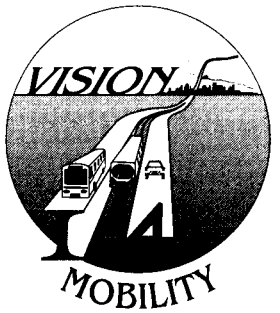

I-4 Multi-Modal Master Plan

TECHNICAL MEMORANDUM

External O&D Survey and Future Year External Model Development

PREPARED FOR

FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5

W.P.I. No.: 5147253
STATE No.: 75280-1401
FAP No.: NH-4-2(149)57
COUNTIES: Osceola, Orange,
Seminole & Volusia

SUBMITTED BY

THE PBS&J TEAM

NOVEMBER 1993

I-4 MULTI-MODAL MASTER PLAN

EXTERNAL O & D SURVEY and FUTURE YEAR EXTERNAL MODEL DEVELOPMENT

Prepared for

FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5

Prepared by

POST, BUCKLEY, SCHUH & JERNIGAN, INC.
1560 N. Orange Avenue, Suite 700
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NOVEMBER 1993

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1.0 INTRODUCTION/SURVEY METHODOLOGY

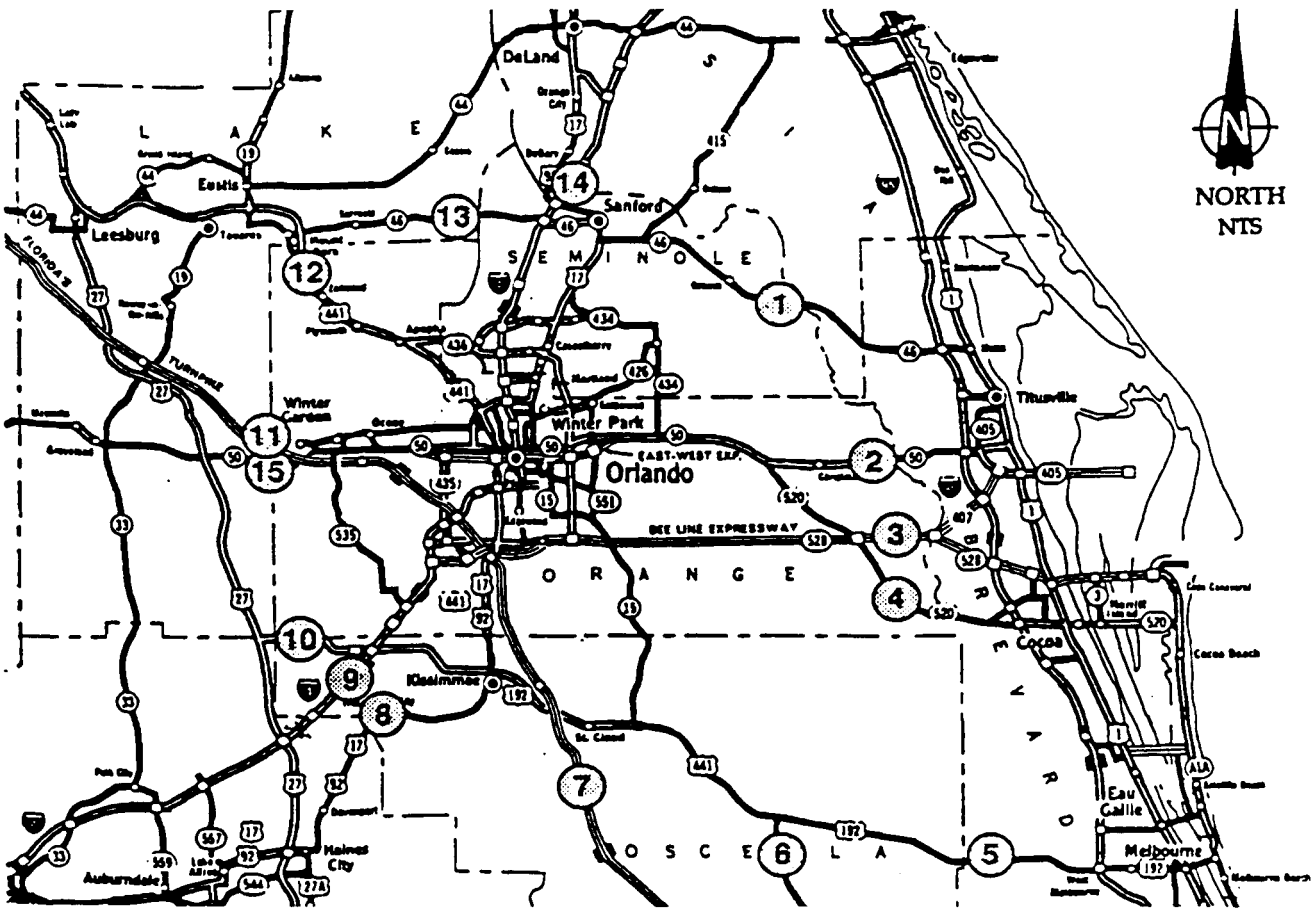
The I-4 Multi-Modal Master Plan Study included an external origin-destination survey designed to provide information for use in future applications of Orlando transportation models. This report describes the roadside interview of trips and video recording of vehicles entering the Orlando area (Osceola, Orange, and Seminole Counties) via fifteen external survey stations. These survey stations are shown in Exhibit 1. Table 1 provides the location description and roadway characteristics for each survey station.

Survey Methodology

Post, Buckley, Schuh and Jernigan, Inc. (PBS&J) and Florida Transportation Engineering, Inc. (FTE) were contracted by the Florida Department of Transportation (FDOT) to conduct and analyze the external origin-destination survey. Each external station was surveyed between the hours of 7:00 am and 11:00 am, on weekdays, for inbound traffic only. Twenty-four hour traffic counts by direction were collected at each external station. In addition, vehicle classification counts in the interview direction were conducted during the four hours of the survey. The dBase and Lotus software programs were used to process and summarize survey responses.

Organization of Report

Section 1 of this report describes the Orlando external survey interview process, the file editing and processing performed, and the survey weighting and expansion used. Section 2 is a summary of survey findings and recommended uses of survey-generated data. The report concludes with Section 3 which describes the methodology used to develop the Orlando future year external model.



LEGEND

(8) INTERVIEW STATION

EXHIBIT 1

I-4 Multi-Modal Master Plan

FLORIDA DEPARTMENT OF TRANSPORTATION • DISTRICT FIVE

THE PBS&J TEAM

ORLANDO EXTERNAL SURVEY
ORIGIN AND DESTINATION INTERVIEW STATION LOCATIONS

TABLE 1
SURVEY STATION CHARACTERISTICS

Station Number	Location	Number Lanes	Roadway Type	Undivided/ Divided
1	SR 46 (WB), east of St. Johns River	2	State Road	Undivided
2	SR 50 (WB), 2 mi. west of St. Johns River	4	State Road	Divided
3	SR 528 (WB), between SR 520 & St. Johns River	4	State Road	Divided
4	SR 520 (WB), east of St. Johns River	2	State Road	Undivided
5	US 192 (WB), at Osceola/Brevard C/L	2	US Highway	Undivided
6	SR 15/US 441 (NB), 2 mi. south of US 192	2	State Road	Undivided
7	SR 91/Florida's Turnpike (NB), north of MP 237	4	State Road	Divided
8	US 17/US 192 (NB), 0.1 mi. north of Osceola/Polk C/L	2	US Highway	Undivided
9	I-4/SR 400 (EB), at CR 545 Overpass	4	Interstate	Divided
10	US 192 (EB), 0.7 mi. east of Lake County	4	US Highway	Divided
11	SR 91/Florida's Turnpike (SB), west of MP 270	4	State Road	Divided
12	US 441 (SB), 0.8 mi. south of Old US 441	4	US Highway	Divided
13	SR 46 (EB), 2 mi. west of Wekiva River	2	State Road	Undivided
14	I-4/SR 400 (WB), 1 mi. north of Exit 53	4	Interstate	Divided
15	SR 50 (EB), west of Orange C/L	4	State Road	Divided

1.1 Survey Conduct

The Orlando external survey was conducted during November and December, 1992. In order to be able to conduct the survey during daylight hours and to represent typical weekday travel, interviews were conducted on Monday through Friday between the hours of 7:00 am and 11:00 am as determined during the methodology meeting with FDOT prior to the survey. Some of the original survey dates were rescheduled due to inclement weather or some other unusual circumstance. Table 2 provides the number of vehicles counted during each hour of the survey period, the number of completed surveys, the hourly expansion factor, the one-way 4 hour count, and the two-way 24 hour count.

Separate sub-sections of this section are devoted to the survey questionnaire and its contents, survey preparations, including safety and training, and the performance of the survey in the field.

1.1.1 Survey Questionnaire

The Orlando external survey was designed to obtain information required for the External module of the Florida Standard Urban Transportation Model Structure (FSUTMS). In particular, this involved calculation of the following:

- the split between through (external-external) and non-through (internal-external) trips at each survey station

- the trip interchange between each external station to create an external-external trip table

Internal-external (IE) trips are included in the ZDATA4 file of the FSUTMS trip generation module. External-external (EE) trips are pre-distributed based on observed origins and destinations. The EE trip table can later be scaled up to a future year.

TABLE 2

SURVEY STATION ACTIVITY SUMMARY

STA. NO.	LOCATION	7:00 – 8:00			8:00 – 9:00			9:00 – 10:00			10:00 – 11:00			11:00 – 12:00			1–WAY 4–HR COUNT	2–WAY 24–HR COUNT
		CNT	INTRV	FACSRV	CNT	INTRV	FACSRV	CNT	INTRV	FACSRV	CNT	INTRV	FACSRV	CNT	INTRV	FACSRV		
1	SR 46 (WB), east of St. Johns River	110	41	2.683	107	35	3.057	89	27	3.296	91	29	3.138	0	0	0.000	397	4409
2	SR 50 (WB), 2 mi. west of St. Johns River	357	37	9.649	0	0	0.000	317	42	7.548	258	62	4.161	279	59	4.729	1211	10871
3	SR 528 (WB), between SR 520 & St. Johns River	666	168	3.964	512	107	4.785	509	82	6.207	497	65	7.646	0	0	0.000	2184	17682
4	SR 520 (WB), east of St. Johns River	227	24	9.458	214	31	6.903	291	32	9.094	273	40	6.825	0	0	0.000	1005	7560
5	US 192 (WB), at Osceola/Brevard C/L	187	35	5.343	173	28	6.179	214	37	5.784	222	31	7.161	0	0	0.000	796	7225
6	SR 15/US 441 (NB), 2 mi. south of US 192	23	14	1.643	32	16	2.000	44	11	4.000	40	16	2.500	0	0	0.000	139	1137
7	SR 91/Florida's Turnpike (NB), north of MP 237	186	41	4.537	312	69	4.522	357	56	6.375	433	75	5.773	0	0	0.000	1288	15552
8	US 17/US 192 (NB), 0.1 mi. north of Osceola/Polk C/L	214	25	8.560	186	33	5.636	182	30	6.067	175	37	4.730	0	0	0.000	757	5699
9	I–4/SR 400 (EB), at CR 545 Overpass	2069	106	19.519	2071	73	28.370	2137	69	30.971	2046	126	16.238	0	0	0.000	8323	67782
10	US 192 (EB), 0.7 mi. east of Lake County	484	48	10.083	554	46	12.043	567	50	11.340	524	49	10.694	0	0	0.000	2129	12343
11	SR 91/Florida's Turnpike (SB), west of MP 270	565	46	12.283	494	41	12.049	578	60	9.633	598	63	9.492	0	0	0.000	2235	21395
12	US 441 (SB), 0.8 mi. south of Old US 441	952	83	11.470	972	51	19.059	730	56	13.036	659	51	12.922	0	0	0.000	3313	22275
13	SR 46 (EB), 2 mi. west of Wekiva River	438	44	9.955	335	51	6.569	293	32	9.156	221	27	8.185	0	0	0.000	1287	9543
14	I–4/SR 400 (WB), 1 mi. north of Exit 53	1718	146	11.767	1409	95	14.832	1369	119	11.504	1454	123	11.821	0	0	0.000	5950	44215
15	SR 50 (EB), west of Orange C/L	1210	139	8.705	810	75	10.800	735	50	14.700	715	69	10.362	0	0	0.000	3470	22315

Note:

CNT – Count

INTRV – Interviews

FACSRV – Hourly Expansion Factor (CNT/INTRV)

There were two external stations on I-4 in the Orlando area. Historic count data at these two locations indicated that the traffic volumes were high. There were concerns that the survey may cause extreme congestion and considering the safety of the survey personnel and drivers, the survey sample at the two external stations was collected by video camera. The license tags of inbound traffic on I-4 were recorded at Station 9, CR 545 overpass; and Station 14, approximately 1.0 mile north of Exit 53. A listing of tags were provided to the Department of Motor Vehicles (DMV) in order to determine the addresses to whom the vehicles were registered. It was assumed that most of the vehicles would be registered to the driver using the vehicle at the time of the survey. Vehicles registered out of state and rental vehicles were not included in the list of tags to the DMV since it would be difficult to obtain the addresses for these groups. Post cards printed with the survey questions and a letter with instructions were mailed to the addresses determined from the DMV match of addresses to license tags.

The time each license tag was recorded by the camera was identified so that the post cards for each license tag could be separated by hour. The post cards were numbered sequentially by hour in order to identify which hour they corresponded to when returned.

The east toll plaza on the Beeline Expressway between SR 520 and the St. Johns River, Station 3, was utilized to distribute post card questionnaires. The post cards were numbered sequentially and the range of numbered post cards distributed each hour were recorded in order to identify which hour they corresponded to when returned.

Direct roadside interviews were conducted at the remaining twelve survey stations. A copy of the post card questionnaire and the interview form is provided in Appendix A.

As indicated on the survey forms, additional questions were included which relate to FSUTMS data requirements:

- vehicle type
- vehicle occupancy
- trip purpose

1.1.2 Survey Preparations

In preparation for the roadside survey, a schedule of survey dates and stations were provided to FDOT. Prior to initiation of the survey, each external station was visited by FDOT, PBS&J, and FTE staff. This field review was to select survey sites that allowed adequate sight distance and safe interview conditions.

To further ensure the safety of the motoring public and the interviewers, an off-duty Florida Highway Patrol officer was hired to be present during each roadside survey. The presence of a law enforcement officer maintained traffic control and encouraged participation from the motoring public. Schematics showing the placement of the warning signs, cones, interview staff, and Florida Highway Patrol officers are provided in Appendix B.

An adequate number of interviewers were utilized to satisfy the target sample size. For stations on roadways with volumes under 10,000 vehicles per day, a sample of 25% of the off-peak traffic and 10% of the peak-hour traffic was required. For stations on roadways with volumes above 10,000 vehicles per day, a sample of 10% of the traffic was required. A training session totaling approximately four hours was conducted indoors and in the field to familiarize interviewers with the survey form, suggested methods of approaching each question, and the station set-up and take-down. The importance of the data being collected was also explained.

1.1.3 Survey Performance

The survey stations were set up following the procedures contained in FDOT's manual titled "The Origin and Destination Interview". Professional staff were present at each survey station to manage the survey team and provide quality control on site. In addition, PBS&J staff visited the survey stations while interviews were in progress on several occasions.

Appropriate signs and safety equipment were used at each survey station. Traffic cones and flags were used to direct selected vehicles into the survey station. A sample size target, described previously, of passing inbound vehicles was set. However, on occasion, heavy traffic volumes precluded this sample from being achieved. For safety reasons, vehicles were sometimes flagged through to prevent extensive queuing delay from the interview process.

Along with the O&D survey, a vehicle classification count was conducted during the four hour interview in the direction of the interview. Vehicle types were identified using a machine counter and summarized for each fifteen minute period. A 24-hour directional traffic count was also performed and summarized for each fifteen minute interval and each hour. The vehicle classification count data are provided in Appendix C. The 24-hour traffic count data are provided in Appendix D. The data was later used for weighting and expansion of survey responses.

1.2 File Editing and Processing

Completed survey forms were checked for accuracy, geocoded, and keypunched using the data format provided in Appendix E. A number of steps were followed in processing the survey data into a format containing all the necessary information relating the survey results to FSUTMS parameters. This section describes the survey data processing and editing in detail. The internal trip destinations were geocoded to the Orlando zone structure. The external trip origins and destinations were geocoded to the statewide zone structure.

1.2.1 Geocoding

A manual process was used to geocode trip origins and destinations. Materials used for performing accurate trip geocoding included the following:

- 1985 Osceola, Orange, Seminole County Traffic Analysis Zone Maps
- Orlando area street map and index
- Orlando area telephone directory
- Statewide Traffic Analysis Zone Map
- Codes for Non-Florida States
- Coding list (Florida place names)

For trip destinations in the Orlando study area, geocoding was based on the 1985 Osceola, Orange and Seminole zone system. Complete street addresses were essential to assigning the correct geocode. The Orlando street map index with block numbers was used to identify street addresses. Geocoding trip origins and destinations outside the Orlando study area only required identification of City or State. The coding list provided statewide TAZ's and Orlando TAZ's for unique place names. It was not sufficient to simply geocode to external station numbers. Instead, TAZ's or non-Florida state codes were assigned to origins and destinations outside the Orlando area.

Part of the quality control was to check survey forms for completeness of geocoding and other information necessary for FSUTMS. Incomplete responses were not keypunched.

1.2.2 File Processing

The original survey dataset was edited and processed using database and spreadsheet capabilities. This general step-by-step process is described in the following paragraphs. Appendix E shows the format of the database fields and ranges.

Step 1: Determine Exit Stations and Survey Frequency; Perform Corrections to Data

The external station to exit out of the Orlando study area was not asked of survey respondents in order to minimize the delay to the driver. This information could be determined based on trip destination. A number of assumptions were used to identify external-to-external trip destination stations.

For example, the through trips (EE) were assigned to external destination stations based on information about the origin and destination of the trip. Trip comparisons were made between the actual station of origin (entry) and estimated station of destination (exit) to ensure a reasonable balance of trip activity in both directions.

A number of edit checks were performed using the dBase software to identify erroneous responses not detected using manual quality control procedures. Once these edits were complete, a series of unweighted statistical summaries were produced. The most important of these summaries was to analyze the distribution of completed surveys by hour of day for use in survey weighting during the next step. Table 2 , presented in Section 1.1, summarized the number of completed surveys by hour.

Step 2: Calculate Survey Expansion Factors

Based on the statistical summaries from Step 1 and the traffic count data provided in Appendix D a set of expansion factors, or survey weights, was computed for each external station. Table 2 also provides the hourly expansion factors. The expansion factors were appended to each interview record. Survey weighting procedures are described in detail under Section 1.3.

Step 3: Create FSUTMS Variables; Produce Statistical Summaries

One variable identified in this step was the traffic analysis zone (TAZ). Trips ending in the Orlando study area received a TAZ assignment from the 1985 Osceola, Orange and Seminole TAZ Maps. Trips ending outside the Orlando study area were assigned to the statewide TAZ map.

A second variable created was trip purpose, to separate home-based trips from those which were nonhome-based. Those trips with either a trip origin or destination at home were considered home-based. Using the trip purposes, vehicle type, and a determination of home orientation, each trip record was assigned one of the following standard FSUTMS trip codes:

- home-based work
- home-based shop
- home-based social/recreational
- home-based other
- nonhome-based
- truck-taxi

Finally, a code was assigned in the database to distinguish external-external trips from internal-external trips so the trip tables could be developed in a later step. Weighted statistical summaries were produced.

Step 4: Build Trip Tables

A spreadsheet format was used to create a preliminary trip table of the survey records. The following variables were used to dimension the array:

- trip origin (station/zone)
- trip destination (station/zone)

- trip purpose (EE or IE)
- expansion factor (weight)

A resulting matrix for external-external trips was created using the Lotus program. All trip interchange values were expanded by survey weights to represent total daily trip activity at each external station. This trip table contains an adequate sample to allow further model application.

1.3 Survey Weighting and Expansion

Each trip record was weighted and expanded to reflect average daily traffic at each survey station. Two types of survey weights, or factors are described in this section:

- expansion of the sample to represent total one-way hourly traffic counts
- further expansion to represent two-way daily traffic counts

1.3.1 Expansion to Hourly Count

The roadside interview sample was geared to achieve a target goal of 25 percent for each survey station (10 percent at high volume stations). The ability to achieve this sample varied by hour, with the greatest challenge being the peak rush hour. Directional traffic counts were conducted and summarized by hour for survey expansion. The following formula was used to expand each survey record to represent total one-way hourly traffic:

$$\text{FACSRV} = \frac{\text{hourly one-way count}}{\text{hourly completed interviews}}$$

1.3.2 Expansion to Daily Count

Expansion of survey records to represent daily two-way travel required separate formulas for internal-external (IE) and external-external (EE) trips. Since IE survey trips only cross the study area boundary in the inbound direction, these trips could be expanded to represent two-way traffic. However, EE trips cross the study boundary twice, and therefore, should only be expanded by direction to avoid double-counting. For example, an EE trip surveyed at Interstate 4 east of Orlando would also become a trip at the external exit station. The sum of EE trips at one external station included outbound trips already surveyed at another station in the inbound direction. The following formula was used for IE trip expansion:

$$\text{FACCNT IE} = \frac{\text{daily two-way count}}{\text{sum of four hour inbound counts}}$$

The following expansion formula was used for EE trips:

$$\text{FACCNT EE} = \frac{\text{daily inbound count}}{\text{sum of four hour inbound counts}}$$

The expansion factor appended to each survey record was a product of the two survey weights:

FACTOR = FACSRV * FACCNT IE or

FACTOR = FACSRV * FACCNT EE

2.0 SURVEY FINDINGS AND RECOMMENDATIONS

2.1 Survey Findings

The tabulations and statistics from Step 3 (described in Section 1.2.2) produced a variety of relevant summaries from survey respondents. The first sub-section of this section describes the split between through and non-through trips at each external station. This is followed by a discussion of EE trip movements. Next are separate sub-sections describing trip purposes, vehicle occupancies, and vehicle classifications.

2.1.1 Split of Through/Non-Through Travel

Table 3 presents the estimated split between through (external-external) and non-through (internal-external) traffic movements for each external station. This table depicts the weighted number of non-through, through, total factored trips, two-way twenty-four hour traffic count, and the percentage split.

Based on the survey data, the Florida's Turnpike north and south of Orlando had the highest percent of through trips of all survey stations. In addition to the Florida's Turnpike, US 192, US 441, SR 46, and Interstate 4 recorded a high percent of through trips.

Generally, the weighted number of trips closely matched the daily traffic count. However, the use of different weighting factors at each station and the sample size at each station results in differences between the counts and the weighted trips. This is not considered a significant variation for planning applications.

2.1.2 External Origins and Destinations

Table 4 shows an external-to-external trip table derived from the weighted origin and destination survey. The most significant number of through movements were

TABLE 3

SUMMARY OF FACTORED TRIPS

Station Number	Location	Number Of Trips IE	Number Of Trips EE	Factored Total	2-Way 24-Hr Count	Percent Of Trips IE	Percent Of Trips EE
1	SR 46 (WB), east of St. Johns River	3451	675	4126	4409	83.64%	16.36%
2	SR 50 (WB), 2 mi. west of St. Johns River	10564	246	10810	10871	97.72%	2.28%
3	SR 528 (WB), between SR 520 & St. Johns River	15711	1988	17699	17682	88.77%	11.23%
4	SR 520 (WB), east of St. Johns River	6440	613	7053	7560	91.30%	8.70%
5	US 192 (WB), at Osceola/Brevard C/L	4886	2305	7192	7225	67.94%	32.06%
6	SR 15/US 441 (NB), 2 mi. south of US 192	790	175	965	1137	81.90%	18.10%
7	SR 91/Florida's Turnpike (NB), north of MP 237	7871	8711	16583	15552	47.47%	52.53%
8	US 17/US 192 (NB), 0.1 mi. north of Osceola/Polk C/L	5404	142	5546	5699	97.43%	2.57%
9	I-4/SR 400 (EB), at CR 545 Overpass	54414	10926	65341	67782	83.28%	16.72%
10	US 192 (EB), 0.7 mi. east of Lake County	12022	161	12183	12343	98.68%	1.32%
11	SR 91/Florida's Turnpike (SB), west of MP 270	11818	9718	21536	21395	54.87%	45.13%
12	US 441 (SB), 0.8 mi. south of Old US 441	21982	275	22257	22275	98.77%	1.23%
13	SR 46 (EB), 2 mi. west of Wekiva River	7782	1364	9147	9543	85.08%	14.92%
14	I-4/SR 400 (WB), 1 mi. north of Exit 53	38459	7615	46074	44215	83.47%	16.53%
15	SR 50 (EB), west of Orange C/L	22042	356	22397	22315	98.41%	1.59%
	TOTAL	223636	45271	268907	270003	83.16%	16.84%

TABLE 4

WEIGHTED STATISTICAL SUMMARIES OF EXTERNAL SURVEY TRIPS

ENTRY STATION	EXIT STATION NUMBER															TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TRIPS
1	0	0	0	0	0	0	0	0	0	0	0	0	233	233	0	466
2	0	0	0	0	0	0	19	0	54	0	22	0	0	19	43	157
3	0	0	0	0	0	0	45	0	648	0	185	0	0	34	37	950
4	0	0	0	0	0	0	85	0	323	0	61	25	0	34	25	553
5	0	0	0	0	0	0	158	0	668	0	146	31	0	25	87	1114
6	0	0	0	0	115	0	0	0	0	0	41	10	0	8	0	175
7	0	0	0	0	37	0	0	0	186	0	3253	63	0	112	26	3676
8	0	0	0	0	91	0	20	0	0	0	31	0	0	0	0	142
9	0	0	893	61	466	0	167	0	0	0	882	0	0	3682	0	6151
10	0	0	97	0	0	0	0	0	33	0	0	0	0	31	0	161
11	0	61	48	0	483	0	4211	0	205	0	0	0	0	0	0	5009
12	0	0	0	0	0	0	82	0	63	0	0	0	0	0	0	145
13	209	0	0	0	0	0	34	0	121	0	0	0	0	524	0	888
14	0	0	0	0	0	0	133	0	2448	0	89	0	243	0	0	2914
15	0	28	0	0	0	0	81	0	28	0	0	0	0	0	0	137

between the two external stations on the Florida's Turnpike, Station 7 and 11, and Interstate 4, Stations 9 and 14.

2.1.3 Trip Purpose Summary

Table 5 provides a summary of external trips by each of the six standard FSUTMS interview trip purposes. Work trips accounted for nearly 23 percent of all external trips through the Orlando area during the morning period. Social and recreational trips accounted for nearly 36 percent of the external trips through the Orlando area.

2.1.4 Vehicle Occupancy

Table 6 provides the vehicle occupancy of external trips by purpose. Home-based work and truck-taxi trips had the lowest vehicle occupancies, 1.30 and 1.42, respectively. Home-based social/recreational trips had the highest vehicle occupancy, 2.06.

2.1.5 Vehicle Classification

Table 7 provides a summary of vehicle classification counts collected at each of the external stations during the survey period; complete station data is provided in Appendix C. Using FDOT vehicle classifications, vehicle classes F4 through F13 were combined to estimate the percent of trucks at each location. The highest truck percent was on the Florida's Turnpike west of Orlando, 25 percent. Significant truck activity was also identified on US 192 southeast of Orlando, 21 percent; US 192 west of Orlando, 18 percent; and SR 15/US 441 south of Orlando, 18 percent. All other stations recorded a truck percent less than 15 percent.

TABLE 5
FACTORED TRIPS BY FSUTMS PURPOSE
External Trips For All Stations

TRIP PURPOSE	EXTERNAL TRIPS	PERCENT
HOME BASED WORK	5093	22.50%
HOME BASED SHOP	94	0.41%
HOME BASED SOCIAL/RECREATIONAL	8027	35.46%
HOME BASED OTHER	4066	17.96%
NON HOME BASED OTHER	3512	15.52%
TRUCK/TAXI	1844	8.14%
TOTAL TRIPS	22635	100.00%

TABLE 6
VEHICLE OCCUPANCY BY FSUTMS PURPOSE
External Trips For All Stations

TRIP PURPOSE	OCCUPANCY RATE
HOME BASED WORK	1.30
HOME BASED SHOP	1.75
HOME BASED SOCIAL/RECREATIONAL	2.06
HOME BASED OTHER	1.86
NON HOME BASED OTHER	1.74
TRUCK/TAXI	1.42

TABLE 7
NUMBER OF VEHICLES BY TYPE AND STATION

(7:00 A.M. to 11:00 A.M. – Inbound Only)

STA.	LOCATION	VEHICLE TYPE (1) F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	TOTALS	PERCENT TRUCKS (2)
1	SR 46 (WB), east of St. Johns River	4	270	52	3	17	7	0	6	6	0	0	0	0	365	10.68%
2	SR 50 (WB), 2 mi. west of St. Johns River	0	877	107	0	13	22	0	6	2	10	3	0	24	1064	7.52%
3	SR 528 (WB), between SR 520 & St. Johns River	4	1687	174	4	37	18	3	54	62	6	10	0	1	2060	9.47%
4	SR 520 (WB), east of St. Johns River	2	802	126	2	36	2	0	11	24	0	0	0	0	1005	7.46%
5	US 192 (WB), at Osceola/Brevard C/L	6	442	73	1	30	13	5	24	68	0	1	0	0	663	21.42%
6	SR 15/US 441 (NB), 2 mi. south of US 192	0	64	29	1	3	2	0	4	9	1	0	0	0	113	17.70%
7	SR 91/Florida's Turnpike (NB), north of MP 237	4	897	112	6	36	5	0	7	82	1	6	1	8	1165	13.05%
8	US 17/US 192 (NB), 0.1 mi. north of Osceola/Polk C/L	1	494	118	2	19	6	9	17	17	1	2	0	0	686	10.64%
9	I–4/SR 400 (EB), at CR 545 Overpass	12	5451	847	26	225	28	2	158	315	7	6	1	6	7084	10.93%
10	US 192 (EB), 0.7 mi. east of Lake County	7	1312	206	16	61	36	48	116	52	5	3	0	0	1862	18.10%
11	SR 91/Florida's Turnpike (SB), west of MP 270	4	1110	179	18	61	11	12	39	250	20	15	4	2	1725	25.04%
12	US 441 (SB), 0.8 mi. south of Old US 441	5	2127	345	3	63	199	1	45	33	30	22	0	14	2887	14.20%
13	SR 46 (EB), 2 mi. west of Wekiva River	9	810	177	6	48	7	2	40	40	1	1	0	1	1142	12.78%
14	I–4/SR 400 (WB), 1.0 mi. north of Exit 53	14	4138	625	28	143	18	1	130	319	6	3	1	4	5430	12.03%
15	SR 50 (EB), west of Orange County C/L	8	2421	421	13	85	30	61	106	79	4	3	0	0	3231	11.79%

(1) Vehicle Type

F1 – Motorcycles
F2 – Passenger Cars
F3 – Other Two–Axle, Four–Tire Single Unit Vehicles
F4 – Buses
F5 – Two–Axle, Six–Tire Single–Unit Trucks
F6 – Three–Axle, Single–Unit Trucks
F7 – Four or More Axle, Single–Unit Trucks
F8 – Four or Less Axle, Single–Trailer Trucks
F9 – Five–Axle, Single–Trailer Trucks
F10 – Six or More Axle, Single–Trailer Trucks
F11 – Five or Less Axle, Multi–Trailer Trucks
F12 – Six–Axle, Multi–Trailer Trucks
F13 – Seven or More Axle, Multi–Trailer Trucks

(2) Percent Trucks determined from Vehicle Types F4 through F13.

2.2 Survey Recommendations

Based on a review of the survey statistics, recommendations were developed and are discussed in this section. These recommendations fall under two basic categories:

- External-External/Internal-External Split
- Survey Conduct

These recommendations are discussed in separate sub-sections.

2.2.1 External-External/Internal-External Split

It is recommended that the percent split of through/non-through trips derived from the weighted survey responses be utilized in conjunction with the I-4 Multi-Modal Master Plan and the Orlando model update. The splits provided in Table 3 were based on recent origin-destination survey data. The weighted splits in Table 3 accounted for sampling procedures and simulation of trips in the outbound direction. Finally, these weighted splits are a necessary element in the development of the external-external trip table, described in the next section.

2.2.2 Survey Conduct

No significant problems were encountered during the roadside interview survey. The importance of good training should be emphasized in future studies so complete survey responses can be obtained. Further, the use of the survey crew for geocoding provides the team members with a greater understanding of the process and the eventual use of the data. It is also important to use the same interview personnel when possible for the entirety of the survey for consistency.

Backup equipment should be available during the survey. Tubes for vehicle classification and volume counts can occasionally become loose or broken. Recounts would have to be taken on a different day than the survey.

The most significant problem encountered in this study was in collecting data using the video recording technique. Concern arises on two counts:

- the technique precludes collection of data from commercial or rental vehicles or out-of-state vehicles;

- the delay which unavoidably occurs due to time required to obtain license tag matches from DMV makes an accurate response by post card recipients questionable.

In conclusion, the external roadside interview survey provides information for use in urban transportation modeling. FDOT's Statewide Model Studies can also make use of these origin and destination characteristics since the external trip ends were geocoded to the Statewide Zone Codes.

3.0 ORLANDO FUTURE YEAR EXTERNAL MODEL DEVELOPMENT

This section describes the methodology used to develop a future year external model for Orlando as part of the I-4 Multi-Modal Master Plan. The master plan scope of services calls for development of an updated external trip table for 2020 for the OUATS study area. This information is then to be incorporated into the regional travel demand model being prepared for the master plan. The following will be discussed in this section:

- Florida Standard External Model
- Preparation of Base Year Information
- Future Year Model Development
- Conclusions

3.1 Florida Standard External Model

External travel models are used to estimate trips traveling into or out of the study area. External trips are split into two components: external-to-external (EE) trips, and internal-to-external (IE) trips. EE trips have both trip ends outside the study area, and are commonly referred to as "through" trips. IE trips differ from through trips in that one trip end is within the study area and one trip end is outside the study area.

FSUTMS requires the use of two separate modules to generate external trips. The "EXT" model is used to build an EE table through use of an input file named EETRIPS. The EETRIPS file contains a series of origin and destination zones with their respective estimate of through trips. The "GEN" model is used to generate IE trips based on input of the ZDATA4 file. Contents of both EETRIPS and ZDATA4 files are generally based on estimates provided from roadside interview origin-destination surveys. Such survey was described in the previous sections of this report.

3.2 Preparation of Base Year Information

As part of the fifteen station O & D survey, split factors between external-external and internal-external traffic movements for each survey station were developed. Table 8 presents the split percentages for the fifteen survey stations along with equivalent external zones in the OUATS zone structure.

It should be noted that some of the survey sites, recommended and approved by FDOT, do not match the external zone configuration of the latest Orlando Urban Area Transportation Study (OUATS) model. The latest OUATS model includes the southern half of Osceola county; this area was not part of the earlier OUATS model and is located beyond the cordon line used in the survey. Table 8 also identifies these additional stations. Furthermore, the model being used for the I-4 Master Plan includes western Volusia County, which is also beyond the survey cordon line.

3.2.1 External-External (EE) Trip Matrix Development

The TRANPLAN MATRIX COMPRESS program was used to create an existing EE trip matrix based on the survey data. The percentage of EE trips from each origin zone to each destination zone was computed based on output from the program. This EE trip percentage matrix was later used to develop the future year EE trip table. Appendix F includes the program control file.

3.2.2 Peak Season Weekday Traffic (PSWT) Conversion

The standard FSUTMS Model provides trip estimates of Peak Season Weekday Traffic (PSWT). In order to be consistent with FSUTMS, base year external trips must be converted to PSWT. Therefore, from the FDOT Weekly Adjustment Factor Table, the appropriate factors for Osceola, Orange and Seminole counties were used to adjust FDOT 1991 AADTs to 1991 PSWTs for each external zone. For those FDOT traffic count stations located in Brevard and Polk counties, the adjustment

TABLE 8
EXTERNAL TRIP SPLIT PERCENTAGES FROM O&D SURVEY

SURVEY STATION	EXTERNAL ZONE	FDOT COUNT STATION	IE SPLIT PERCENTAGE
1	831	SEM–168, SR 46 E	83.64%
2	832	ORA–337, SR 50 E	97.72%
3	833	BRE–398, SR 528 E	88.78%
4	834	BRE–367, SR 520 E	91.30%
5	835	BRE–90, US 192 E	67.94%
6	837	OSC–28, US 441 S	81.97%
7	836	OSC–2001, TURNPIKE S	47.46%
8	839	POLK–125, US 17/92 S	97.44%
9	840	POLK–111, I–4 SW	83.27%
10	841	LAKE–470, US 192 W	98.68%
11	844	ORA–2003, TURNPIKE W	54.87%
12	823	LAKE–476, US 441 N	98.77%
13	827	SEM–74, SR 46 W	85.09%
14	829	VOL–484, I–4 NE	83.47%
15	842	ORA–572, SR 50 W	98.42%
–	820 (*)	LAKE–417, OLD US 441	100.00%
–	821 (*)	INDIAN–2, SR 60 (EAST)	60.34%
–	822 (*)	POLK–19, SR 60	0.00%
–	824 (*)	N/A, ROUND LAKE RD	100.00%
–	825 (*)	N/A, PLYMOUTH–SORRENTO	100.00%
–	826 (*)	N/A, MT. PLYMOUTH RD	100.00%
–	828 (*)	SEM–40, US 17–92	100.00%
–	830 (*)	VOL–25, SR 415	100.00%
–	838 (*)	N/A, CYPRESS PKWY	100.00%
–	843 (*)	N/A, SR 438	100.00%
–	845 (*)	N/A, JONES AVE	100.00%
–	846 (*)	N/A, SADLER AVE	100.00%

(*) Stations not included in the O/D Survey but which are part of the OUATS External model are also listed. With the exception of zones 821 and 822, it is implicitly assumed that 100% of traffic at these zones are IE (internal–external) trips.

factor of neighboring Osceola County is applied. For traffic count stations in Lake and Volusia counties, the adjustment factor of neighboring Seminole County is used. The final adjusted external volumes of 1991 are then utilized for projecting future year external trips. Table 9 presents base and future PSWT volumes. Again, future year external volumes for those OUATS stations not included in the O & D survey are included.

3.3 Future Year Model Development

Development of the future year Orlando external model required use of an alternate procedure to forecast external trips for the horizon year 2020 and interim year 2010. Two projection methods were considered in the study. Each of these methods are described below.

3.3.1 Traffic Count Linear Projections

Historic traffic count linear projections have been used in the past to estimate future external traffic for the OUATS model. Available FDOT historic traffic counts were utilized for the period of 1980-1991, at the corresponding survey station or external zone location. The traffic counts were applied to a linear regressional model, and the different annual compounded growth rates for each external zone were then computed based on the linear projection trends between 1991 and 2010. Detailed linear projection data are provided in Appendix G for each external survey station, both those surveyed and not surveyed.

3.3.2 General Population Growth Rate

In the travel demand forecasting process, general population growth estimates are also an important component used in future year traffic estimation. According to the latest University of Florida, Bureau of Economic and Business Research population projections, the total population for the three Orlando area counties will reach 1,737,500

TABLE 9
2010 AND 2020 OUATS EXTERNAL TRIP PROJECTION

EXTERNAL SURVEY STATION	OUATS EXTERNAL ZONE	FDOT COUNT STATION	1991 AADT	FDOT PSWT FACTOR	TOTAL PSWT 1991 TRIPS	LINEAR PROJ. GROWTH R.	2010 PSWT TOTAL TRIPS	POPULATION GROWTH R.	2020 PSWT TOTAL TRIPS
1	831	SEM-168, SR 46 E	4495	1.062	4774	2.59%	7760	1.58%	9077
2	832 (*)	ORA-337, SR 50 E	10643	1.062	11303	3.97%	23683	1.58%	27703
3	833	BRE-398, SR 528 E	16068	1.062	17064	4.68%	40691	1.58%	47597
4	834	BRE-367, SR 520 E	8736	1.062	9278	2.96%	16149	1.58%	18890
5	835	BRE-90, US 192 E	7367	1.062	7824	2.99%	13694	1.58%	16018
6	837	OSC-28, US 441 S	2412	1.062	2562	4.67%	6097	1.58%	7132
7	836	OSC-2001, TURNPIKE S	14003	1.071	14997	4.09%	32120	1.58%	37572
8	839	POLK-125, US 17/92 S	5603	1.062	5950	0.97%	7148	1.58%	8361
9	840	POLK-111, I-4 SW	47050	1.058	49779	3.98%	104494	1.58%	122229
10	841	LAKE-470, US 192 W	9814	1.062	10422	4.26%	23025	1.58%	26933
11	844	ORA-2003, TURNPIKE W	16600	1.071	17779	4.48%	40882	1.58%	47820
12	823	LAKE-476, US 441 N	17708	1.062	18806	3.25%	34531	1.58%	40391
13	827	SEM-74, SR 46 W	8420	1.062	8942	4.01%	18874	1.58%	22077
14	829	VOL-484, I-4 NE	54647	1.058	57817	4.02%	122257	1.58%	143006
15	842	ORA-572, SR 50 W	16624	1.062	17655	3.69%	35145	1.58%	41110
-	820 (*)	LAKE-417, OLD US 441	3922	1.00	3922	0.02%	3936	1.58%	4604
-	821	INDIAN-2, SR 60 (EAST)	4712	1.062	5004	5.35%	13470	1.58%	15756
-	822	POLK-19, SR 60	4165	1.062	4423	1.00%	5343	1.58%	6250
-	824 (*)	N/A, ROUND LAKE RD	2866	1.00	2866	3.00%	5025	1.58%	5878
-	825 (*)	N/A, PLYMOUTH-SORRENTO	4776	1.00	4776	3.00%	8375	1.58%	9796
-	826 (*)	N/A, MT. PLYMOUTH RD	3821	1.00	3821	3.00%	6700	1.58%	7837
-	828	SEM-40, US 17-92	15500	1.062	16461	3.27%	30337	1.58%	35486
-	830	VOL-25, SR 415	11100	1.062	11788	5.18%	30773	1.58%	35996
-	838 (*)	N/A, CYPRESS PKWY	5810	1.00	4890	3.00%	8576	1.58%	10032
-	843 (*)	N/A, SR 438	3503	1.00	3503	3.00%	6143	1.58%	7186
-	845 (*)	N/A, JONES AVE	2418	1.00	2418	3.00%	4240	1.58%	4960
-	846 (*)	N/A, SADLER AVE	1257	1.00	1257	3.00%	2205	1.58%	2579

*: THE 1991 AADT IS NOT AVAILABLE FOR THIS STATION. LINEAR PROJECTED NUMBER IS USED.
NOTE: LINEAR PROJECTION GROWTH RATE, WHICH IS BASED ON FDOT HISTORICAL TRAFFIC COUNT DATA,
IS APPLIED TO PROJECT YEAR 2010 EXTERNAL TRIPS.
POPULATION GROWTH RATE, WHICH IS AN AVERAGE GROWTH RATE OF THE THREE COUNTIES BETWEEN 2010 AND 2020,
IS USED TO PROJECT YEAR 2020 EXTERNAL TRIPS BASED ON YEAR 2010 TRIPS.

by year 2010 and 2,032,000 by the year 2020. Based on these population estimates, an annual compounded growth rate of 1.58 percent was calculated for the period of 2010-2020.

3.3.3 Final Methodology

The final recommended external traffic forecasting methodology uses a combination of the above two approaches. Estimates of 2010 external traffic were derived by applying linear traffic count growth rates to 1991 PSWTs for each external zone. Next, the 2010 external volumes were projected to 2020 through use of the general population growth rate method.

This methodology recognizes the value of count history as a good indicator of shorter-term traffic growth on existing roadway corridors. However, it is also recognized that traffic count growth rates will "level off" over the long term. This explains the use of general population growth for the 2010-2020 time period.

The percentage split between IE trips and EE trips is derived directly from the O & D survey results. Tables 10 and 11 depict final estimates of 2010 and 2020 external trips, respectively, including a breakdown of IE and EE components.

3.4 Conclusions: Future Year OUATS External Trip Matrix

The development of the future year external model for the Orlando area utilized current O & D survey data for the area. These data provided direct measurement of external-to-external and internal-to-external trip characteristics for the study area. Linear traffic growth trends were used to extrapolate 1991 external travel estimates to the year 2010. General population growth rates were then used to project 2010 external traffic to the year 2020. The methodology used in development of the future year external model is considered accurate and reliable.

TABLE 10
2010 OUATS EXTERNAL TRIP SPLIT

SURVEY STATION	EXTERNAL ZONE	FDOT COUNT STATION	YEAR 2010 TOTAL TRIPS	PERCENT I-E	TOTAL I-E TRIPS	TOTAL E-E TRIPS
1	831	SEM-168, SR 46 E	7760	83.64%	6490	1270
2	832	ORA-337, SR 50 E	23683	97.72%	23143	540
3	833	BRE-398, SR 528 E	40691	88.78%	36125	4566
4	834	BRE-367, SR 520 E	16149	91.30%	14744	1405
5	835	BRE-90, US 192 E	13694	67.94%	9304	4390
6	837	OSC-28, US 441 S	6097	81.97%	4998	1099
7	836	OSC-2001, TURNPIKE S	32120	47.46%	15244	16876
8	839	POLK-125, US 17/92 S	7148	97.44%	6965	183
9	840	POLK-111, I-4 SW	104494	83.27%	87012	17482
10	841	LAKE-470, US 192 W	23025	98.68%	22721	304
11	844	ORA-2003, TURNPIKE W	40882	54.87%	22432	18450
12	823	LAKE-476, US 441 N	34531	98.77%	34106	425
13	827	SEM-74, SR 46 W	18874	85.09%	16060	2814
14	829	VOL-484, I-4 NE	122257	83.47%	102048	20209
15	842	ORA-572, SR 50 W	35145	98.42%	34590	555
-	820	LAKE-417, OLD US 441	3936	100.00%	3936	0
-	821	INDIAN-2, SR 60 (EAST)	13470	60.34%	8128	5342
-	822	POLK-19, SR 60	5343	0.00%	0	5343
-	824	N/A, ROUND LAKE RD	5025	100.00%	5025	0
-	825	N/A, PLYMOUTH-SORRENTO	8375	100.00%	8375	0
-	826	N/A, MT. PLYMOUTH RD	6700	100.00%	6700	0
-	828	SEM-40, US 17-92	30337	100.00%	30337	0
-	830	VOL-25, SR 415	30773	100.00%	30773	0
-	838	N/A, CYPRESS PKWY	8576	100.00%	8576	0
-	843	N/A, SR 438	6143	100.00%	6143	0
-	845	N/A, JONES AVE	4240	100.00%	4240	0
-	846	N/A, SADLER AVE	2205	100.00%	2205	0
TOTAL			651673		550420	101253

TABLE 11
2020 OUATS EXTERNAL TRIP SPLIT

SURVEY STATION	EXTERNAL ZONE	FDOT COUNT STATION	YEAR 2020 TOTAL TRIPS	PERCENT I-E	TOTAL I-E TRIPS	TOTAL E-E TRIPS
1	831	SEM-168, SR 46 E	9077	83.64%	7592	1485
2	832	ORA-337, SR 50 E	27703	97.72%	27071	632
3	833	BRE-398, SR 528 E	47597	88.78%	42257	5340
4	834	BRE-367, SR 520 E	18890	91.30%	17247	1643
5	835	BRE-90, US 192 E	16018	67.94%	10883	5135
6	837	OSC-28, US 441 S	7132	81.97%	5846	1286
7	836	OSC-2001, TURNPIKE S	37572	47.46%	17832	19740
8	839	POLK-125, US 17/92 S	8361	97.44%	8147	214
9	840	POLK-111, I-4 SW	122229	83.27%	101780	20449
10	841	LAKE-470, US 192 W	26933	98.68%	26577	356
11	844	ORA-2003, TURNPIKE W	47820	54.87%	26239	21581
12	823	LAKE-476, US 441 N	40391	98.77%	39894	497
13	827	SEM-74, SR 46 W	22077	85.09%	18785	3292
14	829	VOL-484, I-4 NE	143006	83.47%	119367	23639
15	842	ORA-572, SR 50 W	41110	98.42%	40460	650
-	820	LAKE-417, OLD US 441	4604	100.00%	4604	0
-	821	INDIAN-2, SR 60 (EAST)	15756	60.34%	9507	6249
-	822	POLK-19, SR 60	6250	0.00%	0	6250
-	824	N/A, ROUND LAKE RD	5878	100.00%	5878	0
-	825	N/A, PLYMOUTH-SORRENTO	9796	100.00%	9796	0
-	826	N/A, MT. PLYMOUTH RD	7837	100.00%	7837	0
-	828	SEM-40, US17-92	35486	100.00%	35486	0
-	830	VOL-25, SR 415	35996	100.00%	35996	0
-	838	N/A, CYPRESS PKWY	10032	100.00%	10032	0
-	843	N/A, SR 438	7186	100.00%	7186	0
-	845	N/A, JONES AVE	4960	100.00%	4960	0
-	846	N/A, SADLER AVE	2579	100.00%	2579	0
TOTAL			762276		643839	105939

The Florida standard model structure separates IE trips and EE trips into different trip purposes. The trip generation model requires an input file containing IE trip productions to be entered as ZDATA4. The external model requires an input file containing EE trip productions as EETRIPS. A ZDATA4 file was developed for the 2020 Orlando Model based on the information depicted in Table 11. Tables 12 and 13 depict EE trip totals and percentages for 2010 and 2020, respectively. Appendix H presents final EETRIPS and ZDATA4 files for 2010 and 2020. The EETRIPS file is presented first for 2010, followed by the ZDATA4 file for 2010. The 2020 EETRIPS and ZDATA4 files are then presented in the same order. However, assumptions will need to be made in order to account for new external TAZs in the southern half Osceola County, minor external zones which not included in the O & D Survey, and the inclusion of western Volusia County in the I-4 FSUTMS Model.

TABLE 12
2010 OUATS EE TRIP MATRIX (FROM/TO SURVEY STATIONS)

FROM/TO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	318	318	0	1270	635
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.00		
2	0	0	0	0	0	0	33	0	93	0	38	0	0	33	74	540	270
	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.34	0.00	0.14	0.00	0.00	0.12	0.27		
3	0	0	0	0	0	0	108	0	1559	0	445	0	0	82	89	4566	2283
	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.68	0.00	0.19	0.00	0.00	0.04	0.04		
4	0	0	0	0	0	0	108	0	410	0	77	32	0	43	32	1405	703
	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.58	0.00	0.11	0.05	0.00	0.06	0.05		
5	0	0	0	0	0	0	311	0	1315	0	287	61	0	49	171	4390	2195
	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.60	0.00	0.13	0.03	0.00	0.02	0.08		
6	0	0	0	0	363	0	0	0	0	0	129	32	0	25	0	1099	550
	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.24	0.06	0.00	0.05	0.00		
7	0	0	0	0	85	0	0	0	427	0	7465	145	0	257	60	16876	8438
	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05	0.00	0.88	0.02	0.00	0.03	0.01		
8	0	0	0	0	59	0	13	0	0	0	20	0	0	0	0	183	92
	0.00	0.00	0.00	0.00	0.64	0.00	0.14	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00		
9	0	0	1268	87	661	0	239	0	0	0	1255	0	0	5232	0	17482	8741
	0.00	0.00	0.15	0.01	0.08	0.00	0.03	0.00	0.00	0.00	0.14	0.00	0.00	0.60	0.00		
10	0	0	92	0	0	0	0	0	31	0	0	0	0	29	0	304	152
	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.19	0.00		
11	0	112	88	0	890	0	7757	0	378	0	0	0	0	0	0	18450	9225
	0.00	0.01	0.01	0.00	0.10	0.00	0.84	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00		
12	0	0	0	0	0	0	120	0	92	0	0	0	0	0	0	425	213
	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00		
13	331	0	0	0	0	0	54	0	192	0	0	0	0	830	0	2814	1407
	0.24	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.14	0.00	0.00	0.00	0.00	0.59	0.00		
14	0	0	0	0	0	0	461	0	8492	0	309	0	843	0	0	20209	10105
	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.84	0.00	0.03	0.00	0.08	0.00	0.00		
15	0	57	0	0	0	0	164	0	57	0	0	0	0	0	0	555	278
	0.00	0.20	0.00	0.00	0.00	0.00	0.59	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00		
TOTAL	331	169	1448	87	2057	0	9368	0	13045	0	10026	269	1160	6898	426		

TABLE 13
2020 OUATS EE TRIP MATRIX (FROM/TO SURVEY STATIONS)

FROM/TO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	371	371	0	1485	743
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.00		
2	0	0	0	0	0	0	38	0	109	0	44	0	0	38	87	632	316
	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.34	0.00	0.14	0.00	0.00	0.12	0.27		
3	0	0	0	0	0	0	127	0	1823	0	520	0	0	96	104	5340	2670
	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.68	0.00	0.19	0.00	0.00	0.04	0.04		
4	0	0	0	0	0	0	126	0	480	0	91	37	0	51	37	1643	822
	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.58	0.00	0.11	0.05	0.00	0.06	0.05		
5	0	0	0	0	0	0	364	0	1538	0	336	71	0	58	200	5135	2568
	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.60	0.00	0.13	0.03	0.00	0.02	0.08		
6	0	0	0	0	425	0	0	0	0	0	152	37	0	30	0	1286	643
	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.24	0.06	0.00	0.05	0.00		
7	0	0	0	0	99	0	0	0	499	0	8732	169	0	301	70	19740	9870
	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05	0.00	0.88	0.02	0.00	0.03	0.01		
8	0	0	0	0	69	0	15	0	0	0	23	0	0	0	0	214	107
	0.00	0.00	0.00	0.00	0.64	0.00	0.14	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00		
9	0	0	1483	101	773	0	279	0	0	0	1468	0	0	6120	0	20449	10225
	0.00	0.00	0.15	0.01	0.08	0.00	0.03	0.00	0.00	0.00	0.14	0.00	0.00	0.60	0.00		
10	0	0	107	0	0	0	0	0	36	0	0	0	0	34	0	356	178
	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.19	0.00		
11	0	131	103	0	1041	0	9073	0	442	0	0	0	0	0	0	21581	10791
	0.00	0.01	0.01	0.00	0.10	0.00	0.84	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00		
12	0	0	0	0	0	0	141	0	108	0	0	0	0	0	0	497	249
	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00		
13	387	0	0	0	0	0	63	0	224	0	0	0	0	971	0	3292	1646
	0.24	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.14	0.00	0.00	0.00	0.00	0.59	0.00		
14	0	0	0	0	0	0	540	0	9933	0	361	0	986	0	0	23639	11820
	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.84	0.00	0.03	0.00	0.08	0.00	0.00		
15	0	66	0	0	0	0	192	0	66	0	0	0	0	0	0	650	325
	0.00	0.20	0.00	0.00	0.00	0.00	0.59	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00		
TOTAL	387	198	1694	101	2407	0	10958	0	15259	0	11727	315	1357	8069	498		

eematx.wk3

APPENDIX A

SAMPLE SURVEY QUESTIONNAIRE AND INTERVIEW FORM

I-4 Multi-Modal Master Plan

ORLANDO-AREA TRAVEL SURVEY

Please answer the following questions for the trip on which you received this card, and drop in any mailbox WITHIN ONE WEEK. POSTAGE IS PAID BY US.

1. **Vehicle Type**

a. Auto
b. Pick-up or Panel Truck (Private)
c. Pick-up or Panel Truck (Commercial)
d. 2 Axle Truck
e. 3 Axle Truck Single Unit
f. Combination Truck
g. Taxi
h. Bus

2. **Number of people in vehicle. (Circle your answer.)**

1 2 3 4 5 or more

3. **Where did this trip begin? (Last stop before entering Orlando area.)**

_____
City or Town Address

(If unsure of address, give sub-division, building name or nearest major intersection.)

4. **Activity at that location. (Circle your answer.)**

a. Home
b. Work
c. Shopping
d. Social
e. Personal business
f. School
g. Medical
h. Recreation
i. Other

5. **Where did this trip end? (First stop after entering Orlando area.)**

_____
City or Town Address

(If unsure of address, give sub-division, building name or nearest major intersection.)

6. **Activity at trip end. (Circle your answer.)**

a. Home
b. Work
c. Shopping
d. Social
e. Personal business
f. School
g. Medical
h. Recreation
i. Other

7. **If two or more persons were in the vehicle, is this trip a car pool. (Circle your answer.)** Yes No

8. **If only one person was in vehicle, would you car pool if given the opportunity? (Circle your answer.)** Yes No

9. **In which county in Florida or State is this vehicle Licensed?**

_____
County State

Thank you for your help!

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

URBAN AREA TRANSPORTATION STUDY EXTERNAL INTERVIEW FORM

CARD & STUDY NO. | STATION | DATE | HOUR PERIOD BEGINNING | INBOUND 1 OUTBOUND 2 | DIR. OF FLOW

3 | N. | E. | S. | W.

VEHICLE TYPE	NO. IN VEHICLE	WHERE DID THIS TRIP BEGIN TODAY?	PURPOSE FROM	WHERE WILL THIS TRIP END TODAY?	PURPOSE TO	IF 2 OR MORE PEOPLE, IS THIS TRIP A CARPOOL?	IF 1 PERSON, WOULD YOU CARPOOL IF GIVEN THE OPPORTUNITY?	INTERMEDIATE STOP LOCATION?	PURPOSE	STATE OR COUNTY OF LICENSE

1. PASSENGER CAR
2. PICK-UP OR PANEL (PVT)
3. PICK-UP OR PANEL (COMM)
4. 2-AXLE TRUCK
5. 3-AXLE SINGLE UNIT
6. COMBINATIONS
7. TAXI
8. BUS

0. HOME
1. WORK
2. SHOPPING
3. SOCIAL
4. PERSONAL BUS.
5. SCHOOL
6. MED.-DEN.
7. RECREATION
8. CHANGE MODE
9. SERVE PASS.

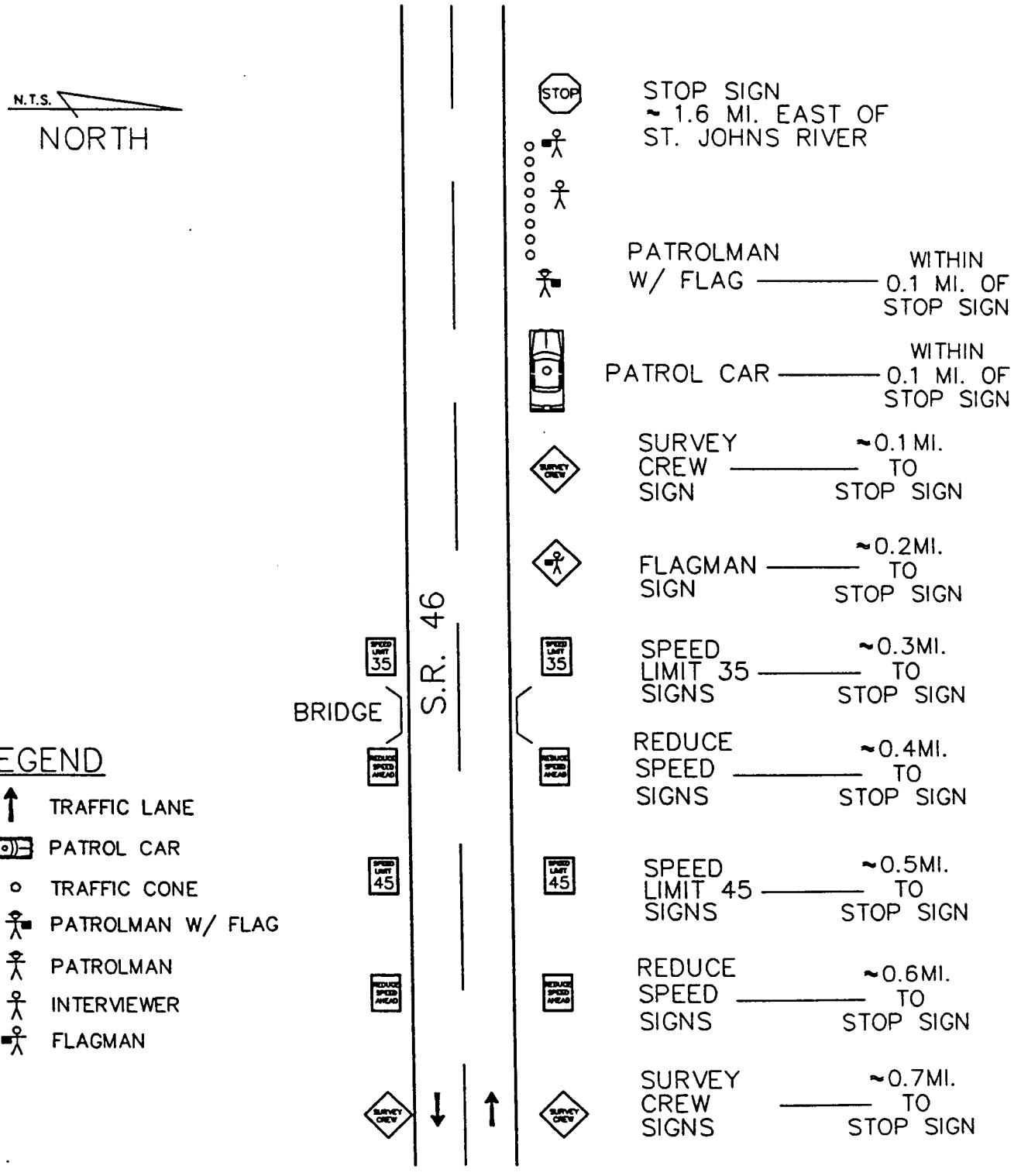
1. WORK
2. SHOPPING
3. SOCIAL
4. EAT MEAL
5. OVERNIGHT
6. GAS OR OIL
7. RECREATION
8. SERVE PASS.

SHEET ____ OF ____

NAME OF INTERVIEWER

APPENDIX B

SURVEY STATION TRAFFIC CONTROL PLANS

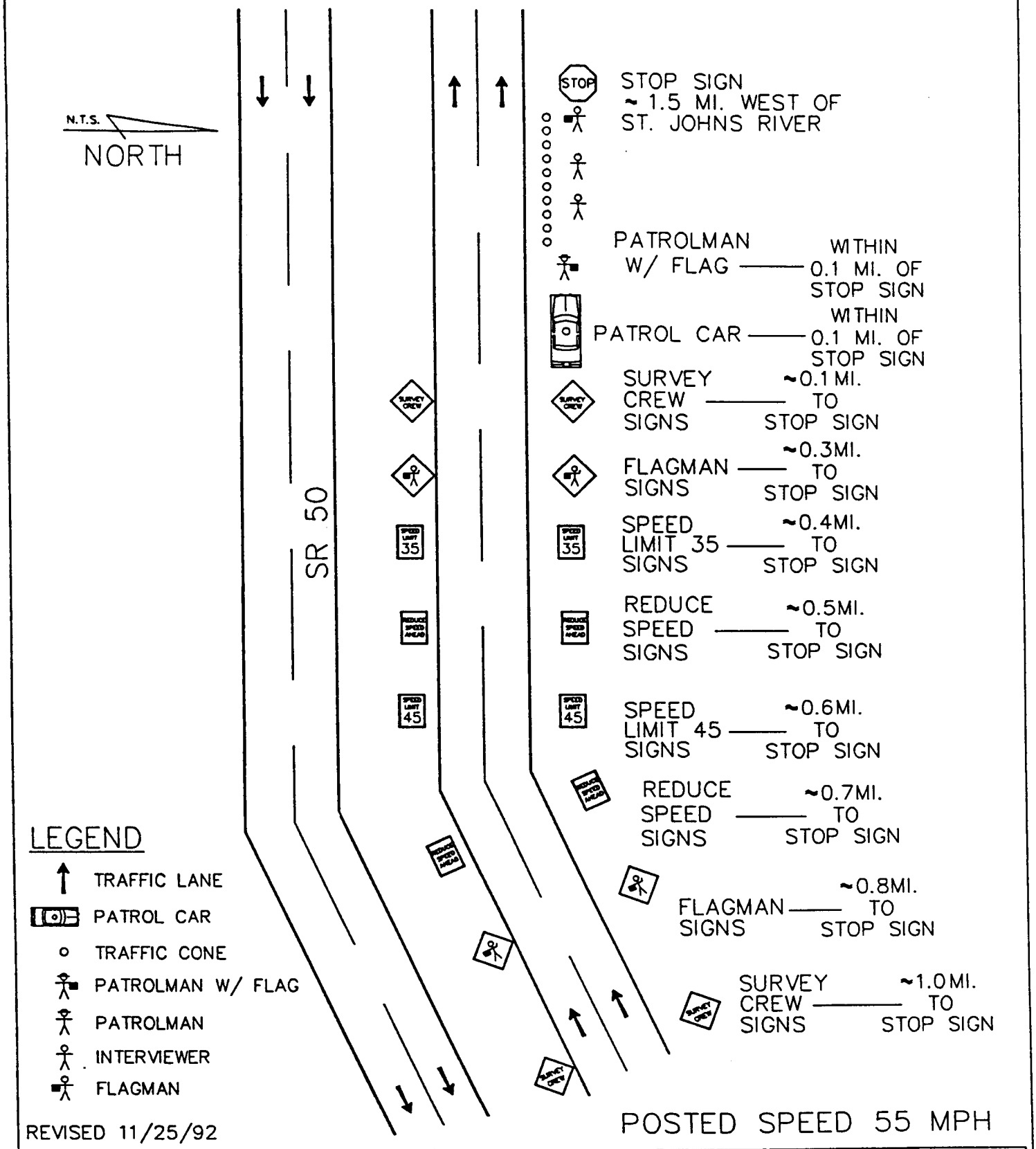


REVISED 11/25/92

POSTED SPEED 55 MPH

STATION No. 1
SR 46 1.6 MI. EAST OF THE ST. JOHNS RIVER IN VOLOUSIA COUNTY

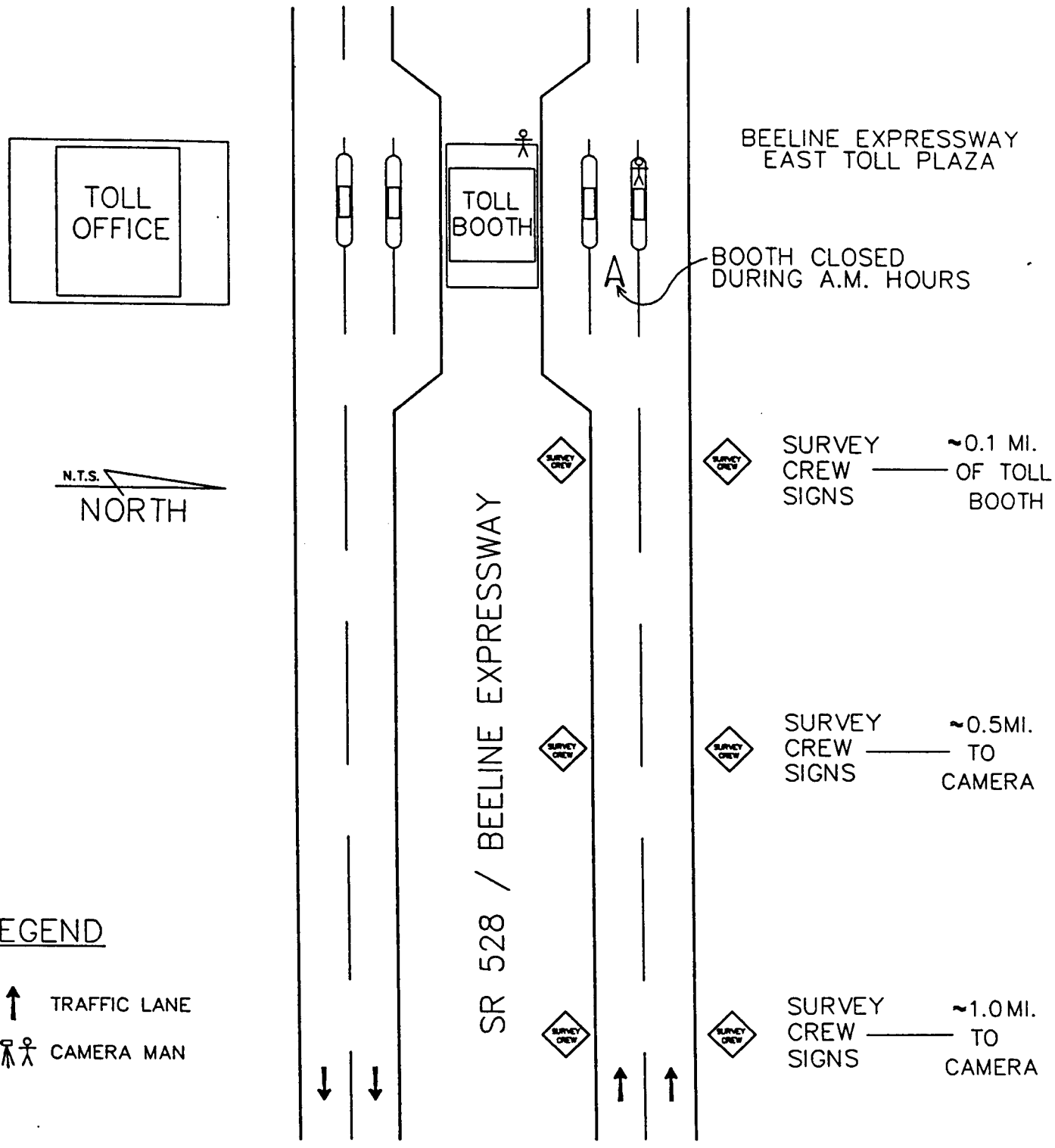
Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



REVISED 11/25/92

STATION No. 2
SR 50 1.5 MI. WEST OF THE ST. JOHNS RIVER IN ORANGE COUNTY

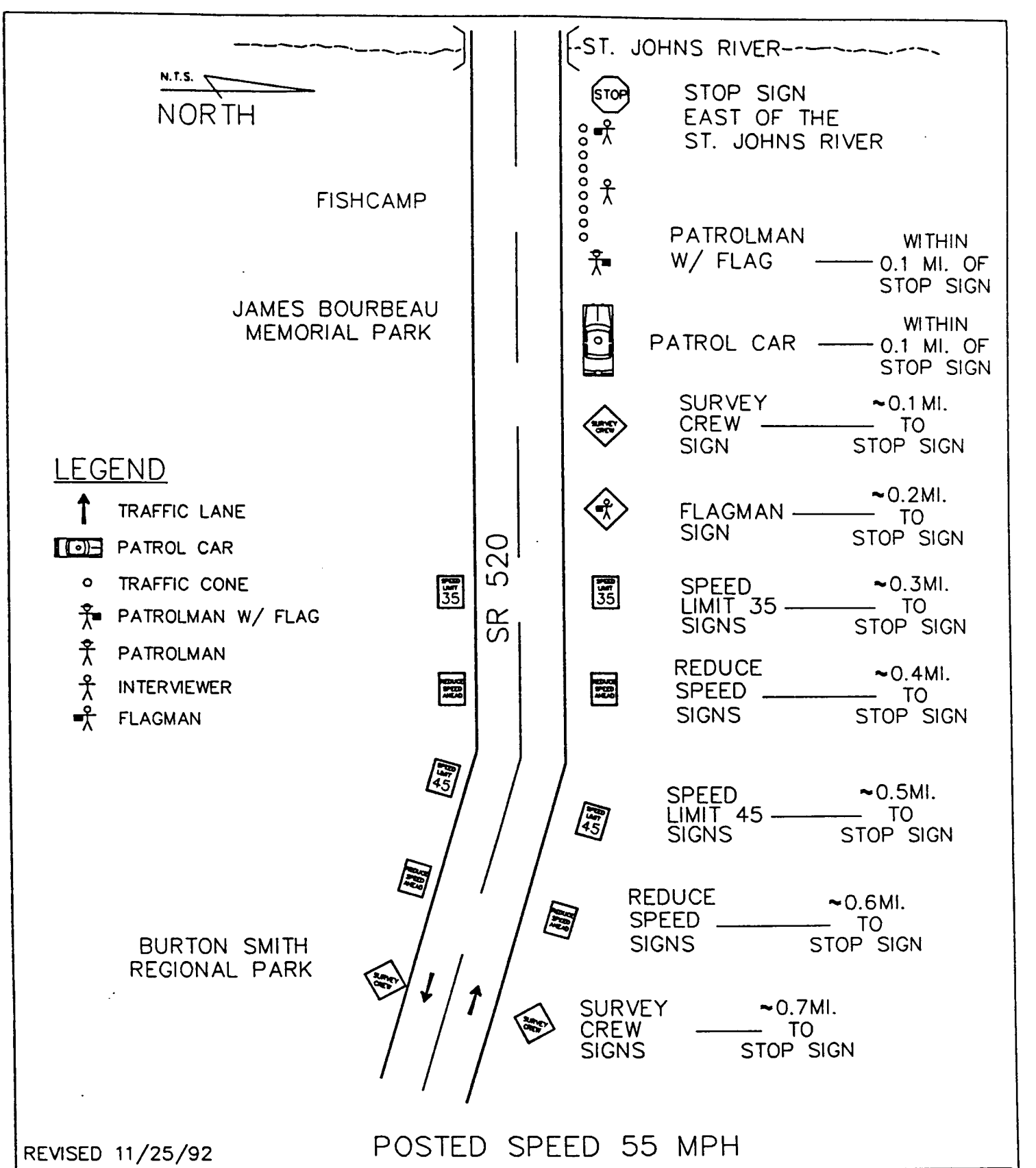
FTE
Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



REVISED 11/25/92

STATION No. 3
SR 528 / BEELINE EXPWY.
THE EAST TOLL PLAZA WEST OF ST. JOHNS RIVER IN ORANGE COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



REVISED 11/25/92

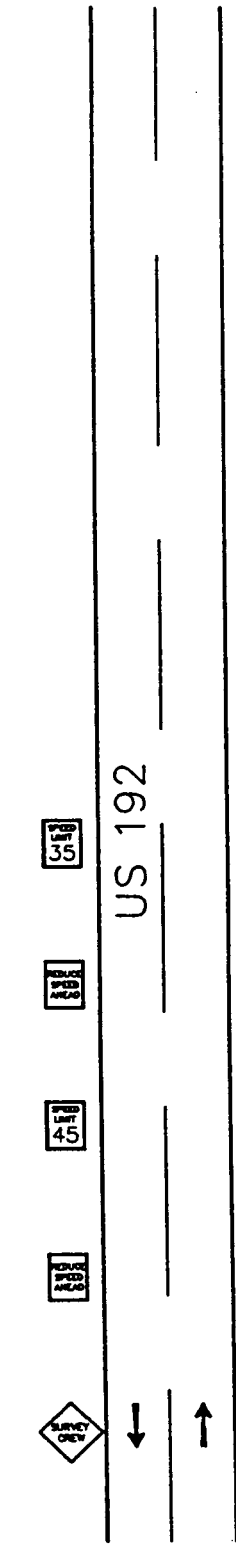
POSTED SPEED 55 MPH

STATION No. 4
SR 520
EAST OF ST. JOHNS RIVER
IN BREVARD COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

N.T.S.

NORTH



STOP SIGN
~0.1 MI. EAST
COUNTY LINE

PATROLMAN W/ FLAG — WITHIN 0.1 MI. OF STOP SIGN

PATROL CAR — WITHIN 0.1 MI. OF STOP SIGN

SURVEY CREW SIGN — ~0.1 MI. TO STOP SIGN

FLAGMAN SIGN — ~0.2MI. TO STOP SIGN

SPEED LIMIT 35 SIGNS — ~0.3MI. TO STOP SIGN

REDUCE SPEED SIGNS — ~0.4MI. TO STOP SIGN

SPEED LIMIT 45 SIGNS — ~0.5MI. TO STOP SIGN

REDUCE SPEED SIGNS — ~0.6MI. TO STOP SIGN

SURVEY CREW SIGNS — ~0.7MI. TO STOP SIGN

CLAYTON ROAD

LEGEND

- TRAFFIC LANE
- PATROL CAR
- TRAFFIC CONE
- PATROLMAN W/ FLAG
- PATROLMAN
- INTERVIEWER
- FLAGMAN

POSTED SPEED 55 MPH

REVISED 11/25/92

STATION No. 5
US 192 0.1 MI. EAST OF OSCEOLA / BREVARD COUNTY LINE

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

REVISED 11/25/92

POSTED SPEED 55 MPH

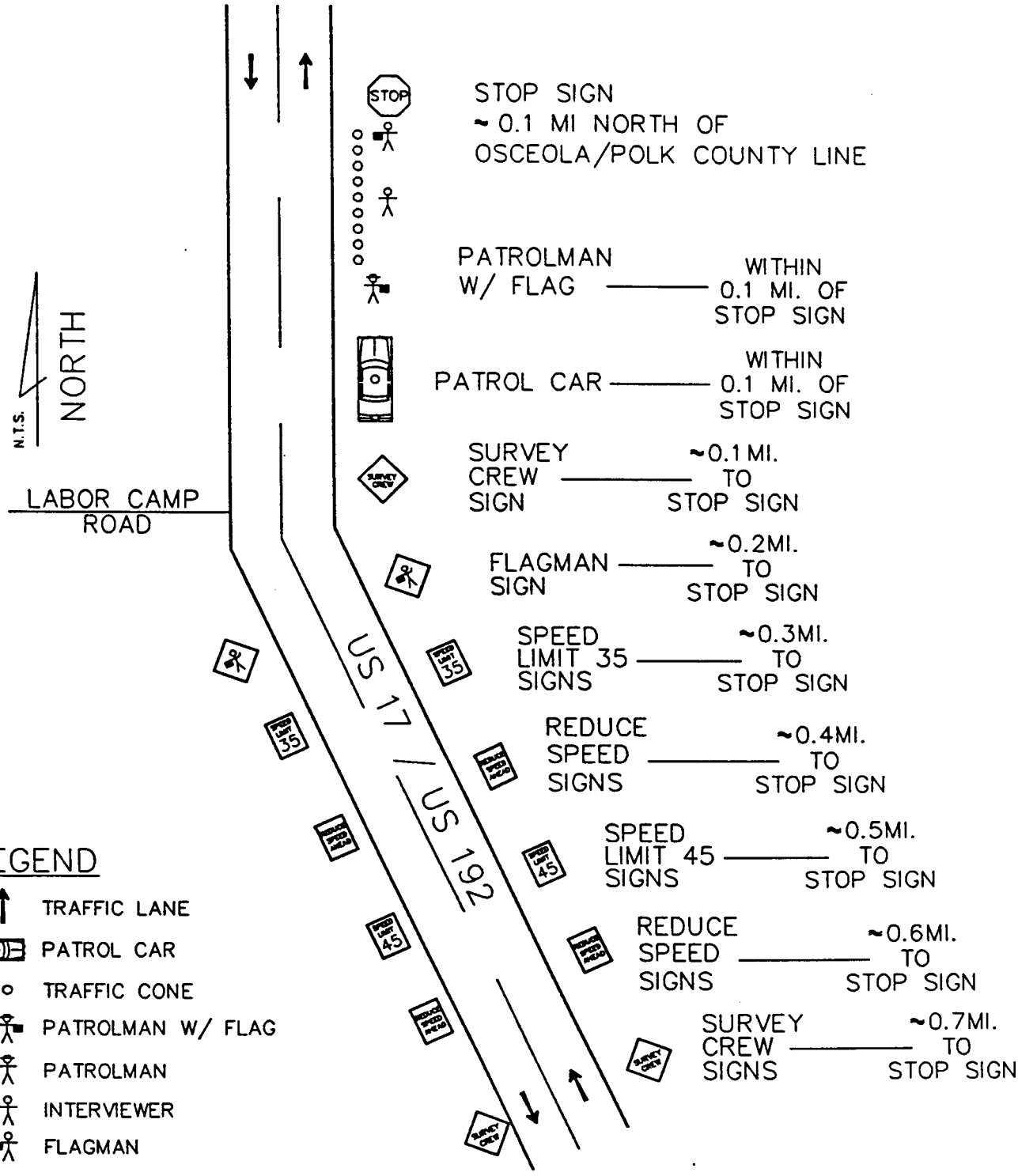
STATION No. 6
SR 15 / US 441
2.0 MI. SOUTH OF US 192
IN OSCEOLA COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

REVISED 11/25/92

STATION No. 7
SR 91 / FLORIDA TURNPIKE
0.3 MI. NORTH OF
MILE POST 237

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

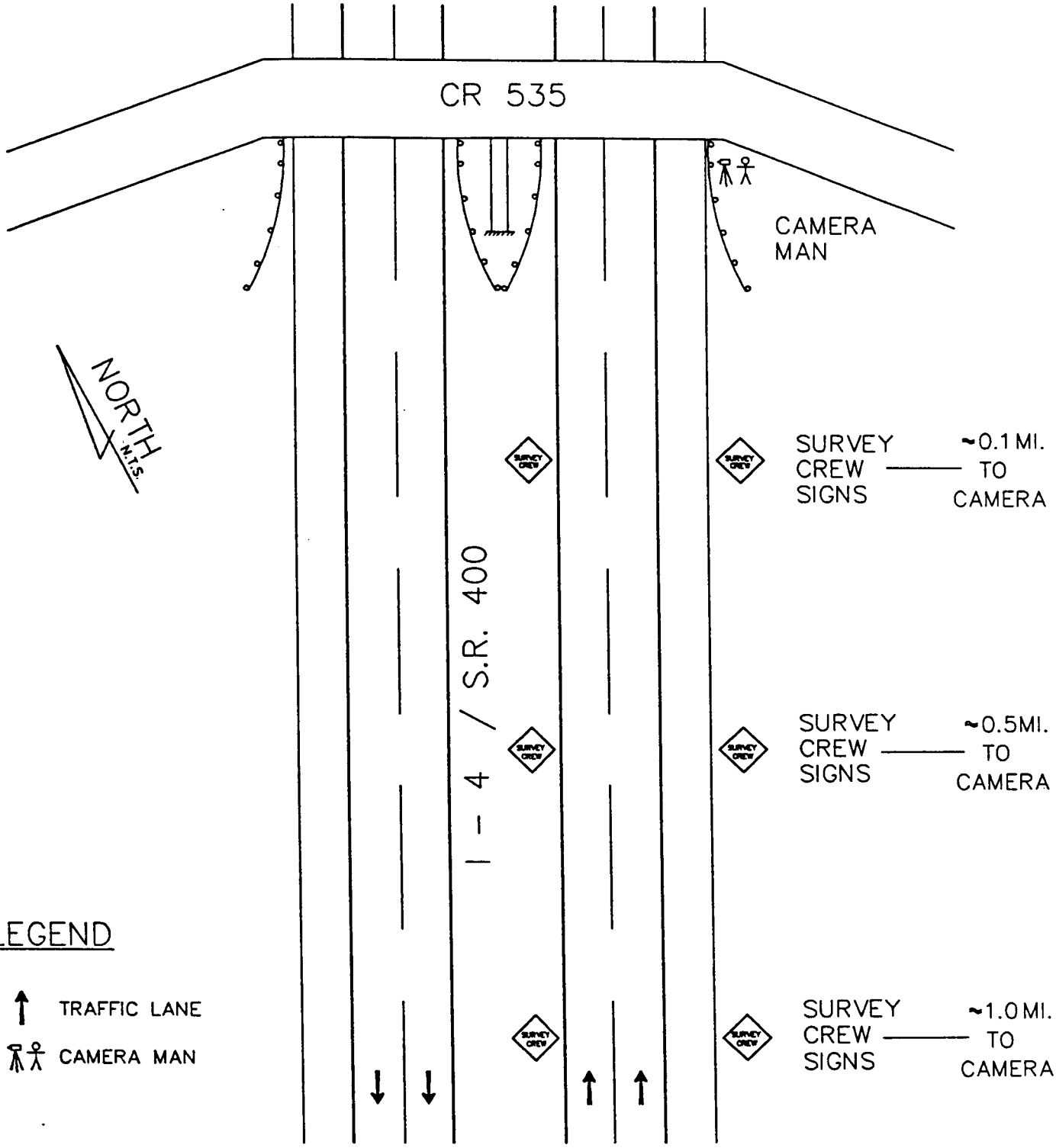


POSTED SPEED 55 MPH

REVISED 11/25/92

STATION No. 8
US 17 / US 192
0.1 MI. NORTH OF
OSCEOLA / POLK COUNTY LINE

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

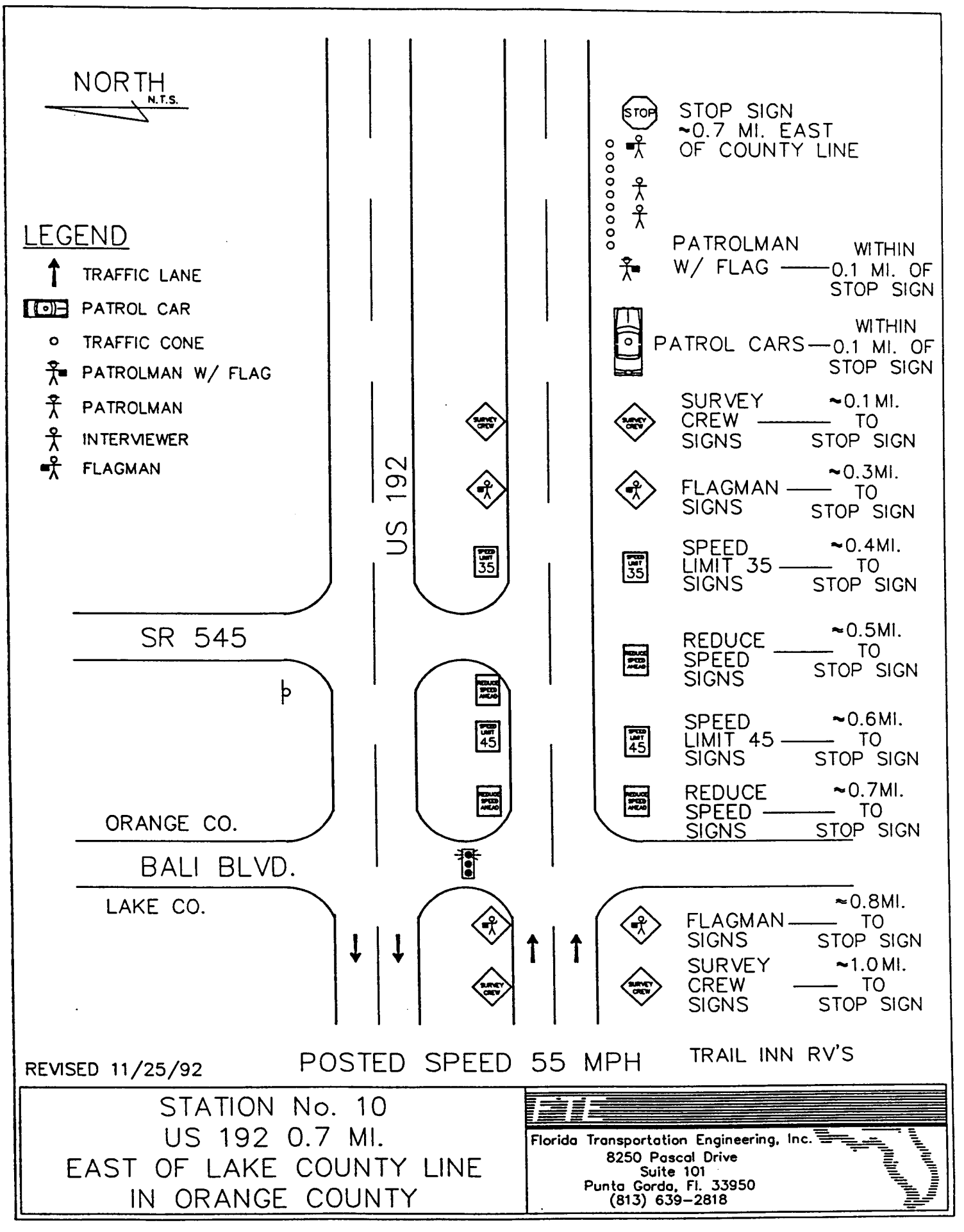


REVISED 11/25/92

POSTED SPEED 65 MPH

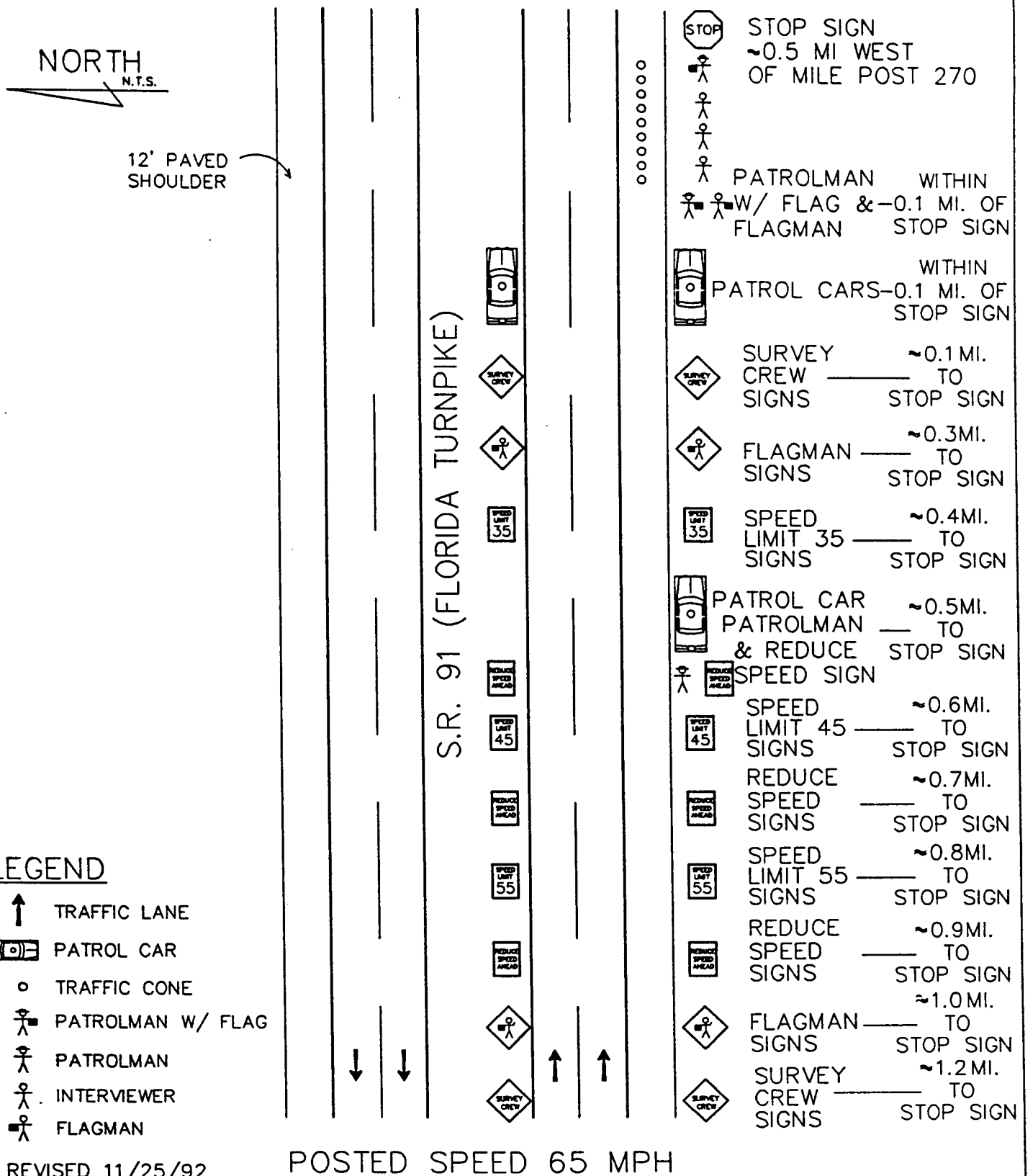
STATION No. 9
I-4 / S.R. 400
AT CR 545 OVERPASS ~3.5 MI. SW OF US 192 IN OSCEOLA COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



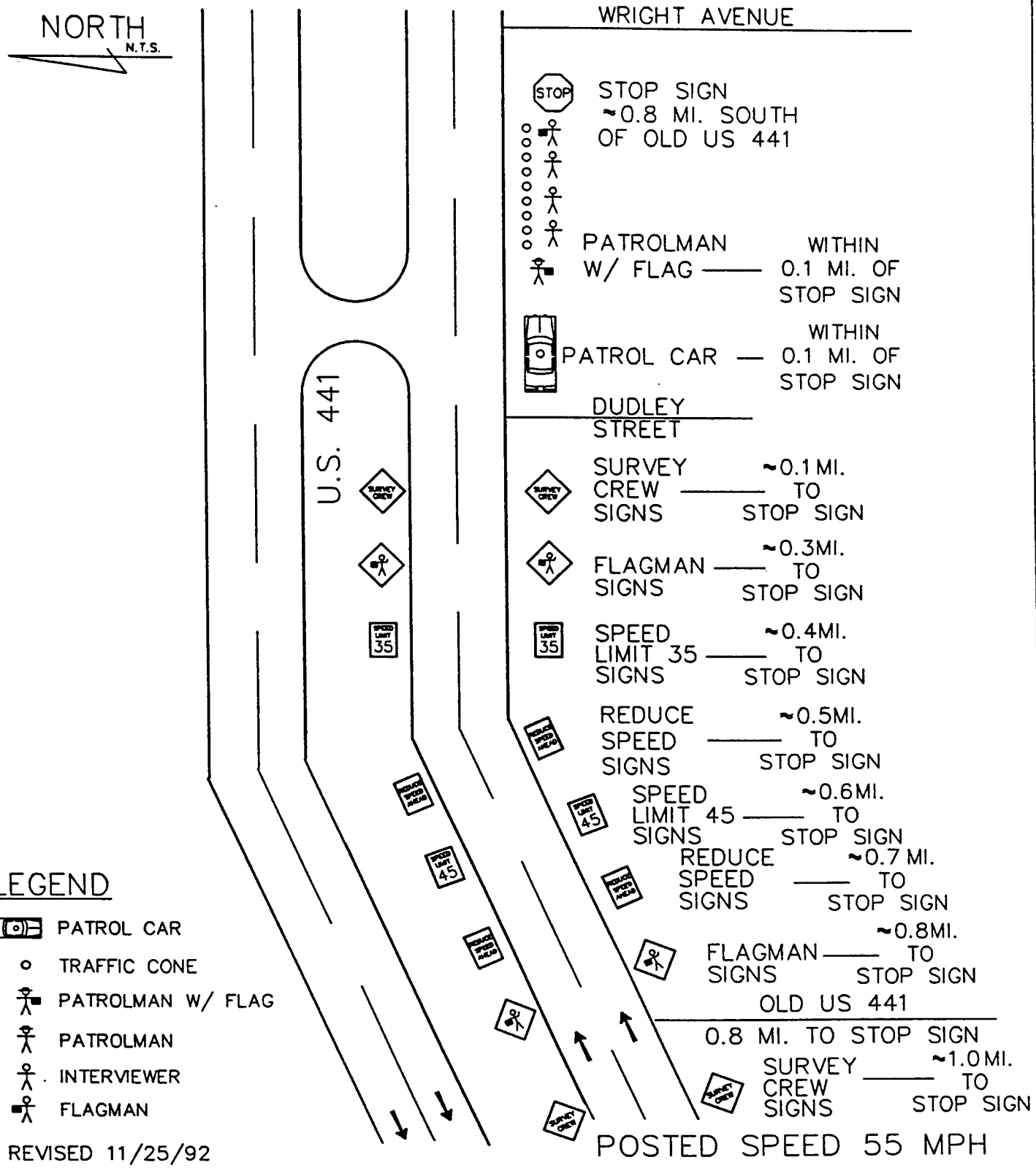
STATION No. 10
US 192 0.7 MI.
EAST OF LAKE COUNTY LINE
IN ORANGE COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



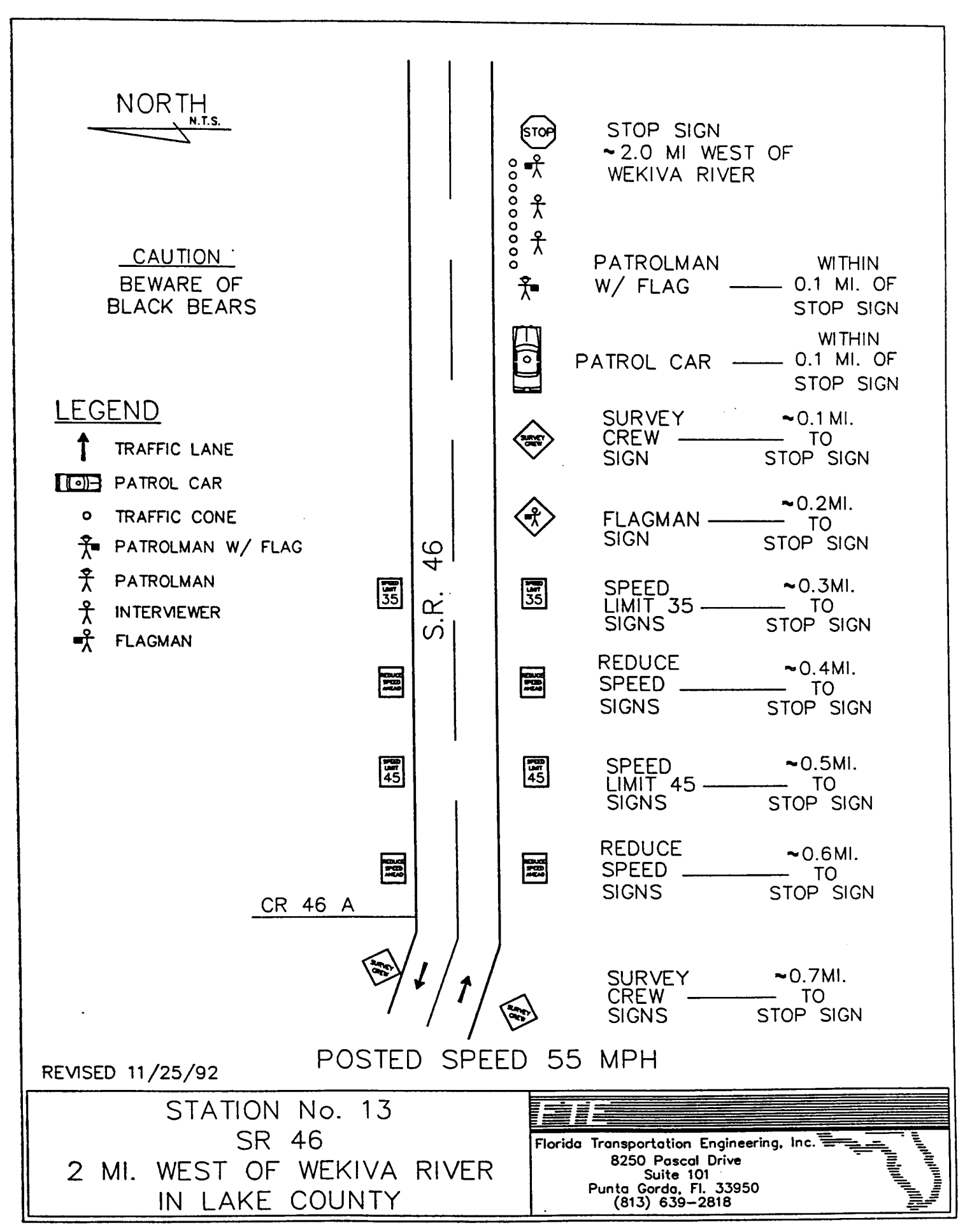
STATION No. 11
SR 91 / FLORIDA TURNPIKE
0.5 mi WEST OF MP 270
(SR 535 OVERPASS) IN ORANGE CO.

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



STATION No. 12
US 441
0.8 MI. SOUTH OFOLD US 441
IN ORANGE COUNTY

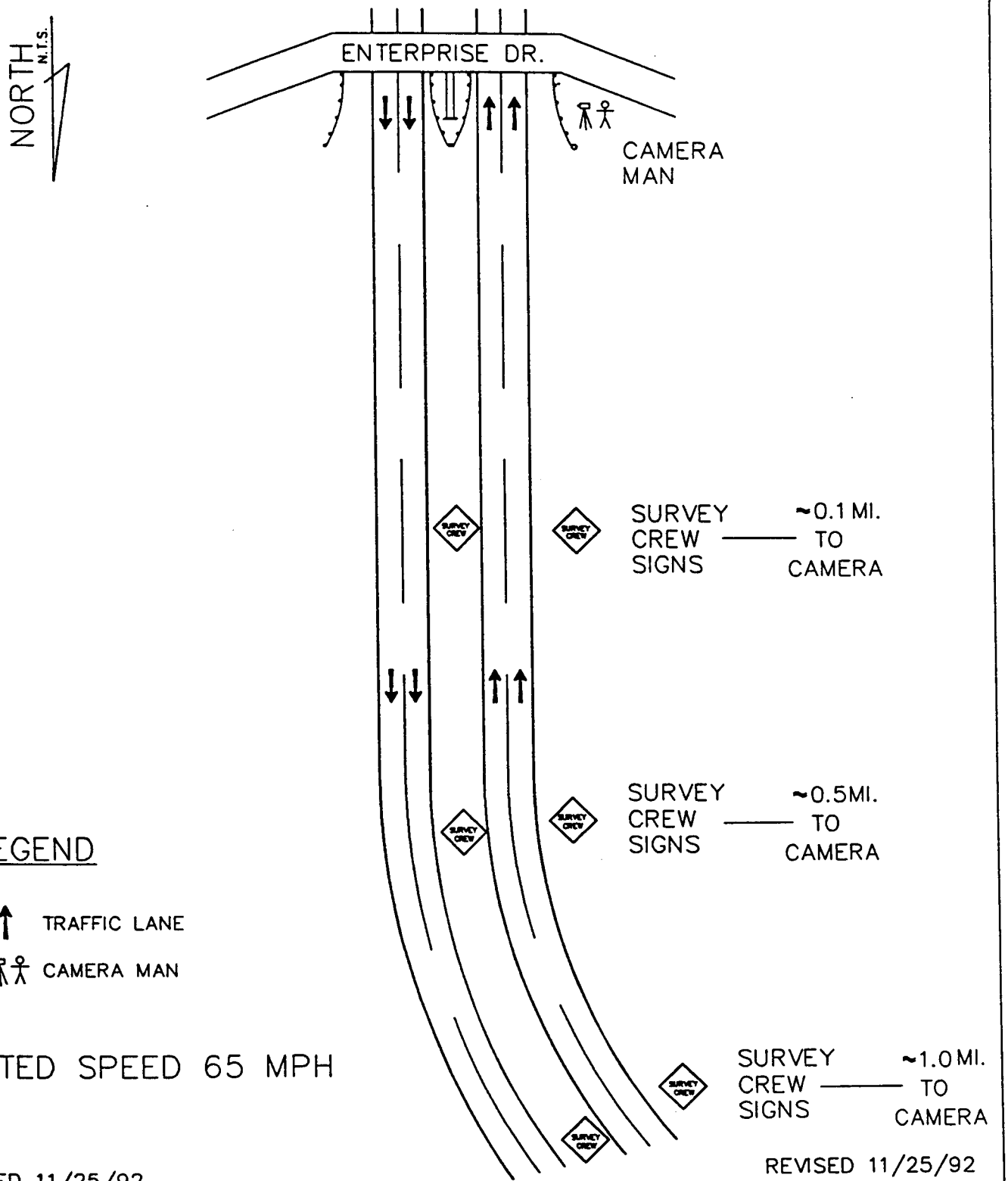
Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



REVISED 11/25/92

STATION No. 13
SR 46
2 MI. WEST OF WEKIVA RIVER
IN LAKE COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818



POSTED SPEED 65 MPH

REVISED 11/25/92

REVISED 11/25/92

STATION No. 14
SR 400 / I-4 1.0 MI. NORTH OF EXIT 53 (De BARRY EXIT) IN VOLOUSIA COUNTY

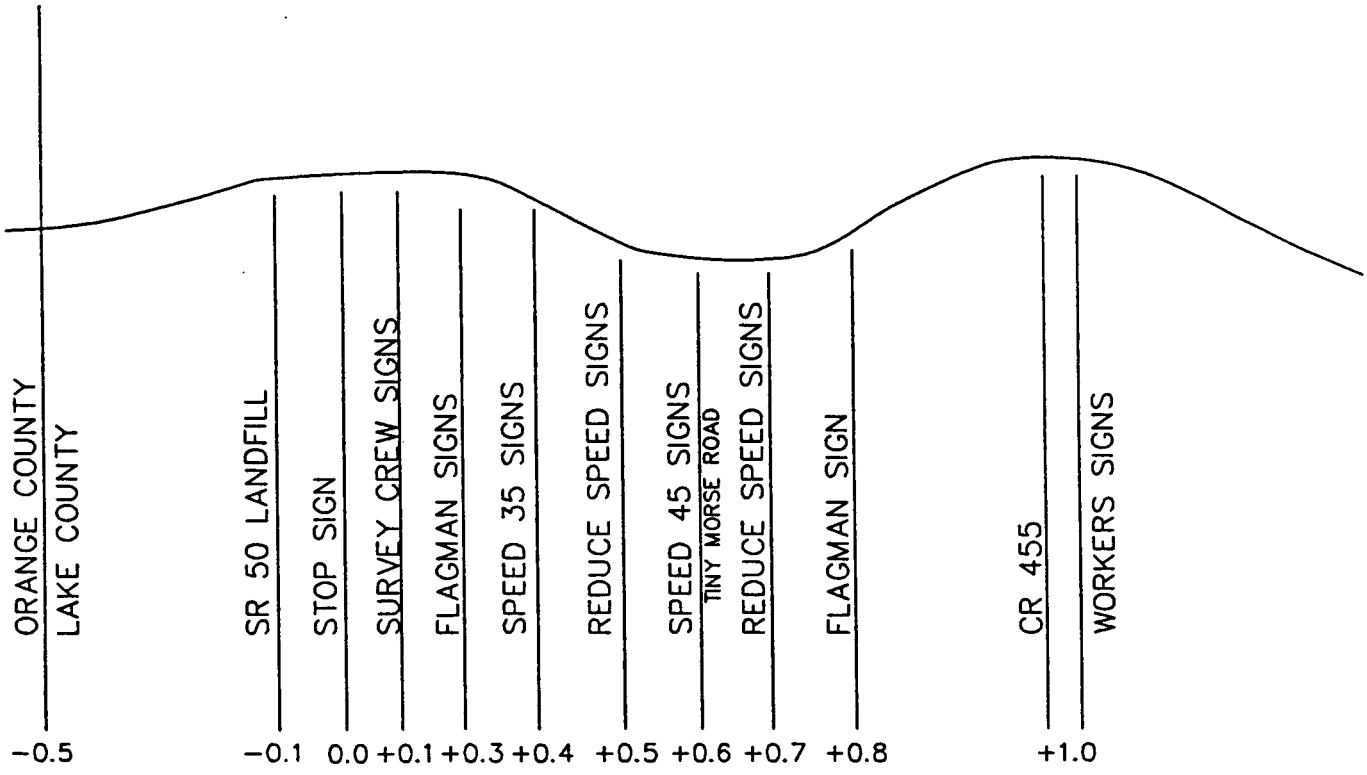
Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

REVISED 11/25/92

STATION No. 15
SR 50
0.5 MI. WEST OF ORANGE CNTY. LINE IN LAKE COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818

PROFILE



REVISED 11/25/92

STATION No. 15
SR 50
0.5 MI. WEST OF ORANGE CNTY.
LINE IN LAKE COUNTY

Florida Transportation Engineering, Inc.
8250 Pascal Drive
Suite 101
Punta Gorda, Fl. 33950
(813) 639-2818