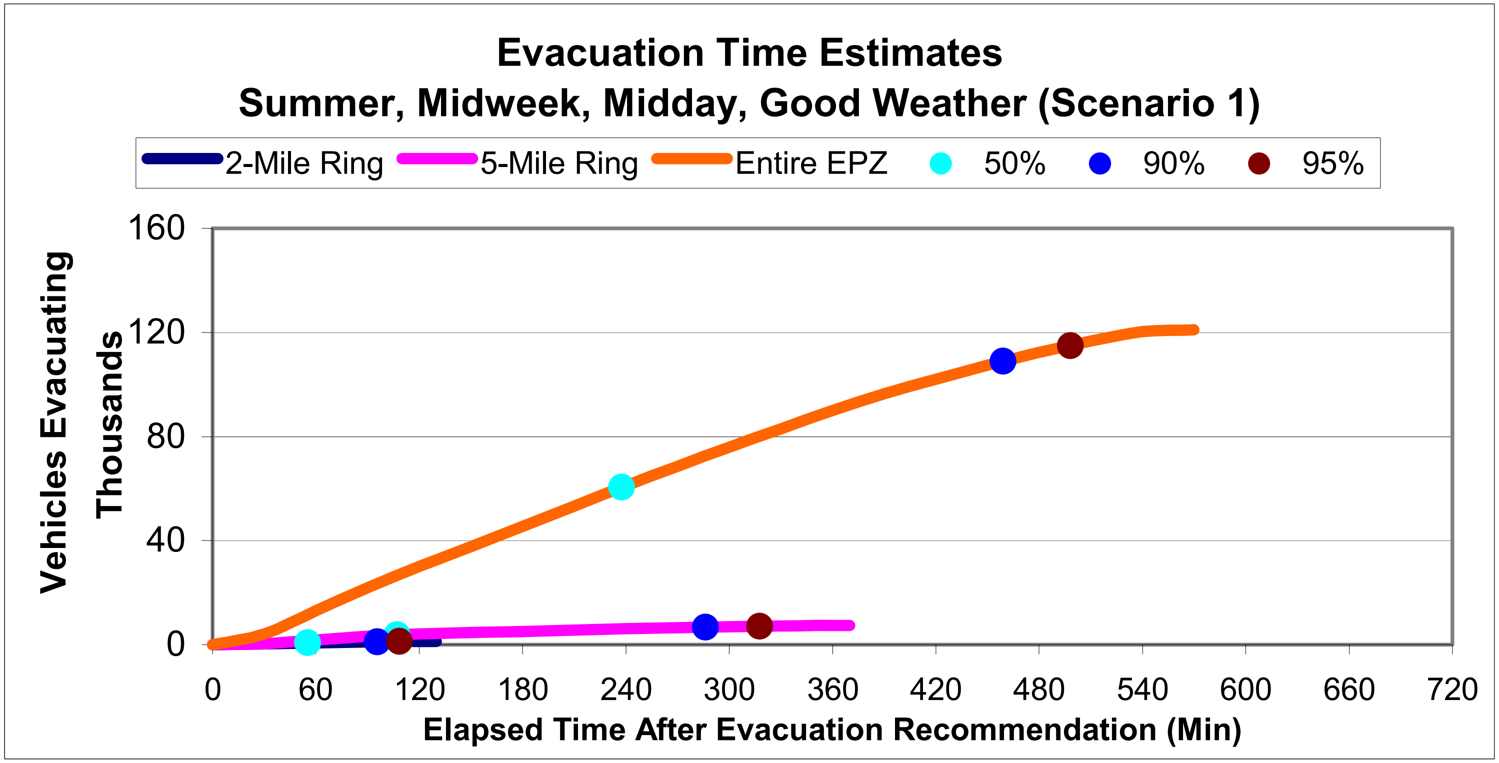


Figure J-2. Evacuation Time Estimates — Scenario 2 for Region R03 (Entire EPZ)

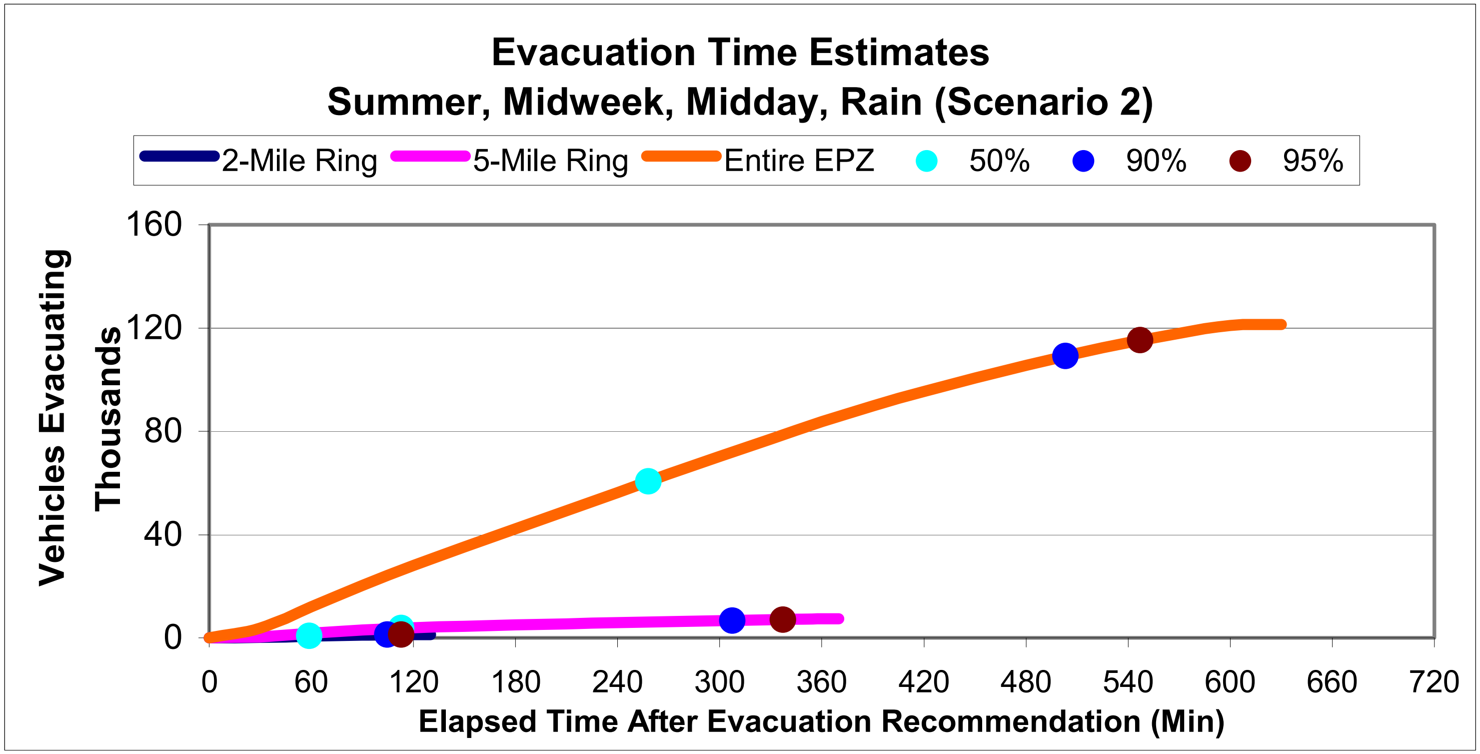


Figure J-3. Evacuation Time Estimates — Scenario 3 for Region R03 (Entire EPZ)

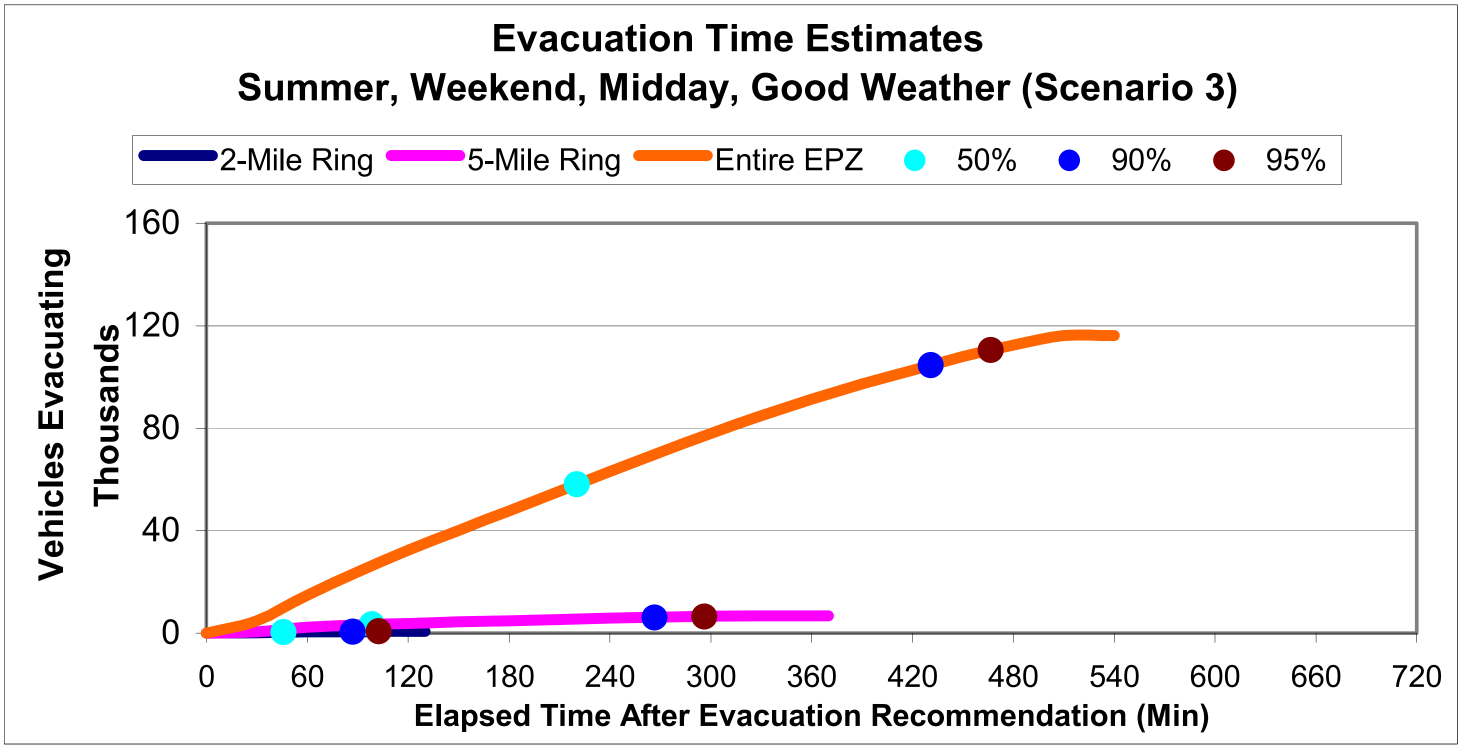


Figure J-4. Evacuation Time Estimates — Scenario 4 for Region R03 (Entire EPZ)

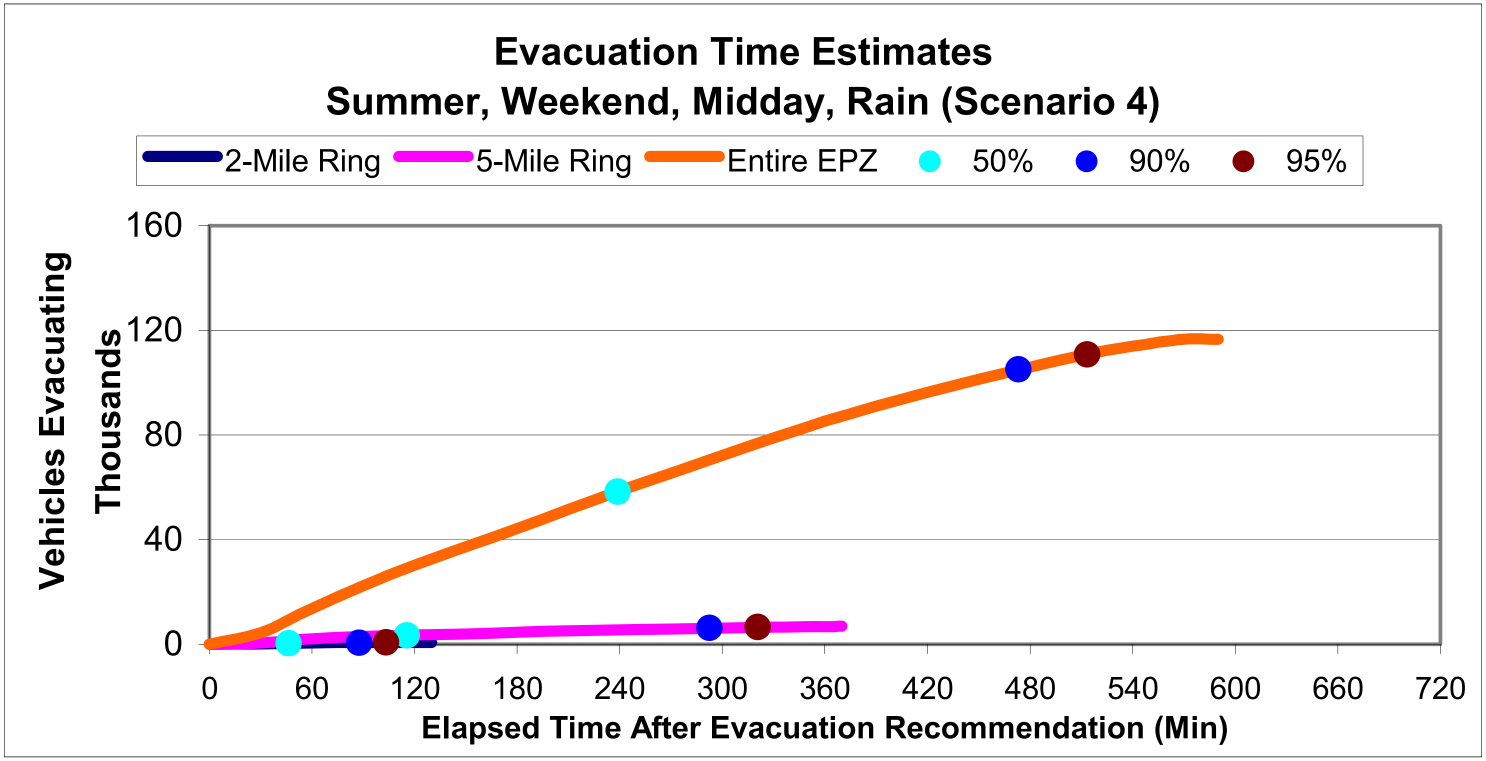


Figure J-5. Evacuation Time Estimates — Scenario 5 for Region R03 (Entire EPZ)

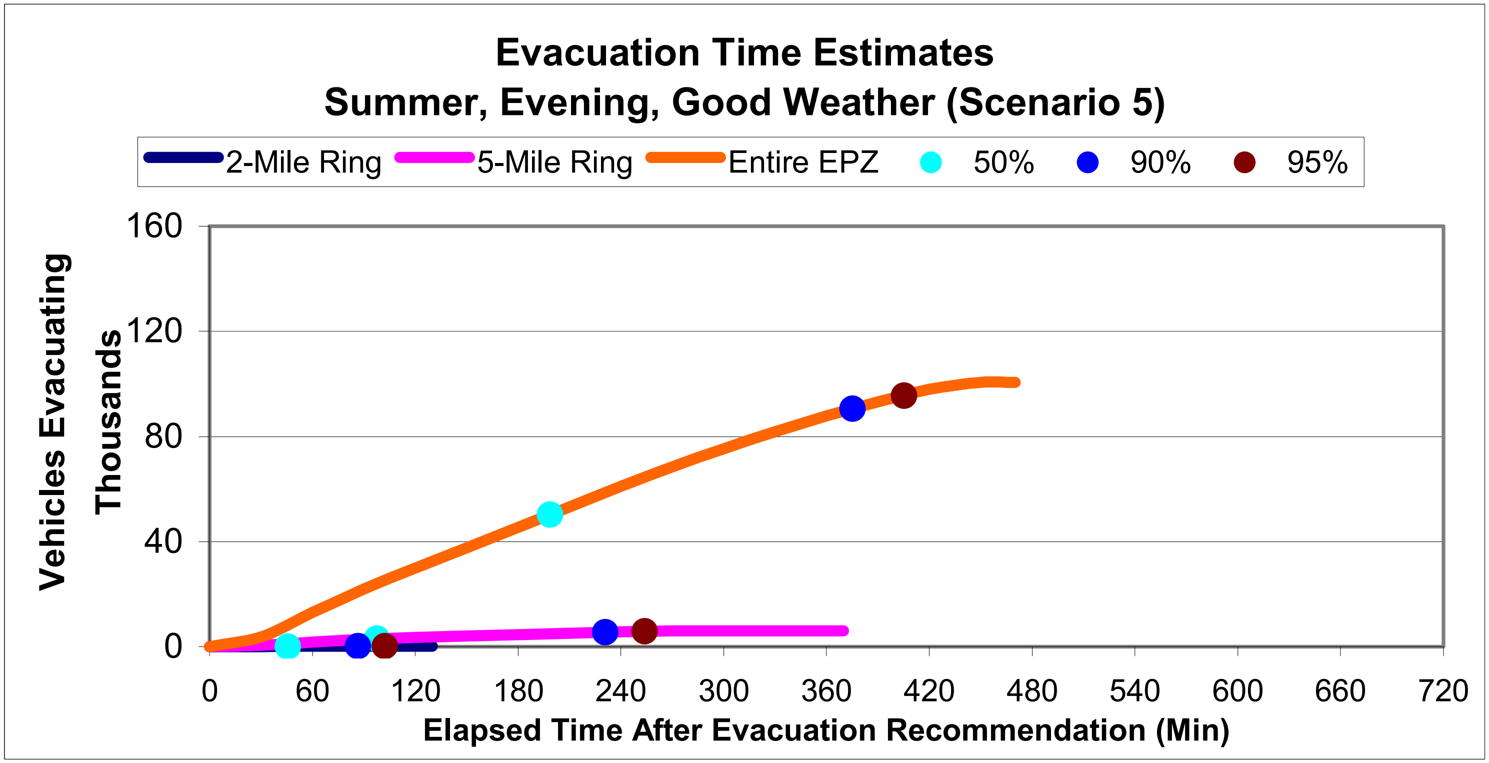


Figure J-6. Evacuation Time Estimates — Scenario 6 for Region R03 (Entire EPZ)

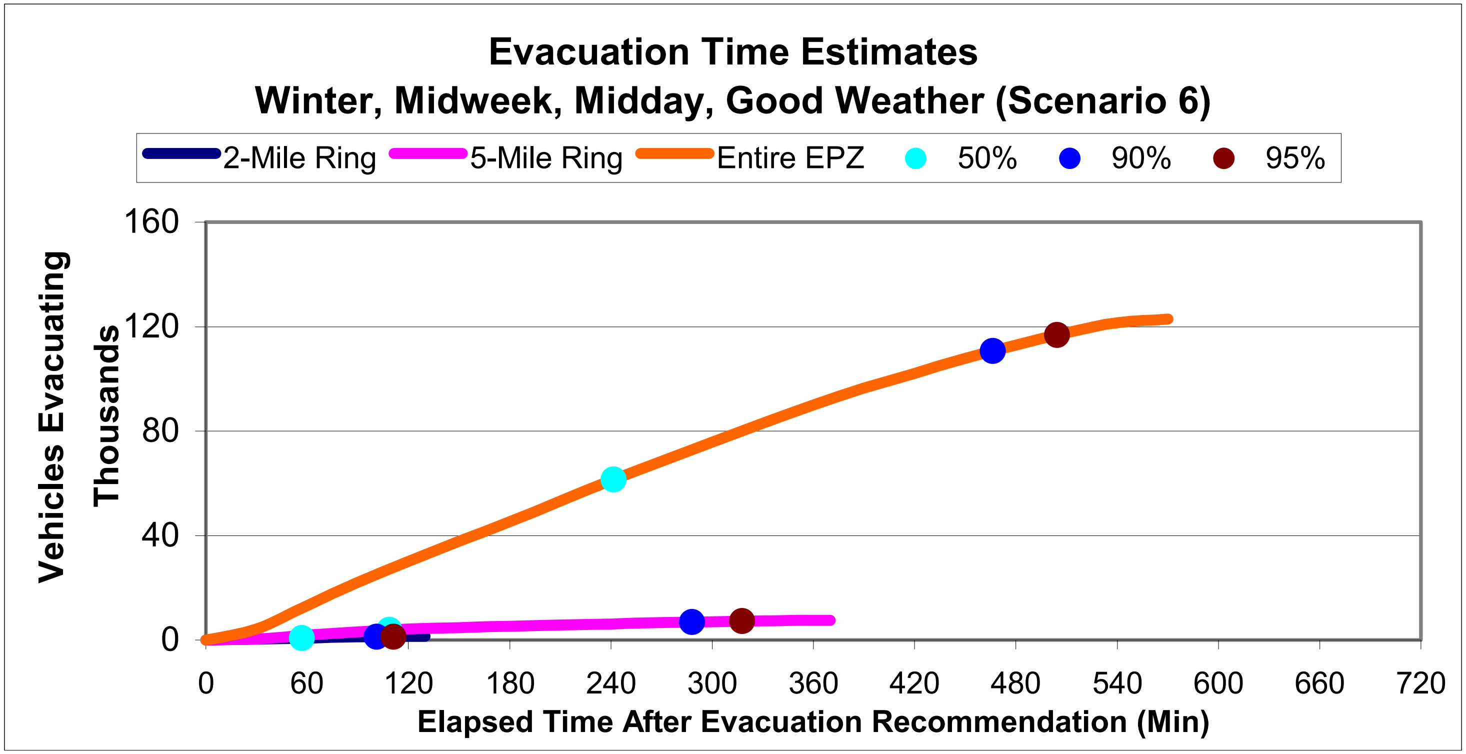


Figure J-7. Evacuation Time Estimates — Scenario 7 for Region R03 (Entire EPZ)

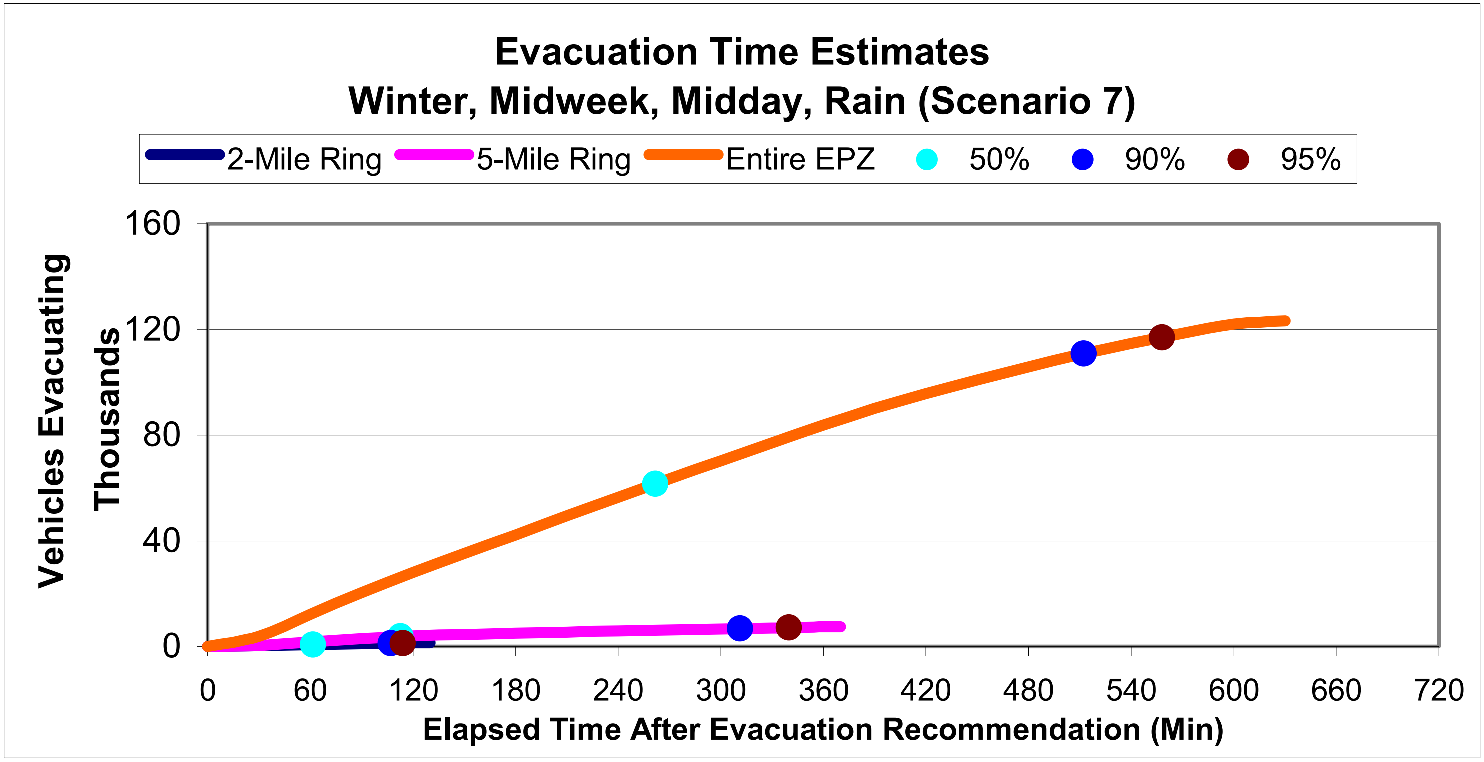


Figure J-8. Evacuation Time Estimates — Scenario 8 for Region R03 (Entire EPZ)

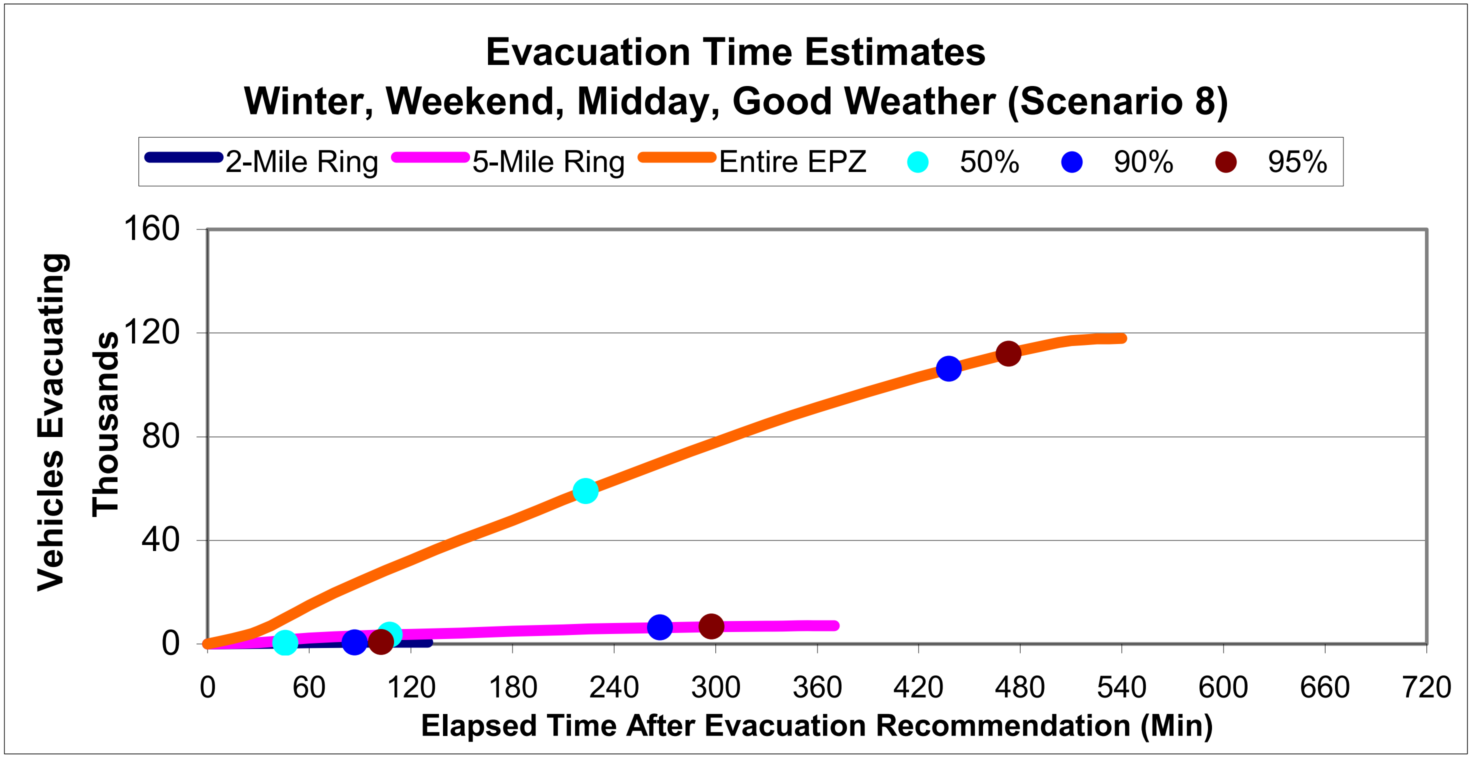


Figure J-9. Evacuation Time Estimates — Scenario 9 for Region R03 (Entire EPZ)

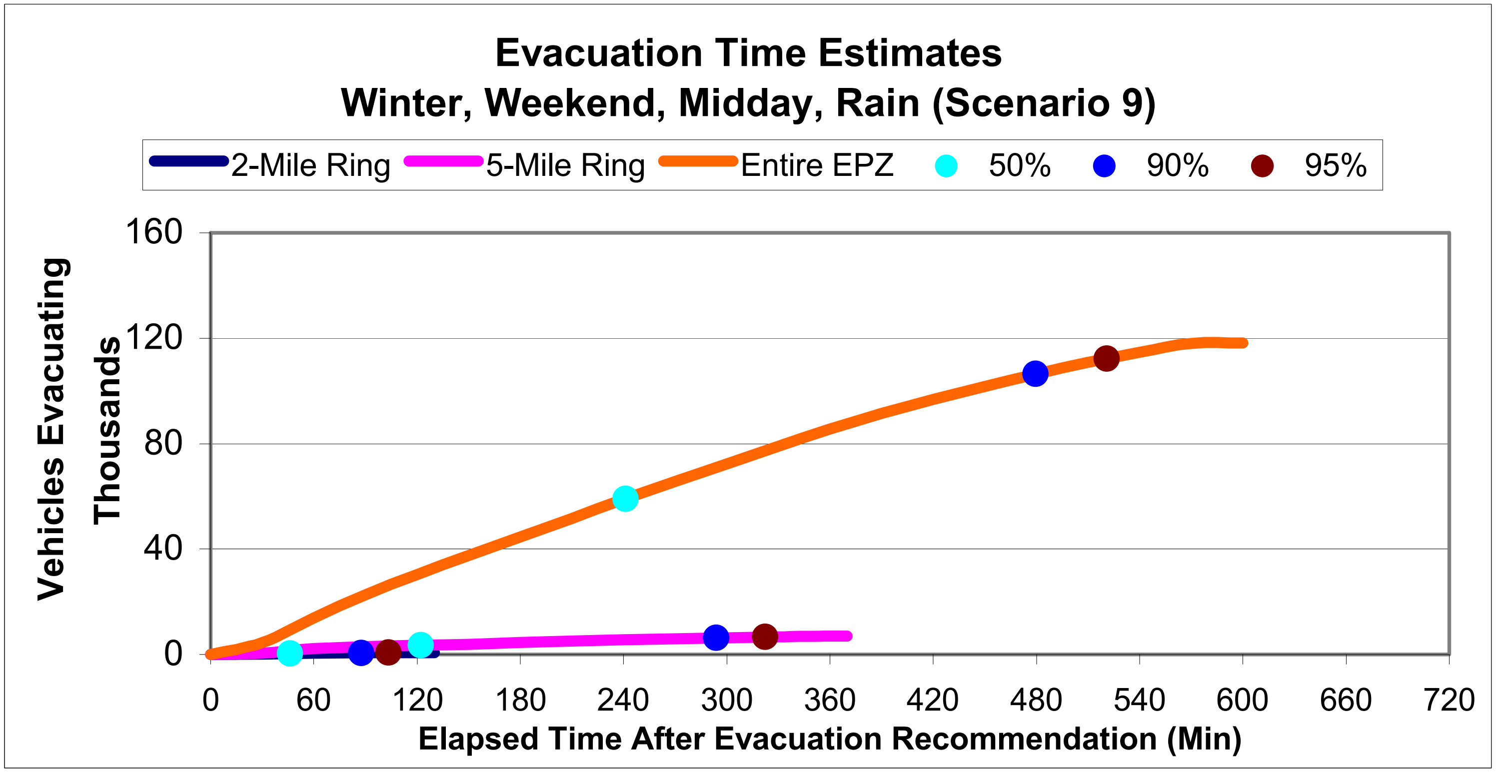


Figure J-10. Evacuation Time Estimates — Scenario 10 for Region R03 (Entire EPZ)

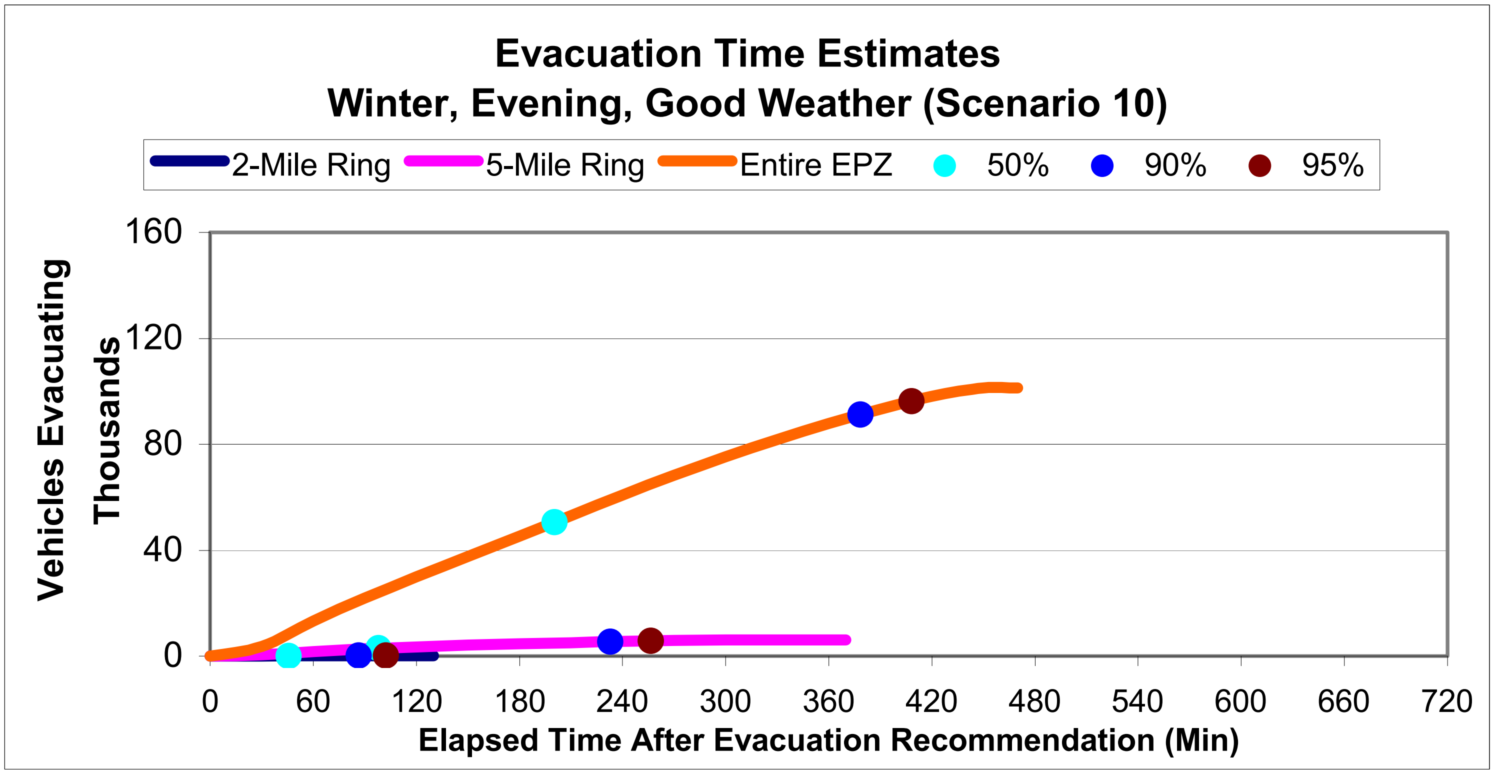
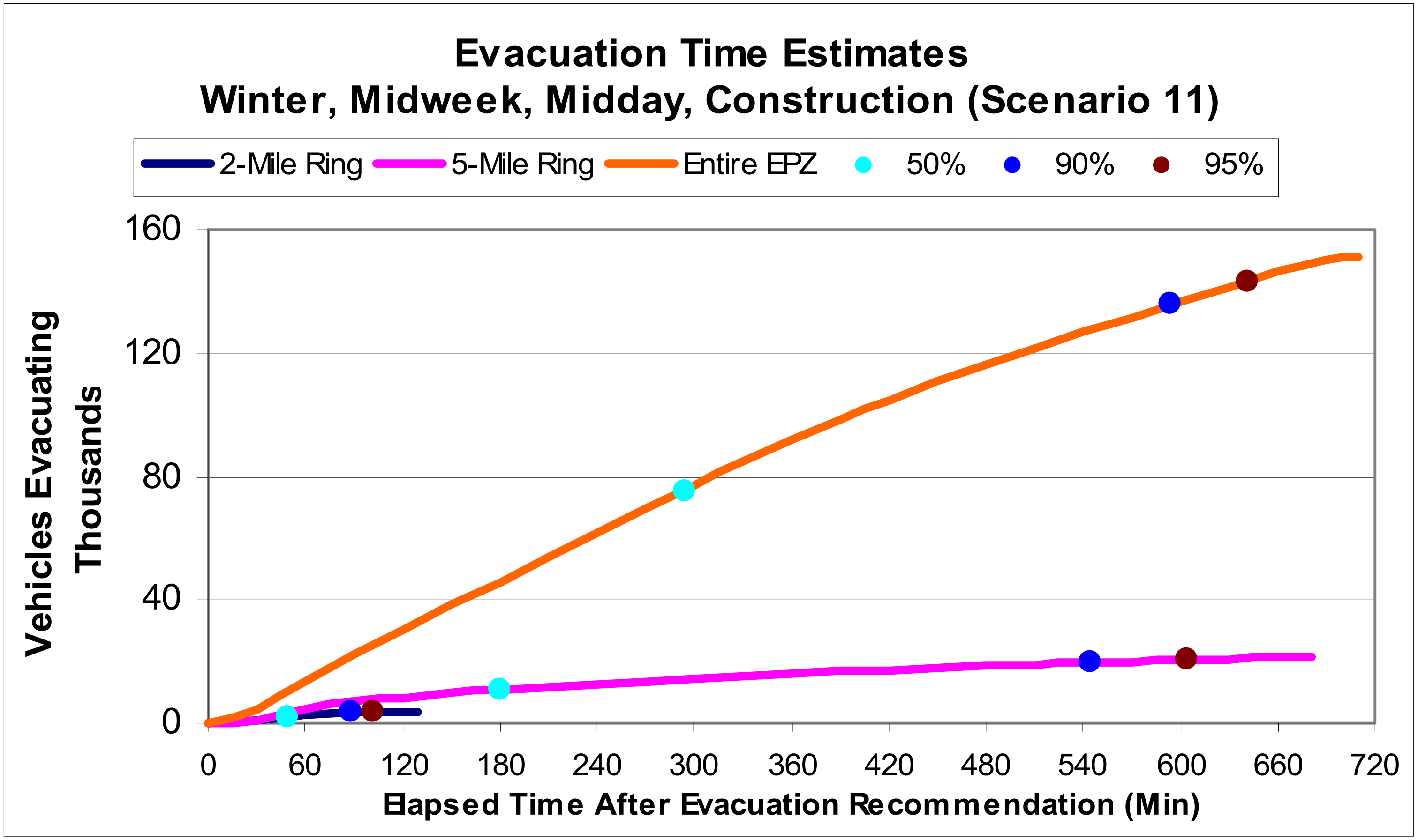


Figure J-11. Evacuation Time Estimates — Scenario 11 for Region R03 (Entire EPZ)



APPENDIX K
EVACUATION ROADWAY NETWORK CHARACTERISTICS

Appendix K
Evacuation Roadway Network Characteristics

Table K-1 lists the characteristics of each roadway modeled in the ETE analysis. Each link is identified by its upstream and downstream node numbers. These node numbers can be cross-referenced to the electronic version of Figure 1-2 to identify the geographic location of each link. As mentioned in Section 1.3, the roadway characteristics were observed during the roadway survey; key roadway sections, and intersections were video-archived during the survey, including audio recordings of the comments made during the survey. A tablet personal computer equipped with geographic information system and global positioning system technologies was also used to note key observations during the survey. Geographic information system shapefiles of the roadway characteristics and traffic control devices observed were created based on field observations and on the audio and video recordings.

The term *Full Lane* identifies the number of lanes that extend throughout the length of the link. Many links have additional lanes on the immediate approach to an intersection; these have been recorded and entered into the IDYNEV system input stream.

Table K-1 (Sheet 1 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
1	75	0.99	1	1714	50
1	78	0.98	1	1714	50
1	623	0.50	1	1714	50
2	243	0.89	1	1714	45
2	244	0.84	1	1714	60
3	27	0.64	1	1714	45
3	257	0.40	1	1714	45
4	6	0.25	2	1714	40
4	9	0.98	3	2250	70
4	10	1.53	4	2250	70
5	4	0.31	2	1714	50
5	6	0.16	3	1714	45
5	650	0.08	2	1714	45
6	5	0.16	4	1714	45
6	8	0.26	2	1714	40
6	646	0.16	2	1714	40
7	5	0.22	2	1714	40
7	8	0.13	3	1714	40
7	103	0.46	2	1714	40
8	7	0.13	3	1714	40
8	102	0.16	2	1714	40
8	642	0.12	2	1714	40
9	4	0.98	3	2250	70
9	11	0.57	3	2250	70
9	643	0.35	1	1714	40
10	4	1.53	4	2250	70
10	440	0.23	4	2250	70
10	481	0.10	1	1714	40
11	9	0.57	3	2250	70
11	15	0.29	2	1714	40
11	219	0.07	3	2250	70
12	13	0.07	1	1500	30
12	215	0.27	3	1714	45
12	268	0.07	3	1714	45
13	14	0.05	1	1500	30
14	11	0.06	1	1500	50
15	19	0.10	3	1714	40
15	20	0.14	2	1714	40

Table K-1 (Sheet 2 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
15	496	0.10	2	1714	40
16	267	0.31	1	1714	40
16	637	0.34	1	1714	40
17	21	0.08	2	1714	40
17	23	0.08	3	1714	40
17	492	0.11	3	1714	45
18	20	0.08	1	1714	40
18	24	0.21	2	2250	70
18	219	0.28	2	2250	70
19	15	0.10	3	1714	40
19	129	0.36	2	1714	40
19	267	0.08	2	1714	40
20	17	0.09	3	1714	40
21	17	0.08	2	1714	40
21	22	0.08	3	1714	40
22	18	0.08	1	1714	50
22	19	0.09	2	1714	40
23	25	0.31	1	1714	50
23	260	0.44	2	1714	40
24	18	0.21	2	2250	70
24	25	0.35	2	2250	70
25	24	0.35	2	2250	70
25	26	0.20	1	1714	40
25	29	0.39	2	2250	70
26	21	0.22	3	1714	40
27	3	0.64	1	1714	45
27	28	0.66	2	1714	45
27	262	0.55	2	1714	40
27	266	0.63	1	1714	40
28	26	0.32	2	1714	40
28	27	0.66	2	1714	45
28	260	0.11	3	1714	45
29	25	0.39	2	2250	70
29	31	1.24	2	2250	70
29	265	0.14	1	1714	40
30	29	0.14	1	1714	50
31	29	1.24	2	2250	70
31	32	0.63	2	2250	70

Table K-1 (Sheet 3 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
32	31	0.63	2	2250	70
32	33	0.42	2	2250	70
32	35	0.37	1	1714	40
33	32	0.42	2	2250	70
33	34	0.17	2	2250	70
33	37	0.06	1	1500	30
34	33	0.17	2	2250	70
34	36	0.18	1	1714	40
34	39	0.88	2	2250	70
35	34	0.24	1	1714	50
35	38	0.06	2	1714	55
35	220	0.20	2	1895	55
36	32	0.44	1	1714	50
36	38	0.11	2	1714	50
36	221	0.93	2	1714	50
37	38	0.05	1	1500	30
38	35	0.06	2	1895	55
38	36	0.11	2	1895	55
39	34	0.88	2	2250	70
39	40	0.49	2	2250	70
40	39	0.49	2	2250	70
40	41	1.20	2	2250	70
41	40	1.20	2	2250	70
41	42	0.20	1	1714	40
41	44	0.41	2	2250	70
42	43	0.38	3	1714	50
42	383	0.10	2	1714	50
43	42	0.38	2	1714	50
43	45	0.08	1	1500	40
43	367	0.52	2	1714	45
44	41	0.41	2	2250	70
44	46	0.25	2	2250	70
45	44	0.11	1	1714	50
46	44	0.25	2	2250	70
46	47	0.11	2	2250	70
47	46	0.11	2	2250	70
47	48	0.35	1	1714	40
47	52	0.40	2	2250	70

Table K-1 (Sheet 4 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
48	49	0.10	2	1714	45
48	53	0.29	1	1714	50
48	364	0.46	2	1714	45
49	47	0.35	1	1714	50
49	48	0.10	3	1714	45
49	50	0.06	2	1714	45
49	51	0.06	1	1500	30
50	49	0.06	3	1714	45
50	367	0.16	2	1714	45
51	52	0.05	1	1500	50
52	47	0.40	2	2250	70
52	53	0.25	2	2250	70
53	52	0.25	2	2250	70
53	54	0.19	1	1714	40
53	57	0.92	2	2250	70
54	55	0.06	1	1714	40
55	50	0.08	1	1714	40
56	57	0.99	2	2250	70
56	60	0.20	2	2250	70
57	53	0.92	2	2250	70
57	56	0.99	2	2250	70
58	209	0.06	1	1500	30
59	61	0.26	3	1714	45
59	340	0.51	2	1714	45
59	341	0.32	1	1714	40
59	343	0.10	1	1714	40
60	56	0.20	2	2250	70
60	59	0.18	1	1714	40
60	344	0.18	2	2250	70
61	59	0.26	3	1714	45
61	94	0.17	2	1714	45
62	63	1.11	2	2250	70
62	223	0.23	2	2250	60
63	62	1.11	2	2250	70
63	344	0.96	2	2250	70
64	351	0.29	1	1714	40
65	66	0.15	1	1714	50
66	67	0.16	2	1714	50

Table K-1 (Sheet 5 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
66	68	0.26	2	1714	50
66	158	0.16	3	1714	50
67	66	0.16	2	1714	50
67	68	0.13	1	1714	50
67	155	0.65	2	1714	50
68	62	0.24	2	2250	60
69	70	0.10	2	1714	50
69	140	0.11	1	1714	40
69	218	0.52	2	1714	50
70	69	0.10	3	1714	50
70	72	0.10	2	1714	50
71	70	0.12	1	1714	40
71	74	1.87	1	1714	60
72	70	0.10	2	1714	50
72	71	0.05	1	1714	40
72	604	0.32	2	1714	50
73	224	1.90	1	1714	60
73	604	0.34	1	1714	60
74	71	1.87	1	1714	50
74	250	1.80	1	1714	60
75	1	0.99	1	1714	50
75	76	1.24	1	1714	50
75	488	0.39	1	1714	50
76	75	1.24	1	1714	50
76	424	0.87	1	1714	50
77	85	1.01	1	1714	50
77	426	1.51	1	1714	40
77	488	1.60	1	1714	50
78	1	0.98	1	1714	50
78	81	0.51	1	1714	50
79	618	0.47	1	1714	50
80	82	1.00	1	1714	50
80	130	1.00	1	1714	50
80	623	0.51	1	1714	50
81	78	0.51	1	1714	50
81	86	1.54	1	1714	50
82	78	1.02	1	1714	40
82	80	1.00	1	1714	50

Table K-1 (Sheet 6 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
82	83	0.50	1	1714	50
83	81	1.03	1	1714	45
83	82	0.50	1	1714	50
83	84	0.52	1	1714	50
84	83	0.52	1	1714	50
84	87	1.01	1	1714	50
85	77	1.01	1	1714	50
85	428	1.54	1	1714	40
85	648	0.79	1	1714	50
86	81	1.54	1	1714	50
86	85	1.05	1	1714	50
86	88	0.93	1	1714	45
87	84	1.01	1	1714	50
87	86	1.02	1	1714	50
87	259	1.27	1	1714	50
88	86	0.93	1	1714	45
88	89	0.91	1	1714	40
88	91	0.98	1	1714	45
89	127	0.16	3	1714	40
90	92	0.79	2	1714	40
90	127	0.30	2	1714	40
91	88	0.98	1	1714	45
91	93	0.11	2	1714	45
92	90	0.79	2	1714	40
92	126	0.24	2	1714	45
93	91	0.11	2	1714	45
93	92	1.11	1	1714	40
93	95	0.27	2	1714	40
94	58	0.12	1	1500	40
94	61	0.17	2	1714	45
94	399	0.09	2	1714	45
95	93	0.27	2	1714	40
95	96	0.36	2	1714	40
96	95	0.36	2	1714	40
96	97	0.66	2	1714	40
96	98	0.87	1	1714	40
96	100	0.24	1	1714	40
97	96	0.66	2	1714	40

Table K-1 (Sheet 7 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
97	99	0.46	1	1714	40
97	101	0.67	1	1714	40
97	645	0.17	2	1714	40
98	99	0.52	2	1714	45
98	126	0.25	2	1714	45
98	649	1.01	1	1714	40
99	98	0.52	2	1714	45
99	432	1.04	1	1714	40
99	646	0.11	2	1714	40
100	96	0.24	1	1714	40
100	101	0.51	1	1714	40
101	97	0.67	1	1714	40
101	100	0.51	1	1714	40
101	213	0.48	1	1714	40
101	639	0.23	1	1714	40
102	8	0.16	2	1714	40
102	645	0.19	2	1714	40
103	7	0.46	2	1714	45
103	104	0.17	2	1714	40
103	110	0.27	2	1714	40
103	653	0.39	2	1714	45
104	103	0.17	2	1714	45
104	125	1.04	1	1714	40
104	650	0.52	2	1714	45
104	652	0.46	2	1714	45
105	106	0.44	1	1714	40
105	109	0.17	3	1714	45
105	111	0.49	3	1714	45
105	417	0.11	2	1714	40
106	105	0.44	1	1714	40
106	107	0.16	1	1714	40
106	108	0.21	1	1714	40
107	106	0.16	1	1714	40
107	109	0.36	2	1714	45
107	112	1.01	1	1714	45
107	123	0.59	1	1714	40
108	106	0.21	1	1714	40
108	119	0.52	1	1714	40

Table K-1 (Sheet 8 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
109	105	0.17	3	1714	45
109	107	0.36	2	1714	45
109	122	0.38	3	1714	50
109	418	0.10	2	1714	30
110	103	0.27	2	1714	40
110	416	0.21	2	1714	40
111	105	0.49	3	1714	45
111	217	0.31	2	1714	40
111	268	0.57	3	1714	45
111	416	0.11	2	1714	40
112	107	1.01	1	1714	45
112	115	0.24	1	1714	45
112	117	0.37	1	1714	45
112	482	0.67	1	1714	40
113	114	0.64	1	1714	45
113	115	0.77	1	1714	45
113	382	1.23	1	1714	45
114	113	0.64	1	1714	45
114	461	0.51	1	1714	45
115	112	0.24	1	1714	45
115	113	0.77	1	1714	45
115	116	0.30	1	1714	40
116	115	0.30	1	1714	40
116	117	0.26	1	1714	40
117	112	0.37	1	1714	45
117	116	0.26	1	1714	40
117	118	0.17	1	1714	40
117	121	0.94	1	1714	40
118	117	0.17	1	1714	40
118	119	0.68	1	1200	40
119	108	0.52	1	1714	40
119	118	0.68	1	1200	40
119	120	0.74	1	1714	40
119	269	0.45	1	1714	40
120	119	0.74	1	1714	40
120	121	0.24	1	1714	30
120	271	0.31	1	1714	30
121	117	0.94	1	1714	45

Table K-1 (Sheet 9 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
121	120	0.24	1	1714	30
121	274	0.10	1	1714	45
122	109	0.38	3	1714	45
122	123	0.30	3	1200	50
123	483	0.14	3	1714	50
124	451	0.86	1	1714	40
124	484	0.07	2	1714	40
124	485	0.11	3	1714	50
125	419	1.00	1	1714	40
125	444	0.53	1	1714	40
125	445	0.52	1	1714	40
126	92	0.24	2	1714	45
126	98	0.25	2	1714	45
127	90	0.30	2	1714	40
127	128	1.53	3	1714	50
127	648	0.15	2	1714	50
128	480	0.52	3	1714	50
129	268	0.13	2	1714	40
130	80	1.00	1	1714	50
130	131	1.00	1	1714	50
130	141	1.01	1	1714	50
131	130	1.00	1	1714	50
131	142	0.99	1	1714	50
131	624	0.53	1	1714	50
132	143	0.99	1	1714	50
132	286	0.52	1	1714	50
132	624	0.47	1	1714	50
133	134	0.52	1	1714	50
133	144	0.55	1	1714	45
133	149	0.51	1	1714	50
133	625	0.46	1	1714	50
134	133	0.52	1	1714	50
134	135	0.49	1	1714	40
134	159	0.56	1	1714	40
134	160	0.51	1	1714	40
135	134	0.49	1	1714	40
135	136	0.51	1	1500	40
135	150	0.51	1	1714	40

Table K-1 (Sheet 10 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
135	361	0.55	1	1714	40
136	135	0.51	1	1500	40
136	151	0.50	1	1500	35
136	161	0.53	1	1200	30
136	362	0.42	2	1714	45
137	138	0.42	1	1500	35
137	161	0.09	1	1500	30
137	511	0.11	1	1714	45
138	137	0.42	1	1500	35
138	139	0.98	1	1200	40
138	155	0.15	2	1500	40
138	509	0.31	1	1500	35
139	138	0.98	1	1200	35
139	140	0.61	1	1714	40
139	158	0.11	3	1714	40
139	519	0.16	2	1500	40
140	69	0.11	1	1714	40
140	139	0.61	1	1714	40
141	82	1.01	1	1714	45
141	130	1.01	1	1714	50
141	278	0.52	1	1714	50
142	131	0.99	1	1714	50
142	141	1.02	1	1714	45
142	283	0.53	1	1714	50
143	132	0.99	1	1714	50
143	142	0.97	1	1714	45
143	279	0.51	1	1714	50
144	133	0.55	1	1714	45
144	159	0.51	1	1714	40
144	288	0.48	1	1714	45
145	336	0.19	1	1714	45
145	361	0.34	1	1714	40
145	362	0.71	1	1714	45
145	512	0.08	1	1714	40
146	130	0.55	1	1714	50
146	616	0.99	1	1714	50
147	131	0.54	1	1714	50
147	146	1.00	1	1714	45

Table K-1 (Sheet 11 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
148	132	0.52	1	1714	50
148	614	0.48	1	1714	50
149	133	0.51	1	1714	45
149	313	0.52	1	1714	50
149	607	0.47	1	1714	50
150	135	0.51	1	1714	40
150	160	0.50	1	1714	40
150	315	0.49	1	1714	40
151	136	0.50	1	1500	40
151	150	0.50	1	1714	40
151	316	0.49	1	1714	35
152	153	0.99	1	1200	35
152	163	0.51	1	1200	35
152	318	0.50	1	1714	40
152	509	0.18	1	1500	35
153	152	0.99	1	1200	35
153	295	0.50	1	1500	40
153	519	0.34	2	1500	40
154	168	0.56	1	1500	40
154	170	0.11	2	1714	40
154	173	0.30	1	1714	40
154	513	0.12	2	1714	45
155	67	0.65	2	1714	50
155	138	0.15	2	1500	35
155	167	0.33	2	1714	50
155	612	0.37	1	1714	45
158	66	0.16	3	1714	50
158	139	0.11	2	1714	40
158	218	0.18	3	1714	50
159	134	0.56	1	1714	40
159	144	0.51	1	1714	45
159	358	0.48	1	1714	40
159	361	0.49	1	1714	40
160	134	0.51	1	1714	40
160	149	0.52	1	1714	50
160	314	0.49	1	1714	40
161	136	0.53	1	1200	30
161	137	0.09	1	1500	35

Table K-1 (Sheet 12 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
161	163	0.50	1	1500	35
161	511	0.07	1	1500	40
162	168	0.16	1	1500	40
162	511	0.08	1	1500	40
163	151	0.53	1	1500	35
163	152	0.51	1	1200	35
163	161	0.50	1	1500	30
163	317	0.50	1	1714	40
164	165	1.00	1	1714	45
164	507	0.60	2	1714	45
165	164	1.00	1	1714	45
165	355	0.50	1	1714	45
165	612	0.55	1	1714	45
166	167	0.27	3	1714	50
166	168	0.17	1	1500	40
166	172	0.19	2	1714	50
166	613	0.14	1	1714	40
167	155	0.33	3	1714	50
167	166	0.27	2	1714	50
168	154	0.56	1	1714	40
168	162	0.16	1	1500	40
168	166	0.17	1	1714	40
169	171	0.51	1	1714	40
169	613	0.51	1	1714	40
170	154	0.11	2	1714	40
170	171	0.30	2	1714	45
170	172	0.43	2	1714	50
170	174	0.30	3	1714	50
171	169	0.51	1	1714	40
171	170	0.30	2	1714	45
171	175	0.25	1	1714	35
171	340	0.52	2	1714	45
172	166	0.19	3	1714	50
172	170	0.43	2	1714	50
173	154	0.30	1	1714	40
173	174	0.10	1	1714	40
174	170	0.30	2	1714	50
174	173	0.10	1	1714	40

Table K-1 (Sheet 13 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
174	175	0.15	1	1714	35
174	176	0.32	2	1714	50
175	171	0.25	1	1714	40
175	174	0.15	1	1714	40
176	174	0.32	2	1714	50
176	177	0.49	1	1714	40
176	178	0.65	2	1714	50
176	512	0.09	1	1714	40
177	176	0.49	1	1714	40
177	180	0.48	1	1714	40
177	340	0.53	1	1714	40
178	176	0.65	2	1714	50
178	179	0.72	2	1714	50
178	180	0.06	1	1714	40
178	514	0.09	1	1714	40
179	178	0.72	2	1714	50
179	183	0.07	2	1714	45
179	337	0.12	2	1714	50
179	515	0.10	1	1714	45
180	177	0.48	1	1714	40
180	178	0.06	1	1714	40
180	338	0.49	1	1714	40
181	291	0.37	1	1714	40
181	335	0.42	1	1714	45
181	359	0.27	1	1714	45
181	515	0.10	1	1714	45
182	335	0.29	1	1714	45
182	336	0.45	1	1714	45
182	358	0.27	1	1714	40
182	514	0.09	1	1714	40
183	179	0.07	2	1714	45
183	337	0.09	1	1714	45
183	338	0.52	1	1714	40
183	347	0.49	2	1714	45
184	186	0.14	1	1714	45
184	187	0.67	2	1714	50
184	337	0.52	2	1714	50
184	517	0.11	1	1714	30

Table K-1 (Sheet 14 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
185	188	0.50	1	1714	45
185	290	0.50	1	1714	45
185	291	0.19	1	1714	45
185	346	0.18	1	1714	45
186	184	0.14	1	1714	45
186	347	0.46	1	1714	40
186	363	0.51	2	1714	45
187	184	0.67	2	1714	50
187	202	0.38	2	1714	50
187	518	0.12	1	1714	30
188	280	0.53	1	1714	45
188	284	0.52	1	1714	40
188	345	0.62	1	1714	40
189	190	0.75	1	1200	40
189	192	0.34	2	1714	50
189	202	0.30	2	1714	50
189	409	0.11	1	1714	30
190	189	0.75	1	1714	50
190	196	0.26	1	1714	40
190	203	0.24	1	1714	40
191	280	1.03	1	1714	50
191	281	1.02	1	1714	50
191	409	0.15	1	1714	50
192	189	0.34	2	1714	50
192	196	0.52	1	1714	40
192	197	0.78	2	1714	50
192	410	0.11	1	1714	30
193	195	0.13	1	1714	50
193	197	0.23	2	1714	50
193	198	0.58	2	1714	50
193	411	0.12	1	1714	50
194	281	0.54	1	1714	50
194	411	0.49	1	1714	50
195	193	0.13	1	1714	50
195	204	0.75	1	1714	50
196	190	0.26	1	1714	40
196	192	0.52	1	1714	40
196	197	0.58	1	1714	40

Table K-1 (Sheet 15 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
197	192	0.78	2	1714	50
197	193	0.23	2	1714	50
197	196	0.58	1	1714	40
198	193	0.58	2	1714	50
198	200	0.77	2	1714	45
198	420	0.10	1	1714	30
199	332	0.39	1	1714	40
199	420	0.46	1	1714	40
199	636	0.26	1	1714	50
200	198	0.77	2	1714	45
200	204	1.02	1	1714	45
200	332	0.11	2	1714	30
200	632	0.67	2	1714	45
201	212	0.85	1	1714	45
201	633	0.52	1	1714	45
202	187	0.38	2	1714	50
202	189	0.30	2	1714	50
202	203	0.97	2	1714	40
203	190	0.24	1	1714	40
203	202	0.97	2	1714	50
203	334	0.26	2	1714	50
203	383	0.24	1	1714	40
204	195	0.75	1	1714	50
204	200	1.02	1	1714	45
204	220	1.52	1	1714	50
204	333	0.46	2	1714	40
205	206	0.33	2	1714	45
205	255	0.83	1	1714	45
205	632	0.35	2	1714	45
205	635	0.12	1	1714	30
206	205	0.33	2	1714	45
206	207	0.53	2	1714	45
206	211	0.62	1	1714	45
206	412	0.14	1	1714	45
207	206	0.53	2	1714	45
207	208	0.37	2	1714	45
207	214	0.23	3	1714	40
207	413	0.11	2	1714	40

Table K-1 (Sheet 16 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
208	207	0.37	2	1714	45
208	414	0.09	1	1714	40
208	489	0.11	2	1714	40
208	493	0.07	3	1714	45
209	56	0.06	1	1500	50
210	399	0.48	2	1714	50
211	206	0.62	1	1714	45
211	214	0.38	2	1895	50
211	255	0.23	2	1895	50
211	260	0.50	2	1714	45
212	93	1.02	1	1714	45
212	259	0.78	1	1714	50
212	412	0.76	1	1200	40
213	101	0.48	1	1714	40
213	413	0.15	2	1714	40
214	207	0.23	3	1714	40
214	211	0.38	2	1895	50
214	261	0.12	3	1714	45
214	490	0.11	2	1714	40
215	12	0.27	3	1714	45
215	415	0.08	2	1714	30
215	494	0.10	3	1714	45
215	495	0.07	2	1714	40
216	415	0.12	2	1714	40
216	639	0.36	1	1714	40
217	111	0.31	2	1714	40
217	269	0.61	1	1200	35
218	69	0.52	2	1714	50
218	158	0.18	2	1714	50
219	11	0.07	3	2250	70
219	18	0.28	2	2250	70
220	35	0.20	2	1895	55
220	204	1.52	1	1714	50
220	631	1.45	2	1895	50
221	36	0.93	2	1895	50
221	222	1.50	2	1714	50
222	221	1.50	2	1714	50
222	334	0.75	2	1714	50

Table K-1 (Sheet 17 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
223	65	0.21	1	1714	40
224	73	1.90	1	1714	60
224	229	1.10	1	1714	60
225	226	1.04	2	1714	60
225	229	1.08	1	1714	60
226	225	1.04	2	1714	60
226	230	1.87	1	1714	60
227	228	0.99	2	1714	60
227	231	1.38	1	1714	60
228	227	0.99	2	1714	60
228	232	1.53	1	1714	60
229	224	1.10	1	1714	60
229	225	1.08	1	1714	60
230	226	1.87	1	1714	60
230	231	1.76	1	1714	60
231	227	1.38	1	1714	60
231	230	1.76	1	1714	60
232	228	1.53	1	1714	60
232	233	1.62	1	1714	60
233	232	1.62	1	1714	60
233	234	1.83	1	1714	60
234	233	1.83	1	1714	60
234	235	1.55	1	1714	60
235	234	1.55	1	1714	60
235	236	1.66	1	1714	40
236	235	1.66	1	1714	40
236	239	0.23	1	1714	45
237	239	0.89	2	1714	45
238	239	1.78	1	1714	45
238	240	1.44	1	1714	55
239	236	0.23	1	1714	40
239	237	0.89	2	1714	45
239	238	1.78	1	1714	55
240	238	1.44	1	1714	55
240	241	2.21	1	1714	55
241	240	2.21	1	1714	55
241	242	1.50	1	1714	55
242	241	1.50	1	1714	55

Table K-1 (Sheet 18 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
242	243	1.37	1	1714	55
243	2	0.89	1	1714	45
243	242	1.37	1	1714	55
244	2	0.84	1	1714	45
244	245	1.00	1	1714	60
245	244	1.00	1	1714	60
245	246	0.46	1	1714	60
246	245	0.46	1	1714	60
246	248	1.52	1	1714	60
247	2	0.90	1	1714	35
248	246	1.52	1	1714	60
248	249	1.40	1	1714	45
249	248	1.40	1	1714	45
249	253	2.19	1	1714	60
250	74	1.80	1	1714	60
250	251	1.78	1	1714	60
251	250	1.78	1	1714	60
251	252	1.82	1	1714	60
252	251	1.82	1	1714	60
252	253	1.83	1	1714	60
253	249	2.19	1	1714	60
253	252	1.83	1	1714	60
254	220	1.42	1	1714	50
255	205	0.83	1	1714	45
255	211	0.23	2	1895	50
255	257	0.49	1	1714	45
255	631	0.29	2	1895	50
256	299	0.16	1	1714	40
257	3	0.40	1	1714	45
257	255	0.49	1	1714	45
258	254	1.12	1	1714	45
258	264	1.81	1	1714	40
259	87	1.27	1	1714	50
259	212	0.78	1	1714	50
260	28	0.11	3	1714	45
260	30	0.13	2	1714	40
260	211	0.50	2	1714	45
261	214	0.12	3	1714	45

Table K-1 (Sheet 19 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
261	491	0.16	3	1714	45
262	27	0.55	2	1714	45
262	263	0.35	2	1714	40
263	262	0.35	2	1714	40
263	264	0.43	2	1714	45
264	263	0.43	2	1714	40
264	378	0.45	1	1714	40
265	28	0.13	2	1714	40
266	27	0.63	1	1714	45
266	270	0.27	1	1714	35
266	271	0.39	1	1714	40
267	16	0.31	1	1714	40
267	19	0.08	2	1714	40
268	12	0.07	3	1714	45
268	111	0.57	3	1714	45
269	119	0.45	1	1714	40
269	217	0.61	1	1200	35
269	270	0.36	1	1714	35
269	637	0.41	1	1714	40
270	266	0.27	1	1714	35
270	269	0.36	1	1714	35
271	120	0.31	1	1714	30
271	266	0.39	1	1714	40
274	121	0.10	1	1714	45
274	382	0.36	1	1714	45
275	121	0.41	1	1714	40
276	87	1.01	1	1714	50
276	277	1.04	1	1714	50
276	636	1.27	1	1714	50
277	84	0.99	1	1714	40
277	276	1.04	1	1714	50
277	278	0.48	1	1714	50
278	83	1.01	1	1714	45
278	141	0.52	1	1714	50
278	277	0.48	1	1714	50
279	143	0.51	1	1714	50
279	280	0.51	1	1714	50
279	283	0.99	1	1714	45

Table K-1 (Sheet 20 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
280	191	1.03	1	1714	50
280	279	0.51	1	1714	50
280	282	0.99	1	1714	45
281	194	0.54	1	1714	50
281	276	1.01	1	1714	50
281	282	1.05	1	1714	50
282	277	1.02	1	1714	45
282	281	1.05	1	1714	50
282	283	0.50	1	1714	50
283	142	0.53	1	1714	50
283	278	1.01	1	1714	45
283	282	0.50	1	1714	50
284	188	0.52	1	1714	40
284	279	0.52	1	1714	45
284	285	0.50	1	1714	40
285	143	0.54	1	1714	45
285	284	0.50	1	1714	40
285	286	1.01	1	1714	40
286	132	0.52	1	1714	50
286	285	1.01	1	1714	40
286	625	0.51	1	1714	50
287	148	0.51	1	1714	50
287	286	0.51	1	1714	50
288	144	0.48	1	1714	45
288	289	0.49	1	1714	45
288	358	0.51	1	1714	45
288	359	0.49	1	1714	45
289	285	0.49	1	1714	45
289	290	0.51	1	1714	45
290	185	0.50	1	1714	45
290	284	0.50	1	1714	45
290	289	0.51	1	1714	45
291	181	0.37	1	1714	45
291	185	0.19	1	1714	45
291	346	0.26	1	1714	45
291	516	0.09	1	1714	45
292	16	0.23	1	1714	35
293	216	0.12	1	1714	35

Table K-1 (Sheet 21 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
294	100	0.25	1	1714	35
295	153	0.50	1	1500	40
295	296	0.50	1	1714	45
295	318	0.99	1	1714	40
296	295	0.50	1	1500	40
296	297	0.50	1	1714	50
296	331	0.99	1	1714	45
297	296	0.50	1	1714	45
297	302	0.50	1	1714	50
298	295	0.51	1	1714	40
298	297	0.50	1	1714	40
299	153	0.49	1	1500	35
299	298	0.50	1	1714	40
300	301	0.22	1	1714	40
301	298	0.49	1	1714	40
301	302	0.52	1	1714	40
302	297	0.50	1	1714	50
302	303	0.97	1	1714	40
303	302	0.97	1	1714	50
303	304	0.67	1	1714	55
304	303	0.67	1	1714	40
304	601	1.45	1	1714	55
308	615	0.52	1	1714	50
308	616	0.49	1	1714	50
309	146	0.48	1	1714	50
309	308	0.97	1	1714	50
310	147	0.48	1	1714	50
310	309	1.01	1	1714	50
311	148	0.51	1	1714	50
311	606	0.50	1	1714	50
312	287	0.51	1	1714	50
312	311	0.49	1	1714	50
313	149	0.52	1	1714	50
313	605	0.47	1	1714	50
314	160	0.49	1	1714	40
314	313	0.52	1	1714	50
315	150	0.49	1	1714	40
315	314	0.50	1	1714	40

Table K-1 (Sheet 22 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
316	151	0.49	1	1500	35
316	315	0.50	1	1714	40
317	163	0.50	1	1500	35
317	316	0.53	1	1714	40
317	318	0.50	1	1714	40
318	152	0.50	1	1500	35
318	295	0.99	1	1714	40
318	317	0.50	1	1714	40
318	331	0.49	1	1714	40
319	296	2.53	1	1714	45
319	602	1.51	1	1714	50
322	619	2.19	1	1714	50
323	310	2.99	1	1714	50
323	322	1.03	1	1714	50
324	311	2.99	1	1714	50
324	323	0.99	1	1714	50
325	312	3.00	1	1714	50
325	324	0.49	1	1714	50
327	314	3.01	1	1714	50
327	325	1.50	1	1714	50
328	315	3.03	1	1714	40
328	327	0.51	1	1714	50
329	316	3.04	1	1714	35
329	328	0.51	1	1714	50
330	317	0.50	1	1714	40
330	331	0.50	1	1714	45
331	296	0.99	1	1714	45
331	318	0.49	1	1714	40
331	330	0.50	1	1714	45
332	199	0.39	1	1714	50
332	200	0.11	3	1714	30
332	201	0.18	1	1714	45
333	204	0.46	2	1714	40
334	195	1.26	1	1714	45
334	203	0.26	2	1714	50
334	222	0.75	2	1714	50
335	181	0.42	1	1714	45
335	182	0.29	1	1714	45

Table K-1 (Sheet 23 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
335	359	0.30	1	1714	45
336	145	0.19	1	1714	45
336	182	0.45	1	1714	45
336	358	0.34	1	1714	45
337	179	0.12	2	1714	50
337	183	0.09	1	1714	45
337	184	0.52	2	1714	50
337	516	0.10	1	1714	45
338	180	0.49	1	1714	40
338	183	0.52	1	1714	40
338	341	0.68	1	1714	40
338	348	0.50	1	1714	40
340	59	0.51	2	1714	40
340	171	0.52	2	1714	45
340	177	0.53	1	1714	40
341	59	0.32	2	1714	45
341	338	0.68	1	1714	40
342	341	0.09	1	1714	20
343	344	0.14	1	1714	50
344	60	0.18	2	2250	70
344	63	0.96	2	2250	70
345	188	0.62	1	1714	40
345	346	0.66	1	1714	45
345	518	0.10	1	1714	30
346	185	0.18	1	1714	45
346	291	0.26	1	1714	40
346	345	0.66	1	1714	40
346	517	0.10	1	1714	30
347	183	0.49	2	1714	45
347	350	0.49	2	1714	45
348	338	0.50	1	1714	40
348	347	0.53	1	1714	40
348	349	0.49	1	1714	40
349	348	0.49	1	1714	40
349	350	0.53	1	1714	40
350	347	0.49	2	1714	45
350	364	0.27	2	1714	45
351	348	0.47	1	1714	40

**Table K-1 (Sheet 24 of 35)
Evacuation Roadway Network Characteristics**

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
352	349	0.31	1	1714	40
353	169	0.53	1	1714	40
353	340	0.49	1	1714	40
355	165	0.50	1	1714	45
355	353	0.53	2	1714	40
355	392	1.01	1	1714	45
358	159	0.48	1	1714	40
358	182	0.27	1	1714	40
358	288	0.51	1	1714	45
358	336	0.34	1	1714	45
359	181	0.27	1	1714	45
359	288	0.49	1	1714	45
359	290	0.48	1	1714	45
360	289	0.16	1	1714	45
361	135	0.55	1	1714	40
361	145	0.34	1	1714	40
361	159	0.49	1	1714	40
362	136	0.42	2	1500	40
362	145	0.71	1	1714	45
362	513	0.09	2	1714	45
363	186	0.51	2	1714	45
363	350	0.46	1	1714	40
363	366	0.24	2	1714	45
364	48	0.46	2	1714	45
364	350	0.27	2	1714	45
365	364	0.32	1	1714	40
366	363	0.24	2	1714	45
366	364	0.46	1	1714	40
366	387	0.14	2	1714	45
367	43	0.52	2	1714	50
367	50	0.16	2	1714	45
368	367	0.54	2	1714	45
369	372	0.34	1	1714	35
370	210	1.01	2	1714	50
370	367	1.51	2	1895	50
372	222	1.26	1	1714	45
372	368	0.47	2	1714	45
373	222	0.28	1	1714	35

Table K-1 (Sheet 25 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
374	258	0.37	1	1714	35
375	264	0.30	1	1714	40
376	377	0.27	2	1714	40
376	378	0.30	2	1714	40
377	275	0.31	1	1714	40
377	380	0.25	2	1714	40
378	275	0.27	1	1714	40
378	629	0.44	2	1714	40
379	377	0.23	2	1714	40
380	274	0.28	2	1714	40
381	376	0.13	2	1714	40
382	113	1.23	1	1714	45
382	274	0.36	1	1714	40
383	42	0.10	3	1714	50
383	203	0.24	1	1714	50
383	384	0.22	2	1714	45
384	383	0.22	2	1714	45
384	385	0.22	2	1714	45
385	384	0.22	2	1714	45
385	386	0.30	2	1714	45
386	385	0.30	2	1714	45
386	387	0.14	1	1714	45
387	366	0.14	2	1714	45
387	386	0.14	1	1714	45
388	370	1.04	2	1895	50
388	389	0.52	2	1714	40
388	401	0.49	1	1714	50
389	388	0.52	2	1895	50
389	390	0.49	1	1714	40
389	528	0.36	2	1714	40
390	391	0.24	2	1714	40
390	400	0.61	1	1714	40
390	401	0.49	2	1714	40
391	390	0.24	2	1714	40
391	395	0.24	2	1714	40
391	397	0.97	2	1714	40
392	355	1.01	1	1714	45
392	397	0.59	2	1714	40

Table K-1 (Sheet 26 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
392	399	1.05	2	1714	40
394	389	0.50	1	1714	40
395	391	0.24	2	1714	40
395	396	1.04	2	1714	45
396	397	0.38	2	1714	40
396	611	0.82	2	1714	45
397	392	0.59	2	1714	45
397	396	0.38	2	1714	40
398	392	0.14	1	1714	50
399	94	0.09	2	1714	45
399	392	1.05	2	1714	45
400	398	0.49	1	1714	40
401	388	0.49	1	1714	40
401	390	0.49	2	1714	40
401	627	0.52	1	1714	50
402	355	0.50	2	1714	45
403	404	1.90	1	1714	50
404	405	0.99	1	1714	50
404	522	1.54	1	1714	40
405	388	1.03	1	1714	50
406	403	0.47	1	1714	40
407	177	0.22	1	1714	40
408	361	0.22	1	1714	40
409	189	0.11	1	1714	30
409	191	0.15	1	1714	50
409	410	0.34	1	1714	45
410	192	0.11	2	1714	30
410	411	1.00	1	1714	45
411	193	0.12	1	1714	50
411	194	0.49	1	1714	50
411	420	0.74	1	1714	45
412	206	0.14	2	1714	30
412	212	0.76	1	1200	40
412	413	0.63	1	1714	45
413	207	0.11	5	1714	30
413	213	0.15	2	1714	40
413	414	0.41	1	1714	45
414	208	0.09	3	1714	30

Table K-1 (Sheet 27 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
414	415	0.32	1	1714	45
415	215	0.08	2	1714	30
415	216	0.12	2	1714	40
415	416	0.91	1	1714	45
416	110	0.21	2	1714	40
416	111	0.11	2	1714	40
416	417	0.43	1	1714	45
417	105	0.11	2	1714	30
417	418	0.18	1	1714	45
417	653	0.07	2	1714	40
418	109	0.10	2	1714	45
418	419	1.14	1	1714	45
418	652	0.08	2	1714	40
419	125	1.00	1	1714	40
419	465	0.43	1	1714	45
419	484	0.07	2	1714	40
420	198	0.10	1	1714	30
420	199	0.46	1	1714	40
420	332	0.61	1	1714	45
421	422	1.48	1	1714	40
422	423	0.77	1	1714	40
423	221	0.53	2	1714	50
424	76	0.87	1	1714	50
425	427	0.43	1	1714	40
426	427	0.52	1	1714	40
426	428	1.05	1	1714	40
427	479	0.87	1	1200	40
428	128	0.95	1	1714	40
428	429	0.51	1	1714	40
429	430	0.69	2	1200	40
430	480	0.25	3	1200	40
432	433	1.01	1	1714	40
432	445	0.51	1	1714	40
433	434	0.80	3	1200	40
433	435	0.10	3	1714	45
433	477	0.10	2	1714	40
434	433	0.80	3	1200	40
434	480	1.23	3	1200	40

Table K-1 (Sheet 28 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
435	10	0.29	2	1714	50
435	433	0.10	3	1714	50
435	436	0.09	3	1714	50
436	435	0.09	3	1714	45
436	437	0.27	2	1714	40
436	454	0.29	2	1714	50
437	457	0.29	2	1714	40
437	478	0.15	2	1714	40
438	477	0.23	3	1714	40
439	438	0.11	2	1714	40
439	441	0.38	4	2250	70
439	442	0.85	5	2250	70
440	10	0.23	4	2250	70
440	441	0.15	4	2250	70
441	439	0.38	4	2250	70
441	440	0.15	4	2250	70
442	439	0.85	5	2250	70
442	468	0.17	3	2250	70
442	475	0.21	3	2250	70
443	444	0.51	1	1714	40
443	454	0.50	1	1714	40
444	443	0.51	1	1714	40
444	446	0.33	2	1714	40
444	449	0.92	1	1200	40
445	125	0.52	1	1714	40
445	432	0.51	1	1714	40
445	443	0.52	1	1714	40
446	447	0.23	2	1714	40
447	448	0.20	2	1714	40
448	454	1.05	2	1200	50
448	466	0.96	2	1200	50
449	444	0.92	1	1200	40
449	486	0.17	1	1714	40
450	452	0.73	3	1714	50
450	465	0.09	2	1714	30
450	485	0.28	3	1714	50
451	124	0.86	1	1714	40
451	460	0.47	1	1714	40

Table K-1 (Sheet 29 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
452	450	0.73	3	1714	50
452	453	0.35	3	1714	50
452	459	0.17	2	1714	40
452	466	0.09	2	1714	30
453	452	0.35	3	1714	50
454	436	0.29	3	1714	50
454	448	1.05	2	1200	50
454	455	0.23	1	1714	40
455	456	0.30	1	1200	40
456	457	0.26	1	1714	40
457	458	0.37	2	1714	40
459	452	0.17	2	1714	40
459	487	0.76	1	1200	40
460	451	0.47	1	1714	40
460	461	0.92	1	1714	40
460	487	1.03	1	1714	40
461	114	0.51	1	1714	45
461	460	0.92	1	1714	40
461	462	1.02	1	1714	45
462	461	1.02	1	1714	45
462	463	0.18	1	1714	45
462	487	0.88	1	1200	40
463	462	0.18	1	1714	45
464	445	0.55	1	1714	40
464	650	0.49	1	1714	40
465	450	0.09	3	1714	30
465	466	0.70	1	1714	45
465	486	0.09	2	1714	40
466	448	0.96	2	1200	50
466	452	0.09	2	1714	30
466	467	0.40	1	1714	45
468	469	0.28	3	2250	70
469	470	0.88	3	2250	70
470	471	0.35	3	2250	70
471	472	0.33	3	2250	70
471	474	0.36	3	2250	70
472	473	0.84	3	2250	70
473	475	0.28	2	2250	70

Table K-1 (Sheet 30 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
474	471	0.36	3	2250	70
475	442	0.21	5	2250	70
475	476	0.38	3	2250	70
476	475	0.38	3	2250	70
477	433	0.10	2	1714	40
477	435	0.13	2	1714	40
477	437	0.12	3	1714	40
478	439	0.10	2	1714	50
479	429	0.17	2	1714	40
480	431	0.59	3	1714	50
480	434	1.23	3	1200	40
481	436	0.19	3	1714	40
482	451	0.36	1	1714	40
482	483	0.96	1	1714	40
483	124	0.36	3	1714	50
483	482	0.96	1	1714	40
484	122	0.76	3	1714	50
484	124	0.07	2	1714	40
484	419	0.07	2	1714	40
485	450	0.28	3	1714	50
485	484	0.13	3	1714	50
486	449	0.17	1	1714	40
486	465	0.09	2	1714	40
487	459	0.76	1	1200	40
487	462	0.88	1	1200	40
488	75	0.39	1	1714	50
488	77	1.60	1	1714	50
489	208	0.11	2	1714	40
489	490	0.08	2	1714	40
490	214	0.11	2	1895	50
490	489	0.08	2	1714	40
491	261	0.16	3	1714	45
491	492	0.16	3	1714	45
492	17	0.11	3	1714	40
492	491	0.16	3	1714	45
493	208	0.07	4	1714	45
493	506	0.08	3	1714	45
494	215	0.10	5	1714	45

Table K-1 (Sheet 31 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
494	506	0.12	3	1714	45
495	215	0.07	3	1714	40
495	496	0.09	2	1714	40
496	15	0.10	2	1714	40
496	495	0.09	2	1714	40
497	494	0.05	2	1500	25
497	495	0.10	2	1500	25
497	498	0.13	1	1500	25
498	497	0.13	1	1500	25
498	499	0.10	1	1500	25
498	506	0.05	2	1500	25
499	493	0.06	1	1500	25
499	498	0.10	1	1500	25
499	500	0.11	1	1500	25
500	489	0.06	1	1500	25
500	499	0.11	1	1500	25
500	501	0.07	1	1500	25
501	490	0.06	2	1500	25
501	500	0.07	1	1500	25
501	502	0.07	1	1500	25
502	261	0.07	2	1500	25
502	501	0.07	1	1500	25
502	503	0.14	1	1500	25
503	491	0.05	2	1500	25
503	502	0.14	1	1500	25
503	504	0.14	1	1500	25
504	492	0.09	2	1500	25
504	503	0.14	1	1500	25
504	505	0.20	1	1500	25
505	496	0.08	2	1500	25
505	504	0.20	1	1500	25
506	493	0.08	4	1714	45
506	494	0.12	3	1714	45
507	158	0.33	2	1714	45
508	507	0.29	2	1714	40
509	138	0.31	1	1500	35
509	152	0.18	1	1500	35
509	510	0.18	1	1714	45

**Table K-1 (Sheet 32 of 35)
Evacuation Roadway Network Characteristics**

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
510	137	0.36	1	1714	45
511	161	0.07	1	1500	30
511	162	0.08	1	1500	40
511	513	0.68	1	1714	45
512	145	0.08	1	1714	40
512	176	0.09	1	1714	40
512	514	0.65	1	1714	45
513	154	0.12	2	1714	40
513	362	0.09	2	1714	45
513	512	0.70	1	1714	40
514	178	0.09	1	1714	40
514	182	0.09	1	1714	40
514	515	0.71	1	1714	45
515	179	0.10	2	1714	45
515	181	0.10	1	1714	45
515	516	0.26	1	1714	45
516	291	0.09	1	1714	45
516	337	0.10	1	1714	45
516	517	0.38	1	1714	45
517	184	0.11	2	1714	30
517	346	0.10	1	1714	45
517	518	0.67	1	1714	45
518	187	0.12	2	1714	30
518	345	0.10	1	1714	40
518	409	0.68	1	1714	45
519	139	0.16	2	1500	40
519	153	0.34	2	1500	40
519	509	0.99	1	1200	40
521	404	1.03	1	1714	50
521	527	1.53	1	1714	50
522	421	0.99	1	1714	40
523	521	2.05	1	1714	50
524	523	0.81	1	1714	40
525	526	0.76	1	1714	40
526	521	0.72	1	1714	40
527	529	0.75	1	1714	50
528	389	0.36	2	1714	40
528	391	0.22	2	1714	40

Table K-1 (Sheet 33 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
528	529	0.23	2	1714	40
529	395	0.24	2	1714	40
529	528	0.23	2	1714	40
600	319	3.03	1	1714	50
600	601	0.83	1	1714	55
600	603	1.10	1	1714	55
601	304	1.45	1	1714	55
601	600	0.83	1	1714	55
602	329	0.49	1	1714	50
602	330	2.56	1	1714	45
603	600	1.10	1	1714	55
604	72	0.32	2	1714	50
604	73	0.34	1	1714	60
605	312	0.50	1	1714	50
605	607	0.51	1	1714	50
606	310	0.53	1	1714	50
606	614	0.48	1	1714	50
607	287	0.51	1	1714	50
607	625	0.51	1	1714	40
611	164	0.71	2	1714	45
611	402	0.38	2	1714	45
612	155	0.37	1	1714	40
612	165	0.55	1	1714	45
612	613	0.52	1	1714	40
613	166	0.14	1	1714	40
613	169	0.51	1	1714	40
613	612	0.52	1	1714	40
614	147	0.52	1	1714	50
614	624	0.53	1	1714	50
615	79	0.50	1	1714	50
615	617	0.49	1	1714	50
616	80	0.56	1	1714	50
616	617	0.52	1	1714	50
617	618	0.49	1	1714	50
617	623	0.56	1	1714	40
618	1	0.56	1	1714	50
619	309	0.79	1	1714	50
619	620	0.95	1	1714	50

Table K-1 (Sheet 34 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
620	308	0.79	1	1714	50
620	621	0.53	1	1714	50
621	615	0.79	1	1714	50
621	622	0.47	1	1714	50
622	79	0.78	1	1714	50
623	1	0.50	1	1714	50
623	80	0.51	1	1714	50
624	131	0.53	1	1714	50
624	132	0.47	1	1714	50
625	133	0.46	1	1714	50
625	286	0.51	1	1714	50
626	370	0.25	1	1714	40
627	210	1.06	1	1714	40
627	398	0.36	1	1714	50
628	210	0.21	2	1714	40
629	271	0.48	1	1714	40
630	114	0.54	1	1714	40
631	220	1.45	2	1895	50
631	255	0.29	2	1895	50
631	632	1.07	1	1714	40
632	200	0.67	2	1714	45
632	205	0.35	2	1714	45
632	631	1.07	1	1714	40
632	633	0.10	1	1714	30
633	632	0.10	2	1714	40
633	635	0.33	1	1714	45
634	631	0.26	1	1714	40
635	205	0.12	2	1714	30
635	412	0.31	1	1714	45
636	199	0.26	1	1714	50
636	259	0.99	1	1714	50
636	276	1.27	1	1714	50
637	16	0.32	1	1714	40
637	269	0.39	1	1714	40
638	637	0.23	1	1714	35
639	101	0.23	1	1714	40
639	216	0.36	1	1714	40
640	639	0.44	1	1714	35

Table K-1 (Sheet 35 of 35)
Evacuation Roadway Network Characteristics

Upstream Node Number	Downstream Node Number	Length (Miles)	Full Lanes	Saturation Flow Rate (Veh/hr/ln)	Free Flow Speed (MPH)
640	644	0.21	1	1714	40
641	110	0.14	1	1714	35
642	9	0.38	1	1714	50
643	7	0.11	2	1714	40
644	645	0.16	1	1714	40
645	97	0.17	2	1714	40
645	102	0.19	2	1714	40
645	646	0.35	1	1714	40
646	6	0.16	2	1714	45
646	99	0.11	2	1714	45
647	88	0.23	1	1000	30
648	85	0.79	1	1714	50
648	127	0.15	2	1714	50
649	432	0.50	1	1714	40
650	5	0.08	2	1714	45
650	104	0.52	2	1714	45
651	460	0.24	1	1714	40
652	104	0.46	2	1714	45
652	418	0.08	2	1714	45
652	653	0.19	1	1714	40
653	103	0.39	2	1714	45
653	417	0.07	2	1714	45
653	652	0.19	1	1714	40

APPENDIX L
AREA BOUNDARIES

Appendix L
Area Boundaries

Area 1

Turkey Point Units 3 & 4.

Area 2

An annular ring with a radius of 2 miles centered at the Turkey Point Units 3 & 4.

Area 3

Palm Drive (SW 344th Street) west from the border of Area 2 to SW 137th Avenue.137th Avenue south to Card Sound Road. Card Sound Road south to Card Sound. North on the coast to the border of Area 2.

Area 4

SW 280th Street west from the coast to SW 107th Avenue. SW 107th Avenue north to SW 268th Street (Hainlin Mill Drive). SW 268th Street west to SW 137th Avenue. SW 137th Avenue south to Palm Drive (SW 344th Street). SW 344th Street east to the Area 2 boundary. Follows Area 2 boundary to the shore and follows the shore north to
SW 280th Street.

Area 5

Eureka Drive (SW 184th Street) west from the coast to S Dixie Highway (U.S. Highway 1). U.S. Highway 1 south to the Florida Turnpike. Florida Turnpike south to Black Creek Canal. Follows Black Creek Canal south to the shore. Follows the shoreline north to Eureka Drive.

Area 6

West on Caribbean Boulevard (SW 200th Street) from the intersection with U.S. Highway 1 and the Florida Turnpike to SW 122nd Avenue. South on SW 122nd Avenue to SW 204th Street. West on SW 204th Street to SW 127th Avenue. South on SW 127th Avenue to Hainlin Mill Drive (SW 216th Street.). West on SW 216th Street to SW 137th Avenue. South on SW 137th Avenue to Moody Drive (SW 268th Street). East on Moody Drive to SW 107th Avenue. South on SW 107th Avenue to SW 280th Street. East on SW 280th Street to the shore. Follows the shoreline north to Black Creek Canal. Follows Black Creek Canal north to the Florida Turnpike. Florida Turnpike north to the intersection with U.S. Highway 1 just north of Caribbean Boulevard.

Area 7

Hainlin Mill Drive (SW 216th Street) west from the intersection with SW 137th Avenue to Naranja Road (SW 147th Avenue). Naranja Road south to Silver Palm Drive (SW 232nd Street). Silver Palm Drive west to Newton Road (SW 157th Avenue). Newton Road south to Coconut Palm Drive (SW 248th Street). Coconut Palm Drive west to Tennessee Road (SW 167th Avenue). Tennessee Road south to Epmore Drive (SW 272nd Street). Epmore Drive west to Krome Avenue (SW 177th Street). Krome Avenue south to Biscayne Drive (SW 288th Street). Biscayne Drive east to SW 137th Avenue. 137th Avenue north to intersection with Hainlin Mill Drive.

Area 8

Biscayne Drive (SW 288th Street) west from the intersection with SW 137th Avenue to Redland Road (SW 187th Avenue). Redland Road south to SW 392nd Street. SW 392nd Street east to SW 137th Avenue. SW 137th Avenue north to intersection with Biscayne Drive.

Area 9

SW 392nd Street west from the intersection with SW 137th Avenue to SW 182nd Avenue. SW 182nd Avenue south to Dade County Work Camp Road. Work Camp Road east to Card Sound Road (road physically ends at U.S. Highway 1). Card Sound Road south to SW 137th Avenue. SW 137th Avenue north to intersection with SW 392nd Street.

Area 10

Ocean Reef Community in Monroe County.