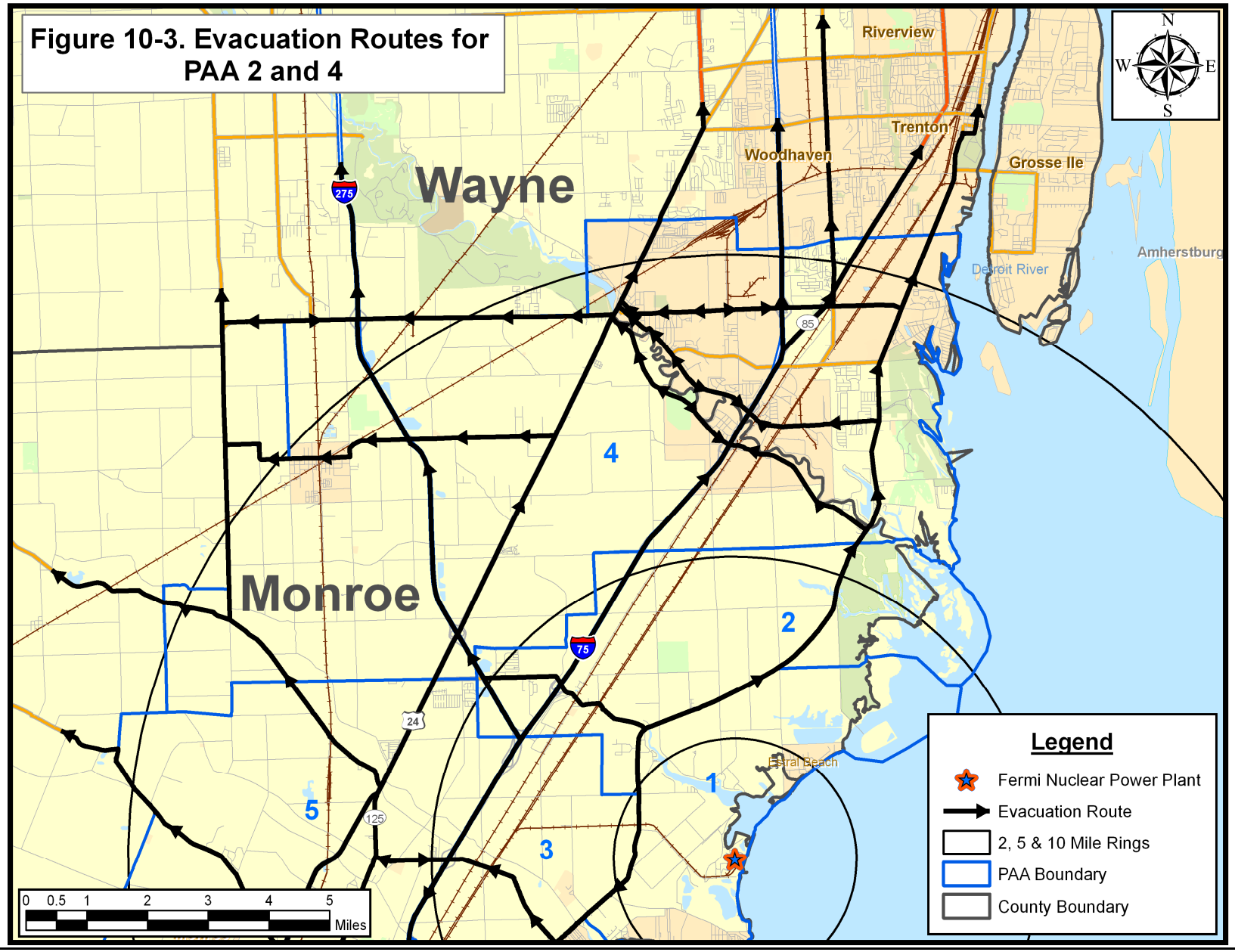


Figure 10-3. Evacuation Routes for PAA 2 and 4
Wayne
Monroe
Riverview
Trenton
Woodhaven
Grosse Ile
Amherstburg
Detroit River
Estral Beach
275
75
85
24
125
1
2
3
4
5
N
S
E
W
0 0.5 1 2 3 4 5
Miles
Legend
Fermi Nuclear Power Plant
Evacuation Route
2, 5 & 10 Mile Rings
PAA Boundary
County Boundary

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.

1. Traffic control personnel, located at Traffic Control and Access Control points, provide fixed-point surveillance.
2. Ground patrols may be undertaken along well-defined paths to ensure coverage of those highways that serve as major evacuation routes.
3. Aerial surveillance of evacuation operations may also be conducted using helicopter or fixed-wing aircraft.
4. 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 due to 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. Past 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 counter-flow relative to evacuating traffic.

12. CONFIRMATION TIME

It is necessary to confirm that the evacuation process is effective in the sense that the public is complying with the Advisory to Evacuate. Evacuation confirmation time as, defined by NUREG-0654, is the time required for emergency preparedness personnel to confirm that all persons desiring to evacuate have done so. In accordance with the county plans and procedures, evacuation confirmation activities to assure that all of the population has been notified will be conducted on the basis of either the monitoring of traffic flow from the EPZ or interviews of evacuees at established reception centers. In accordance with established procedures for Monroe County, additional door-to-door confirmation may be performed as a backup.

Not all evacuees will go to reception centers, as many evacuees will elect to evacuate to a lodging facility or the home of a friend/family member outside of the EPZ. In fact, page III-92 of the FEMA Radiological Emergency Planning (REP) manual indicates that reception centers should have the capacity to monitor 20% of the EPZ population within 12 hours. Thus, confirmation of evacuation based on data compiled at reception centers/congregate care facilities is not feasible as approximately 80% of evacuees will not go to a congregate care facility. Additionally, door-to-door confirmation of evacuation can be accomplished; however, this would require hours of effort by police.

This Section provides an estimate for a recommended methodology for evacuation confirmation to be performed by the EPZ counties. Although the counties in the EPZ may use their own procedures for confirmation, we suggest an alternative or complementary approach.

The procedure we suggest employs a stratified random sample and a telephone survey. The size of the sample is dependent on the expected number of households that do not comply with the Advisory to Evacuate. We believe 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 at about 2-1/2 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 7-1/2 person 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 Protective Action Areas), then the confirmation process will extend over a time frame of about 75 minutes. Thus, 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, then the telephone survey should be repeated after an hour's interval until the confirmation process is completed.

If this method is indeed used by Monroe and Wayne Counties, it is recommended that a list of telephone numbers within the EPZ be available in their Emergency Operation Center (EOC) at all times. Such a list could be purchased from vendors and should be periodically updated. As indicated above, the confirmation process should not begin until 2.5 hours after the Advisory to Evacuate, to ensure that most households have had enough time to mobilize and to start their evacuation travel. This timeframe will enable telephone operators to arrive at their workplace, access the call list and prepare to make the necessary phone calls.

TABLE 12-1
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:

No. of households plus other facilities, N, within the EPZ (est.) = 38,000
Est. 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:

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

Thus, 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.

Est. Person Hours to complete 300 telephone calls

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 sec.
Interval between calls: 20 sec.

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 EPZ or shadow area, where trips are generated at a specified rate in vehicles per hour (vph). 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 (vps) or vehicles per hour (vph).
Service Volume	Maximum number of vehicles which 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 (vph).
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) which services a particular combination of traffic movements on selected approaches to the intersection. The phase duration is expressed in seconds.

Term	Definition
Traffic (Trip) Assignment	A process of assigning traffic to paths of travel in such a way as to satisfy all 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.
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 (vpm).
Traffic (Trip) Distribution	A process for determining the destinations of all 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, so as 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 (vph). 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 (vph) 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, so as 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 seek to travel out of an area of potential risk as rapidly as possible by selecting the "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 approach we adopt is to extend the basic equilibrium assignment methodology to embrace the distribution process, as well. That is, the selection of 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 capacity constraints, so as to satisfy the stated objective function. This objective function is the statement of the User Optimization Principle by Wardrop[1].

To accomplish this integration, we leave the equilibrium assignment model intact, changing only the form of the objective function. It will also be necessary to create a "fictional" augmentation of the highway network. This augmentation will consist of Pseudo-Links and Pseudo-Nodes, so configured as to embed an equilibrium Distribution Model within the fabric of the Assignment Model.

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

Specification of TRAD Model Inputs

The user 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 as to satisfy the network-wide objective function (Wardrop's Principle).

The user must also specify the total number of trips which 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, we require that the total number of trips traveling to a destination, j, from all origin nodes, i, cannot exceed the attraction of destination node, j. By summing over all destination nodes, this constraint also states that the total trips generated at all origin nodes must not exceed the total capacity to accommodate these trips at all of the specified destinations.

In summary, the user 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 which include the traffic control tactics. The TRAD model includes a function which 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. Thus, 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 we have an intractable problem:

- If TRAD retains the basic assignment algorithm, it must be provided a Trip Table as input.
- On the other hand, if the distribution model is embedded within the assignment model, rather than preceding it, a Trip Table is not available as input.

The resolution of this problem is as follows:

1. We construct 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. We construct pseudo-links which enforce the specified values of attraction, A_j, for all destination nodes, j, by suitably calibrating the relationship of the travel time vs. volume and capacity.

This augmented network is comprised of three sub-networks:

1. The highway sub-network, which consists of "Class I" Links and Nodes.
2. A sub-network of "Class II" Pseudo-Links which acts as an interface between the highway sub-network and the network augmentation.
3. The sub-network of "Class III" Pseudo-Links and Nodes which 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 which 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 pseudo-links are constructed so as to connect each specified destination node with its Class III Pseudo-Node (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 Pseudo-Links provide paths from the Class II links servicing traffic traveling from the specified [real] destination nodes, to the Super-Nodes which represent the user-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 sub-network and the augmentation sub-network. These pseudo-links 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 Pseudo-Links. This approach is much more suitable, computationally.

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

The Class II Pseudo-Links and the network augmentation of Class III Pseudo-Nodes and Links represent logical constructs of fictitious links created internally by the model, which allows the user to specify the identity of all 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. Since Class II links are Pseudo-Links, 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. Since the Class II links limit the number of vehicles entering the Class III subnetwork at all entry points (i.e., at the Class II Pseudo-Nodes) and since all these links are Pseudo-Links, it follows that the Class III network is, by definition, an uncapacitated 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, we will adopt the following form based on the original "BPR Formula[2]":

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

Where, as for the present traffic assignment model in TRAD,

T	=	Link travel time, sec.
T_o	=	Unimpeded link travel time, sec.
V	=	Traffic volume on the link, veh/hr
C	=	Link capacity, veh/hr
a_i, b_i	=	Calibration parameters
α, ß	=	Coefficients defined below
I	=	Impedance term, expressed in seconds, which could represent turning penalties or any other factor which 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:

$a_1 = 0.8$ $b_1 = 5.0$

The values of a_2 and b_2, which are applicable for each Class II link, are based upon 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 Pseudo-Links 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.

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

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. For emergency planning purposes, this is a desirable model feature. Such a result will be flagged by the model to alert the user to the fact 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, named PC-DYNEV, is an adaptation of the TRAFLO Level II simulation model, developed by KLD for the Federal Highway Administration (FHWA). 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 (MOE) 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 which 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 which 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 such 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 which 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 and are also aggregated over the entire network.

- The QUEUE histograms that 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.
- The OUT histograms that 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 6)
- 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 (RTOR)
- Route diversion specifications
- Turn restrictions
- Lane control (e.g. lane closure, movement-specific)

DRIVER'S 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.

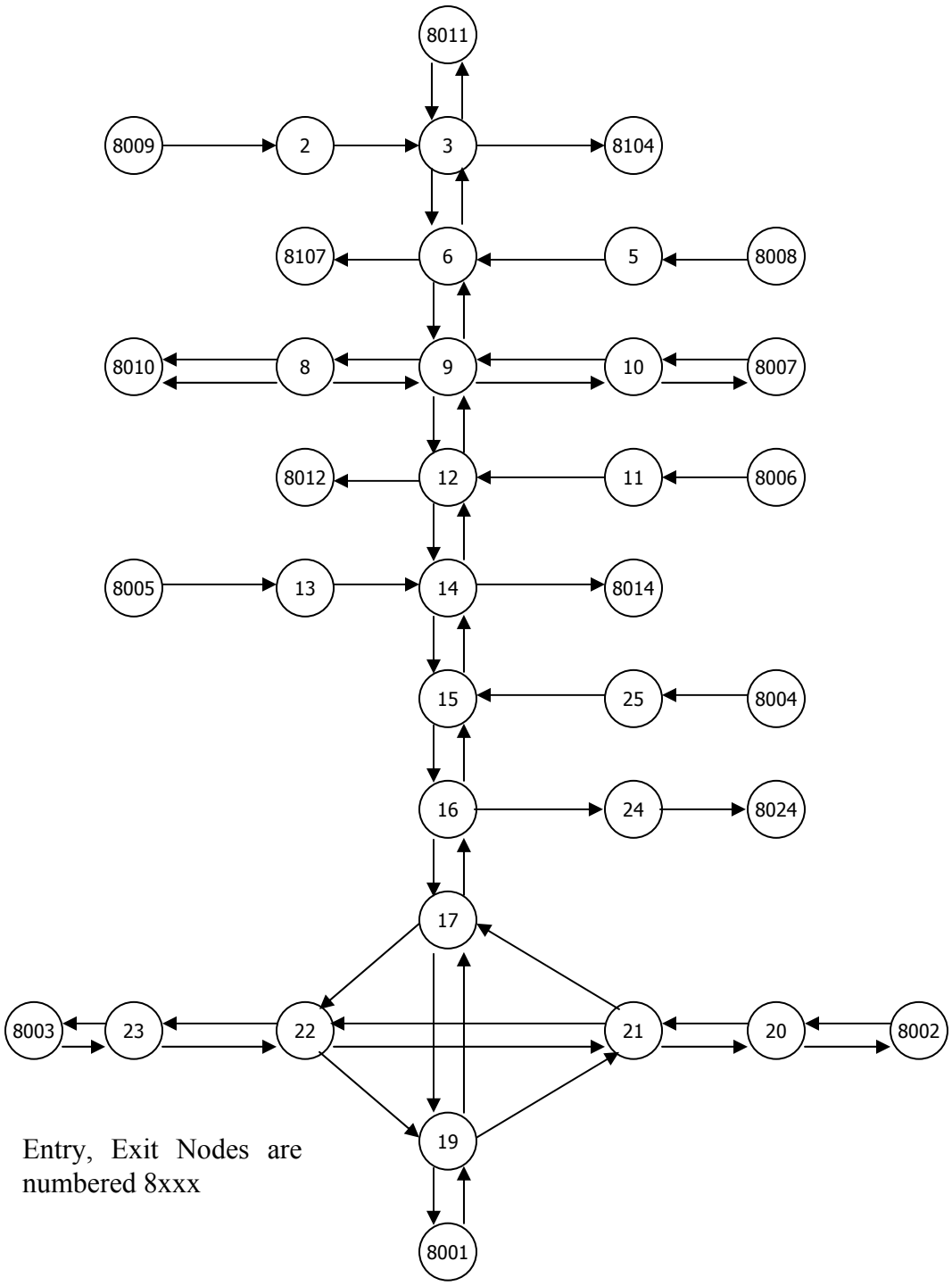


Figure C-1: Representative Analysis Network

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 (ETE). 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 within the Emergency Planning Zone (EPZ). These data were obtained from U.S. Census files and from the results of a telephone survey conducted within the EPZ. Lists of recreational areas and major employers were provided by County Emergency Management Offices. Transient population data and employee data were obtained through phone calls to the facilities listed by the County Emergency Management Offices.

Step 2.
The next activity is to examine large-scale maps of the EPZ in both hard-copy form and using Geographical Information System (GIS) 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 Position System (GPS) technology is 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. The evacuation analysis network was calibrated using the observations made during the field survey conducted in January 2008.

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 were 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, either as excess demand due to improper routing, as a shortfall of capacity, or as 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; or
- The input stream must be modified accordingly.

This decision requires, of course, the application of the user's judgment based upon 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 user, 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 so as to provide improved service for one or more movements, or in

prescribing specific treatments for channelizing the flow so as 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. These data are 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 (MOE), 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. Thus, it is possible to identify the cause of any problems by carefully studying the output.

Again, one can implement corrective treatments designed 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, then one can decide whether to return to Step 8 to again execute the TRAD model and repeat the whole process, or to accept the simulation results. If there were no changes indicated by the activities of Step 14, because the results were satisfactory, we can then proceed to 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.

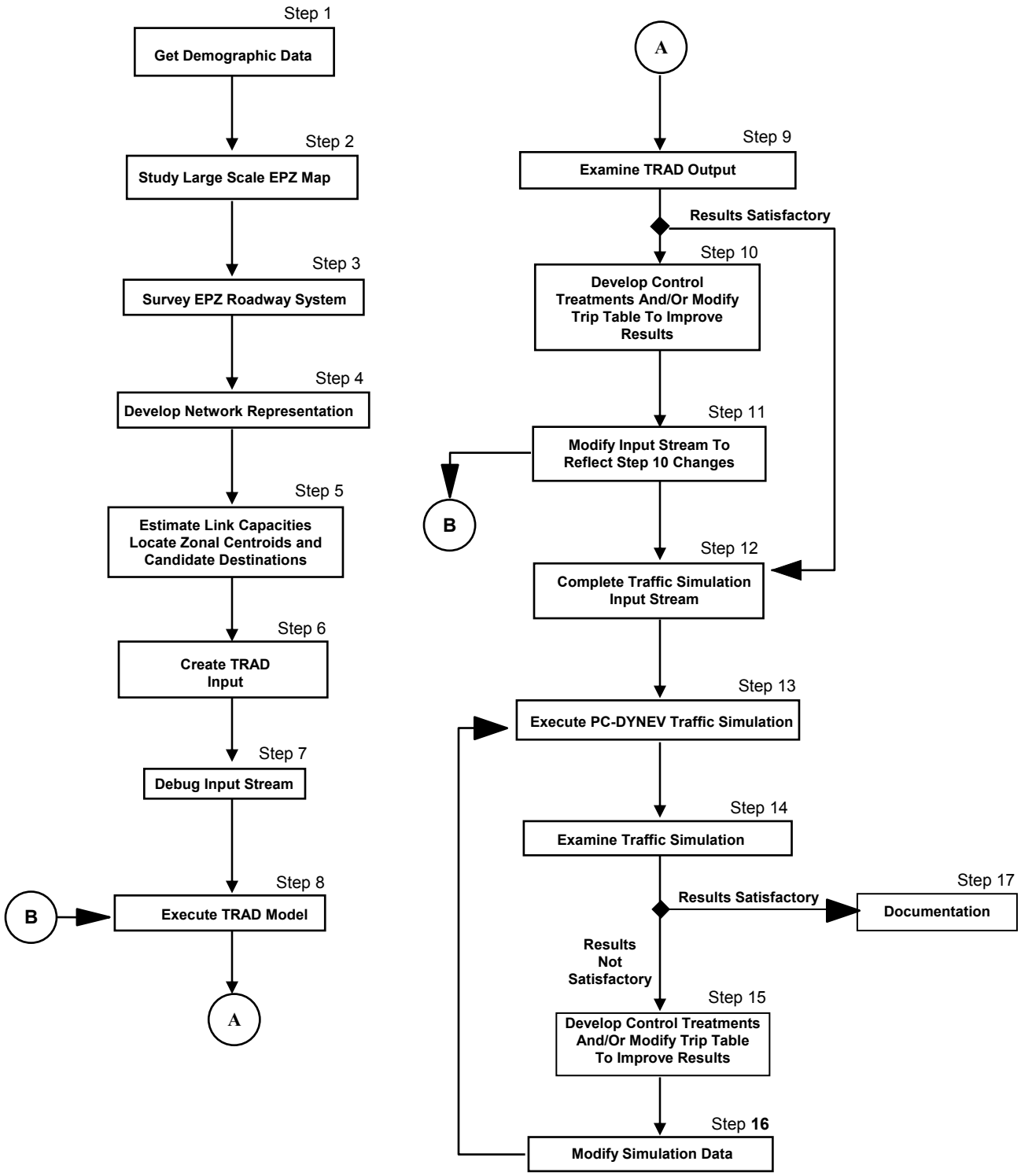


Figure D-1. Flow Diagram of Activities

APPENDIX E

Special Facility Data

APPENDIX E: SPECIAL FACILITY DATA

The following tables list population information for special facilities that are located within the Fermi Nuclear Power Plant EPZ. Special facilities are defined as schools, day care centers, hospitals and other medical care facilities, correctional facilities, and major employers. Transient population data are included in the tables for parks, hotels and motels, marinas, golf courses and major retail facilities. Each table is grouped by county. The location of the facility is described by its straight-line distance (miles) and direction (magnetic bearing) from the nuclear plant.

Table E-1. Monroe County Schools within the Fermi EPZ (Page 1 of 2)								
PAA	Distance (miles)	Dir-ection	School Name	Street Address	Municipality	Phone	Enroll-ment	Staff
1	2.5	NNW	North Elementary School	8271 North Dixie Highway	Newport	(734) 586-6784	425	23
2	3.7	NW	Neidermeier Elementary School	8400 S. Newport Rd.	S. Rockwood	(734) 654-2121	306	16
2	2.7	NW	St. Charles School	8125 Swan Creek	Monroe	(734) 586-2531	194	10
3	2.8	W	Jefferson High School	5707 Williams Rd.	Monroe	(734) 289-5555	775	45
3	2.9	WSW	Jefferson Middle School	5201 N. Stony Creek Rd.	Monroe	(734) 289-5565	365	21
3	3.4	WSW	Sodt Elementary School	2888 Nadeau Rd.	Monroe	(734) 586-6784	344	20
4	8.2	NW	Airport Senior High School	11330 Grafton Rd.	Carleton	(734) 654-6208	1,050	55
4	9.9	NW	Carleton Country Day	12707 Maxwell Rd	Carleton	(734) 654-8424	114	11
4	8.6	NW	Eyler Elementary School	1335 Carleton-S. Rockwood Rd.	Carleton	(734) 654-2121	300	19
4	6.9	N	Ritter Elementary School	5650 Carleton-S. Rockwood Rd.	S. Rockwood	(734) 379-5335	300	18
4	9.2	WNW	St. Patrick's School	2970 West Labo Rd.	Carleton	(734) 654-2522	134	13
4	8.2	NW	Sterling Elementary School	160 Fessner Rd.	Carleton	(734) 654-6846	313	17
4	8.1	NW	Wager Junior High School	11200 Grafton Rd.	Carleton	(734) 654-2522	740	44
5	6.9	WSW	Cantrick Middle School	1008 Riverview Avenue	Monroe	(734) 265-3800	554	68
5	7.5	WSW	Christiancy Elementary School	306 Lincoln Avenue	Monroe	(734) 265-4200	262	17
5	10.5	WSW	Custer Elementary School #1	5003 West Albain Rd.	Monroe	(734) 265-4300	650	48
5	10.5	WSW	Custer Elementary School #2	5001 West Albain Rd.	Monroe	(734) 265-4300	294	10
5	6.8	WSW	Hollywood Elementary School	1135 Riverview Avenue	Monroe	(734) 265-4500	237	21
5	8.9	WNW	Holy Ghost Lutheran School	3563 Heiss Rd.	Monroe	(734) 242-0509	100	10

Table E-1. Monroe County Schools within the Fermi EPZ (Page 2 of 2)								
5	5.0	WSW	Hurd Elementary School	1960 E. Hurd Rd	Monroe	(734) 289-5580	420	50
5	7.6	WSW	Lincoln Elementary School	908 East Second St.	Monroe	(734) 265-4500	271	30
5	5.7	WNW	Lutheran High School South	8210 North Telegraph Rd.	Monroe	(734) 586-8832	36	6
5	8.4	WSW	Manor Elementary School	1731 West Lorain St.	Monroe	(734) 265-4700	406	36
5	8.1	WSW	Monroe Middle School	503 Washington St.	Monroe	(734) 265-4000	941	59
5	9.7	WSW	Monroe Senior High School	901 Herr Rd.	Monroe	(734) 265-3400	2,130	118
5	7.5	SW	Orchard Center High School	1750 Oak St.	Monroe	(734) 265-3700	175	15
5	7.5	WSW	Pathway Christian Academy/ Daycare	1199 Stewart Rd.	Monroe	(734) 241-1002	138	22
5	9.6	WSW	Raisinville Elementary School	2300 North Raisinville Rd.	Monroe	(734) 265-4800	425	25
5	8.2	WSW	Riverside Elementary School	77 North Roessler St.	Monroe	(734) 265-4900	162	9
5	9.2	WSW	S. Monroe Townsite Elementary School	15488 Eastwood	Monroe	(734) 265-5000	138	9
5	8.2	WSW	St. John's School	521 South Monroe St.	Monroe	(734) 421-1670	211	16
5	7.8	WSW	St. Mary's Catholic Center High School	108 West Elm Avenue	Monroe	(734) 241-0663	411	33
5	7.7	WSW	St. Mary's Parish School	151 North Monroe St.	Monroe	(734) 421-3377	248	14
5	8.2	WSW	St. Michael's School	510 West Front St.	Monroe	(734) 241-3923	185	14
5	7.9	WSW	Trinity Lutheran School	315 Scott St.	Monroe	(734) 241-1160	220	12
5	9.1	WSW	Waterloo Elementary School	1933 South Custer Rd.	Monroe	(734) 265-5100	250	14
5	6.8	WSW	Zion Lutheran School	186 Cole Rd.	Monroe	(734) 242-1378	62	5
						Total	**14,286**	**973**

Table E-2. Wayne County Schools within the Fermi EPZ								
PAA	Distance (miles)	Dir-ection	School Name	Street Address	Municipality	Phone	Enroll-ment	Staff
4	7.9	N	Chapman Elementary School	31500 Olmstead Rd	Rockwood	(734) 379-3766	503	53
4	9.7	N	David Oren Hunter Elementary School	21320 Roche Rd	Brownstown	(734) 676-9550	422	68
4	7.6	NNE	Downriver High School	33211 McCann Rd	Rockwood	(734) 379-4704	62	12
4	9.4	N	Ethel C. Bobcean Elementary School	28300 Evergreen St	Flat Rock	(734) 782-3005	483	60
4	9.3	N	Flat Rock / Gibraltar Head Start	28639 Division St	Flat Rock	(734) 379-6810	175	0
4	9.6	N	Flat Rock Community High School	28100 Aspen Dr	Flat Rock	(734) 782-1270	568	49
4	8.8	NNE	Hellen C. Shumate Junior High School	30550 W Jefferson Ave	Gibraltar	(734) 379-7600	895	56
4	8.6	N	John M. Barnes Elementary	24925 Meadows Dr	Flat Rock	(734) 782-2113	429	35
4	8.8	NNE	Oscar A. Carlson High School	30550 W Jefferson Ave	Gibraltar	(734) 379-7100	1,074	67
4	9.6	NNE	Parsons Elementary School	14473 Middle Gibraltar Rd	Gibraltar	(734) 676-9550	447	53
4	8.7	N	Simpson Middle School	24900 Meadows Dr	Flat Rock	(734) 782-2453	431	33
4	7.4	N	St. Mary Rockwood Elementary School	32447 Church St	Rockwood	(734) 379-9285	220	15
4	8.6	N	Summit Academy/Summit Early Childhood	30100 Omstead Rd	Flat Rock	(734) 379-6810	403	60
						Total	**6,112**	**561**

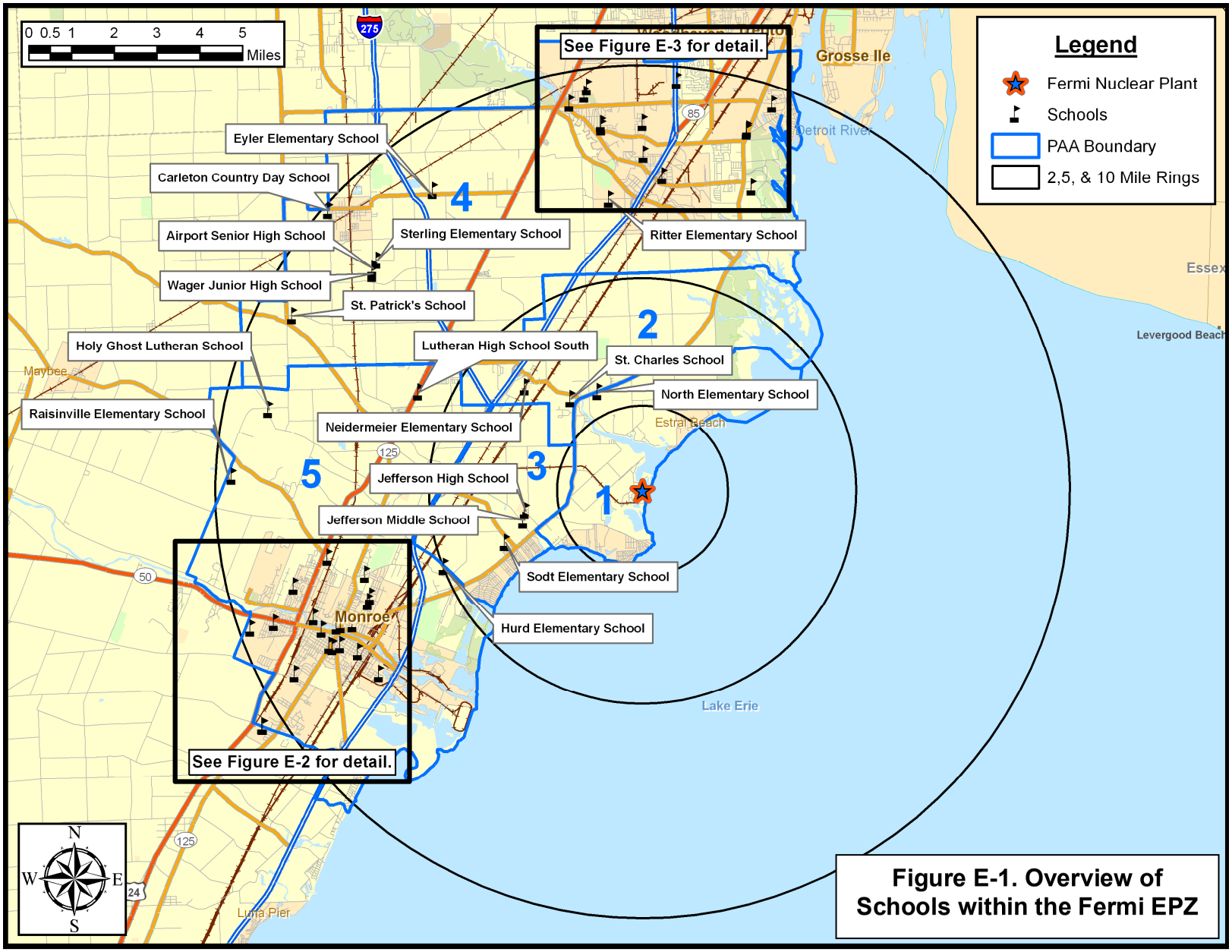
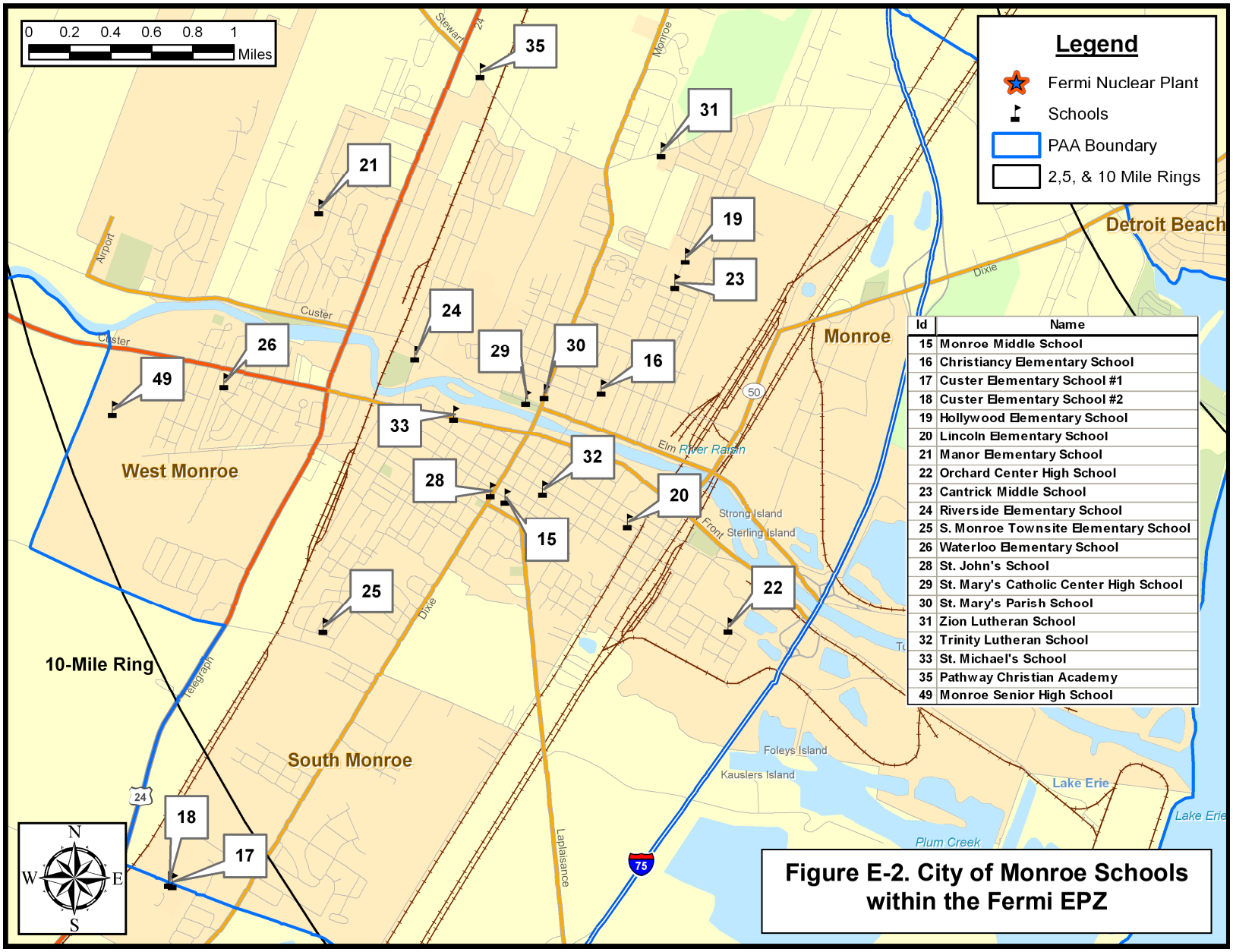
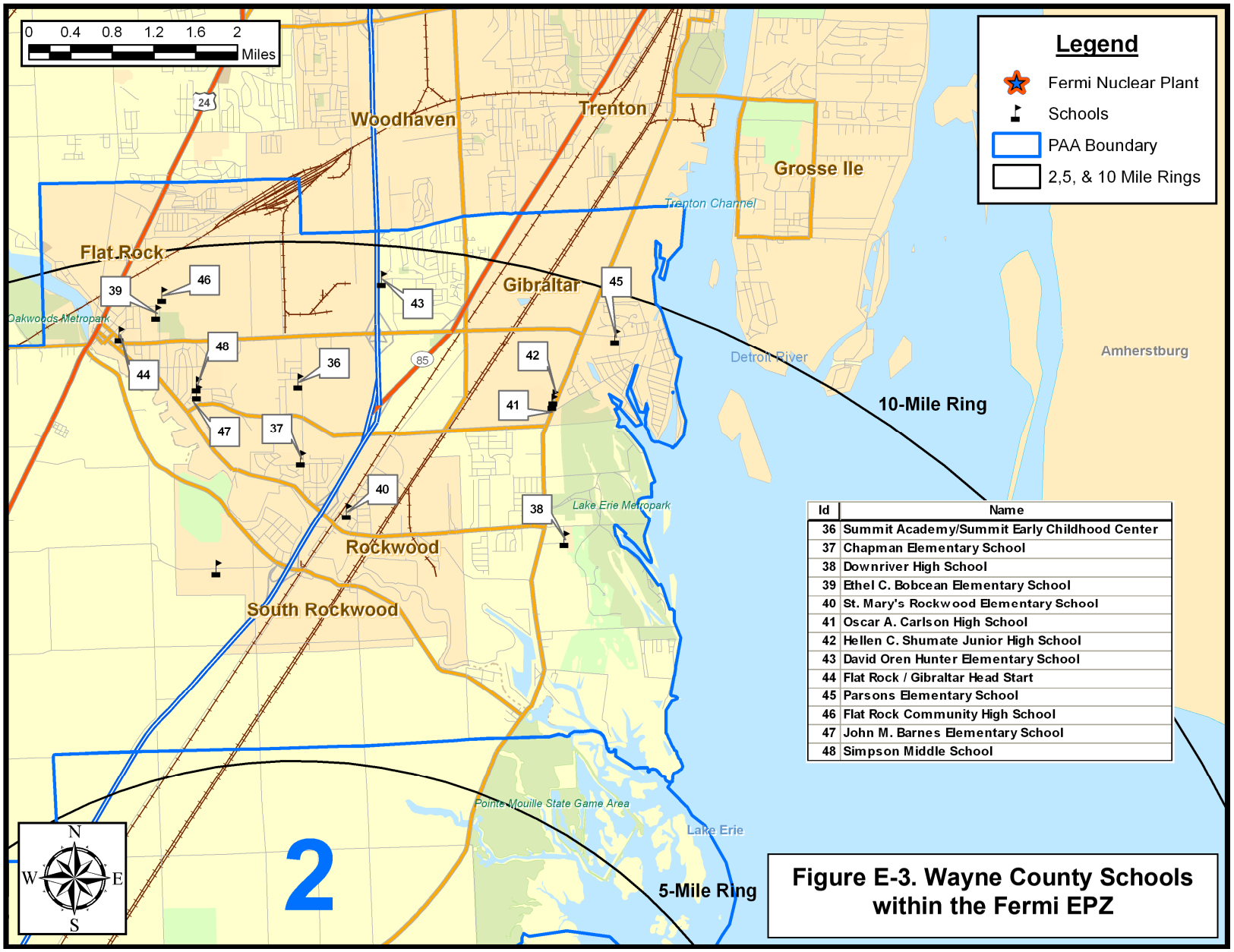


Figure E-1. Overview of Schools within the Fermi EPZ



Id	Name
15	Monroe Middle School
16	Christiancy Elementary School
17	Custer Elementary School #1
18	Custer Elementary School #2
19	Hollywood Elementary School
20	Lincoln Elementary School
21	Manor Elementary School
22	Orchard Center High School
23	Cantrick Middle School
24	Riverside Elementary School
25	S. Monroe Townsite Elementary School
26	Waterloo Elementary School
28	St. John's School
29	St. Mary's Catholic Center High School
30	St. Mary's Parish School
31	Zion Lutheran School
32	Trinity Lutheran School
33	St. Michael's School
35	Pathway Christian Academy
49	Monroe Senior High School

Figure E-2. City of Monroe Schools within the Fermi EPZ



Id	Name
36	Summit Academy/Summit Early Childhood Center
37	Chapman Elementary School
38	Downriver High School
39	Ethel C. Bobcean Elementary School
40	St. Mary's Rockwood Elementary School
41	Oscar A. Carlson High School
42	Hellen C. Shumate Junior High School
43	David Oren Hunter Elementary School
44	Flat Rock / Gibraltar Head Start
45	Parsons Elementary School
46	Flat Rock Community High School
47	John M. Barnes Elementary School
48	Simpson Middle School

Figure E-3. Wayne County Schools within the Fermi EPZ

Table E-3. Major Employers within the Fermi EPZ (Page 1 of 2)										
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Total Employees	Max Shift	Percent Commuting into EPZ	Commuting Employees
MONROE COUNTY										
1	-	-	Fermi Nuclear Power Plant	6400 N Dixie Hwy	Monroe	(734) 586-5300	867	817	55%	449
2	3.9	NW	Meijer Distribution Center*	8857 Swan Creek Rd	Monroe	(734) 586-7100	450	450	39%	176
3	4.3	WSW	Jefferson Public Schools*	2400 N Dixie Hwy	Monroe	(734) 289-5550	300	300	39%	117
3	4.5	W	TWB Company LLC	1600 Nadeau Rd	Monroe	(734) 289-6400	232	90	40%	36
4	8.2	NW	Airport Community Schools	11270 Grafton Rd	Carleton	(734) 654-2414	80	80	51%	41
4	10.6	NNW	Detroit Auto Action	600 Will Carleton Rd	Carleton	(734) 654-7100	537	400	70%	280
4	7.4	NW	Four Star Greenhouse*	1015 Indian Trail Rd	Carleton	(734) 654-6420	320	320	39%	125
4	7.2	NW	Four Star Greenhouse*	1199 E Sigler Rd	Carleton	(734) 654-8127	125	125	39%	49
4	10.5	NNW	Guardian Industries	14600 Romine Rd	Carleton	(734) 654-6264	500	500	85%	425
4	10.5	NNW	Guardian Science & Technology Center	14511 Romine Rd	Carleton	(734) 654-1111	120	75	90%	68
4	10.5	NNW	KC Transportation	888 Will Carleton Rd	Carleton	(734) 654-4600	125	100	70%	70
5	6.2	WSW	Backyard Products, LLC*	1000 Ternes Dr.	Monroe	(734) 242-6900	145	145	39%	57
5	9.1	WSW	Bay Corrugated*	1655 W 7th St	Monroe	(734) 243-5400	250	250	39%	98
5	7.9	WSW	County of Monroe	125 E 2nd St	Monroe	(734) 240-7046	200	200	50%	100
5	7.4	WSW	Detroit Stoker*	1510 E 1st St	Monroe	(734) 241-9500	160	160	39%	62
5	6.8	WSW	Frenchtown Square Mall	2121 N Monroe St	Monroe	(734) 242-9150	909	455	25%	114

* As shown in Table E-3, there are 31 major employers in the EPZ. Phone calls to these major employers were made to gather employment data; 16 of the 31 facilities provided data on the number of people commuting to work from outside the area, while the remaining 15 facilities did not have this data available. The average percentage of people commuting more than 10 miles to work was 39% based on the 16 facilities that did provide data. This average value was used for those employers which did not have data on the number of people commuting to work from outside the area.

Table E-3. Major Employers within the Fermi EPZ (Page 2 of 2)										
5	7.8	WSW	La-Z-Boy Incorporated	1284 N Telegraph Rd	Monroe	(734) 242-1444	480	480	40%	192
5	7.0	SW	MACSTEEL	3000 E Front St	Monroe	(734) 243-2446	443	148	60%	89
5	7.5	W	Meijer (Frenchtown Store)*	1700 N Telegraph Rd	Monroe	(734) 384-8001	625	156	39%	61
5	7.3	WSW	Mercy Memorial Hospital System*	725 N Monroe St	Monroe	(734) 240-8940	1,600	1,200	39%	468
5	7.8	WSW	Monroe Bank & Trust	10 Washington St	Monroe	(734) 241-3431	100	100	80%	80
5	9.0	SW	Monroe Factory Shops*	14500 Laplaisance Rd	Monroe	(734) 735-0894	150	113	39%	44
5	6.9	SW	Monroe Power Plant	3500 E Front St	Monroe	(734) 384-2201	1,012	687	55%	378
5	6.9	WSW	Monroe Public Schools	1275 N Macomb St	Monroe	(734) 265-3000	40	40	25%	10
5	7.9	WSW	Monroe Publishing Company*	20 W 1st St	Monroe	(734) 242-1100	125	125	39%	49
5	6.5	WSW	National Galvanizing*	1500 Telb St	Monroe	(734) 243-1882	100	100	39%	39
5	6.4	WSW	Pioneer Metal Finishing*	525 Ternes Dr	Monroe	(734) 384-1323	130	130	39%	51
5	8.1	WSW	Sisters, Servants of the Immaculate Heart of Mary	610 W Elm Ave	Monroe	(734) 241-3660	265	186	15%	28
5	6.5	WSW	SYGMA Network	660 Detroit Ave	Monroe	(734) 241-2890	162	70	50%	35
5	7.4	W	Wal-Mart*	2155 N Telegraph Rd	Monroe	(734) 242-2280	255	75	39%	29
WAYNE COUNTY										
4	9.8	N	Auto Alliance International*	1 International Drive	Flat Rock	(734) 782-0498	3,700	3,145	39%	1,227
						Total	**14,507**	**11,222**	**39%**	**5,047**

* As shown in Table E-3, there are 31 major employers in the EPZ. Phone calls to these major employers were made to gather employment data; 16 of the 31 facilities provided data on the number of people commuting to work from outside the area, while the remaining 15 facilities did not have this data available. The average percentage of people commuting more than 10 miles to work was 39% based on the 16 facilities that did provide data. This average value was used for those employers which did not have data on the number of people commuting to work from outside the area.

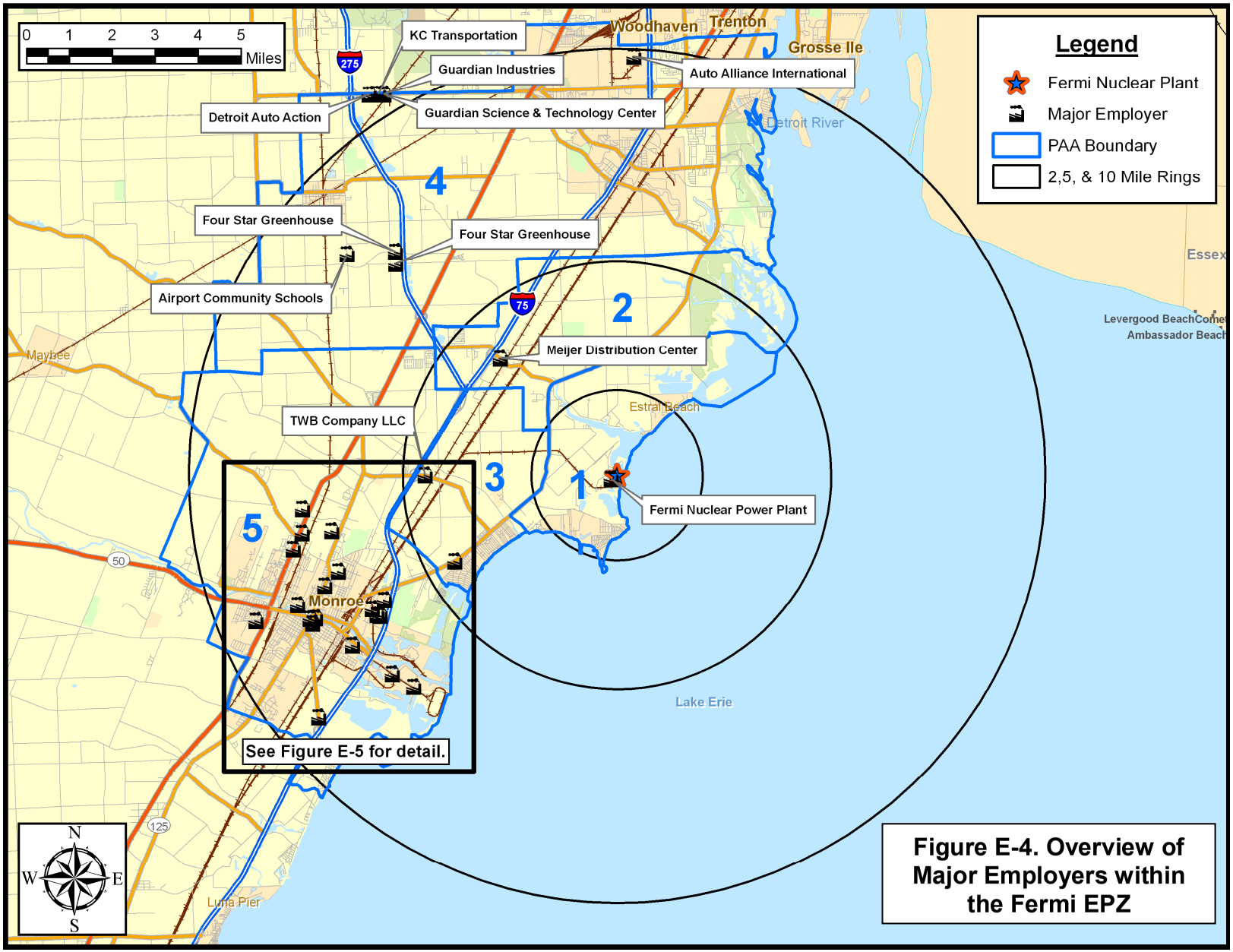
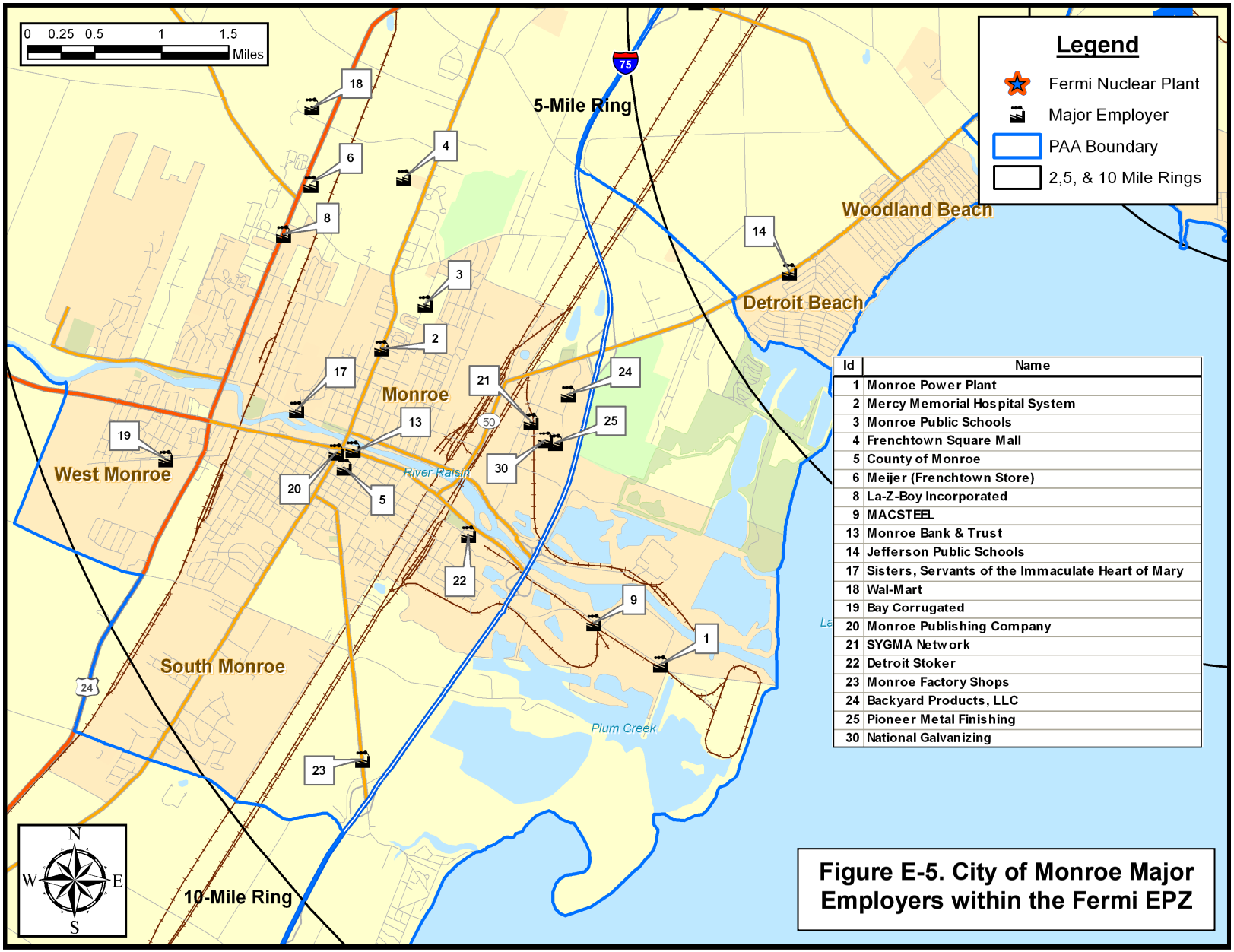


Figure E-4. Overview of Major Employers within the Fermi EPZ



Id	Name
1	Monroe Power Plant
2	Mercy Memorial Hospital System
3	Monroe Public Schools
4	Frenchtown Square Mall
5	County of Monroe
6	Meijer (Frenchtown Store)
8	La-Z-Boy Incorporated
9	MACSTEEL
13	Monroe Bank & Trust
14	Jefferson Public Schools
17	Sisters, Servants of the Immaculate Heart of Mary
18	Wal-Mart
19	Bay Corrugated
20	Monroe Publishing Company
21	SYGMA Network
22	Detroit Stoker
23	Monroe Factory Shops
24	Backyard Products, LLC
25	Pioneer Metal Finishing
30	National Galvanizing

Figure E-5. City of Monroe Major Employers within the Fermi EPZ

Table E-4. Lodging Facilities* within the Fermi EPZ								
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Per-sons	Veh-icles
MONROE COUNTY								
4	9.4	NW	Carlton Hotel	927 Monroe St	Carleton	(734) 654-6910	16	8
4	6.8	NNW	Eva's Motel	11920 Telegraph Rd	Carleton	(734) 654-9143	20	10
4	6.0	NW	Glee Motel	10195 Telegraph Rd	Carleton	(734) 586-8100	16	8
5	8.9	SW	Baymont Inn & Suites Monroe	14774 Laplaisance Rd	Monroe	(248) 931-7694	100	50
5	5.5	WSW	Best Value Inn	1885 Welcome Way	Monroe	(734) 289-1080	178	89
5	5.5	WSW	Best Western	1900 Welcome Way	Monroe	(734) 289-2330	192	96
5	9.4	SW	Comfort Inn	6500 East Albain Road	Monroe	(734) 384-1500	104	52
5	7.6	WSW	Del Rio Suites & Hotel	215 E Elm St	Monroe	(734) 242-9400	40	20
5	5.3	WSW	Hampton Inn Monroe	1565 N Dixie Hwy	Monroe	(734) 289-5700	118	59
5	6.1	WSW	Holiday Inn Express Hotel & Suites	1225 N Dixie Hwy	Monroe	(734) 242-0555	258	129
5	8.0	WSW	Hollywood Motel	1028 N Telegraph Rd	Monroe	(734) 241-7333	20	10
5	6.0	WSW	Knights Inn	1250 N Dixie Hwy	Monroe	(734) 243-0597	176	88
5	10.0	WSW	Monroe Motel	15339 S Telegraph Rd	Monroe	(734) 241-6443	20	10
5	9.1	WSW	Motel Seven	15390 S Dixie Hwy	Monroe	(734) 384-1100	54	27
5	8.3	WSW	Sunset Motel	450 N Telegraph Rd	Monroe	(734) 242-3448	12	6
5	5.6	WSW	Travel Inn Suites & Spas	1440 N Dixie Hwy	Monroe	(734) 289-2000	80	40
WAYNE COUNTY								
4	9.9	N	Best Motel	27527 Telegraph Rd	Flat Rock	(734) 782-9399	38	19
4	10.2	N	Poplar Motel	26831 Telegraph Rd	Flat Rock	(734) 782-3716	14	7
4	9.8	N	Ram's Motel	27541 Telegraph Rd	Flat Rock	(734) 783-2933	16	8
4	9.0	N	Sleep Inn	29101 Commerce Dr	Flat Rock	(734) 782-9898	100	50
						Total	**1,572**	**786**

*2 people and 1 vehicle per occupied room are used to estimate persons and vehicles. Peak occupancy rates were obtained through phone calls to the facilities.

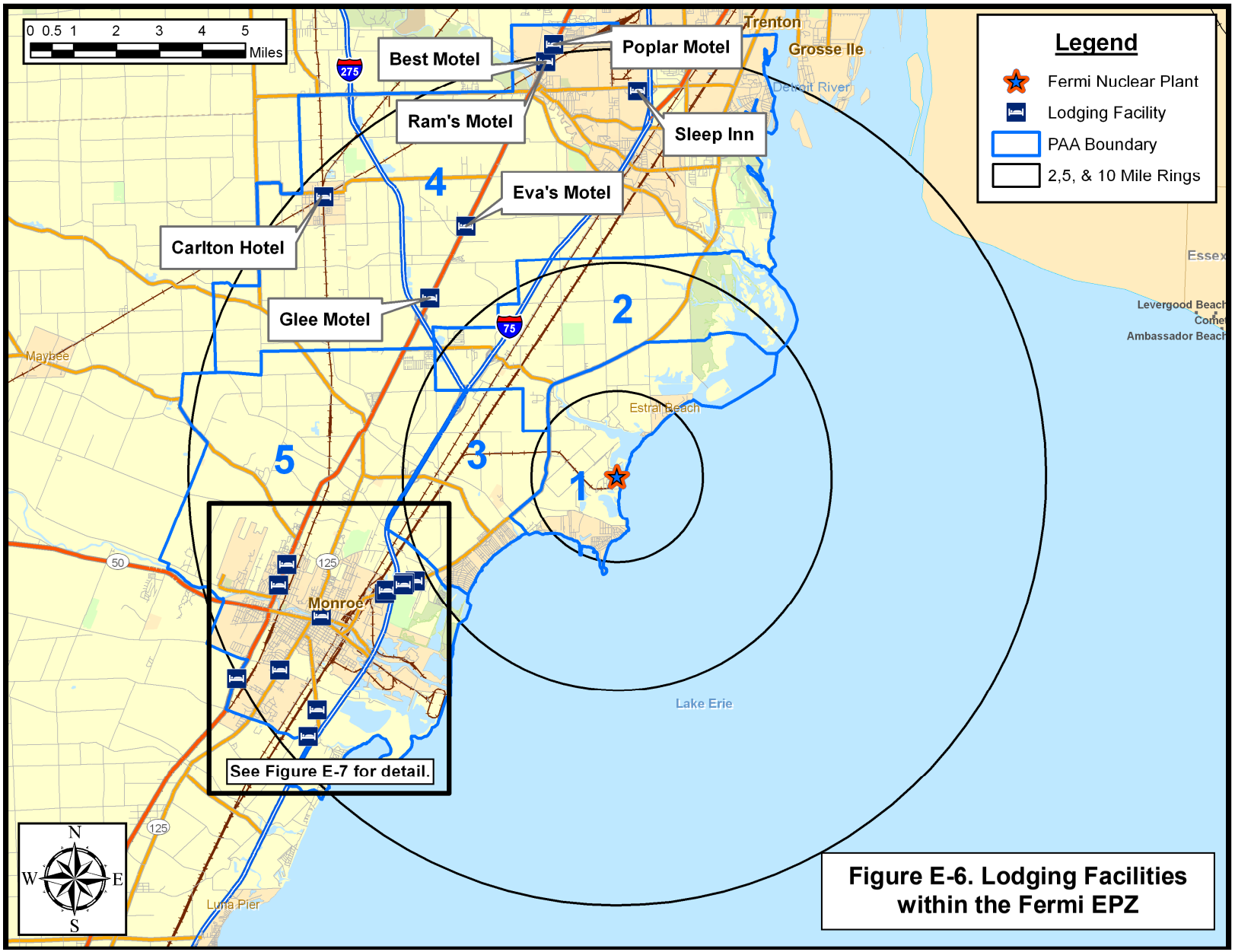
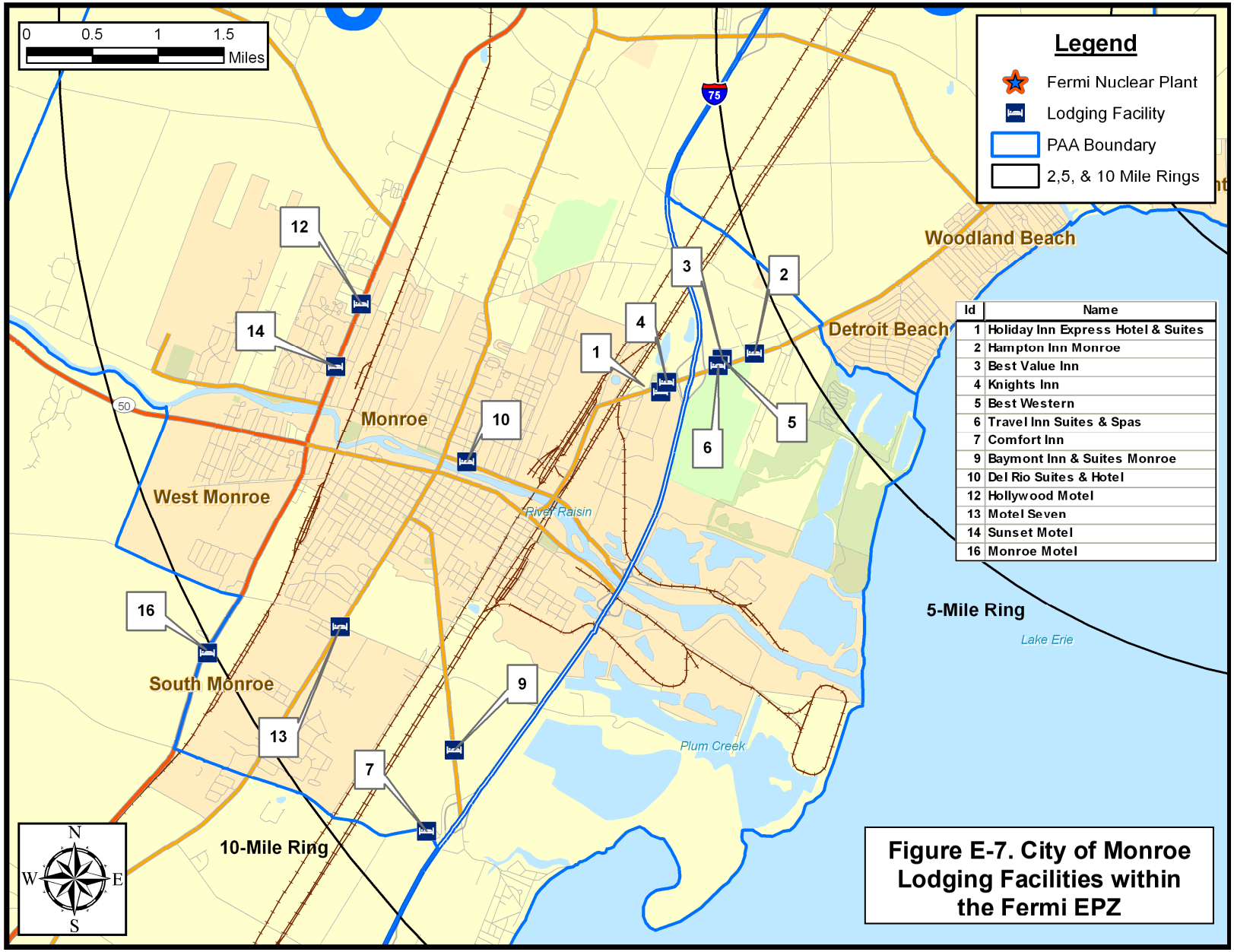


Figure E-6. Lodging Facilities within the Fermi EPZ



Id	Name
1	Holiday Inn Express Hotel & Suites
2	Hampton Inn Monroe
3	Best Value Inn
4	Knights Inn
5	Best Western
6	Travel Inn Suites & Spas
7	Comfort Inn
9	Baymont Inn & Suites Monroe
10	Del Rio Suites & Hotel
12	Hollywood Motel
13	Motel Seven
14	Sunset Motel
16	Monroe Motel

Figure E-7. City of Monroe Lodging Facilities within the Fermi EPZ

Table E-5. Parks, Golf Courses and Major Retail Establishments within the Fermi EPZ								
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Per-sons	Total Vehicles
MONROE COUNTY								
2	3.5	NNW	Lilac Brothers Golf Course	9090 Armstrong Rd	Newport	(734) 586-7555	50	50
2	4.9	NNE	Point Mouillee State Game Area	37205 Point Mouille Rd	Brownstown	(734) 379-9692	2,000	870
4	9.6	NW	Carleton Glen Golf Club	13470 Grafton Rd	Carlton	(734) 654-6201	50	50
4	7.5	N	Wesburn Golf & Country Club	5617 S Huron River Dr	South Rockwood	(734) 379-3555	50	50
5	6.8	WSW	Frenchtown Square Mall	2121 N Monroe St	Monroe	(734) 242-9150	400	200
5	6.3	WSW	Monroe Golf & Country Club	611 Cole Rd	Monroe	(734) 241-6531	50	50
5	9.0	SW	Monroe Factory Shops	14500 Laplaisance Rd	Monroe	(734) 735-0894	800	400
5	5.9	WSW	Raisin River Country Club	1500 N Dixie Hwy	Monroe	(734) 289-3700	50	50
5	8.7	W	Sandy Creek Golf Course	3177 Heiss Rd	Monroe	(734) 242-7200	50	50
5	5.5	SW	Sterling State Park	2800 State Park Rd	Monroe	(734) 289-2715	4,302	1,937
WAYNE COUNTY								
4	8.2	NNE	Lake Erie Metropark	32481 W Jefferson	Brownstown	(734) 379-5020	2,300	1,000
4	6.9	NNE	Lake Erie Metropark Golf Course*	14786 Lee Rd	Brownstown	(734) 379-0048	0	0
						Total	**10,102**	**4,707**

*People and vehicles at the Golf Course are already included within the park.

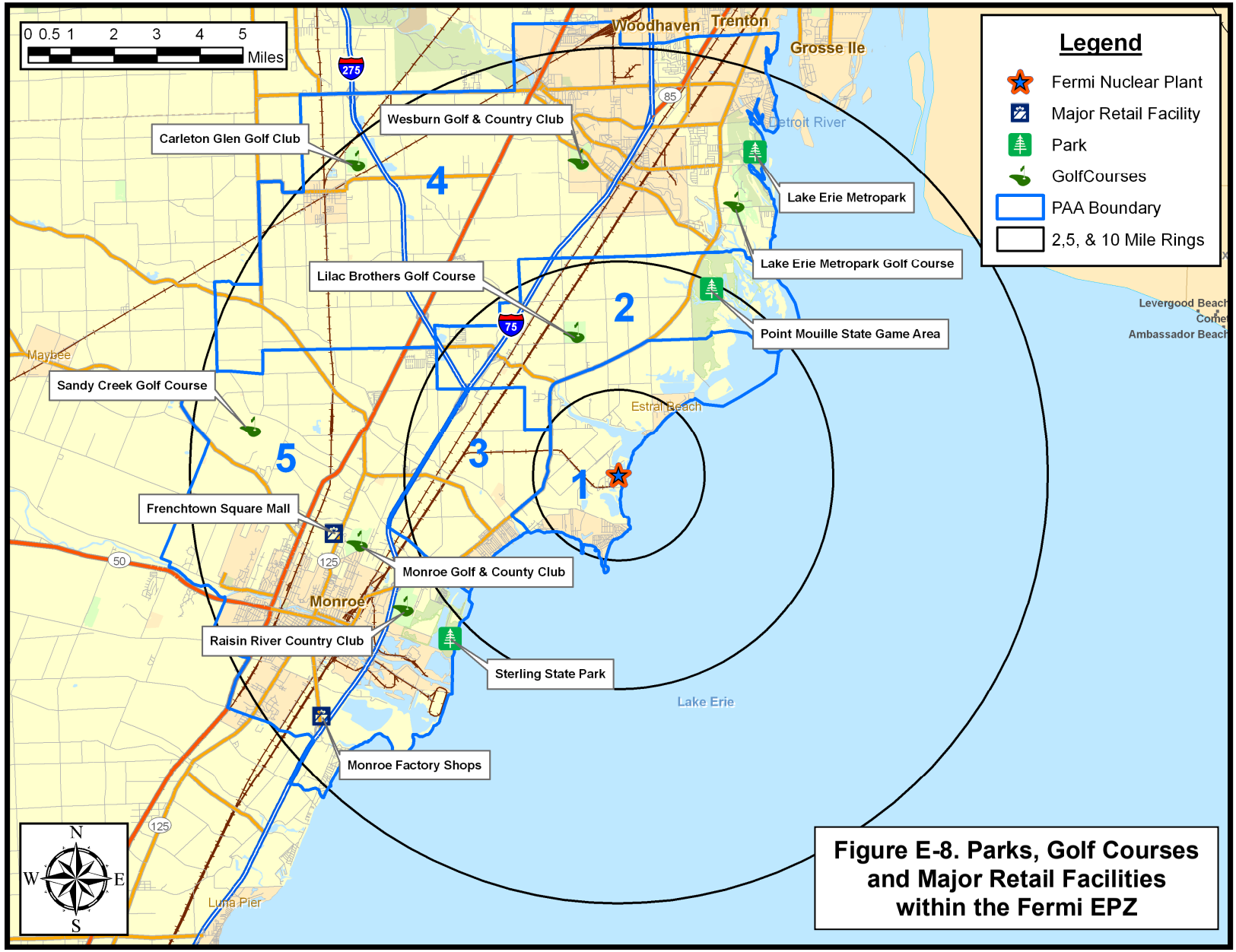


Figure E-8. Parks, Golf Courses and Major Retail Facilities within the Fermi EPZ

Table E-6. Marinas within the Fermi EPZ								
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Per-sons	Total Vehicles
MONROE COUNTY								
1	2.4	WSW	Brest Bay Marina	4088 Brest Rd	Newport	(734) 289-1234	30	15
1	1.4	NNW	Swan Yacht Basin	5898 Trombley Rd	Newport	(734) 586-2762	14	7
5	10.1	SW	Charlie's Boat & Bait	13468 Laplaisance Rd	Monroe	(734) 241-1545	40	40
5	9.3	SW	Erie Party Shoppe & Docks	6838 Laplaisance Rd	Monroe	(734) 242-2833	1,000	500
5	9.1	SW	Harbor Marina	13950 Bridge St	Monroe	(734) 241-2833	50	25
5	9.3	SW	Miller Boat Marina	6838 Laplaisance Rd	Monroe	(734) 242-7734	50	25
5	7.1	WSW	Riverfront Marina	1560 E Elm Ave	Monroe	(734) 242-0737	150	75
5	10.2	SW	Trout's Yacht Basin	7970 Bolles Harbor Dr	Monroe	(734) 242-5545	50	25
WAYNE COUNTY								
4	9.9	NNE	Humbug Marina, Inc.	13400 Middle Gibraltar Rd	Rockwood	(734) 676-6633	400	200
4	7.1	NNE	Lake Erie Metropark Harbor of Refuge*	14786 Lee Road	Brownstown	(734) 379-0048	0	0
						Total	**1,784**	**912**

*People and vehicles at the marina are already included within the park.

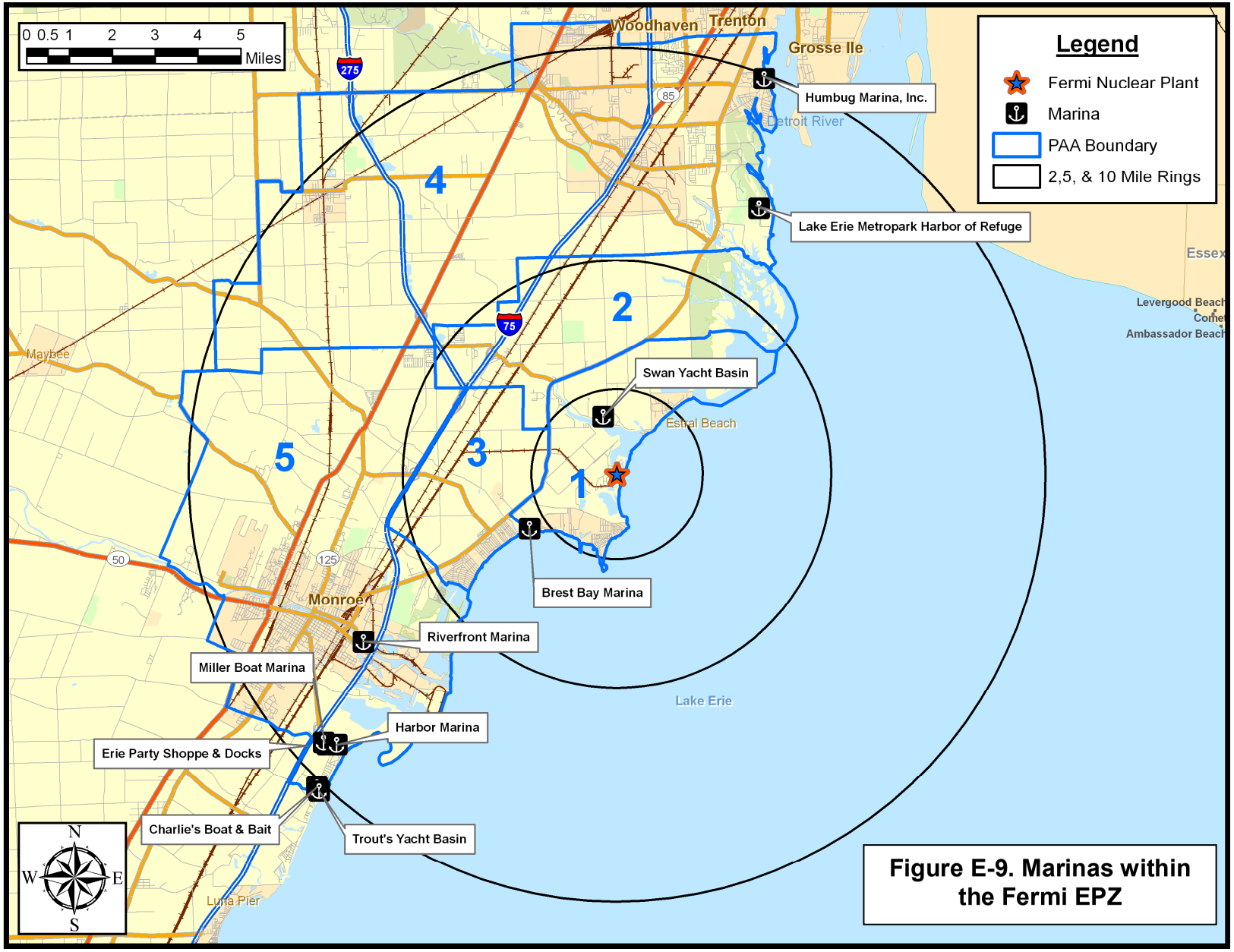


Figure E-9. Marinas within the Fermi EPZ

Table E-7. Medical Facilities & Nursing Homes within the Fermi EPZ											
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Capacity	Census	Wheelchair Bound	Bed-ridden	Ambulatory
MONROE COUNTY											
5	6.4	W	ALCC	2590 N Monroe St	Monroe	(734) 243-4000	21	12	6	0	6
5	8.2	WSW	Alterra	1605 Fredericks Dr	Monroe	(734) 241-5700	20	15	0	0	15
5	8.1	WSW	IHM Motherhouse	610 W Elm Ave	Monroe	(734) 777-3482	210	192	13	2	177
5	7.1	WSW	Lutheran Home	1236 S Monroe St	Monroe	(734) 241-9533	115	115	8	1	106
5	6.0	W	Maplewood Manor	3250 N Monroe St	Monroe	(734) 243-5100	120	110	8	1	101
5	8.3	WSW	Medilodge II	481 Village Green Ln	Monroe	(734) 242-6282	103	92	6	1	85
5	7.2	WSW	Mercy Memorial Hospital	718 N Macomb St	Monroe	(734) 240-8400	168	168	69	30	69
5	7.4	WSW	Mercy Memorial Nursing Center	700 Stewart Rd	Monroe	(734) 240-1888	70	60	0	1	59
5	7.8	WSW	Tendercare of Monroe	1215 N Telegraph Rd	Monroe	(734) 242-4848	192	175	12	2	161
WAYNE COUNTY											
4	9.1	N	Marybrook Residence	23201 Gibraltar Rd	Flat Rock	(734) 782-0015	12	11	1	0	10
						Total	**1,031**	**950**	**123**	**38**	**789**

* Detailed censuses of these facilities were not available. On average, nursing homes are 91% occupied; 7% of residents are wheelchair bound, 1% of residents are bed-ridden, and 92% of residents are ambulatory. These averages were applied to those facilities that did not provide detailed data.

Table E-8. Correctional Facilities within the Fermi EPZ									
PAA	Distance (miles)	Dir-ection	Facility Name	Street Address	Municipality	Phone	Staff	Capacity	Census
MONROE COUNTY									
5	7.9	WSW	Monroe County Jail - Facility #1	100 E 2nd St	Monroe	(734) 240-7400	37	183	183
5	8.5	SW	Monroe County Jail - Facility #2	7000 E Dunbar Rd	Monroe	(734) 240-7400	37	160	160
						Total	**74**	**343**	**343**

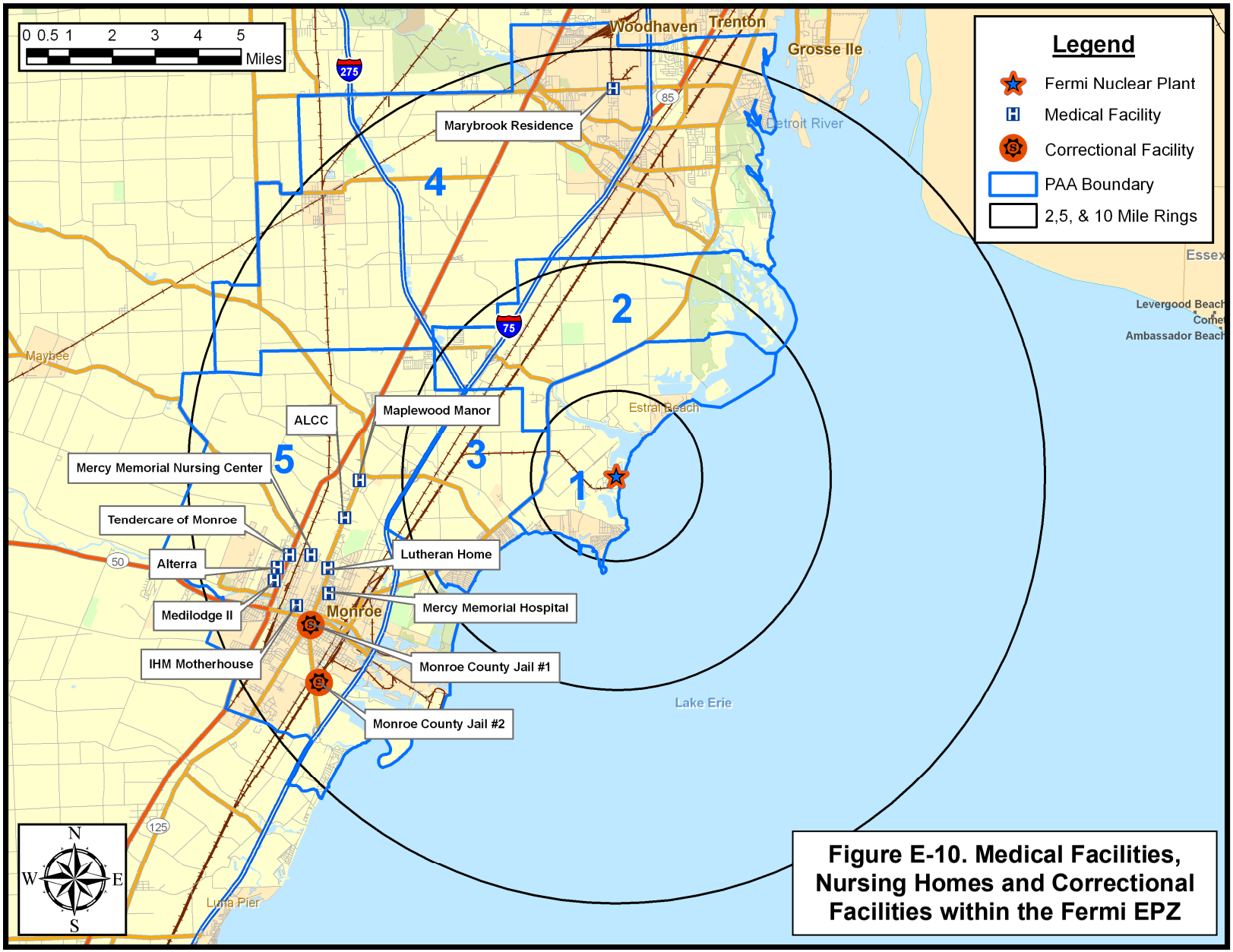


Figure E-10. Medical Facilities, Nursing Homes and Correctional Facilities within the Fermi EPZ

APPENDIX F

Telephone Survey

APPENDIX F: TELEPHONE SURVEY

1. INTRODUCTION

The development of evacuation time estimates for the Emergency Planning Zone (EPZ) of the Fermi Nuclear Power Plant requires the identification of travel patterns, car ownership and household size of the population within the EPZ. Demographic information is obtained from Census data. The use of this data has several limitations when applied to emergency planning. First, the census data do not encompass the range of information needed to identify the time required for preliminary activities that must be undertaken prior to evacuating the area. Secondly, the census data do 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 of 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 …?”).

2. SURVEY INSTRUMENT AND SAMPLING PLAN

Attachment A presents the final survey instrument. A draft of the instrument was submitted for comment. Comments were received and the survey instrument was modified.

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, based on average household size provided by Census data. The proportional number of the desired completed survey interviews for each area was identified, as shown in Table F-1.

Table F-1. Survey Sampling Plan

Fermi Telephone Survey

Zip Code	Population in ZIP (2000)	Households in ZIP (2000)	Required Sample
48117	7,333	2,683	42
48134	8,958	3,430	54
48145	112	35	0
48161	20,502	8,042	126
48162	27,406	10,634	166
48166	10,468	3,677	57
48173	10,247	3,968	62
48179	3,067	1,100	17
48183	4,606	1,661	26
Total:	**92,699**	**35,230**	**550**
Average Household Size			**2.63**
Total Sample Required			**550**

3. 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. These data are 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 within the EPZ. The average household contains 2.72 people. The estimated household size (2.63 persons) 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 from the Census is an indication of the reliability of the survey.

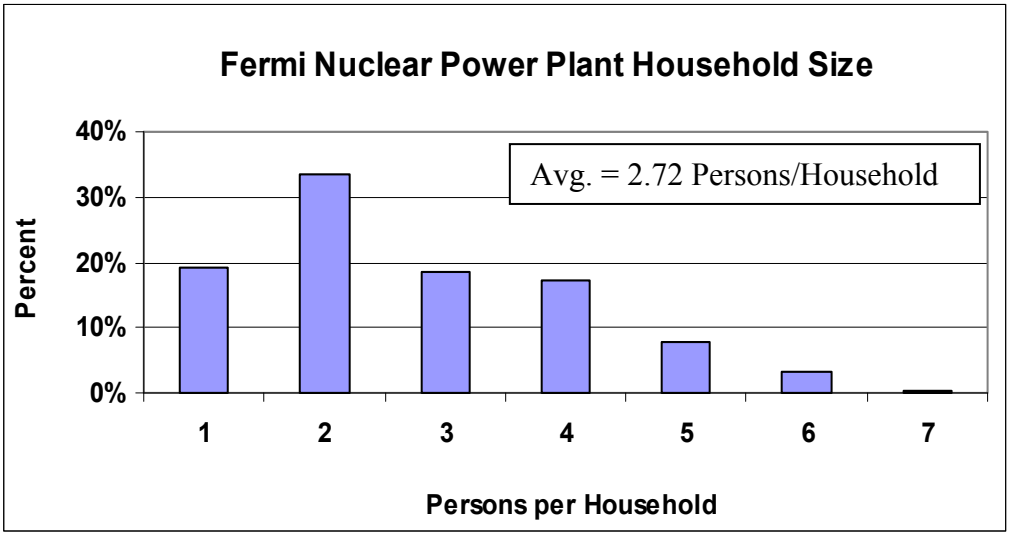


Figure F-1. Household Size in the EPZ

Automobile Ownership

The average number of automobiles per household in the EPZ is 1.99. The distribution of automobile ownership is presented in Figure F-2. Figures F-3 and F-4 present the auto mobile availability by household size; approximately 4.2 percent of households do not have access to an automobile. The majority of households without access to a vehicle are single person households; nearly all households of 2 or more people have access to at least one vehicle.

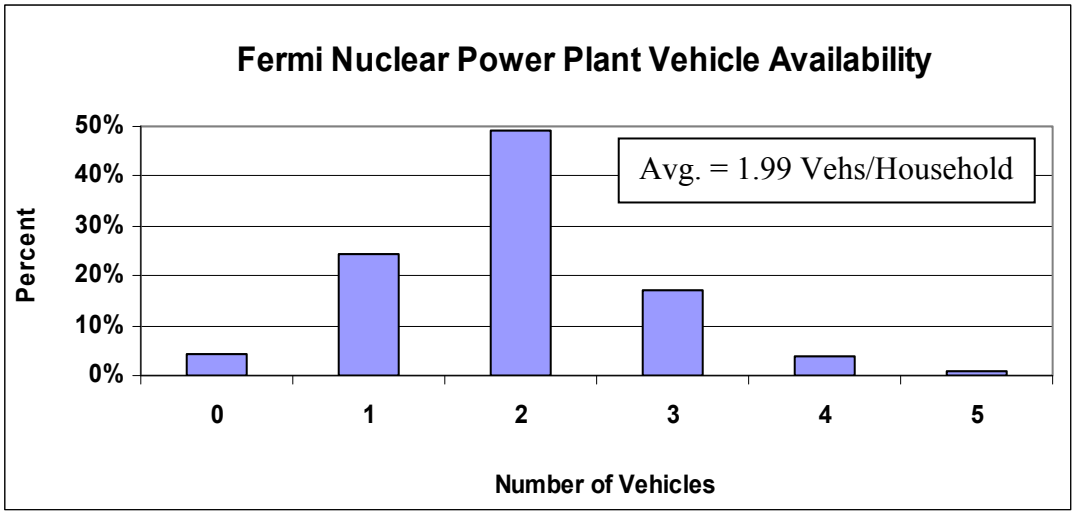


Figure F-2. Household Vehicle Availability

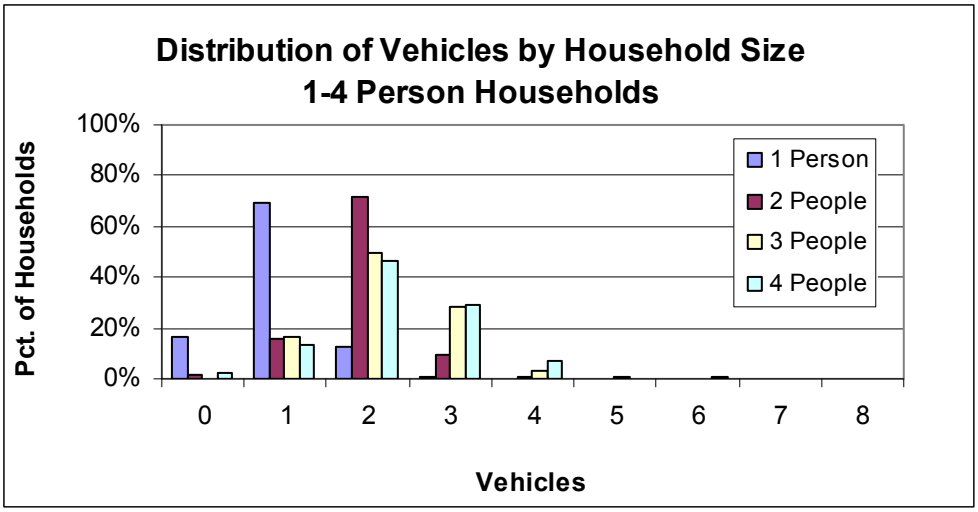


Figure F-3. Vehicle Availability – 1 to 4 Person Households

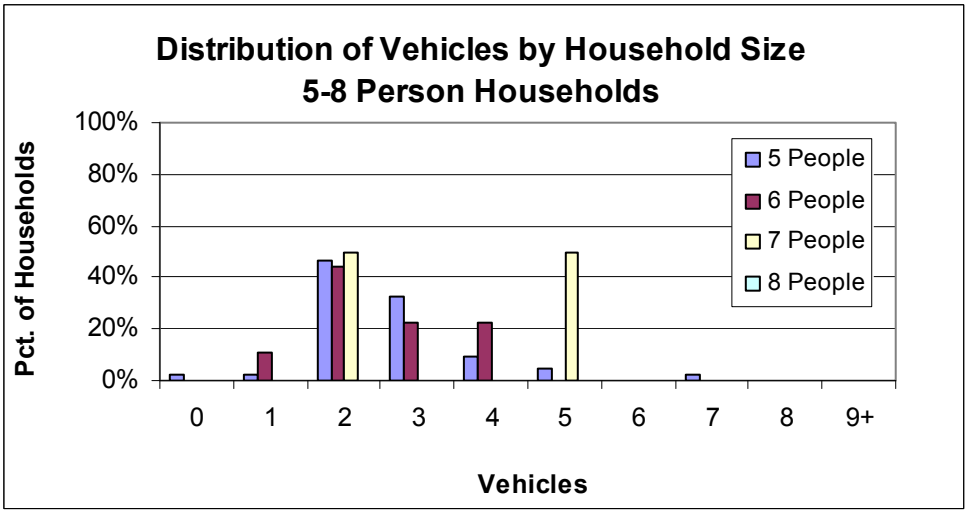


Figure F-4. Vehicle Availability – 5 to 8 Person Households

Schoolchildren

The average number of schoolchildren per household identified by the survey is 0.70. Figure F-5 presents the distribution of schoolchildren.

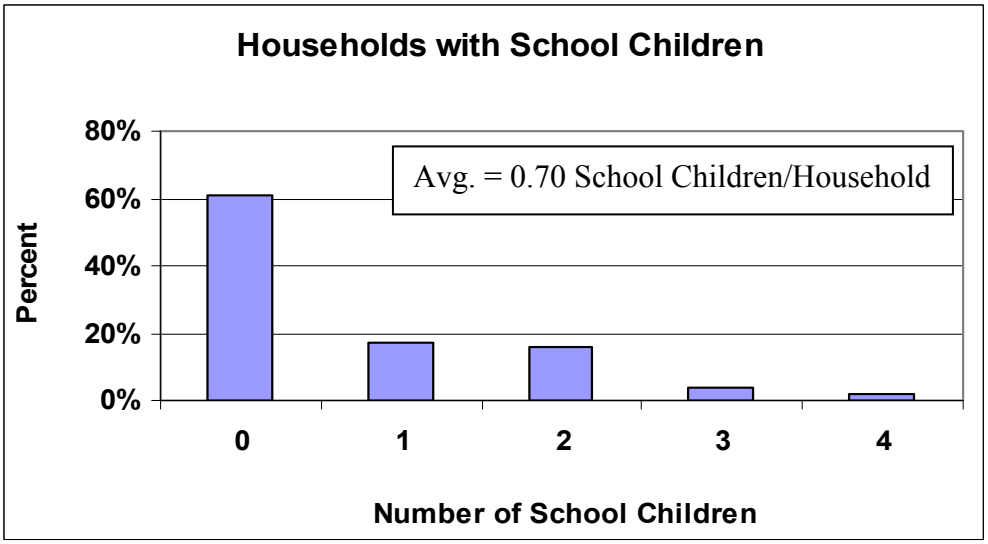


Figure F-5. Schoolchildren in Households

Commuters

Figure F-6 presents the distribution of the number of commuters in each household. The data show an average of 1.05 commuters in each household in the EPZ.

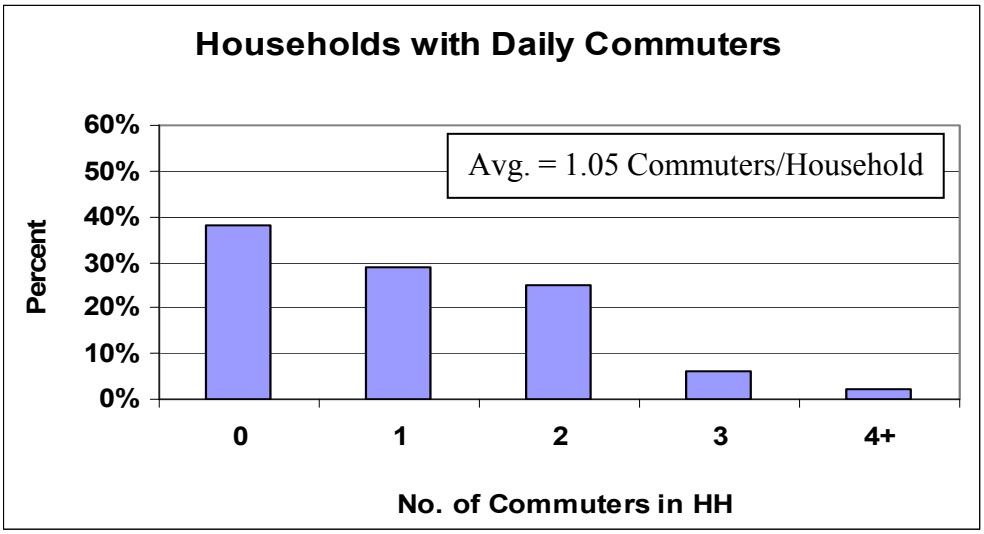


Figure F-6. Commuters in Households in the EPZ

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.

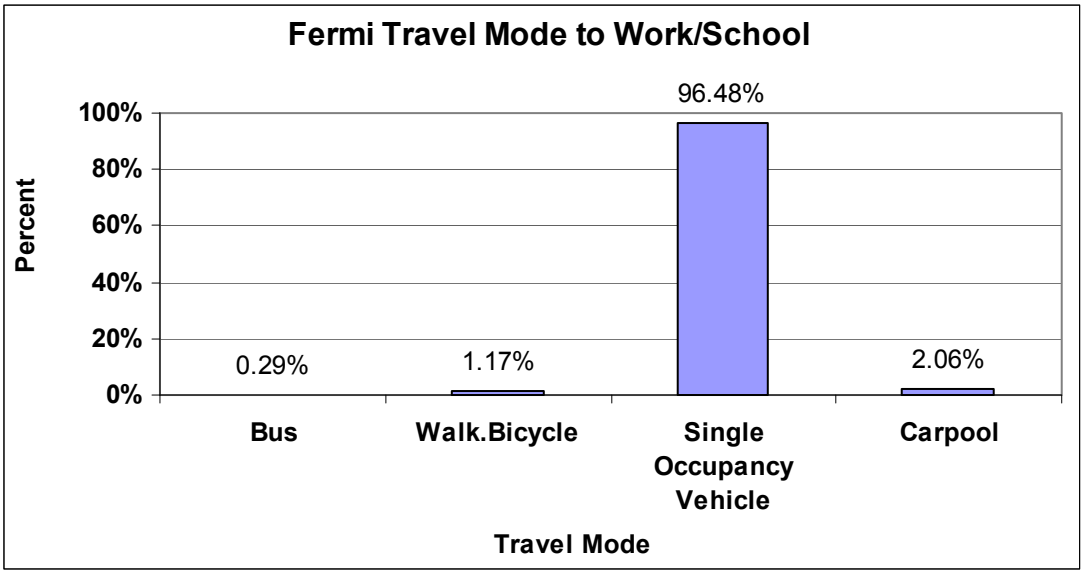


Figure F-7. Modes of Travel to Work by EPZ Residents

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, 1.24 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, 64 percent said that there was another vehicle available to evacuate, while 36 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, 55 percent said they would await the return of other family members before evacuating and 45 percent indicated that they would not await the return of other family members.

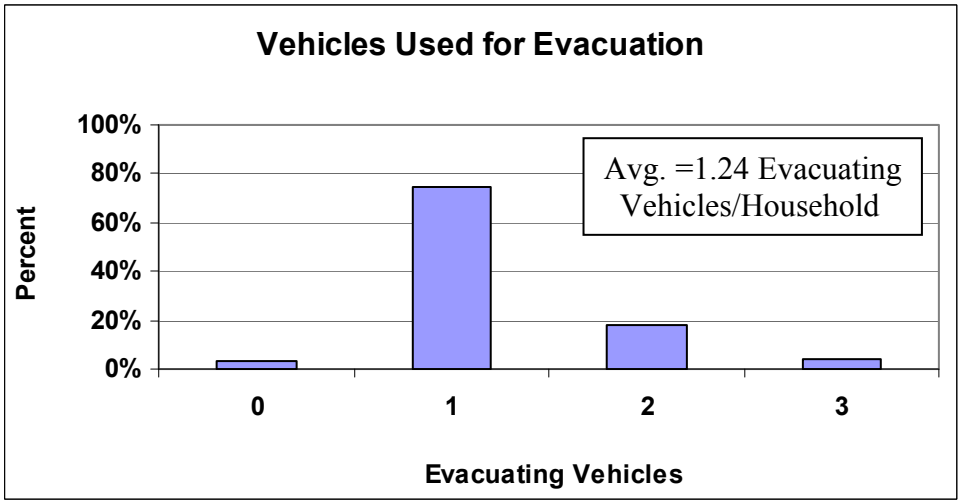


Figure F-8. Number of Vehicles Used for Evacuation

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. Thus, 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-9 presents the cumulative distribution. In all cases, this activity is completed by about 120 minutes. Forty five percent can leave within 15 minutes.

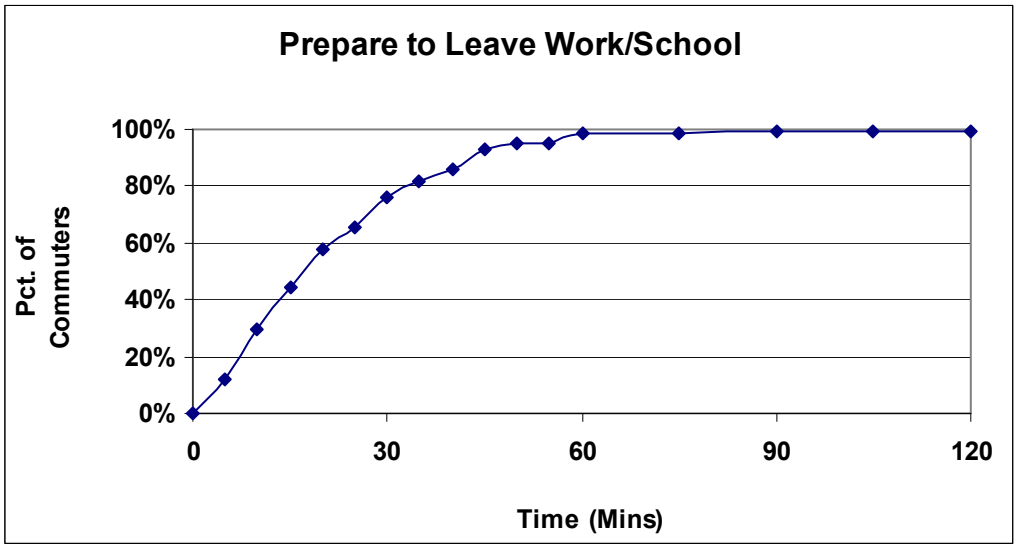


Figure F-9. Time Required to Prepare to Leave Work/School

How long would it take the commuter to travel home?

Figure F-10 presents the work to home travel time. Over 90 percent of commuters can arrive home within about 45 minutes of leaving work; all within 90 minutes.

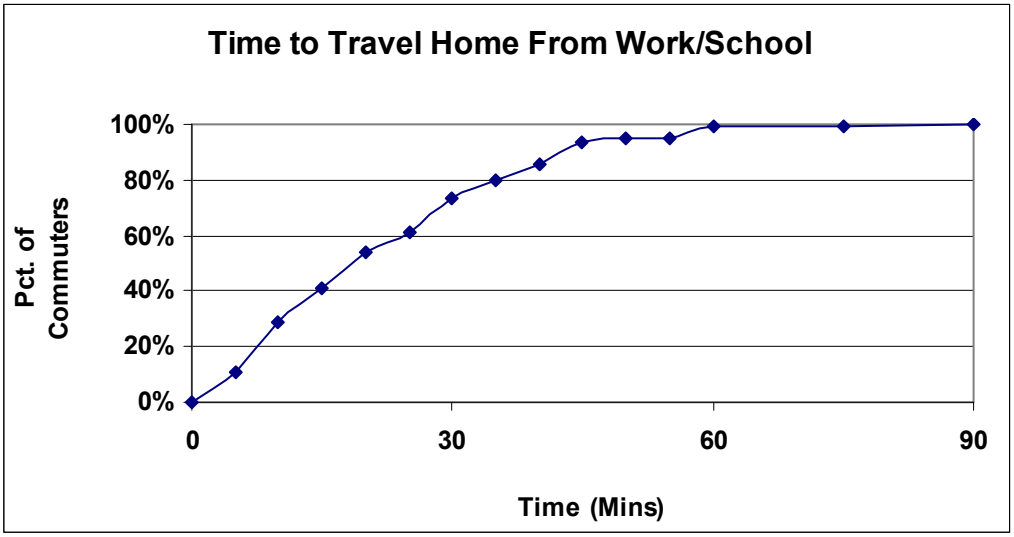


Figure F-10. Time to Travel Home From Work/School

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

Figure F-11 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. Hence, the responses represent the experience of the responder in performing similar activities.

The distribution shown in Figure F-11 has a long "tail." Approximately 95 percent of households can be ready to leave home within two hours; all households can be ready to leave within four hours.

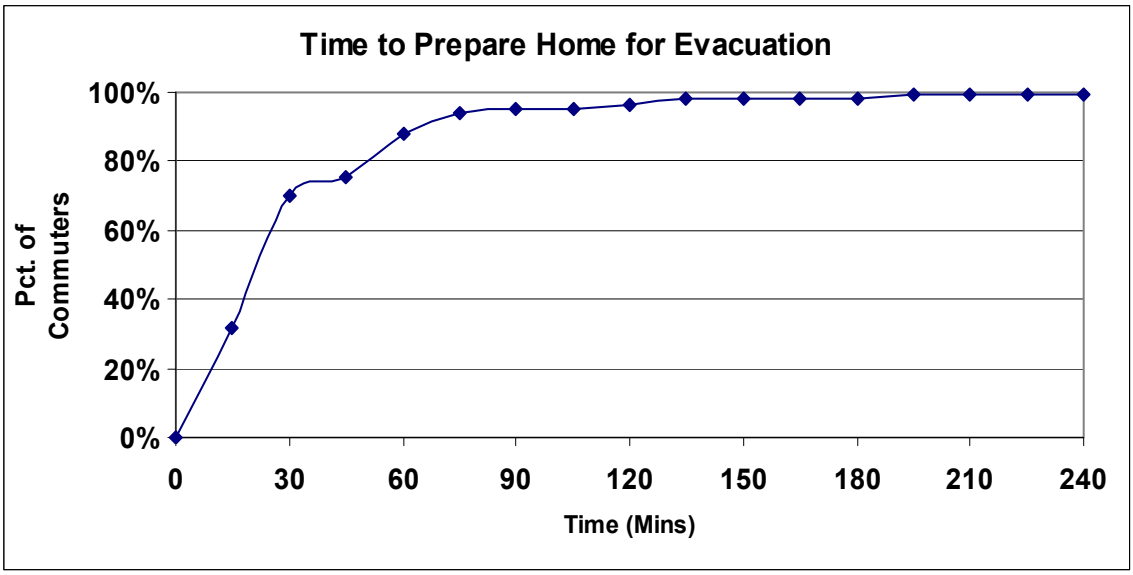


Figure F-11. Time to Prepare Home for Evacuation

How long would it take you to clear 6 to 8 inches of snow?

During adverse, snowy weather conditions an additional activity must be performed before residents can depart on the evacuation trip. Although snow scenarios assume that the roads and highways have been plowed and are passable (albeit at lower speeds and capacities), it would be necessary to clear a private driveway prior to leaving the home so that the vehicle can access the street. Figure F-12 presents these results. The time distribution for clearing the driveway has a long tail; about 90 percent of driveways are passable within 1 hour. However, the last driveway is cleared 3 hours after the start of this activity.

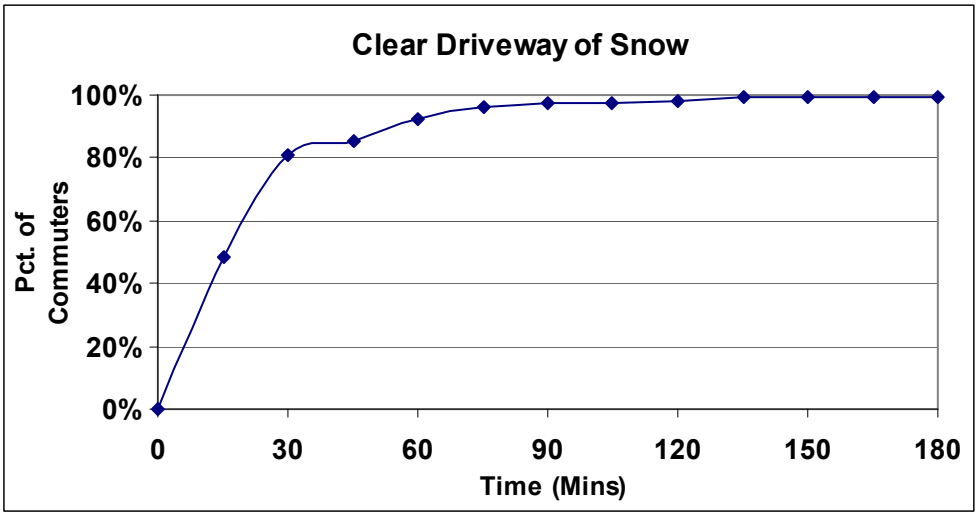


Figure F-12. Time to Clear Driveways of Snow

4. CONCLUSIONS

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

ATTACHMENT A

Telephone Survey Instrument

Survey Instrument

Hello, my name is _____ and I'm working on a survey being made for [insert marketing firm name] designed to identify local travel patterns in your area. The survey will be used for emergency plans in response to hazards that **are not weather-related**. The information obtained will be used in a traffic engineering study and in connection with an update of the county's emergency response plans. Your participation in this survey will greatly enhance the county's emergency preparedness program.

COL.1 Unused
COL.2 Unused
COL.3 Unused
COL.4 Unused
COL.5 Unused

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	COL.42
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.43	COL.44
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.45	COL.46
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.47	COL.48
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

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. 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. How long would it take you to clear 6-8" of snow to move the car from the driveway or curb to begin the evacuation trip? Assume the roads are passable. (DO NOT READ RESPONSES.)

COL.63

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.64

1 MORE THAN 3 HOURS
2 DON'T KNOW

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

Col. 65	
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	EMA Phone
Monroe	(734)240-3135
Wayne	(734)942-5289

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 Fermi Nuclear Power Plant EPZ. Pages G-2 through G-41 detail Traffic Control Points (TCP), which are typically intersections within the EPZ; these points are established to facilitate the flow of evacuee traffic from within the EPZ. Table G-1 summarizes the TCP and the manpower and equipment needed to implement traffic control. Figure G-1 provides detailed mapping of the location of each traffic control point.

Pages G-42 through G-54 detail the Access Control Points (ACP), which are typically on the periphery of the EPZ; these points are established to divert vehicles from entering the EPZ. Doing so provides all of the available roadway capacity within the EPZ to the evacuees. Table G-2 summarizes the ACP and the manpower and equipment needs to establish access control, while Figure G-2 provides a detailed map of the location of each ACP.

In addition to diverting most vehicles from entering the EPZ, the traffic guides at ACPs should selectively facilitate the movement of entering vehicles that are servicing the public evacuating from within the EPZ. These vehicles include:

- Buses which are dispatched to provide service for transit dependent evacuees.
- All police units and emergency response personnel.
- Late arriving returning commuters who need to provide transport for his or her family.

It is recognized that the need to establish the validity of an entering privately owned vehicle could be time consuming and potentially delay other vehicles that obviously are needed for emergency response. The personnel should be trained to expedite the entry of those vehicles such as buses and other emergency vehicles while ensuring that private vehicles have a legitimate need to enter the EPZ. Any delay experienced by these relatively few private vehicles which arrive after the ACP is activated is unavoidable and will not influence the movements of those vehicles evacuating from the EPZ.

This traffic management plan has been reviewed by state and local police. During an evacuation, there are likely to be concerns about manpower and equipment shortages. As such, prioritization of TCP and ACP 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, will also aid in overcoming manpower shortages.

With reference to discussion of Section 2.3, these TCP serve many useful functions, but are not considered in specifying the inputs to the IDYNEV system used to calculate ETE. Consequently, the results presented in Section 7 and in Appendix J do not credit the presence of these TCP.

Table G-1. Summary of Traffic Control Points							
PAA	**TCP ID**	**Municipality**	**Intersection Location**	**Priority**	**# of Guides**	**# of Cones**	**# of Barricades**
Monroe County							
4	1	Ash	Interstate 275 & Will Carleton Rd	1	2	6	0
1	2	Frenchtown	N. Dixie Hwy & Enrico Fermi Dr	2	1	3	0
1	3	Frenchtown	N. Dixie Hwy & Marshall Field Dr/Point Aux Peaux	3	1	9	0
3	4	Frenchtown	N. Dixie Hwy & Nadeau Rd	1	1	6	0
3	5	Frenchtown	N. Dixie Hwy & Grand Blvd	3	1	6	0
5	6	Frenchtown	N. Dixie Hwy & Sandy Creek Rd	3	1	6	0
5	8	Frenchtown	US Hwy 24 & Stewart Rd/Cole Rd	2	2	12	0
5	9	Monroe City	US Hwy 24 & State Hwy 50	1	3	12	0
5	11	Monroe	State Hwy 50 & Raisinville Rd	2	1	9	0
4	12A	Berlin	S. Huron River Dr & I-75 Nouthbound Ramps	2	1	6	0
4	12B	Berlin	S. Huron River Dr & Ramps to Southbound I-75	2	1	3	0
4	15	Ash	I-275 & Carleton Rockwood Rd	1	2	9	0
3	16	Frenchtown	Interstate 75 & Interstate 275	1	2	0	20
4	17	Ash	I-275 & US Hwy 24	1	3	12	4
5	18	Frenchtown	N. Dixie Hwy & Ramp to I-75 North	1	2	9	0
5	19	Monroe City	N. Dixie Hwy & Ramp to I-75 South	1	2	12	0
5	20	Monroe City	N. Dixie Hwy & Ternes Dr	3	2	6	0
5	21	Monroe	Laplaisance Rd & I-75 Southbound Ramps	1	1	6	0
5	22A	Monroe City	East Elm Ave & I-75 North Ramps	2	2	12	0
5	22B	Monroe City	East Elm Ave & I-75 South Ramps	2	2	9	0
5	23	Monroe City	N. Monroe St & Cole Rd/Stewart Rd	1	3	12	0
5	24	Monroe	State Hwy 50 & Herr Rd	2	1	6	0
2	27&28	Berlin	Swan Creek Rd & I-75	2	2	6	0
5	30	Monroe City	I-75 & East Front St	2	2	21	0
3	31	Frenchtown	I-75 & Nadeau Rd	2	1	6	0
5	32	Monroe City	Monroe St & Elm Ave	1	2	9	0
5	33	Monroe City	Monroe St & Front St	1	1	6	0
5	39	Frenchtown	N. Dixie Hwy & Sterling State Park Entrance	1	1	6	0
Total Manpower/Equipment for Monroe County:					**46**	**225**	**24**
Wayne County							
4	13	Berlin	N. Huron River Dr & I-75 Northbound Ramps	2	1	6	0
4	14	Brownstown	Fort St & Gibraltar Rd	2	2	12	0
4	25	Flat Rock	I-75 Southbound Ramps & Gibraltar Rd	2	1	3	0
4	26	Brownstown	I-75 Northbound Ramps & Gibraltar Rd	2	3	18	0
4	29	Rockwood	Huron River Dr & I-75 South Ramps	2	2	3	0
4	34	Berlin	West Jefferson Ave & S. Huron River Rd	2	1	3	0
4	35	Brownstown	West Jefferson Ave & Huron River Dr	2	1	9	0
4	36	Brownstown	Telegraph Rd & West Huron River Dr	2	1	9	0
4	37	Brownstown	West Jefferson Ave & Gibraltar Rd	2	1	6	0
4	38	Berlin	Telegraph Rd & Will Carleton Rd/S. Huron River Rd	2	2	9	0
Total Manpower/Equipment for Wayne County:					**15**	**78**	**0**
TOTAL Manpower/Equipment FOR ENTIRE EPZ:					**61**	**303**	**24**

*TCP ID 7 and 10 are not in use.

**TCP ID 39 should only be implemented for summer weekend conditions.

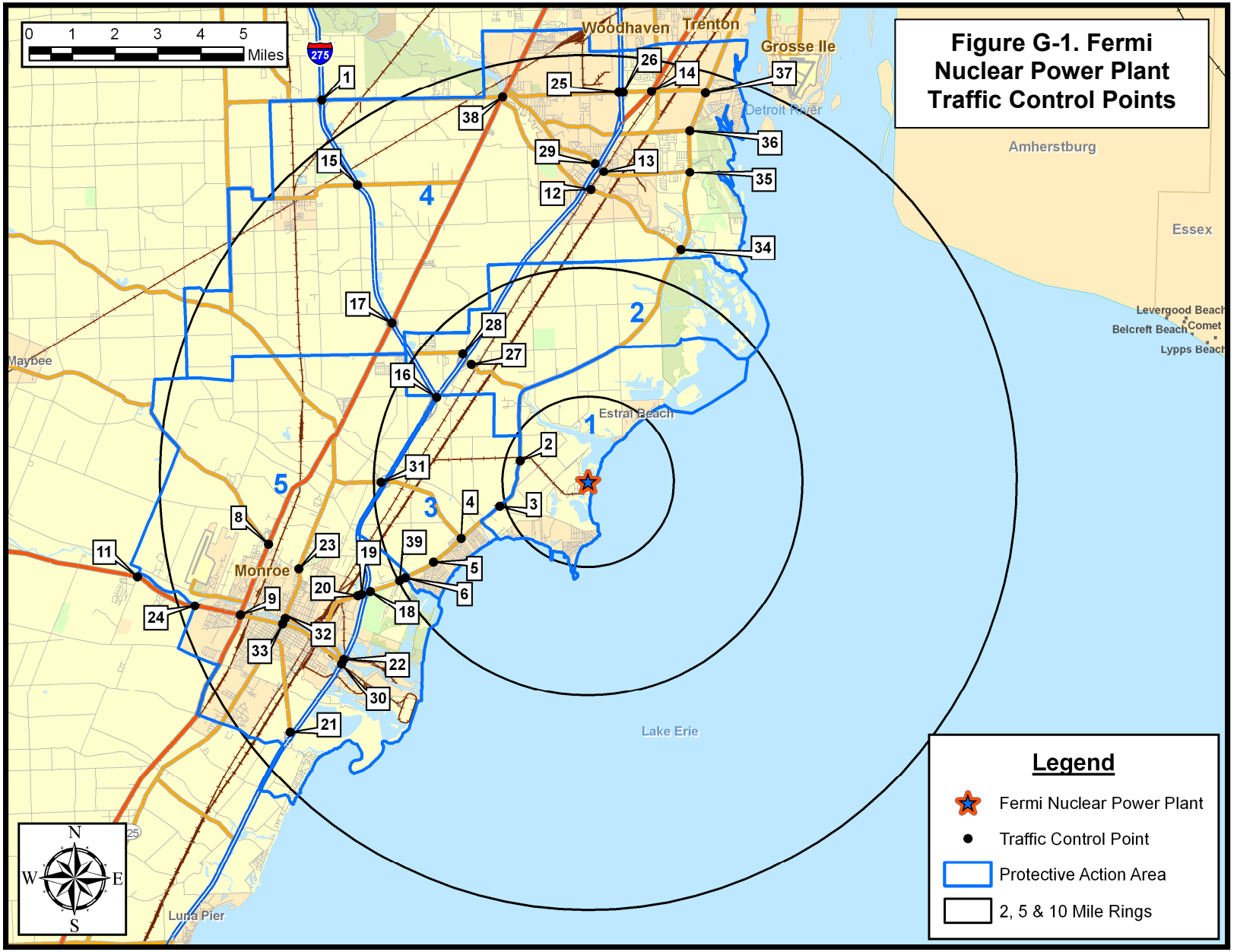


Figure G-1. Fermi Nuclear Power Plant Traffic Control Points
0 1 2 3 4 5 Miles
Woodhaven
Trenton
Grosse Ile
Detroit River
Amherstburg
Essex
Levergood Beach
Belcreft Beach
Comet
Lypps Beach
Maybee
Estral Beach
Monroe
Lake Erie
Luna Pier
1
2
3
4
5
Legend
Fermi Nuclear Power Plant
Traffic Control Point
Protective Action Area
2, 5 & 10 Mile Rings
N
S
E
W

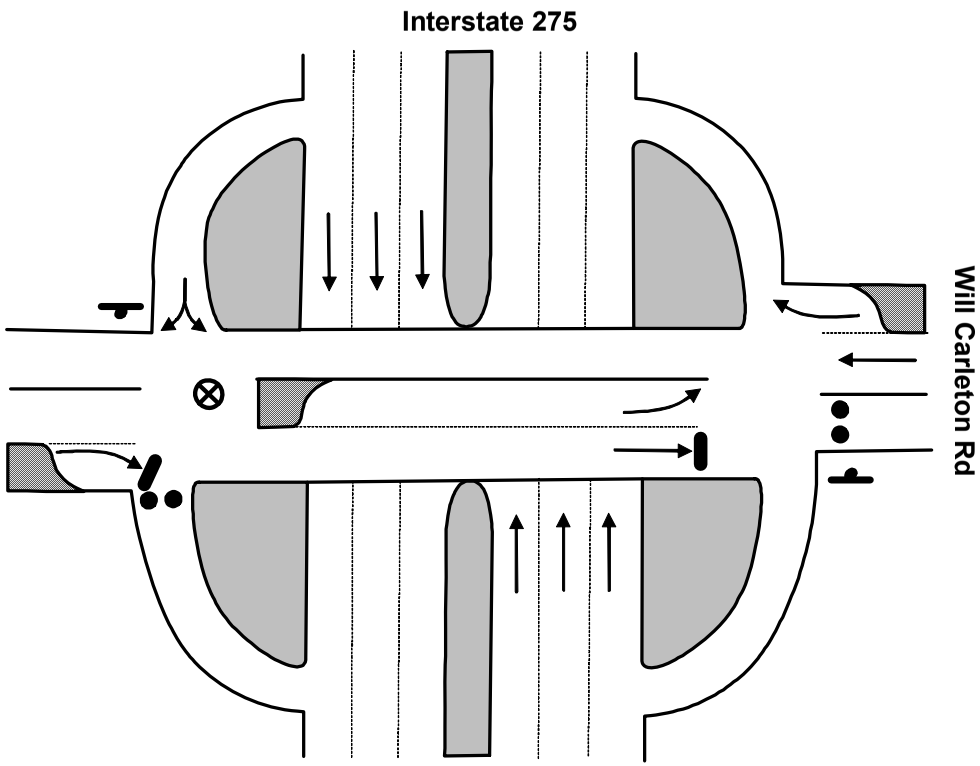
TCP

TOWN: ASH

LOCATION: INTERSTATE 275 & WILL CARLETON RD

TCP ID: 1

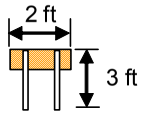
PAA: 4



**Traffic Guide should position himself safely

KEY

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE



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

ACTIONS TO BE TAKEN

1. Discourage access to southbound I-275.

MANPOWER/EQUIPMENT ESTIMATE

2 Traffic Guide(s)
6 Traffic Cones

LOCATION PRIORITY

1

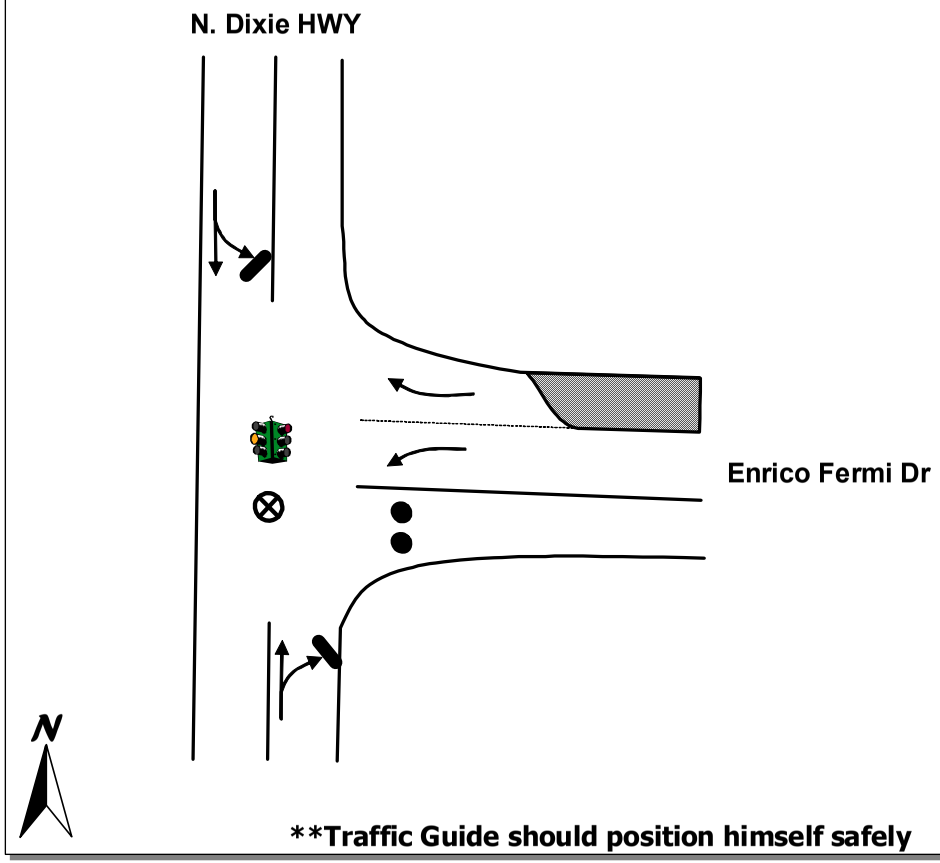
TCP

TOWN: FRENCHTOWN

LOCATION: N. DIXIE HWY & ENRICO FERMI DR

TCP ID: 2

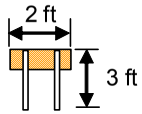
PAA: 1



**Traffic Guide should position himself safely

KEY

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE



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

ACTIONS TO BE TAKEN

1. Discourage eastbound movement on Enrico Fermi Dr for all non-emergency vehicles.

MANPOWER/EQUIPMENT ESTIMATE

1 Traffic Guide(s)
3 Traffic Cones

LOCATION PRIORITY

2

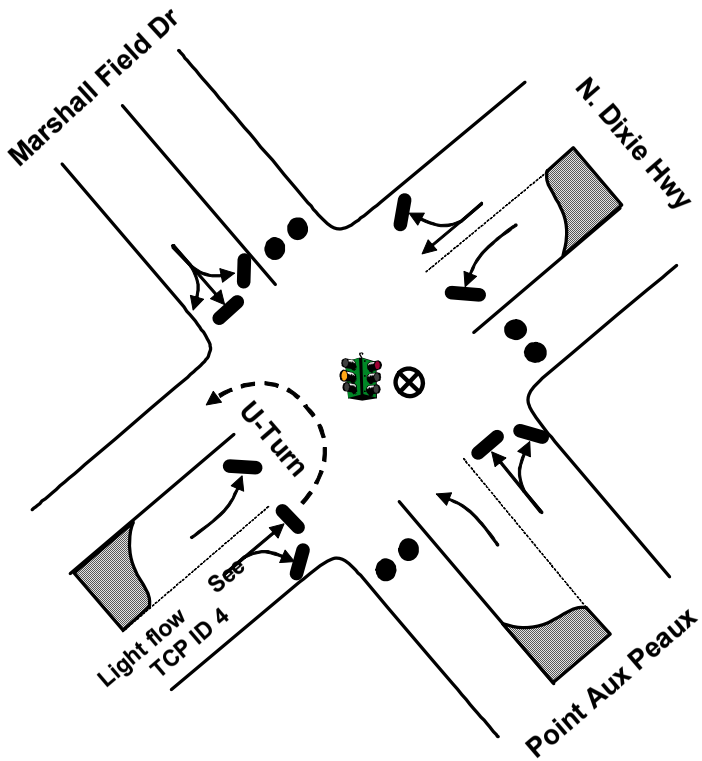
TCP

TOWN: FRENCHTOWN

LOCATION: N. DIXIE HWY & MARSHALL FIELD DR/POINT AUX PEAUX

TCP ID: 3

PAA: 1

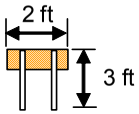


N

****Traffic Guide should position himself safely**

KEY

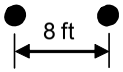
- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE



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):



ACTIONS TO BE TAKEN

1. Discourage northbound movement on North Dixie Hwy.
2. Discourage westbound movement on Marshall Field Dr.
3. Discourage eastbound movement on Point Aux Peaux.

MANPOWER/EQUIPMENT ESTIMATE

1 Traffic Guide(s)
9 Traffic Cones

LOCATION PRIORITY

3

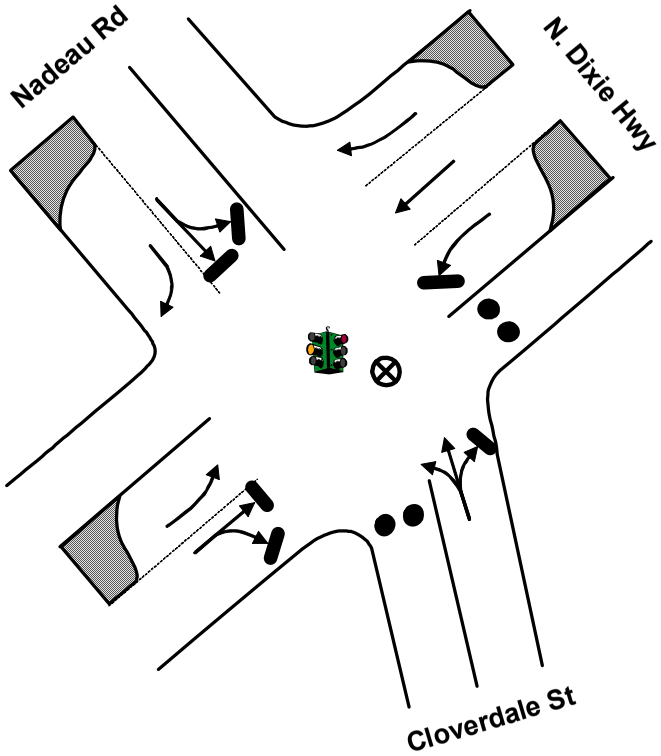
TCP

TOWN: FRENCHTOWN

LOCATION: N. DIXIE HWY & NADEAU RD

TCP ID: 4

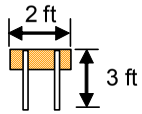
PAA: 3



****Traffic Guide should position himself safely**

KEY

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE



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

ACTIONS TO BE TAKEN

1. Discourage northbound movement on North Dixie Hwy.
2. Discourage eastbound movement on Cloverdale St.

MANPOWER/EQUIPMENT ESTIMATE

1 Traffic Guide(s)
6 Traffic Cones

LOCATION PRIORITY

1

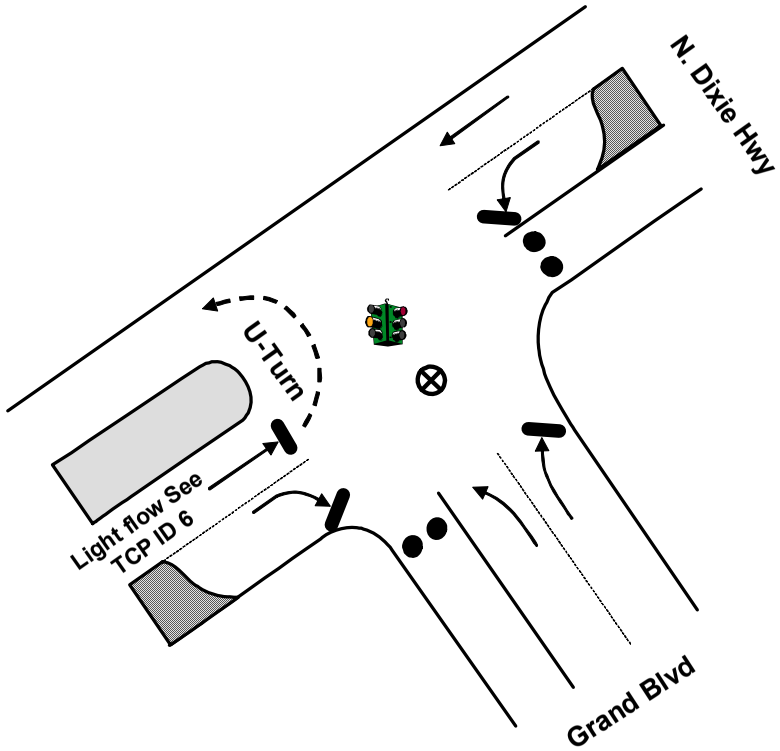
TCP

TOWN: FRENCHTOWN

LOCATION: N. DIXIE HWY& GRAND BLVD

TCP ID: 5

PAA: 3

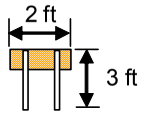


N

****Traffic Guide should position himself safely**

KEY

- MOVEMENT FACILITATED
- MOVEMENT DISCOURAGED/DIVERTED
- TRAFFIC GUIDE
- STOP SIGN
- TRAFFIC BARRICADE



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

ACTIONS TO BE TAKEN

1. Discourage eastboud movement on Grand Blvd.
2. Discourage northbound movement on N Dixie Hwy.

MANPOWER/EQUIPMENT ESTIMATE

1 Traffic Guide(s)
6 Traffic Cones

LOCATION PRIORITY

3

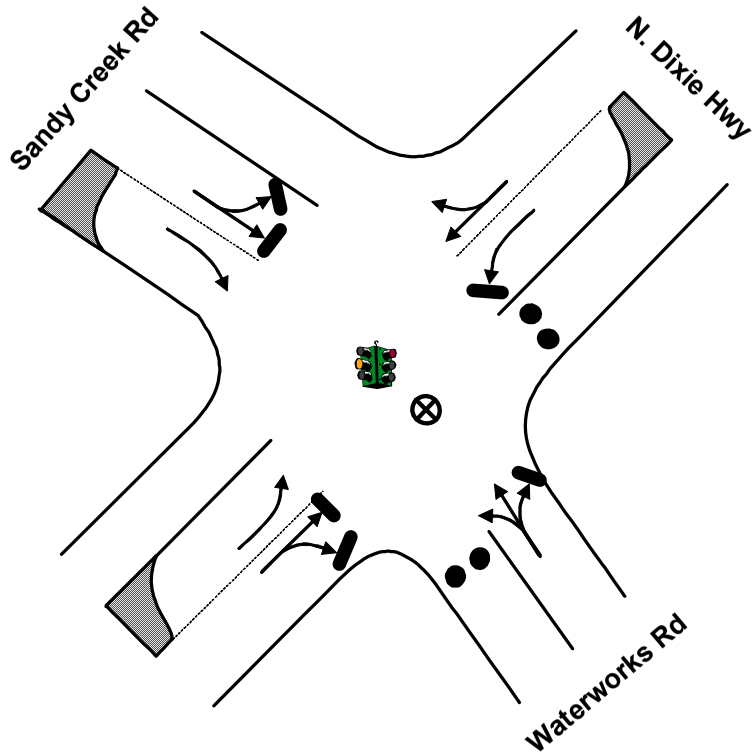
TCP

TOWN: FRENCHTOWN

LOCATION: N. DIXIE HWY & SANDY CREEK RD

TCP ID: 6

PAA: 5



****Traffic Guide should position himself safely**

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)

ACTIONS TO BE TAKEN

1. Discourage northbound movement on North Dixie Hwy.
2. Discourage eastbound movement on Waterworks Rd.

MANPOWER/EQUIPMENT ESTIMATE

1 Traffic Guide(s)
6 Traffic Cones

LOCATION PRIORITY

3